

RESEARCH QUALITY ASSURANCE  
FOR THE FUTURE

RQ<sub>08</sub>

A Quality Review of Research  
at Lund University 2007/08

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Editors GS Boulton and B Söderström

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## Foreword

The initiative to perform this evaluation of all research at Lund University, Research Quality Evaluation for the Future – RQ08, was indirectly taken by the University Board by accepting the Lund University Strategic Plan 2007–2010. Here is stated that the first research evaluation by external panels shall be carried out during 2008. The aims of such an evaluation are many-folded but can be generalized as an instrument to strengthen the research quality of the university but also to identify processes which may foster a development towards more strong research environments.

In January 2007 the Vice-Chancellor, Prof Göran Bexell, asked me to organize a research evaluation. During the spring 2007 different formats of the evaluation were discussed. In May the Vice-Chancellor took the formal decision to appoint me as a project manager and a Project Steering Group (3 members + the project manager) was named. The work then intensified. The decision to actually start the evaluation was made in September when a project reference group was appointed. The format of the evaluation was here also decided and a project office was established. In October a web page was published including a time plan which, during the running project, had to be slightly adjusted. The University staff thus was informed about the coming evaluation and its format during the autumn 2007. During the whole process, both the Project Steering Group and the Reference Group have been very important for policy discussions as well as more detailed modelling of the evaluation procedure.

The adopted general format was based on a peer review procedure. Distinguished international scholars were invited to evaluate research performance and future plans based on self-evaluations of the departments as well as data collected from university common databases. Full lists of publications should be available for the evaluators from the Lund University Publications data base, a service that unfortunately was not fully functional during the process. The departments were allocated under 17 different groups and a panel of experts was appointed to each group of departments.

Allocation of the departments under different panels (see Annex 3) as well as the assignment of the evaluators, the panellists, (see Annex 2), was

made in a close and continued interaction with the faculty leaderships. Only panellists working outside Sweden were appointed and each panel consisted of 4–9 experts. In all 117 experts were engaged (incl. external advisors requested by some panels). The Panellists and Panel Chairs were appointed by the Vice-Chancellor. A Main Chair was also appointed.

The evaluation procedure included a site visit by the Panel Chairs and Vice Chairs (appointed by the panels) to Lund 9–13 June. Before that each panel met one to two days in April–May, meetings many of which were organized in Copenhagen. Some panels met in London, Paris or Helsinki. One major reason for adopting this procedure rather than site visits of all panellists, was to make the evaluation work of the invited experts less time consuming.

The departments prepared their final reports during January and February 2008 during which time the other data material was also finalized. All reports and all additional material were made available to all evaluators at a Project Portal and each evaluator was also supported with all material referring to their panel via e-mail in March or later.

During the panel meetings, the evaluators were given a standardized presentation by a representative from the RQ08 project office, including descriptions of the Swedish university system, national and local research resource allocation systems, types of university positions and other basic information. Then, the panels discussed the Terms of Reference (Annex 4) and agreed on their working procedure. They also discussed their general views on the background material available and the departments under review. Many panels decided they needed more material on which to base their evaluation work, material that was supported by the departments after requests from the project office. Possible non-attending members of the panels were normally connected via telephone. During all panel meetings, possible conflicts of interests were raised, discussed and handled. In some cases they were also discussed in the Project Steering Group.

Preliminary reports were prepared in time for the site visit of the panel chairs and vice-chairs and in these reports questions to handle during the site visit were also raised. During the site visit (June 9–13), meetings were organized with the university leadership (common session) and faculty leaderships (joint session with a few panels). Each panel met the departmental chairs as well as representatives for young and senior researchers.

In all, almost 200 individuals from Lund University were engaged during these 5 days. During a series of common sessions, organized and chaired by the Main Chair, common and more general issues were discussed. The first two parts of this report are a result of these sessions.

After the site visit, the panel reports were finalized and submitted. It is inevitable that the different panels have interpreted the terms of reference slightly differently, that the format of the reports differ and indeed, that there might be slightly different formats also within a report. After the general presentation at the panel meetings, the RQ08 representatives have had no influence whatsoever on the 17 panels' working procedure and report writing – the office has only served the panels with demanded material and information.

Before handing the reports to the printer, the Heads of Departments were invited to submit corrections of the reports with regard to the data and information originally submitted. The suggested corrections were then handed over to the Panel Chairs for possible adjustments. Normally, only significant corrections that had an effect on the evaluation outcome were considered. Few such corrections were made.

During the evaluation work many panels asked for bibliometric data, like citation analyses, to support the department reports. Unfortunately, we were not able to produce such data. However, in parallel to this peer review based evaluation, a full bibliometric analysis of Lund University will be carried out.

We now hand over the final result of the Lund University Research Quality Evaluation for the Future, RQ08, to the University for further actions.

Finally, I want to express my gratitude to the evaluators, to the Panel Chairs, Vice-Chairs and to the Main Chair. It has been a privilege working for you and your professionalism, integrity and patience has been truly impressive, particularly considering the extremely hard time schedule we have all been working under. The extra dimension of the evaluation that was added by the Main Chair's initiative and hard work, I think gives the final report a strongly added value.

Also, I would like to thank the departments and the faculties for efficiently supporting the panels with additional material during the spring,

an extra work task they had not been warned about in advance, all done under extreme time pressure. Also, all extra efforts during the site visit in June were very important and highly appreciated.

Lund August 15, 2008

Bengt Söderström  
RQ08 Project Manager

All background material to RQ08 is available in an Appendix to this main report.



## Preface

The review of research at the University of Lund was designed to assess the quality of the research effort and to suggest ways in which an already high standard of research could be even further improved. It was conducted by a team of experienced and distinguished academics and researchers. They were impressed by the pattern of excellence in the University's research, and have commented without fear or favour on opportunities and potential improvements.

The report is divided into three parts. *Part 1* sets out the background to the review: the review team's view of the role and significance of universities to society, the vital context for their judgements, the University's rationale for the review, the terms of reference for the review team, the process of the review and the team's approach to evaluation.

*Part 2* summarises the conclusions of the review by broad disciplinary area, suggests areas for future improvement in the structures and processes that facilitate research, suggests how future reviews might be improved, and addresses national issues that influence the excellence and impact of research in Lund and, it is suggested, throughout the Swedish universities.

*Part 3* gives the detailed reports of all 17 disciplinary panels involved in the review, the membership of panels, the panel structure and detailed terms of reference.

Geoffrey Boulton,  
Main Chair of the Review

## **PART 1 – BACKGROUND**

### **A. CONTEXT – THE ROLE OF THE UNIVERSITY**

1. Research-intensive universities are amongst the great entrepreneurial centres of the modern world. They are important national assets that generate a wide diversity of social benefits: as vital sources of new knowledge and innovative thinking, as major components of the national research base, as providers of skilled personnel and credible credentials, as contributors to innovation, as attractors of international talent and business investment into a region, as agents of social justice and mobility, and as contributors to social and cultural vitality. Their exploration of the boundaries of human understanding through research not only provides a direct source of innovation in society, but crucially, is the ideal setting in which the rising generation learn to question interpretations, to reduce the chaos of information to the order of an analytical argument, to seek out what is relevant to the resolution of a problem and to do so by rational argument supported by evidence. They learn not to be dismayed by complexity but to unravel it, to seek the true meaning of things, to distinguish between the true and the merely seemingly true, to verify for themselves what is stable in that very unstable compound that often passes for knowledge. These are the attributes that a modern society needs in its citizens, and are the source of the creativity that is an engine of change for both society and the economy.
2. Such an enterprise is not easy to manage. It is not like managing industrial production in response to market demand, and effective models cannot be directly imported from industry. Its great strengths are its unpredictable creativity and entrepreneurialism, which derive from the relative freedom and autonomy of its academics and the lack of inhibition of its students. The challenge for a University's leadership is to implement the changes that are needed from time to time if the University is to retain its vitality and relevance, whilst not inhibiting the freedom that makes it a creative force that will forge the ideas, the concepts and the people that the future will need. The challenge for government, which in Sweden, as in Europe, is the principal funder of universities, and for

society and university governing boards, is to articulate a compact that recognises the value of university autonomy and freedom and supports them, but is able to assess their value and benefit to society without oppressive accountability or restrictive mechanisms of control that undermine a university's potential for creativity and innovation.

## **B. LUND UNIVERSITY'S OBJECTIVES AND THE REMIT FOR THE REVIEW**

3. Lund University's top level objective set out in its Strategic Plan for 2007–2011 is to be a leading contributor to Swedish, European and global society as one of the foremost universities in Europe in both education and research, and with all its undertakings being ranked among the national leaders in their fields. Its strategies for achieving these objectives are based on:
  - quality assurance;
  - cross-disciplinary collaboration;
  - internationalization;
  - and leader, teacher and employee excellence.
  
4. Lund University's research is very strong in comparison to other Swedish institutions. For example, in the last two years it has won 8 and 6 out of 20 respectively of the prestigious, 10-year Linnaeus grants from the Swedish Research Council (Vetenskapsrådet). However, notwithstanding areas of the highest international excellence, its overall position in the international rankings that have been produced in recent years is lower than it would wish. Its strategy to enhance the international competitiveness of its research includes a regular process of review designed to test its performance against international standards, to set a benchmark against which future improvement can be judged and to advise on and stimulate the research strategies that will be required for progress. The University also intends to use the outcome of the current review as basis for selective funding to stimulate and reward excellence.
  
5. A distinguished international group of experts in the fields of study represented in Lund were therefore commissioned to undertake the first such review during 2008. It had the following terms of reference:

- to assess the quality of research across the whole university;
  - to identify research of the highest international standard and to suggest how it might be further strengthened;
  - to identify research areas and research environments that have the potential to develop towards the highest level of international research, and to determine what is necessary to ensure such development;
  - to identify research areas and research environments which are not internationally or nationally competitive and which lack developmental potential;
  - to identify processes and changes within the University which would promote achievement of the goals of the Strategic Plan.
6. It is anticipated that this will be the first of a series of regular reviews designed to monitor and stimulate a process of continuous improvement. Based on the experience of this review, section G suggests how future reviews might improve in analytic value whilst minimizing disruption to the work of the University.

### **C. THE STRUCTURE AND PROCESS OF THE REVIEW**

7. Lund University has about 70 departments or similar units grouped into nine faculties (eight faculty boards). Most of its work is concentrated in Lund, but with significant activities in Malmö. The University has about 3,800 academic and research staff, and about 26,600 full time equivalent students, of which 1,600 are postgraduates. For the purposes of the review, the departments and other units were grouped into 17 cognate units of assessment, with a specialist panel allocated to each unit as shown in Annex 2.
8. Review panels received assessment materials comprising details of staff and research student complement, income, publication record, a description of research activities, a SWOT analysis and future plans, together with terms of reference, the university strategic plan and a paper describing Swedish national policy for research. Some panels requested additional materials including lists of projects, research teams, full publication lists etc., and some interrogated web-based sources of publication.

9. All panels had a plenary one-day meeting to discuss their collective conclusions during the period April–May 2008, and most produced interim assessments prior to or during a group visit to Lund of Panel chairs and vice-chairs (see annex 2) during the week 9–13 June 2008. The early part of the week involved meetings with staff and researchers. Plenary meetings identified cross-cutting issues, including cross-discipline developments, and agreed the structure of a final report. There was iteration with staff at all levels to explore specific issues. The week ended with a feedback session for senior staff of the University. Reports were collated and revised during June–July 2008.

#### **D. APPROACH TO EVALUATION OF RESEARCH EXCELLENCE**

10. Lund University encompasses an extremely wide range of research activity that is subdivided into a large number of administrative units that vary greatly in size. Cognate groups have been categorized together in 17 units of assessment, each one of which has been assessed by a suitably skilled panel so as to produce an assessment of the spectrum of research quality across them. Although in some cases it has proved possible to reach a summative conclusion about the quality of research in the panel area as a whole, it is the assessment of the spectrum of research quality in the assessed unit that is the fundamental output of the review.
11. It is also important to stress that there is little basis for making direct comparisons between disciplines or discipline areas. The nature of the research process, the nature of the research community, and the nature of publication in areas such as Chemistry or History are so different that a ranking based on a direct comparison would be meaningless. The criteria that have been employed in assessment, as set out in Annex 3, are of the performance of each assessed area in relation to international and national standards of excellence in that area.

## **PART 2 – CONCLUSIONS OF THE REVIEW**

12. The terms of reference for the review in paragraph 5 (see also Annex 4) contain two broad components: firstly a review of the current status of research in the University of Lund, and secondly how the University's research might be strengthened and the goals of the strategic plan that relate to research achieved. Section E below summarises the first, and Annex 1 provides in-depth analysis at the level of individual Panels. In relation to the second, section F below suggests cross-cutting, University level priorities; Annex 1 makes suggestions for improvement at the level investigated by individual Panels; and section H comments on national processes that influence the quality of research.

### **E. SUMMARY OF THE RESEARCH EVALUATIONS**

13. The detailed panel reviews at the level of individual units of assessment are contained in Annex 1. The following summaries are presented as an overview of the assessment for those who do not wish to go into detail. To do this we have somewhat arbitrarily subdivided the assessment into five areas: Humanities and Arts, Social Sciences, Science, Medicine, and Engineering.

#### ***E1. HUMANITIES AND ARTS***

(Panels: 2 Religious Studies, 3 Arts, 4 Philosophy/Languages)

##### **Theology and Religious Studies**

14. Research quality ranges from excellent in some units to good/very good in others. Research, particularly in the areas of Biblical Studies, Church History and History of religion is based on a small number, particularly of full professors who have widespread international reputations and contribute to the main contemporary theological debates and issues. The standard is very good/excellent, but there is a lack of the infrastructural support and the PhD students that would translate this into an outstanding effort and create greater impact in current international debates.

15. There is considerable potential to create a focus area on the theme of current developments in Islam in the Nordic countries of Europe and their relations to Islam in the Middle East (combining major issues in religious studies with Arabic Language and Culture, especially in the northern regions of India/Pakistan, and special focus on Indic Religions, Jainism, Sikhism). Such a project would deal with the central issue of European migration in terms of religious and cultural identities. Lund is the only Swedish university with the research infrastructure for this major issue. It would benefit from a chair in Indic religions and links with the new established chair of inter-religious theology being established in Jerusalem. The University is encouraged to consider supporting a major bid for EU support, but effective development of this research area would also need to be supported by new study programmes, new positions for research and teaching, particularly in languages as base for PhD research, and cooperation with a university in the Middle East and/or North India. Such a focus area also would also make a major contribution to internationalization of the CTR.

### **History, Culture and Communication**

16. Under the heading 'Arts' a number of departments and disciplines are brought together that in various ways are concerned with questions related to history, culture and communication at the international as well as at the national level. A recent restructuring has brought area studies together with comparative literature and foreign language literatures as well as film studies as one part of the Language and Literature Centre (LLC). This merger is considered to be an advantage by the scholars involved and seems to have initiated a fruitful development. A similar restructuring will bring a number of fields together in a new larger unit including Ethnology and the former departments of Cultural Sciences and of Art and Musicology. Since there are several related research interests in these fields, there are good reasons to expect that the new organization will instigate new initiatives. The departments of History, Archaeology and Ancient History are already large units. In the coming structure there are a number of cross-departmental issues and competences, particularly in the large field of cultural history, cultural analysis and cultural theory. Area studies also integrate disciplines that belong to a variety of departments (history, contemporary sociology, intellectual history, arts, literature,

media and popular culture). What will be needed are thus not only a good leadership and a lively internal community of scholars at the department level, but also interdepartmental structures to support cross-disciplinary research.

17. Among the most successful sections are area studies and similar research in foreign cultures. They belong, together with History, Human Ecology and Semiotics, to the excellent parts of the History, Culture and Communication part of the Humanities. Research in many of the subsections is very good and some is good.
18. There are a number of potential areas of development that are not institutionalized as subjects, e.g. popular culture and media studies. In some areas a higher degree of internationalization (of subject matter as well as publication and collaboration) would be desirable. It should be a priority for the faculty, as it is in the future plans in a number of the research communities. A striking disparity exists between the language section and the literature/film/area studies section of LLC. There are about two times as many scholars in languages compared to literature/film/area studies. There are very few scholars in the fields of foreign literatures and cultures, and there are none in German and Italian, just to stay within the European context. In general it should be a strategic goal to expand the representation of expertise in foreign cultures.
19. Although the quality of the majority of the research in the fields under consideration here is very good or even excellent, the articulation of plans for the future is in some cases (although not all cases, as e.g. History demonstrates) disappointing. There is in several fields a need to strengthen planning – also with a view to applications for external funding. In many of the fields there has been a serious decrease in such funds.

### **Philosophy**

20. The Philosophical Institutes comprises three sections: Theoretical Philosophy, Practical Philosophy and Cognitive Science. Impressive research in cognitive science and practical philosophy has been led by world-leading scholars. The recent addition of a Professor of Theoretical Philosophy has created a very strong constellation that allows fruitful cross-fertilization of research, and has enabled



younger researchers to establish international profiles. Research in theoretical philosophy, now covers an impressively wide scope.

21. However, the outlook is unpromising, such that it is difficult to evaluate plans for the future. The low level of funding has permitted very few PhD posts to be filled. About half the members of staff appear to be employed on contracts that will terminate in the immediate future. A number of researchers hold permanent part-time teaching positions that are supplemented by external funding. The current research leaders will retire in a few years time. They were appointed prior to the recent reforms of professorial promotion. It is questionable whether the new procedures are consistent with appointment of the best talents. The Philosophical Institute no longer finds its natural research partners within its traditional home in the Faculty of Humanities. There is a serious need for a strategic view by the University about the future of the Institute.

### **Languages**

22. There are a few publications with high international impact, especially in general linguistics (including generative and cognitive linguistics), phonetics, Nordic languages, language acquisition and Romance languages. Many publications find their most interested readership in a predominantly Nordic or Swedish context and are published accordingly. This said, it must be kept in mind that the Nordic context is the primary one for Nordic languages. Quality is not only a matter of impact, but also of originality and innovative power. Some of publications were clearly at the leading edge of current research, excellent in terms of innovation as well as impact, but the larger picture is one of research that is of sound quality rather than high originality.
23. The establishment of the Centre for Languages and Literature (SOL) in 2006 was an important and creative step in consolidating resources and capabilities, re-profiling existing capacities and increasing collaboration between the many languages. Such major reorganizations require time to develop their full potential as well as creating new cross-disciplinary networks and research profiles. This process is now in its mid infancy and should be strongly supported.
24. The Humanities Laboratory is a valuable research resource that has facilitated innovative cross-disciplinary research. We expect that it

will become increasingly effective in this role. It is a major generator of external funding, and it should be a primary aim of the relevant faculties to determine the organizational status of the Humanities Laboratory and to secure its funding on a permanent basis. The absence of professors of English language is a serious drawback in the modern linguistic environment and should be corrected.

## **E2. SOCIAL SCIENCES**

(Panels: 1 Law, 5 Behavioural Sciences, 6 Social Sciences, 7 Economics & Management)

### **Introduction**

25. Units concerned with the social and behavioural sciences include psychology, sociology, gender studies, education, media and communication, law, and economics and management (LUSEM). They relate to areas of important societal need and key issues for public policy. They have strong links to the humanities, medicine, technology, and the arts. They have important implications for many areas of cross- and inter-disciplinary research.

### **Research quality**

26. In general, research is of high quality, with grades awarded ranging from insufficient to excellent. In the social sciences, the School of Social Work undertakes excellent research, with a mix of professional education and scholarship of international quality. In the behavioural sciences, the Department of Psychology is very good, approaching excellent, being in the forefront of research related to clinical, neuropsychology and cognitive psychology. The Department of Economic History is one the largest of its kind in the world, with excellent research of high international standard. An additional focus on economics could well propel research into the outstanding category. The Department of Economics also produces excellent research and has good potential to rise even higher in international rankings. Among the larger interdisciplinary units CIRCLE stands out as excellent with a large and influential scholarly productivity. To maintain excellence, it is important that the university encourages research quality by creating clear incentives for top-level publications. Such incentives could include greater time available for research for those of proven excellence.

### **Potential development areas**

27. All the above areas have considerable potential for further development. In areas that are not so highly rated, there is also good potential, particularly in gender studies, media and communication, and East and South-East Asian studies. In law, because of the reduced size of the individual units in the faculty, a potential for excellence lies in interdisciplinary projects and cooperation between different legal disciplines, as is the case generally within social sciences. The development of greater cross-disciplinary collaboration on important contemporary issues should be a priority for inter-faculty cooperation.

### **Areas where development is problematic**

28. There are several relatively weak areas, such as Education (not including Malmö Academy of Music which was very positively assessed separately by an external scientist: See Annex 1, Panel 5 Behavioural Sciences, Section 4) and Informatics, where considerable material and staffing support would be necessary if significant change is to be achieved. A decision whether to do this, for instance in Education, should depend on the extent to which the University believes the area is intrinsically important as an area for study.

### **Strategies and processes to promote achievement of goals**

29. We see a clear deficit in the way the University operationalises general strategic goals into manageable targets and processes supporting those targets at the faculty and department level. It would be useful to create clear ways of measuring research quality, and ways in which these measures, through a working incentive structure, would bring, for example, salary increases or more research time at the department or individual level.
30. At the moment, the excessive teaching load of in most areas clearly prevents the development of research. Areas identified as excellent or approaching excellence should be expected to produce strategic plans in order to maintain the quality of research.
31. The promotion system seems to hinder effective external and strategic recruitment of the best available scholars. A clear university-level policy encouraging faculties to recruit new professors by open competition should be implemented as a general rule, in preference to

the now dominant route of internal promotion. In many fields, the small number of doctoral students could undermine the potential for development in those fields. There is often no well-structured research training (Ph.D. programme) or recruitment strategy.

### **E3. SCIENCE**

(Panels: 12 Biogeoscience, 13 Physics, 14 Chemistry)

#### **Biogeosciences**

32. Research of the highest international standard is done by the Lund Vision Group, in animal migration and flight energetics, in soil microbial ecology, in Quaternary Science and on the global carbon cycle. The quality of scientific research overall is, not surprisingly, of high variance. There are identifiable research groups and some whole departments that are unarguably world leaders. There are others with low research productivity with papers published only in national (rather than international) low-impact journals. More usually, as far as departments are concerned, there is a full spectrum of research groupings ranging from outstanding to barely satisfactory.
33. There is no quick fix for improving the situation bearing in mind the fact the full undergraduate courses must be taught and therefore wide-ranging teaching expertise must be retained. In addition, strengthening research groups generally requires new appointments, which, within the budgetary landscape, must be very limited in number. There is one research area, however, which deserves immediate attention and that relates to the two museums. At present, research activity at both is unsatisfactory, and the two professors (studying animals and plants) are near retirement age. A political decision has been made to retain the internationally important collections, with their many type specimens, in Lund. The professors will need to be replaced shortly. We recommend making proleptic appointments immediately, with the appointment panel consisting largely of internationally respected museum research scientists.
34. Scientists frequently move Universities in mid-career, from one tenured position to another. That is refreshing for all concerned including the scientists' research output and the University department that hires them. This seems less easily achieved in

Lund, partly for the reasons outlined in section F2. Its effects are compounded by the fact that a high proportion of academic staff have only been out of Lund or Sweden for a year or two for post-doctoral experience.

### **Physics**

35. Physics as a whole is of the highest international standard with many outstanding groups. It is one of the crown jewels of Lund University, with excellent prospects of opening new scientific horizons, as they have done in the past. The areas of outstanding achievement include nano-science (the nanometre consortium), nano-biotechnology, computational biology, astronomy, synchrotron radiation and accelerator physics (MAX-lab), atomic physics (LLC) including ultra fast science, combustion physics and mathematical physics. It is a powerful record of achievement. Notwithstanding complicated organisational structures, the two faculties between which physics is spread are able to work closely together, particularly reflected in collaborations between basic and more applied science.
36. The faculty has many outstanding scientists, but gives young talent both space and opportunity to develop their own careers, in spite of the lack of a transparent career structure and the national funding. The groups and department have a collegial atmosphere towards their younger faculty that supports their attempts to attract funding. There are many PhD students and staff that have graduated from Lund University, but senior members of staff are aware of the danger of inbreeding and are taking appropriate measures to ensure the focus on quality.
37. Major opportunities exist in the near future with new large-scale facilities like MAX IV and ESS Advanced Materials Centre, Life Science and accelerator science. The merger of Astronomy and Theoretical Physics should create more critical mass in computational physics and will strengthen the educational base of the department. However, it is not clear to the panel that a complete merger for all departments would be beneficial and give more coherent science. In some areas of physics there is definite need to bring in female faculty and the panel would urge the department to work out strategic plans and incentives.

### **Mathematics**

38. Mathematics continues to maintain international standards and presence despite lack of funding opportunities for curiosity driven research. Collectively, staff members are editors of ten internationally respected journals. All research oriented faculty members publish in and serve as referees for a number of respected international journals. They have also been awarded prestigious national and international awards. The needs of mathematicians are modest and small amounts of funding will go a long way in attracting/retaining young faculty with high international reputations. Some areas already have extensive collaborations both within Lund University, with local industry and with other international groups. Others in mathematics could benefit from initiatives that foster interdisciplinary work.

### **Chemistry**

39. The panel is greatly impressed by the many excellent and outstanding groups operating within the umbrella of chemical sciences. (This also applies to the Department of Immunotechnology, which was assessed separately by an external scientist: see Annex 1, Panel 5 Chemistry, Section 5). There are indisputably star individuals, and the central facilities are second to none – arguably among the best in the world. Excellent and outstanding research areas are numerous. Those areas of activities adjacent to biology are particularly good. So far as the physico-chemical sciences are concerned, there is room for new directions of research devoted to preparation and synthesis of new materials across the entire domain of chemistry. The new molecules and materials will benefit the university in two ways:
- i) Offering new directions of activities in physico-chemical sciences;
  - ii) Making the department more attractive for Swedish and international industry.
40. To maintain a high standard and to enhance it further, certain courses of action must now be implemented. Among these, we identify the following:
- i) Recruitment of excellent faculty (both external and internal) with the necessary financial support to do international quality research;
  - ii) Adopting initiatives for improving and attracting undergraduate students from high schools;

- iii) Commitment from the faculty and institutions to young scientists embarking on scientific careers;
- iv) Clear, long-term strategy from Lund University as to what disciplines should be taught and also what areas of research should be represented at the university. This strategy should be based on what successful research is done at the university and on societal needs.
- v) Seeking ways to nullify the oppressive financial burden that permeates the departments.

#### **E4. MEDICINE**

(Panels: 8 Medicine | Clinical, 9 Medicine | Experimental, 10 Medicine | Laboratory, 11 Health Sciences).

41. The research and teaching activities of the Faculty of Medicine are divided between two campuses: one in Lund, the other in Malmö. The work and methodology of the faculty covers a very broad spectrum, from highly innovative biological laboratory studies through to qualitative investigations of the effects of severe mental illness on peoples' everyday lives, all very relevant to the health of today's communities. The areas of research also cover the whole life span, from perinatal care to supportive environments for the very old. Despite the relative geographic vicinity of the two campuses, the division does cause problems both at the level of infrastructure and in friction related to productive collaboration, given that the main emphasis of the research strategy of the Faculty is on translational research. Therefore, measures should be taken to develop and improve the interaction with the hospitals in Malmö and Lund.

#### **Research quality**

42. The scientific quality and activity of the research in the Faculty is on average good to very good. There is substantial variation in outputs between different research groups and units, with individual grading ranging from outstanding to insufficient. The areas of the highest international standard are:
- **The Stem Cell Centre Lund**, which is at the international cutting edge in its field but faces a challenge, with the departure of its leader. There is a need to recruit a prominent leader who can attract external funding to continue to build one of the very

outstanding 6–7 year old programmes at Lund University. The results from basic stem cell research are likely to affect clinical medicine in the near future.

- **Neurophysiology**, where the Neurofortis and Bacadilico Consortium has gained international visibility and is a leading unit in its field. Neurophysiology appears to have secured its vitality after the retirement of the current PI.
- **Angiology, Cardiology and Medicine**, Malmö which has an advanced biobanking system, undertakes research that is “Excellent-Outstanding”. In several areas (in particular: Cancer Epidemiology – especially nutrition and cancer; genetic epidemiology; and inflammation and immunity in atherosclerosis) members of this faculty have international prominence.
- **Endocrinology**, Malmö has been very successful. Having certain key senior investigators of high international reputation, they have successfully generated a number of smaller sub-teams, headed by younger PIs, who cover different sub-areas within a well-integrated network. The quality and quantity of scientific production has been increasing continuously and is now at the absolutely highest international level. (There is also close national collaboration with the major epidemiological projects in the Malmö region.) Clinical mechanistic physiological investigations in humans could perhaps be expanded.
- **Microbiology, Immunology and Glycobiology** have generated several pioneering contributions to understanding microbial pathogenesis and mucosal inflammation.

### **Areas with potential to develop towards the highest level**

43. **Molecular Medicine and Gene Therapy** needs a better transgenic animal facility. More emphasis should be put on translational work. **Health and care of women and children** is a productive unit on an international level with a strong infrastructure. It undertakes effective translational research in a cross-disciplinary setting. **Cell and Matrix Biology, Vascular and Airway Research** has the potential to reach the international frontline in research. A closer interaction between individual groups would facilitate positive developments. Research on **Drug Dependence** is currently an internationally recognized unit. The potential to develop further is dependent on success in forthcoming recruitments exercises. It is important that



it competes for the best talents. Another area with great potential is **Ageing and the Elderly**, which could move towards the higher level of international research, if the areas of Gerontology, Ageing and Supporting Environments (including CASE), the Elderly Chronically Ill and Palliative Care, are brought together, and include the support that Occupational Therapy, Physiotherapy, and Geriatric Medicine brings to these research projects.

**Areas and research environments that are not internationally or nationally competitive and which lack evident development potential**

44. • **Pathology and Forensic Medicine in Lund, Imaging Units at Dept of Clinical Sciences, Lund and Malmö Diagnostic Radiology** can be only rated as insufficient and good only in the area of **Neuroradiology**. Research in Diagnostic Radiology could be improved and enhanced by stronger input from Medical Radiation Physics or Biomedical Engineering. In the same way, Clinical Physiology could profit greatly from the know-how and infrastructure of Medical Radiation Physics.
- **Dept of Medicine, Lund (Part of)**. Research activities focus on diabetes, type I and II, with four groups active in the field, with extensive list of publications and a high number of citations. The key threat to this Department is the age of the principal investigators (three out of four professors are in the range 63–66 years old) and the need to take strategic steps for the future. A key issue will be replacement of these professors.
- **Oncology**. Unlike the research in laboratory work in molecular medicine, clinical activity could develop and exploit translational processes to create translational research of the highest standard. Achieving this will critically dependent on appropriate recruitment into clinical oncology.
- **Pediatrics**. The research staff of the Department is of limited size given the importance of the discipline. There are however a large number of PhD students and postdoctoral researchers. External funding is reasonable, but not high. Despite this, the list of publications by key investigators is impressive, and may provide a basis for further development.
- **Forensic Medicine** is seen to lack potential for future development in its present situation.

**Processes which may promote development towards the goals of the Strategic Plan**

45. These include:
- More professional fund raising systems.
  - Focused recruitments of international scientists, which will establish centres of excellence.
  - Creation of better environments for translational research.
  - Bringing together the several research areas into ageing and elderly care.
  - A clearer and more transparent structure for post-doctoral research.
  - Supporting the development of female researchers.

**E5. ENGINEERING**

(Panels 15 Product Development, 16 Systems Science, 17 Building)

**Introduction**

46. The College of Engineering, as would be expected in a world class University, covers a broad range of areas that are divided in several departments with a wide spectrum of disciplines.

**Research Quality**

47. On a global basis the quality of research at LTH (College of Engineering) as a whole falls in the good to very good range. Within the college, organizations and reorganizations have led to a few departments that have the needed strength and size, while there are several that are still operating as fragmented clusters, and a few that have been broken down to less than critical mass and which are therefore are not efficient or fully productive. For such a large engineering college, we feel that the Material Research area does not have the expected international visibility, in part because of fragmentation, and that the Computer Science area is quite fragmented and does not have the needed critical mass.

**Areas of Excellence**

48. Traditionally, areas such as Control Science, Energy Science, Information Theory, Aerosol Sciences have been operating at the highest international standards. Some such as Control Science will clearly continue in spite of recent retirements, but there are concerns

that others may not be in the position to do so, depending on key retirements. Others, specifically the Energy Science Department, will need to expand further into cutting edge areas such as bio-fuels/biomass, hydrogen storage, and fuel cells, in order to maintain their current international prominence.

49. The involvement of engineering in public policies, social issues and standards (IIIEE group) seems to be unique to LTH in that engineering is the driving partner rather than the supporting group.
50. Focused and homogeneous groups, with critical mass, were found to be in a position of secure sustainable funding for their activities and therefore have the ability to move into innovative and high risk areas. Unfortunately, this desirable situation is limited to only a few groups in the college.

### **Potential Development Areas**

51. In spite of limited faculty the **Computer Graphics** group has achieved international prominence and could excel with further planned expansion of the group with a defined focus. **Water Resources Engineering** has created an impressive international network and seems to be on its way to becoming an internationally recognized unit. The **EIT Department** has had recent reorganization. As a result interesting and potentially outstanding resources were gathered. But the overall vision is still lacking that could provide the additional synergy to put this department at the highest international level.
52. The numerous organizations that the **Department of Mechanical Engineering** has undergone have left it without being of critical mass and have burdened the researchers with unusual teaching loads, considerably minimizing its effectiveness and potential. The fragmentation of the area of Building Science into several departments is hindering it from realizing its potential.

### **Areas in need of Development**

53. There is a group that we believe is not competitive in its current constitution: Real Estate Science (Department of Technology and Society). The Networking and Security Group (EIT) is a result of a recent re-organization and needs more time to find its new position.

**Strategies and Processes  
to Promote Achievement of Goals**

54. Based on factors that are specific to LTH only, the working of the Automatic Control Group/Department could be used as a standard to improve the research and graduate study programs in most of the other departments.<sup>1</sup>
55. In spite of social trends, we feel that the low female to male student ratio in engineering is positively addressed and we recommend increasing these efforts considerably. LTH is not doing a good job in attracting international PhD students because of inadequate PR and advertising.
56. We feel that the current funding structure within the University and the country is hindering not only graduate research but also long range innovative strategic planning.
57. Teaching requirements seem to be totally arbitrary and vary from group to group and department to department. Although it is evident that to a major extent these are controlled by budget constraints, some level of equity would help the staff feel invested and could promote their research output and external funding.

**F. CROSS-CUTTING RECOMMENDATIONS FOR  
IMPROVING THE VITALITY AND IMPACT OF RESEARCH**

58. A number of issues that influence the vitality of the research environment recurred in the deliberations of many or all panels, and which we suggest should be adopted as priorities for action by the University's leadership. We are aware that some of these are relatively intractable because they reflect long-standing traditions and

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1. On organization, it is noted that the Automatic Control Department is much smaller than the other departments and is of outstanding quality. There are historic reasons for this, regarding its initial establishment, its continuing international reputation, and its academic goals of both theoretical advances and applications across a wide range of domains. It would be inappropriate to draw any general organizational conclusions except to say that the structure needs to be sufficiently flexible to allow such anomalies rather than conclude either that this model be more widely adopted or that this department should become a group within a larger department.

procedures that are characteristic of the Swedish university system, and in some cases may require action at national level. We address these latter issues in section H, which we hope will be of value to national stakeholders.

## ***F1. THE MAKE-UP OF THE ACADEMIC COMMUNITY***

59. The foremost international universities increasingly owe their strengths to their capacity to act as magnets for international talents. These bring a diversity of inspiration to the university and to the society of which it is part. They stimulate international collaboration and the mobility of people and ideas that continually refresh the university. The pool of talent from which Lund University draws tends to be limited to Sweden and indeed is dominated by its own graduates. If Lund wishes to rank amongst the best in the world, this must change. It should adapt its processes so that it is increasingly able to draw on the international pool of talent.
60. The processes that require attention if this is to happen are associated with the point of entry to the university, the structure of careers and salaries, and a number of other issues that influence the attractiveness of Lund for researchers. They are addressed in sections F2 below. We regard them as fundamental issues that influence the research potential of the university, as they have a great influence on the University's capacity to attract and develop staff of the highest calibre, and it is the quality of the University's staff that is the single most important determinant of its research strength.

## ***F2. THE STRUCTURE OF CAREERS AND RESEARCH TRAINING***

### **a) The point of entry to the University**

61. Current processes by which tenured staff are appointed encourages PhD graduates to take up a variety of fixed term posts within the University until the application of Swedish employment law requires that they are given permanent posts or until a tenured position can be found for them. The University should move to a position where there is a clear entry point into tenured academic posts and where such posts are advertised nationally and internationally with

a view to appointing the best possible candidates. (Box 1 shows the pattern of academic/research posts in Swedish universities).

62. Such a move would of course involve a number of linguistic issues. Although it might draw in staff from other Scandinavian countries, its greatest impact would be if it were to decide to draw on talent from the wider world, in which English is the *lingua franca*. The University might wish to apply a language requirement, or it might accept that a growing proportion of its staff may become predominantly anglophone.
63. We are also aware however that such a change would have a major effect on the current ethos of the university, the career planning of young researchers and the attractiveness of PhD studies. Some of these issues are addressed in following sections. Change such as we suggest would need to be accompanied by much greater clarity about career pathways for young researchers and academics.

#### **b) The timing of the PhD**

64. Across much of the University, the average age for PhD graduation is between 30 and 40, although this varies considerably for different subject areas. This compares poorly with many other countries in Europe and beyond where PhD graduation commonly occurs between the ages of 27 and 30, or even earlier. This has serious implications. Firstly there is a tendency for PhD studies to be largely undertaken by those with the desire to become full-time academics, rather than also being a route for a significant cohort who seek employment in business and non-academic fields. Secondly, it has serious implications for the recommendation in paragraph 55.
65. It is increasingly important in a modern knowledge economy that interactions between the knowledge base in the universities and the demand for innovation in business and society are strengthened. PhD graduates are one of the most important links between the university research base and knowledge intensive companies. They are aware of leading edge concepts in their field, they bring knowledge of the laboratories that they have recently left, and are ideal links between their company's market interests and the capabilities of the university research base. They are often crucial agents in the innovation system. In the US for example, 80% of PhD graduates

**BOX 1.****Academic/Research Positions in Swedish Universities***Mainline academic posts*

- Professor (permanent) – appointed through recruitment or promotion (promotion is a right)
- Lecturer [Lector] (permanent)
  - new recruitment or promotion (promotion is a right)
- Research Fellow [Forskarassistent]
  - strictly 4-year position, mainly research
- Assistant Lecturer [Biträdande lector] – strictly 4-year-position, after evaluation, may become permanent
- Teacher [Adjunct] – permanent (promotion is a right)

*Other teaching posts*

- Guest Teacher/Guest Professor
- Adjunct Professor

*Other Research Positions*

- PhD student – a four year position – external or faculty funding
- Post-doctoral researchers – only supported by external funds
  - stipends or short-term contracts
- Researcher [Forskare] – only supported by external funds
  - must be permanent after two years
- Research engineer [Forskningsingenjör]
  - normally a permanent position

work in industry, and are powerful vectors for interactions that power the US innovation process. If PhD graduates are to play a role similar to those in the USA, and if Lund is therefore to attract PhD students that see their future outside the University, the age of PhD graduation must be brought down.

66. The average age of PhD graduation in Lund tends to coincide with the age of child-bearing, which is typically in the mid to late 30s amongst professional classes, and is a time when new parents are loath to be highly mobile. It seems to us therefore that the current choice to undertake PhD studies is only rational if the objective is

ultimately to enter the academic profession and there is a strong probability that PhD completion will sooner or later lead on to a tenured academic post. This system of late PhD completion not only militates against the PhD being a route into professional employment outside the university, but it also creates a cohort of expectant PhD graduates who take up a succession of short-term contracts in Lund whilst waiting for a permanent post to turn up. At the same time, the links with their supervisors or research group leaders and the responsibility their departments naturally feel towards them tend to ensure that entry into tenured posts is predominantly from this group. The system also deters young post-doctoral researchers from taking the opportunity for international experience at a time in their careers when they could most benefit from it, although many take such opportunities during their PhD studies.

67. Although we recognise the difficulty of compressing the timescale for study leading to doctoral graduation, we believe that there are very strong structural reasons for doing so, and also suggest that this should be done in association with much clearer pathways for research and academic careers, that also take into account the issues raised in section F2b. Graduate Schools, some organised at national level, have proved elsewhere to be an effective means of shortening the time required for completion of a doctoral thesis, and can also create collaboration between different research centres and cultures.

### **c) Professorial promotions**

68. Recently introduced legislation permits holders of lecturer posts to apply for promotion to professor (see Box 1). We were informed that failure to gain a professorial promotion could be challenged by appeal to Stockholm, and that such appeals rarely failed. We understand that a consequence of this is that the University tends to accept many applications that might elsewhere be deemed premature. We are concerned about the lack of a competitive system for professorial appointment, with internationally competitive research or scholarship as key criteria for promotion, and which creates a crucial incentive for excellent research, scholarship and grant winning. The motivation to introduce the current system might have been laudable, but it seems to us that that the consequences have been negative for the quality and competitiveness of research.



**d) The make-up of academic salaries**

69. As an increasing proportion of the funding for research has come from research grants rather through the core funding of the university, a pattern has developed whereby the offer of new posts tends to be associated with an imperative for the appointee to derive a large proportion of their salary from external research grant funding. In one example, we found that only 3 out of 13 professors were funded by the University. This is highly undesirable. It skews the role of the University in hiring senior staff and has an adverse effect on hiring the very best staff. No private company would contemplate such a system. The University should address this problem urgently. In the international market for talented researchers, such posts are highly unattractive, and uncompetitive compared with those offered in many other countries. It drastically limits the capacity of the University to exploit the pool of international talent.
70. It would be of great benefit to the University in attracting the best talents and removing corrosive uncertainties if it could move to a system whereby it simply offers tenured posts at full salary at the point of entry. We recognise however that this system, which undermines the competitiveness of Swedish universities, has arisen because of the progressive process of reduction in the core funding of research in universities and its reallocation through competitive research council grants. Whilst competition for research funding is to be welcomed, the shift has a debilitating effect on the talent available to the Swedish public research base compared with its international competitors. It also reduces the strategic creativity of the university as discussed in section H6.
71. If the trend of reduced core funding, which we understand has also been accompanied by a real terms reduction in the public funding of research, cannot be reversed, it is important that the University should do what it can to reduce the damaging impact of the system. It could choose to accept a greater financial risk by simply offering fully funded posts at the point of entry into permanent positions, but with funding continuing to come from a combination of the University's core income and external research contracts. Provided that research grant funding continued at the same high level, the university's coffers could simply be replenished from this latter income without any reference to a need to find a large part of the academic salary from external sources.

72. We have heard a partial justification for this system as providing an incentive for staff to seek research grants. We see no reason or justification for this type of incentive, particularly when it has such negative consequences. In other university or institute systems, the challenge of international competition in research and the thirst for new knowledge is incentive enough<sup>2</sup>, and is generally coupled with the healthier incentive offered by competitive promotion (see F2c). There is no reason why it should not also be true in Lund. Moreover, if this and the suggestion in section F1 were implemented, the increased quality of staff should lead to greater success in winning research funds.

**d) Research and teaching loads**

73. The pattern of teaching loads and research opportunities in many parts of the University gave us cause for concern. In several areas, young academics bear a disproportionate part of the load, at an age when they should be encouraged and given the opportunity to develop their research careers.

74. We have a further concern about the habit of joint funding for academic posts, where academics are able to buy themselves out of teaching using research funds that they have won. This not only carries the possibility that education is seen as a less important activity than research, or that research and teaching become detached, but also has the potential to waste human resources. Those early in their careers who fail to bring in research funding tend to bear an increasing teaching load, which may continue to inhibit their future capacity to win research funding.

75. We suggest that a more equitable distribution of teaching loads would be beneficial, although not one driven by formula, but by intelligent judgement on the part of a head of department concerned with the career development of staff. The opportunity for the young

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2. We offer an example of a system of incentives at INRIA (a French national engineering laboratory), which is also typical of many other university institutions in Europe and beyond. Despite the fact that all positions at INRIA are tenured (including young scientists), INRIA has managed to motivate its faculty to seek external funding. Incentives are twofold: firstly, grant income is a criterion for promotion, which is open and competitive; and secondly, external, funded cooperation, particularly with business, is a university strategic priority and a criterion for promotion and salary enhancement.

to develop their research, or for a more seasoned academic to mine a particularly rich vein of research or to develop productive external engagement, all merit adjustments of teaching loads.

### **e) Mentoring**

76. The process of ensuring that the distribution of departmental and university roles and duties is consistent with individual career development and the action of the department as a harmonious team can be greatly aided by a system of mentoring, in which departmental needs and individual aspirations are reconciled. In a small department, this can be done by the Head. In a large one, a team of senior staff can be used.

## **F3. STRATEGY DEVELOPMENT**

77. An effective modern university, particularly one committed to high standards of international excellence in research, needs the capacity to enunciate, share and implement a strategic vision for its future, whilst maintaining the internal freedom and autonomy for academics and students that is the ultimate source of the university's strength. Not only does the Vice Chancellor's immediate team require that strategic grasp, but it also needs to be shared by Deans, Heads of Department (HoDs) and the members of the University. Equally important, Heads of Department and Deans also need to be involved in the creation and transmission upwards of strategic options that are the outcome of the activities of their academic colleagues and students.
78. Departments need to respond to the shifting research agenda in their discipline, the distinctive opportunities that their own research may have revealed, the opportunities for new knowledge that might arise through collaboration with other disciplines, and the shifting pattern of interest and demand for education from students and employers. There must be means of transmitting these opportunities and options upwards, and a response from higher levels within the university about if, and how they can be accommodated within faculty and university planning. The worst approach is simply a slavish adherence to a traditional pattern of activity. There is resistance in some departments to anything other

than a “bottom-up” approach to strategy. A top-down component of planning is however vital. Without it, major opportunities and efficient ways of utilizing resources can be missed.

79. Some departments are very creative in strategy formulation, either through an energetic head who confers and communicates well with colleagues, or through an effective tradition of debate where the head acts as chair. There are others however where we were not aware of strategic thinking about priorities. This view was strengthened by the fact that many of the individual self-assessments presented to us lacked a well-formulated view of the future plans of the units involved. We suggest that the university’s capacity for strategic thinking and planning could be enhanced in the two following ways.
80. In some departments, heads appear to be so overburdened by routine management tasks that time for dispassionate analysis or promotion of strategic options is rarely available. In these cases we suspect that many Heads of Department undertake their roles without enthusiasm because it is “their turn”. It important that such an ethos is overturned. HoDs and Deans have an important strategic role, and they should be enabled to undertake it by stripping them of many routine tasks. The University should consider developing a larger cohort of professional managers to do these tasks. It would not increase the amount of administration, merely make it more efficiently progressed through a division of labour and by freeing senior academics to undertake what they do best.
81. At a University level, we were not made aware of any formal top-down/bottom-up process to ensure that the University’s medium term plans are appropriately formulated and efficiently implemented. If this does not yet exist, we suggest that the University’s response to this review could be the occasion to develop such a process. This could then be rolled forward through an annual planning cycle.

#### ***F4. DOCTORAL STUDIES***

82. In general the proportion of PhD students compared with other research staff is small in comparison with universities that score

highly in the international research league. In such institutions, PhD students play an important role in developing the diversity of the research effort, exploring novel avenues and as means whereby research-based understanding finds its way into society. There are some departments where there have been no new PhD students for several years. It is important that the University, its faculties and departments, adopt an increase in PhD student numbers as a priority for strategy, and seek means of funding them. It is also important to recognise, given the limited capacity of the University to absorb PhD graduates into its permanent staff, and the importance of mechanisms that lead to an increase in non-Lund appointees to these posts, that an increased flux of PhD students into the University should be encouraged, on attaining their degrees, to seek employment in society beyond the University. This would require the issues in section F2b to be addressed.

## **F5. TRANSLATIONAL PROCESSES**

83. There are many processes through which knowledge created within the university, or derived from the international networks of which it is part, finds its way into application in society: through the annual wave of graduates passing into society, through published research, through informal contacts between researchers and users, etc. But it is also important that there are more focussed, managed processes through which the university responds to societal, economic and business needs. At its most powerful, this consists of drawing on fundamental understanding of processes and properties to address specific needs, whether it is the application of new technology in business innovation or the development of public policy or practice.
84. In developing the application of new science and technology for example, the University of Lund is well positioned to develop a three-tier approach. We suggest that the University should consider forming a consortium or centre based on the basic sciences (physics and chemistry) together with the Engineering College (LTH) to actively pursue and develop novel innovation and technology. Although this occurs naturally to a certain extent, a formal organization, with the current strength of the Physics Department and

LHT, could considerably enhance productivity and place Lund in a powerful position. External funding in Sweden seems to be based on a dual strategy, with basic research (in the academy) getting about 20% and applied R&D (in industry) getting about 80%. Typically, some of these latter funds are then sub-contracted to the Universities to provide research to industry. It seems to us that Lund is less successful in this latter activity than it should be, and that a consortium/centre would not only improve its capacity to win a larger share of the available funding from industry, but could also be a direct contender for applied R&D external funding. In such an enterprise, an advisory board with external representation from industry and academia could be of great benefit in global networking/funding, strategic planning, and overseeing the long-range function of a consortium/centre.

85. It is also important to recognise that the translation of new knowledge and understanding into society refers to more than the creation of immediate economic value. New knowledge from the University is also important for the development of public policy, professional practice and production and performance in the creative arts, regionally, nationally and internationally.
86. There is a balance to be struck between the creation of new fundamental knowledge that is universally relevant and that which addresses specific regional and national issues and which often require strong engagement with external bodies and groups. Although these approaches tend to reinforce each other, they do need to be kept in an appropriate balance. They are some areas of the university where concerns are excessively regional and parochial, and need to be balanced by a broader view. Equally, there are some areas where the perspective is exclusively general or universal, but where a focus on regional application could bring regional benefit. It is also important that younger staff are mentored to understand how they might best develop their research portfolio in relation to these contrasting imperatives, and be given clear signals about the relative value that the University places on them.
87. We also regard it as an important part of the responsibility of a powerful research-intensive university such as Lund to use its capacities to support the enhancement of education, research and the

application of research to practical problems in developing countries. This is most readily done through close collaboration with their universities and other agencies. We recognise however that the increasing use of targeted funding at the expense of unrestricted funds, and the need to prioritise grant winning to meet universities' salary bills, has diminished their flexibility to address such issues. We have referred to negative impact of this system in section F2d and do so again in section H6 in relation to the University's overall strategic flexibility.

## **F6. THE SIZE AND NATURE OF UNIVERSITY UNITS**

88. In an era when many of the questions being asked of and by the research community increasingly transgress disciplinary boundaries, when many of the advances in research occur at disciplinary interfaces, and when the rate of advance of knowledge is arguably greater than ever, academic units that span a wide disciplinary range offer great flexibility by permitting the research effort to be perennially re-configured to address these challenges without the need for the creation of new departments. Such large units can also offer the opportunity for small, successful research efforts to grow rapidly; an opportunity that is often denied them if they are isolated small departments. Lund University has adapted to these imperatives in the last decade by combining pre-existing units in larger groupings.
89. This is not however a general prescription. Where a department is successfully mining a rich vein of research opportunities that keep it at the international cutting edge, such changes can be damaging distractions.
90. We have not therefore systematically sought to identify possible reconfigurations of departmental boundaries. We have however suggested, in the Panel reports in Annex 1, where we believe that departmental re-structuring can open up new opportunities in research. We have also suggested a number of areas where greater integration of infrastructural support can bring benefit. For example, Panel 11 (Medicine/Health Sciences) has suggested that greater integration of infrastructure in multiple research areas could be highly beneficial, and that there may be opportunities to build-

up structures in Lund that could play a coordinating national role, for example in nursing sciences.

## **F7. GENDER AND EQUAL OPPORTUNITY ISSUES**

91. Lund University places special emphasis on increasing the number of women in professorial and higher administrative positions. Although some success has been achieved, with the percentage of women in such positions being comparable or higher than in many universities in North America and Western Europe, the proportions remain low, particularly in the mathematical, physical and engineering sciences where proportions fluctuate around 10% (higher than that in American universities). In view of the limited success attained by the University's strenuous efforts to support women's careers, panels were asked to comment on how they thought improvements could be made. This section summarises our suggestions.
92. It is particularly surprising that the proportion of women in senior posts is so relatively low in view of the strength of child care infrastructure in Sweden, that many would consider to as an ideal precondition for effective involvement of women in the work force (government supported child care programmes, paternity leave options, child support etc). A number of options for action emerged in discussion with women scientists and administrators. They are by no means an authoritative response to an issue that continues to plague institutions worldwide, and should be taken as food for thought based on cursory observations, with the possibility that we have misunderstood essential cultural and social issues that influence it.

### **a) Job insecurities**

93. The relative insecurity of the early years of academic careers (see section F2), when many post-doctoral researchers are waiting for academic posts to become open, where a large part of salary tends to depend on winning external grants, and when posts could in principle be lost if such funding fails, may disproportionately effect women. It tends to coincide with child-bearing years, when women are faced with the decision of whether to have a family or to devote themselves fully to academic achievement and job security. Thus, despite the



supportive infrastructure for child care, the Swedish academic scene is not conducive to junior women faculty. (American academia is not known for its sensitivity to gender issues, but even there, there is job security once tenure is achieved. Moreover, the tenure clock is nowadays held back if children are born during the tenure-earning period). Some women we talked to had held research cum teaching positions for over 10 years without apparent prospect of a permanent post. A process that in some countries (e.g. UK), is severely discouraged. Several felt burdened by family needs and did not think that they were serving as good role models for junior women.

94. We echo our previous recommendation (section F2d) that the University should move to a system in which basic funding for a staff positions is stable and independent of fluctuations in funds from external agencies; that there should be a clear point of entry to faculty positions (section F2a); that those who fail this hurdle should not be maintained on perennial, short term, temporary contracts; and that there should be flexibility in the probationary period in the event of child birth.

#### **b) Paternity Leave Issues**

95. While the rest of the world looks at the paternity leave policies in Nordic countries with awe and envy, it is interesting to note that it may affect women's careers in unintended ways. It appears that even though men also partake in this activity, women are expected to take care of the child in the first year. Usually women take 6-12 months leave from their job, which may be too long a break in research careers. It was not clear why women could not come back to work on a flexible time basis sooner after the baby's birth. Apparently, it is not done and child care for only a few hours is not possible to arrange for an infant. This is a societal issue and could be handled with some planning and cooperation. Women should be able to get back to research and scientific interactions even while taking care of a baby. There are a number of models that could be adopted, as deemed fit, on an individual basis.
96. We recommend that academic units, and the University, should facilitate continued scientific engagement of women who have infants by being supportive and providing a child friendly environment and infrastructure. Flexible working conditions and timings would be

very helpful in keeping women engaged in both career advancement and child raising.

**c) Role Models and Mentoring**

97. Role models can be very influential. Female students are particularly inclined to emulate successful female academics. A good example is the number of female students who choose to work with women as thesis advisors. In the early years of a scientific career, support from established academics is particularly important. Heads of department are, because of their roles in the recruitment process, well placed to ensure pro-active measures that encourage applications for professorial posts by highly qualified women academics.
98. Another useful process could be for departments systematically to invite excellent, high profile female academics to give lectures or seminars, or to spend a sabbatical period in Lund. There could also be continual, systematic, well-prepared and well-resourced mentoring programmes could offer ideas and strategies for enhancing the image, stature, and competitiveness of junior women in academics on a permanent basis. We would add that the Lund Gender Studies Department is very well placed to analyse the reasons for and processes to remove the “glass ceiling” effect for women academics. It would not only benefit Lund and Sweden, but the many institutions world-wide that are struggling with this issue.

**F8. THE UNIVERSITY WEBSITE**

99. A high quality website that is internationally accessible, that is to say, has an English version, is vital for an internationally facing university such as Lund. For example, the absence of a comprehensive English web presence robbed many of the panels of a facility that they would normally expect to exploit in an assessment such as they have just undertaken. Its utility cannot be underestimated in attracting students, in attracting staff, and in fostering collaboration with international researchers and businesses. It should be a high priority for improvement by the University.

## **G. SUGGESTIONS FOR FUTURE REVIEW PROCESSES**

100. The current intention of the University is that a review process analogous to that undertaken in 2008 should become a regular event. Its purpose would be to subject Lund's development as a research-intensive university to rigorous testing against international standards and to inform its strategic planning at all levels. Moreover, it is anticipated that a form of regular review will be instituted at national level at some time in the near future. We therefore offer the following comments about how future reviews might be carried out, in view of the reviewers' experiences in 2008, and also add comments that might be helpful to those who could be tasked to plan a national review scheme.
101. Although we are aware of three major reviews that have been undertaken at Scandinavian universities in recent years, at the Universities of Helsinki, Oulu and Uppsala, the panels have avoided scrutinising these reviews as models for their approach, to ensure that the review fits the circumstances in Lund. We understand however that the internal planning group for the review took the experiences of those other reviews into account in planning the structure of the Lund exercise.

### **G1. THE UTILITY OF THE REVIEW TO THE UNIVERSITY**

102. The utility of the review to the central management of the University will depend upon the way in which they use it to inform future planning and decisions. We have asked, and they have agreed, that they will report back within a year to the review group about ways in which the outcome of the review has been used in future planning. Any group planning a national review might wish to discuss with the University management how review outcomes have been useful to the university in strategic planning.
103. In meetings with faculties, departments and other research groupings, and their deans, heads and leaders, reviewers asked about the degree to which the review process had been a net burden or net benefit to them. A common response was that although the review had been initially unwelcome as an additional imposition, the

process of self-review had been enlightening, giving them in many cases a fresh perspective on their activities and opportunities, and that the net balance of the process was positive. It suggests that it would be helpful to the University, in planning future reviews and instructive to reviewers and others, if faculties and their component units were able to comment on the value of the final report, and ways in which the final report could have been of greater value.

## ***G2. THE FREQUENCY OF FUTURE REVIEWS***

104. There is a balance to be struck between reviews that are so frequent that they impose an excessive cumulative burden on staff and where the inter-review period is too short for strategic change to occur, and so infrequent that their role in monitoring and stimulating change is undermined. We suggest that a 6-year period would strike the correct balance, rather than the 5-year period currently proposed by the University.

## ***G3. THE PROCESS OF REVIEW***

105. We believe that there is considerable value in the dual imperative in our terms of reference for both research assessment and strategic evaluation. We recommend that the University persists with this twin track approach, although in coming years, as its strategic grasp and direction evolve, it may be able to frame the review in such a way as minimise internal disruption.
106. There are a number of improvements that we suggest for future reviews:
- a) Many panels commented on the impossibility of “de-personalising” their review of the research effort in the way requested in the initial documentation. The research performance of a university reflects the aggregate efforts of individuals, and in many cases, specific individuals play key roles. Although we were asked to avoid assessment at this level, it was generally found to be impossible to avoid.
  - b) It would have been helpful to have bibliometric reports provided before and not after the Lund visitation.

- c) Particularly in areas where electronic access to published work is difficult (particularly the arts and humanities), a lay-out of published work in relevant departments during the site visit would have been helpful
  - d) It would have been helpful to have more in-depth meetings with researchers and departmental and faculty leaders, which could be more effectively done by a visit to Lund by all panel members (rather than panel meetings being held away from Lund).
  - e) Teaching and research are intimately related in their demands on staff time, on the vitality of particular areas, which is often conditioned by the contributions from different income sources, in the role of research in education, and in the fact that the most powerful vector whereby research understanding passes into society is through university graduates. Departmental self-reviews should therefore also analyse the teaching-research relationship.
107. We therefore suggest the following process for future reviews:
- Step 1: Initial documentation to individual panels should comprise: the terms of reference for the review, self-evaluations at departmental and faculty levels (including the approach to teaching as well as research), listing of all faculty members, the university strategic plan, the report of the preceding review, bibliometric analyses, details of grants and publication, and collaboration.
  - Step 2: Collation of interim reports from panels that also identify issues for the site visit.
  - Step 3: 3-day site visit including all panel members for discussions with staff in the units of assessment (including lay-out of published material in fields where materials are not electronically available).
  - Step 4: 2-day continuation of the site visit involving only chairs and vice chairs of panels to integrate their conclusions, address cross-cutting issues, give preliminary verbal feedback, and plan collation of the final report.

## **H. NATIONAL ISSUES THAT INFLUENCE THE QUALITY AND IMPACT OF RESEARCH**

108. The membership of the review group embodies a wide range of international excellence and experience: at the leading edge of research, in university governance, in national and international policy for research and universities. In view of this, it was felt appropriate to offer comments from this international perspective on issues that effect the performance of Lund University but which tend to be beyond its capacity to control, as they reflect national traditions, processes and regulations. We first highlight some crucial issues for universities in H1–H3, and H4–H7 go on to discuss national processes in Sweden that influence the efficiency and excellence of research.

### ***H1. THE CHANGING INTERNATIONAL SETTING***

109. The international and national environments in which universities operate have changed considerably in recent decades. They now educate a large proportion of the rising generation in addition to those of more mature years who increasingly join them as students. In the world of globalisation, universities are regarded as crucial national assets. Governments worldwide see them as vital agents of the knowledge economy and, in many countries, they are the dominant component of the national, publicly funded research base.
110. However, the diversity of roles expected of universities (see paragraph 1) is now greater than can be efficiently discharged by any single institution, such that a functionally diverse spectrum of institutions is increasingly seen as necessary in a national higher education system. Lund University occupies one part of that spectrum, as a comprehensive, research-intensive university that competes with the world's best. In a modern knowledge-based economy, where the competition to be locations for economic, social and cultural creativity and impact in a rapidly changing world becomes stronger, such universities have pivotal roles. They are: to be a magnet for the best international talents; in maintaining and developing the national research base; in creating new knowledge; in importing new knowledge no-matter

where it originates; as welcome members of international research networks that operate at the research frontiers; and by ensuring that relevant novel concepts are translated into utility through their links with business and those responsible for public policy. The annual flux of skilled graduates armed with these capacities continually refreshes society's technical excellence and its economic, social and cultural vitality, and is crucial to its capacity to take bold, imaginative and principled action in the face of an uncertain future, rather than cowering in fear of it. The Universities' role is not only to respond to immediate national priorities but also to develop the ideas and capacities that an unknown future will require. The environment that they help to create is a powerful attractor for increasingly mobile, research-intensive international companies.

## **H2. THE CROSS-DISCIPLINARY IMPERATIVE**

111. Many of the major issues for modern society, such as climate change, food security, ageing, the application of new genetic technologies, migration, and cross-cultural relations require new understanding based on integration of approaches from the different disciplines that form the framework of modern understanding. Research-intensive, comprehensive universities have a fundamental role to play in this. They are unique amongst human institutions in the range of knowledge they encompass. As a consequence, they have the potential rapidly to re-structure and re-combine their skills in novel ways to address not only these cross-disciplinary issues, but also to explore new, unexpected avenues of understanding. As the pace of un-anticipated discovery and the urgency of demand increase, this capacity is increasingly vital. Although much has been made of the need to develop and maintain critical mass in research, the *critical diversity* required to confront challenges as they arise or to create novel combinations of researchers to address evolving trans-disciplinary demands is often more important. Comprehensive universities are, *par excellence*, the crucial locations for this diversity.

### **H3. THE HUMANITIES AND SOCIAL SCIENCES**

112. At this point we wish to underline the role in a university such as Lund of the humanities and social sciences, as government policies for universities, particularly in research, too frequently concentrate on science, technology and medicine, with a perfunctory nod towards the humanities and social sciences that implicitly under-values their importance for society. There is an implicit notion that the understanding they confer is less important than that loosely termed “science”, although natural scientists themselves rarely take that view.
113. Research in the humanities and social sciences is concerned with issues that are essential to stability, good order, creativity and inspiration in society. In these disciplines are gathered the thinking, learning, and explanation of what binds and what separates human beings. They seek not only to understand and make accessible that extraordinary intensity and complexity of beauty by which humans specify themselves in the merging of thought, emotion and expression – a high enough mission by any standard. More important for our purpose, they provide understanding of why and how we express differently our common characteristics of being, as well as how we differ as individuals, groups and cultures. History – and none more so than recent and contemporary history – demonstrates how supremely important the dissemination of that understanding is to stable and healthy societies. Globalisation, especially in its effects of instantly accessible worldwide information, and increasingly mobile populations, has created political complexity by bringing once distant cultural assumptions into close proximity, and makes the latter an ever more pressing necessity.
114. They contribute decisively to today’s recognition that modern society depends on the whole range and interconnectedness of knowledge rather than on a few academic disciplines. They make an increasingly effective practical contribution, together with other disciplines, to the creation of public policy. Many major contemporary issues, the introduction of novel and disruptive technologies, policies for health, education and penal reform, the consequences of climate change and the development of new energy systems require engagement across the whole disciplinary spectrum if they are to



be rationally addressed. Moreover, it is increasingly recognised that the “creative industries” contribute far more to GNP than has been hitherto supposed. It is for these reasons that national processes that have the capacity to maintain the contributions of the humanities and social sciences are given due consideration.

#### ***H4. ATTRACTING THE BEST INTERNATIONAL TALENT***

115. We have been dismayed by the extent to which the processes of appointment, promotion and funding militate against the University’s capacity to recruit from the international pool of talent and minimise the extent to which young post-doctoral researchers in particular feel free to obtain vital, formative experience in the international research community. This appears not to be a problem exclusive to Lund University, but a feature of the Swedish University system as a whole. As the international research community becomes better networked, as it increasingly works together on major international issues and programmes, and as the nascent European Research Area takes shape, with its proper emphasis on researcher mobility, national processes that inhibit mobility are becoming a national disadvantage.
116. We have highlighted the processes that contribute to this state of affairs in sections F1–F3 above. The key issues at a national level are the make up of academic salaries and the legal framework for promotion. We refer to the former again in G6 below. The legal framework for promotion to professorial status is one that we believe diminishes the competitive pressures that stimulate excellence. We suggest that a national review of the consequences of the relevant legislation would be very timely.

#### ***H5. THE ROLE OF THE FIRST DEGREE AND CAREER STRUCTURES***

117. Although we have not seen data that would clarify this point, our experience in Lund suggests that there are broad patterns of expectation from those undertaking bachelor’s and doctor’s degrees that may be worthy of further consideration. In many areas of

bachelor's study, the pattern of student demand appears to represent a perception of their immediate relevance to graduate employment that may be misguided. We suggest that the principal purpose of the bachelor's degree is not to be a vocational qualification, except in areas such as engineering or clinical medicine, but as an advanced education through the means of a subject that the student cares about. This is the means whereby the qualities prized by employers, of analytic thought, capacity to communicate and to work in teams, are most readily developed. We suspect that too ready an association of a first degree with a particular profession may underlie the decline in student choice for parts of the humanities, which, because of falling income from student numbers, also undermines research potential. This is a trend that is the reverse of that found in many other western countries, for example in the UK, where the first degree is not generally regarded as a vocational training.

118. Another distinctive pattern of concern is that the PhD route appears to be dominated by those who aspire to permanent university posts, with very few going into business or the public services. This contrasts strikingly, for example, with the USA, where a large proportion of PhD graduates, particularly but not exclusively in science, engineering and technology, enter industry, particularly high technology industry. This is not only a means of bringing new research-based ideas into industry, but it perennially re-invigorates the university-industry connection, much to the benefit of business innovation. We advocate the introduction of processes that stimulate awareness, enthusiasm and support for such a route. If this were to be a priority, it would also be necessary to address the slow progress to the PhD degree analysed in section F2b, that is typical of many disciplines in Lund and in Sweden more generally.

## ***H6. UNIVERSITY STRATEGIC FLEXIBILITY***

119. The routes by which government funding reaches Universities have a major impact on their strategic flexibility. The shift in the proportion of funding from that directly allocated to the University to that won through submissions to Research Councils, have diminished the University's capacity to make its own decisions about new research initiatives. The system has the advantage that it

allocates funding directly to those who will use it, but it has several disadvantages.

120. It diminishes the University's capacity to attract the best talents, as described in sections F1 and F2d. In addition, it means that innovative research developments in the University are largely dependent on the pattern of external grant success. Does this matter? We believe that it does. One of the great advantages of universities, which embrace a unique range of knowledge compared with any other institutions, is that they are able to re-combine disciplinary capacities in novel ways to address cross-disciplinary imperatives, new unexpected areas of research (see section G2) and issues for which universities should take responsibility, for example in the field of international development (e.g. paragraph 82). But they need the resource and the flexibility to back their own hunches about such innovations, rather than depending on the pattern of individual research grants or having to persuade national funding bodies of the opportunity. In Sweden, the latter is particularly difficult because of the construction of salaries. Some of the most important and creative departures in modern research have arisen by universities exercising their own creativity to generate new research enterprises. Lund's creativity in this regard, in difficult financial circumstances, is exemplified by its Flight Tunnel Facility, which has set a new international agenda along with new standards for understanding the dynamics and control of flight, particularly in birds; by CIRCLE – the Centre for Innovation, Research and Competence in the Learning Economy focusing on the interrelations between knowledge creation, innovation, and economic growth which has successfully competed for large national grants including a Linneus grant; and by CREATE HEALTH – Strategic Centre for Clinical Cancer Research, which integrates researchers from Lund University Hospital, the Faculties of Medical and Natural Sciences and Lund Institute of Technology in a superbly equipped and integrated "omics" platform, concentrated in a single area.
121. The importance of grant funding for the salaries of young researchers can also encourage young researchers into premature independence and to create an excessive number of small research groups. Such groups are vulnerable and rarely create critical mass. This is particularly noticeable for example in Laboratory Medicine.

122. We suggest that it would be timely to consider whether the present situation, where the university tends to act as a “research hotel”, should be reassessed, to consider whether greater flexibility to act creatively would stimulate greater vitality in the university research base in Sweden. The US and UK university systems are arguably more creative because of such strategic flexibility, and there are moves throughout Western Europe to change in this direction.<sup>3</sup>

## ***H7. NATIONAL RESEARCH REVIEWS***

123. We understand that there has been discussion about the possibility of instituting a national research assessment exercise, and offer some comments in the aftermath of our experience in Lund. Such assessments may have the function of allocating core funding for university research, independently of individual, targeted research grants, or be designed to assess research performance in a way that is helpful to the university in planning for its future. The UK Research Assessment Exercise (RAE) is designed for the former purpose. The current review of Lund University’s is designed for the latter. Alternatively, a review may combine both purposes.
124. If our evaluation that the element of core funding of university research has diminished to a degree that is counter-productive were accepted, a national research assessment exercise would be a means of determining how an increased proportion of research funding could be allocated through this route. At the same time, we are of the view that an evaluation of the type that we have undertaken is a valuable adjunct to a university’s strategic development, and that an assessment designed to inform both funding and strategic planning would be the optimal route forward. In the long term however, as strategic planning becomes more systematic and as patterns of funding become established, we would expect an assessment system to evolve and become lighter in touch.

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3. We have also noted the system whereby a profit-making state-owned company (Akademiska Hus) leases buildings to the universities, as a form of taxation on funds that are supplied by the state to support research. We understand the underlying rationale, but have noted some of the perverse effects that this creates, and which also inhibit the universities capacity to act in an entrepreneurial fashion.

## **PART 3 – ANNEXES**

### **ANNEX 1 – REPORTS OF REVIEW PANELS**

# PANEL 1 – LAW

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## 1. OVERALL ASSESSMENT

According to its Strategic Plan 2007–2011, the Lund Faculty as a research unit should be Sweden's best and also counted among the foremost centres of legal research in Europe. In some areas of law, the Faculty has already been able to approach the goals of the Strategic Plan. Some of the research is also internationally recognized.

A clearly positive development in the Faculty has been that more and more scholarship is published in international languages (mainly English, but German as well) and on international venues. The present internationalisation of law requires the internationalisation of legal scholarship, and the use of other than national languages brings legal scholarship into the reach of much wider audiences than before. However, law continues to be also a national phenomenon, and legal scholars still have specific responsibilities with regard to the national legal culture and are required to publish in their national languages, too. The Lund legal scholars have found a functioning balance in their use of different publishing languages.

The role of legal faculties varies from country to country, and it is difficult to set up unequivocal international standards for academic legal scholarship. The Nordic scholarly community is the most natural point of reference in the assessment of Swedish legal scholarship. The criteria the Panel has employed in its evaluation derive from their particular

experience and knowledge of the situation in other Nordic law faculties, although larger international settings have also been duly considered.

A true problem for the Faculty is its small size, as will be elaborated more in detail below. Most of the individual disciplines have a staff of only a few persons. Quality research only thrives amidst sufficient critical masses: the fewer researchers, the greater the threat that quality drops. Small units have difficulties also in establishing international networks and in enticing researchers from abroad.

The problem of size is even further accentuated in disciplines which at present do not have a tenured, full professor. At present this category includes, among others, jurisprudence and legal theory, as well as legal history, which may be said to represent basic research in relation to positive-law disciplines. This inevitably affects their ability to fulfil the specific role they have in both legal education and legal research. The fact that the Department of Legal Sociology is located outside the Faculty further aggravates the situation.

The many vacancies at the level of tenured professors are related to choices in personnel policy. In many cases, the Faculty has chosen to wait for current associate professors to achieve the level at which they can be promoted to professors. However, it can be argued that only appointments after open competition can ensure the recruitment of the best national and international candidates. The policy of promotions may lead to long vacancies and closed academic careers.

The Panel's main task has been the evaluation of the quality of research. The evaluation has been undertaken under considerable time pressure. The panel held one meeting outside Lund, which not all members were able to attend, in addition to which the chair and the vice-chair took part in the site visit at Lund 9–13 June. During this visit, they held discussions with the dean, as well as with representatives of both senior and junior researchers.

Below, detailed evaluations, following the division into “teaching teams” (lärarlag), are presented. On the basis of the detailed motivations and the grades given to the teaching teams, the Panel has come to the conclusion that the grade *very good* describes the average level of the research. However, the panel wants to stress that, as is shown by the

detailed evaluations, there are considerable differences in scientific output between the teaching teams, as well as within the teams between the different subjects. Within the panel, the major discussion concerned the choice between good and very good. The Panel estimated the general level of research to be slightly above the average of Nordic law faculties, which supports the higher grade.

## **2. RESEARCH INFRASTRUCTURE**

### **2.1. Faculty**

The most serious structural problem the Faculty faces is its small size and the certain granularity ensuing from this. The staff of most of the individual disciplines consist of only a few researchers – typically one professor, and one or two associate professors. The problems arising from the smallness of the Faculty could perhaps partly be remedied by intensified collaboration between different disciplines within the Faculty and increased cooperation with nearby universities (for instance, in the form of the so-called Öresund University). The Faculty has good experiences of interdisciplinary projects in the past: most notably, the NORMA project (Normative Development within the Social Dimension from a European Integration Perspective) which still exists as a research milieu. In order for such interdisciplinary projects to be possible, the Faculty should have at its disposal non-earmarked research funds which could be allocated to cross-disciplinary endeavours, in accordance with the preferences indicated in the Strategic Plan.

The organisational overlap between the Faculty of Law and the Department of Law deserves attention. The benefits of two overlapping organizational units, comprising the same staff and activities, remain unclear.

The teaching teams, operating as basic units in the planning and execution of teaching, make up for the lack of smaller administrative units. The teaching teams seem to function in a non-bureaucratic and efficient way, lending also support to research activities. However, the problem may be that the teaching teams have not been designed specifically for research purposes.

The Department of Sociology of Law is located in the Faculty of Social Sciences and not in the Law Faculty. The Panel recommends that the



location of sociology of law be reconsidered. Closer collaboration between the sociology of law and the positive-law disciplines could benefit both sides, and the inclusion of the sociology of law in the Law Faculty would strengthen the general jurisprudential disciplines. Commercial law, currently located in the Business School (LUSEM), should also be (re-) integrated with the Law Faculty.

Several disciplines in the Faculty lack tenured, full professors. The Faculty seems to rely on the promotion system and wait for associate professors to qualify for professorships. The system motivates associate professors and creates guarantees for a secure academic career. However, it may also turn into an obstacle to the recruitment of best possible talents in the academic “market-place” and diminish mobility between universities.

Strategic planning and the setting of emphases in any law faculty have their limits, because a law faculty has to cover all the fields relevant for legal education. In line with this, the Strategic Plan of the Faculty states that all key disciplines should be staffed by at least one full professor. However, four of these disciplines currently lack a professor: legal theory, legal history, banking law (a donated chair) and environmental law. This state of affairs is far from satisfactory.

In addition to the four disciplines mentioned above, there is no professorship in EU law. This is a conscious choice of the Faculty. The basic idea is that EU law traverses almost all positive-law disciplines and should be dealt with in conjunction with the respective norms of domestic law. This is a defensible argument. However, it can also be maintained that there are certain general premises and principles of EU law which, in a dispersed model, do not perhaps receive the attention they deserve. The same goes for institutional and constitutional issues. In the latter respect, it should also be noted that constitutional law does not belong to the strong areas of the Faculty; indeed, there is no professor specialized in constitutional law, either.

The doctoral training at the Faculty is well-developed, and the training is networked both at the national and the international level. However, the small number of the doctoral students is alarming; in fact, there is a danger that in certain areas the current lack of competent research and teaching staff will not be remedied in the future, especially if the present reliance on the closed promotion system continues.

Great emphasis should be laid on personnel planning. In the near future, several professors will retire. The Faculty should have a clear policy how the continuity in the affected disciplines can be ensured.

## **2.2. Public Law**

In comparison to other disciplines in Lund, Public Law has a fair amount of teachers: the subject of public law two professors and three other teachers; environmental law one associate professor; social law two teachers; and taxation law one professor and one other teacher. Five doctoral students are listed as well, in addition to which two Vietnamese doctoral candidates have been accepted within the framework of the Swedish/Vietnamese project on legal education. However, there is no chair in constitutional law (nor is such a chair envisaged) and, consequently, very little scholarship in this discipline.

## **2.3. Private Law I and II (The Social Dimension)**

The researchers of Private Law I and Private International Law seem to work closely together. However, they belong to different teaching teams. This solution should be reconsidered.

The researchers in Private Law II work in a very integrated way, which seems to ensure prominent results. They are actively engaged in multi-disciplinary research and in international co-operation, working also as experts in, for instance, the context of the EU.

The retirement of prominent researchers makes it urgent to ensure that new professors are recruited in this well-performing area to maintain the standard achieved.

## **2.4. Criminal Law and the Law of Procedure**

The majority of the professors in the area of Criminal Law and the Law of Judicial Procedure will retire in the near future, which will probably lead to considerable changes. The younger criminal law teachers, including two associate professors, are junior researchers who have completed their doctorates at Lund. In this respect, continuity seems to be ensured. The junior researchers have divergent research profiles: gender studies, different fields of criminal policy, traditional criminal law doctrines, and issues of international and EU criminal law.

The situation in procedural law is more alarming: there are only two professors, one of which will soon retire.

Many of the researchers in criminal law and the law of judicial procedure have been actively involved in various research projects. Participation in and the aims of these projects have varied considerably. This can be attributed to the ways in which research projects are funded today. Some projects are commissioned, with externally defined research questions; some are international projects in which professors are only nominally involved. In some cases, projects have been able to secure partial funding for junior researchers. The dean has apparently taken part in a large number of projects as an organiser. One of the teachers has directed a project financed by the Swedish Insurance Federation, and another has been actively involved for ten years in the Nordic network “Law and Gender”. Other Nordic networks are also represented, as well as numerous Swedish and European research groups.

## **2.5. International Law**

### *2.5.1. Public International Law*

Public international law constitutes a relatively small research unit, consisting of one full-time and tenured, and one part-time professor, as well as one tenured associate professor. The part-time professor is also the director of the Raoul Wallenberg Institute. However, this link between the Faculty and the Raoul Wallenberg Institute will be cut in the near future. The research staff includes five doctoral students working in Lund and two stationed in Riga. In addition, the professor of public international law is co-supervisor of two additional doctoral students. The relative high number of doctoral students may be seen as reinforcement to research resources. But, on the other hand, supervising the doctoral students may also be seen as a drain on the senior staff’s research possibilities.

Co-operation with the Raoul Wallenberg Institute adds to the research resources available in public international law. It is therefore important that the loosening of the organizational tie between the faculty and the institute will not endanger the well-functioning cooperation. The library of the Raoul Wallenberg Institute, which is especially rich on human rights literature, is available also to researchers stationed at the university.

### ***2.5.2. Private International Law and Comparative Law***

In the division into teaching teams, private international law and comparative law form the unit of international law together with public international law. However, the researchers of private international law seem to have closer contacts with substantive private law than with public international law. In effect, two of the three researchers mostly teach in the field of private (substantive) law. Comparative law is taught by only one teacher.

Therefore, one may ask why the teaching teams have been constituted on a basis which does not reflect the reality of teaching and the needs of research cooperation. A more natural solution would be a joint teaching team of private law and private international law. This could stimulate further research cooperation between these already today close disciplines.

According to the self-evaluation of the Faculty, “working in research groups in-house is a relatively new phenomenon”. No such research groups involving private international law are mentioned. However, establishing such groups would be important for the future of this branch of law, with a staff of only three persons.

### **2.6. Jurisprudence and Philosophy of Law**

The staff in Jurisprudence and Philosophy of Law is small, consisting of one associate professor and one assistant professor, one researcher working on external funding, two doctoral students and two other doctoral students with a “double citizenship”, that is, affiliated also to another discipline. The research unit has been considerably affected by the retirement of two internationally renowned professors and the subsequent decease of one of them.

### **2.7. Legal History**

During the period under evaluation, the staff of legal history has included one tenured professor, emeritus though since June 2007, one associate professor and one extra associate professor, whose tenure ended after the spring semester 2004, and four doctoral candidates. At the time of the writing of this report, one post of associate professor is about to be filled again, but the discipline has no full professorship. The other associate

professor is 50 % engaged in the administration of the Faculty's Vietnam project. Considering the meagre number of senior researchers, the group (under the leadership of the now-retired professor) has managed to create an international atmosphere with wide contacts and networks. This is an important part of a functioning research infrastructure.

The situation is nevertheless far from satisfactory, considering the fact that the small group of teachers is responsible for all levels of teaching. The training and supervision of potential doctoral students is particularly endangered, given the fact that a full professorship is lacking and that the discipline has only 1½ senior teachers at its disposal. The lack of senior posts is not likely to attract new students; thus, in a few years we may be witnessing a vicious circle of diminishing activity. The Faculty's strategy vis-à-vis the discipline of legal history needs to be clarified.

### **3. RESEARCH QUALITY**

#### **3.1. Faculty**

According to the Terms of Reference for the evaluation, *good* means that the research attracts “mainly national attention but [possesses also] international potential.” The next grade upwards on the scale is *very good*, which refers to research of “such high quality that it attracts wide national and international attention.” During the period under consideration, the research at the Lund Faculty has clearly reached at least the level of *good*. Considering the performance of certain units, the average grade of *very good* is justified. It should be noted that the Panel that, in spite of the performance of individual researchers, certain units have not risen above the grade *good*, at least partly due to their poor resourcing. In order to receive one of the highest grades, a unit should at least have a permanent professorial chair.

#### **3.2. Public Law**

There is quite a remarkable difference in the level of ambition and strategy between the general description of the research environment and activities in Public Law, and the accomplishments of individual researchers. While a number of researchers have carried out important scientific work and attained a high profile within their respective areas of law, Public Law as such seems to be lacking a comprehensive research

strategy, and the SWOT analysis is rather unbalanced and not very persuasive.

In tax law, the quality of research seems to be in some instances *excellent*, and generally *very good*. Some researchers are very productive, so that in that respect, too, the grade would be *very good* for this area. Relevance of the tax law research is *excellent*, if not *outstanding*, in particular due to the focus on international aspects and on intersection with other areas of law. With regard to vitality and organisational capacity, tax law seems to be one of the Public Law areas best able to conduct integrated and interdisciplinary projects, and could therefore be considered *excellent* also in this regard.

The research quality in environmental law is *good*, as is the overall productivity. Relevance is *very good*, for parts of the research even *excellent*. Vitality and organisational capacity seem to be *good*.

EU law research has been published in internationally recognised fora, which points to its *excellent quality*. The productivity within the field seems *very good*, notwithstanding the limited staff resources allocated to this area. The relevance of the research is also *very good*. The vitality factor is difficult to assess, but this research area may be suffering from limited resources. Despite the performance of individual researchers, given the unsatisfactory state of organisation in which EU law finds itself, the discipline as a whole cannot be given more than *good* as a grade.

The quality and relevance of research related to the international aspects of administrative law are *excellent*, in particular as is reflected in the doctoral dissertation on cross-border administrative cooperation. The productivity of the researchers is *very good*. The vitality could best be graded *good*, although more international research contacts should be developed.

A major problem in the public law research is the virtual lack of constitutional law.

To sum up, the grade for public law is *very good*.

### **3.3. Private Law I**

The Lund team of Private Law I is strong. This applies to the volume, quality and relevance of the production of the staff members; domestic

and international collaboration; teaching arrangements (notably master programs); and the vision of the future. The important contribution of the Lund team to legal development cooperation (Vietnam) is to be emphasized.

The description of current research activities in the field of Private Law I demonstrates that research productivity has been high during the evaluation period, taking into account the number of researchers. The staff and the doctoral candidates have published three doctoral theses, one new treatise, three new editions of previous treatises, two licentiate theses, and several articles. The general quality of scholarship is high. One of the theses has been republished by an international publishing house, and one of the articles, written by a Lund researcher together with an American scholar, has been very much downloaded in the USA.

The relevance of the scientific production is also high. Generally speaking, the books and articles cover most sectors of Private Law I and deal with modern and topical themes. Competition law and intellectual property law are especially highlighted, but there also are contributions in the fields of information technology law and corporation law.

Since the research topics have a predominantly international nature, there often are comparative aspects included. For example, one doctoral thesis includes, in accordance with its subtitle, a comparison between the laws of the EU and the USA.

The grade for Private Law I is *very good*.

### **3.4. Private Law II (The Social Dimension)**

Private Law with the Social dimension consists of labour law, family law, related social welfare law and the Norma Research Programme.

The three research elements are integrated through the social dimension. This approach seems to be an advantage, as it has facilitated interdisciplinary research.

The area includes the research of 12 individuals: three full professors (1 retired), three associate professors, one senior researcher and five doctoral students.

In 2002–2007 seven (out of 39) and in 1996–2007 nine (out of 51) doctoral degrees were granted in private law with the social dimension (primarily labour law).

The Norma Research Programme has been an interesting and successful project, involving one professor, five associate professors, one senior researcher and four doctoral students. Its purpose has been to study the topic in depth and from a long-term perspective. The research has been conducted within a multidisciplinary legal scientific framework. The research programme has been internationally oriented, with strong comparative and European integration elements. Many publications are in English. The programme has its own publication series, but the members of the team have also – wisely – chosen to publish in internationally recognised journals. They have participated in a number of European Commission’s networks of legal experts.

Labour law involves three professors, four associate professors, one senior researcher and three doctoral students. Research in labour law has to a large extent been integrated in the Norma Research Programme. Two main topics have been Flexibility in Service and Discrimination in Employment, which both are relevant and pertinent issues. In addition, industrial relations constitutes a stronghold. In labour law, three researchers have defended their doctoral theses, and one doctoral student is writing her thesis. Much of the work is of interdisciplinary character, with an EU or comparative dimension. Gender and law-and-culture approaches have also played a major role. Some of the researchers are internationally renowned and have worked at foreign universities as visiting scholars.

Social welfare is also to a large extent integrated in the Norma Research Programme. The staff consists of one professor, three associate professors and three doctoral students. Part of it has a quite strong national and international standing. EU aspects are also present in research on social security and welfare. A doctoral project looks into parental benefits schemes and ”the flexibilisation of families”. Another thesis focuses on parents at work, and includes a gender perspective. A study on family law and its interplay with social security schemes as well as a number of projects on different aspects of child law and social law are being carried out. Especially one researcher is extensively engaged in international activity, both within the World Congress on Labour Law and Social Security, and the European Commission’s Networks of Legal Experts.



The staff of family law consists of only one associate professor and two doctoral students. A family law thesis focuses on the division of property, a classic and important family law topic. Child-parent relationship constitutes a major area in family law research. Research is also carried out on genetics and family law. A new project on the elderly is planned, which seems a timely topic of great relevance. Part of the research is of comparative and interdisciplinary nature, and published in English. There exists certain integration between family law and social law.

The success of the Norma Programme, in particular, leads to a very positive evaluation of Private Law II (the Social Dimension). The challenge is, however, how to replace some key persons, who have deceased or retired.

The grade for Private Law II (the Social Dimension) is *excellent*.

### **3.5. Criminal Law and the Law of Procedure**

Despite the fact that most of the professors' and associate professors' time goes into basic teaching, four doctoral theses were published in the area of criminal law and the law of judicial procedure in the period 2003–2007. At present, there are seven doctoral students working actively on their theses. The teachers in the area of Criminal Law and the Law of Judicial Procedure have also been active in writing and publishing articles.

Research in the area has largely been basic legal research, with a traditional doctrinal approach. However, broader and cross-disciplinary topics have also been pursued, as in, for example, a thesis, completed in 2004, which examined sexual violence by discourse analysis methods. Another thesis published in the same year focused on the criminal liability of juridical persons, approaching the topic from not only a legal but also a cultural historical perspective. Such unorthodox methodological innovations are of course open to criticism. However, they also display a pioneering spirit and open-mindedness on the part of the Faculty.

Most of the scientific production in the field consists of monograph-style doctoral theses by individual researchers. As is the case in other Nordic law faculties, too, the quality of these works varies. However, in Nordic terms they generally represent a solid standard and also meet international requirements for the doctorate. What may be criticized is the almost total lack of empirically-oriented studies with a criminological approach.

In the last ten years, the research environment in criminal law and the law of judicial procedure at Lund has become more active and lively. The best research compares favourably with the accomplishments of other Nordic law faculties. However, the intensity and scope of research activity fall behind the best Nordic faculties. Here, again, the small size of the Lund Faculty plays its role.

The grade for criminal and procedural law is between *good* and *very good*.

### **3.6. International Law**

#### ***3.6.1. Public International Law***

The research staff of Public International Law consists of relatively young researchers who are only in the process of gaining a position in the international research community of the discipline. However, in a quite short time, the researchers, especially the professor of the discipline, have established renown for innovative and theoretically ambitious research on highly pertinent topics in public international law. The introduction of new approaches and theoretically informed insights into the analysis of doctrinal issues is characteristic for the research. Qualitatively the research is of high international level, and in quantitative respect, the output is quite extensive, especially taking into account the other responsibilities, such as teaching, of the relatively small staff. A clear sign of the internationally acknowledged level of the research is the publication of books, authored or edited by members of the staff, by international publishers, and of articles in international refereed journals. The grading would be *very good* (or perhaps even excellent).

#### ***3.6.2. Private International Law and Comparative Law***

There are very strong sides in the activities of the Lund researchers of private international law. Notably, the volume of production of the staff – as regards both study materials and scientific works – is impressive, and the quality is high. The staff has published two doctoral theses, two textbooks, two casebooks and a great number of scientific articles. Furthermore, the staff members are active in international cooperation in the field of teaching and thesis supervising.

On the other hand, certain deficiencies can also be identified: the staff members do not belong to in-house research groups (from this point of

view, the teaching-team division of the Faculty should be revised; see, above: Research infrastructure), active participation in international research networks could be intensified and, above all, the staff has no detailed plan for future research. Since there is an urgent need of research in the field of international private law and the staff is very competent, a clear vision of the future and a general research plan should be developed.

The relevance of the scientific production is high. The textbooks generally cover the field of private international law, and the theses deal with modern and topical themes, linked with the private-international-law problems of Internet usage. Both theses under preparation (one of them partly) are located in the field of international procedural law. This is a good choice since procedural problems of an international nature are particularly topical today – as is demonstrated by the on-going legislative work of the European Union. In both theses, the problems of jurisdiction are discussed. In the future, other aspect of international procedural law (enforcement of foreign judgments, international legal assistance) could also be researched.

Generally, it can be stated that except for textbooks and manuals, the research of private international law in Lund substantially relies on doctoral theses. It is positive that these theses are produced but post-doc research (shortly referred to in the description paper) would be needed as well.

Grading the research of private international law as *very good* seems appropriate.

If graded separately, Comparative Law would receive the grade *good*. The work of the sole professor teaching the subject would certainly deserve a higher grade. However, since more resources have not been allocated to the discipline, a higher grade is hardly possible. A comparative approach could of course be advanced within other disciplines, too; however, no great enthusiasm for comparative work seems to prevail in the Faculty.

### **3.7. Jurisprudence and Philosophy of Law**

The discipline of Jurisprudence and Philosophy of Law is clearly undergoing a transitional period after the retirement of its two professors of international stature. The professors have still published during the five-year period under evaluation, and their publications clearly

contribute favourably to the overall assessment of research outputs. The other researchers are still in the initial phase of their research career. Their publications, some of which have appeared in international, refereed context, are of a good quality but for understandable reasons do not perhaps yet reach the same level as the products of the previous generation. In quantitative respect, the already published research of the present staff is not particularly extensive, probably at least partly due to their other responsibilities, such as teaching. The grading is *very good*, if the publications of the former professors are taken into account, *good*, if not.

### **3.8. Legal History**

Because of the small staff in Legal History, the present level of research is not easy to assess at the moment. Only three senior researchers are included in the evaluation. Of these three, one is now retired, one employed by a Danish university, while one devotes 50 % of his time to the Vietnam Project. The general impression is that the level of research varies and does not, in all cases, quite meet the level of the wide international networks the Lund legal historians are engaged in. However, some of the senior researchers have made excellent contributions to books published by well-known international publishing companies, and the doctoral students too can display publications. What is still lacking are articles in the best international journals. Despite the very good or even excellent performance of certain researchers, and because of the poor state of resources described above, the overall, average grade is *good*.

## **4. COLLABORATION**

### **4.1. Faculty**

The teachers of the Faculty are well connected to the outside world, both at the national, Nordic and international level. Practically all teaching teams or disciplines are able to show a wide and credible array of networks in which they are engaged. The Vietnam Project, involving teachers of many disciplines, deserves a special mention.

### **4.2. Public Law**

There are quite significant differences between the various sub-areas of Public Law in terms of collaboration with other research environments. Some researchers and research areas have well-established network con-

tacts at national, Nordic, and international level, contributing to fruitful research activities and to important publications in international fora. Other researchers could undoubtedly take advantage of extending their collaborative networks in order to realise the transnational aspects and potential of their subject areas (see 3.2. above). Furthermore, a general problem seems to be the absence of collaboration structures between researchers within constitutional and administrative law, as well as EU law, and the research activities within Public International Law, apart from ad hoc collaboration between tax law and migration law (see 4.5.1. below).

### **4.3. Private Law I and Private Law II (The Social Dimension)**

Domestic and international collaboration may be considered as a particularly strong side of the activities within Private Law I and II. This collaboration takes many forms.

Firstly, private-law researchers are involved in national and international networks, some of the latter on a Nordic basis (e.g. foundation law, maritime law). Exchange of researchers and teaching cooperation can also be mentioned (see below).

Secondly, the researchers are engaged in advanced multi-disciplinary cooperation with some other research units of the university. The Department of Business Law at the School of Economics should be particularly mentioned. Recently, a joint project of corporate governance has been launched.

Thirdly, private-law researchers are active in the legal development project with Vietnam. There is a well-developed exchange of teachers and researchers, and four Vietnamese doctoral candidates are writing their theses in Lund.

However, it is slightly surprising that there is no macro-regional cooperation with the countries of Eastern Central Europe (or with the Baltic countries). The private-law institutes of Poland, Czech Republic, and Slovakia etc. would be quite natural partners for several reasons, and the private laws of these new EU countries constitute an important object of research.

Private Law II (The Social Dimension) has a strong tradition of collaboration with various partners. This includes multidisciplinary collaboration

within the Faculty; collaboration with national partners; activities within the EU; and international collaboration.

#### **4.4. Criminal Law and the Law of Procedure**

Despite the small number of tenured professors and associate professors, the teaching team of Criminal Law and the Law of Procedure in Lund is very active in many forms of collaboration. The professors and younger researchers are working in several international networks and clusters. Practically all researchers have participated in several Swedish and international research projects. The co-operation is often of an interdisciplinary nature.

The researchers in Lund have actively organised workshops, seminars, symposia and conferences. They have also edited scientific publications. Most of the international co-operation has occurred at the Nordic level, but there has also been collaboration with German, Dutch and British research teams.

The staff has been active in the legal development project with Vietnam, teaching and supervising Vietnamese students and doctoral candidates both in Lund and in Vietnam. The researchers have also contacts outside academic life: with courts, other public authorities and NGOs.

#### **4.5. International Law**

##### ***4.5.1. Public International Law***

Within the Faculty, Public International Law collaborates especially with Jurisprudence and Philosophy of Law, in the form of a common, multi-annual research project on the theme of Use of Force funded by the faculty. This collaboration attests to the theoretical ambitions, characteristic for the research within public international law. Within the field of migration law, there is collaboration with tax law and labour law. As regards the University as whole, the Raoul Wallenberg Institute, the Institution for Peace and Conflict Research and the Institution for Political Science constitute natural partners of co-operation. What is perhaps surprising is that within the faculty, there seems to be no co-operation with the public law disciplines of constitutional or administrative law. Furthermore, at present there seems to be no ongoing common research with the Raoul Wallenberg Institute.

Public international law is by nature an internationally-oriented discipline and international networking is a necessary prerequisite for successful research. Due to the fact that the tenured are still in the beginning of the careers, it is understandable that they have not yet been able to establish very extensive international contacts. However, a good start has been made, with especially good contacts with, in addition to Nordic academic institutions, Australian institutes and faculties.

#### *4.5.2. Private International Law and Comparative Law*

As already pointed out, there is much of collaboration between the researchers of private international law and private substantive law. As regards teaching collaboration and collaboration within international organizations of the field, the situation is excellent. At present, a member of the staff serves as the president of an international association of the leading European experts on private international law. He will give the appreciated General Course on Private International Law at The Hague Academy of International Law in 2010.

A member of the staff supervises two doctoral theses in other Swedish law faculties and one in Vietnam.

#### **4.6. Jurisprudence and Philosophy of Law**

Within the faculty, Jurisprudence and Philosophy of Law has established three research clusters with other disciplines (public international law, procedural law and corporate law). One of the clusters has also received a considerable amount of external funding. Such collaboration within the faculty must be regarded as a very positive and promising development.

On the other hand, established collaboration with other faculties and institutions of the universities seems to be lacking, although by its nature the discipline is well suited to co-operation with, e.g., the Department of Philosophy. There is no mention of international partners of co-operation, either, in spite of the internationally-oriented character of the discipline and the strong heritage, left by the former professors.

#### **4.7. Legal History**

The legal historians at Lund have excellent connections with the outside world, at both the national, Nordic and international level. The junior

researchers have benefited from and actively contributed to the REUNA network of Nordic legal history. They are also busy establishing contacts of their own. Some of the senior researchers are extremely well connected with European and even US colleagues through various projects and networks, such as the European Consortium of State and Church (Milan), Religion in the 21st century (Copenhagen) and Nordic Legal Maps in Transition (Lund). National collaboration exists as well. The well-established international and local, interdisciplinary contacts to the theologians deserve a special mention.

Many of the projects in which that the Lund historians are involved are of an interdisciplinary nature, involving colleagues from various branches of positive law as well as from comparative law, sociology of law and theology. What is particularly praiseworthy and exemplary is that the seniors have managed to involve the doctoral students in their networks.

## **5. RESEARCH ACTIVITY AND TEACHING**

The Faculty has paid specific attention to researcher training and conducted an assessment of it in 2004. The assessment came to the conclusion that researcher training should aim at creating a pool of researchers who would be qualified applicants for professorial chairs and positions as university lecturers in the future. This would presuppose a higher amount of doctoral students, with the consequence of more of the teachers' time required for the supervision of them.

The teaching load of some of the associate professors amounts to 80 % of their total working time. This is evidently too much and leaves practically no time for meaningful research. Although it is in principle possible to “buy out” time for research by acquiring external grants, this option is not available to all concerned.

As regards the substance of undergraduate teaching, the necessity of providing future lawyers with a comprehensive legal education restricts the possibility of immediate links between teaching and ongoing research.



## 6. EVALUATION OF FUTURE PLANS

### 6.1. Public Law

Some of the researchers have presented interesting and persuasive future research projects or plans. The Public Law teaching team as such does not, however, have a comprehensive strategy for future activities. Thus, there seem to be no clear strategic choices as regards the relative weight of the different research areas within Public Law, the relationship between general administrative law and the specialised branches of administrative law, and the interaction between (national) public law and public international law. For example, the present divisions between administrative law and social welfare law, and between the latter and health law, as well as the location of these subjects within the teaching teams, are not entirely logical. The position and the disciplinary integration of research on “Law and Development” may also need some strategic (re)consideration. Although the important national commitments of legal research – with respect to support for both legal education and legal practice – must be recognised, these commitments too would benefit from clearer strategic choices.

### 6.2. Private Law I

The private-law teachers in Lund have a clear vision of the future. According to the plans presented to the Panel, domestic and international cooperation will continue in many sectors (foundation law, corporate governance, intellectual property law, etc.) and with several partners (Copenhagen Business School, London University, Lund School of Economics, other law faculties in Sweden, etc.).

As the names of the partners indicate, there are important multidisciplinary elements in the future research. The corporate governance project is a good example. In addition to lawyers and business researchers, social scientists will be involved.

There are also highly interesting ideas waiting for their realization. Notably, an innovation market project, of a multidisciplinary nature and with international and developmental elements, could be mentioned. Unfortunately, the project has recently been shelved due to changes in Swedish developmental aid policy.

The number of doctoral candidates is important. The total number of theses in progress seems to be at least ten (several doctoral candidates come from Vietnam).

Predominantly, the future research of the team focuses on problems connected with international business and commerce. Classical property-law themes are not included.

### **6.3. Private Law II (The Social Dimension)**

Promising fields of future research continue on the line of integrated research – for instance, the interaction between changing labour market conditions, sustainable social security systems and new, more flexible family patterns. Other promising fields are discrimination in employment, flexicurity and industrial relations. The prospects of future research are bright: new topics will be introduced and new perspectives adopted.

### **6.4. Criminal Law and the Law of Procedure**

The researchers in Lund are now specialized in many highly pertinent topics, such as international criminal law, criminal law in the European Union, Human Rights, economic crimes, alternative conflict solutions etc. The researchers are well up-to-date in their research themes.

However, the variety of themes causes problems, too. It seems that team work is not functioning in research as well as in teaching. Clear vision and strategy of common future research is lacking. The fragmentation of the research profiles cannot be remedied only by recruiting more researchers and teachers. The resources must also be allocated to specific themes and research groups.

### **6.5. International Law**

#### ***6.5.1. Public International Law***

Within Public International Law, the topics and themes where the emphasis of research will lie have been clearly defined, and in most of these areas, research has already been initiated. These research fields will also constitute the focus of both local and international co-operation. Such a

conscious concentration of efforts is particularly important for a relatively small research unit. All in all, the research strategy to be followed in the future is clearly defined and articulated.

### **6.5.2. *Private International Law and Comparative Law***

According to the Strategic Plan of the Faculty, Comparative Law and Private International Law should always have at least one professor.

The plans for future research are not developed enough. It is merely stated that the current professor's "research focuses at present on the ongoing Europeanization of PIL" and that the two other staff members "are presently working on books developing further the subjects of their respective dissertations".

It is essential that the staff develop a clear vision of the future research needs in the field of private international law. The same goes for comparative law, the future of which seems rather insecure and excessively dependant on one prominent researcher.

### **6.6. Jurisprudence and Philosophy of Law**

Obviously because of the current transitional phase, the research strategy of Jurisprudence and Philosophy of law is not very clearly defined. However, it can be concluded that in addition to general legal theoretical and legal philosophical issues, an emphasis is laid on issues of theoretical or philosophical character which relate to a specific branch of law. The formation of common research clusters with other disciplines of the faculty follows such a strategy. Such a strategy, which can be of great benefit to both partners, deserves support and encouragement.

Because of the limited resources available, a clear definition of the focal points of research would be needed.

### **6.7. Legal History**

The research strategy of Lund Legal History is not articulated in the documents presented to the Panel. Implicitly, however, the legal historians have aimed at crossing the borders between legal history and other legal disciplines (such as comparative law) and even other fields (such as theology). This seems a wise path to continue on.

## 7. FUTURE POTENTIALS AND POSSIBILITIES

### 7.1. Public Law

See section 6.1. Public Law above.

### 7.2. Private Law I

Private Law I in Lund has very strong future potentials. There is a competent staff and numerous doctoral candidates, working on well-chosen problems. Certainly, one could indicate other problems where more research would be desirable (like those of property law, mentioned above). However, one team cannot focus on all possible themes, and the coverage of the themes chosen by the Lund team is very good.

From the geographical point of view, the coverage is also good. It is natural that the interest of the researchers concentrates on the EU and that the USA often constitutes an object of comparison. The researchers mostly deal with problems which are – or will be – regulated at the level of the European Union, and of which the USA already has experience.

However, one question could be raised with regard to the geographical coverage of the research: the European countries of transition economy are not (explicitly) present in the plans at all. As is well-known, Russia (like China and India) has a huge potential as a market economy, and Western research focusing on the development of Russian private law is very much needed. Certainly, it must be remembered that this kind of research is actually carried out in other Swedish universities. In any case, at least co-operation with the countries of Eastern Central Europe, and research on their private laws, would seem quite natural: these countries are geographically close to Lund, and they also possess an important economical potential (notably Poland), as well as old and developed legal cultures. Furthermore, there are students (even teachers) in Lund coming from this area and possessing the relevant language and cultural knowledge. Therefore, one might suggest that future cooperation partners in the field of private law be also sought from Poland and other countries of Eastern Central Europe. The same applies to the Baltic countries. In this way, inter alia, the interesting question concerning private-law convergence, raised in the Description Paper, could be analyzed from the perspective of an important region of Europe.

The aspect of legal development co-operation is strongly present in the existing and planned research of the private-law team. It is understandable that only one partner country, Vietnam, has been chosen.

### **7.3. Private Law II (The Social Dimension)**

In the background documents, the Norma Research Programme is characterised as "the most successful research program during the last decades at the Faculty of Law at Lund".

The self-evaluation mentions as specific strengths of the team of Private Law II the focusing on issues which topical are from a political, economical and societal point of view; the inclusion of both the national, the EU and the global perspective; a strong multidisciplinary profile; networking and the ability to attract external funds. The diminishing number of full professors and the small size of the staff are mentioned the main weaknesses.

Taking into account the quality of the research and its international dimensions, the potentials seem well founded and the prospects realistic, provided that sufficient resources are secured.

### **7.4. Criminal Law and the Law of Procedure**

The basic structure of the staff is good. The combination of full professors, associate professors, senior lecturers and doctoral students is in balance. However the future prospects of research depend strongly on the appointments of the professors of the next generation. Criminal Law and Law of Procedure needs one professor who could focus on directing the research.

The professors have successfully recruited and tutored several doctoral candidates and younger researchers. Thus, the possibilities of hiring young scholars to the research teams are good. The Lund team already possesses broad multidisciplinary and international contacts, experience of applying external research funding and ability to organize international meetings and conferences. In this respect, the infra-structure is in order. However, the teaching load is clearly draining too much of the research capacity.

## **7.5. International Law**

### *7.5.1. Public International Law*

Clearly defined research strategy, which also serves as a focus for local and international co-operation, constitutes a fruitful basis for future research within Public International Law. Several promising research projects have already been launched. Efforts to obtain external research funding are a promising sign of future success. With additional funding, increased staff and increased opportunities to concentrate on research, further extension of co-operation with local and international partners and the enhancement of the unit's and its researchers' international standing, the unit has excellent possibilities to achieve its ambitious aims.

### *7.5.2. Private International Law and Comparative Law*

It is obvious that the staff members of Private International Law and Comparative Law represent high know-how in their field. As is well-known, researchers of substantive private law also deal, to some extent, with problems of private international law. However, the development of the general doctrines or *allgemeine Lehren* of the field (*ordre public*, immediately applicable rules, etc.) falls to the specialized researchers of private international law.

In addition, there are important problems of a general nature which are not included in the general doctrines and which have been practically ignored in the research of private international law. One example consists of the issue of languages and translation. In cases of international private law, law courts normally face this problem: when foreign law should be applied, the original documents stating the contents of this law are usually written in a foreign language. The same applies to the execution of foreign judgments.

Important research on legal language and legal translation in general exists but these problems have been very little, if at all, discussed in connection with international private law. Deep-going research would be important, preferably in inter-disciplinary cooperation with linguists. The Lund staff would be ideal to carry out such research, thanks to their excellent language knowledge. The same holds for the issues of *allgemeine Lehren* of private international law.

Securing the position of comparative law demands conscious measures by the Faculty. One possible solution would be to strengthen the ties of the discipline with one of its most natural companions, legal history.

### **7.6. Jurisprudence and Philosophy of Law**

The future prospects of research in Jurisprudence and Philosophy of Law depend on choices of personnel policy. The discipline is in obvious need of a tenured professor who could effectively direct the research activities, procure necessary funding and establish functioning international contacts. The research of the present staff is interesting and promising and constitutes a good basis for future success and a continuation of the obliging traditions of jurisprudence and philosophy of law in Lund. Such a success, however, also requires determined efforts from the side of the faculty and university. Within legal scholarship, jurisprudence and legal philosophy is engaged in basic research, and strong basic research is a prerequisite for successful research in general.

### **7.7. Legal History**

The strong international contacts of the Lund legal historians, both senior and junior, constitute their foremost asset. The legal historical conferences and symposia organised at Lund have benefited not only the legal historians but other Faculty members as well. These contacts, although already remarkably well-functioning, are a potential that has not yet been fully exhausted.

The Legal History unit has been strongly geared towards comparative approaches and considerations of legal cultures, a path well in tune with the latest developments and trends in international research. It would definitely be advisable to continue in this direction, especially since comparative law as a separate discipline is poorly resourced in the Faculty and Legal History is the most natural discipline to make up for the lack. Legal History, however, would need more resources in the form of a tenured, full professorship.

## **8. GENDER AND EQUAL OPPORTUNITY ISSUES**

In 2005–2007, eleven doctoral dissertations were defended, ten by male and only one by a female doctoral student. Judging by the amount of doctoral students at the moment, the situation is likely to be remedied in the coming years.

Most of the law degrees are already taken by female students (for instance, in 2007 63 % of the graduated were female). However, only three out of the twelve full professors of the Faculty are women. In the teacher corps as a whole, the situation is not remarkably more balanced: as of 1.1.2008, 29 % of the teachers at the Faculty were women.

The Faculty has prepared a plan for the years 2008–2009 to address the gender problem. The plan aims at, among other things, increasing the number of female teachers. Thus, for example, in the near future three female part-time guest professors (in labour law, criminal law and legal history) will be hired.



# PANEL 2 – RELIGIOUS STUDIES

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## 1. INTRODUCTION

In the present stage CTR (Centre of Theology and Religious Studies) is part of the Faculty of Humanities and Theology with the status of a center. In 2009 CTR will be transformed into a department of the Faculty of Humanities and Theology. CTR currently includes the following areas: History of Religion, Biblical Studies, History of Christianity, Studies in Faith and Philosophies. CTR has 15 full professors (10 of them senior p.) and 11 associate professors, 5 assistance professors and 4 assistant researchers.

CTR is internationally known for excellent exegesis and excellent church history. The theological profile of the CTR emphasizes the study of theological notions and practices in the historical settings of the Biblical texts as well as in the settings that from early on and up until modern times were decisively influenced by these texts. The profile in Religious studies is concerned with the roles of religion(s) in western multicultural societies and their relation to traditional western and non western societies and religious milieus. A strong focus lies on the study of the religious scene of the middle East and India.

## 2. OVERALL ASSESSMENT

The quality of research of CTR ranges from *excellent* in some units to *good/very good* in others.

### **3. RESEARCH QUALITY**

The research quality corresponds to international standards. In some disciplines of the unit the research results have attracted international attention and are at the frontier of research. Several professors of CTR (especially in the fields of Church History, Biblical Exegesis, and History of Religion) are internationally well known. So the scale extends from *excellent* to *good*.

### **4. AREAS OF EXCELLENCE**

Research in the areas of the “old” chairs of Biblical Studies, Church History and Dogmatics is based on a small number, particularly of full professors, have widespread international reputation and contribute to the main contemporary theological debates and issues. The standard is *very good/excellent*, but there is a lack of the infrastructural support and the PhD students that would translate this into an outstanding effort and to create greater impact in current international debates.

### **5. RESEARCH ACTIVITY AND TEACHING**

Research activity relates to productivity, international standing and international activity as well as to dissertations and projects. The productivity in terms of bibliometry is only on average (as to several professors with a high or outstanding productivity see the additional remarks). The number of doctoral dissertations is good/very good (differing between the disciplines, some excellent disciplines). The existing international reputation of CTR would be strengthened by publishing in English or German, especially for doctoral dissertations. The teaching load is too high and the lack of sabbaticals is a serious handicap in the international context.

### **6. FUTURE POTENTIALS AND POSSIBILITIES**

Beside the areas of excellence, which we see as areas of continued potential, we see *very good* future potential in the French-Swedish long time symposium on the issue of religious pluralism and dialogue.

**Potential development areas:** There is considerable potential to create a focus area on the theme of current developments in Islam in the Nordic countries of Europe and their relations to Islam in the Middle East (combining major issues in religious studies with Arabic Language and Culture, especially in the northern regions of India/Pakistan, and special focus on Indic Religions, Jainism, Sikhism). Such a project would deal with the central issue of European migration in terms of religious and cultural identities. Lund is the only Swedish university with the research infrastructure for this major issue. It would benefit from a chair in Indic religions and links with the new established chair of interreligious theology being established in Jerusalem). The University is encouraged to consider supporting a major bid for EU support, but effective development of this research area would also need to be supported by new study programmes, new positions for research and teaching, particularly in languages as base for PhD research, and cooperation with a university in the Middle East and/or North India. Such a focus area also would also make a major contribution to internationalization of the CTR.

We also wonder whether the very good possibilities and chances for future research in the field of ethics (see the EU financed project in Biomedicine) in cooperation with philosophy on the one hand and the faculties of medicine and engineering on the other hand could be brought to a European standard.

## **7. GENDER AND EQUAL OPPORTUNITY ISSUES**

Concerning staff and doctoral dissertations we see *good/very good* equal opportunity possibilities. The faculty should look for excellent female members of the academic staff who are not one-sided concentrated on gender issues but whose scholarship is wide-ranging.

## **8. APPENDIX TO THE PANEL 2 REPORT**

The following consists of a more detailed review of the research of CTR prepared as part of their preliminary report by Panel 2, and on which the above final report is largely based. It was felt however that it would be useful for CTR and the University to see these comments to amplify the final Panel report. *G.S.Boulton, Main Chair.*

### **8.1 Preliminary remark**

For CTR, the evaluation takes place at a difficult time, after a major restructuring due to financial problems, at the same time the Bologna system has had to be implemented, and in the midst of a reorganization which will result in it ceasing to be a centre and becoming a department in the School of Humanities and Theology. To be downgraded from an (old and leading) faculty to a centre and then to a mere department causes problems of identity and motivation. It is a difficult, uncertain and stressful times for staff and management a difficult time for evaluation of research quality. However, we hope that the challenge of coping with these difficult circumstances will lead to further fundamental and critical reflection on a new identity as a department. At SHT level this process of finding a new identity should be actively promoted and supported. CTR has a strong reputation and should have the opportunity to keep that reputation in a new setting. This is crucial in creating a motivation for change.

### **8.2 Fields of research**

The sub-division of CTR into 14 fields serves the purpose of indicating to students, colleagues and those responsible for the budgets the type of education and research CTR offer. Each field has at least one full professor. The leading idea seems to be completeness of disciplines both in Theology and in Religious Studies. This guarantees a wide or almost complete range of opportunities for the study of Theology and Religion which is a distinctive quality not only in teaching but also of in the infrastructure for research (library, competent colleagues). In response to earlier criticism of being too sub-divided, several measures for concentration and exchange have been taken. There are examples of joint ventures, both in the form of research seminars (seven doctoral seminars and two research seminars in Theology and the History of Religion), research projects and other *ad hoc* arrangements. But there still seems to be potential for more cooperation, especially when it comes to stimulating interdisciplinary research and creating larger research groups.

CTR in Lund and the Theological Faculty of Uppsala are unique in Sweden in that research within the History of Religion is carried out in a faculty of Theology. However, it is not clear how and to what degree there is an interplay between History of Religion and Theology that influences research and creates synergy effects.

There is a policy to add new fields and projects – recently Indic religion, Human Rights and Theology of Religion (with a site in Jerusalem: which is very remarkable and promising) have been introduced as new fields – which is positive and part of a dynamic development within CTR. But what happens to the old fields, is there a policy for discontinuing fields and projects?

As to the field of ethics we have some general questions and issues: in view of what is done in the field of ethics, is there a collaboration with the department of medical ethics at the faculty of medicine? In view of the strong position of the faculties of science and of engineering, what about doing things together in the philosophy of science and technology, research ethics, applied ethics? Would there be a place for a University Institute of Ethics?

### **8.3 Publications and quality of research**

This assessment takes a six year perspective on publications and assesses 35 researchers at CTR. (According to the Dean's evaluation there are 15 full professors, 11 associate professors, 5 assistant professors and 4 associate researchers.)

According to the basic descriptive data from 2002–2007 there were 53 original articles in refereed journals (average ca. 8,8 per year), 1 scientific review, 6 conference papers (average 1 per year), 125 book chapters (average ca. 21 per year), 17 books ( average ca. 3 per year), 26 edited volumes (ca. 4,3 per year).

All together there were 228 strict scientific publications from 2002-2007 (average 38 per year). As for articles and book chapters 185 scientific contributions were published (average 31 per year). This means that professors and researchers have published on average ca. one article or book chapter per year. They have also published on the average ca. one book per ten years and edited one volume per seven years. The frequency/quantity of publication at the CTR at large is satisfactory, but not impressive. The general impression is that all fields publish. But we have to consider that there is a manifest difference between one group of professors publishing at an international standards and in international publishing houses and another group whose publishing is rather poor.

The long-term aim of the evaluation of LU is to strengthen the University as a research organization of international high standard. The quality, productivity and vitality of the publishing activity of CTR should be assessed against international standards. CTR's output consists of a variety of publications. Most striking is that there is a rather low number of articles in scientific journals compared to book chapters. This, however, seems to be in line with a contemporary pattern of publishing in humanities and theology.

Almost half of the book chapters and articles were published in English or German, which probably strikes a good balance between publications in Swedish and other languages. Of the thirteen book listed, eleven were published in Swedish. There are internationally different "publishing cultures", not only between science and humanities, but between the different fields of CTR, where some of the fields tend to publish more internationally. CTR should encourage all fields to publish more in international accessible languages and in higher ranked publication channels, especially those fields where there are only or almost only Swedish publications. CTR should use the opportunities of translations at least into English and German (funded by European funding). This does not mean that it is not meritorious to publish in Swedish. It is, of course, important that academic literature is published in the national languages. An edited volume in Swedish could, for instance, be the result of a joint-venture within CTR and a result of a team building process across the different fields, which is positive.

The evaluation panel has consulted bibliographical data and counted the number of articles, monographs and book chapters published by the researchers in each of the 14 fields, and have tried to estimate the quality of the journals or publishing houses involved (book reviews, abstract and conferences are not included). Only 27 persons of the 35 researchers of CTR were listed with publications (see above). Some of them that were listed without publications probably have some, although relevant information may not have been given to us. The picture is also slightly distorted because those who have retired during the last five years are usually not in the list of publications. All the same, the survey hopefully suggests some tendencies in the publication patterns of the different fields.

What follows is a grade for each field. The grade is made on the basis of the publication data that we have got, but also on the basis of additional

data in the Dean's report about research projects, international networks etc. Doctoral theses have not been included in this evaluation. It is difficult/unfair on the basis of the accessible data to point out fields that do not perform so well (insufficient or poor).

## **8.4 Specific comments**

### **Philosophy of religion:**

15 bookchapt. and articles. All in Swedish. OK journals. Slightly more publications than the average of CTR, but only publications in Swedish.

### **Church History:**

3 books (Swedish), 43 book chapters and articles (12 in English or German). Published by Vandenhoeck& Ruprecht, Mohr Siebeck, Cambridge and de Gruyter. Huge amount of publication. Both national and international publications.

### **Practical theology:**

3 articles and bookchapters (Swedish). Less than the average of CTR. Are there more people in this field? A strong amount of dissertations (8).

### **NT exegesis:**

3 books (Swedish), 24 articles and bookchapters (9 in English or German). Highly ranked journals and publishing houses. Published more than the average in CTR and with several publications in highly ranked journals and publishing houses.

### **OT exegesis:**

3 books (Swedish), 11 articles (1 Swedish), 1 Book chapter (Brill). Several highly ranked. Publishes more than the average of CTR and has several publications in highly ranked journals and publishing houses.

### **Psychology of Religion:**

4 books (Swedish), 2 articles/bookchapters (English). Publishes more than the average in CTR. Most national, but also international publ.

### **Sociology of Religion:**

4 book chapters, Swedish and English. Less than the average publication activity.

**Ethics:**

2 dissertations (Swedish). 17 articles and book chapters, most of them in English. Highly ranked journals/publishing companies. Some articles with joint authorship. High publication activity. International orientation.

**Migration studies:**

1 book (Swedish), 4 articles and book chapters (3 in English). Highly ranked publishing houses and journals. More publications than the average of CTR, some of them international.

**World Christianity and Eucumenics:**

3 articles and book chapters (English).

**History of Religions (+ Indic):**

7 articles and book chapters (6 in English) Highly ranked journals and publishing houses.

**Islamic Studies:**

1 article. 4 book chapters, English, French and Swedish. Slightly below average of CTR, but with some international publications.

**Jewish Studies:**

7 book chapters. English and Swedish. Slightly above the average of CTR.

**Systematic Theology:**

One book co-authored (Swedish). 4 bookchapters and articles, three in English, one in Swedish. Also several recent bookchapters and articles are listed on internet, but not in the data we have got. More publications than the average of CTR.

**Human rights:**

One dissertation and one book chapter. New field. In the process of appointing a professor.

**Doctoral dissertations:**

There were 81 registered doctoral students in 2007. In 2002-2007 there were 66 Ph.D. which is an average of ca. 11 per year. (The Dean's report says an average of 15 doctoral dissertations yearly). Mean age in 2007 was 46.4 (In 2003–2007 mean age was 44.5). The age is too high.



Ranking in accordance with the number of doctoral exams (Ph.D.) (2002–2007):



According to this list, all fields produce doctoral theses. Some of them are more productive than others. History of Religion with 11 candidates is on top (ca. 2 doctoral candidates per year), while Judaic Religion and Migration studies have only had one doctoral candidate each the last six years.

The average age for taking a doctoral degree is too high (46.4 year in 2007). The average time to take the degree is also too high (5.9 years; in Germany 3 years). The reason for high doctoral age can either be that people begin their doctoral studies too late and/or there are many older candidates that take a doctoral degree, so that the average age is pushed up. The relationship between registered doctoral student and those that take a degree is not optimal, 12/81 in 2007.

The percentage of women who take doctoral degrees is lower than average for LU:11 % in 2007 (but 33% 2003–2007) compared to 46 %.

21 of the dissertations were written in Swedish. In the History of Religion 3 of 11 were in Swedish, Church History had all in English (5), while Ethics had 5 of 6 in Swedish.

### 8.5 Most successful research areas

Based on publications, Ph.D. candidates, international co-operation, external funding and strong national and international impact, we assess the following research areas as the most successful:

**Church History** is the most outstanding field in CTR. The field has two international well known professors, who have published extensively. A book on the letters of Anthony changed the entire field of research of ancient monasticism in Egypt. A book on Jewish race as a hindrance to marriage in Sweden is mentioned in the Dean's report as one of the five publications which best represents the research activity of CTR. It is in addition the one publication that had most global media attention of all publications from CTR. Together they have co-authored a research-generated text book in Church history (in Swedish), used at several universities. In the series Svenskt Patristiskt Bibliotek Christian ancient texts are translated from Greek, Latin, Syriac and Coptic into Swedish. Four books have been published, six more are planned. The milieu has had a high impact in Scandinavia and also internationally.

In addition, **Old and New Testament Exegesis** have performed at a very high international level with large research groups, external funding, publications in high impact journals and highly-reputable international publishing houses, and with a high output of doctoral candidates. However, a number of the professors have recently retired, so while it is easy to see that Biblical Exegesis has had a glorious recent past at LU, it is perhaps open to doubt that this will continue into the future?

The **History of Religion** and the **Philosophy of Religion** are also especially successful.

**Indic religion**, which emerged from the History of Religion, is a relatively new field. It has an extensive international cooperation. Its professor has received long-term financial support for his research group (three researchers + doctoral students) and has the status of a leading scholar. He is internationally recognized for his achievements. History of Religion including Indic Religion has during the last six years had 11 Ph.D exams.

**Philosophy of Religion** is, according to the Dean's report, a dynamic field where there have been a growing number and doctoral students, external funding, interdisciplinary projects, extensive international

networks and exchanges, and high publishing activity. One of the articles from this field is especially praised by the Dean. Though this field should be more ambitious in their publishing policy, we follow the Dean's report in ranking this as one of the most successful areas.

## **8.6 General considerations**

### *Individualism and larger research groups*

We have the impression that there is, in CTR research, a situation comparable to many other theological faculties at European universities; that humanities and theology research has been an endeavor of individuals. But, as with sciences and technology, humanities and theology have to face the conditions of funding and national and international research policies that target long term projects with groups of scholars. Humanities and theology should be successful in both fields: in individually based research that still remains the base of our activities as well as in research groups.

As to strong long term projects in the humanities, we have to face the reality that critical editions and translations have the only real chances of being funded. Is there a possibility for editing and translation in the fields of Islam and Indic Religious Studies? In the current circumstances at Lund University (as at other universities), the management of CTR/HT cannot avoid making a (short term and long term) research policy choices, which imply a painful focusing of areas of research, recruitment of staff, PhD policy (in what research field should a PhD student work?) and publication policy. Much effort should be given to gaining the support of as many staff members as possible for change. The ideal situation would be to coordinate individual motivation (and skill) and department policy.

### *Research policy*

Research policy requires choices. Doing everything often means doing nothing well. We offer CTR the following advice: try to find out where you are or want to be excellent and what kind of issues you want to deal with. There are 17 universities/colleges in Sweden where religious studies/theology is currently studied. They all have to face the same problem as in Lund. Negotiate with them concerning focus areas of research. Lund University (and even the Swedish government) should promote and support these negotiations. Even if the negotiations fail, making choices is necessary. Making choices in research areas is important for the

recruitment of staff members and PhD students as well (please consider our above evaluation of the disciplines).

### *Issues of research*

The remarkable strength of the faculty in Church History and Exegesis at the one hand and History of Religion at the other hand should become the base of one or two focus areas. E.g.: questions of the relation between Christian canonical texts and their hermeneutics and Koran hermeneutics or between Christian monastic groups and Islamic spiritual schools need present-day research and could be funded by European institutions. Another important field is the impact of theological ethics to current issues of technology and medicine as well as to human rights (see above). A third field is the new tight connection between Humanities and Theology/Religion. Here are many challenges, possibilities, and chances for joint research projects (in the historical disciplines, in classics, in cultural studies). As to long term projects see above.

### *International position*

At the moment the international position of CTR is ‘completely dependent on initiatives of its individual researchers’. Here again we would advise that CTR should try to ‘institutionalize’ some of the major international connections and take the initiative to create structural collaboration in research areas between institutes and faculties of religious studies/ theology in other countries. In other words, making choices in research policy could give an impetus to international collaboration (and the other way around). Joint initiatives like in philosophy of religion are appropriate and should be stimulated, but long term international collaboration between research groups would contribute to the international standing of Lund University in general and (the future form of) CTR in particular. In short: try to combine the creativity and the networks of individual researchers with CTR policy.

### *Funding*

We can understand why external funding is both a strong and a weak point. We can see the vulnerability it leads to. So it is clear that a research policy should be based on faculty funded in long term research lines. It is not good to be entirely dependent on short term external funding. However, within the framework of a strong and relevant research policy, external funding may be welcomed as in strengthening of long term research as long as continuity of research can be maintained. It is

needless to say that a new research strategy requires investment from the university (and perhaps from the government).

### *Staff and management*

The academic quality of the staff is excellent. However, the proportion of (senior) professors is remarkably high. We get the impression that nearly everybody is a professor. We are not acquainted with the Swedish system, but our suggestion would be to rearrange the proportions between (senior, full, associate, assistant) professors and (associate) researchers, to appoint fewer professors, at the same time to strengthen their position, especially their responsibility for national, but especially for international research strategy and defining new research issues and more researchers (with a teaching assignment). E.g. it would be much more attractive for scholars from abroad to cooperate with a well known professor as with a local associate researcher. And, because research and teaching are related, make clearer time arrangement for staff members in teaching, research and administration (for instance an average of 40% – 40% – 20%).

# PANEL 3 – ARTS

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## 1. INTRODUCTORY REMARKS

In each their way the departments and divisions under consideration by this panel take care of cultural and historical memory as well as contemporary consciousness. Their subjects and the way in which they are treated in research and in education based on research are of crucial importance to the cultural and historical horizon of citizens in a world that is marked by dramatic changes.

In many ways these academic disciplines are since the Nineteenth century by tradition oriented towards national cultures and histories, and in particular towards the national history and culture of the nation in which the research takes place – Swedish history and Swedish culture has thus had a very high priority in the Swedish context. Yet also foreign cultures, in particular literatures, have been studied in each their national context, usually in departments covering both language and literature. These organizational structures and priorities have been challenged and are increasingly challenged by modern history as well as by new developments in the various fields of research.

The crucial role of culture and historical memory has become obvious in the wake of changes not least in European politics in the context of globalization. Migration, technological developments, and cultural exchanges at the global level go beyond national – and European – borders. Coming to terms with these changes is a task that calls for knowledge

about foreign cultures and their social as well as historical background. Although interaction with national history and culture is an important task for the academic world, regional, European and wider international horizons should characterize research in the humanities.

The role and impact of studies in culture in the broader sense, including popular culture and media, is less evident than the role of many other fields of research, yet these fields are increasingly integrated in considerations of questions that usually are taken as belonging to the fields of the social sciences. Cross-faculty research that integrates aspects of social sciences and the humanities will in the future become still more important. Area-studies are one version of such interactions. Although there are reasons to focus on departments as organizational structures of research it is equally important to support cross departmental and cross faculty structures of research.

Universities are central agencies for knowledge about the social and cultural conditions of the world, we live in. Research that is developed in interaction with the best international research communities is an essential resource for education, for mediatized information, as well as for political and administrative agencies. Bringing together on one hand historical knowledge and insight in cultural formations on the international scene and on the other hand knowledge about social, economic and political conditions is a task that demands types of intellectual interaction and organizational structures that go beyond the present organization of the university.

The combination of direct access to foreign areas based on language skills, insight in historical backgrounds and intimate familiarity with foreign cultures, i.e. the combination that is distinctive of research in the Humanities at its best, is a unique resource in itself, yet it should also be set in play in other fields.

## **2. DEPARTMENT OF ARCHAEOLOGY AND ANCIENT HISTORY**

### **2.1 Overall assessment**

Department of Archaeology and Ancient History is a strong research environment, which has four disciplines: Archaeology, Classical

Archaeology and Ancient history, Historical Archaeology and Historical Osteology. The department is one of the largest in the faculty. The approach of the research is long-term and in many cases multi- and interdisciplinary.

The self evaluation gives a balanced and realistic description of the most important features of the department's research activities.

The output of the doctoral dissertations has been very good. At this time, the number of registered doctoral students is also high, even though the number of salaried doctoral students is not.

## **2.2 Research infrastructure**

The organization and administration of the unit is quite complex and seems to be a little bit disordered. There are several administrative bodies, which, however, can not make real decisions concerning for example the research or research strategies. In spite of this, it should also be mentioned that the co-operation within the department operates well.

Department writes that the Historical Museum and the Museum of Classical Antiquities are the most important resources for scientific activity. There are also several other museums and laboratories, which are crucial in this matter. However, it is not clear if these institutions really can provide important substance for the research, even if they are important for teaching and for the “third task” of the department. It might be so that these supporting infrastructures can take too much effort, which could be used in basic research.

The department has not told much about the resource materials or special equipments which have been used in studies, but several laboratories etc. have been mentioned.

The economy of the department has deteriorated drastically during the evaluation period. Especially the grants for research, i.e. external funding, have decreased from 10 MSEK to 5 MSEK. This has to effect on the activities of the department.



### 2.3 Research Quality

The reputation of the department is very good, which can be observed firstly from the list of the awarded individuals. Secondly, the researchers of the department have very actively joined the international conferences as invited lecturers and plenary or keynote speakers. One striking observation is that so many members of the staff have been participated in these seminars. It also should be mentioned that several researchers have got assignments to be evaluators and editors in national and international contexts. This indicates that the staff is competent and also highly respected in the community of researchers.

During the evaluation period the staff has published a number of publications. The productivity of the department is, however, sufficient in relation to the number of researchers. The low quantity is at least partly explained by the fact that the researchers publishes quite a lot in refereed journals and write book chapters. Many of these publications are published abroad or are otherwise international.

The department has mentioned three main research projects, which all have been successful. They all have been continued quite a long time and especially the Road to Midgard and The Uppåkra project have got plenty of results too. The department informs also two promising research areas, which are very different compared to the present main research projects. Both of them, The Archaeology of Time Travel and Social Dimensions of Technological Change are even more interdisciplinary than the previous ones, but at the same time they seem to be quite “fashionable” and also not so unique, “different” or as focused than the first mentioned ones.

The quality of research at the department is *very good*.

### 2.4 Collaboration

The department has worked a lot to integrate the disciplines, and have got visible results. The joint seminars and work shops have been held and even though each field has its own area of study there are several cross-cutting areas of research within the department. The interdisciplinary character of the department can be utilized with help of these.

The collaboration within the department is functioning, as with some other departments within the University. The themes of the main

research areas seem to be quite close also to several other departments' interests at the faculty of humanities.

The department is active in national and international collaboration. The high number of lectures and different kinds of assignments is an evidence of that. International collaboration could be even more active, if one is looking at the total numbers of visits etc. However, today the official criteria of at least three months visits abroad is not adequate, since many fruitful research visits are much shorter nowadays.

The “third task” (or obligation) of the university is well managed and it shows that these tasks are integrated in the research.

In terms of collaboration the department is *very good*.

## **2.5 Research activity and teaching**

The department has been active in arranging national and international conferences. The researchers have frequently been participating in seminars and conferences.

The department is highly research oriented and thus the teaching has been connected with in a proper way. The interaction between research and teaching is lively, for instance there are field schools and excavations entirely attached with the ongoing research. Undergraduate students have been recruited to the projects and they have written their BA and MA thesis within these projects.

The department has been successful in collecting grants from external resources. Also the research culture within the department seems to favor projects and large research groups.

## **2.6 Evaluation of future plans**

The plans for the future seem to be realistic. There is a generation change waiting and at this moment there might be some problems of planning the future or to control the situation. However, the department has succeeded in research and the internal co-operation is working well, so the challenges in the future are not necessarily so drastic either. After all, the aim to become a leading center in Archaeology and Ancient History is fully feasible.

The plans of the department are *very good*.

## **2.7 Future potentials and possibilities**

Strong leadership is needed in the near future, when there is going to be a generation change. The department has acknowledged the challenges. The administration should be simplified. The role of the different museums should be evaluated in connection with the research and the diminishing funding. The balance between disciplines within the department should be strengthened, for instance the number of PhD-students varies a lot in various disciplines.

The research plans of the new projects are very vivid and also the international connections are very well described. The new projects do not seem to have many common features compared to the older, prominent ones. Care should be taken that the tacit knowledge and the experiences from the former projects are not going to be lost. It is also important to maintain the archeological basic skills and approaches in the future. The traditional research projects still have remarkable know-how also in fund raising: these experiences can be useful even in new situations. The new ways of doing archaeology are of course welcomed and can help the department to vitalize and renew the research. Even closer collaboration with e.g. Department of History or discipline of Ethnology could give more opportunities to new approaches and new possibilities for funding.

## **2.8 Gender and equal opportunity issues**

The gender balance in the department is slightly for the women: in all personnel categories there are more women than men, in all 66 per cent of the staff are women.

# **3. DEPARTMENT OF ART HISTORY AND MUSICOLOGY**

## **3.1 Overall assessment**

The department is a small unit consisting of three divisions: 1) Art history (1 professor and 3-4 lecturers), 2) Musicology (2 professors and 1 lecturer), and 3) Semiotics (1 professor). There are discrepancies between information at the home page of the department and the list of employees provided for the panel. The majority of the employees are part time.

Including research fellows and researchers the full time equivalent is 21 for all three divisions together. There are 7 doctoral students (Art: 3, Music: 3, semiotics 1). There is a department board, but each division has its own committee for all levels of education and for research.

In Art history and visual culture there is a special emphasis on the period after 1900 including “non-art media and mass media contexts where visuality and visual aspects have a decisive role”. In Musicology there is a special emphasis on both Swedish and European music, particularly in a social and political context. Semiotics has an emphasis on cultural and in particular visual semiotics. The division of semiotics is the only one in Sweden and has a prominent status in international research in semiotics – at the basis of the work of professor Sonesson.

The total revenue is down from kSEK 18 579 in 2003 to kSEK 13 797 in 2007; revenue from undergraduate education and revenue for research are both down about 25%. In particular grants for research have decreased (2003: kSEK 4 595 – 2007: kSEK 2 631). Two professors (three, including Sonesson?) and three lecturers, i.e. about half of the professors and lecturers, are over 60.

Productivity in terms of PhDs is steady; although it is low (about 3 a year) it should be compared to the limited number of professors and lecturers. Most of the PhDs are in Art History and Visual Studies.

It is obvious that staffs of this size cannot cover entire fields of research; it does thus make good sense that both art history and musicology have made the choice to highlight particular areas as indicated above. A merger of the department with Cultural Sciences and Ethnology will potentially create new constellations, in particular in the field of cultural history, yet it is important to prepare for new recruitments.

Since there are significant differences between the research activities of the three sub sections, an overall assessment is not to the point. Below each of the sections will be dealt with separately.

### **3.2 Research infrastructure**

A regular ‘Higher Seminar of Art History and Visual Studies’ invites scholars from other disciplines at the department. The Centre of Sound Environment represents an important potential for interdisciplinary research.

### 3.3 Research quality

Professor Greger Andersson was during the period under consideration here leader of a broad interdisciplinary project at the national level (funded by the Swedish research council) on “Fear, Fascination and Friendship. Swedish culture and science under the influence of Nazism and Fascism 1930–1950”. The project resulted in books, articles and conference papers in German and English as well as in Swedish and demonstrates collaboration at the national level as well as internationally. A similar approach is demonstrated in other publications (e.g. about Shostakovich) from this division of the department.

In both Art history and Musicology a very high proportion of publications are books or contributions to books, a bibliometric emphasis on output in terms of articles in journals is thus not adequate.

**Productivity:** With 43 publications, working papers and conference contributions in Swedish, English, French, German, Spanish and Portuguese between 2002 and 2007 Göran Sonesson’s research output is remarkable and demonstrates his full integration in the international community in the field as a highly respected scholar.

The publications in the field of Art and Visual studies are with some exceptions in Swedish and published in Sweden; the subject matter is predominantly Swedish, yet a number of international subjects are taken up. It is worth underscoring that a number of publications are of a theoretical character, among them several of the publications in English. There are so radical differences between the output of the least productive and the most productive employees that it does not make sense to consider the average number of publications. Within the period under consideration the numbers are within the range of on one hand 19 publications plus 1 book from 2003–2007 and on the other hand zero publications since 2001. A group of scholars in the field are at the level of between 2 and 4 publications a year (including books), this part of the area is thus working fine, yet not even a minimal general norm seems to be enforced in general.<sup>4</sup>

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4. At a very late stage the panel received the information that professor Weimarck during 2002–04 was leading a project financed by the Swedish Research Council on “Design and Visual culture in Sweden after World War II”, the contributions are not yet published.

In musicology the average number of publications (including books) and conference papers are about 2 a year. The majority of the publications are in Swedish and published in Sweden, most of the exceptions are conference papers in English by one doctoral student and first and foremost contributions to the study of music and Nazism in Germany and Sweden by professor Andersson and research assistant Ursula Geisler, research that has resulted in a book (in Swedish) on 'Myth and Propaganda. Music in the Service of Nazism in Sweden and Germany' (2007). Relations between music and politics are a recurrent theme in the publications from this division of the department.

**Research quality:** The research in semiotics which is basically the result of a one man venture, i.e. the work of Göran Sonesson, is internationally recognized.

The musicological research in the field of the social and political context and role of music is leading in Sweden, and does internationally represent development of an important field of research.

Research in Art and visual studies are at the national level.

**Relevance:** Several publications in the field of art are related to exhibitions and thus examples of interaction with the world of art and galleries as it is also the case with other publications that analyse contemporary artists. The studies in social and political aspects of music should be highlighted as important contributions to musicology as cultural history in a broader sense than is usual in the field. In an international as well as a national perspective these studies approach difficult questions in the cultural historical memory, and some of the publications are of a popularizing character. Both art history and musicology thus relate in each their way to the Swedish public. The general studies in the field of images, not least the semiotic contributions, point in the direction of interesting and important interactions between areas of research that usually are far from each other.

**Vitality:** The contributions to semiotics in the period under consideration in the evaluation represent a continuation of a long and steady commitment to the field that is so much more remarkable as it is mainly taken care of by one person. The research in music and politics represents an energetic renewal in the field of musicology. The uneven output in Art

and Visual culture is problematic, yet some scholars stand out as dynamic factors in the research community (cf. below).

The quality of research in Art History is *good*, in Musicology *very good*, and in Semiotics *excellent*.

### 3.4 Collaboration

During two decades a Seminar on Semiotics has brought representatives of various disciplines together, and semiotics has been involved in several research projects at the national and the EU-level, applications have recently been elaborated together with cognitive science, linguistics, human ecology and philosophy. Sonesson holds several prominent posts in Nordic and international organizations in the field of semiotics, among them the posts as general secretary of International Association for Visual Semiotics and vice general secretary of International Association for Semiotic Studies. He is also among the editors of an international journal of visual semiotics.

Recently an ‘Image Group’ was established with a view of collaboration across departments, including Radiology, Medical Informatics, and Physical Geography.

The report from the department mentions unspecified collaborations with other disciplines in- and outside Sweden and points to a master programme in visual studies that involves film studies and philosophy, as well as an international network in visual culture. During the last years international collaboration has had a high priority, e.g. in organization of and participation in conferences. One researcher in art is leading a NordForsk network on ‘The Bodily Turn’ together with leading Nordic scholars. The musicological project mentioned above also involved international collaboration.

In terms of collaboration Art History is *good*, Musicology is between *good* and *very good*, Semiotics is *excellent*.

### 3.5 Research activity and teaching

An effort to bring own research into the higher levels of teaching is mentioned in the report from the department.

### 3.6 Evaluation of future plans

In the field of art and visual culture the plan is to maintain the emphasis on visual arts and visual culture since 1900, in particular with a view of broad research into the role of images and visibility across traditional disciplines and in relation to bodily experience. This is a promising and highly relevant field of research, although the description is somewhat abstract.

In the field of musicology a highly recommendable further development of research in music and politics is the most important project. Other fields of research are mentioned in a rather vague manner.

In the field of semiotics interaction with other fields like cognitive studies and linguistics is highlighted with a view of – as it appears – first and foremost theoretical studies.

The plans of Art History and Musicology are *good*; the plans of Semiotics are *very good*.

### 3.7 Potentials and possibilities

The report mentions the “planned construction of a more extensive and larger historical-philosophical department of humanities” which will “facilitate the research development and cooperation in a multi-disciplinary direction”. Meant is probably the planned merger with Cultural Sciences and Ethnology. It is obvious that there are interesting potentials in interaction with other disciplines within the faculty. It should be underscored, though, that the question is not only a question of ‘critical mass’, it should of course be handled as a question of content. There are in the actual department at least two promising directions of research, one is theoretical – particularly in visual studies understood in a broader cultural context, another is concerned with questions of cultural history in the modern period. The research in semiotics is closely related to the first field, as it is to other fields. Modern visual culture is not least popular culture, aspects of the work at the department thus relates to media studies and studies in popular culture (i.e. to aspects of the literature & film division of SOL as well as to studies in the traditional field of art history, ‘high art’). Yet it is worth considering that the department of History also does express a strong interest in cultural history. Independently of the institutional arrangements, it seems important to keep this plurality of



relations between the various divisions and departments in mind. There does not seem to be just one solution in terms of department construction that will take care of all the potentials for further development of current interesting research and renewal, nor would an emphasis on leadership at the department level provide a solution to cross-disciplinarity.

### **3.8 Gender and equal opportunity issues**

The proportion of women in the academic staff is 48%, yet among doctoral students there are 75% women – an effort might be to the point to attract more men as doctoral students, so much more as 64% of the doctors between 2003 and 2007 were women, and all three in 2007 as well.

## **4. DEPARTMENT OF CULTURAL SCIENCES**

### **4.1 Overall assessment**

The Department of Cultural Sciences comprises four sections: ALM (Archives, Libraries and Museums – Library and Information Science), Book History, History of Science and Ideas and Cultural Studies. It represents a small but vital research environment focusing upon topics that are highly relevant for the digital and multicultural knowledge society. The profile is characterized by multidisciplinary, although with a joint perspective between the four sections. Understanding the impact of digital technologies on patterns of communication in general and scholarly communications in particular and tracing the roots of emerging cultural forms can be described as the integrating focus and research profile of the department. These are major intellectual challenges within the humanities as well as the social sciences today. Combining Library and Information Science, History of Science and Ideas, Book History and Cultural Studies seem to constitute a very fruitful platform for doing research related to these challenges.

Research on documents and media includes information use and scholarly communication as well as print and digital artifacts and transmediation. Research on cultural phenomena includes historical analyses of Western science and philosophy, global post-modernism and contemporary popular culture. The study of knowledge and uses of information are important areas at the department.

The multi-disciplinary approach characterizing the department's subject fields seem to be an important asset. Disciplinary borders seem to be crossed easily.

The department represents a national centre of competence within the field of Book History.

The output of the department measured by publications has had a positive development. The number of publications in 2007 is 300 per cent higher than in 2003. The section on History of Science and Ideas seems to be the most research active at the moment, although the section on library and information science has a very high proportion of its most recent publications in high ranking international peer reviewed journals.

The output of doctoral degrees with approximately 2 per year is satisfactory when compared to an academic staff of only 17.

An international orientation seems to characterize the research of the department, partly through its publication pattern (LIS), partly through building international networks (History of Ideas and Sciences).

#### **4.2 Research infrastructure.**

The internal organization seems to work fine, although the self evaluation indicates that the multidisciplinary potential could be utilized even more efficiently. Concrete plans have been developed and initiatives taken to develop this potential. The number of academic staff within the four sections is limited. That seems, however, to be compensated for through cooperation with other institutions in the same field, for instance the department's participation in NORSLIS (Nordic research School in Library and Information Science) and through cooperation within the department. Existing plans aiming at an organizational restructuring are also important in this respect. And although small, the department is a national and Nordic centre of competence within the field of book history.

The economic situation of the department has deteriorated during the period of evaluation. External funding has fallen from 3,6 MSEK to 1,9 MSEK which must be described as a dramatic reduction. The fact that the department in spite of this during the period of evaluation has been able to increase its research output in the form of a marked increase in the number of publications indicate that it represents a vital environment.

Another positive indicator is the fact the mean age of the academic staff is five years lower in 2007 compared to 2003 (45 years compared to 50). Among senior lecturers the mean age has been reduced with 7 years (42 compared to 49). Of those recruited to academic positions during the period, approximately one third are externally recruited with a PhD from another university. Also these are important facts when assessing the potential and dynamism of the research environment.

### **4.3 Research quality**

Measured by number of publications, the research productivity of the department has undergone a positive development during the period. In 2003 there were 0,7 publications per academic staff member. That figure increased till almost 2 (1,9) in 2007. These figures indicate that the department finds itself in a positive developmental trend in spite of budgetary cuts.

The section on History of Ideas and Sciences stands forth as the most research active and productive. 70 per cent of all reported publications during the period of evaluation stem from this section. On the other hand, the LIS section documents quality with a high proportion of its publications being published in international peer reviewed journals. Of 11 publications from the LIS section in the years 2007–2008, 8 have been published in international peer reviewed journals, of which at least 3 belong to the most highly ranked within the field.

In general a strong international orientation seems to be one important quality characterizing the research activity of the department. This international orientation is documented by the section of the History of Ideas and Sciences' being instrumental in creating two international networks on globalization and culture connecting more than 200 researchers from Latin America, the US and Europe. One is about embarking a collaborative international project on humanistic informatics together with the University of Madrid, Spain, and the University of Bergen, Norway. The LIS section, as indicated above, seems to have an international orientation in its research and publication practice and takes an active part in Nordic collaboration in PhD-education through the NORDFORSK-financed Nordic Research School in Library and Information Science.

The international orientation also reflects itself in the lines of research. One of three major lines of research in the field of History of Ideas and Sciences focuses upon international perspectives going beyond the borders of Europe. Neither are the major topics of research in Book History (documents of script and print cultures and the processes by which these documents are produced, distributed and used in an historical context) and LIS (scholarly communication and information seeking of professionals and young people) nationally limited.

The research within the department is interdisciplinary.

Scholars within the department have been assigned as evaluators and editors in national and international contexts and keynote-speakers at international conferences.

The output of doctoral students of approximately two per year seems to be normal and satisfactory when taking into regard the size of the academic staff.

The department disposes of a unique national research competence within the field of book history.

There seems to be a lack of balance between Cultural Studies and the three other sections of the department as far as research is concerned, where cultural studies seems to be lagging somewhat behind.

Taken as a whole the average quality of research at the department should be graded between *good* and *very good*.

#### **4.4 Collaboration**

The internal cooperation in the department seems to work well at several levels: There are joint courses and seminars. All four sections in the department are in the process of establishing a joint research project. Resources are earmarked for a project coordinator at departmental level. These initiatives document that the department actively strives to compensate for the smallness of the individual sections through collaborative efforts and that it has a conscious strategy of utilizing the interdisciplinary potential.

Collaboration with other departments at Lund University is first and foremost the Research Policy Institute, Department of Informatics and Department of Philosophy. As for Nordic and international collaboration it is the LIS and History of Ideas and Sciences section that stand out as particularly active

In terms of collaboration the department should be rated between *good* and *very good*.

#### **4.5 Research activity and training**

The department seems to concentrate much on teaching. Many staff members teach across disciplines and the four sections jointly offer a BA. There is a master program in LIS and 3 PhD-programs. The department focuses strongly upon the links between teaching/education and research.

#### **4.6 Evaluation of future plans**

The future plans of the department are in general sound and feasible. Initiatives are about being taken in order to connect the disciplines more closely. There are also proofs of this interaction (Master's Program), in the future also in research. The plan for a joint research project is a good start.

The self-evaluation shows that the department concerned about it terms "general lack of critical mass due to limited faculty". This kind of honesty is a credit for the department, especially when the department is trying to do something to compensate for this, partly through cooperation across disciplines within the department, partly through Nordic cooperation. Also the plans to gain more funding from external sources are highly important.

The plans of the department are in general *very good*.

#### **4.7 Future potentials and possibilities**

There will be a generational change in the near future when all professors are going into retirement. The period of transformation should be planned carefully. There are indicators that such a planned process is taking place. The reduced average age within the staff in general and among senior lecturers in particular and the recruitment of staff members from other universities than Lund are such indicators.

Co-operation with the other departments at the faculty should be strengthened on the one hand. There tends to be a lack of balance in research output between the different sections, particularly between Cultural Science and the three others and this imbalance should be taken care of. The planned initiatives to promote joint research at departmental level will probably be important in this respect.

Cooperation with other departments at the university should be strengthened and one should also take steps to counteract the obvious imbalance between the different disciplines and their research output.

The department should utilize its open-minded culture in full strength in research and transform the interdisciplinary to an asset. Joint publications in esteemed forums could be a good aim. Initiatives should be taken to utilize the openness and the multidisciplinary of the department even not efficiently as an asset.

#### **4.8 Gender and equal opportunity**

There is a gender bias in the sense that only 18 per cent of the academic staff are women. The percentage of women has been reduced with three per cent between 2003 and 2007.

### **5. DEPARTMENT OF EUROPEAN ETHNOLOGY**

#### **5.1 Overall assessment**

The Department of European Ethnology at Lund is one of the foremost departments of its kind by reputation in Europe, responsible for establishing what is known worldwide as the Lund school of ethnology. This reputation rests on research published in the 1980s and 1990s, with the volumes *The Culture Builders* (Löfgren/Frykman) and, to a lesser degree, *Body Time* (eds. Lundin/Åkesson) being particularly important. The period of assessment has seen a decline in staff numbers from 42 FTE to 26 FTE, of whom only 14 FTE are professors, lecturers and researchers. Of these, 3.22 FTE is attached to the more recently established division of Human Ecology, which comprises a distinct sub-unit within the Department. Whilst these two divisions share a common heritage in anthropological research and methods, there is no connection between the two, even at the level of internal

management.<sup>5</sup> It is clear that the submission has been prepared by two distinct sub-units; no attempt has been made to bring these together as an integrated statement.

The unit of assessment has experienced considerable financial contraction in the evaluation period, from €2.97m (2003) to €2.5m (2006) and €2m (2007); a decline in income from teaching, and a substantial decline in income from research. In such circumstances, European Ethnology is to be commended for its continued productivity; for the continued relevance of its research; and for its high professional service profile in Scandinavia. It is important to recognise, nonetheless, that this part of the Department has a ‘top heavy’ and ageing profile; that its international reputation rests on a very few key figures, many of whom are approaching retirement age; and that it faces major challenges in relation to generational renewal and sustainability. It is to be hoped that the stated merger with Art History, Musicology and Cultural Sciences will provide the necessary reinvigoration. Human Ecology performs consistently above its weight in FTE terms. It has a very strong international publication record; a strong track record in grant earning; and is producing work at the forefront of the trans-disciplinary field of human-environment relations. In no small part this is down to the energy of its senior professor (Hornborg).

The submission shows a lack of leadership at a Departmental level and a responsive, rather than proactive, attitude to change. This is evidenced particularly by the absence of future planning, as well as by apparent internal management difficulties. Although the response to future planning is perhaps explained by the forthcoming merger, strong leadership will be required in order to effect the planned reorganisation and to ensure that the Lund tradition in ethnology is maintained.

## 5.2 Research infrastructure

Human Ecology operates as a clearly focused research group within the Department. The benefits are evidenced in publications. Within European Ethnology there are nine research themes. This is too many for

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5. Since Human Ecology operates as a distinct division within the Department and does not appear to be included in the 2009 merger, it is discussed separately from European Ethnology, and in so far as possible given the databases, according to the same assessment criteria.

a Department of this size, and suggests that Ethnology, up to now, has followed a pattern of ‘lone scholar’ research. There is clear evidence of a rather different model provided by HEX (Section 2.4). This should be encouraged: it is the way in which humanities scholarship is developing elsewhere, and for Lund to be competitive in securing interdisciplinary research funds in the future this structure will be essential.

### **5.3 Research quality, including quality, productivity, relevance and vitality**

The Department (Ethnology + Human Ecology) has maintained a strong record of productivity throughout the period, with a total of 298 academic publications from 2002.<sup>6</sup> Notwithstanding the reduction in FTE, productivity per FTE across the full Department (including Human Ecology) in the assessment period increased from 1.3 outputs/FTE in 2003 to 2.2 outputs/FTE in 2007. Of the  $\approx$  300 publications roughly half are book chapters. The Department might perhaps consider whether this is the best publication strategy for research evaluations based increasingly on metrics.

Scrutiny of the research publications database for European Ethnology showed 251 outputs in total; 41 ( $\approx$  10%) are in English and of these only 7 are in refereed journal articles/ books.<sup>7</sup> Whilst European Ethnology has published its research in the major Scandinavian and European ethnology journals, its reputation internationally rests (for better or worse) on its publication in the English-speaking world. A key issue in maintaining an international profile is to ensure that current research is disseminated beyond Scandinavia and particularly within the English-speaking world.

Scrutiny of the research publications database for Human Ecology showed 110 outputs in total, 70 of which ( $\approx$  65%) are in English. Human Ecology is therefore responsible for  $\approx$  33% of the total publication output

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6. There are considerable inconsistencies between the data in Form 1.3 and the full list of publications by Department, supplied as additional information. The combined publication list from European Ethnology and Human Ecology gives a total of 361 publications; Form 1.3 gives a combined total of 492. Productivity has been calculated on the basis of the information supplied in Form 1.1 and 1.3.

7. Consultation of Web of Knowledge suggests that the publication database for European Ethnology is incomplete, particularly with regard to some English language publications.



of the Department (from  $\approx 20\%$  of the FTE). Hornborg is responsible for 53 ( $\approx 50\%$ ) of these outputs (31 in English).

The combined Department has produced a total of 17 PhDs in the assessment period (1.2/FTE). The text commentary suggests that the majority of these are from Human Ecology. However, further clarification confirms exact figures as follows: European Ethnology 11 (8 female: 3 male), Human Ecology 6 (3 female: 3 male).

**Research quality:** it is striking that European Ethnology chose to flag two books published well before the evaluation period. Beyond the flagged texts, it is difficult to make an assessment of the international/national quality of published research for European Ethnology, for this part of the Department does not provide an answer to the questions asked in Section 2.3, limiting its response to a list of input measures. The full publications database shows clear evidence of national and international (within Scandinavia) quality publication for a majority of staff in European Ethnology, including younger staff on promising trajectories. Web of Knowledge shows modest levels of citation for work in the health, medicine and biotech field and for work in cultural economy. On a stricter interpretation, however, only Löfgren has an international reputation. His work on new economies is now being cited by key international figures within the field, and adds to his earlier reputation from the 1980s, gained principally in anthropology and material culture.

The output from Human Ecology is more impressive in terms of citation impact. In no small part this is down to publishing in the major English language journals in the field, listed in Section 2.3, although it is important to note that this has not been to the detriment of publication within Scandinavia. Hornborg is a major international figure in the field, whose work on unequal exchange and environmental load displacement has attracted much interest. The flagged texts are major international collections; the flagged journal publication is genuinely innovative in its attempts to combine anthropological perspectives with policy concerns. The quality of the research in this part of the Department is further evidenced by the volume of grant income that it is attracting ( $\approx \text{€}1\text{m}$  on an FTE of 3.22).

**Relevance:** European Ethnology's research interests are clearly of broad socio-economic and cultural significance within Scandinavia, and there

have been commendable efforts both to publicise results to broader audiences (ETN) and to engage with key stakeholders. Some of the most innovative of recent research involves collaborations with artists and film makers. Human Ecology's research is clearly of interest and significance to major political and international debates concerning sustainability and lifestyle, although there is less evidence here of engagement with research users than might be anticipated.

**Vitality:** European Ethnology remains an active, collaborative research environment, however, an absence of leadership has clearly made strategic decision making with respect to research initiatives difficult. Declining revenue together with a declining FTE will have impinged markedly on teaching loads, and further affected the ability to conduct research. Human Ecology is a small but strong and successful research environment, showing clearly the benefits of strong leadership at senior levels, and the links between input/output measures, international collaboration and networking. However, there is no indication in the submission of where this part of the Department sees its future within the internal organisation of Lund University.

Research in European Ethnology is *very good*; research in Human Ecology is *excellent*.

#### **5.4 Collaboration**

European Ethnology has a strong tradition of local collaborative working which is well evidenced in its publications, many of which showcase the collective work of Lund researchers. It has also been successful in conducting collaborative research within Scandinavia, with the Öresund project as a notable example. European Ethnology might perhaps reflect on the absence of co-publication collaborations with researchers based outside Scandinavia and on the opportunities for collaboration with researchers where there are possibilities through bi-lateral agreements. Human Ecology is more successful at international collaboration and networking, evidenced by its edited collections, which include authors from the US, UK, continental Europe and Scandinavia, as well as 'local' researchers.

In terms of collaboration the department is *very good*.

### 5.5 Research activity and teaching

European Ethnology states a strong commitment to integrating research and teaching, and this is evidenced by their use of co-authored books as teaching texts. It is clear that a 33% contraction in FTE (2003–7) will have had a major impact on capacity to deliver teaching programmes. Human Ecology's commitment to teaching is more clearly evidenced at the Master's level.

### 5.6 Evaluation of future plans

European Ethnology does not provide an answer to the questions listed in Section 2.4. There is no discussion of strategic vision and planning, nor possibilities and obstacles. No discussion is provided of a need for further recruitment. This is surprising given the reduction in staffing encountered during the evaluation period. The absence of any forethought as to how research might be repackaged is particularly surprising given the pending reorganisation of the Department within an amalgamated unit in the humanities, and is indicative of a responsive rather than proactive approach to change. By way of response, the Department lists two new interdisciplinary collaborations and a few more speculative possibilities. The response is at the level of individual plans for further research and/or collaboration. There is a need to think more strategically here.

Human Ecology provides a clear statement as to its future research priority areas. These are obvious developments from existing areas of expertise, and are likely to be able to attract considerable funding in the future.

The plans of European Ethnology are *poor*; the plans of Human Ecology are *very good*.

### 5.7 Potentials and possibilities

There will clearly be possibilities for collaboration consequent upon the merger with Art History, Musicology and Cultural Sciences. It is suggested that an early priority for the new unit should be to establish priority research themes for future research. Whilst there are clear synergies between these departments, it is important that the new critical mass generates related research agendas and not just individual research plans.

Human Ecology does not belong within the newly merged department: it has a very different approach to the primarily humanities scholarship of Ethnology, Art History, Musicology and the Cultural Sciences. It is suggested that an alternative ‘home’ be found within Lund University.

### **5.8 Gender and equal opportunity issues**

The Department has a strong record in gender equality, although it should be noted that there are no female researchers (7 employees). The age-profile of European Ethnology is overly ‘top heavy’, with 6 of 7.85 FTE in the professorial bracket > 64. This problem has been exacerbated by a decline in the number of PhD registrations. It is striking that no data is provided on ethnicity.

## **6. DEPARTMENT OF HISTORY**

### **6.1 Overall assessment**

Department of History is a very strong research environment. The department is one of the largest in the faculty. The number of academic staff is sufficient and the distribution of different categories of posts is even. The research practiced within the department has significant depth in themes and a vast knowledge of different time periods. The department also administrates a graduate school in history, which is a great asset to the department and also a concrete evidence of the reputation of research.

The department has recognized its important role as a discussant and an interpreter for the present day and for the society. History has always had a strong national significance and practically everywhere in the world the discipline is basically national. This national character of the whole field can not be used to department’s disadvantage since the international comparability can be easily seen in research.

The department has a well formulated and motivated research profile. The focal research area today – the New Cultural History – is internationally and nationally interesting and important. The department has also very good evidence on results in these matters; the number of publications and the output of completed doctoral dissertations are excellent.

## 6.2 Research infrastructure

The administrative structure of the department is clear. It is an advantage that the department contains only one academic discipline, especially when the possibilities of interdisciplinary research have been taken care of.

The number of doctoral students is especially high because of the National Graduate School of History. This is a remarkable resource for the department and the department has made good use of it. The graduate school has a functioning strategy and the supervision of the doctoral students is well managed. The graduate school has operated in cooperation with other departments and disciplines within the university as well as with other universities. The Centre of Labour History and the Centre of Danish Studies are also associated to the department.

The economy of the department has been quite stable during the evaluation period. However, especially the external funding has fluctuated quite a lot during the period. In any case, department has pretty good resources and an excellent infrastructure.

## 6.3 Research Quality

The department's research is characterized as the New Cultural History, which in this context means long time period, strong knowledge of theories and models and diversity of themes. The subjects are very broad and sometimes one wonders if something could be left out. On the other hand, as the department writes, some themes are overlapping, which is always a good sign in historical research – there is not only one explanation or just one point of view. In the fields mentioned, the department has shown to be very competent and esteemed, even internationally. The subjects like legal cultures (in broad sense), state formation, Holocaust studies and also gender studies and labor history show that the research in department has been raised to a high level of generalization. All of these themes are also internationally relevant, important and at this moment widely studied; thus the research is internationally comparable, even – or especially – when the research objects are Swedish. The “Swedish case” is as such significant and especially when it is combined with and connected to the Nordic and global contexts. The department emphasizes the role of the comparisons.

During the evaluation period the staff has published a very high number of publications. The productivity of the department is excellent in relation to the number of researchers. The researchers publish mostly, on the one hand, book chapters and on the other hand book reviews and popular science publications. The latter is a very valuable task, but there should perhaps be little more articles in refereed journals and also monographs (books). The best publications represented are mostly written in Swedish, but the themes of these books are in most cases international and highly interesting. The relevance of the publications and the research projects are high both within the discipline and in relation to society at large. Some scholars have an exceptional high publishing activity and several scholars have published a lot in well esteemed fora.

The department is highly respected. Several researchers of the department have got assignments to be evaluators and some editors in national and international contexts. The vice-presidency of CISH is also a strong evidence of the reputation of the department.

The research quality of the department is *excellent*.

#### **6.4 Collaboration**

The department does not write much about the international collaboration in concrete terms, but the joint-publications and the research visits shows that it is lively. The department has also the only chair in Sweden specialized in international history. The comparative approach to e.g. Nordic history has been one of the specialties of the department.

The collaboration within the department is working well and the organization of the research seems to be systematically analyzed: it means that there is room for both projects and for individual researchers. “Network” is the key word in this department (see also the Advanced Seminar in below). The vitality of the department can thus be saved and developed in the future too because the “critical mass” is sufficient and new promising researchers rises frequently.

The department has been interested in the multi- and interdisciplinary research both at the individual level and within the projects. However, the collaboration within the faculty of humanities should be strengthening even more, because there are several departments and/or disciplines,

which could be closely connected to the Department of History's focal main areas; especially such as the Dept. of Archaeology and Ancient History and Dept. of European Ethnology, but also Dept. of Art and Musicology as well as field of Literature and Film. The department has been an open minded what comes to interdisciplinary studies and also uses expertise from the other disciplines for example in the activities of the graduate school.

The third task (or obligation) of the university is well done by the department: there are many publications which have been focused to the public. Several scholars have been able and willing to have the close connection to the media. When all this "openness" is happening without any problems with the quality of the research, it is of course a real asset to the department and an evidence of the relevance to the present society.

In terms of collaboration the department is *very good*.

### **6.5 Research activity and teaching**

The teaching staff is highly competent and is able to do own research and guide younger researchers in various time periods and on different themes.

The department is effective in its research activities. The activity shows amongst other things in the rate of the publications. An innovation is the Advanced Seminar, which connects the younger and the established researchers together and makes possible to present new ideas and to have comments on different kinds of writings. This kind of good practices should be disseminated to the other departments too.

The research orientation of the department keeps the research and teaching closely connected to each other. The doctoral students have the possibility to teach the undergraduates, which is also an effective form of doctoral training. The department seems to have utilized the possibilities of the Graduate School in this matter.

### **6.6 Evaluation of future plans**

The research plan of the department is well formulated and it comes to the core of the field of history. The research projects are adequately integrated to each other and they also gives room for overlapping ideas

and new thoughts. The department has proved to be able to put the plan into practice.

“Continuity” is the key concept, which helps to understand the department plans for the future. The department looks well-grounded peacefully to the future, because the main structures and infrastructure are well built and flexible. The department has not in its plan of the future tried to change the whole strategy but is building new areas of interest on the ground of the older ones. This is a good solution and very well argued. One interesting point is, however, the underlined aspiration to in the future take even more than today the contemporary problems as starting points. A good point is to address the role of the postdoctoral researchers and the improvement of their career, this kind of planning should in the future do even more at the faculty level too.

The plans of the department are *excellent*.

### **6.7 Future potentials and possibilities**

The department has promising possibilities to develop its activities even in the future. The report shows that the department is well managed and sufficiently interested in strategic work. The holders of the most important posts will be active in working life still a quite a long time and this continuity ensures that the most fruitful research areas shall be strengthened.

As said before, the co-operation within the faculty should be strengthened. The Graduate School in History has a remarkable potential and this well-managed school can open new possibilities even for the post doctoral research activities. However, the department should develop its “exit strategy” for the graduate school and also a strategy for the post doctoral researchers. There is also lot to win by connecting the doctoral student and their themes more closely to the main areas of the research done within the department. For instance, the Department has been a very strong centre of research in the early modern period and this excellence should be maintained.

The department has promoted the permanent staff by funding the participation to international conferences. This good practice should keep on. If the department has the resources this practice should be expanded also to the post doctoral researchers because this group is commonly in key position in internationalization: they usually have the best possibilities to



go abroad, and apparently have the newest knowledge and also energy to disseminate the new findings.

### **6.8 Gender and equal opportunity issues**

In general, the gender balance is good in the department, although there are varieties between different groups of staff.

## **7. RESEARCH AREA LITERATURE (CENTRE FOR LANGUAGES AND LITERATURE)**

### **7.1 Overall assessment**

The Research Area Literature at the Centre for Languages and Literature comprises three sub areas: 1) Literature Sciences or Comparative Literature (15 employees); 2) Foreign Literatures and Area Studies (18); 3) Film Studies (6); plus an 80% employed lecturer in Theatre Science, and a 50% employed teacher in journalism. There are overlaps between the areas 1) and 2) to the extent that research in comparative literature includes foreign literature. The distribution between the various foreign literatures and area studies is: Arabic (1), Chinese (1), English (6), French (2), Polish (1), Romanian (1), Russian (4), Spanish (2). If the various part time employments are taken into consideration, the volume of research in Comparative Literature approximately equals the volume of research in foreign literatures and area studies. As it was also underscored in Högskoleverket's Evaluation of programs in literature and rhetoric at higher education institutions in Sweden (2006:13 R) Comparative Literature in the Swedish context is to a fairly high degree synonymous with research in Swedish literature. This is also the case in Lund.

The Centre for Languages and Literatures is the result of a recent restructuring (2006) that has brought research in Comparative Literature and together with research in foreign literatures. This makes good sense. Yet the number of employees in foreign literatures is surprisingly low. There are no positions in the fields of German literature, of Italian literature, of Turkish literature, of Japanese literature, and more could be mentioned. At the department as a whole there are: Linguistics: 19 professors, 52 lectures; Literature: 9 professors, 22 lecturers; Film: 1 professor, 6 lecturers; Area studies: 2 professors, 3 lecturers. The research volume in languages

is thus about the double of the research volume in literature. According to the report this is a result of the politics of the former Departments. The allocation of resources to the fields of literature, film and area studies should not perpetuate a similar politics, but rather be based on recognition of the importance and relevance of these areas.

Within the international field research at the division is roughly of two sorts, on one hand predominantly literary, on the other hand of a broader kind that includes intellectual culture and political issues – this is the case not only in the fields of Chinese and Central- and East-European studies, but also in Spanish, whereas French and English studies concentrate on literature and literary theory.

The revenue from Undergraduate education is about 20% down in 2007 from 2006. The government faculty resources are about 15% down, yet most striking is the reduction of grants for research from kSEK 9076 to kSEK3385, i.e. 40% in 2007 compared to 2006.

The panel has no information about the number of PhD exams in the research area, the number provided of PhDs at SOL-centre as whole is of no significance.

Since there are significant differences between the research activities of the three sub sections, an overall assessment is not to the point. Below each of the sections will be dealt with separately.

## **7.2 Research infrastructure**

The restructuring that has brought research in foreign literatures together with comparative literature, film, and area studies has initiated a fruitful process of collaboration that has a great potential. The institutionalization of a research board for these fields facilitates decisions and initiatives. The distribution of research volume is uneven, though. Compared to the resources for research in linguistics, the allocation of resources for literature, film, foreign cultures and area studies is remarkably low. Except for English studies the number of researchers in foreign literatures and cultures is minimal or even nil (e.g. German, Italian).

The physical and technological surroundings are excellent and so are the library facilities.

### 7.3 Research Quality

The numerical indicators provided for the research area (i.e. the information corresponding to Form 3: Quantitative summary of activities and academic reputation) are partial, only information about a limited number of individuals has been available, and the lacking information is not accessible at the individual homepages. The lists of publications are not always up to date. The information at hand is thus somewhat incoherent and partial.

There are obvious differences in the research activity of the various subsections of the division. Area studies and foreign literature studies stand out as particularly successful.

Since a very high proportion of publications are books or contributions to books, a bibliometric emphasis on output in terms of articles in journals is not adequate.

**Productivity:** In foreign literatures and area studies the general pattern is that the professors are highly productive, whereas lecturers publish very little, in some cases nothing at all. The outputs of some of the professors are very impressive, Enkvist in Spanish has more than 70 publications, including 10 books (of which some apparently are the same in Swedish and Spanish); Schoenhals in Chinese studies has next to 40 publications, among them a major book in the field; Thormählen in English has 17 publications, among them 3 books; Törnqvist-Plewa in Central- and Eastern European studies has 22 publications, including a book, and Larsson in French has 17 publications, including a book.

In comparative literature the pattern is somewhat different. The predominant – and quite reasonable – level is 9–10 publication, in some cases including a book or editorship of one or more books. There are exceptions to this pattern though. The productivity of the professors as a group does not stand out compared to the most productive lecturers and researchers – it should be added, though, that there are striking differences in output among the professors.

In film studies the only professor, Erik Hedling, stand out with an output of 43 publications, among these the first published monograph on Lindsay Anderson and several anthologies. The research output among the lecturers and researchers is very varied and uneven, from the questionable to the recommendable.

**Research quality:** There are obvious differences when it comes to the degree of internationalization. Whereas research in foreign literatures and area studies to a great extent is published in international publications (journals, publishing houses), and there are several examples of international impact, the majority of the research in comparative literature is on the other hand published in Sweden and predominantly in Swedish – with notable exceptions, though. In film studies the main tendency in publications is to publish in Swedish and to a large extent on Swedish subjects. However, here too there are notable exceptions (see below). There seems to be a commitment to strengthen international publication in this area.

In comparative literature most of the research is on Swedish subjects, although there are exceptions – among them a book on Bertolt Brecht. Contributions to literary theory are mostly on the receptive side (including textbooks), there are only a few examples of contributions to the international debate – among them a substantial survey and discussion of questions related to the writing of global literary history highlighted in the report and written as a contribution to the impressive Swedish research project on the writing of the history of world literature, that was published in four volumes in English. In the field of foreign literatures there are a number of contributions to the international theoretical debate published in foreign languages, e.g. contributions to a publication on ‘modernism’ edited by the English section; a fine essay on questions concerning representation and fictionality from the French section, and several contributions from Arab studies to the world literature project mentioned above.

Research in comparative literature holds the national standard. Area studies and studies in foreign literatures are strong not only nationally but also internationally – to mention only two examples: the work of Marianne Thormählen has been well received in English studies in the English speaking world; Michael Schoenhals is considered to be among the leading authorities in the field of the history of the Chinese Communist Party. Through his publications in English Erik Hedling has managed to establish himself as an internationally respected researcher in Film Studies. His output functions as a solid backbone for the research activities in film studies.

**Relevance:** As mentioned above research in comparative literature in Sweden has – in particular in recent decades – mostly been on Swedish subjects and with a view of the Swedish reading public and educational

system. This is obviously an important aspect of literary studies, yet research in literature and broader cultural issues should no less contribute to knowledge about foreign areas and questions that go across nations and areas. The discipline was conceived with a view of similar questions, and the urgency of cultural exchanges across the borders is no less obvious today than in the time of the pioneers.

The relevance of area studies is exactly to provide insight in the world beyond the borders of the nation, as well as to contribute to international research. In both of the area studies in Lund as well as in Spanish studies this is done very well. Foreign literatures are crucial for an understanding of foreign cultures and contexts for political and social issues, as well as for insight in general aspects of human life. One would stress, though, that there is a historical dimension to this and that research in periods earlier than 1800 is scarcely represented.

With a view of the central cultural role of movies during next to a century and the prominent status of Swedish film, research in this area is of obvious importance, and the section has contributed to research in Swedish film as well as in international film not only for a national, but also for an international public.

**Vitality:** The research output as well as the lively participation in national, regional and international conferences, bears witness to a productive and committed research milieu. Yet in this respect too, there are differences: Schoenhals, Enkvist and Törnquist-Plewa stand out as particularly active participants in the international scholarly community.

Internally at the section regular seminars bring scholars from the former individual departments together in an effort to develop common intellectual frames and potential projects. There are all reasons to believe that the interaction between research communities with different traditions will be productive.

The research quality of Comparative Literature is *good*; the research quality of Film Studies is *very good*; the research quality of Foreign Literatures and Area Studies is *excellent*.

#### **7.4 Collaboration**

Collective projects are prominent in film studies, and there are examples of international collaboration (like a guest-edited volume of an international journal and two anthologies). Individuals from Film Studies in Lund have been active in the establishment of the European Network for Film and Media Studies (NECS) and will be hosting the 2009 Conference of that organization.

Some scholars in comparative literature and foreign literatures have as mentioned above been involved in an internationally published joint 4-volume publication at the background of a national Swedish project on questions concerning the writing of the history of world literature, among the international contributors are a number of leading scholars. A volume based on a conference in Lund on the concept of modernism has similarly brought several prominent international scholars together with contributors from Lund. In area studies internal collaboration and interdepartmental collaboration is prominent. In this respect too Schoenhals stands out a member of the boards of 7 international journals.

Particularly in the field of comparative literature an intensification of the participation in the international scholarly community is desirable.

Internal collaboration in the research area is *very good*; in terms of external collaboration Comparative Literature is *good*, Film Studies as well as Foreign Literatures and Area Studies are *very good*.

#### **7.5 Research activity and teaching**

The writing of text books for teaching is a striking feature in the pattern of publications particularly in comparative literature. Depending on the point of view this may be taken as an indication of concern for teaching or as a problematic emphasis on second hand activity rather than an emphasis on primary research.

With a view of the scarcity of researchers it is surprising that highly qualified researchers in the fields of foreign literatures and area studies are teaching language courses.

## 7.6 Evaluation of future plans

The plans for the future articulated in the report (2.4) from the section are quite limited. Only two projects are mentioned, one concerning performativity of literature in Sweden 1800–2008 involving seven scholars from the section (all probably from comparative literature), another concerning ‘Literary Public Spheres’ involving scholars from a number of areas at the section.

Performativity is a subject that attracts quite a lot of attention internationally, yet the restriction to Sweden is in line with the questionable priorities in comparative literature. The second project to the contrary represents an excellent integration of qualifications and points to a very interesting question at the international level. This project has received support for further development from the faculty level.

The joint projects in film studies that are listed elsewhere in the report involve more scholars in national questions than in international.

The strategic planning as it appears in the report is clearly insufficient, although there is a very brief indication that plans “are underway to give areas studies a firmer theoretical and methodological base inside the CLL” (2.1).

The average level of the plans in the research area is *good*.

## 7.7 Future potentials and possibilities

There is a relatively even over all distribution of age within the spans 30–40 (9), 40–50 (14), 50–60 (11), 60–(10), none of the employees are more than 65, 4 professors are in their sixties. Yet such numbers tell very little about the situation in the various fields. Although it is not the task of the panel to go into details about this, but it should be underscored.

1) that the staff in the research area (including Swedish and international literature, area studies and film studies) is only half the size of the staff in the research area of languages

2) that there are areas without any staff, although they should be covered at a comprehensive university as Lund University; German and Italian literature and culture are perhaps the most striking examples, yet with

a view of the present and future European development at least Turkish culture should be covered too.

The university should provide the entire research area with additional economic resources within the frame of a plan for future development. A stronger internationalization of comparative literature could be one aspect of a similar plan, e.g. by appointing scholars with qualifications in comparative literature with special emphasis on German and Italian literature and culture respectively. A stronger development in the direction of area studies seems desirable, i.e. an integration of literary studies in broader cultural and socio-historical studies. With a view of the foreseeable role of China in the future, it would also seem appropriate to expand Chinese studies into the cultural field.

One university must not necessarily cover all fields, but the sporadic representation of American studies at Sweden's largest university is striking. There are a few scholars at the section that work on or have published on US-related subjects, but the field ought to have a higher priority. Film and media studies and studies in popular culture in general could be one corner stone – this is but one reason to strengthen film studies. Latin American studies are also scarcely represented, although the culture of the area is closely linked to European (and US-) culture, and the economic and political role of the continent is on the rise. The absence of studies in Japanese culture is already pointed out.

The reduction of research grants from 2006 to 2007 gives reasons for care. An intensification of work on applications for external funding is an obvious task, yet the university should simultaneously secure stable research activity in the important fields covered by the research area.

Although no strong strategic plans or visions are articulated in the report, there are obvious potentials in the combinations of qualifications at the section. A number of scholars across the fields are working on media and popular culture. One possible project could be to develop humanistic studies in media and popular culture. A number of scholars are working on aspects of intellectual history, in some cases in relation to political questions in the present. Area studies that include similar questions and interact with history and the social sciences are an obvious way to bring qualifications, among them the language skills, at the department in play. Centres for e.g. European Studies, for Central- and East European



Studies, for Middle East Studies, and for Asian Studies could be crucial organizational structures for a similar development and should probably have a prominent place in strategic planning. In general a broadening of the horizon to include other aspects of cultural history than literature is an advantage – also in literary studies proper.

### **7.8 Gender and equal opportunity issues**

The number of females employed equals the number of men, out of 11 professors 6 are women, out of 23 lecturers 11 are women.

## PANEL 4 – LANGUAGES / PHILOSOPHY

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### 1. CENTRE FOR LANGUAGES AND LITERATURE (SOL) – LANGUAGES

#### 1.1 Overall assessment

Considering all four subcriteria of research quality (quality, productivity, relevance and vitality), our overall rating is *good* (not far from very good).

#### 1.2 Research infrastructure

The number of academic staff in March 2007 was 65 of which 18 are professors and 30 senior lecturers. Linguistics (including phonetics) with a personnel of 13 and Swedish with 16 are the two big subjects, all other languages must be considered small. Surprisingly, English has a personnel of only 6 and no professor in the English language. That lack should be remedied.

The establishment of the Centre for Languages and Literature (SOL) in 2006 was an important, far-sighted, highly commendable step in consolidating and profiling the existing resources: personnel, libraries, and technical equipment alike. For such major reorganizations to take full force, they require 5–10 years of accommodation as well as formation of new cross-disciplinary networks and research profiles. This process is now in its mid infancy and should be strongly supported.

The Humanities Laboratory is a valuable research resource that has already facilitated innovative cross-disciplinary research, and will increasingly continue to do so. It is a major generator of external funding. It should be a primary aim of the relevant faculties to determine the organizational status of the Humanities Laboratory and secure its funding on a permanent basis.

Less impressive is the amount of funding (SEK 250.000 per annum) made available by SOL for researchers to disseminate their findings

through working paper publication and at international conferences and other events, both within the University and outside it. This amounts to some SEK 4.000 per staff member; or to put it another way, less than 1% of the reported research income of SEK 31 mio. It is clearly insufficient, especially given our comments below about the importance of dissemination at international conferences.

### 1.3 Research quality

**Quality.** A citation analysis (AHCI + SSCI + expanded SCI) was conducted for 130+ Lund researchers in Languages listed on the respective official home pages. Less than a handful have more than 100 citations and two have more than 200. Linguistics and Swedish had the highest mean citation rates, though there are wide individual differences and some researchers in other disciplines were cited at significantly higher than average rates. These results are not outstanding. For comparison, the most cited Nordic linguists (languages, general linguistics and phonetics included) have a few thousand citations and some five Swedish linguists have more than 500 citations.

Given the operational criteria of this evaluation, we judge the research quality as in some cases *excellent* but mostly *very good* or *good*. There are a few publications with high international impact, especially in general linguistics (including generative and cognitive linguistics), phonetics, Nordic languages, language acquisition and Romance languages. Many publications find their most interested readership in a predominantly Nordic or Swedish context and are published accordingly. This said, it must be kept in mind that the Nordic context is the primary one for Nordic languages. Quality is not only a matter of impact, but also of originality and innovative power. Some of the publications that we were sent to evaluate were clearly at the leading edge of current research, excellent in terms of innovation as well as impact, but the larger picture is one of research that is of sound quality rather than high originality.

**Productivity.** There is a welcome positive trend over the past five years for SOL as a whole in the publication rate of papers in refereed journals: 21, 22, 22, 32, 27, 35. However, as these figures also include the literature teachers, and as the number of professors in Languages is 18 and that of senior lecturers 30, the average productivity is at the most a modest  $\frac{1}{2}$  peer-reviewed journal article per senior person year. The figures for books

published also suggest need for analysis and concern: 6, 12, 17, 14, 12, 7. The number of conference papers is around 120 for the five-year period, the number of book chapters a reasonable 180. On the average, every researcher produced some two publications a year. The curves for external funding of all types distressingly point downwards.

As stated in the self-evaluation report, SOL has four topical research groups or more loose networks: grammar, language acquisition, semantics, cognitive linguistics – the presentation of cognitive linguistics is sketchy. This is somewhat counterbalanced by a distressing decrease in the number and amount of funding, professors, PhD's, and doctoral students. Especially the decrease of new PhD's over the past five years is alarming: 20, 38, 19, 17, 18, 12. In part, this is related to a general decline in the interest for language and linguistic studies in several Nordic countries, in part to the detrimental consequences of nationwide trends and policies.

These averages for productivity (which are overall *good*) conceal major differences between individuals and groups, as is evidenced also by the wide inter-individual disparities in citation rates.

The idea in the self-evaluation to increase local publication channels (departmental series etc) is not commendable as the university-wide strategic aim is to attain the highest standard in research and education, even if there is a need for an outlet for PhD dissertations.

**Relevance.** The relevance of the work is *good* or *very good* both as regards theory and applications. The latter include e.g. language acquisition, clinical linguistics, and the voice characteristics of aging people.

**Vitality and organisational capacity.** The current number of professors is 18, that of doctoral students 34, i.e. on the average less than two per professor. This ratio is very favorable indeed but must not go further down if existential questions about the future of some subjects or individual positions are to be avoided.

The age and career stage profile of permanent staff in Languages and Linguistics gives cause for concern. The report draws attention to the large number of highly competent researchers on soft money, but it is also clear that most recruitment to permanent positions is internal rather than external. A major indicator of vitality and organizational capacity is the

existence of an articulated and coherent recruitment and retention policy for high quality young and mid-career researchers. There is no evidence that such a policy has been developed.

The initial attitude on the part of the Languages to the evaluation exercise was not very favorable. The self-evaluation stated that the upcoming exercise was superfluous and detrimental to the efficient use of time. However, during the site visit, the evaluators perceived the attitude as much more positive and learned i.a. about the important planned cross-disciplinary functions of the “Research Colleges” (forskningskollegier) that had not been clearly described in the self-evaluation.

There were no clear indications in the self-evaluation that the suggestions from the 2004 evaluation of Humanities and Theology would have been discussed in detail, but the site visit disproved this impression. The 2004 evaluation exercise had indeed been a major impetus for the reorganization of the former independent language departments as SOL. Anyhow, there is a certain lack of strategic vision evident in the current documentation, and a tendency to over-reliance on infrastructure such as the Humanities Laboratory (important in itself) as a substitute for strategic thinking. Overall, vitality and organizational capacity are *good*.

#### **1.4 Collaboration**

The establishment of SOL is a major, highly commendable, enterprise, explicitly oriented to increasing interdisciplinary collaboration. This initiative has ramifications well beyond the borders between the traditional language disciplines, extending into many types of research in culture, cognition and communication. It presupposes a methodological reorientation which needs at least a decade for reaching a state of mature fruition. It is extremely important to provide sufficient funding as SOL still is in its founding phase.

It is equally important that the fostering of collaboration within SOL should not be at the expense of developing inter-institutional links between SOL and other research entities at Lund University. There should be a high level of responsiveness to internationally vibrant and growing areas of interdisciplinary collaboration, such as language, culture and cognition, and language-based area studies, with effective mechanisms for encouraging their development in Lund.

There are internal theoretical conflicts, especially between the generative linguistic and the other, more usage-oriented approaches. This puts a strain on the formulation of a common strategy and also on curriculum construction, giving the impression that strategic thinking is not a priority. We do not recommend any attempt to prioritise one theoretical approach over another, since the likely outcome of this would be destructive, divisive and unproductive. A more fruitful way forward would be to identify theoretically or practically driven research topics that can potentially be brought together under more general themes, and to promote fruitful interchange around these thematised topics. In some ways this approach is already practiced: for example, in the field of language acquisition, researchers tend to cooperate well, despite differences in theoretical orientation.

The international dimension of collaboration involving members of SOL is excellent, including conference organization activities, editorships, memberships in academies and learned societies, evaluations for lectureships and professorships, and number of visitors coming and going.

We rate the overall level and results of collaboration *very good*.

### **1.5 Research activity and teaching**

As stated in the self-evaluation report, the relation between research and teaching is stronger in Nordic languages and general linguistics than in foreign languages. There are, however, successful examples of incorporating research perspectives in undergraduate teaching of foreign languages. With SOL's strong language acquisition researchers, this should be done more systematically. We rate the relation between research activity and teaching as *good*.

### **1.6 Evaluation of future plans**

The plans are mostly in the spirit of continuing and extending work that has turned out to be successful so far in the frameworks mentioned above. The major new foci are microvariation in generative syntax, computerization of language acquisition research and (somewhat unspecific) possible topics to be addressed by the methodology offered by the Humanist Laboratory. Surprisingly, the major new future research opportunities are claimed to be language policies and politics, minority languages, language problems of immigrants and other similar problems.

The self-evaluation report does not mention Sven Strömqvist's involvement in an application for an interdisciplinary research project entitled "Thinking in Time: Cognition, Communication and Learning", which is one of Lund University's candidates for the Swedish Research Council's Linnaean grants 2007–2008 and is bound to be of strategic significance if funded;<sup>8</sup> nor does it mention the participation of a team led by Jordan Zlatev in the EU 6th Framework PATHFINDER project "Stages in the Evolution and Development of Sign Use", a major interdisciplinary project funded under the theme of "What it means to be human". The absence of the profiling of language and cognition (an area researched by individuals with generative, cognitive and functional approaches) is puzzling.

Our overall rating of the future plans in their present form is *good* (not far from *very good*).

### 1.7 Recommendations

The consolidation of the current initial phase of SOL should be strongly supported, including the cross-disciplinary "Research Colleges" (*forskar-kollegierna*).

SOL does have great future potential if it develops a coherent strategy (or set of strategies), but not if it continues to drift. Its potential for Cross Boundary Initiatives is high, with some researchers already taking such initiatives. This should be recognised and encouraged.

The future focus areas of SOL should be discussed. Reasonable candidates are linguistic theory (not any particular one), language and cognition, and language acquisition.

Some excellent work is done at SOL but there is a problem concerning unevenness of quality. Attention should be paid to promoting quality, including the selection of publication fora. Research productivity should be enhanced.

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8. For clarity we mention that this application is indeed mentioned in the Dean's report "Research in Humanities and Theology". On June 18 2008 the Swedish Research Council (Vetenskapsrådet) decided to grant Linnaean funding to this project.

The Humanities Laboratory is a valuable research resource that has already facilitated innovative cross-disciplinary research, and will increasingly continue to do so. The Laboratory is an excellent humanistic answer to the demand of the central university management for cross-disciplinary research. The Laboratory is a major generator of external funding. It should be a primary aim of SOL and the Area of Humanities and Theology to determine the organizational status of the Humanities Laboratory, to lay down its long-term strategies, and to secure its funding on a permanent basis. Other faculties and the central management of Lund University should be actively engaged in the planning, work and financing of the Laboratory. The leader of the Laboratory should be given status and power of a department leader. An international advisory board for the Laboratory is needed.

More funds should be allocated to mobility and international contacts.

A large number of senior staff are close to retirement age. This is an opportunity to think about recruitment strategy, about whether replacements should be at full professor level or lower. Replacement positions should be widely externally advertised. Student recruitment should also be taken into account. The worst thing would be for particular disciplines just to fade away just because a professor retires, although it would be reasonable for SOL to ponder whether the full current range of disciplines can be supported by chairs.

There should be a recruitment and retention strategy for developing junior and mid career researchers.

There should be a system for encouraging and incentivizing more grant acquisition.

A research mentoring system could be instituted to diffuse better the good practices (in e.g. publishing) and enthusiasm of the most productive researchers.

The high proportion of part-timers and people on temporary contracts is counter-productive and in the long run detrimental both for individuals and for departments.



Serious problems are caused by the shortage of PhD positions in both linguistics, language subjects and literature (a problem that recurs in the three philosophical subjects and elsewhere).

Interdisciplinarity is important and it should be fostered institutionally, but not at the cost of losing discipline strength.

## 2. DEPARTMENT OF PHILOSOPHY

The Philosophical Institute comprises three sections or departments corresponding to as many university subjects - Theoretical Philosophy, Practical Philosophy and Cognitive Science (which can only be studied at an advanced level).

The permanent and temporary staff in all three sections adds up to about 20, roughly evenly spread over the three disciplines. (The information at our disposal gives conflicting numbers and owing to the distribution of researchers over (part-time) temporary and permanent posts it is not possible for us to determine the exact figures.) The research achievement is impressive. In Cognitive Science and Practical Philosophy the research is guided by world leaders in their respective disciplines (Decision Theory, Belief Revision Theory, Value Theory). Their status is confirmed by book publications with prominent international publishing houses, articles in high level journals, frequent invitations to speak, or serve on the programme committees, at international conferences, and memberships in national and international learned societies as well as Editorial Boards of prominent journals. Lund has long been a home to distinguished researchers applying formal methods to concepts in value and decision theory, and such expertise is also present elsewhere in the University. Thanks to the recent appointment of a professor of Theoretical Philosophy the application of formal methods within epistemology will complement the formal approaches to value and decision theory. All in all, a uniquely strong constellation is present that allows fruitful cross-fertilization of research, and has also enabled younger researchers to establish firm international research profiles with publications in top journals such as *Mind* and the *Journal of Philosophy*; indeed, permanent staff-members all either have, or are close to professorial competence. The research in theoretical philosophy has an impressively wide scope. It covers metaphysics and ontology, a welcome addition to Swedish

philosophical research, and epistemology, thanks to the recent appointment in Theoretical Philosophy.

Productivity is reasonable – ca 40 publications a year on average – which, given the current level of staffing (some 20 staff members) roughly amounts to 2 publications a year on average per staff-member, a quite respectable, though not remarkable result. However, in the light of the complex staff composition this might actually be a significantly better result in that not all researchers seem to have had the customary 40 % research time at their disposal. (We lack the information needed to be more precise). It should be stressed that a large number of researchers publish in highly reputable journals.

The research has the relevance peculiar to a number of theoretical disciplines. It contributes to replenishing the reservoir of critical thinking in the public domain and the body politic and to maintaining awareness of the achievements and failures of Western thought. When these contributions continue to be made their beneficial effects are scarcely noticed, because then things function as they ought. When they are lacking society speedily goes off the rails – elementary canons of practical and theoretical rationality are ignored or flouted in political, economic and cultural debate.

The Institute has been managed well, in a highly cooperative spirit that has been conducive to creating a fruitful research atmosphere, over the past six or seven years. The creative and innovative use of an impressively restored Institute building, which includes a splendid Library, has created a strong *esprit de corps* among the researchers, as has the excellent example of senior researchers who spend their research time in the Institute. The infrastructure could hardly be bettered, and as far as motivation, ability, and initiative are concerned the Institute's closely-knit research group is a very strong one. The strength of the Institute, however, is severely threatened by its very heavy dependence on external funding.

The well-housed and well-run Institute has a permanent staff of less than ten researchers, two of whom are world leaders, a third of prominent international standing, and all of solid international standing, with good international publications and personal research networks, regularly participating in and organizing international conferences. It regularly receives external funding and has attracted very able junior permanent

and part-time members. A distinguished foreign colleague said of it: ‘One of the two best philosophy departments in Continental Europe’. (The other one referred to was Barcelona.) We lack the means to substantiate the statement, but are inclined to think it not implausible. To the best of our knowledge, the Institute’s great international presence and the impact of its top-level research make it the foremost Philosophy department in Sweden. Its research contribution deserves to be called *outstanding*.

The Institute rightly notes that (lack of) funding constitutes a serious obstacle to the development of Ph D training; the number of available positions is very low indeed. This means that neither a *Nachwuchs* nor continuation of the present high level of research can be guaranteed – a lost opportunity and a grave threat. The lack of Ph D students might also be the cause of grave injustice to otherwise perfectly competent candidates for promotion to professorships. We have been given to understand that one requirement for such promotion, supervision of a successful doctoral candidate, is – in practice – impossible to satisfy. To maintain this requirement in a situation where there has been a four year (plus) moratorium of Faculty supported PhD positions appears to be monstrously unjust.

Furthermore, many (perhaps even most) members of the Institute are employed, either part-time, or on a temporary (project-related) basis that is externally financed. Also a number of researchers hold permanent part-time teaching positions in the department and supplement this with external research funding. According to the most recent information given to us about 50 % of the staff-members are employed on a temporary basis, on contracts that will terminate in the immediate future, during the calendar year 2008. It is therefore impossible for us to make a considered judgement about the - in themselves quite reasonable – plans for future research. From the information available to us it is very unclear which staff-members will continue to be employed. As the Institute itself notes, this is a most unsatisfactory situation and one which patently constitutes a serious threat to effective planning and realization of its research potential.

The present outstanding level of research is to a very large extent due to the presence of outstanding leaders; both were recruited prior to the recent reforms of the Swedish corps of Professors. Both leaders will, in the normal course of affairs, reach retirement age, either within the coming five-year period, or shortly thereafter. It is obviously a *sine qua non* for

the research of the Institute that they have successors at a comparable level of full professor who are internationally eminent researchers appointed in open competition. Accordingly we recommend that funding be reserved already at this stage to ensure that such appointments will be financially possible.

The interaction between Cognitive Science and the rest of the Institute has been beneficial; this is no surprise given that the Chair-holder has a strong research background in Belief Revision Theory, Group Decision Theory and Intensional Logic that is highly relevant to research in theoretical and practical philosophy as currently done at Lund. However, in the light of the ever-increasing importance of empirical work in Cognitive Science, tension between the aims and methods of cognitive science and those of philosophy seems to be a risk which the Institute should be aware of.

The Institute finds the current faculty structure to be a hindrance to its cross-disciplinary efforts and ambitions; today, in Lund as well as internationally, Philosophy is by no means confined only to partners within the Humanities. Psychology, Medicine, Medical Ethics, Physics, Biology, Mathematics, Computer Science, Information Science, Political Science, Gender Studies, etc., can all be readily envisaged as more likely partners in research than the traditional humanities disciplines. We have been given to understand, though, by colleagues from Philosophy and other disciplines, that crossing Faculty borders is impossible owing to practically insuperable financial and administrative obstacles; if more than mere lip-service is going to be paid to the ideal of cross-disciplinarity, some action is obviously called for at this point. It is worth noting that, from 1965 until 1999, Philosophy in Dutch Universities had the status of a 'Central Interfaculty' precisely in order to facilitate cross-fertilization of research across the whole of the university and not only within the humanities. Given the existence of a 10<sup>th</sup> section at Lund perhaps a similar arrangement would constitute a definite improvement.

## PANEL 5 – BEHAVIOURAL SCIENCE

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### 1. DEPARTMENT OF PSYCHOLOGY

#### 1.1 Overall assessment

The Department of Psychology has a strong research profile in many areas of psychology, with up-to-date laboratories and with access to advanced research equipment at the University Hospital. The organization into Divisions within the Department, reflecting the major research areas, is a strong organizational move that facilitates research organization at the Department while at the same time encouraging intramural collaborations between the Divisions. The Department obviously has an attractive PhD programme that brings in many students, also from abroad. The number of PhD dissertations is also good for the period 2002–2007. The PhD programme seems overall to be in good standing, with a steady output of dissertations. The percentage of women finishing a PhD degree is excellent, with close to or more than 50% over the time period covered in the evaluation. The mean age of the candidates is, however, somewhat high, with a mean age of 43 years for the time period covered. The median age would perhaps have been more important than the mean age when evaluating the progress of the candidates.

A weakness is that too few of the academic staff have external research funding, as also acknowledged in the self-evaluation provided by the Department. The ratio of external grants to academic staff is less than SEK 40K/year for the time period 2003–2007, with no major EU funding, or funding from other major international grant providers. Considering the obvious opportunities for advanced research at the Department, with several academic staff members conducting excellent research, a more active approach to attracting international funding (or funding from major national "excellence" programs) would be within reach. The Evaluation Panel therefore recommends that the Department strategically facilitates

procedures for researchers to seek major international funding, e.g. from the EU 7th Framework Programme, or the newly established European Research Council (ERC). It also seems important that all Divisions have enough senior researchers to supervise and guide young PhD candidates and postdocs, also when it comes to grant proposal writing.

Taken together, the Department is given an overall rating of ‘*very good*’, with the Division of Clinical Psychology rated as ‘*excellent*’. The key senior members of the Division of Clinical Psychology, Lars Gunnar Lundh and Etzel Cardena have very good citation figures, as listed in the ISI Web of Science. They have also published in high quality journals within their field and have contributed significantly to psychotherapy research in Sweden. The Division of Neuropsychology comes close to excellence, and especially if the current trend of publications in high prestige journals, like the Journal of Cognitive Neuroscience and Cerebral Cortex, is also upheld in the future.

## **1.2 Research infrastructure**

The Department of Psychology is part of the Faculty of Social Sciences at Lund University. The Department employs a total academic staff of 50 as per March 2007, corresponding to 42 full-time equivalents. The mean age is 52 years, with 42% women among the academic staff. The Department carries out comprehensive research, teaching and clinical activity. The total number of students reaches ca. 1300 yearly. The most comprehensive course of studies offered is the Master’s Programme in Professional Psychology, a five-year program. The department offers 30 free-standing courses each year at basic and advanced levels. The doctoral program comprises a total of 240 Swedish credits (the equivalent of 4 years full-time study). The Department has 50 doctoral students. Research at the Department of Psychology is organized into 6 divisions, Division of Clinical Psychology, Division of Cognition, Division of Developmental Psychology, Division of Neuropsychology, Division of Personality and Social Psychology, Division of Work- and Organizational Psychology.

## **1.3 Collaboration**

The Department has witnessed a welcome broadening of research activity during the last decade, with an increase in inter-departmental collaboration between the different Divisions. Researchers at the

Department have extended collaborations with clinical neurosciences, psychiatry, logopedics and pediatrics at the Faculty of Medicine, and with researchers in linguistics, cognitive science, mathematical statistics, and sociology of law. Researchers at the Department also take part in collaborations, e.g. in projects conducted within the Centre for Research on People, Technology and Change at Work, UNIVA, School of Economics, and School of Work Environment. Extramural collaborations include national and international collaborations in developmental psychology (almost all the other Swedish universities, University College of Kristianstad, Malmö University College, Center for Lifespan Psychology, Max Planck Institute for Human Development in Berlin, University of Oslo, and Neurobehavioral Infant and Child Studies and Child Development Unit, both at Harvard Medical School in Boston), cognitive neuroscience (Universität des Saarlandes in Saarbrücken, Rikshospitalet in Oslo and Berkeley), linguistics (Oslo), early brain development (Institute for Nutrition Research, Oslo), forensic psychology (University College of Kristianstad, Göteborg University), creative knowledge (Göteborg University).

The Department of Psychology thus no doubt has extended contacts with other researchers connected to the profiles of research at the Department, both nationally and internationally. As part of the collaboration between the different Divisions at the Department, several of the academic staff are also members of more than one Division and they also move between Divisions when appropriate for the research questions being pursued.

#### **1.4 Research activity and teaching**

The Department has the ambition to integrate teaching and research by tailoring course menus to fit with the different research areas in the Divisions. Courses are taught based on literature and teaching rooted in international research and research literature. Student essays are often written within existing research projects, while PhD students may choose whether they want to join existing research projects, or pursue their own research plans. The background documents do not explicitly list the number of postdoc positions at the Department. Postdoc positions are important in terms of bridging between the PhD and the professorial levels of research, and may provide the opportunity for a Division to go deeper into its research questions than a PhD thesis project will allow, and when the teaching load of the senior staff members prevents full-time

devotion to research, with teaching load being a weakness, as stated in the self-evaluation.

When it comes to research productivity and quality, the Department of Psychology has published 394 strict scientific publication and 139 other publications in the time period 2002 - 2007. With an average of 39 full-time academic staff in the same time period, the Department's academic staff has a mean publication ratio of 8.29 articles for the whole time period and 1.38 articles per year. This last figure should have been higher, especially considering the overall good research productivity at the Department. Thus, the Evaluation Panel recommends that the publication productivity per individual staff member should improve. Department members have received several awards and prizes for their publications and conference presentations, e.g. 'Distinguished Scientific Contribution to Hypnosis', given by the American Psychological Association to Etzel Cardena in 2007, and several others.

### **1.5 Evaluation of future plans**

Among the future plans the Evaluation Panel would like to highlight certain aspects that we believe would strengthen the Department of Psychology. On a general level, we agree to the strategic recruitment of internationally recognized researchers. Such a strategy could also consider proactive recruitment to areas under development, or in relation to the age structure and upcoming retirements at the Department. The Department's goals, and the optimal weighing of research and teaching could be further clarified and communicated to the Faculty. There is moreover a need for a full professorship at one of the divisions, and a need for more post-graduate positions. The six divisions could easily accommodate several postdoc graduates. It would also be feasible to further develop policy and routines to accommodate visiting professors, and to facilitate the financing of doctoral students by external funding. The need for specific secretarial positions was voiced during interviews with Department members.

### **1.6 Future potential and possibilities**

The Faculty of Social Sciences has been described as having a granular structure, including departments of very different sizes. The Department of Psychology belongs to the large and productive departments,



although the behavioural science speciality tends to be overshadowed by the heterogeneous structure of the Faculty. This is unfortunate, and it would weaken the University if behavioural science was viewed as a satellite to e.g. sociology. The Department of Psychology should be recommended to better profile the behavioural science it pursues, and be encouraged to further develop the connections to medicine and technology that already exist, in addition to continuing collaboration with the social sciences.

It is recommended that the communication with the Faculty and University be improved, so that needs and expectations are forwarded across the levels of administration on the basis of explicit and agreed strategies and rules. A long-term strategic overview of the Faculty of Social Sciences, regarding organization and goals, would be one aspect of such work. In addition, and although identity and group promotion is strong in the Department of Psychology, increased clarity of approved academic career goals and accessible pathways, and evaluation criteria, within an improved information feedback system, would further motivate personnel and strengthen research quality.

To reach an overall status of ‘*excellent*’ the Department of Psychology needs to allocate more time for research activities, including an appropriate reduction of the teaching load when granted research funding.

### **1.7 Gender and equal opportunity issues**

There is a strong interest in psychology among men and women, and the evaluation panel sees no problems in recruitment or career opportunities. We approve of the policy of equal salary for the same type of work.

## **2. DEPARTMENT OF EDUCATION**

### **2.1 Overall assessment**

In contrast to the self-evaluation report of the Department of Psychology, the report of the Department of Education, as we have it, is a sketchy and in places confused document which does not provide the full picture of past, present, and planned future research expected in such a text. There is therefore a relative paucity of material to assist our evaluation. What follows is based on our understanding, from what is contained in the

report, of the Department's achievements and its plans for the future, taking additional information into account.

The Department's report transparently identifies a number of weaknesses which in its view have affected its standing in research and scholarship. These include: a low 'rate of flow' in the doctoral programme; previous (undescribed) 'research profiles' which the report admits did not prove to be as successful as was hoped; a lack of collaborative effort with other institutions in Sweden; and an imbalance between teaching demands and research opportunity. In addition, the report makes the seemingly anomalous point that the Department's international standing is stronger than its national reputation.

Data provided point to a one-third reduction in the number of academic staff over the period 2003–2007 and show a decline in the number of publications (whether strictly scientific or other) from 2006 to 2007 and only three books published over a six-year period. The report concedes that the research culture of the Department has been underdeveloped and that research and publication rates have been low, while asserting that the situation is changing.

We concur with the main conclusions of this honestly stated self-criticism. While there is evidence of published research over the period in question that is both respectable and relevant to the kind of academic activity expected in a university department of education, what we find lacking is evidence of any coherent overall research strategy with a clear focus that has made collaborative use of the individual talents and expertise of departmental members.

On the RQ08 grading scale it is clear to us that while some of the Department's research can be deemed to be 'good', including that of the unit 'Learning Lund', the overall impression is that the outcomes as described show a tendency from 'good' towards 'insufficient' in terms of what might be expected in a leading university.

The age profile of both academics and doctoral students, as elsewhere in the University, is high. The Department makes the point that new personnel will be necessary to ensure research development on the lines proposed. If the new leadership group (as intimated in the report) has a clear research development function it should be able to initiate and encourage a new

research culture, given appropriate additional staffing and an improvement in the recruitment of doctoral students. We make some recommendations below which are designed to strengthen the Department's stated intentions.

## 2.2 Research infrastructure

As is evident in the Department's report, staffing levels have declined over the period 2003–2007 and the flow of doctoral students has been problematic. There has been some success in securing external funding, though funded symposia and other meetings, while providing the potential for research collaboration, of course do not in themselves constitute research.

## 2.3 Research quality

The self-evaluation report gives only scant information on publications. Among the texts mentioned in the report over the period 2002–2007 the most advanced are those on research on multicultural education. There has been further work on the discussion since the 1970s on language and knowledge from a post-structuralist perspective, but the relevance of these studies for the development of any significant theory of education is difficult to identify. It is surprising that the list of 'publications which best represent renewal of research activities' includes an introductory text that, while comprehensive in its coverage, does not constitute original research.

What we have not found in the report is evidence over the period under review of research with relevance for any general theory of education or even in promising relation to other educational research in Swedish. Research in Norway and Denmark is not considered either, despite the fact that contact with Nordic researchers is claimed. And we can find nothing in terms of engagement with Anglo-American philosophy of education since Dewey or with German *Bildungstheorie*, which seriously diminishes any international voice the Department might have.

'Learning Lund', however, is an interdisciplinary research unit which is engaged in investigations with interest and implications for the whole of the University and beyond. Its publication record is good, it engages in practice-oriented research, and its work encompasses a focus on multicultural and multilingual education which fits with the future research plans

of the Department. We have the impression, though, of a lack of active engagement of those involved with Learning Lund with Nordic educational researchers in general and we would have liked to see dialogue with others in the Nordic research community that could have been fruitful for both sides.

## **2.4 Collaboration**

As mentioned above, the Department admits to a lack of collaboration with other institutions, though there is evidence of individual engagement with international activity at conferences and symposia. While some collaborative taught courses have been or are being established, there is as yet no clearly defined profile for collaborative intra- and interdepartmental research as well as cooperation with colleagues in other parts of Sweden and in other countries. Possibilities for such collaboration – perhaps on an interdisciplinary basis – might be explored with profit. In this connection involvement with NOCIES and applications to NORDPLUS could be focused on research potential as well as on networking on the one hand and on support for teaching on the other. While the development of a distance Master of Education course in Syria might enhance the teaching experience of departmental staff and draw on their expertise (and so constitute a positive initiative) the possibilities such engagement with the Middle East provides for research should become part of the collaborative research process: otherwise providing such a course will simply be a distraction from serious research effort. Similarly, commendable work in the field of ‘personnel administration’, while having potential for research, seems largely limited to teaching.

## **2.5 Research activity and teaching**

There is a tendency in social science departments to require doctoral students to undergo an intensive period of research training in their first year. There are evidently procedures in place for such training in Lund, but it is not clear whether existing interdepartmental programmes adequately cover what is required in such training. What is clear, however, is that the research efforts of faculty members should feed in to teaching, and that research engagement should in particular contribute to the research training of doctoral students. One particular circumstance which impedes practice-based research and its use in teaching is the lack of a teacher training programme now that that aspect of the Department’s work has moved to

Malmö. This means that there is no obvious entrée into local schools and that teaching cannot be based on research in a local environment which is shared by teachers and taught. In such circumstances it might be expected that research of a more theoretical nature would be stronger. The Department feels that while some of its work has relevance for teacher education there is no possibility for engagement with it. A reconnection with teacher education would therefore be appropriate.

## **2.6 Evaluation of future plans**

The Department identifies two broad research areas with potential for future development: intercultural education and comparative and international education. In the first of these areas there is evidence of past achievement. There has been, for example (and as mentioned above), research on the challenges to traditional general education in Sweden. This important research theme is of relevance throughout the Nordic countries and beyond, and links well with the second area, comparative and international education. Here too there has been some positive development, with papers in a significant English-language journal in the field (*Compare*) and in publications under the aegis of CERI (OECD) and the Comparative Education Society of Europe (CESE), though with their focus on Sweden these particular pieces are not strictly speaking comparative. We see considerable potential in the development of research activity in these areas, especially in collaboration with other researchers in Sweden and more widely in the Nordic countries. A contribution might be made to comparative and international studies generally if a research profile with a specifically regional (Nordic) comparative focus could be developed. The proposal to introduce a Masters programme in Intercultural Education could be a useful first step in the establishment of a stronger research base in the field of multi- and intercultural education.

However, in terms of the ‘renewal of research activities’ it is not clear how work on language and knowledge would reflect the stated intention to focus on either intercultural or comparative and international education. Nor is it clear, since this is not explicit in the report, precisely what the research profiles were that have now been abandoned in favour of the new areas of inquiry. This makes it difficult to evaluate both the outcome of previous stated research endeavour and the efficacy of the proposed change in the general foci of the Department’s research.

As far as plans for the future are concerned, we conclude that they are ‘good’ rather than ‘poor’, but that much further work is necessary on the lines suggested above. The intentions to ‘broaden the theoretical and methodological research base of the Department’ and to facilitate a stronger international focus in the research training programme for doctoral students are to be welcomed, but they need further clarification.

## **2.7 Future potential and possibilities**

‘Much further work is necessary’. We note that the Department is developing new research foci and that a new leadership group is in place. This should create the framework for a reinvigoration of research effort, especially if staffing levels can be restored and if more doctoral students can be admitted within the framework of a programme of intensive collaborative research training. In this connection the plans outlined in the self-evaluation report appear to be in general on the right track. In particular, we recommend the following:

- (1) The University should make clear to the Department what its expectations of it are.
- (2) The Department should be asked to produce a research plan for the next six years, with clearly stated objectives based on the projected work of coherent research groups that would encourage co-operation among departmental members.
- (3) Support for more doctoral students, for one or two post-doctoral positions, and for the renewal of posts should be provided by the University.
- (4) Serious consideration should be given to ways in which the Department might reconnect with teacher training, perhaps through a formal co-operative arrangement with providers in Malmö and/or elsewhere.
- (5) ‘Learning Lund’ should either be retained with a higher profile within the Department or restored to its original place (in ‘Area 10’) and so made more identifiable as a genuinely inter-faculty research centre.

## 2.8 Gender and equal opportunity issues

We have no specific comments to make in connection to gender and equal opportunity issues.

## 3. DEPARTMENT OF MEDIA AND COMMUNICATION STUDIES

### 3.1 Overall assessment

The Department of Media and Communication Studies (MKV) is in organisational terms rather small. The academic staff (March 2007) counted six persons (full-time equivalent: five persons). Only two of nine registered doctoral students were employees with a formal position inside the Department.<sup>9</sup>

The size of the Department is important, because a limited number of researchers and doctoral students necessarily means that the Department – to achieve research quality – has to concentrate its research activities on some selected areas and consciously ignore many others. The Department has in our opinion shown ability to take into account such difficult priorities.

We will, as an overall assessment, characterize the research of the Department as *'very good'* (high quality research attracting national and international attention). However, in some areas the Department represents research of excellent international quality, and in these fields it is highly visible in the international community of communication scholars.

### 3.2 Research infrastructure

Media and Communication Studies was until December 2005 a part of the Department of Sociology. In 2006 it moved to its present location in a Humanities building, though remaining within the Social Science

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9. The report from the Head of Department (RQ8- Form 2) states that the department is engaged in a merging process with two other small units, journalism (at present an educational section more or less without academic research activities) and Press Studies (located at the Faculty of Humanities and Theology). The Department for Press Studies has, according to the statistics in Form 1.3 a, a limited research activity. At this point it would, however, be misleading to include the Department Press Studies in the evaluation of the Department of Media and Communication Studies.

faculty. One of the two professors heads the department (25 %), the other professor heads the doctoral programme, and both are engaged in teaching. According to the report from the Head of Department (Form 2) the other personnel involved in teaching are three lecturers, two adjuncts, plus part-time engagement from a few doctoral students and others. The limited size of the Department, and the permanent educational duties, underlines the importance of external research funding. The documentation (form 1.2) shows that the Department has had some success in this area, including research grants from the EU.

### **3.3 Research quality and productivity**

According to Form 1.3 the number of strict scientific publications in the years 2002–2007 was 26. Original articles in refereed journals and chapters in books represented the majority of the publications. The production per staff member (full-time equivalent March 2007) was 5,2 publications in these years, i.e. less than one publication per researcher per year, which is rather low compared with departments in other scientific areas where articles in refereed journals are the main publication form.

However, the publication statistics also include three books and three edited volumes. Such publication forms are important in the social sciences and the humanities, and are normally much more time consuming than the shorter article format. In addition the researchers produced several reports and popular science publications that have represented an important contribution to the public debate.

Some parts of the research at the Department can, according to the assessment standards of RQ-08, be characterized as having an *excellent* research quality, documented by several publications in international refereed journals and chapters/books published by international publishing houses, both in English and French.

The more nationally oriented research from the Department, published in Swedish, is within the Nordic research community known to have a solid quality. In the fields of research given priority, like democracy, Net media and public sphere questions and media and gender research, the Department is in the forefront of media and communications research in Sweden.



It also can be mentioned that a few staff members at the Department are actively engaged in the international scientific community as speakers at international conferences, and in assignments to research councils and assignments as members of editorial boards in international journals.

The number of doctoral theses produced within the Department of Media and Communication in 2002–2007 was seven monographs, i.e. around one per year as an average. The number is not high, but must be considered ‘normal’ given the size of the academic staff and the limited number of employed doctoral student. The monograph format also means that there will be published fewer scientific articles than in departments with dissertations based on a collection of published articles.

Assessment: ‘*very good*’, but also with examples of research of ‘*excellent*’ standard.

### **3.4 Collaboration**

The small size of the department limits the research possibilities and of course increases the need for national and international cooperation. The Department seem to be conscious of this and has participated in one comparative study of Young People, the Internet and Civic Participation (funded by the EU’s Sixth Framework Programme) and has established a broad national research project about Media and Women’s Health Issues. In these areas the assessment is ‘*very good*’.

### **3.5 Research activity and teaching**

The publications of the academic staff are actively used in the Department’s courses and teaching. The Department is also involved in teaching/courses with other units and departments, among them the Journalism programme, Gender Studies and the Sociology of Law. These multi-discipline activities document the strength of the Department; however, they are at the same time very demanding. The planned organisational integration with journalism/press studies will possibly sharpen the resource conflict between teaching and research.

The background documents give no information of student essays/articles written within existing research projects. The lack of postdoc positions

undermines the Department's possibilities to give talented researchers a chance to develop their research abilities in new areas after the PhD thesis.

### **3.6 Evaluation of future plans**

Concerning future research directions two areas are mentioned.

One of them follows up previous research about the expansive Web, both analyzing new forms of 'the political' and new modes of social networking and identity development, incorporating popular culture. The vision is to develop a network-based international project. The plan is to begin on a small, exploratory scale.

The second project concerns 'the media and the Judicial System', a research project with some cooperation with the Department of the Sociology of Law.

Assessment: '*good*', but with possibilities to be '*very good*' or better. Both projects can potentially be of great public interest, but the descriptions of strategy, visions, possibilities and obstacles are (so far) rather general and 'topic'-oriented.

### **3.7 Future potential and possibilities**

The Department has, as mentioned, many strengths; however, a definitive weakness is its small size, which makes the research projects (as well as the educational responsibilities) dependent on a few key members of staff. This makes the Department especially vulnerable concerning long-term research planning and cooperation. The described plans to merge with two other small units seem to be well founded, given the similarities of research areas, educational duties and the need for a more robust organisation. However, if the aim also is a strengthened research quality the condition must be an increase in the staff of researchers and employed doctoral students.

### **3.8 Gender and equal opportunity issues**

The Department has, as indicated, a strong profile concerning media and gender questions. It also 'lives as it learns'; the gender balance is good (also in the leadership of the department). In this respect the Department could be a role model for other more traditional male-dominated departments.

*Additional Panel Report*<sup>10</sup>**4. MALMÖ ACADEMY OF MUSIC****Achievement quality****– Quality (international comparability and innovative power)**

Within the international community of researchers, Malmö is considered to be one of the leading music education research institutions in the world in its focus on how music learning is shaped by social context. Malmö has the leading group of researchers in Sweden in music education research (notwithstanding the high quality evidenced by a small team of scholars in Gothenburg). Furthermore, there is an overall coherence to the Malmö research output that is relatively rare internationally. Both academic staff and doctoral students have generated research which (a) falls under the broad focus of investigations into contextualised learning (whether in formal or informal settings) and (b) has had an international impact in its influence on other researchers (such as in Australia and the UK). They have also been at the forefront internationally of expanding our understanding of how music learning is framed and shaped by the emergence of new technologies and popular culture.

**– Productivity (scientific production)**

Although this is a relatively young research group (having just celebrated its tenth anniversary of doctoral research), there is a breadth and depth in its published output, as evidenced in the wide range of topics in the student's doctoral theses, as well as in the overall coherence under a contextualised learning umbrella. The number of publications over the past six years (form 1.3) is commendable in a context where university music departments nationally and internationally have a tradition of scholarly activity that informs musical practice, but not of empirical research. Malmö has established a research culture in which music education research can flourish. The team has attracted external research grants for each of the past three years. Internationally, these tend to be small in arts-related subjects (such as in the interface with social sciences in education) and so the sums involved are also commendable.

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10. Panel 5 declared that it did not have the competences to perform a proper evaluation of the Malmö Academy of Music. Therefore, an external reviewer was appointed to perform the scientific evaluation of this department.

– **Relevance (scientific, social and socioeconomic significance)**

As mentioned above under ‘quality’, the international research community value the work of the Malmö team very highly because they have enabled us to understand the impact on musical behaviour and development of key features of socio-cultural context, technology and media across a wide range of musical genres.

– **Vitality and ability to manage research (flexibility, control and leadership)**

One of the key features of the research group is its activity as a group, with regular scheduled meetings for colleagues to share development, explore ideas and support each other. This collectivity in the development of the research culture is rare in the field of music education. Senior members of the team provide an experience framework in which the younger/less experienced members can flourish and in which everyone can develop. This is highly commendable.

Overall, in terms of achievements, the evidence base (allied to my own first-hand experiences of reading examples of their published output, examining a recent PhD candidate and observing Malmö academics presenting at international research symposia) suggests that the quality is ‘*excellent*’ according to your criteria.

Concerning ‘plans for the future’, the research team are aware of the current limitations in opportunities for doctoral students to progress post-qualification and the challenges of enabling the senior lecturers to become more research active (a common challenge in music departments with a strong performance component across the Western world). Nevertheless, they will be building from a solid foundation and track record. Their strength is in recognising that musical learning can be equally powerful outside as well as within institutional settings and that informal learning has been under-represented in the research literature. Their proposed focus for the future is to build on their existing research excellence and extend the number and variety of research sites to include music learning across the lifespan (another under-researched area). Also their intention to study musical performance as a learning activity is at the forefront of development in this area and will enable them have concrete contexts in which lifelong learning in music can be situated. Given their track record, with continued support, they are ideally placed to realise their goals. Overall, the planning overview is considered to

be '*very good*' and could be excellent if there was a mechanism for supporting the development of post-doctoral and senior lecturer staff in their research, such that the whole community were able to have research as a core element of their working week.

## PANEL 6 – SOCIAL SCIENCES

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### 1. INTRODUCTION

Panel 6 for the Lund University Research Quality Evaluation recognizes the importance of the principle of a research evaluation exercise. Many of its members have participated in comparable exercises elsewhere and they believe that such evaluation of research quality offers important guidelines for future university developments. The panel is also aware that the increasing importance of such assessments in Sweden and elsewhere in the world is largely the result of political and social pressures, a growing emphasis on productivity, efficiency, and economic/financial constraints/possibilities. Given this situation, it is, however, important to regard the mission of Social Sciences in their entire context, and this applies with special force to the Social Sciences since their social utility is often systematically underestimated. In addition to research, education of future generations of scholars and professionals as well as the participation of intellectuals in the public debate and in developing cultural and social conditions of citizens, are crucial tasks.

Because of the multiple tasks of comprehensive universities where the Social Sciences may interact beyond faculty borders, a narrow emphasis on competitiveness, productivity and often short-term assessments may have a detrimental effect on the intellectual, academic and societal mission of universities and their constituent departments. Such endeavours, particularly in the Social Sciences and Humanities, can reduce the range of ideas explored, narrow the fields of academic enquiry, and rupture the important articulation between intellectuals and other spheres of social life.

The panel agreed that universities, their reputations and their contributions, also reside exactly in nurturing intellectual freedom, stimulating innovative and blue-sky research, encouraging unorthodox thinking and foster the debate between academia, civil society, and politics/government. A narrow focus on metric data, an overemphasis on quantifiable benchmarking, and a concern with economically measurable indicators, are dangers that are implicit in each assessment exercise of the Social Sciences that above all are meaning producers. In a wider social context, in which intellectual life is in danger of further marginalisation, as a premium is put on directly measurable effects, we believe it is imperative to keep the role of universities as leading centres of intellectual life at the forefront of our assessment. This means, among others, that our assessments are guided by a concern for maintaining, fostering and nurturing speculative thinking, advanced academic research, a vibrant intellectual milieu for both teachers and students, and the degree to which the intellectual life of the university interacts or articulates with other sectors of society.

In sum, universities are and should be centres of intellectual excellence, debate, disagreement and the exploration of novel ideas, the different, including the uncomfortable, the disagreeable, and even the marginal. We therefore believe that the mission of research assessments is not solely to identify what constitutes success (or otherwise) in narrowly defined metric terms, but also to assure that the intellectual mission and the public role of departments subject to assessment is strengthened for the future. We suggest that interdisciplinary research and cross-faculty co-operation are strengthened to assure these goals. Innovation might occur if new research areas are allowed to emerge, are recognised and nurtured across present boundaries.

In addition to somewhat impenetrable faculty and departmental boundaries, one of the present problems seems to be the lack of a clearly

defined and transparent reward structure within the Faculty, for example, in relation to a conscious publication strategy. We see as important to explicitly support and reward publishing activities through a coherent incentive structure that not only rewards participation and contributions to international scholarly discussion and research activities, but which offers incentives for contributions to the development of professional areas, public and policy discourses in Sweden. Equally important in our opinion is to offer benefits for efforts to expand intellectual debates in Sweden in the Swedish language, for example through textbooks, and to reward successful endeavours to transmit Swedish research findings to the international arena. We suggest that departments consider actively enhancing the co-operation with neighbouring ones, to make strategic choices to promote dynamism, innovation and excellence in their respective fields. A deliberate policy could also make visible a too great weight on provincialism/parochialism which otherwise might be a risk.

During the site visit in which the chair and vice-chair of the panel took part, some more general problems for Lund research and Lund scholars arose. Many of these problems are dealt with in the executive summary of the RQ08 exercise. For example, it seems as if some efforts have been made, but perhaps not continued, to overcome the so called leaking pipe line resulting in losing women scholars in the trajectory between PhD and professorial level. In the Social Sciences there was only one more female professor in 2007 compared to the situation in 2003. Women made up 30 per cent of the professorial staff in 2007, which hardly can be regarded as a high proportion, considered the specific field, and a system that allows the promotion to professor of all merited ones.

Some Social Science departments tend to favour individual research rather than team research or team-based projects. Although it is recognised that individual scholarship might be appropriate for some type of research, the absence of collaborative research might be a problem. In particular, international joint research and co-operation customarily leads to higher impact through international publications and heightens the international visibility and recognition of Lund's research capabilities. It is recommended, therefore, that these departments make a substantial effort to integrate their research agendas in wider co-operative research programmes. Efforts of this kind would also improve long-term planning which in some cases could be more elaborated than shown in the self-evaluations. Such initiatives merit efficient support of all administrative levels of the university.



Departments that have not recruited PhD students in recent years are recommended to find resources to do so. We find it detrimental for the future of the respective professions and fields of research not to recruit PhD students regularly. Perhaps this lack of orientation towards the future partly explains why so many units have presented somewhat less convincing future plans and strategies. However, we also recognise that this is the very first research assessment exercise of Lund University, resulting in unfamiliarity in providing necessary documents in a short time period and therefore consider the present assessment also a learning exercise for departments, and centres.

Another problem of many departments is the strongly asymmetric age structure of academic staff, especially the inordinate concentration of pending retirements of professors in the coming years. To address this problem as well as to enhance the research standing of the entire faculty through injection of new scholarly perspectives, issues, methods and a sensibility for emerging Social Science themes we suggest the faculty in the short and the medium term to consider two measures. First, we recommend a proactive programme to gain a competitive advantage over other Swedish and Nordic Social Science faculties and departments that confront a similar age structure. A strategic programme could be put in place that permits the Faculty of Social Sciences to early replace members (at the professorial level) that are about to retire, resulting in temporary doubling up of these positions.

Such a doubling of positions could be flexible and range to a period from five to ten years. The advantages of such a measure are obvious: The Faculty of Social Sciences would have a distinctive competitive edge in replacing retiring staff before competing institutions also enter the market. The competition for the early replacement positions should be open and internationally advertised. Other distinctive advantages that would enhance the research quality of the Faculty are new perspectives and the strengthening of existing potentially excellent research areas within the Faculty.

One way of enhancing these areas could be a programme of a handful of Lund Distinguished Visiting Professors. Such professorships should be instituted in cross-disciplinary research areas identified by the Faculty, in co-operation with the departments. The funding could be based on external sponsorship funds. The aim would be to bring the best scholars in the respective fields to the Faculty of Social Sciences for an academic

year each. Lund Distinguished Visiting Professors should be a distinct asset to staff and students and strengthen the research profile of the Faculty of Social Sciences.

In the following reports on the departments, centres and research units and of the Faculty of Social Sciences, it is important to recognise the heterogeneity of the assessed units in a number of dimensions: size, age, composition of staff, research profile, position within the faculty, etc. While the School of Social Work and Social Welfare stands out as one of the *excellent* units within Social Sciences in a broad sense, and the Department of Gender Studies to have particular potential, some other units also score high with panel 6, among them the Department of Sociology of Law and the Department of Social and Economic Geography. The other departments and units rank from *good* to *very good*. The assessment of individual departments and centres that follows below is mainly based on evaluations of panel members that are experts in the respective areas of knowledge. In a small number of cases, two or more panel members are responsible for the assessment.

## 2. SCHOOL OF SOCIAL WORK AND SOCIAL WELFARE

### 2.1 Overall Assessment

The School of Social Work is one of the biggest departments at the Faculty. According to the statistical information provided, its academic staff amounted in 2007 to 32 in all. The number of professors is 5 (FTE). The number of researchers has declined somewhat since 2003, while the number of senior lecturers has increased. About half of the staff members are women. The full time academic staff/student ratio is high: about 50 students per staff member.

The department's English name, "School of social work and social welfare", captures the research profile in an accurate way: The focus at the School is not only on social work practices and interventions, but also on more general questions regarding social policy and social problems in society in general. Despite the size of the unit, the research activities at the department are well integrated. All schools of social work in Sweden do carry out research on "social welfare", at least to some extent, but the Lund School has been particularly successful within this field.

The collaboration between staff members is intensive and dynamic. At least during the time period to be evaluated here, the School has been the leading Swedish social work department as regards the development of theoretical bases for social work. The “Lund-team” has e.g. initiated *Socialvetenskaplig Tidskrift* (a mainly Swedish-language, high quality scientific journal for the social sciences, read through-out Scandinavia) and has produced the most influential textbooks on social work in Scandinavia at the moment.

The various activities at the School have clearly contributed to the theoretical, methodological and empirical knowledge of social work, while at the same time providing new perspectives on the subject field. The department also actively participates in ongoing international scientific and professional debates concerning social work and social welfare.

However, also the share of applied research at the department is considerable, and the School can be considered to answer to the demands by professional social workers and the general public through a variety of activities.

Combining a commitment to “society” and demands for publishing for professionals has proven a problem for many social work units, but the Lund School has so far succeeded in finding strategies (i.e. concerning publishing) which consider both needs within practical social work and those of the academic society. To make such a “dual” strategy work is, however, a demanding task in many respects.

## **2.2. Research Infrastructure**

The school has students at two campuses, Lund and Helsingborg, but the self-evaluation does not provide any information on the research activities at the Helsingborg campus. On the basis of information provided on the School’s web pages, it seems like if the research activities at Campus Helsingborg would not be very extensive. It might, in many respects, be wise to concentrate the research activities to the Lund campus. However, the School should have a strategy for ensuring the involvement of students at the Helsingborg campus in its different research activities.

### 2.3 Research Quality

**Quality:** The department has managed to cover all levels of social work (societal, organizational, individual) in its research activities, but in a fairly integrated manner, thus avoiding the not uncommon but nevertheless artificial and counter-productive academic division according to which questions related to social welfare at the macro level are being handled by e.g. sociologists and economists, and social problems and social interventions at the micro level by researchers in social work respectively: Nearly one third of the scientific publications produced by the School belong to the category of national or international refereed articles, which is a very large share when it comes to the field of social work, at least in Scandinavian comparison.

The School was also “ranked” very high among social work departments when the Swedish Research Council for Working Life and Social Sciences evaluated the research activities within the field of social work in 2003. Thus, in terms of quality, the School must be ranked as *excellent*.

**Productivity.** The School is (at least) as productive as are the other big units at the faculty. If the volume of production is viewed in relation to the comparably high teaching load of the academic staff (which, due to the nature of social work education, includes providing both academic and professional skills), the relatively moderate share of external research funding in comparison to other units at the faculty, and the intensive “interaction” with professionals in practical social work and with society at large, the department ranks (at least) as *excellent* as regards productivity.

**Relevance:** The research conducted at the department must be ranked as *excellent* in terms of relevance. The research activities of the School have broadened the theoretical basis of social work and social welfare. The research is also of high relevance for the professionals and decision-makers in the field.

**Vitality and organizational capacity:** The School has shown its vitality through a number of activities: it has established highly qualified scientific journals/research networks, its staff has taken part in a variety of public reports as experts, The School is the leading social work department in Scandinavia as regards the number of joint research projects/publications etc. The department also has managed to recruit many and good PhD

candidates. The interaction between research at the School and society is impressive. In terms of vitality the department stands out as *excellent*.

## 2.4 Collaboration

The staff at the School is involved in a number of local, national and international projects, many of them multidisciplinary, and the School has a unique position in Nordic research networks and international collaboration. In terms of collaboration activities, the department ranks as *excellent*.

## 2.5 Research Activity and Teaching

According to the self-evaluation of the School, its vision is to make research available to students and the public. In this respect the vision seems already to have been realized to a large extent.

## 2.6 Evaluation of Future Plans

Existing meta-analyses of research within the field of social work have shown that there has been almost no comparative empirical research conducted so far within social work. The future plans of the School, thus, seem to be *excellent/outstanding* in this respect. Several promising research areas are emphasised in the School's self-evaluation: e.g. labour market research, care for the elderly, research on interventions in social work and, above all, more comparative research in social work. All of these areas stand out as important both from a theoretical and from a national and international societal perspective.

## 2.7 Future Potentials and Possibilities

The staff at the School is heavily involved in cooperation with professionals in the field. The different demands on social work can be compared to balancing on a "slack rope", with demands from professionals in the field and in society on the one hand, and demands placed on the universities for "going international" on the other.

Further, the teaching load of staff holding a PhD seems heavy when looking at the relationship between teachers and students (1200 students and only 25 full time academic teachers). Against this background, the quality and productivity of the School's research is impressive. In a longer

perspective, this equation may, however, become difficult to uphold. The School and, especially, the Faculty should consider different measures for further promoting the research possibilities for teachers holding a PhD (as well as other staff). Increased possibilities for conducting research would also increase the School's possibilities to compete for external funding.

### **2.8 Gender and Equal Opportunity Issues**

The gender balance at the department is fairly even.

## **3. DEPARTMENT OF SOCIOLOGY OF LAW**

### **3.1 Introduction**

This is a small unit, with only 2 full time top ranking academic staff (professors) and a total of 8 full time academic staff (2007). According to the statistical material provided for us, it has a total staff of 22; 36 % of them are permanently employed; 64 % are women (2007). At present, the Samuel Pufendorf Professorship is allocated to the unit (2008–2011). During the period 2003–2007, the unit had 10 PhD students, which must be considered a fairly large number relative to the number of professors. It has a complete undergraduate education (with separate courses for 120 ECT) and a postgraduate education, and a total of some 200 students every year. The full time academic staff/student ratio (8/200) is 25 students per staff member.

### **3.2 Description of activities**

In a small unit such as sociology of law, a dispersal of foci could easily lead to superficial and unintegrated research. As can be seen from the unit's own report, sociology of law in Lund has instead chosen a concentration of focus. As a point of departure, this seems to be a very wise choice when personnel and resources are scarce. The next question is, of course, the specific choice of focus. Preferably, the focus would have to be theoretically as well as empirically at the core of the subject, while at the same time of a broad or general nature in order for important issues not to be left out or weeded out. It is not easy to put together such a menu. Sociology of law in Lund has chosen an emphasis on norms as its focus. As a subject matter for sociology of law, this focus is extremely well chosen. The concept of "norm" is essential and central to sociology

as well as to law. Normative patterns are basic to an understanding of society, and legal regulations are norms. The concept of “norm” may be and has been analysed in depth both by lawyers and sociologists. It goes to the core of both disciplines, thus creating a very relevant “bridge” between the two into sociology of law. A large number of key problems in the sociology of law may be seen in the light of norms: Legal cultures in different contexts; juridification or legalization of social relationships and institutions; legal pluralism; law, power and repression; law as a means of counteracting repression; and so on. A concentration on norms provides coherence and theoretical meeting ground for staff and students in a subject which, with small size, might easily become fragmented. At the same time, it triggers a whole vista of interesting research problems. The norm perspective as described is not developed as a formal model, which could easily become stifling, but as a theme which goes to the heart of the matter in law and sociology alike, thus permeating both disciplines, and which ignites theory and research. But the list of references in 2.5–2.8 shows that there is also openness to other approaches. The unit seems well aware of this important point.

Being interdisciplinary, the department collaborates with several other departments in Lund inside and outside the faculty, and with law and social science disciplines in a number of other Swedish centres of learning. It collaborates with the International Institute for Sociology of Law in Onati (Spain) and with universities in Italy and Poland. Its national and international standing is very high, with new cooperative relationships coming up.

### 3.3 Assessment

*Strengths* include, paradoxically, the size of the unit. To repeat, it is a small unit, making it possible for the highly professionalized and competent staff to interact well. Among other strengths is unit’s emphasis on interdisciplinary national and international contacts. A *weakness* is that it is, also because of small size, vulnerable to sudden personnel changes and exhaustion of researchers. Our opinion is that sociology of law in Lund could well use a larger staff without endangering the positive aspects of small size. It would be a responsibility of the University to increase size to an optimal level. The *opportunities* of the unit are great, especially through its contacts with law and well as sociology, which, to repeat, open a whole vista of important research problems – important

to theory as well as to Swedish and international society. Important is also the unit's position in a Nordic research network and international engagements.

The most successful research of the unit concentrates on norms and law. This focus is maintained in PhD dissertations as well as other research throughout the unit. There is an increasing emphasis on using the norm perspective in understanding society, paralleled by an increasing interest in the mass media. There are three strong research areas – social welfare, democracy and social politics; children, youth, family and victims of crime; and environment and sustainable development. Many of them have a focus on norms. The allocation of the Samuel Pufendorf Professorship to the unit offers new opportunities for developing theory and methods.

Several promising research areas are emphasised. They include a particularly important point – referred to as a vision: The establishment of a Research Centre on Norm Studies, with a European and International emphasis. This would be of great interest to many different departments, and we consider it a very courageous and forward-looking idea. To realize the vision, increased recruitment to an optimal level and expansion would be necessary.

Three of seven publications (only seven are allowed listed) are devoted to the development and use of the norm perspective: Håkan Hydén's *Normvetenskap* (2002); Matthias Maier's PhD dissertation *Norm och Rättsregel*, on the construction of a tunnel through Hallandsåsen (2003); and the article *The Concept of Norms in Sociology of Law* by Hydén and Måns Svensson (2008).

In terms of **quality** (international comparability and innovative power): There is a strong emphasis on national and international cooperation. Due to its innovative emphasis on norm studies and normative perspectives as used in law, sociology and consequently sociology of law, the unit ranks among the highest internationally in the field, and can safely be called *excellent*.

In terms of **productivity** (scientific production, especially volume of production seen in the context of size of staff), the department ranks as *excellent*.



In terms of **relevance** (scientific, social and socioeconomic significance): In view of the relevance of the norm perspective for an understanding of modern and late modern society and societal change, the department ranks as *excellent*.

In terms of **vitality and organizational capacity** (flexibility, control, leadership): The unit shows great vitality in carving out a basic and highly relevant perspective to be followed in research on law and society, and it shows a clear capacity to implement successfully such research (see 2.5–2.8). In these terms, the unit ranks as *excellent*.

**Concerning plans for the future.** The vision of a research centre on norms is an extremely interesting and original idea for the future. The University would be wise to make a note of this vision, and give it support. Many departments could be involved, and interests in questions of ethics, gender, socialization, and culture and society in general could be vitalized and integrated. On a four point scale it is given the rank of *excellent*.

## 4. DEPARTMENT OF SOCIOLOGY AND SOCIAL ANTHROPOLOGY

### 4.1 Introduction

The Department of Sociology {SOC} (and Social Anthropology [SOC A]) is a large unit within the Faculty of Social Sciences. According to the statistical information provided it has a total academic staff of 42 in 2007. Both the number of academic staff and composition of the academic staff have changed significantly since 2003. The number professors has dropped by about a third (while the mean age has increased from 57 to 61), the number of senior lecturers dropped a quarter and the number of researchers declined even more, from 18 to 6 researchers. In line with these changes, the number of doctoral students and other personnel declined significantly. Overall, the department in 2007 is roughly half the size of the 2003 department. Despite the drop in academic staff members, the Lund University sociology department was the largest Nordic sociology department in 2005 (cf. Aaltojärvi et al., 2008: Table 2<sup>11</sup>).

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11. Aaltojärvi, Inari et al. (2008), "Scientific productivity, web visibility and citation patterns in sixteen Nordic sociology departments," *Acta Sociologica* 51 (1): 5-22.

The small Social Anthropology unit with the Department of Sociology has three professors (one full and two associate) and one lecturer.

#### **4.2 General description of the department and research activities**

It appears that Social Anthropology offers in proportion to its staff a far larger number of courses (14 versus 25). In the fall of 2007 Sociology enrolled 38 doctoral students and Social Anthropology 11. The student/staff ratio in sociology at the doctoral level is therefore smaller than it is in Social Anthropology.

The field of sociology and social anthropology is generally characterized by a multitude of theoretical traditions, a diversity of research interests and methods. The Department recognizes such diversity and has created eight research environments with the objective of producing 3–5 “distinguished environments by 2010. The research environments range from “Everyday-life and Life-World Research” to “Anthropology/Sociology of Governance”. At present time, funding for the eight research environments is mainly symbolic. The Social Anthropology unit has justifiably a more distinctive research focus on “global systematic anthropology”.

The interdisciplinary activities and relations to other departments are extensive and impressive. Similarly, the international standing especially of the small Social Anthropology unit is *outstanding*.

**Strengths – Weaknesses – Opportunities – Threats:** The strength of the Department of Sociology and the Social Anthropology unit are seen in their existing research environments and areas, cooperation with other departments in LU and national as well as international networks. The weakness is the generational asymmetry of staff and the lack of external funding. The threats issue from the age structure of staff and uncertainties with respect to student interest in the fields.

**Successful Research Areas:** In sociology the research area “Sustainability and Development Studies”, “Network for Studies of Criminology, Deviance and Social Problems”, and “Social Policy, Working Life and Global Welfare” identified as a successful research specialty. In all cases the future recruitment of academic staff and/or students remains an issue.

In Social Anthropology it is the successful field of “Anthropology of Global Systems”.

**Most Promising Research Areas:** A number of promising research areas are listed in the department report corresponding to the development within the previously listed eight research environments. In Social Anthropology the most promising new research direction is in the field of the anthropology of governance, the state and culture.

**List of Publications Which Best Represent Research Activities:** A variety of articles and books are listed.

**Professional Activity (2003–2007):** The Department of Sociology and the Social Anthropology Unit are very active professionally. In many categories, the SOC A is significantly more active.

**International Collaboration (2003–2007):** There is a fair amount of international exchange and collaboration.

### 4.3 Overall assessment

In terms of an overall assessment we would differentiate between SOC and SOC A: The overall quality of the Sociology unit is *good* and of the Social Anthropology unit is *very good*.

### 4.4 Research Quality (a measure of excellence and attention received within the community of researchers).

The overall productivity is very good but not surprisingly unevenly distributed across academic staff. The decline in total publications more recently reflects, one would assume, the reduction in academic staff.<sup>12</sup> The productivity of the SOC unit is *good* and in the SOC A unit is *very good*.

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12. According to the study by Aaltojärvi et al., 2008:Table 3, (which only takes output into account and not available resources, for example) the average number of publications (as found in the GOOGLE Scholar search engine) in the sociology department at LU per faculty is 1.9 which is lower than in most Nordic sociology departments. According to the same study, academic staff with publications listed by GOOGLE Scholar represent 57 percent of all faculty which falls below the proportion of faculty with such publications in other major Nordic sociology departments.

#### **4.5 Collaboration**

There is reasonable emphasis on national and international collaboration both in SOC (*good*) and in SOC A. (*very good*).

#### **4.6 Research activity and teaching**

Difficult to assess on the basis of the information made available.

#### **4.7 Relevance (scientific, technological, clinical, social, cultural and socioeconomic significance)**

In light of the many scientific reports that directly address contemporary national and international social issues through books and other publications as well as the participation of faculty in governmental bodies, the relevance of the scientific activity of the department is *good*.

#### **4.8 Vitality and Organizational Capacity**

The internal and external vitality of the two units appear to be *good*. Proactive measures to cope with the generational imbalance seem to be in order.

#### **4.9 Evaluation of future plans**

There is adequate concern about future intellectual directions but less, it seems, about future staffing and student recruitment.

#### **4.10 Gender and equal opportunity issues**

The gender balance in the entire department is better than in many other departments of the same size and stature.

### **5. CENTRE FOR GENDER STUDIES**

The Centre for Gender Studies was established in 1978 as a comprehensive university unit with interdisciplinary research, teaching and documentation tasks. Since 2002, it belongs to the Faculty of Social Sciences and functions as a department. It is one of the smallest faculty departments with only one professor and a total of 6 full time equivalent academic staff (the number has not changed since 2003). The integration of the Centre for Gender Studies into a faculty structure as an inde-

pendent department follows a general trend in Sweden as well as, for example, in Finland which does not seem to have had any negative effects on interdisciplinarity.

Organisational changes, new staff and a recently started PhD training (2006), encompassing 3 students imply that the department is in a process of elaborating its research profile, recruitment of researchers and PhD training.

### **5.1 Overall assessment**

Gender Studies is a vital and innovative department with a research agenda that has a leading position in Sweden. The department has potential of lasting impact.

### **5.2 Research Quality**

The department reports intersectionality, post-colonial and queer studies as its research and teaching profile. In these fields Gender Studies at Lund is one of Sweden's leading departments. Postcolonial, and especially queer studies, are however new fields that have not yet produced such a body of research in the Nordic countries that it would be possible to assess their long-term effects. It is also too early, because of major changes in staff, to definitively assess the quality of the research activities. Yet, the chosen priorities show vitality and innovative power and are without doubt internationally cutting-edge research fields within Gender Studies. Another indicator of high quality is the attraction of both staff and PhD positions that the department recently has witnessed. The reported productivity follows both quantitatively and qualitatively the pattern of other Social Science departments at Lund, with more book chapters than referee journal articles. Predominantly domestic publishing could be regarded as both understandable and necessary considering the profile of the department, given the extraordinary high level of societal relevance of the research activities. There is internationally, however, a great demand for high quality research in English on the Nordic (welfare) societies from new perspectives. To satisfy both needs requires a delicate balance and poses a challenge for Gender Studies. On average, putting several dimensions together, the department ranks *very good/excellent*.

### 5.3 Collaboration

Gender Studies collaborates within Lund University on PhD training, but the attached documentation does not provide data on research collaboration, which no doubt occurs. The department has a long tradition of participating in international curriculum development and other training activities, but it does not participate in joint international research projects. The department does not report any regional or national research co-operation either, which is a pity. However, the publications of some scholars, most significantly in the field of post-colonial studies, indicate international profiles and strong international links on an individual level. The wide network of international contacts that the department as well as individual scholars embrace enables future research collaboration with external competitive funding.

### 5.4 Research activity and teaching

Gender Studies follows the tradition among Gender Studies Centres of having established a very strong connection between research and training. This includes the contents of training and the high competence of teachers. On BA and MA levels the relations are remarkably good. In PhD training the collaboration is in the process of development and needs both monitoring and sufficient resources in order to be productive. One could consider whether it would benefit the research and training milieu to increase the number of PhD students up to 5–6, or if the present arrangements are enough to provide the current 3 PhD students with a sufficiently enriching environment.

### 5.5 Evaluation of future plans

The department reports Gendered Communities, explored in relation to key terms such as solidarity and social justice as its upcoming research profile. This new profile will possibly follow the centre's present orientation. To draw on the current profile is an excellent choice, but the future plan seems to need much improvement and efficient integration of the scholars' projects as well as of individual research profiles in order to become a competitive project (or research programme). At the moment the plan is rated *good*. The department could choose one of three options: collaboration within the faculty, national/regional co-operation or international collaboration. Being a small department, choices have to be made. In addition, given the limited resources, either training or research

could be emphasised. In research, priority could be given to a broad range of topics, or to one theme of strategic value. The centre might consider a division of labour in co-operation with other Gender Studies Centres in the country.

### **5.6 Future potentials and possibilities**

The Centre for Gender Studies may ensure high quality PhD training through co-operation with other departments. This is especially urgent at national and regional (Lund-Copenhagen/Denmark) level. These levels are less developed than, for example, the Nordic level. The recently established national PhD training programme in Gender Studies offers good potential. There is also a need for consolidation of the present activities after an intensive phase of major changes. The vitality, innovativeness and the leading position of the department in post-colonial and queer studies along with a good network of international contacts offer excellent future potential and important possibilities for qualitative impact.

## **6. DEPARTMENT OF POLITICAL SCIENCE**

The size of the department is relatively big according to international standards. Around 50 persons are enrolled as full time academic staff members. If these figures are broken down due to type of employment, 15 are PhD students. The number is not high but well compensated by a high turn out as the department produces in average around four or more degrees annually. As compared to the figures above the department encompass 3 chairs only, which seem to fill only one chair each for the three main fields: IR, public policy, and political science general. Partly this imbalance is compensated by two promoted professors among the lecturers. To reach highest international standards the number of chairs should be considerably increased or alternatively the number of promoted professors must be enhanced and spread to all three main fields. The number of full time senior lecturers is 17. Their mean age is 47 years and according to the career curve many of them must have exceeded the age years ago to take the next and final step in the employment hierarchy. Why this has not happened is an open question for us. Many of the lecturers are women, none of the professors. Measures must be taken to encourage the lecturers in their career and to open the gates for external recruitment.

Partly the problem discussed above can be traced to the flat development of external grants. The same holds true for the number of published articles in refereed journals. Saying that does not mean that the staff members are unproductive, quite the contrary, too much effort is laid on publications that are not referee articles or scientific monographs. In addition, it looks like this is a structural problem facing a much larger community than Political Science department in Lund; however, it is not an excuse.

Other signals from the department give a picture of cooperation and synergy. One of these is the sub disciplines which are successfully encouraged to collaborate in research projects and joint seminars. The decision to eradicate the division between domestic politics and international relations is wise as the border line between the domestic and the international is blurred in the European Union. A separation of sub disciplines may easily increase the risk of developing two or three mini departments, which is a waste of resources. Also, in times of scarce resources such an arrangement is vulnerable to conflicts about hiring and firing staff members.

On the other hand, it looks like the research activity at the department is scattered to a broad area of special interests. Academic freedom for the university and its employees cannot be taken for granted; it is something that must be actively guarded. It is therefore somewhat risky to propose that the departments should encourage its staff to come more together as an organisation of research and less act as a platform for individual interests. The existing collaboration between sub disciplines could therefore be further developed. Similarly seems the cooperation be well utilized with other departments and research centres in Lund. A more organised manner to perform research at the department including all types of staff members could give more positive results in terms of individual publishing and career making. This can well be done in cooperation with other departments in Lund. In sum, the research activities of the department grade *very good*.

Much hope and resources have been invested in the formatting of a prospective Öresund region, bringing the neighbouring Danish and Swedish regions together in order to become the leading region in Scandinavia. More people than ever cross the bridge every day to live and work on both sides of the connecting bridge. Many formal hindrances have been



abolished to make integration possible for common people. Universities and their employees are by definition the most international institutions and professionals. To our disappointment we cannot find anything from the department report that reflects our expectations. The political science department in Copenhagen is big, internationally oriented, and the quality is high. Also the sub disciplines in Copenhagen seem to fit well with those in Lund.

Danish and Swedish are defined as different languages divided by state borders. If the latter would not be the case probably these two languages could be defined as one with two main sub variations. Common people who commute have easily overcome the language differences in their work and living in the region. If common people can integrate, why is it so complicated for the universities and their academic staff? So far it looks like a tragedy seldom heard of. If needed, short courses in Danish can be easily organised and Danish books can be included in teaching and exams for the students.

The distance from Lund to Copenhagen is small in terms of travelling time and language difference, distance to the English language and the international arena is much greater. In fact and by definition, crossing the bridge is an act of internationalisation both for the scholars in Lund and in Copenhagen. Measures must be taken now by these two departments to rapidly enhance institutional collaboration in terms of exchange, joint courses, research projects, seminars to begin with. Otherwise we must conclude that Lund University has very successfully fulfilled the intentions from 1666 to turn the former Danes in Skåne into Swedish nationalists. The plan for the future grades under these circumstances only *good*.

## **7. DEPARTMENT OF SOCIAL AND ECONOMIC GEOGRAPHY**

### **7.1 Introduction**

The Department of Social and Economic Geography of Lund University has a long and distinguished international academic reputation. Despite its relatively small size (it is below average size in the Social Sciences), it stands out as one of Sweden's leading geography departments, particularly in the well-established research domains of the department. The

department has 4 full time equivalent professors and 8 full time equivalent senior lecturers. With a core academic staff of 12, the department ranks among the smaller ones in terms of staff numbers. It has 9 full time equivalent PhD students.

## **7.2 Overall Assessment**

Its research is organised in four major research domains, namely economic geography, social and urban geography, cultural historical landscape research, and development geography. Given its small size and compared with other, larger units, the geography department performs very well. It has a good number of doctoral candidates and doctoral examinations, the research intensity percentage (research revenue/total revenue) is high and the research output, at least for the leading research clusters, is *excellent*. There is significant collaboration, both across the university as with other universities or academic institutions in Sweden and abroad. The research output is somewhat uneven, with two research clusters that stand out in terms of international standing, while the others are important in national terms or in the process of consolidating their contribution (see below). Most of the members of the department are active internationally (particularly the two leading research areas) and have excellent international collaborative networks.

## **7.3 Research Infrastructure**

The research infrastructure is difficult to assess on the basis of the available documentation and information. I had particular difficulties navigating the departmental web-site. This is somewhat unevenly organised. As the website is one of the key windows to world through which the department presents itself, we would suggest that resources are devoted to developing, and in particular, maintaining and updating research information. This is also true for some of the other departments.

## **7.4 Research Quality**

The research output in quantitative terms is impressive. In quality terms, the research is somewhat uneven. Two research clusters or groups stand out in terms of the quality of research and international reputation. The economic geography group is clearly of the highest standard with leading state of the art research published in international journals and with im-

pressive other forms of research dissemination. The challenge here must be to sustain this impact by enlarging the remit of innovation research beyond the confines of clusters and technological innovation. The second research area, around social and urban geographical research, focuses on uneven development and a broadly conceived political economy of the city and of urbanisation. This research is also of international standard and is setting part of the agenda for urban geographical research internationally. Moreover, this work has shown an extraordinary ability to fuse together innovative theoretical arguments with socially highly relevant research themes. These two research clusters are clearly *excellent*.

The research on cultural and historical landscape research is somewhat more local/national in scope and dissemination. An effort can be made here to bring this research more to the attention of an international academic public with a strategy to support high impact journal publications. Furthermore, the development geography research activities are clearly an area in which expansion has taken place recently and that is beginning to make a major impact. This research needs further consolidation to become a fourth major pillar of research in the geography department.

### **7.5 Collaboration**

There is good evidence of significant collaboration across the university (such as LUCSUS, CIRCLE, with Campus Helsingborg, and with cognate disciplines across the university). In addition, the leading research teams have extensive international networks and collaboration.

### **7.6 Research Activity and Teaching**

The Department edits and manages one of the leading human geography journals (*Geografiska Annaler*) and under Lund's management, became an ISI indexed journal. It has an excellent reputation and a very good citation (albeit somewhat) uneven impact. Staff members are actively involved in several leading international journals, research income is excellent, and the geography department has organised a series of seminal international academic meetings. The doctoral thesis output is above average given the size of the unit and the publication record of its PhD students is excellent. Research income is obtained from a variety of research institutions and funding sources. There is an excellent relationship between teaching and research as all research active members take part in teaching too.

### **7.7 Evaluation of Future Plans**

The department has clear and excellent visions for the future. While the economic and urban/social research components are well established, the future planning emphasizes development geography and environmental geography. While these are indeed promising future research directions, their development should not impede or affect negatively the research themes that are currently excellent. The expansion into new domains should not take place at the expense of the signature research of the department.

### **7.8 Future Potentials and Possibilities**

Given the extraordinary variation of research in social and economic geography internationally, the relatively small size of the department does not allow for a comprehensive coverage of social and economic geography. It is imperative, therefore, that *either* the department identifies a limited and sustainable number of key areas in which it can consolidate or develop a leading position nationally and internationally *and/or* to strategically expand in domains in which it feels a leading position can be built up. As suggested above, a significant part of the department's research is excellent, while other parts are very good, with the development geography group showing good promise. The ambition to develop further in the domain of environmental geography can be encouraged provided it is based on intense collaboration with the Centre for Sustainability Studies. A case can be made, we would argue, to incorporate LUCSUS within the department of geography. This would increase the critical mass and provide a cross-fertilization that would permit the currently fragmented research output on nature, society and the environment to become consolidated, with a greater impact as a positive result. Finally, the relationships with CIRCLE need to be clarified. It is our view that independent, theme-based, research centres tend to be difficult to sustain in the long run and face the risk of reproducing the same research terrain. Both CIRCLE and LUCSUS should be an integral part of a departmental structure so as to permit a stable intellectual, academic, and institutional setting that permits developing new research terrain in addition to pursuing established research avenues.

### **7.9 Gender and Equal Opportunity Issues**

It is striking that none of its four professors are female and only 33% of its senior lecturers are female. An effort should be made to re-assess the

gender balance, particularly in the upper levels of the academic hierarchy, but also for senior lecturers. It is encouraging to see that the department has a few non-Swedish and/or ethnic minority staff members. This should be further encouraged in order to reflect the changing social composition of Sweden and the rest of Europe.

## **8. SERVICE MANAGEMENT (ORGANISATION, SOCIOLOGY, SOCIAL GEOGRAPHY) – CAMPUS HELSINGBORG**

### **8.1 Overall assessment**

The overall assessment is *'very good'*.

### **8.2 Research Quality**

Overall the quantitative data indicates a rising trend of output and activity. We expect that this grading will be higher next time this exercise is undertaken, provided that the Department makes interesting and synergistic appointments. The research in the areas of services, tourism, and the 'experience economy' is impressive.

### **8.3 Collaboration**

The international collaboration seems good as far as it is detailed but could be further enhanced especially as relatively junior staff come to develop their careers.

### **8.4 Research activity and teaching**

The area of 'services' is where there is a great deal of synergy between research and teaching. They seem to have developed this rather well and we would commend this as a major strength of this group. Another area is that of 'mobilities research'.

### **8.5 Evaluation of future plans**

The account of future plans was *'excellent'*. It seemed that the Department was dealing well with what could be described as a 'shambles' of the existing resource allocation system and was seeking to overcome what the department saw as some of the rigidities of the Swedish system.

### **8.6 Future potentials and possibilities**

We would recommend that the areas the scholars work in are ‘international’ and therefore they need to be fully part of the research communities where these developments are taking place.

## **9. LUND UNIVERSITY CENTRE FOR SUSTAINABILITY STUDIES**

### **9.1 Introduction**

LUCSUS (Lund University Centre for Sustainability Studies) was founded in 2000 and has recently become a cross-faculty centre (January 2005). It has grown rapidly, although it has only a small core of full academic staff (1 professor and 3 associate professors). This expansion of LUCSUS was based primarily on outside or contract research funding. LUCSUS is a classic example of university strategies to establish network- or umbrella-type centres on themes of a contemporary relevance, but which fall outside of the ‘standard’ academic division of labour. The centre is also responsible for teaching a master’s program (LUMES)

### **9.2 Overall Assessment**

The success of LUCSUS is clear from its rapid expansion over the past few years, mainly on the strength of its success in obtaining external grant income. Its research activities are impressive and its international networking is excellent. As is often the case with centres that depend largely on external grant income for securing research (and, in particular, salaries), the research efforts is largely set and framed by the funding agencies and their objectives, needs, and requirements. This is visible in the research output of the Centre, which shows a high level of diversity, a tendency to focus on applied research, and difficulty to identify and develop cutting-edge or blue sky research. While extremely important, the research at LUCSUS is comparable to that found in other centres dedicated to sustainability or environmental management research. The institutional structure and organization of such organizations make it difficult to become truly excellent on the international terrain.

### 9.3 Research Quality

The assessment of the research quality of LUCSUS is difficult to undertake. On the one hand, the quantitative output is impressive, the insertion in international research networks excellent and their ability to obtain national and international research funding is significant. This, however, does not always lead to research output that changes the parameters of our understanding of ‘sustainability’ or that leads to path-breaking and state-of-the-art output that will set the agenda for future research in the field. The extremely high dependence on external funding may have a negative impact on originality of research, type of research, and innovative quality of output. The research quality assessment is *good*.

### 9.4 Collaboration

There is clear evidence of intensive collaboration both across the university and with a wide range of highly recognised research centres in Europe and elsewhere. Much of the funding for the research activities is international and most research projects are internationally collaborative projects. The collaborative effort is *very good*.

### 9.5 Research Activity and Teaching

There is a clear and positive mutual interaction between research and teaching through the International Masters program in Environmental Studies and Sustainability Science.

### 9.6 Evaluation of Future Plans/Potentials and Possibilities

The objective of LUCSUS is to strengthen its role as stimulator of communication and cooperation within academia as well as between academia and civil society. Given the challenges listed in the vision, this is a considerable effort. At this stage, it is unclear whether LUCSUS would be able to achieve this within its present institutional structure and a research capacity that is largely dependent on outside grant income. This seems to us to be the greatest challenge, i.e. to assure the ‘sustainability’ of LUCSUS and to nurture path-breaking and innovative research while maintaining a role as public interface with a limited core staff and a high contract-research based configuration. Perhaps it is possible to consider LUCSUS to be institutionally affiliated with or organised within one of the existing departments working on similar or cognate themes, such

as, for example, the department of social and economic geography. The assessment is *good*.

## **10. CENTRE FOR EAST AND SOUTHEAST ASIAN STUDIES**

The Centre is young, founded in 1996. Independent centres for Area Studies connected to universities have steadily been growing around the globe. East and South East Asia is the strongest growing region in the world with prospects to be the leading economy and political power in the future. Therefore it seems well motivated to enhance teaching and research in that particular region. In fact, although the Centre has expanded, the academic staff is small as no more than five persons are employed. Of them, the professor is on a permanent basis, the researchers are not permanently employed. Planning for the future is problematic when the staff is small and almost all of them lack permanent positions.

### **10.1 Research Activity and Quality**

Although the Centre lacks a critical mass among its staff, the productivity in terms of publications is in a relatively good mode. This is due to the strong international orientation enhanced by post-doctoral fellowships. The fellowships only last for a two year period which is not optimal to develop a sustainable research unit. Nevertheless, under these given circumstances the success of research could not have been reached without a very good international collaboration. On the contrary, as the Centre is short of permanent positions a closer collaboration with the Department of Political Science in Lund could well be developed. The strength of International Relations (IR) at the Department and the focus on East and Southeast Asia at the Centre could give a good opportunity for joint research projects. In addition, it could well be seriously considered to plan institutional arrangements where the Centre is an autonomous part of the Department. By doing so a synergy could be achieved benefitting both institutions. The department ranks as *very good*.

### **10.2 Teaching**

Teaching at the Centre is solely focused on an international two year Master's programme. The courses are interdisciplinary. The academic staff and the post-doctoral fellows are all involved in teaching. However,



the Centre has a handicap because it does not provide a PhD programme with the aim to produce researchers in the field. The question is whether the Centre has capacities enough to fulfil requirements for such a programme. Again, an institutional alliance with IR at the Department of Political Science could be the solution giving benefits to both departments. Results will not come automatically, and the Centre needs to have enough teaching resources in order to reach a suitable balance in the division of labour between the departments. A joint PhD programme could, if successful, be a sustainable base for internal researcher recruitment.

### **10.3 Future potentials and possibilities**

The interdisciplinary profile of the Centre is necessarily not a problem if a closer collaboration with IR at the Department of Political Science will be enhanced. In fact, the IR network is interdisciplinary as well. In addition, following the official statement of the Copenhagen based Nordic Institute of Asian Studies (NISA); they collaborate actively with universities in the Öresund region. However, nothing is mentioned about NISA in the self evaluation form. It might be a lapse, but if not, then this matter must be seen as a problem. Again the Öresund collaboration must be highlighted as the natural base for international cooperation and which can give strength and enough critical mass for research and teaching. At present, the plan ranks *good*.

### **10.4 Gender and equal opportunity issues**

The gender balance at the Centre is not equally fulfilled. A man (the professor) is the chair of the Centre, whereas three out of four researchers are female. Added together there is a slight female majority but in terms of positions in the hierarchy, there is not. Given the small size of the Centre, possibilities at the moment are practically non-existent to make a career in the organisation. Positions as lecturers could be an option to create, given that resources are provided. Shared lecturers with the department of Political Science is another, or why not take the train to Copenhagen and negotiate a common strategy.

## **11. CENTRE FOR EUROPEAN STUDIES (CFE)**

### **11.1 Overall assessment:**

CFE is a coordinating centre for promoting research on Europe, connecting scholars within the faculties of social sciences, humanities, economy

and legal studies. Another priority is to inform the public about research on Europe. The centre is staffed with three part time positions.

### **11.2 Research quality**

CFE is not a research and teaching organization in its own right. It has to be underlined, however, that CFE has played an active role in trying to provide external funding for two cooperative research programs, “Energy and Security in Europe” and “Political Uses of memory in Europe”. As a coordinating centre, CFE mainly has to be evaluated by other criteria like collaboration.

### **11.3 Collaboration**

Since 2005, CFE has organized three international conferences/workshops with convincing success. Since 2003, 12 Working Papers and one Conference paper volume have been published, with two more Conference papers to be published during the first half of 2008. Collaboration is *excellent/outstanding*.

### **11.4 Future plans, potentials and possibilities**

CFE is planning a collaborative scheme together with Forum of Contemporary Europe at Stanford University. In the last two years, CFE has become increasingly active in coordinating joint efforts to provide external funding for interdisciplinary research projects, thus illustrating the highly important coordinating role of the centre.

## **12. BRIEF REMARKS ON HUMAN RIGHTS**

Research and teaching in HR is an activity crossing faculties, departments and disciplines. HR is addressed particularly in the evaluation material from Department of Political Science, Department of Sociology (and Social Anthropology), Sociology of Law and Centre for East and South-East Asian Studies. The Department of Political science is worth special credit for establishing and promoting HR as a new interdisciplinary research and teaching subject at Lund University. The future potential for further collaboration is obvious. There might be a question whether HR research in a greater extent should address not only “international” HR topics, but focus more on HR challenges in a national context as well.

## **13. CRIMINOLOGY AND NETWORK FOR STUDIES OF CRIMINOLOGY, DEVIANCE AND SOCIAL PROBLEMS**

### **13.1 Overall assessment**

In spite of modest resources, this research and teaching environment is highly productive. Network for studies of criminology, deviance and social problems is a vigorous meeting place for researchers and students from various faculties, including both senior and junior members.

### **13.2 Research quality**

Research projects focus on a manifold of social phenomena, not only restricted to traditional criminological issues. The aim of widening the scope of criminology theoretically is successful and innovative. Theoretical and analytical perspectives are characterized by diversity, and the development and using of qualitative methods is especially strong. Members of the network have published internationally as well as nationally. Research quality must be ranked as *excellent*.

### **13.3 Collaboration**

The Network represents interdisciplinary collaboration within Lund University. There has also been cooperation with researchers from other universities in Sweden, Europe, New Zealand and US. Collaboration is *very good*, and worth developing further.

### **13.4 Research activity and teaching**

The relation between research and teaching is *very good* in the sense of mutual enrichment; research is integrated with various courses in criminology and social work. The demand for education in criminology for undergraduate as well as graduate students is growing. There seems to be a highly problematic relationship between research and teaching due to resources. The recruitment of a combined lecturer/researcher is a step in the right direction, but does not seem to solve the problem in a substantial way.

### **13.5 Future plans, potentials and possibilities**

Criminology has been pointed out by the Department of Sociology (and Social Anthropology) as one of 8 research environments with the

aim of producing 3–5 distinguished environments by 2010. This should not surprise anyone engaged in criminological research and education in other countries. Criminology at Lund University has for many years represented inspiring impact on criminological research especially in other Nordic countries. The scientific potential for developing this impact further both nationally and internationally, is *excellent*.

# PANEL 7 – ECONOMICS AND MANAGEMENT (LUSEM)

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## 1. DEPARTMENT OF ECONOMIC HISTORY

### 1.1 Unit Description

Independent economic history departments have traditionally been largely confined to Britain and Scandinavia. In recent years, the majority have disappeared from Britain. Lund now has probably the largest economic history department in the world. The survivor technique therefore indicates that the department must be of high quality.

The department employs close to 30 researchers, teachers, and post-docs, and around 20 PhD students. Faculty members are mainly organized as research groups, under the broad headings of economic and historical demography, economic growth and structural change, and economic growth, structural change and distribution in developing countries. Two research groups closely connected with the department received first round Linneaus Grants, the Centre for Economic Demography (covered in another report) and CIRCLE (Centre for Innovation, Research and Competence in the Learning Economy).

## 1.2. Research infrastructure

No information is provided about seed corn for new research projects, except that within-faculty research funding is insufficient, which tends to perpetuate a high reliance on external funding, about quality control in for example grant applications, and there is apparently no explicit research strategy, beyond the research groupings.

## 1.3. Research

**Quality.** The publications report is apparently incomplete. 123 items are listed compared with a total of 234 reported in Form 1. Inspection of individual staff entries on the departmental website points to at least some of the omissions. For what it is worth, few papers listed appear to have been published in core British or American economic history journals (two articles in the *Economic History Review*). On the other hand, papers were published in prestigious journals such as the *Journal of Evolutionary Economics*, *European Review of Economic History*, *Structural Change and Economic Dynamics*, *Population Studies* and *Social Science History*.

**Productivity.** Dividing published items, including 30 books, by researchers indicates an impressive average level of productivity.

**Relevance.** Subjects of research, such as innovation and ecological economics, are socially relevant.

**Vitality and Organizational Capacity.** The department has been very effective in attracting external research funding. In the years 2003–07, no recruitment of researchers with a PhD from a university other than Lund has taken place, although there have been four internal recruits in this period. Two of the PhDs listed concern contemporary or near contemporary South East Asia, but no connection has been identified with the South East Asian Centre.

Overall, on the basis of the information available, the research quality is *excellent*.

## 1.4. Collaboration

There is considerable participation in international networks and international conferences. Departmental members have been Presidents of

scientific societies, on editorial boards of scholarly journals and given plenary and keynote lectures. Overall collaboration is *excellent*.

### **1.5 Research activity and teaching**

The panel has not given any specific comments. (*Information added by the RQ08 Project Office.*)

### **1.6 Future plans**

Identifying ‘opportunities’ with future plans, the department considers that it can offer a research environment and research training program in the discipline of economic history that is difficult to match elsewhere in the world. The department therefore hopes to take on a role as a nucleus for research training generally and for post-docs in specialized fields of research.

There is also concern that, with a more multi-disciplinary orientation of research, the character of the discipline will be transformed. Although a necessary and in some respects beneficial development, the downside may be an erosion of the core of the discipline of economic history. It is not clear that the department was aware they were expected to indicate their future plans.

### **1.7 Future potential and possibilities**

The departmental research would probably benefit from closer links with Economics and with the South East Asia centre. The department believes that a stronger presence in the undergraduate Economics program would improve their graduate recruitment- as well as enhancing undergraduate economics degrees.

### **1.8 Gender and equal opportunity issues**

The panel has not given any specific comments. (*Information added by the RQ08 Project Office.*)

### 1.9 Overall assessment

Research	<i>Excellent</i>
Collaboration	<i>Excellent</i>
Research/teaching	
Future plans	
Overall assessment	<i>Excellent</i>

This is an unusual department by international standards with an excellent research and international collaboration record. The department has proved adept at interdisciplinary co-operation and obtaining external funding. The addition of some more economics to the economic history may well propel the research into the outstanding category.

## 2. CENTRE OF ECONOMIC DEMOGRAPHY

### 2.1 Unit Description

The Centre started its activities in late 2006, but a smaller research group – mainly within the Department of Economic History – has existed earlier. The following evaluation covers, however, mainly the research done within the Centre in its relatively short lifetime. There is no information available about the size of the staff in the RQ-material, and all the researchers have dual affiliations, the second being in departments within the social sciences and medicine. Most of the salaries of the senior members are therefore paid by other departments, but the Centre's annual report shows that 22 senior researchers and 5 post-docs have used part of their time on projects initiated by or in cooperation with the Centre. There is no undergraduate teaching, but the Centre offers courses to graduate students and has started a master programme in economic demography and a PhD-programme. So far several PhD-students from other departments have taken part in courses and seminars organised by the Centre. Most of the resources defrayed directly by the Centre come from a 10-year grant from the Swedish Research Council under the so called Linnaeus programme, awarded after a national competition covering all sciences in Sweden, and the Centre has also received other grants from national bodies.



## 2.2 Research infrastructure

A special interest is given to the building-up of a database exploiting the excellent Swedish historical population material for a sample of parishes over a period of three centuries in order to allow for life histories of individuals and to connect these histories to economic and environmental conditions.

## 2.3 Research

**Quality.** Demography is a subject, which needs insight in as different sciences as medicine, biology, statistics, sociology, economics, economic history and general history. Research results can consequently be published in a wide variety of journals, and the publication tradition in some of the areas studied by the Centre is monographs and contributions to thematic volumes rather than articles in journals. Articles have mainly been published in medical journals within the research topic of social epidemiology, and among them, several in top journals. Articles and working papers on problems in Swedish social policy and migration topics have to a higher extent been addressed to a Swedish audience. Among the publications with topics from historical demography, a book with the director of the Centre as one of the co-authors was honored with the American Sociological Association's award for being an outstanding book on Asia. Since there are no other institutions in the world, which have exactly the same research profile as the CED, comparisons are difficult to undertake. Other institutions would e.g. try to cover all aspects of demography with theoretical issues as the main task, undertake broad population studies, or specialize in other topics such as historical demography or epidemiology.

**Productivity.** The annual report has a list of 174 publications from 2006 to 2008, covering a wide variety of subjects – although a few of them with topics which have little connection to the research topics of the Centre. Compared to the time used within the Centre's framework, the productivity is high for all the individuals, but demonstrates also the very different publication traditions of the various disciplines, e.g. medical articles with several authors, and economic history monographs.

**Relevance.** Many of the topics, which the Centre plans to study during the grant period, are very relevant for society in general, and the fact that the Linnaeus-grant has been given to the Centre in an open competition

is an indication of that. Among the topics there are important questions for present day European societies, such as integration of immigrants, consequences of declining fertility, and changing partnership patterns.

**Vitality and Organizational Capacity.** The Centre has in the course of its short lifetime been able to attract researchers from a wide variety of disciplines at Lund University, and thus to create the interdisciplinary environment which is essential in order to study important aspects of demography. The organising of courses and seminars for graduates from several disciplines is also a good way to mobilise future interest in a subject which, until now, has been rather weakly represented at Swedish universities. The interdisciplinary research, which the broad group of researchers makes possible has, however, not yet been demonstrated in publications from the Centre.

#### **2.4 Collaboration**

The core group of researchers has a wide net of contacts, both in Sweden and internationally, and the publication list has many examples of co-authorships with non-Swedish colleagues. Among the initiatives is participation in a European training of PhD-students in demography in cooperation with leading centres in Europe. The staff has taken part in many international meetings and presented papers on these occasions, and visitors from several foreign demography departments have visited Lund. Among the partners the Centre cooperates with are also institutions in China and Japan.

#### **2.5 Research activity and teaching:**

Not applicable (not a teaching unit).

#### **2.6 Future plans**

In connection with the grants, the Centre has to draw up yearly plans and reports which demonstrate that the Centre has plans for a range of specific projects under the general heading of economic demography. The potential for accomplishing these plans seem to be present in the group of researchers attached to the Centre, but the real test will be if it can achieve the interdisciplinary connection between the members of this group of researchers, in order to give new insight into various topics

studied. The period in which the Centre has existed is still too short to say to which extent this goal can be achieved

## 2.7 Future potential and possibilities

The Centre has the potential for becoming an important international institution in the study of economic demography. It has already established a wide range of international cooperation, and if its plans for interdisciplinary studies are realised, the results will have great impact internationally.

## 2.8 Gender and equal opportunity issues

The panel has not given any specific comments. (*Information added by the RQ08 Project Office.*)

## 2.9 Overall assessment

Research	<i>Very good</i>
Collaboration	<i>Excellent</i>
Research/teaching	<i>Inapplicable</i>
Future plans	<i>Excellent</i>
Overall assessment	<i>Excellent</i>

The Centre has the potential for becoming an important international institution in the study of economic demography.

## 3. CENTRE FOR INNOVATION, RESEARCH AND COMPETENCE IN THE LEARNING ECONOMY (CIRCLE)

### 3.1 Unit Description

Established in 2004, CIRCLE is a large interdisciplinary research centre focusing on the interrelations between knowledge creation, innovation, and economic growth. Many of its staff come from, and have their primary appointments in, other departments and institutes. The Unit has substantial long term research funding: a Centre of Excellence grant from VINNOVA (a Swedish government agency promoting innovation), 2004–2010, and in 2006 it succeeded in obtaining a highly competitive ten-year Linnaeus grant from the Swedish Research Council (one of

only five awarded in the social sciences and humanities). The Unit's teaching function is limited, though many staff members teach in their 'home' departments. As noted in the self-evaluation, because many staff members have joint appointments, data on personnel as well as output are unreliable.

### **3.2 Research infrastructure**

In 2006 CIRCLE absorbed a research unit from the University's Faculty of Engineering. In 2007 it re-located to a building shared with two other Units, one of which is the Research Policy Institute (RPI). Worthy of note are the Innovation Database for Economic Research (CIDER), maintained by the Unit, and its excellent and easily navigated website. On the website the Unit's Electronic Working Papers can be found and downloaded.

### **3.3 Research**

**Quality.** Research is published in a range of journals covering the economics of innovation, research policy, environmental and regional studies, energy policy etc. With impact factors largely between 1.00 and 2.00 these are significant journals in the social sciences. To a considerable extent, work produced by CIRCLE is of high quality.

**Productivity.** The multiple affiliations of many staff members make it difficult to assess the Unit's productivity. Form 1.3 lists an output of 33 scientific publications in 2004, rising to 86 in 2007, or 261 in total. (For comparison, CIRCLE's list of publications includes 510 items. Excluding conference presentations and unpublished reports (that are also listed) yields approximately 110 articles in peer-reviewed journals and 120 books and book chapters.) Relating the 2007 output to personnel structure reported in Form 1.1 (earlier figures are not given) yields 14.3 publications per staff member (17.2 per full time equivalent). Whilst this figure is undoubtedly an artifact reflecting the difficulties of counting here, it is clear that the Unit is highly productive.

**Relevance.** The focus of the Unit's work, its funding, the large number of keynote lectures given by senior staff, as well as memberships in advisory committees etc. all attest to both the scholarly and the societal relevance of CIRCLE's work.

**Vitality and Organizational Capacity.** Three factors suggest that here too CIRCLE should be assessed highly. First, and no doubt partly reflecting the Linnaeus grant obtained in 2007, the Unit’s research income doubled between 2006 and 2007. Second (and doubtless reflecting its success in obtaining external funding), the staff “has grown from zero to more than thirty researchers” in less than four years. Nearly half of the new recruitments were from outside Lund. Finally, and importantly, the Unit’s programme of work is well structured in four interrelated but clearly specified areas.

### **3.4 Collaboration**

The Unit collaborates widely and internationally. It has an international scientific advisory group (membership is given on the website), and participated in two Networks of Excellence funded under the EU’s 6th Framework programme. Its publication list points to many collaborations with scholars abroad, some of them world leaders in their field.

### **3.5 Research activity and teaching:**

Not applicable (not a teaching unit).

### **3.6 Future Plans**

The Unit’s future plans correspond largely to the 10 year Linnaeus grant that it obtained in 2007. As explained earlier, the major thrust is towards integrating research on knowledge creation, entrepreneurship and innovation: areas that in the past have tended to be studied separately. Moreover, the intention is to study these interconnections in a comparative context (geographically, sectorally and institutionally). The self-evaluation sets out a clear, ambitious, and innovative programme of future work.

### **3.7 Future potential and possibilities**

Given the Unit’s resources and record of scientific productivity, there is good reason for thinking that these plans will be implemented creatively and fruitfully. The only caveats to be noted, and these are given in the Unit’s own SWOT analysis are (a) the limited number of PhD students (particularly unfortunate given the number of senior researchers) and (b) a possible lack of long-term funding when the VINNOVA grant expires in 2010.

### 3.8 Gender and equal opportunity issues

The panel has not given any specific comments. (*Information added by the RQ08 Project Office.*)

### 3.9 Overall assessment

Research	<i>Excellent</i>
Collaboration	<i>Excellent</i>
Research/teaching	<i>Inapplicable</i>
Future plans	<i>Excellent</i>
Overall assessment	<i>Excellent</i>

This is a research unit of very high quality, integrating and promoting state of the art research in its field. Its research program is extremely well conceived, and the combination of generous funding and intellectual leadership that are clearly in evidence bode well for the future.

## 4. DEPARTMENT OF BUSINESS ADMINISTRATION

### 4.1 Unit Description

The Department of Business Administration covers the classical functional areas within the field: corporate finance, financial accounting and management control, marketing, organization, entrepreneurship and strategic management. Maintaining activities within all these areas is a requirement in order to be able to cover all aspects of teaching business administration; in terms of research, it is clear that such a diversity of topics raises special research leadership challenges. The department tries to balance the need for breadth with the need to focus research on certain areas. In its self-evaluation, four research focus areas are mentioned as especially successful: Lund International Food Studies (a group mainly related to marketing topics), the KLIO group (knowledge, leadership and identity in organizations) and the corporate finance and governance research groups. But many other, smaller activities seem to be ongoing. Research in business administration seems to be mostly organized in the Lund Institute of Economic Research (LRI), which list many other, mostly smaller research areas.

The department consists of (figures refer to full time equivalents in 2007) 7 professors, 27 senior lectures, 24 doctoral students and 26 other staff. While this makes for a sizeable department, it is important to remember

that the group covers a range of functional areas, with only limited overlap and/or synergies, so that in each functional area the research group working with it seems to be of limited size. It was not possible to get precise aggregate information on how much of the staff time can be devoted to research; the minimum requirements of 10–20% are very low by international standards. If one multiplies the full time equivalent of professors and senior lectures with 0.3 one gets the equivalent of 10 research man years, which is very little giving the broad range of fields to be covered, and the large number of students (e.g. about 300 per year already on the B.Sc. program, which is only one of the programs).

The self-evaluation mentions the dependence on external funds (mainly to free research time); however, for 2007 only a minor sum of 754 kSEK is listed as external research grants. The panel assumes that the research funding is mostly located at LRI and therefore not listed here. The actual volume of external grants is therefore not known.

#### 4.2 Research infrastructure

The panel has not given any specific comments. (*Information added by the RQ08 Project Office.*)

#### 4.3 Research

**Quality.** Corresponding to the diversity of topics dealt with there is also a wide range of publications, but it is also clear that some of the focus areas account for the bulk of high impact output. The KLIO group, the entrepreneurship group and the marketing group have a number of high level publications. Several publications from the KLIO group are in absolute top journals, like the *Academy of Management Review* and *Human Relations*, and can be expected to have a strong impact on the field. The publication list contains a very high number of dissertations (though the exact number is unclear, see below), but most of these seem to be in the form of monographs with little direct impact on the research community.

**Productivity.** The lack of information on actual amount of time that can be devoted to research makes an evaluation difficult. Also, the publication list obtained contains 148 items, whereas the self-evaluation report suggests 356 items. All of this makes an evaluation here highly tentative. Of the 148 items on the publication list, 70 (!) are PhD dissertations and

30 are journal articles. These figures are highly discrepant from the figures in the self-evaluation form (27 and 108) and are not easily reconciled. If the figures computed from the literature list are correct, this would amount to 5 journal publications per year, or 0.5 journal publications per year per research man year based on the assumptions on research time. This is certainly in line with productivity figures of other departments of business administration in the world, but does not make this department a high performer. As noted above, though, these figures probably conceal enormous differences in productivity between the various research groups.

**Relevance.** The focus areas chosen for research at the department are all highly topical. The work of the KLIO group, doing research on subjectivity and sense-making in knowledge-intensive organizations, is highly relevant for the knowledge economy and its development. The work in corporate finance and governance is highly relevant in a globalized economy. The food studies group has contributed relevant research on functional foods and other topical areas. Also research on public management and on strategic management seems to be well-linked with stakeholders interests in Sweden and elsewhere. Also the research in cooperation with CIRCLE has a high degree of relevance.

**Vitality and Organizational Capacity.** The mean age of professors and senior lectures is rather high (55 and 47 years), which could give some concern for renewal capabilities. On the other hand, there is a steady production of PhD students, though it is difficult to see how many of these can be retained at the department for an academic career. The description of research priorities for the next 5–10 years is a cautious extension of current activities, with some new perspectives. Long-term development will crucially depend on finding a good balance between covering all fields of business administration in teaching, and concentrating research in a few areas, and on finding ways of freeing research time for senior staff.

#### **4.4 Collaboration**

There is ample collaboration both with other researchers at Lund, with Swedish and foreign researchers at other universities, and with industry and public bodies. Part of the research is carried out as action research, where an industry partner is both the beneficiary of the work and the object of study. Many contacts with the practical world occur via LRI. Especially the KLIO group and the corporate finance and governance group have extensive international networks.



#### 4.5 Research activity and teaching

The heavy teaching load at this unit seems to severely limit the time that can be allocated for research.

#### 4.6 Future plans

The panel has not given any specific comments. (*Information added by the RQ08 Project Office.*)

#### 4.7 Future potential and possibilities

The department has some high class research groups, but also suffers from the fragmentation that to some extent is unavoidable when one department has to cover all of business administration with a restricted staff. The number of professors seems extremely small with respect to the number of different areas within business administration (6) to be covered, and can partly hamper the development of stronger research units. If the whole department, and not only some research groups, is to become a top player in research, it will be crucial to concentrate research even more than now on a few focus areas, and / or increase the number of research faculty / find means of freeing time of the staff involved for research activities. A specific question is the location of Finance, which now is both within Business Administration and Economics, a division which may have a negative effect on the development of that area to an even stronger one within LUSEM.

#### 4.8 Gender and equal opportunity issues

The panel has not given any specific comments. (*Information added by the RQ08 Project Office.*)

#### 4.9 Overall assessment

Research	<i>Very good</i>
Collaboration	<i>Excellent</i>
Research/teaching	<i>Good</i>
Future plans	<i>Good</i>
Overall assessment	<i>Very good</i>

The department covers a wide diverse range of topics in business administration. For some of these, research groups that do research of top level international quality have been formed. The unevenness in the production can be related to the compromises between having to teach all topics and concentrating research in a few areas.

## **5. DEPARTMENT OF BUSINESS LAW**

### **5.1 Unit Description**

Besides Business Administration, the Schools of Economics and Management both in the Nordic countries and elsewhere, consist usually of subjects that are closely connected to the research of business administration and business life. Business Law is one of those subjects which is essential as part of a whole. It is an absolute prerequisite in teaching economics students, and in order to do that, it is essential that in the same institution there is also research which focuses to problems of economics and business law.

The Department of Business Law has long traditions in Lund. Many of its researchers are well known in the Nordic countries and some also internationally. The department has four professors and four senior lecturers. In addition to that there are six full time doctoral students. As such the department is probably a little bit larger than the average business law department in the Schools of Economics in the Nordic region.

Research primarily focuses on economic questions with respect to the company, industry and the society. The purpose is to contribute to the theoretical framework and understanding of legal issues within the fields of law, business administration and other social science disciplines. Research projects in corporate and tax law take an economic and international focus, sharing common ground with business administration, economics and public finance.

### **5.2 Research infrastructure**

Research is organized in a way which is typical to business law departments or law schools, i.e. each researcher more or less focuses on his or her own research interests. However that doesn't prevent researchers to take part in larger research programs with individuals focusing to same topics in other institutions.

Even though the department is probably larger than an average business law department, it still is too small to form research groups. The department has to cover various legal fields in order to be able to cover all the teaching needs of LUSEM. Despite that, the department has succeeded quite well in research and in attracting new doctoral students.

### 5.3 Research

When evaluating the research in business law, one should bear in mind that legal studies, legal research and its publishing tradition differs quite a lot from that of for example economics. Firstly, the legislation in every country is still very national and that is why legal research quite often focuses in national questions and is written in the national language. It also has to be that way because the society needs knowledge about national legislation. The second difference is that dissertations in legal studies typically are large monographs which require at least three to four years to complete and during that time, the doctoral student rarely publishes anything else than perhaps some working papers. Also post doc research is often published in books. A large monograph might require the same amount of work as many articles. Therefore the number of publications of legal researchers is normally much lower than what the researchers in other disciplines publish. The third difference is that there are not so many possibilities to publish in international journals, at least it is very much dependent of the subject, i.e. the field of law in question.

**Quality.** The delivered material consists only of the topics of the publications. The research is mostly published as monographs. A few articles have also been published in international journals (especially in law and economics). Compared to other business law units, at least in the Nordic countries, this is a positive development and one could say that the Business Law Department in Lund is much more internationally oriented than the other similar units. It is not possible to evaluate the total quality without seeing all the actual publications. Based on earlier encountered articles, the research can be considered as *excellent* or *very good*; the research output of this unit has a good reputation in the community of law researchers. Some of the staff members have also been awarded with international and national awards.

**Productivity.** When considering the productivity, one has to bear in mind the publishing traditions of the discipline. The department has

been fairly productive. There are two doctoral dissertations, a number of books and articles. The productivity seems to be above average when compared to corresponding units.

**Relevance.** The research seems to be well focused to business life. The present research covers legal issues with respect to companies' external reporting, international tax law, regulation and tax of small and medium enterprises, investor protection and securities law banking law accounting and auditing law. They are all relevant questions and can contribute both the needs of society and to the theoretical framework and understanding of legal issues within the fields of law, business administration and other social science disciplines.

**Vitality and Organizational Capacity.** The mean age of the permanent staff is a little over 50. The advantage of this is that they have a long experience and a good contact network. Some of the teachers are close to retirement, which will give the unit the possibility to do some reallocation of resources or make some refocusing of research activities. Maybe the department should consider concentrating to only some of the legal fields that are now included in its portfolio.

#### **5.4 Collaboration**

Collaboration with the scientific society seems to be very active both in national and international level. The department is well connected according to many indicators. Researchers are often invited lectures to international conferences; they act as editors in journals and evaluators in academic assignments. They have also many contacts to the practical business life. Collaboration can be graded as *very good* or *excellent*.

#### **5.5 Research activity and teaching**

The interaction between research and teaching is good. Faculty members are both teachers and active researchers. Research papers and text books written by departments own academic staff are often used in courses.

#### **5.6 Future plans**

The panel has not given any specific comments. (*Information added by the RQ08 Project Office.*)

### 5.7 Future potential and possibilities

In international comparison the department is small or middle size (in Nordic comparison middle size or large). It is very active especially in international contacts (lectures, keynote speakers, memberships etc.) even that publications in international journals are not so many. Since the unit already is rather internationally oriented, it might consider developing that even further. The unit also tries to cover many different fields of law in order to fulfill its teaching obligations. However if the resources don't increase, it might be worthwhile to consider concentrating to only some of the legal fields that are now included in its portfolio.

### 5.8 Gender and equal opportunity issues

Women are underrepresented, only 1/3 of the academic staff is female. The equality of genders has been improving during the last few years and most probably it will continue.

### 5.9 Overall assessment

Research	<i>very good</i>
Collaboration	<i>very good</i>
Research/teaching	<i>excellent</i>
Future plans	–
Overall assessment	<i>very good</i>

Department has a strong research profile combined with teaching in various fields of business law. The evaluation of research is somewhat problematic because the publications of the unit are not included in the material. The department and its researchers are already well recognized in the Nordic countries. Its research in the field of law and economics is also known internationally.

## 6. DEPARTMENT OF ECONOMICS

### 6.1 Unit Description

Economics has a long and prestigious tradition at Lund University. Nowadays the Department of Economics (DE) is the second largest unit within LUSEM after the Department of Business Administration in terms of several size indicators (academic staff, full time equivalent,

PhD students and total revenue) but the largest one as far as revenue for research is concerned. It is second (after the Department of Economic History) when considering the ratio between revenue from research sources and revenue from undergraduate education.

## 6.2 Research infrastructure

Teaching and research is organized in a number of specialized areas (eight research profiles composed by 5–10 senior researchers and the same number of PhD students) with the potential for fruitful interactions.

## 6.3 Research

**Quality.** DE undertakes high quality research on a broad range of themes. The panel received a more detailed list of 180 publications for DE, including 89 articles (this being a narrower set than the publications listed in Form 1.3). These articles were evaluated by the panel on the basis of the French CNR<sup>13</sup> ranking which range from five stars for top generalist journal to one star. The data were also evaluated using the Journal Citation Reports databank. Due to the absence of a bibliometric analysis, it was necessary to use these indicators, which however should be considered with some caution. Twenty (out of 89) articles were published in top field journals (four stars journals). Of these, six articles were published in journals with an impact factor greater than 2. Five or six groups with high quality publications could be identified.

**Productivity.** Research productivity at DE has reached a good standard by international levels and has considerably improved overtime. Articles (table 1.3) per academic staff full time equivalent (table 1.1) increased from 1,7 in 2003 to 2,8 in 2007. This would be a very good level only if all the articles considered were published in journals included in international databanks such as Scopus. The overall figure for publications per academic staff full time equivalent also rose from 2.07 in 2003 to 3.7 in 2007. Better data however would be necessary to offer a more precise evaluation of productivity.

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13. French National Committee for Scientific Research (July 2004), Journal Ranking in Economics and Management

**Relevance.** The themes addressed by DE are of high social relevance. Just to mention some themes, work is undertaken on health related behavior, financial risk, collective decision making in a democratic society, trust attitude, econometric methods with applications in various fields, social networks, cartels, exchange rates and economic development in China. The relevance is also indicated by the prizes received both by staff and PhD students.

**Vitality and organizational capacity.** DE has won a large number of research projects and has been successful in terms of external research funds. The renewal indicators in table 3.3 show that only one new faculty member was appointed in 2003–2007. In the self evaluation it is mentioned that the new faculty member has “good research possibilities”. The data in fact show that DE has been able to strengthen a research area (econometrics), which with microeconomics and macroeconomics form the core for a good PhD program.

#### **6.4 Collaboration**

There is close interaction within the Department between the different profiles, which collaborate in joint research projects, and interaction with other Departments of LUSEM (which takes the form of common participation to the Centre for Economic Demography, joint master program with other Faculties). The Department is well connected with the international scientific community as indicated e.g. by the good number of presentations at international conferences, and memberships / positions in scientific societies. However, it seems to be attracting only a small number of incoming research visitors and has only a few international research collaborations.

#### **6.5 Research activity and teaching**

The interaction between research and teaching is good (faculty are both teachers and active researchers in their respective fields, publications from researchers are regularly used in various courses).

#### **6.6 Future plans**

The design of future plans is convincing. The self evaluation clearly acknowledges that the main weakness of DE lies in the core area of

Macroeconomics. The Department presents a realistic and focused plan for the future: strengthening Macroeconomics and then focusing on the existing most successful research lines, targeting areas in which a position of excellence can be achieved within Sweden and internationally, and finally strengthening international collaborations.

### **6.7 Future potential and possibilities**

The Department presents a large potential, given the quality, relevance and breadth of research activity and the existence of critical mass. The priorities as to future development are already in the DE agenda: strengthening core areas (in particular Macroeconomics); identifying areas in which it can achieve a position of excellence in Sweden and internationally; strengthening international collaborations. Crucial for the success of the plan is persisting in a policy of very selective recruitment.

### **6.8 Gender and equal opportunity issues**

The percentage of women in total staff has increased in 2007 versus 2003 (but it has decreased at the Professor level). DE stands on a middle position as to the percentage of women at the level of Professor, which ranges for LUSEM from 0% (DEH, DBA, DS) to 40% (CESAS). It is 8% for DE.

### **6.9 Overall assessment**

Research	<i>Excellent</i>
Collaboration	<i>Very good</i>
Research/teaching	<i>Good</i>
Future plans	<i>Excellent</i>
Overall assessment	<i>Excellent</i>

DE has the potential of rising in the international ranking of Department of Economics as it has several complementary research groups producing high quality research, which in recent years have considerably increased their productivity.



## 7. DEPARTMENT OF STATISTICS

### 7.1 Unit description

This is a very small unit (on average 2 professors, an academic staff total of 3 persons) also involved in teaching, and with a modest Ph.D. production (1 exam in last 5 years). The age structure is rather high, and the proportion of external research funding in relation to the funding for basic education is modest.

### 7.2 Research infrastructure

The small size of the department prevents the formation of research groups. Each professor tries to cover a few fields. Overall, the department tries to cover a rather large field in statistics, related e.g. both to biostatistics, medical diagnostics, economic history, political sciences, economics, and stochastic finance. Besides (or related to) its small size, the department is burdened by a heavy teaching load, and seems to get much less financing per student than other departments in Sweden get (others get 50% to 80% more). The department also has problems in providing external funding for Ph.D. students due to the abstract nature of the subject.

### 7.3 Research

**Quality:** The research is mainly published in good but not in top field journals, mostly within other fields than mainstream statistics (only 6 of 36 publications in the publication list are mainly in “statistical” journals). This is of course in line with the nature of the subject, statistics being an important supporting science for a variety of fields, and it is also a sign of good cross-disciplinary contacts. However, good ability to reach good statistical journals would also be expected from a very strong research unit in statistics. The unit has had some earlier very good success (e.g. *Annals of Probability* earlier, and a paper in the top-journal *JASA* in 2001).

**Productivity:** Taking its small size into consideration, the unit has been quite productive, with the highest number of refereed journal articles per academic staff member among the units evaluated by this panel (15 refereed journal articles per staff member during 5 years i.e. on average 3 per academic staff and year). Most of the unit’s research is published in refereed journals. The publication activity seems to be well distributed among the staff members, and the time trend is stable.

**Relevance:** The research seems to be well linked to relevant problems in other fields, and often dealing with subjects on the research front. However, the contributions in these other fields such as in economics and finance have not typically reached top journals, and the impression is that the unit may split its limited resources too much by trying to cover so many fields, at the cost of quality and relevance.

**Vitality and organizational capacity:** The internal vitality seems seasonably good, as evidenced by research on new applied fields being started, and a new Master's program in 2007. The scattered research activity of the unit (efforts to try to cover a perhaps too large applied field) is a sign of a potential need for improvement in the organizational capacity.

#### **7.4 Collaboration**

The unit seems to have very good research collaboration within Lund University, witnessed by the many joint publications with researchers from other departments. Most papers are written jointly with other researchers. It also has decent national as well as international research contacts. However, the statistics on active engagement in the scientific society by other means than conference presentations are rather modest (e.g. no incoming nor outgoing longer research visits).

#### **7.5 Research activity and teaching**

Promising links between teaching and research. See the future plans.

#### **7.6 Future plans**

The future plans include the new Master's program (from 2007) and the co-operation connected to it, with other departments within and outside LUSUM. The future plans also include research on some new projects / areas, which are promising and within the capacities of the unit.

#### **7.7 Future potential and possibilities**

The unit is active but small. It has a good track record (some excellent past publications), but operates on a large field. The unit's age structure is also challenging. For a Statistics department within a university, the unit seems to be clearly under-dimensioned. The unit should either focus

its scarce resources better, or (preferably) be able to develop itself better (with more resources), to even better serve the different departments at LUSEM.

### 7.8 Gender and equal opportunity issues

Women are underrepresented, but not differently for this field elsewhere (a mathematical subject).

### 7.9 Overall assessment

Research	<i>Very good /Good</i>
Collaboration	<i>Good</i>
Research/teaching	<i>Good</i>
Future plans	<i>Good</i>
Overall assessment	<i>Good</i>

This is a good research unit in international standards, and has good potential for further improvement.

## 8. DEPARTMENT OF INFORMATICS

### 8.1 Unit description

This is a reasonably small unit in terms of its academic staff (total staff number is however large). The unit is also involved in teaching. The age structure of the academic staff is quite high (with a mean age of 60 for 4 professors). The external research funding is very low (lowest fraction among all units for this panel). The Ph.D. production is decent for a small unit (5 in 5 years).

### 8.2 Research infrastructure

Research at the department is hampered by too few researchers, too little time (a heavy focus on teaching), but also by the fact that many staff members are not interested in or capable of research. Many active researchers have left the unit, and recruitment activities are lacking. Given the high age structure, this unit is really in the need of strong actions to correct the situation.

### **8.3 Research**

**Quality:** The few more recent journal publications seem to be in good field journals. The department mentions having published in good impact journals, such as *Decision Sciences* in 1999. A few conference papers have also more recently obtained best paper awards or nominations for awards (in 2007).

**Productivity:** The publication activity is very low in terms of publications in refereed scientific journals. The numbers are somewhat better when other types of publications are included. “Book chapters” are the most common form of publication. Of the 20 publications in the list, 14 are dissertations, 4 conference papers, and only 2 refereed journal publications.

**Relevance:** The research output is scarce both concerning journal articles as well as conference papers. Therefore it is hard to assess its relevance.

**Vitality and organizational capacity:** The unit points at recruitment problems (although there has been some outside recruitments during the last years). The unit does not give a very vital impression.

### **8.4 Collaboration**

There seems to be no collaboration within the department or any form of multi- or interdisciplinary activities. The unit collaborates with two other units within the LUSEM, and participates actively in a national research school. International contacts are decent. Some researchers are active in international organizations, and there is a reasonable amount of international collaboration and engagement in society.

### **8.5 Research activity and teaching**

The department reports that there is no research impact on teaching; there is some research based on educational material.

### **8.6 Future plans**

There are some potentially fruitful development plans. However, the challenge is to overcome the lacking research climate and lacking recruitment of researchers. Also some departmental borders seem to hamper

the plans. The Ph.D. production seems to be in better shape, and there is good future potential through new research programs (at the Institute of Economic Research).

### 8.7 Future potential and possibilities

The unit's high age structure for the staff offers a potential to renew the unit within a near future. The active Ph.D. program also offers some promise in terms of future recruitment. The average age by which the Ph.D.s take their degree has promisingly gone down. Since the unit's main problem seems to be an insufficient amount of active researchers, and not the quality of the research itself, there is good potential for higher future research output given the research climate can be amended.

### 8.8 Gender and equal opportunity issues

There are fewer females as is typical within this field.

### 8.9 Overall assessment

Research	<i>Insufficient</i>
Collaboration	<i>Worth developing</i>
Research/teaching	<i>Poor</i>
Future plans	<i>Good</i>
Overall assessment	<i>Insufficient</i>

The level of research activity in this unit is very low. Although some good papers have been produced, and awards obtained, the recruitment processes and research activity in this unit need to be activated. This is an important subject for a business school and definitely needs to be developed further.

## 9. RESEARCH POLICY INSTITUTE (RPI)

### 9.1 Unit Description

Established in 1966, the RPI was among the first institutes established in Europe to carry out empirical studies of (contemporary) science, technology and innovation ("research on research" or, hereafter, STI). The field then emerging brought together perspectives and approaches from sociology of science, economics of innovation, political science and (to

some degree) the history and philosophy of science and technology. Many of the early practitioners had backgrounds in the natural sciences. So also at RPI. Today, also the RPI staff have diverse disciplinary backgrounds. The Institute later became one of the founding partners in CIRCLE, with which it participates in a European MA in STI. Other teaching is limited. A PhD program, with all students externally funded, was established in 2007, and 8 PhD candidates are registered in 2007. Though of modest size, the academic staff (in full time equivalents) of RPI grew from 4 in 2003 to 9 in 2007 (14 staff members with PhD degrees). In the same period its research revenue also almost doubled, wholly thanks to external funding.

## 9.2 Research infrastructure

As from September 2007, RPI is located in a building shared with CIRCLE, of which a number of staff are also members. Though this change may well have led to improved facilities, the consequences for the functioning of RPI as a whole, and of individual staff-members, are difficult to establish on the basis of available data.

## 9.3 Research

**Quality.** A large share (43%) of RPI's publications is represented by book chapters. Of the 30 articles for which information is provided, 7 appeared in SCI-listed journals<sup>14</sup>, of which only 3–4 in leading journals. The modest score may reflect a growing emphasis on externally-funded contract research that does not always lend itself to publications of high quality. Moreover, researchers employed with external contract funding often lack time for producing scholarly publications.

**Productivity.** Research productivity is modest. The total number of publications listed is 30, from 2005, although no dates are given for

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14. Whilst the impact factors of the journals in which staff publish provide a reasonable indicator of research quality, some caution needs to be exercised in this regard. Publications in this field appear in a wide range of journals, differing in their coverage. Even leading journals in which STI publications appear differ considerably in terms of their impact factors. Good journals that largely publish historical research on science and technology have impact factors only between 0.2 and 0.6, whilst the few journals with impact factors between 1.3 and 1.5 largely publish quantitative and/or policy-oriented studies.

many of these. Relating the total number of articles given in form 1.3 to the number of academic staff reported in form 1.1 yields 1.5 publications (including unpublished reports and book-chapters in Swedish) per staff-member in 2003 (2.5 per full time equivalent) and 1.5 (1.9 per f.t.e.) in 2007. Whilst the recent expansion of the Unit should be seen as a mitigating factor, and whilst some publications may be listed under CIRCLE, this is a modest score. Output data is however of poor quality: surprising given the field in which RPI works.

**Relevance.** The self-evaluation notes RPI's continuing engagement, via consultancies etc, with national and regional organizations. The social relevance of its work is demonstrated by these links, as well as by publications aimed at non-specialist audiences. The Unit distinguishes three themes as constituting the core of its work (research policy; studies of risks and social intelligence; and science and innovation for development). Each of these themes is certainly significant both for society and for the field of STI. However, judged on the basis of publications, it appears that the Unit's contribution to knowledge in these areas has been modest.

**Vitality and Organizational Capacity.** After a period of relative quiescence, the Unit appears to have been revitalized in the last year or two. It has succeeded in expanding the number of academic staff; in establishing a PhD program and recruiting a significant number of (externally-funded) PhD students; and in doubling its research income in the last few years. Of 5 new academic staff recruited, 2 have come from outside Lund. On this indicator, the Unit thus scores highly.

#### **9.4 Collaboration**

A difficulty in evaluating RPI under this heading is its participation in CIRCLE. This clearly provides an opportunity for extending both in-house collaboration and for extending the network through which international collaborations can be established. The newness of this link (September 2007) means that this change in the Unit's environment is not reflected in publications and cannot really be assessed. Data provided in forms 3.1 and 3.2 suggest that a number of the Institute's staff are individually well established in their international field, and that many collaborations ("with joint publications") exist. It was difficult to confirm this from the publication list. The Unit is said to be actively involved in a number of global research networks, but too little information is provided

for the significance or operation of these to be assessed. International exchanges (3.2) were few in number, but given the Unit's relatively recent growth (and the newness of its PhD program) this is perhaps unsurprising.

### **9.5 Research activity and teaching**

Undergraduate teaching accounts for one tenth of RPI's activities and income and serves as an important channel for research dissemination.

### **9.6 Future plans**

The panel has not given any specific comments. (*Information added by the RQ08 Project Office.*)

### **9.7 Future potential and possibilities**

The Unit defines its sphere of interest very broadly. The intention is to continue to focus on the three themes around which work to date is structured, but "to promote greater integration of its research in these three areas". Three topics are proposed, said to permit this to be achieved: globalization and knowledge, environmental and climate policies, and bio-politics and health care. All of these are important, and each may well cross the older thematic lines. But how these plans are to be realized is unclear, and the desirability of so broad a programme, given the Unit's size, must be questioned. Clearer strategic choices need to be made, bearing RPI's size and its proximity to CIRCLE in mind. These could involve a clearer disciplinary focus (eg historical and/or sociological studies of STI), or a more limited choice of thematic areas (clearly distinguished from those of CIRCLE), or an enhanced responsibility for postgraduate teaching across the field of STI.

### **9.8 Gender and equal opportunity issues**

The panel has not given any specific comments. (*Information added by the RQ08 Project Office.*)



### 9.9 Overall assessment

Research	<i>Good / Insufficient</i>
Collaboration	<i>Good</i>
Research/teaching	<i>Good</i>
Future plans	<i>Poor</i>
Overall assessment	<i>Good</i>

This small Unit has performed modestly over the period of the assessment, and seems to have difficulty in making the necessary strategic choices. Its recent growth speaks in its favour, but its relationship with the much larger CIRCLE (in which some staff participate) can be seen as providing both opportunities and threats.

## 10. THE CENTRE FOR EAST AND SOUTH-EAST ASIAN STUDIES

### 10.1 Unit Description

The Centre for East and South-East Asian Studies was established in 1996, to stimulate multi-disciplinary and interdisciplinary research and education, about the region particularly in the social sciences, economics and the humanities. Over the last five years the Centre has almost doubled in personnel size and budget. Personnel working in the Centre are normally affiliated to traditional departments so that it is difficult to give reliable and meaningful data on personnel structure and financing. Nonetheless four full time equivalent (fte) academic staff and nine other fte:s are recorded. The Centre is evaluated in both Panels 6 and 7.

Research at the Centre is organized in four research clusters (Asian Capitalism; Gender Studies; Law, Justice and Human Rights; and Religion and Society). The Centre teaches a research masters program and regularly provides two-year post-doctoral fellowships to younger scholars from around the world. There are currently six other externally funded scholars in the Centre.

### 10.2 Research infrastructure

The Centre's Asia Library, established in 1999 is the foremost library of its kind in Scandinavia.

### 10.3 Research

**Quality.** 68 publications, including 28 ‘strict scientific publications’, are recorded in form 1. The publications list records 140, but they date back to 1987 and include duplications. Many if not most of the publications are not properly referenced, for instance includes no date at all, no journal title for articles, or no title of book or publisher for book chapter. The following is an illustration of a journal reference in the list ‘Journal article, Quick Search this Journal, 2006, 13, 3, 329 – 348’. Hence appraising the research output is problematic. However, we do recognize three journals within the time frame of the present exercise; Urban Studies, Health Research Policy and Systems and Modern Asian Studies.

**Productivity.** The Director of the Centre is clearly very productive.

**Relevance.** –

**Vitality and Organizational Capacity.** In 2004, the Centre began publishing a series entitled Working Papers in Contemporary Asian Studies. The Centre apparently scores highly on external recruitments, with 13 appointments holding a doctorate from another university compared with 3 internally recruited, but it is unclear how this is compatible with the number of affiliates of the Centre.

The only research theme that obviously fits in the School of Economics and Management is Asian capitalism. The other three themes are more appropriate to Humanities and other Social Sciences and perhaps Law.

### 10.4 Collaboration

The Centre works with colleagues in other departments, who teach and act as tutors on the program, and also participate in collaborative research projects and joint publications. The Centre has been instrumental in the creation of two new European initiatives in the field of East Asian Studies, as a founding member of EastAsiaNet and as a prime mover behind the European Chinese Law Studies Association (ECLS). The Centre will be the host to the 17th Conference of the European Association of Chinese Studies in August 2008. The activities under this heading seem *excellent*.

### 10.5 Research activity and teaching

The unit's activities include the running of a 2-year interdisciplinary master's programme, from which many students continue for Ph.D. studies in European universities. Publications produced by researchers at the unit are used as course literature. The connection between research and teaching seems to be *good*.

### 10.6 Future Plans

Working together with departments at Lund University, the Centre intends to develop jointly tutored and taught Ph.D. programs. The dynamic growth of East and South-East Asia, and particularly China offer enormous possibilities for research.

### 10.7 Future potential and possibilities

The Centre hopes to develop into the leading interdisciplinary centre for research in the field in Scandinavia.

### 10.8 Gender and equal opportunity issues

### 10.9 Overall assessment

Research

Collaboration *Excellent*

Research/teaching *Good*

Future plans

Overall assessment

Evaluation of multi-disciplinary and interdisciplinary research is always challenging compared to research in a single subject, but it is made much more problematic when inadequate and insufficient information is supplied. The Centre appears to undertake substantial research though it is hard to comment on the quality. The international and national collaboration and entrepreneurship of the Centre is easier to assess and is excellent.

# PANEL 8 – MEDICINE | CLINICAL

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## 1. GENERAL TOPICS

### 1.2 Recruitment strategies

During the site visit several important issues were brought up concerning recruitment strategies. For investigators at the junior PI level (around age 35–40), a general impression was an uncertainty about future Faculty positions. The reduced salary for medical investigators (like postdocs) compared to similar earnings for a clinical position was mentioned by the young investigators as a key problem, reflected by the fact the majority of young PI to be scientists, not MDs. While the Faculty currently advertise 44 positions (13 professors, 20 lecturers, 2 assistant lecturers, 4 research assistants, 1 researcher and 4 postdocs), the clear impression from the meeting with young investigators was a general uncertainty concerning permanent Faculty positions in the future.

At the senior level, several of the professors in clinical medicine are in their middle sixties, thus to retire within a time frame over the next 5 years. Here, it was revealed (and confirmed by the vice Dean) that there is a plan to reduce costs by leaving approximately 2/3 of these positions unfilled following retirement of the current employee. In certain areas (like gastroenterological medicine), there is currently one professorship only; this could mean the Faculty may be left without any professorship in this important clinical area.

A subject of discussion was the issue that persons employed as Senior Lecturers, upon reaching qualification level, could apply for an upgrade to full professorial position; it was questioned whether this was an optimal way of recruiting new professors. This however is part of the general national system for promotion within the University system in general, and not conditioned to local practise.

It was not fully clear to the panels how the Faculty plans to secure senior Faculty members within strategic important areas. For the moment, this is reflected by an example of imbalanced leadership: there are several professors and senior investigators involved in diabetes and diabetic research within the 2 Departments of Clinical Medicine in Lund and Malmö (a very strong research area within the Faculty; see details); while at the same time only one professor covering the whole field of gastroenterology. While this subject may be well covered by consultants also involved in research within this area at the clinical departmental level, this does not fully compensate for this vulnerability.

The Faculty may need to develop a general strategy if they plan head-hunting people of outstanding qualifications from the outside. While personal conditions will be subject to negotiations, the fact a “supporting package” (regarding technical assistance and so on) may account for something around 500.000 SEK a year does not make the Faculty compatible at an international level.

All in all, the belief of this panel is the Faculty may benefit from making a fundamental analysis with respect to securing key academic positions with qualified persons, as well as optimal recruitment among junior investigators. At this stage, the fear of the panel is the medical faculty may find themselves non-competitive at an international level in this area over the years to come unless there is a clear strategic plan for recruiting, and a commitment to provide the necessary resources (space, funding, support personnel) at a competitive level.

## **1.2 Locations**

The fact that the Faculty practice at 2 major Hospitals located 20 km apart poses certain significant problems to the scientific activity (see in particular comments with respect to dept of Pathology, Lund, and ophthalmology). We understand this is mainly decided based on County Health Decisions (clinical management); yet, it represents a challenge to the Faculty in every respect to look for allocation / relocation opportunities with respect to research activity based on potentials to improve research standards through synergisms and tend to avoid “political” solutions to such problems that, in the opinion of the panel members, rarely become successful. We recommend that the Faculty consider a stronger integration with respect to research activities between the Lund

and Malmö units. This relates in particular to areas where research within the same fields are ongoing in both places (like diabetes), but probably even more to areas where collaboration exist or may be developed between specialities targeting joint problems from different angles. An example is pathology, where most research into cancer pathology is allocated to the Malmö unit, contrasting the fact that oncology research in general (and the oncology clinic) is located in Lund.

### 1.3 PhD training programs

The PhD program differs somewhat from contemporary standards in most countries being stipulated to 4, not 3, years of duration. Among young PIs interviewed, some expressed a concern considering the financial issue, as many grants would cover 3 years of the period, while they had to apply specifically for the 4<sup>th</sup> year.

### 1.4 Overall conclusions

The panel finds the research activity of the Medical Faculty overall to be very good, with some groups qualifying for the terms “excellent” or “outstanding”. For some of the best groups, the research quality is at a top international level. Considering major threats to successful future development, the panel would like to point out the following issues:

- Developing a clear Research Strategic Plan for recruitments and resource investment, which recognizes:
  - a high number of leading principal investigators expected to retire over the next years
  - a need to look for better integration of scientific activities between the two campuses
  - critical assessment whether each small academic unit should be preserved at its current status
- Considering a “Faculty Development” program aiming at securing leading young investigators on temporary positions, who can then apply for permanent positions in due time. This could reduce the uncertainty now felt by many young PIs on temporary positions with respect to the future.

## 2. DEPARTMENT OF CLINICAL MEDICINE, LUND CAMPUS

### 2.1 Department of Anaesthesiology and Intensive Care

The Department of Anaesthesiology and Intensive Care consist of 1 professor, 1 lecturer and 1 researcher. The total research money available for 2007 was SEK 680.452. From 2003 to 2007 the group of Mikael Bodelsson reported 7, the group of Per-Olov Grände 22 publications mainly in clinical journals.

Overall rating: *Good*

### 2.2 Department of Cardiology

**Overall assessment:** There appear to be ~ 57 professorial level faculties in the Lund Clinical Sciences Department; Cardiology accounts for only 1 full Professor and 6 Asst professors (7/57 or ~12%). The unit appears to be a “complete” cardiology division from a clinical perspective, possibly the only unit at this level in Sweden. Based on their publications, the two most prominent research programs are innovations in ECG utilization, and cell biology and cell signalling in cardiomyocytes, smooth muscle cells, and platelets.

**Research infrastructure:** They list the LUNDHEARTGENE bio bank as an important resource, but it is difficult identifying publications coming from this resource; possibly the paper by Amisten et al. is in this group. Several members of the faculty seem facile with animal models of different aspects of CVD, leading to publications.

**Research Achievements Reported:** Their research may be graded as “*very good*”, with the possible exception of the electrophysiology/device area which may be “*excellent*”. A concern is the lack of top-tier publishing in the 2003–2007 time periods.

**Quality:** They list several areas of national and international leadership, but international leadership is not consistent with the reported publications in any of these areas, again with the possible exception of their work in hypothermia and experimental and clinical electrophysiology; while this is not our field of expertise, their numerous publications in this area might place them in a leadership position internationally. National leadership in Sweden is difficult to judge.

**Productivity:** The productivity for 5–7 faculty in cardiology over 2003–2007 seemed modest; in the reported manuscripts there were three from *ATVB* (Impact Factor (IF) = 6.9), one from *Blood* (10.4), two from *Circulation Research* (9.9), one in the *European Heart Journal* (7.3), and a moderate number in journals having to do with electrophysiology and cardiac pacing. While some of these are excellent specialty journals, there were no publications listed from top tier journals (*Science*, *Nature*, *Cell*, *NEJM*, etc).

**Relevance:** The publications could be classified as “solid” in their fields, with the possible exception of the electrophysiology and device implantation work. Their *Lancet* paper from 2001 appears to be a “classic” in this field (Amer-Wahlin et al). Extramural funding is modest at best: a total of ~ 2.2M SEK in 2007 (~\$0.5M), with most of that from “Private” sources, which we suspect, means non-competitive.

**Vitality (flexibility, control, leadership):** This may be hard to judge from the information presented. It is reasonable to assume there is good leadership in the strongest area of experimental and clinical electrophysiology; little evidence for strong organization and leadership in the other areas.

**Collaboration:** No evidence of collaboration outside what is ordinarily done with colleagues at one’s own institution was revealed. They mention graduating 9 students over the last 3 years, which seems excellent for a faculty of this size, but the topics are not presented.

**Research activity and teaching:** We have little information to judge; there are 14 graduate students in the unit which seems laudable given the total of 7 faculties.

**Evaluation of future plans:** They list three major initiatives: continue development of a program in cardiac stem cells and become a Center in the world for cellular therapeutics in CVD; continue to work on hypothermia, cardio protection, and percutaneous devices; and, make use of the LUNDHEARTGENE resource. It is difficult to judge whether they are investing heavily enough in the first to successfully compete in this active area; the impression is they are not, but that may be wrong. The second seems a strength, and continued investment might indeed be worthwhile. The third is achievable, but the complete lack of epidemiological, genomic, or proteomic publications suggest a considerable



investment would be needed. Based on the little information we had, we would grade their plans as “good”.

**Future potentials and possibilities:** Unless there is strong investment, it may be difficult to develop the stem cell area to international prominence. We would suggest that targeted investment in faculty and collaborations would make the utilization of the bio bank a successful venture.

**Gender and equal opportunity:** While the percentage of doctoral students associated with the medical faculty of Lund is excellent (>50%), women comprise only 17% of the Professors and 29% of the academic staff suggesting there is work to be done. We do not know the numbers specific to Cardiology.

### 2.3 Respiratory Medicine and Allergology

Unfortunately, no description of research lines has been provided. The research staff consists of 4 active researchers. The head of the department is 59 years old. External funding is mainly from private money; somewhat remarkable for respiratory medicine and allergology. Although there are 13 PhD students, the number of graduates of the last 3 years was zero. When looking at the output of the department, the list of publications of Egesten is limited, especially when looking at the first and last authorship. For Hallgren only 1 paper has been given. The group of Lofdahl is mainly doing clinical studies. Although in the first description of the research we read about in-depth studies, we cannot find results of the studies in the list of publications. The list of publications of Bjerner indicates that this researcher is interested in indicators of inflammation in the lung. Here is a reasonably good list of publications.

Overall rating: Hard to describe. Probably *very good*.

### 2.4 Department of Medicine

**Overall assessment:** This is a large department containing several different units. The papers list a total of four professors, two researchers and one senior lecturer. The professors are all males; the 2 researchers (and lecturer) are females. The number of PhD students are listed as 18, number of PhD graduates over the last three years to 6.

**Research activities:** The research activities focus on diabetes, type I and II, with four groups active in the field. Professor Ahrens team has provided an extensive list of publication, and the principle investigator himself as an extensive publication record. Overall, he has a high number of citations. In addition, a second team working on diabetes is headed by Dr. Mona Landin Ohlson. That team is smaller: For both teams the quality of the research deserves the merit *very good*, with some papers *aspiring to excellence*. A third team working with diabetes related problems is headed by Dr. Winzell who, from the papers provided, does not seem to occupy a faculty position. Dr. Ewa Maria Erfuhrts also heads a team working in the field of diabetes with a more limited publication record. All in all, the activities by Dr. Erfuhrts and Winzell could be rated as *good* with some quite good quality publications but in general a limited output. Yet, in case Dr Winzell has no academic position, her output stands out as more impressive. A team working into gastroenterology is headed by the Head of the Department (Professor Åke Nilsson), who has an extensive publication record and is highly cited in the literature; the research is *very good*. While the output of the activity from the other team doing research in the gastrointestinal area, Dr. Ruidong Duan also has been quite productive over the recent years under the principle investigator has smaller all over publication record, and may be rated as “*good*”. Finally, Dr. Lars Edvinsson is heading a team working on cerebral circulation issues. This principle investigator has a most extensive track record with respect to publications as well as citations in the ISI Web of Science, and the activity could be rated as *excellent*.

**Future:** A key problem to this Department is the age of the principle investigators. As such, three out of four professors are within an age range of 63–66 years old, with the fourth professor (Åhrén) being 56. Dr. Edvinsson is at the age of 67. and Drs Landin-Olsson and Erfuhrts are both well in their 50-ties. Considering the high quality research provided by each of the groups headed by the Professors, it is mandatory to provide strategic plans how these activities may be prolonged following their retirement. We believe with respect to replacement it is highly important to continue the ongoing activities in the field of diabetes research, but perhaps a stronger integration between the smaller groups may facilitate their robustness.

## 2.5 Medical Ethics

According to the description the Medical ethics group is planning to do research in three areas:

- 1) Bio-ethics. The ethical implications of stem cell research.
- 2) Ethical problems in relation to nano-medicine.
- 3) Medical decision making.

These topics are very interesting and certainly relevant. They are in line with the main topics of research in the Faculty. At the same time, however, when looking at the publications we cannot identify publications related to the topics 1 and 2. All publications seem to be related to topic nr. 3. Therefore these lines of research still have to be developed.

The staff of the department is adequate, with a limited number of PhD students, which however is in line with the topic of the department. In this department you will never have a large number of PhD's. The funding of the department is limited. This, however, is not unusual for a department of medical ethics. The number of publications is good. They are, however, not all in high impact journals.

Overall: the Department of Medical Ethics is productive and is aiming to explore new lines of research. From these new lines no publications are available.

Overall rating: *Very good.*

## 2.6 Nephrology

This unit has 1 professor and two research fellows. The publication record of this unit is not impressive, although described as being “the highest ranking nephrology unit in Sweden”. Article 5 by Anna-Leena Berg published in Science seem to be an error as the article appears unrelated to nephrology and there is no author with this first name and just one male with the surname Berg). None of the principal investigators has an impressive publication record. There appears to be collaboration with vasculitis investigators in Sweden and abroad, and with microalbuminuria investigators at the Cleveland Clinic.

The unit can be evaluated as *insufficient/good* at the present time. The future plans regarding microalbuminuria appear promising.

## 2.7 Department of Thoracic Surgery

The Department of Thoracic Surgery has 1 professor and acquired SEK 309.799 as total external money. The group of Stig Steen reported 19 publications in various clinical journals from 2003 to 2007, e.g. in *Annals of Thoracic Surgery* 2006 and 2007, *Journal of Heart and Lung Transplantation* 2005, *Annals of Thoracic Surgery* 2006.

Overall rating: *Good with international impact*

## 2.8 Department of Dermatology and Venereology

**Overall assessment:** The Department contains three professorial positions (a high number for such an area) of which two are close to retirement. They report four principle investigators (3 professors and a younger Researcher). Looking at the list of publication provided, it is separated into two parts on which the bulk of the research activity is concentrated on the researcher (Dr. Smitschen). All members of the academic staff are males.

**Research quality:** Assessing the size of the unit the total research quality should be rated as *good* with most of the publication concentrated on activities within one team. It is not clear to distinguish the individual groups otherwise. For the research activity here, it is listed collaboration on a national- as well as international level. Yet, it seems that intra-institutional contribution in particular with respect to collaboration with Department of Infection Medicine seems crucial.

**Evaluation of future plans:** They list their main activities to develop novel peptide based anti-microbials for skin disorders and allergic skin information heptanes, although detailed outlines are lacking.

**Teaching:** No particular information is provided.

**Future potential and possibilities:** The research activity with respect to antifungal and antimicrobial properties is well on track. Considering the publication quality, the bulk of the papers are published in average/to low

impact journals of bite with some papers in very good journals like *Journal of Biological Chemistry* and *Journal of Clinical Investigation*. On these papers, however, collaboration with Infectious Medicine seems crucial based on the subject (titles of papers) as well as author contribution.

**Future possibilities:** Collaboration in particular with Department of Medicine seems crucial, and has generated the publications of good quality as listed. It is not clear to the Committee to what degree laboratory activities is covered also within Department of Dermatology or, or whether they for this research provide clinical samples and are dependent on laboratories elsewhere. For replacement of the professors close to retirement, it is crucial to the University to be aware of the somewhat narrow spectrum considering the research activity of the Department, bringing in new areas.

## 2.9 Infection Medicine

According to the description there are three topics within the department:

- 1) Study the mechanisms of the newly discovered anti-oxidant protein and radical scavengers.
- 2) Study the therapeutic potential in auto-immune diseases of 2 bacterial enzymes with unique specificity for IgG antibodies.
- 3) Define molecular bacteria host interactions which contribute to severe inflammation and sepsis.

The department has a good collaboration with groups inside and outside the Faculty and throughout the world. Details however are not given. The infrastructure seems well equipped with a P2 laboratory. The research staff is compared to other departments quite extensive with 17 PhD students and 9 PhD graduates over the last 3 years. The topics of research are all interesting, although topic 3 is studied in more institutions across the world. The funding of the department is very good compared with other departments in Lund. They seem to have the third-largest external funding of the faculty. The number of publications for the group in total is very good, with publications in various good journals. For some of the investigations, however, the number of publications is rather limited.

The overall rating is *excellent*, with attention for the output of a few of the researchers.

### 2.10 Department of Orthopaedics

The Department of Orthopaedics consists of 4 professors and 1.5 researchers. The group of Gunnar Flivik reported 8 publications from 2003 to 2007, the group of Richard Frobell 2 publications, the group of Lars Lidgren 31 publications, the group of Stefan Lohmander 50 publications and the group of Ewa Roos 43 publications, the group of Karl-Göran Thorngren 57 publications, the group of Hans Magnus Tägil 17 publications, the group of Jian-Sheng Wang 10 publications and the group of Hans Wingstrand 8 publications. However, some publications are listed twice or 3 times, e.g. in Lohmander, Ross, Lancet 2007. The department has a remarkable output of publications, some of high and some of very high quality, e.g. in *Journal of Immunology* 2005 (2x) and 2007 (2x), *Trends in Immunology* 2007, Lancet 2007 and 2005. The Department acquired a total of SEK 6.561.664 of external money during the year 2007.

Overall rating: *Outstanding*

### 2.11 Rheumatology

According to the description there are three main lines of research:

- Matrix biology.
- Systemic lupus erythematoses.
- Effects and side effects of the use of cytokine inhibitors.

All these topics are very interesting and important. The department has an extensive network for collaboration including both other departments within the university and centres all over the world. The number of publications is very good. External funding is certainly acceptable for a department like rheumatology. The staff has 4 members of the active research staff. The professor and head is 50 years old. No data on age of the other members have been given. The number of PhD students is good as well as the number of graduates.

Overall rating: *Very good*

### 2.12 Child and adolescent psychiatry

No description of the plans for the research of this group is provided. This group has a rather small staff. The head of the unit is 63 years old

and has one active researcher in her staff. There are 3 PhD students, and 2 graduated last years. There is almost no funding, and only one publication in 2007.

Overall opinion: one really has to consider if this group has a future. It is very small with limited funding and almost no output.

Overall rating: *Poor*.

### **2.13 Experimental Brain Research**

According to the table presented there is one Professor and 2 researchers, there are currently 4 PhD students and three in the past three years. All three of the research active staff appears to be productive with a significant number of publications to each of their names. They have over 4.5 million kr in external peer review funding and the department although small appears to be ideally placed within the University for collaboration for future work.

### **2.14 Clinical Neurophysiology**

The department appears to be headed by one individual who is 67 years of age and has published 25 papers over the past 5 years, the last in 2007 so is still relatively active. Clearly at the age of 67 successions planning is an issue. Grant funding is at a significantly lower level then the departments previously noted at 640, 000 kr. The university needs to take a decision on what will happen to this department when Professor Rosen retires and whether it should be continued.

### **2.15 Logopedics**

According to the description this group has three lines of research:

- Developmental language disorders.
- Cogluar implants.
- Voice disorders.

These three groups are lead by three different scientists, of whom one is 60 years old. This is the same age as the head of the unit has. The head of the unit has not been indicated in any of the research groups.

The description of the research topics is rather broad and hard to evaluate. Developmental language disorders are certainly very interesting, but it is not clear what they are going to study. What the cogluar implants group is doing other than elsewhere in the world, also is not clear. Description of the voice disorders group is somewhat more focussed.

The collaboration of the department is mainly within the own university. The infra structure seems well equipped.

The research staff is certainly not small for this department. When looking at the external funding, this is limited for a group of this size. Also limited is the number of PhD graduates over the last 3 years: only 1. When looking at the number of publications, considering the size of the research group it is limited. At least for some of the investigators the number really is limited.

Overall rating: *Good*.

## **2.16 Neurosurgery**

The Department of Neurosurgery consists of 1 professor and 1 researcher. From 2004 to 2007 it has produced 4 theses. 5 publications were listed by the group of Anna Darabi, and 28 by the group of Leif Salford, three of his citations are published in high quality journals, e.g. in *Cancer*, letters 2007, *International Journal of Immunology* 2007, *Blood* 2006. The Department acquired external money of SEK 6.627.721 in 2007.

With regard to future plans there appears to be significant research planned linked with the Rausing Laboratory for translational neuro-oncology and the spinal cord injury group. We note that Professor Salford as Head of Unit is 66 years of age so clearly succession planning will be an issue here. The collaborations would appear to be excellent.

Overall rating: *Excellent*

## **2.17 Neurology**

According to the table presented there are 2 professors and 3 lecturers, there has been one thesis since 2005 and the external funding amounts to



in excess of 12 million kronor. There appears to be significant collaboration between the clinical/research group and sections of neuro-imaging and neurosurgery, genetics and basic neuroscience as well as many international collaborations in these areas.

We note that the head of unit is 61 years of age, however the other members of the academic staff at Professorial status range between 46 and 57 years of age so succession planning should not be a problem.

The department appears to be active with a good level of funding and collaboration. All of the listed members of staff appear to be research active with a significant number of publications over the past years.

### **2.18 Ophthalmology**

There are three Professors, 1 lecturer and 2.5 researchers active in this unit which appears to have an external funding of over 7 million kronor.

The Ophthalmology unit in Lund thus appears to be larger than the Malmö unit and in consequence have a more varied academic output. (We do note that the papers attributed to Malin Malmsjö appear not to be related to ophthalmology but appear in journals like Cardiovascular, pharmacology and the annals of thoracic surgery – we wonder if this is a misattribution). The unit appears to be research active, well funded and have significant future plans, these relate to studying neuroprotection and retinal disorders, with significant collaborations with bio bank and ERN-RET for retinal degeneration. The unit appears to be viable, well supported and academically active.

### **2.19 Geriatric Psychiatry**

This unit has one professor and 1 PhD student and 1 PhD student graduated during the last 3 years. Research is focused around dementia. We find 1 last author publication since year 2003 by the head of the unit, although there are a total of 44 articles. This is based on our own PubMed search as we could not identify the list of publications in the material. Overall assessment of the research activity is *insufficient*.

## 2.20 Psychiatry

The department has 2 professors aged 61 and 63 and 2 other researchers. It currently appears to have ten PhD students and has had 5 undergraduates over the past three years. There is 2.6million kroner in external funding currently available to them and all of the research active members of the department in both psychiatry and molecular psychiatry appear to be active. The age of senior academic staff means that succession planning is an issue but the department appears to be viable in the longer term.

## 2.21 Rehabilitation Medicine

**Overall assessment:** The unit was established in 2006 and therefore an extensive evaluation of its achievements in the past is impossible. The unit is part of the Centre of Aging and Supportive Environments, one of the core activities of the Department of Clinical Sciences in Lund. The unit can be evaluated as *good to very good*. It has definitely international potential; however, the number of scientists involved as well as Ph.D.-students should be increased.

**Research infrastructure:** The unit is linked to the large clinical Department of Rehabilitation, one of the largest of its kind in Scandinavia with over 250 employees. The unit has a well-equipped neuromuscular research laboratory, a pain-measurement laboratory and access to several major rehabilitation outcome databases.

**Research quality:** There is no information available on the research output of the unit. Similarly there is no information on the grants acquired within the unit. PhD-dissertations up to now have been completed at other departments within Lund University or outside.

**Collaboration:** The unit is well imbedded within the Centre for Aging and Supportive Environments of Lund University and has collaborations with a large number of departments. It has however to be mentioned that within the research areas of the unit a collaboration with Medical Radiation Physics and its expertise on functional imaging would be appropriate. There are also collaborations with foreign universities.

**Research activity and teaching:** The three topics on which the unit focuses: neuro-rehabilitation, long-term pain and neuromuscular function are obvious but promising areas of rehabilitation medicine. A

stronger collaboration with neuro-physiology and imaging would be appropriate.

**Evaluation of future plans:** Are definitely promising and seem to be at least very good. The areas of research are well embedded within Lund University's major research areas and extensive collaboration could guarantee their fulfilment.

**Future potentials and possibilities:** Lund University's imaging department has a strong emphasis on neuro-imaging, particularly on functional MRI. A more extended collaboration with Rehabilitation Medicine should be envisaged.

**Gender and equal opportunity:** The group is small and consists of one head of unit at a professor level and one PhD graduate over the last three years.

## 2.22 Otorhinolaryngology, Head and Neck Surgery

This department has two professors, no lecturers and no researchers. 4 theses are noted but no identified funding in the table dated 11th June 2008. 21 papers published since 2003, mainly in journals of head and neck surgery.

We note in the file where otorhinolaryngology is joined with head and neck surgery there are three professors listed, age range 53 to 62 and that the number of PhD students has been noted as 10.

We were not able to identify future plans for this department and in the absence of research funding was not able to make a clear statement on the long term viability of this department within the university.

## 2.23 Department of Cancer Epidemiology

This unit contains two senior positions, one professor and one senior lecturer. The age of the two persons occupying the positions are 66 and 64 years respectively. No information regarding number of PhD students and PhD graduates have been provided.

**Publication records:** On the publication records it appears that the two senior persons are acting as statistical consultants to clinical studies, in as

much as they act as co-authors in general with respect to therapy-related trials. Considering the publication list of the professor (Alvegård), this is directly related to his names on the papers. For the publication list provided by principle investigator senior lecturer Andersson, his name is lacking from many of the publications, suggesting junior assistants acting in the team may be co-authors. Yet, no information on this issue is provided. As such, it is difficult to provide direct rating of the quality of the research work in as much as they seem to act more as consultants to the work of others. Importantly, however, the unit does not stand out as an independent epidemiological unit with an independent profile; thus, the term “*insufficient*” may apply.

**Future potential and possibilities:** With the two team-leaders approaching retirement age, it is an open question whether the Unit of Cancer Epidemiology should stay as a separate unit or rather; the positions should be allocated into a larger unit handling epidemiology or statistical consultancy. As the unit is functioning now, it seems to act as a statistical consultant unit to clinicians. They list a number of collaborations to Scandinavian and Swedish Research Organisations, and there is no reason to believe this has not worked to the satisfaction of both parts. Yet, the activity does not qualify for a separate unit term “cancer epidemiology”, in as much as they are not dealing with epidemiology as an issue on its own. We believe a re-structuring of the unit with translocation of positions may be a solution for the next upcoming years.

## 2.24 Electron Microscopy

**Overall assessment:** The Electron Microscopy unit was formed more than 20 years ago as a service facility for research performed in collaboration with other groups. It is not understandable why a new unit of research for electron microscopy should be positioned within the Department of Clinical Sciences and not within Experimental Medicine. A restructuring should be considered after the retirement of the Head of the Unit.

At the present stage research of this unit can only be evaluated as being *poor or insufficient*.

**Research infrastructure:** The unit is equipped with state-of-the-art electron microscopy facilities and is processing a large variety of samples.

**Research quality:** There is no information available on the research output. There have been only 4 publications over the last 8 years (PubMed) in which the head of the unit has been involved. Funding is only provided by the Medical faculty and other state financing and to a very small amount from private funding.

**Collaboration:** There is no overview on the structural collaborations of the unit.

**Research activities and teaching:** There is no information available on the present or future research lines of the unit.

**Future potentials and possibilities:** Due to the age of the single researcher within the group (Head of the Unit is aged 66) no substantial future potentials can be seen.

## 2.25 Imaging Units at the Department of Clinical Sciences

There are four research units involved mainly or at least partially in biomedical imaging. The unit of Clinical Physiology with a strong cardiac MR imaging group, Diagnostic Radiology performing mainly brain MR research, Medical Radiation Physics involved also in brain MR research, but additionally dealing with nuclear medicine methodology and radiation related topics, and finally Biomedical Engineering particularly focussing on medical ultrasound and high intensity focused ultrasound therapy. Since some of the researchers involved in the these four units collaborate strongly with each other, some of the imaging infrastructure is shared between the units and research in- and output is produced mainly in collaboration a separate evaluation of these four units is very difficult. Therefore we will try to give an overall view of the imaging units at the Department of Clinical Sciences in Lund with some specific remarks on the different units.

**Overall assessment:** Structuring of imaging research around the four units is less than obvious. It is understandable that the research units were established somewhat in parallel with the clinical departments, like Diagnostic Radiology and Clinical Physiology. However, due to the overlap in expertise, research areas, infrastructure and even people a complete restructuring of biomedical imaging should be considered. Research of Diagnostic Radiology could definitely be improved and enhanced through a stronger input from Medical Radiation Physics or Biomedical Engine-

ering. In the same way Clinical Physiology could strongly profit from the know-how and infrastructure of Medical Radiation Physics. Overall, the unit of Medical Radiation Physics could be rated as *excellent to outstanding*, while both Clinical Physiology and Biomedical Engineering have a *very good to excellent* research performance. However, Diagnostic Radiology can be only rated as *insufficient* and *good* only in the area of neuroradiology.

**Research infrastructure:** Overall the available infrastructure for biomedical imaging seems to be excellent. All state-of-the-art and emerging technologies are available within the different units including high resolution animal imaging including nuclear medicine technology and MR human SPECT and PET, ultrasound and high field MR, also with the perspective of installing a whole body 7T MR system in the future. However it remains unclear how access and availability is managed for the different units. A much stronger integration and overall sharing of facilities would be recommended.

**Research quality:** The quality of the in- and output for the different units is different. Medical Physics seems to have an outstanding impact and Biomedical Engineering as well as Clinical Physiology has a *very good to excellent* research output. The research output of Diagnostic Radiology is comparably rather *insufficient* with the exception of neuroradiology.

**Collaboration:** There is a wide range of collaboration due to the fact that Biomedical Imaging is by virtue of its service character involved in collaborative research with other departments. Also relations with the Clinical Department in Malmö as well as within Sweden and the region seem to be well developed. There is a wide range of research activities within the different units focussing on cardio-vascular-, neuro-, molecular imaging, basic science and technology development as well as many other smaller areas. An improved structure with reduction of the large number of different research projects and stronger collaboration between the groups would be recommended.

**Evaluation of future plans:** Particularly within Medical Radiation Physics and Biomedical Engineering the future plans are well developed and promising. Similar information is not available on Diagnostic Radiology.

**Future potentials and possibilities:** An improved structure of biomedical imaging with stronger collaboration between the different groups of

the four units has a potential to make this area in Lund to an excellent or even outstanding research line. There are a large number of younger researchers with long-term potential. With exception of Biomedical Engineering the groups have involved also adequate numbers of PhD students.

### **2.26 Department of Obstetrics and Gynaecology**

The Department contains two professorial positions, one senior lecturer and a researcher in addition to clinicians and others involved in scientific research. Except for a female researcher, both professors, the senior lecturer and the rest of the academic staff are males. The key problem is the age of the two professors (65 years each), as well as the senior lecturer (age 58). Thus, major changes will occur over the next few years.

**Research quality:** They list a total of 6 different groups, were mainly involved in neonatology research on placenta with respect to humans as well as animal (sheep model) facilities. They provide a well organized list of core facilities, including a perinatal sheep model and several other facilities. There are partly collaboration and overlap between the groups. In addition, there is research on sonographic investigations. The general problem is the difficulty in seeing a hypothesis driven research program with respect to the type of translational research conducted (individual parameters correlated to outcome and biological studies without their relation to clinical parameters). They are exploring a number of individual parameters, also applying novel technologies like arrays, but it remains far from clear what is the underlying “theories” driving their research; rather, it seems as they obtain tissue banking and evaluate a panel of parameters. Considering the individual principle investigators and looking at the citations with respect to age, a total assessment may rate between *insufficient to good*.

**Future potential and possibilities:** With three of the senior staff aiming for retirement over the next couple of years, this may implicate significant structural changes to the unit. A strength is collaboration with other investigators involved in basic research (translation), however, it does not seem they generate the full benefit from such programs. The fact that two of the professorial positions are to be occupied with new persons over the next few years opens for new possibilities in this area. Clearly, the possibilities are there (considering facilities and patients) to improve quality standard of the research, provided the University is able to recruit

highly qualified people for these positions. Of similar importance, they will need to provide them with the resources necessary to generate novel innovative programs. As the program stands, a general continuation of the ongoing activity is not likely to become successful; there is a need to generate novel programs within the area. A closer integration with the unit in Malmö should be considered (see Malmö evaluation).

## 2.27 Department of Oncology

**Overall assessment:** According to the information provided Department of Oncology is the largest research unit within the Institute of Clinical Science in Lund. It contains two directors, two clinical professors and three experimental professors. On the detailed list, 6 persons are enlisted as professors (title missing for Rubin; anticipated to be a Professor as well); counting up to 7. Out of these, 1 is female, the rest are males. Yet, from the junior staff, nearly 50% are females. While several professors are in their 50-ties, the age distribution is not particularly disturbing.

**Research quality:** The departments provide an extensive research activity concentrated on issues related to molecular biology. Here, they have some very strong researchers at a high international level. Their works have a seminal influence on experimental studies as well as epidemiology, epidemiological registry on inherited cancer syndromes, and also translational studies with respect to prognostication in cancers. The molecular biology and genetic activity in general qualify for the term *excellent* with certain activities related to key-investigators like Åke Borg as *outstanding*. In addition, there are a number of senior investigators in this area that in general qualify for the term *very good*, with a couple of investigators (as professor Ferno and research fellow Hedenfalk) whose contributions qualify for the term *excellent*. The seminal influence on other activities in the Department is obvious. As such, they provide a high research activity with respect to prognostic factors (professor M. Nilbert) and an extensive program with respect to cancer risk factors (professor H. Olsson), the activities led by both qualifying for the term *excellent*. In contrast, there is limited translational research with respect to therapy (predictive factors), which may have been generated through an integrated program between clinical researchers and the strong research teams with respect to molecular biology. The only therapy-related part of the program is the activity run by Dr. Tenlow with respect to radioimmuno-therapy, which merit classification as “*very good*”. For the rest of the clinical therapy research activity, for reasons



mentioned above and also with respect to clinical studies in general, the term *insufficient* may apply; definitely, there is a need and opportunity for significant improvement in this area. While a collaborate in Nordic and Swedish research groups, with the strong facilities with respect to cancer molecular biology, clinicians should be expected to take up much more of a leading role in this area, which they obviously not do.

**Evaluation of future plans:** They discuss opportunities with respect to tissue banking, interdisciplinary activities (like cancer stem cell program), and summarize multiple techniques. Further, they summarize issues like photodynamic therapy and participation in different Multi-centre Trial Organizations. As treats, they summarize lack of post docs and researchers. The issue, however, melt on to what was said above, the imbalance between the strength of the laboratory units compared to the lack of optimal activity with respect to the Clinical Department. This is the major treat to successful development, and there is a need to discuss strategic plans to handle these issues for the future.

**Future potential and possibilities:** The Department of Oncology has unique opportunities in case they are able to integrate the above mentioned issues in a successful way. As for lack of results post docs etc. it seems to recruitment for the basic research (which otherwise is a key problem in many universities) is doing well, probably due to the well known reputation of some of the senior investigators in this field. Clearly, the Clinical Department needs to take advantage of this collaboration with research units and develop the program forward.

## 2.28 Department of Pathology

**Overall assessment:** There appears to be ~ 57 professorial level faculties in the Lund Clinical Sciences Department, Pathology accounts for only a small number. They do list just 2 “research active” faculty, and offer concern about the future since one of them is retiring soon (department head). They discuss two major research themes: neuropathology and imaging of tumours and inflammatory conditions.

**Research infrastructure:** They list the imaging equipment as a core facility, and several other departments list the pathology department as an active collaboration. Thus, it is assumed many investigators in Lund use the imaging equipment in pathology in their research.

**Research Achievements Reported:** Overall research may be graded as “*very good*”, but nearly all activity is related to Dr. Englund’s research.

**Quality:** They did not list areas of national and international leadership. From their publications, most were in the general field of neuropathology, but none were in top-tier journals.

**Productivity:** The two active faculty list 33 articles in 2003–2007, 30 of which were by Dr. Englund. Of these over half were in the general field of neuropathology, although none were in top-tier journals (NEJM, Nature Medicine, etc) or the top-tier neuroscience journals (Nature Neuroscience, Neuron, Brain, Lancet Neurology). They list one paper in Neurology (IF=5.7) with many journals in quite low IF journals.

**Relevance:** As a “department”, their publication record may be classified as “modest”, although clearly Dr. Englund is quite active in the field of neuropathology. There is *very little* extramural funding; they list a total of ~ 0.6M SEK in 2007 (~\$0.12M), with most of that from “Private” sources, raising the issue whether they may be non-competitive in this respect.

**Vitality (flexibility, control, leadership):** Seems non-existent, given their concerns over leadership.

**Collaboration:** They seem to collaborate, especially in the neurosciences, but nothing outside of the expected collaborations. Their core facility for imaging appears to be used by others at their institutions.

**Research activity and teaching:** Little information for assessment available.

**Evaluation of future plans:** They list developing a core facility for advanced morphology as something that “would be of enormous benefit”, suggesting it’s not really a plan but more of a hope for the future. We do not see any other plan for the future, and this area is rated as “*poor*”.

**Future potentials and possibilities:** The department seems to be in an “uncertain” mood given the upcoming retirement of the head. In general there is always great potential for Pathology, given the expertise in disease processes, imaging, and broad-based knowledge of pathobiology from the molecular to the gross. However, we do not see much evidence that

the small research faculty have any influence on decision-making around resource allocation.

**Gender and equal opportunity:** While the percentage of doctoral students associated with the medical faculty of Lund is excellent (>50%), women comprise only 17% of the Professors and 29% of the academic staff suggesting there is work to be done. The numbers specific to Pathology are not known.

### 2.29 Pediatrics

Unfortunately, no description of the lines of research of pediatrics has been provided. The research staff of the Department of Pediatrics seems rather limited, considering the size of the discipline. At the same time there are a high number of PhD students with also a high number of PhD graduates. The external funding is reasonable, but not very high.

When looking at the publications there are 5 PI's listed. 2 of them only have a very limited bibliography, namely Axelsson, who has only reports of an ESPGAN committee, and Leven. The list of publications of Fellman, Karpman and Pesonen are *excellent*.

Overall rating: not really possible, provisional *excellent*.

### 2.30 Department of Urology

The Department of Urology consists of 1 professor. The group of Anders Mattiasson reported 21 publications, mainly in clinical journals, e.g. in *Urology* 2007, *Neurourology and Urodynamics* 2006 and 2004, *American Journal of Obstetrics and Gynaecology*. The group of Björn Wullt reports 17 publications, e.g. in *International Journal of Cancer* 2007, *European Urology* 2006 and 2004, as well as various journals for infectious diseases. The Department acquired SEK 297.526 of external money.

Overall rating: *Good* with international impact

### 2.31 Department of Surgery

In 2007 the Department of Surgery consists of 2 professors and 1 lecturer. The department acquired a total of external money of SEK

831.115. The group of Roland Andersson reported 46 publications since 2003, mainly in international clinical journals, e.g. in *Annals of Surgery* 2007, 2006, *British Journal of Surgery* 2007, 2005, *Scandinavian Journal of Gastroenterology*, *International Journal of Colorectal Disease* as well as *Journal of Proteome Research* 2004.

Overall rating: *Very good*

### **3. DEPARTMENT OF CLINICAL MEDICINE, MALMÖ CAMPUS**

#### **3.1 Anaesthesiology and Intensive Care**

The personnel structure of the Clinical Science in Malmö shows for the Department of Anaesthesiology and Intensive Care 1 lecturer. The group of Jonas Åkesson reports 31 publications from 2003 to 2007, mainly in renowned international clinical journals. The group acquired an external funding of SEK 23.862.

Overall rating: *Good* with international impact

#### **3.2 Angiology, Cardiology, and Medicine (AC&M)**

**Overall assessment:** There appear to be ~58 professorial level faculty in the Malmö Clinical Sciences Department; the AC&M unit accounts for approximately 11 faculty or 19% of this total. The unit is very active in research, comprising 7 of the ~50 departmental research programs (~14%). Based on their publications, all of these units do well, with a couple reaching the outstanding category. Total extramural support in 2007 was ~20M SEK or about 15% of the total departmental extramural funding. The two most prominent research programs are the Experimental Cardiovascular Research and Internal Medicine.

**Research infrastructure:** They list a number of bio banks and epidemiology projects as important “infrastructure” which is supported by their publications. In the Internal Medicine program, for example, out of 173 total publication listed from 2003–2007, approximately two-thirds related to epidemiology and public health. Within this group of publications, a number related to genetic epidemiology, pointing to the success of their investment in high through-put genomic technology. The Experimental

Cardiovascular Research program relies heavily (and productively) on the animal husbandry infrastructure.

**Research Achievements Reported:** overall their research may be graded as “*Excellent-Outstanding*”, with several top-tier publications in the 2003–2007 time period (Science, JAMA, Lancet, Nature Genetics, Nature Clinical Practice), and many influential reviews (e.g., Current Opinions in Lipidology, etc). In several areas in particular (cancer epidemiology especially nutrition and cancer; genetic epidemiology; and inflammation and immunity in atherosclerosis) members of this faculty have international prominence.

**Quality:** They list a total of more than 350 publications in the 2003-2007 periods. As noted above, there are several top-tier publications, especially from the epidemiological efforts. These are centered in the Internal Medicine program, which accounted for 173 (~50%) publications. This program also had many prominent publications in top level specialty journals such as the Journal of the *National Cancer Institute* (IF=15.1), *Cancer Research* (7.6), *Stroke* (5.4), *TAB* (6.8), *Journal of American College of Cardiology* (9.7), and others. However, all the programs had prominent publications in specialty journals, adding up to an impressive list.

**Productivity:** The productivity of this faculty seems *excellent*. The total number of manuscripts and the relative prominence of the extramural funding are *outstanding*.

**Relevance:** Many of their publications may be graded as “influential” and the program leaders especially in the Internal Medicine program and Experimental Cardiovascular Disease program are active internationally in giving invited talks, etc. Clearly their work is very relevant to the international biomedical research community, and they participate frequently in developing guidelines, editorial comments, etc.

**Vitality (flexibility, control, leadership):** For the bigger programs in this department, there is clear evidence of superb leadership.

**Collaboration:** In particular, their epidemiological work is obviously collaborative on an international scale. There is also evidence of collaboration in their more molecular work, such as the immunity and atherosclerosis activities, mainly based in the Experimental Cardiovascular Research program.

**Research activity and teaching:** There is little information presented; there are 43 doctoral students in the department which seems reasonable given the size of their faculty.

**Evaluation of future plans:** They describe several areas for growth that are based on their current strengths, which seems a logical approach. The key feature is “public health”, and one strategy is to extend their work into the community which has become more multi-ethnic than some of their cohorts reflect. They will attempt to develop structured interventional programs at the community level in an effort to increase the “translation” of their work. A proposed Center for Primary Care Research seems an excellent approach to this issue. Finally they recognize a major “missing piece” of their translational program, namely clinical research units in both oncology and cardiovascular disease. These two units will require significant investment (some of which seems to be in place, but details were lacking), but would provide critical linkages between more basic work, and their population-based science. Their plans may be rated as “*excellent*”, assuming resources are provided.

**Future potentials and possibilities:** They outline these well, and they focus on their current strengths.

**Gender and equal opportunity:** While the percentage of doctoral students associated with the medical faculty of Malmö is excellent (>60%), women comprise only 33% of the academic staff suggesting there is some room for improvement. We do not know the numbers specific to AC&M.

### **3.3 Dermatology and Venerology**

The unit has one professor. The unit in Malmö has a total funding of 204,000 from the Faculty. The unit focuses purely on education. Therefore the research activity of this unit can only be evaluated as being non-existent or poor.

### **3.4 Endocrinology**

**Overall assessment:** This is a unit which has mainly been established by two international stars in their fields, professors Leif Groop and Åke Lernmark. There are several independent investigators, which nevertheless work together closely. The by far most active is the group headed by Leif Groop.

The quality and quantity has continuously been increasing and is now at the absolutely highest international level. The other group leaders (other than Lernmark and Groop) are still miles behind or have stabilized at a good but not top level. The unit can be evaluated as *outstanding*. The unit has indeed all the potential to solve major questions in the genetic etiology of both type 1 and type 2 diabetes. Funding is impressive (21 514 230 is the largest of any unit of clinical sciences in Malmö), as is international collaboration and expertise in insulin action and secretion. The publication record is truly impressive (Science, N Engl J Med, Nature genetics etc). There is also close national collaboration with the major epidemiological projects which are ongoing in the Malmö region. Clinical mechanistic physiological investigation in humans could perhaps be expanded.

### 3.5 Epidemiology

This unit has two areas of research, one dealing with cardiovascular epidemiology with two researchers and one with nutrition epidemiology also with two research positions. The quality of publications is good European/Scandinavian level. The researchers do not appear to be last authors but often second authors which are sometimes the preference of senior authors. Most of the funding of the cardiovascular epidemiology group is from the faculty (864 008 out of 1 146 434). We cannot find the budgetary information of the nutrition epidemiology group. Our overall assessment of this unit is *good*.

### 3.6 Family and Community Medicine

According to the description there are four lines of research within this department.

- Hakansson et al. This group has published a number of papers on a wide variety of topics. The group does not seem to be much focussed. The support is very limited.
- Rastam et al: This group consists of only one person and has reasonable external funding. There are publications on the Skaraborg project. The question is why this group is not working more closely together with other groups in Malmö like Groop.
- Merlo et al seem to have good funding while no data on funding was provided for the group of Ostergren et al. It was not easy for this reviewer to judge if these two groups published papers.

Doing research in family and community medicine is usually not that simple. Overall the group has published quite a number of papers, for a department like this. In this sense the group seems to be productive. At the same time the wide variety of topics gives the indication that the group is not very focussed. Focussing on a smaller number of topics and collaborating on studies on type 2 diabetes with the other group in Malmö seems advisable.

Overall rating: *Good*.

### **3.7 Hand Surgery**

The Department of Hand Surgery has 1 professor and 0.5 researchers. The research group of Göran Lundborg and Lars Dahlin listed 160 citations in various clinical journals, eg. *Journal of Bone and Joint Surgery* 2007, 2006, *Radiology* 2007 as well as *Proc. Natl. Acad. Sci.* 2006. The group acquired an external funding on SEK 3.341.228.

Overall rating: *Excellent*

### **3.8 Imaging and Radiation Physics**

**Overall assessment:** Imaging and Radiation Physics concentrates on methodology and clinical protocol optimization. Additionally there is an internationally well-known line on development of contrast media. In collaboration with other clinical departments and research units of the hospital there is an impressive number of publications in high quality journals. However, there is no obvious involvement in population based imaging in collaboration with the strong epidemiology group in Malmö. The quality can be evaluated as *very good to excellent*.

**Research infrastructure:** The unit seems to have access to state-of-the-art infrastructure. Potential collaboration with Lund and its high field MR systems, as well as animal imaging facilities is not pursued.

**Research quality:** The unit relies on mainly faculty budget and some external funding and it shows an impressive number of excellent publications. There is however quite a limited number of PhD-students and a limited focus of research on the main research lines of Malmö hospital.



**Collaboration:** There is extensive collaboration within the hospital as well as with groups outside. A more extensive collaboration with Endocrinology and Epidemiology should be fostered.

**Research activity:** A relation between research and teaching is not described.

**Evaluation of future plans:** The future plans of the unit are not very well described and therefore not obvious.

**Future potentials and possibilities:** There are a number of younger researchers in the group and the strong scientific output underlines the potential for the future, however, an increased focus on the main research lines of Malmö hospital as well as a stronger collaboration with the Biomedical Imaging units in Lund should be recommended.

### 3.9 Infectious Disease

According to the description provided there is only one researcher in this group. The focus is on national and international collaboration in order to limit the use of antibiotics. The group has rather limited funds. The papers are indeed reflecting the collaborations. One might wonder if this group should stay with an own identity, or whether it could combine with infectious diseases in Lund. The group as it is at the moment according to the description is very vulnerable.

### 3.10 Obstetrics, Gynecology and Reproduction

**Overall assessment:** The department contains one Professor (Lil Valentin, born 1948), and one adjunct professor (Alexander Giwercman; born 1955). This position is now formally terminated but is under consideration for further prolongation. A third group is headed by Senior Lecturer Martin Stjernqvist (born 1952), currently under consideration for promotion to a full professor position.

**Research activities:** The Department lists 3 research groups; Gynecological and prenatal Ultrasound Diagnostics (Principle Investigator Lil Valentin), Uro-gynecology (Martin Stjernqvist), and Molecular and Reproductive Research (principle investigator Alexander Giwercman). Stjernqvist is mainly engaged in teaching activities. The group headed

by Lil Valentine has a good output, albeit in journals with an average to low impact. The principle investigator and the research in general are not highly cited, although it's gradually increasing. The activity of the group headed by Alexander Giwercman has a high output, and the principle investigator is highly cited; his most cited works however all were conducted > 10 years ago. All in all, the research activity of the Department spans from *good* (Stjernquist), to *very good* (Valentine) and *excellent* (Giwercman).

**Future potential and possibilities:** The University contains two Obstetric / Gynecological Research Units. The activities in Lund and Malmö may benefit from a closer integration. In both units, there is ongoing research with respect to ultrasound activities; also, the Molecular and reproductive research here may benefit from a closer collaboration with the unit in Lund. Based on this evaluation, we consider the unit in Lund the most fragile with respect to ongoing research activity and, in particular, the fact some of the principle investigators are close to retirement age. Thus, a closer integration, also with respect to the investments performed in Lund (sheep facility) may strengthen the ongoing activity in both places.

With respect to Malmö, the fact that the principle investigator in charge of the most successful program is currently re-applying for continuation as an adjunct professor, while a Senior Lecturer with a limited ongoing research program is currently promoted to Professor due to the general regulations questions whether this is an optimal system for recruitment in academic units. In the opinion of this panel, further academic success of the Malmö unit depends on securing Giwercman a permanent position as Professor.

### 3.11 Ophthalmology

The ophthalmology unit in Malmö seem to be somewhat smaller than the Lund unit with one professor and an external funding of 2.8 million kr. The unit is headed by Anders Heijl has produced 43 papers, 5 are in the high impact journal IOVS, 8 in the good but slightly lower impact journals of Ophthalmology, Archives and American Journal of Ophthalmology, and the remainder are in the Nordic journals Acta. The unit appears to be functioning well and has an adequate level of external peer reviewed funding. The unit appears to be viable, well supported and academically active.

### 3.12 Pediatrics

There are three different topics of research within the Department of Pediatrics. According to the description all groups only have one researcher.

- Ivarsson et al: Study pediatric immunology and auto-immune diseases. This group has some external funding, clearly from international collaboration. For pediatric endocrinology the funding is certainly not very high. The number of papers is limited.
- Pediatric hematology: Ljung et al: This group also has limited financial support and a limited amount of papers. Also here collaboration with some other group might be advisable.
- Cellular auto-immunity: Cilio et al: This group studies phenotype and regulation of auto reactive T-cells in auto-immune diseases. No information is provided regarding the financial support of this group. There are some good publications. The number of articles with first or last authorship seems limited. Also for this group collaboration with another group seems advisable.

Overall rating of Pediatrics: *Good*. The group should really consider very strong interaction with other groups. Merging with pediatrics in Lund might be advisable. Otherwise collaboration with strong groups in Malmö is recommended.

### 3.13 Orthopaedics

The Department of Orthopaedics has 2 professors and 2 lecturers. The groups of Kristina Åkesson, Karl Obrant and Magnus Karlsson reported 117 publications, the Joint and Soft Tissue Research Unit of Leif Dahlberg 6 publications. The mainly clinical journals include the *Journal of Bone and Joint Surgery*, *Osteoporosis International* and, of high quality, the *New England Journal of Medicine* 2003. The group of the Joint and Soft Tissue Research acquired SEK 660.298 of external money and the group of Clinical and Molecular Osteoporosis Research of Åkesson SEK 4.254.431.

Overall rating: *Excellent*

### 3.14 Psychiatry

Again, it is perhaps unfortunate that different panelists evaluate psychiatry in Malmö and Lund. In Lund, we have been given one name

(Ankarsäter H) which we assume should be written Anckarsäter H (d.o.b 1966). This name appears in PubMed in 22 articles which deal with autism and a variety of other conditions. The quality of research appears good/very good, but independence cannot be judged based on the information available.

Our overall assessment of this unit is *good*.

### **3.15 Surgery**

The Department of Surgery has 3 professors, 1 lecturer and 3 researchers. The group of Henrik Ekberg reported 18 publications, the groups of Bengt Jeppsson and Henry Svensson reported 96 publications. Papers were published e.g. in *New England Journal of Medicine* 2007, *Cancer Epidemiol Biomarkers Prevention* 2007, *International Journal of Cancer* 2007, *Journal of Hepatology* 2006. The surgeons received an external funding of SEK 4.753.062.

Overall rating: *Outstanding*

### **3.16 Urology**

There exist 2 listings for the Urology. One department consists of 1 professor and 2 researchers, the other one of 1 professor and 1 researcher. The Division of Urological Cancers, P-A Abrahamsson, Anders Bjartell, listed 17 publications, e.g. *Clinical Cancer Research* 2007, *Oncogene* 2005, *International Journal of Cancer* 2005, and acquired SEK 2.879.430 for Urology research and SEK 1.887.913 for Urological Cancer research as external money.

Overall rating: *Excellent*

# PANEL 9 – MEDICINE | EXPERIMENTAL

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## 1. OVERALL ASSESSMENT

The department has about 200 staff members of which about 20 are researchers in tenured positions, 90 are researchers (including doctoral students) in temporary positions (time limited grants) and 81 are other personnel (mainly technical support personnel) many of which are also on temporary grants.

The research quality is judged as being on average very good with great variability. Large parts of the big neurophysiological division are of outstanding quality while other groups such as the divisions of immunology, vascular and airway research and cell and matrix biology have leading positions in Sweden and attract wide international attention. It is our impression that the high quality work of the neurophysiological division can probably withstand the anticipated retirement of a leading PI in the foreseeable future, but that attention must be given to maintaining the division's international reputation. In the cell and matrix biology division, retirement of the leading PI in the near future requires attention. We think there is potential in the interaction of several researchers in the Department, which have overlapping interests in matrix biology. It seems that division of immunology has young and very promising researchers and there is important potential in this division which could be exploited.

The division of cellular and molecular pharmacology might play an important role if the Faculty considers taking part in establishing education

in pharmacy in collaboration with other faculties. It seems natural that this division should be involved in pharmacy education.

The division of diabetes metabolism and endocrinology also appears to produce work of high quality in an area of substantial societal relevance. There appears to be good interaction with other groups in the faculty who study diabetes making this area an important part of the research profile of the Faculty.

The small division of developmental biology may be under the critical mass to be very productive. There seems little interaction between the two PIs and the publication rate is falling and is currently at a low level.

The department has undergone substantial changes in the type of personnel employed during the last 4 years. The number of research fellows has been reduced to about 30% and the number of doctoral students has been reduced with more than 50%. This is compensated to some extent by an increase in the number of researchers, but there is an overall substantial reduction in researchers. The reduction of doctoral students was consequent to recommendations from a previous evaluation and was motivated by the argument that postdoctoral fellows produce better research, which is a relevant argument and it is not our impression that the level is too low. On the other hand many of the postdoctoral fellows (“researchers”) may come from countries where the quality of the Ph.D. education is variable, although we have seen no statistics for this.

We see a problem in that less than 10% of the scientific personnel at the age of 38–39 years have permanent positions and that it is very difficult for a young researcher to have a credible career path with some security ahead of him/her. This is also in contrast with the stated goals of the research strategy of the Faculty. We fear that this could discourage talented young people to follow a research career and negatively influence their choice of research projects, and it may have negative consequences for the gender issues as it could be feared that this is a greater problem for young female researchers.

We think there is a problem for the flexible development of high quality research in the management structure. The HoD who is now running a large unit has apparently very limited possibility to think strategically in

that she has no control over the recruitment strategy and the economical possibilities are very limited. Apparently she is responsible for deficits but has limited access to surpluses arising during the year, although this needs confirmation. If correct this has several consequences: It limits the possibilities for the HoD who has insight into the detailed function of the unit to act appropriately, it will be difficult to hire qualified and engaged HoDs and it will be demotivating for the researchers to experience the limited possibility of the Departmental management. We appreciate that the management structure means that the formal power lies at the Faculty management or with the Vice-chancellor, but we think that it might be worth considering whether there could be some advantages in delegating some more responsibility to the HoD.

It has been somewhat difficult to be certain on the strategy adopted for the recruitment. On the one hand it was stated to us that the Faculty had “a strategy of no strategy” in their recruitment plan despite that the stated goals in the Faculty strategic plan is to develop “strategies for prioritizing areas of research and staffing”. This apparently reflects the opening of 3 lectures positions which were not in specified areas. The aim was to try to hire the best possible young investigators with the longterm goal of establishing highly successful research groups in the future. From the positions which are currently advertised at the faculty of Medicine it is clear that there is a strategy behind the way that recruitment is approached. It is difficult to find out what this recruitment means for the Department of Experimental Medical Science. We should also point out that from an internationalization point of view it is striking that the positions are apparently only advertised in Swedish.

## **2. RESEARCH INFRASTRUCTURE**

The research infrastructure is very good with the BMC being a good platform for interaction and flexibility. There is room for improvement though. To enhance possibilities for translational research it might be worth considering whether clinicians and possibly relevant groups from other faculties (e.g. science faculty) could be physically more integrated with the preclinical researchers. In one instance we found the gangway between the clinical and preclinical units in BMC blocked! Apparently there is also a limited possibility for the researchers to meet at coffee and lunch rooms for informal interaction. With respect to complex

technological platforms there is a wish for better transgene facilities, imaging facilities, mass spectroscopy facilities etc, as long as they are not run as core facilities in the classical sense. It was suggested that they are based in and run by research groups, which should then make some of these state of the art technologies available for other groups. It is worth considering how this is best done but for some facilities e.g. transgene facilities it seems that a central facility run by a dedicated staff may be the best option. There was also an indication that the IT support could be at a higher level.

### 3. RESEARCH QUALITY

The division consists of seven Divisions which are based on research interests.

#### 3.1 Cell and Matrix Biology

**Summary:** This is a relatively small Division, but populated by some excellent scientists. The Division as a whole has a long and distinguished history and a distinctive scientific profile. Their blueprint is the identification and characterization of many proteoglycans and other types of multifunctional molecules, the investigation of the complex architecture of the extracellular matrix, and bridging basic research to relevant disorders. Their contributions are internationally well recognized and the Division can be counted among the leading matrix biology setups in Europe. Another line is represented by work on binding of *Helicobacter pylori* to mucins. The effort in Matrix Biology seems to far outweigh the “Cell Biology” component – perhaps the name of this Division is not an accurate reflection of activity.

**Quality:** On average *excellent*, though varies *between very good and outstanding*. Many publications appear in highly regarded international journals, and are cited often. It should be noted perhaps that not all the chosen publications are in the first rank of journals, but this partly reflects the specialized nature of some of the research. The high quality research is backed up by significant extramural funding, although again this is variable between investigators. The average support is less than that of some other groups in the Department, but it is also probably the case that not all investigators are full time in Lund.



**Productivity:** The group consistently publishes and has kept up a very good rate of publication over many years. On average *very good*.

**Relevance:** This is *excellent to outstanding*. Diseases of relevance to man are studied, ranging from arthritis, atherosclerosis, reproductive biology and muscular dystrophy. Important contributions have been made to all of these areas, though inevitably, with the small division size, this means that each disease area receives attention from only one group.

**Vitality and Organisational Capacity:** *Good* – but an area of concern. Several investigators will retire in the next few years, but a younger generation of PIs, with very good track records, is also present. Nevertheless, without replacement, the Division would be badly compromised. Future plans depend on the recruitment strategy and the focus of the research. As a future direction “cellular biomechanics” is targeted in the document. This presumably builds on much of the current work in the area of musculoskeletal extracellular matrix, and is a logical target. However, connections with biomechanics, tissue engineering and related disciplines are not apparent, and could be very important for the future. Moreover, investigators in other Divisions, such as Developmental Biology and Vascular/Airway research clearly have expertise related to that in Cell and Matrix Biology, but there seems little collaboration. Altogether, the scope of the research and strategies for embracing the changes that the Division is facing should receive strong attention. Reducing fragmentation and ensuring critical mass and synergies is essential. The strong medical relevance and scientific profile should provide a fruitful basis for such planning as well as the excellent international network of the Division.

### 3.2 Cellular and Molecular Pharmacology

**Summary:** This is a relatively small division that includes sections in Drug Target Discovery, Biogenic Amines, Biomedical Polymer Technology and Genomics and Bioinformatics. The major concentration of support is within the Biomedical polymer section. Overall the publication record of the leaders of the sections is good, but it appears that the productivity is restricted to these individuals. This is also the case with the Genomics and Bioinformatics section in which the publications are limited to manuscripts from Dr. Medstrand. It isn't clear whether the services and resources of this section are utilized by investigators in other Divisions, or whether comparable resources and facilities exist elsewhere

within the institution. There was no possibility to explore this further at the site visit.

**Quality:** Overall the quality of the research is judged to be *good*. Importantly, several of the publications have direct translational relevance. The manuscripts are largely restricted to specialty journals and there are only a limited number of publications that are published in higher impact and general scientific journals.

**Productivity:** The productivity is judged to be *good*. Many of the manuscripts are in press and past publication records are good. It isn't clear whether there are relations or collaborations with pharmaceutical partners. This should be encouraged since several of the projects and publications would appear to have clinical application and relevance.

**Relevance:** The focus of the research projects as exemplified in the publications is relevant to the specialty interests of the sections. Likely, because of the small number of research faculty, the work is of relatively limited scope, although as described above, several of the projects have clinical translational relevance.

**Vitality and Organisational Capacity:** Because of the limited number of personnel and relatively conservative budget, it is difficult to judge the overall vitality. The leaders of the sections are the major authors on essentially all of the publications and it would be useful to know whether there are plans for expansion of the individual programs. Also, it isn't clear whether there is interaction and collaboration between the sections. This is particularly the case with the Genomics and Informatics section that in many research organizations serves as a general resource for the research community. Also, it would be useful to know whether there are ties to graduate programs outside the division and to have more information concerning the graduate and post-graduate training and education activities of the division.

### **3.3 Diabetes, Metabolism and Endocrinology**

**Summary:** The scientists in this Division produce work of excellent quality, and the work is internationally well recognized. The questions addressed in this area are central for our understanding of the pathophysiology of the epidemic of obesity and diabetes and are therefore extraor-

dinary relevant for the society. There appears to be a fruitful interaction with other groups in the faculty interested in diabetes and it is stated that it is intended to enhance this interaction further with the aim to optimize possibilities for translational research.

**Quality:** On average very *good* to *excellent*. Many publications appear in highly regarded international journals, and all PIs have high citation rates. The high quality research is backed up by reasonable extramural funding, to almost all PIs in the group. The average support is less than that of some other groups in the Department.

**Productivity:** The group consistently publishes papers of high quality and impact and has kept up a good rate of publication over many years.

**Relevance:** This is *excellent* to *outstanding*. Obesity and diabetes are currently very important diseases in the society and it is very relevant that this area has attention. The areas studied by the groups are central for our understanding of the pathophysiology of these conditions.

**Vitality and Organisational Capacity:** Judged as *good*. All PIs appear to have vital programs with good publication rates. There are indications that interaction with our groups interested in diabetes are strong and that it is actively considered to enhance this interaction, which will provide an excellent platform for synergism and translational research. The age distribution suggests that the unit will remain viable although retirements in the near future must require attention. The division has a very high percentage of female researchers. It might have been interesting to penetrate into the background for this.

### 3.4 Vascular and Airway Research

#### *Airways*

**Summary:** Airway Research is conducted and led by PIs, one of whom is also Head of Department (HoD) of Experimental Medicine Science. Both PIs have researcher status. The generated budget between them is 54.3% of their particular division. The overall divisional research strategy is translational and focuses on mechanistic aspects of tissue remodelling and repair processes. As such there are potential trends that could link into other Divisions. For example, the Immunology Division, specifically the grouping of Stem Cell Ageing which is likely to have aspects of

research that could be exploited in determining differentiation and fate of fibrocytes and other immune effector cells. It is difficult to ascertain what interactions exist between these 2 groups or whether there are plans in place to address a more global approach to Regenerative Medicine and Tissue Engineering. This move would create critical mass, bringing together relatively young scientists who have already made a mark in their own niche whether locally or whilst in other Institutions; and collectively have the potential to produce and establish outstanding international acclaim in this fast advancing discipline at Lund in the future. The two PIs appear to have individual research focus with good international collaborations with peer scientists and industry.

**Quality:** At the moment the overall impression in terms of international comparability and innovation is *very good*, but with strong potential *towards very good to excellent*, as each PI's portfolio matures. To achieve this, there is a need for them to show a more uniformed research strategy towards lung disease in their programme. Specifically, they need to show a more coherent approach in their research programme of tissue remodelling and repair; both would mutually benefit from creating valuable interactions with other groups within their University milieu in the immediate future. Strictly speaking, the research particularly that of GWT is not just limited to the airway as is seen by some of the publications; there is evidence of an interest in lung fibrogenesis and associated interstitial lung diseases; hence the group's name is a misnomer. It is advised that perhaps name of Division is changed to encompass actual research activity and direction. Furthermore, in view of the obvious interest in fibrogenesis, there is a potential in strong links with the vascular group and the Cell & Matrix Biology Division.

**Productivity:** Overall *good*. In terms of the budget allocation (54.3% of their division and as a Division are the 2nd highest income generators in the Department, though comparatively smaller by a long margin from Neuroscience), one would have expected more and better publications and wider data dissemination e.g. the majority of publications are in respiratory journals; which whilst being excellent in the field, should be balanced with top flight translational research journals with a broader audience. From the recently circulated paperwork, there was a nil return from one of the PIs. However on accessing PubMed there is the promise of some good recent publications but not yet reaching excellent status. A higher return might have been expected, but this should be seen in

relation to one of the PIs being HoD which might impact on productivity, particularly as some excellent publications were made 4–5 years ago. Furthermore, judging by the recent papers, it would appear that the research may have suffered a lapse in focus. A possible factor in the paucity of apparent publications could also be the commercial interaction, which may bind emerging data in IP and patent filings etc.

**Relevance:** In terms of relevance to lung disease and associated morbidity and mortality of chronic airways diseases and pulmonary fibrosis, the research focus on tissue remodelling and repair is very important and opportune. Despite this one would judge the status of the PIs at the moment to be *good to very good* as there is no objective evidence that their recent research data has made a significant impact within the international science and clinical community. In addition, whilst their resume suggests that their research opens avenues for potential targets, there are no research publications to date showing attempts at therapeutic modulation of key molecules or regulatory pathways to stop/reverse tissue remodelling. There is much room for critical improvement to lift their research programme to a future excellent status; the potential is clearly there but this requires a targeted strategy and stronger interaction between the 2 PIs and with other groups in the first instance.

**Vitality and Organisational Capacity:** In view of the comments already made, this is judged at the moment to be *good* but with a potential to achieve at least excellent status in future. This is a major area of concern as it also appears that lung research is directed by just 2 PIs with researcher status, whom are not 100% permanently employed, yet they appear to have relatively significant income generation.

### *Vascular*

**Summary:** The research is conducted by 4 researchers (two of which have professor status and two have researcher status) with PI status. Three of them make vascular (smooth muscle and endothelial cell) physiology and one makes vascular wall biology as it relates to atherosclerosis. Between them they generate about half of the divisions grant money and the division. There are strong interactions between the three researchers making vascular physiology but there appears to be little interaction between this group and the PI which makes vascular wall biology. There is a recent focus on the role of the extracellular matrix for modeling of the vascular wall and it would be of interest to know whether there is interaction

with the other groups in the Department which are also interested in extracellular matrix biology although it may not necessarily be a fruitful interaction.

**Quality:** The quality of the research is *very good to excellent* in comparison with other groups in the same area, although there is quite some variability between the individuals with respect to the quality of the output. There are publications in the best vascular journals although no publications in the top general journals have been produced. Since the grant money for the three researchers making vascular physiology is pooled it is difficult to assess the ability of the individuals to generate money. It would be relevant to obtain more information on the research educational activity in the unit e.g. how many doctoral students are part of the group.

**Productivity:** In terms of productivity all four PIs are publishing although for one of the PIs the publications are in journals of limited impact.

**Relevance:** Vascular diseases is a major burden for society in terms of morbidity and socioeconomical impact. The general theme of the group is therefore of substantial importance. It is difficult from the “description of future promising research areas” to see in which direction the group is orienting themselves and which type of interaction they foresee.

**Vitality and Organizational Capacity:** It is now time to consider under which conditions the vascular group should continue given that the senior PI is 63 years. It is important to ensure stable conditions for the young and productive members of the group and also to consider whether the PI doing vessel wall biology has the critical mass to perform at an optimal level or whether conditions for her could be improved. It is relevant that a productive PI and his group moved one year ago. It should be considered whether it is important to replace him.

### 3.5 Immunology

**Summary:** The Division of Immunology appears to be a relatively moderately sized grouping with the third largest collective budget within the Department of Experimental Medical Science. The overall research focus is on immune response regulation and relationship to disease pathogenesis, which according to Form 2 is described as being in autoim-

immune/inflammatory diseases (MS, SLE and RA) and cancer. However recent publications appear to relate to the gut, haematopoietic progenitor cell differentiation and like studies; there are no apparent translational or clinical papers in these disease areas. It was not possible to penetrate more into this at the site visit. There are 6 PIs listed, with the majority of income support for 1 of the professors (WA) and a recently appointed researcher; it is clear that these 2 comparatively young PIs are raising stars to an excellent international level with first class research. Recent changes appear to have been introduced in this Division, with a creation of the Centre for Immune Regulation under FI as PI. It is difficult to determine why this separate group has been formed and the motivation behind this step, but it appears to be related to the importance of young researchers to create their own groups to be competitive for the few permanent positions. One of the difficulties to gauge is how this Division inter-links with other relevant areas within the Department or are they isolated? For example, the group of Stem cell Ageing is extremely important; but it would also fit in well with other areas such as for example Vascular and Airway Research and possibly aspects of Cell and Matrix Biology. It may prove more opportune for the Department to strategically focus efforts on forming a critical mass interest in Regenerative Medicine, Cellular Engineering and Matrix biology. Despite this, some of the PIs have established some excellent collaborations with external premier Institutions; there appear to be circulated publications for Reproductive Immunology, but it is not possible to see where it's PI fits in or the budget and how this research activity fits in with the rest of the Division.

**Quality:** *Very good to excellent*; indeed some areas may even be considered to be Outstanding with data dissemination in highly acclaimed top-of-the-league international journals; although it needs to be pointed out that publications for Stem Cell Ageing appear to be ones possibly masterminded from Stanford University, and indeed the work may not have been performed in Lund.

**Productivity:** Sadly this varies from *poor to excellent* across the PIs. First class activity in Mucosal Immunology, clearly reflecting the international status and niche expertise of the PI. This contrasts markedly with the poor return of Immune Regulation, which does not appear to have any papers for past 2–3 years, yet has been singled out as a separate Centre. Again it is difficult to know whether the returns for the Stem Cell Ageing PI have been performed in Lund or in another Institution.

**Relevance:** *Good to very good.* Albeit that recent years have seen a huge growth in –omics and molecular biology research, immune effector cell interactions and regulation remain a hugely important area relevant to disease pathogenesis, opening up new avenues for therapeutic targeting. However, as stated above, the translational aspects of the current research programme are not immediately visible. Mucosal Immunity could also link into certain aspects of lung cell biology. There is a huge future opportunity with the Stem Cell Aging group, but it is vital that links are made to other divisions with like interests.

**Vitality and Organisational Capacity:** *Very good* in terms of some bright young PIs with strong budgets giving this Division a good prognosis for the future; but as outlined in the summary above there are outstanding questions to answer in terms of overall structure and how this translates to the individual PIs and as a whole. This makes it difficult to truly evaluate their ability to manage project activity within this particular division.

### 3.6 Neuroscience

**Summary:** In summary, this is an *excellent* unit with two foci of interest in neurophysiology of sensory motor systems and neurodegenerative disorders. Given the relatively-small size of the unit, the strategy to focus research on these topics seems appropriate. Our judgment of excellence in neuroscience is based on outstanding publications of some of the PIs and on plentiful funding from competitive grants. Still, attention should be paid to recruitment of new, young PIs who will be able to build strong, independent research programs with international impact and independent funding, and whose programs would bridge between the two existing foci of neurophysiology and analysis of neurodegenerative disorders.

**Quality:** The Neuroscience Unit at Lund University is of *excellent* quality. It is composed of two centres of excellence with high quality levels. The Neurofortis and Bagadilico Consortia are of *outstanding* quality and composed in part of world leader in the field of neurodegenerative disorders. The results obtained in term of modelling neurodegenerative disorders, understanding the pathophysiology and developing new neurorestorative strategies is of utmost quality. The second Centre of Excellence composing the neuroscience unit is the Neuronano Research Centre which



conducts neurophysiological research and is involved in development of small size new tools for neurophysiology. This subgroup produces very high-quality, internationally-recognized research in the areas of spinal cord function and cerebellar function and learning, but is somewhat uneven in terms of the accomplishments of different members. Several of the Neuronano investigators have excellent international reputations that are deserved, while a number seem to be lagging in terms of international recognition. The methodological developments of Neuronano are of high quality and should be used more widely especially by the other Centre of Excellence in the Neuroscience Unit.

**Productivity:** The productivity of the Neuroscience Unit taken as a whole is *excellent* in term of both quality and quantity. Yet, the overall analysis masks the fact that some PIs have an outstanding productivity whereas others have only a very good or good productivity. This distinction is not a matter of age of the PIs as both young and more aged PIs have an outstanding productivity. It is rather a matter of individual accomplishments of the researcher. In particular, the productivity of the Neuronano Research Centre is very uneven and the group's publication stream is dominated by a small fraction of the investigators.

**Relevance:** The research topic developed by the Neuroscience Unit is highly relevant in term of clinical, social and socio-economic aspects. Indeed, it deals with a major issue of our industrialize countries namely neurodegenerative disorders. The unit tries to better understand the pathophysiology of neurodegenerative disorders including Parkinson's and Huntington's disease and to develop therapeutic strategies for neurorestoration. Such strategies are directly tested by some of the applicants and have provided new therapeutical strategies. The Neuronano unit concerns itself with the relationship between cellular/molecular mechanisms and behavioural function and is therefore highly relevant to developing an understanding of the relationship between molecular-based neurological disease and the symptoms of disease. Furthermore, in term of methodological development, the study of new types of implantable arrays of ultrathin electrodes telemetrically connected for electrophysiological analysis is potentially of high impact. Thus, the Neuroscience Unit as a whole must be strongly supported by Lund University both in term of new positions and funding.

**Vitality and organisational capacity:** The vitality of the Department of Neuroscience is of *excellent* quality as attested by the fact that this department has been able to attract young neuroscientists from other countries as PIs in the centres of excellence. One troublesome point is that only half of the investigators in Neuronano seem to have grant support, raising questions about the true independence of some of the scientists listed as members. Further, some of the PIs will retire during the next ten years and it is of utmost importance that their position is retained within the department. This represents a unique opportunity to reorganize and strengthen the department. In particular, the interaction between the two Centres of Excellence is not obvious and the new recruitments should bridge the gap between methodological development and electrophysiological studies on one hand and the study of neurodegenerative disorders on the other hand. In particular, the Unit of Neuroscience may benefit from the integration of groups involved in the pathophysiology of neurodegenerative disorders and those capable of physiological and electrophysiological studies. There also may be some synergies in development of interactions with quantitative disciplines such as physics or computer science and with more traditional psychology, all of which recently have begun to interact seriously with basic and translational neuroscience research in other countries.

### 3.7 Developmental Biology

**Summary:** This is a very small Division, with just two PIs. Both use *Drosophila* as a model for examining development, extracellular matrix and regulation of the cytoskeleton with relevance to cell polarity. The output used to be good but has dropped over recent years. The publications are routinely in internationally recognized peer-reviewed journals. The group has external funding, though perhaps less on average than others in the Department. The major concerns are whether the group has critical mass. It is difficult to see connections with related science in other Divisions and interaction. Clearly this area would require considerable internal funding if Developmental Biology is to be expanded.

**Quality:** The groups have published in high quality journals, and have an international reputation for their work. Extramural funding is current, although at a level below the mean for other Divisions in the Department.

**Productivity:** There has been a declining level of publication in the recent past.

**Relevance:** *Very good.* It has been shown many times that research into model systems, including invertebrate, can have impact on understanding the molecular regulation of development and disease in the human. Therefore, while indirect, this research can be relevant to human health.

**Vitality and Organisational Capacity:** *Poor.* There is concern that this Division does not enjoy a critical mass for optimal progress. While there is some scientific overlap with work in the Divisions of Cell and Matrix Biology, and Vascular/Airway, in the area of matrix biology, there seems to be little collaboration. It should be assessed whether the Divisions are geographically separate or can share core facilities with related research activities. Given that there will be retirements in related fields within the Department, this may be the opportunity to rationalise the organisation.

#### 4. COLLABORATION

The department is very large, with around 200 members, and this has arisen through reorganisation in 2005 that included amalgamations. From discussions and publications it is clear that there is evidence of a good level of collaboration between research groups from within the Department, and across Departments although a detailed analysis of this was not possible with the time given for this evaluation. Some have included members of clinical departments, and together with a clear commitment to bring medically qualified investigators into PhD programmes, a foundation is present for future and further collaborations that include translational aspects of biomedical research. The excellent BMC in Lund therefore has the potential to be a significant focus of research that spans the basic and clinical disciplines, and could develop into a major strength of the University. This can be enhanced by clinical appointments where research interests can be housed in the BMC where collaborations with members of the Experimental Medicine Department can be fostered. This might also be enhanced by the Faculty promoting joint PhD programmes, where students have mentors drawn from clinical and preclinical departments. This type of future investment by the University, is of relatively low cost, yet may yield high returns in the form of further funding opportunities.

## 5. RESEARCH ACTIVITY AND TEACHING

It appears that most members of the department take part in the undergraduate and graduate teaching, which means that the teaching is research based. We have not spoken with sufficient number of researchers or received sufficient material about this issue to know to what extent the teaching is impacting in negative or positive ways on the research.

## 6. EVALUATION OF FUTURE PLANS

In the documentation provided, rather limited information on future plans was described. This is perhaps consistent with the documentation being provided by the Head of Department, yet policy generated at the level of the Dean. However, there is a need to continue the development of technology platforms, and this was strongly endorsed in discussions through the site visit. The published document “The Future of the Faculty of Medicine: strategic plan 2007–2011”, describes with a general plan for development, but again the section entitled “Research Strategies” emphasises collaborative, and integrative approaches, but defers prioritisation to the Faculty’s Strategic Advisory Board. A slightly different emphasis is encompassed in a second document “The Way Forward: Staff Strategy for the Faculty of Medicine 2007–2012”, where specific foci of strength are identified. Some are clearly within the remit of the Department of Experimental Medicine and include neuroscience research, immunology, musculoskeletal disorders, diabetes and stem cell research. It is then clear and appropriate that support should be provided to areas of strength. From discussions with Faculty leadership, a second strand is to support successful researchers whatever the specialty. However, the nature of support, other than infrastructure is not so clear, and it is apparent that close interaction between the faculty and the Dean and his Advisory Board must be maintained in order that promising research is fostered and supported. Here a role for the Head of Department could be strengthened.

Within the Faculty and the University, there are clear goals of increasing internationalisation. However, perhaps understandable in view of limited available funds, the approach of the Faculty of Medicine is to emphasise the recruitment of overseas postdoctoral researchers, rather than recruitment into faculty positions. Undoubtedly universities are enriched by the infusion of new blood, and the BMC provides a stimulating environment

for young researchers. Successful young international researchers can then be fostered for the future. However, to be fully maximised, the University of Lund website, and recruitment calls must be easily accessed in English in addition to Swedish.

## **7. FUTURE POTENTIALS AND POSSIBILITIES**

Research into life sciences of the sort made in the department is in high demand currently and has substantial potential. It is the impression that there are substantial possibilities for the department to take part in this development. In particular it seems relevant that there is a good mix of senior people and young skilled scientists, which are highly competitive. The very competitive atmosphere is documented by many apparently highly qualified applicants for recent new research positions (this needs documentation). In the current financial situation (a substantial deficit) it is our view that by far the best option is to provide good opportunities for young people rather than spending big sums in an attempt to recruit top international scientist, whose recruitment may be difficult to maintain in Lund, even if successful. This view is reinforced by the limited success for the Faculty with this approach in the recent history and by the situation that the most successful group in the department is based on local talent. The success of neurophysiology has ensured an influx of very good people from abroad and thus documented the potential value of the more conservative approach. This does not mean that there should not be efforts made to recruit international scientists and to this end it is a surprise that apparently the recent call for new research positions is posted in Swedish only. There is a concern that none of the professors retiring from the department in the coming years will be replaced. This is a concern we share, because it would be damaging to the potential of the department with longlasting consequences.

## **8. GENDER AND EQUAL OPPORTUNITY ISSUES**

The proportion of females at the research fellow level and the Ph.D. student level is about 65% which is very good – even to the extent where one should consider why males are outnumbered and whether this is important. At the senior lectures level 35% are females and at the professor level only 16% and there has been little change in these figures over

the last 4 years. It could be hoped that the figures for the senior positions will improve in the coming years with the high proportion of females at the younger level. However we fear that the barely visible career tract with doctoral status at an average age of 31 years and a permanent position only at 40–45 years of age may impact negatively on this.

We see the dramatic shift in gender balance at higher levels of seniority as related to the slow and uncertain process of advancement to independence in the system at the University of Lund. In this regard, we have two overall recommendations to correct this situation. One is that the University make it a priority to enable independence of highly qualified individuals at a young age (early 30's) and support this priority with central funding and incentives that make positions both attractive and viable. The second is that the University creates, monitors, and rewards an effort for mentoring young investigators. In many top institutions, it is now common to create a mentoring committee for a starting investigator and to mandate that this committee meet with the investigator semi-annually, going over strategy and detail, helping in the generation of requests for funding, and keeping close track of research and career progress. Given the institutional mandate for international reputation, it might be valuable to include recognized international authorities on the mentoring committee of starting investigators.

# PANEL 10 – MEDICINE | LABORATORY

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## 1. OVERALL ASSESSMENT

The research activity at the Departments of Laboratory Medicine in Lund and in Malmö and at the Lund Stem cell Center holds on average a high standard but with substantial variations between different Departments. The Stem Cell Center Lund has been a very successful concept. During the past five years the Center has developed into an internationally recognized unit that is steadily producing groundbreaking scientific reports. The Stem Cell Center is also an ample demonstration of how synergistic advantages can be achieved by gathering enthusiastic scientist around a common theme in a translational setting.

The number of publications trends to dominate over the quality. This is a general phenomenon in Scandinavian countries. It is partially caused by the relatively short of external financing terms that compels researcher to produce papers in order to ensure funding for the next period. The PhD training programs, in which the candidate is expected to generate publications within a limited time, also favours many small papers.

## 2. DEPARTMENT OF LABORATORY MEDICINE LUND

### 2.1 Overall research infrastructure

The Department includes eight Divisions of Clinical Chemistry and Pharmacology, Clinical Genetics, Hematology and Transfusion Medicine, Molecular Medicine and Gene Therapy, Medical Microbiology, Microbiology, Immunology and Glycobiology, Occupational and Environmental Medicine and Psychiatric Epidemiology. It is unusual to find Divisions like Occupational and Environmental Medicine and Psychiatric Epidemiology included in the Department of Laboratory Medicine. On the other

hand Pathology does not belong to the Laboratory Medicine in Lund while the Division of Pathology in Malmö is included. The reason for this inconformity is not discernible from the provided material.

The Department lists a staff of 125 persons in 2007 including 18 professors (two females) three research fellows 20 researches and four senior lecturers (a reduction of five positions since 2003).

Taken together, the Department of Laboratory Medicine Lund has a very strong research tradition. There are several highly successful groups that consistently contribute to the cutting edge of their field of research. The age distribution of the PIs is, however, rather high with several retirements ahead during the next few years. The forthcoming recruitments of PIs will be critical for the continuous success of the research activity at the Department of Laboratory medicine in Lund The gender equality is still not on a satisfactory level.

Given that translational research is a strategic goal of the Faculty, it is interesting to notice that the proportion of the PhD student with a medical background has increased during the past five years from 37 to 52 percent. This change is, however, mainly caused by a reduced overall recruitment of PhD students in particular of those with a basic training in natural sciences. There is a gender imbalance among the newly registered PhD students with 78% women.

## **2.2 The Division of Clinical Chemistry and Pharmacology/Lund**

### *2.2.1 Overall assessment*

The Division is quite large and subdivided in several Sections (research groups), which appear to work quite independently even if some of them collaborate. Most groups mainly conduct basic medical research, but some of them have successfully translated their results into clinical diagnostics. Several groups are well consolidated and internationally renowned, some are of good national standard, while some relatively new groups are still establishing themselves.

### *2.2.2 Research infrastructure*

The infrastructure of the Division is rather confusing. The units in Malmö and Lund appear to be quite independent of each other, some



“Sections” being present only in one location while other ones with the same name (e.g., clinical chemistry) occur in “several copies”, defined by the research focus of the PI. It is not clear how the “Management Group” in Lund and the “Department Board” in Malmö collaborate and coordinate their activities within the Division.

### 2.2.3 Research quality

The overall level of expertise at the Department is very high especially in areas such as protein chemistry, protease and protease inhibitor research, and molecular biology including expression of recombinant proteins. Expertise in protein mass spectrometry is apparently obtained through collaboration with other University Departments. The quality of the research conducted in the groups varies; some groups are at the ultimate front line of their field. The groups are therefore commented on separately.

#### **Cystatins GFR**

This group led by Anders Grubb has performed outstanding basic research on urinary proteins and has translated the results into internationally accepted clinical methods for evaluation of kidney function.

Score: *Excellent*

#### **Lipid metabolism** (Peter Nilsson-Ehle)

The group performs research on several topics at a moderate rate.

Score: *Insufficient*

#### **“Pain, sens nerve”** (Edward Högestätt/Peter Zygmunt)

This group has produced some research of very high quality but at a moderate pace

Score: *Good*

#### **Cystatins and cancer** (Dr. Magnus Abrahamson.)

This group produces results of high quality at a fairly steady pace.

Score: *Good*

#### **Urogenital pharmacology** (Karl-Erik Andersson/Petter Hedlund)

This is a very active group producing exciting results of clinical relevance.

Score: *Excellent*

### *2.2.4 Collaboration*

Collaborate between groups is variable, but many groups are extensively networked both on a national and international level. They also pursue successful collaboration with clinicians in the faculty. The expertise within the University and in other Divisions is apparently utilized.

### *2.2.5 Research activity and teaching*

The average research activity is high. The trend has been fairly constant during the last five years. The training of PhD students appears to be well organized.

### *2.2.6 Evaluation of future plans*

Information on future plans is available for a few top groups only. The plans presented are challenging but realistic.

### *2.2.7 Future potentials and possibilities*

Several group leaders are of international top class and some relatively new PIs are very promising. The PIs of several groups are approaching their retirement meaning that new PIs have to be recruited of during the next years. Some groups have successfully translation their research findings into clinical diagnostics while other ones and could probably utilize their findings more efficiently. A closer coordination of the activities in Lund and Malmö and between the different groups on each site should be encouraged.

## **2.3 Division of Medical Microbiology, Lund**

### *2.3.1 Overall assessment*

The Departments of Laboratory Medicine in Lund and Malmö both contain teams having projects dealing with Immunology and Microbiology. However, in the documents provided it is not clear how the different teams interact with each other. Their interaction with hospital Departments of infectious diseases on each site also remains unclear. Therefore, separate evaluation will be done for each team. On both sites, outstanding and excellent teams are present.

### **The FENYÖ group**

Research on pathogenesis of human and simian immunodeficiency viruses: biological and antigenic variation. Research interest focused on

phenotypic differences of HIV•1, HIV•2 and SIV isolates sequentially collected from adults or children and from SIV• infected monkeys undergoing progressive disease. The aim is to learn about pathogenic mechanisms in HIV infection and in the SIV model in order to help design therapeutic and preventive measures. During the past five years 25 papers in journals of good standard. This team has ongoing international collaboration. Fenyö has retired.

Score: *Very good*

#### **The Lennart Larsson group**

Investigations on microbial metabolomics: Studies specialized in developing mass spectrometry-based analytical techniques for determining microbial monomeric structures and metabolites (chemical markers) in complex matrices. Focus on pathogenesis and diagnosis of infections, toxin analysis, asthma/allergy, and microbial structure/bioactivity relationships. The activity is good with some 29 papers during the past five years in journals good standard. This team is actively involved in international collaborations. Plans for the future cannot be evaluated from the material provided.

Score: *Good*

#### **The Claes Schalen/Aftab Jasir group**

Investigations on the epidemiology of group A streptococcal infections (clinical microbiology). Coordination of a major four-year EU project ("Strep-EURO") focused on the epidemiology of severe group A streptococcal infections. A matter of concern in the diffuse focus of the research projects. It seems that there is no collaboration with the outstanding team of G. Lindahl (see later) that is doing research on similar topics on Group A streptococci. The scientific output of the groups has been very modest. This team is coordinator of a major four-year EU project ("Strep-EURO"). Plans for the future cannot be evaluated from the material provided. Schalen is approaching his retirement.

Score: *Insufficient*

#### **The Gunnar Lindahl group**

Molecular analysis of host-pathogen interactions in bacterial infections with special emphasis on the molecular mechanisms by which pathogenic streptococci cause disease. The question of how streptococci evade host immunity is also being addressed. Since 2003, thirteen articles published in highly prestigious journals like Nature, J Exp Med, Cell

Host Microbes, PloS Pathogens, Mol Microbiol, Infect Immun, Vaccine. The plans for the future are difficult to evaluate from the documents provided. Lindahl has recently retired from his professorship but is still actively doing research. The Faculty is facing a challenge in finding a successor of corresponding capacity.

Score: *Excellent–Outstanding*

#### **Torkel Wadstöm group**

Studies on *Helicobacter pylori* and their association with chronic liver diseases, inflammatory bowel disease diseases, pancreatitis and malignancies of the GI tract. Focus on pathogenesis and development of diagnostic tools for human and veterinary medicine. Since 2003, 40 papers in good journals of clinical microbiology. The plans for the future are difficult to evaluate from the documents provided. Wadström has retired.

Score: *Good*

#### **2.3.2 Evaluation and recommendations:**

It is somehow surprising to find that activities generated by already retired PIs are included in the material provided for evaluation. Although they are still active to various extents, the evaluation should be focused on the current situation. The impression remains, that the Division of Medical Microbiology is facing some restructuring with recruitments of new PIs. Main emphasis should be put on improved collaboration between the different groups involved in microbiological research in Lund and also with the corresponding groups in Malmö.

#### **2.4 Division of Microbiology, Immunology and Glycobiology**

The research activity of the Divisions Microbiology, Immunology and Glycobiology headed by Catharina Svanborg is focused on three main topics:

- A: Microbial pathogenesis and activation of mucosal inflammation with urinary tract infections as a comprehensive model. The host response to infections and the tissue pathology. The ultimate goal is to provide a molecular and genetic explanation for the susceptibility to mucosal infections and to offer more precise tools for their diagnosis and therapy.
- B: The innate immunity and resistance to mucosal infection
- C. HAMLET – a folding variant of human  $\alpha$ -lactalbumin that

selectively induces apoptosis in tumor cells. HAMLET has also been found to kill streptococci. This may turn out to be an important discovery that may lead to the development of new therapeutic modalities of cancer and infections. The group has carried out highly innovative research during the past years. Several discoveries have been groundbreaking in the field. This group has the vitality and originality required for continuous production of top-level science during the forthcoming years. Since 2003 36 published papers, many in the most prestigious journals.

Score: *Outstanding*

## **2.5 Division of Molecular Medicine and Gene Therapy**

### **2.5.1 Overall assessment**

The research at the Division of Molecular Medicine and Gene Therapy has high quality, is internationally competitive and has innovative power. The PIs are leading scientists in their field with international reputation. The scientific productivity by all research groups and principal investigators is high as documented by the number of original publications in the last 5–10 years. All research areas are relevant in terms of scientific, social and socioeconomic significance. The vitality and ability to manage research is convincing. Translational strength of the research is documented by the nature of the individual projects and the interactions with Lund Stem Cell Centre.

### **2.5.2 Research infrastructure**

The Division of Molecular Medicine and Gene Therapy, Department of Laboratory Medicine, Lund is a relatively small research laboratory with 24 researchers including one professor, 12 postdocs, 7 PhD and graduate students and 4 other personnel. The technology applied at Division of Molecular Medicine and Gene Therapy is up-to-date, advanced and high through put including virus vector gene transfer, gene microarray and genetic screening methodology among others.

### **2.5.3 Research quality**

The head of Division of Molecular Medicine and Gene Therapy, Stefan Karlsson is internationally recognized and famous for his scientific discoveries and impact in the field of hematopoiesis and cell and gene therapy. His research is characterized by originality, high quality, productivity and

impact. Group leaders Jörg Cammenga, Jonas Larsson and Johan Richter are also innovative, competitive and internationally respected. Together their contributions have resulted in international recognition of Division of Molecular Medicine and Gene Therapy.

#### *2.5.4 Collaboration*

The Division of Molecular Medicine and Gene Therapy are strongly interacting with other research groups in the Department of Laboratory Medicine, Lund including the Lund Stem Cell Centre, Division of Clinical Genetics.

#### *2.5.5 Research activity*

The research activities at the Division of Molecular Medicine and Gene Therapy are focused on two main areas: the cellular and molecular mechanisms of hematopoiesis, and development of cell and gene therapies for patients with malignant or genetic blood disorders. The two research areas hematopoiesis and cell and gene therapy are well integrated and interlinked.

The hematopoiesis area covers several topics including hematopoietic stem cell self-renewal, Smad signaling, regulation by Hox proteins and stem cell expansion. In these projects the genetic control of hematopoietic stem cell proliferation, self-renewal, differentiation and commitment is investigated at the molecular and cellular level.

The cell and gene therapy area covers various genetic diseases that disturb normal function of blood cells and malignant disorders of the blood, bone marrow and lymphnodes. These diseases would be strong candidates for stem cell gene therapy. Examples are Gaucher disease, Diamond-Blackfan anemia, osteopetrosis and various immune defects as well as leukemias and lymphomas. In these projects the long-term goal is to develop hematopoietic stem cell expansion for cell and gene therapy.

#### *2.5.6 Evaluation of future plans*

No detailed planning provided in the material.

#### *2.5.7 Future potentials and possibilities*

The Division of Molecular Medicine and Gene Therapy has an optimal size of a research centre with >10 researchers with one PI. This meets the criteria of critical mass for competitive research at an international level.

The research profile of has good focus and clear purpose. The methodological approaches are characterized by novel and state-of-the-art technologies for high-through-put research. The research organization is clear with 1 principal investigator and 3 group leaders. The two main areas of research: cellular and molecular mechanism of hematopoiesis and development of cell and gene therapies for patients with malignant or genetic blood disorders are well integrated and connected. The interaction with researchers in other Departments and Institutions at Lund University in particular Lund Stem Cell Centre is optimal.

### **2.5.8 Recommendation**

The Division of Molecular Medicine and Gene Therapy should keep its organization develop the projects and continue its fruitful research activities and collaborations at Lund University.

Score: *Outstanding*

## **2.6 Division of Occupational and Environmental Medicine (OEM)**

### **2.6.1 Organization**

Occupational and Environmental Medicine includes one clinical unit (Department of Occupational and Environmental Medicine) at the University Hospital in Lund and a research unit (Division of Occupational and Environmental Medicine within the Department of Laboratory Medicine/Lund) in the Medical Faculty at Lund University. The clinical and research activities are claimed to be well integrated. The entire Department of Occupational and Environmental Medicine has a total staff of approximately 75 persons in 2008. These include approximately 35 professors, physicians and researchers, 10 research students and 30 other personnel working in 5 defined research groups according to the home page of Occupational and Environmental Medicine. The Division of Occupational and Environmental Medicine, Department of Laboratory Medicine, Lund are a medium-size research department.

The entire Department is divided in 6 clinical sections: Airway disorders, Ergonomics, Epidemiology and environmental medicine, Occupational and environmental hygiene, Environmental analytical chemistry and Behavioural medicine. A section chief, who is also principal investigator

for the corresponding research section with the exception of Occupational and environmental hygiene, directs the sections. A Chief physician and a Professor direct the Department.

### *2.6.2 Research activities*

The research activities at the Division of Occupational and Environmental Medicine, Department of Laboratory Medicine, Lund, are related to 5 main programs: Cancer, genotoxicity and impairment of reproductive health by environmental agents; Respiratory disease caused by environmental factors; Health effects of metals; Work-related musculoskeletal disease; Behavioural medicine.

The Cancer, genotoxicity and reproduction program is run by the Section of Epidemiology and Environmental Medicine and has focus on the environmental agents for the emergence of malignant neoplasms and for negative effects on reproductive health. Epidemiological techniques are used in combination with biomarkers for internal dose, early biological effects, and genetic susceptibility. Three areas are investigated: the dietary source for persistent organohalogen compounds, such as e.g. PCB and dioxins, in fatty fish from the Baltic Sea; association between occupational exposure to mineral dust and colorectal cancer; impact of clonal chromosomal aberrations in tumor cells and environmental risk factors on the emergence of myelodysplastic syndromes, acute myeloid leukemia and other forms of leukaemia.

The area of Respiratory diseases is investigated by the Section of Airway Disorders and has focus on human health implications of air pollution and chemical residues in the environment. Among pollutants studied are organohalogen compounds, phthalates, pesticides, and heavy metals as well as nanoparticles. The pollutant exposure is quantified by mass spectrometry, and biomarkers of effect are determined. Genetic susceptibility is analysed. Health effects are determined in experimental settings, medical examinations at workplaces or by epidemiological surveys and register studies. The results have led to recommendations for regulatory purposes, i.e. occupational exposure limits, and dietary recommendations from the Swedish National Food Administration.

The area of Health and metals is investigated by the Section on Environmental analytical chemistry and has focus on the environmental exposure to metals (mainly lead, mercury, cadmium, platinum, palladium and



rhodium) Analysis of blood from children (yearly sampling) and adults (biobank samples and continuous sampling) is performed and compared to, emissions from industry and traffic, and fish intake.

Research on work-related musculoskeletal area is performed in the Section on Ergonomics with focus on the physical and mental workload. The physical and mental exposure and effect are quantified by various methods like wrist flexion velocity and salivary cortisol. Data on physical workload as well as prevalence of musculoskeletal disorders among workers have been collected from about 50 different work settings. Epidemiological and experimental studies have contributed with empirically based development of theoretical models on Idiopathic Environmental Intolerance. Longitudinal studies of working populations, as well as of cases with work stress related disorders, are ongoing to reveal the course of, and risk factors for long-term effects of work related stress.

Behavioural medicine is investigated in the Section on Behavioural Medicine with focus on stress factors and their psychological and biological effects within a broad range of branches and work sites. Examples are night working persons in hospitals and industry, subjects with idiopathic environmental illness such as subjective sensitivity to electric equipment or smells, and persons with stress and exhaustion reactions. Stress is interpreted in terms of cognitive activation theory of stress, transactional models and the accumulation of previous and present load. The interaction between physical and psychosocial work environment is studied using self-reported stress factors and health, and biological outcome measures, such as activation of nervous and endocrine systems.

### **2.6.3 Researchers**

The research is led by 4 PIs including Maria Albin (Epidemiology and environmental medicine,) Bo Jönsson (Airway disorders), Staffan Skjerfving (Environmental analytical chemistry and Ergonomics) and Björn Karlsson (Behavioural medicine). These 4 principal investigators are in general characterized by originality, high quality, productivity and impact in their research. They are innovative, competitive and internationally respected.

### **2.6.4 Interactions with other research groups at Lund University**

The Division of Occupational and Environmental Medicine, Department of Laboratory Medicine, Lund has several inter-department interactions within Lund University driven firstly by research needs and common

interests in scientific or educational issues. To exemplify, the newly formed FAS (The Swedish Council for Working Life and Social Research) and Centre of Excellence METALUND brings together researchers from the division and the Department of Aerosol Technology and Ergonomics.

### *2.6.5 Technologies*

The Division of Occupational and Environmental Medicine has a well-equipped laboratory with broad mass spectrometry equipment and PCR. The division has developed advanced technology for work place investigations with equipment to measure physical workloads. Other strengths are the closeness to the health/hospital system and access to the unique Swedish disease registries (causes of deaths, births, tumors, and in- and out-patients), and to large bio-banks.

### *2.6.6. Evaluation*

The research at the Division of Occupational and Environmental Medicine has high quality, is internationally competitive and has innovative power. In general, the principal investigators are leading scientists in their field with varying international reputation. The scientific productivity by all research groups and principal investigators is generally high as documented by the number of original publications in the last 5–10 years. All research areas are relevant in terms of scientific, social and socioeconomic significance. The research projects have actuality. The vitality and ability to manage research is difficult to evaluate from the material. Translational strength of the research is documented by the nature of the individual projects and the interactions with other departments at Lund University.

### *2.6.7 Criticism*

Research groups of the Division of Occupational and Environmental Medicine include 3 groups with >10 researchers and 2 smaller groups with 4–7 researchers in each group. On an international level the smaller groups do not have the critical mass for competitive, high performance and cutting edge research.

The research profile of the 2 small groups is thin with narrow focus and purpose. The methodological approaches are characterized by traditional methods, small-scale analysis and limited equipment. There is no capacity for the single group to implement and develop new demanding technologies of large scale.

The organization of the 5 research groups in the Division of Occupational and Environmental Medicine is not clear. On the home page the number of researchers listed in each research program is equal to the number of academic personnel in the corresponding clinical section of the Department. However, there is no information on the actual working hours allocated to research versus clinical and medical work. Accordingly, it is difficult to evaluate the actual personnel and working hours in research.

The productivity of the PIs of the 5 research groups varies from relatively high (60 publications in scientific journals per 10 years) to very low (10 publications in scientific journals per 10 years). The highest productivity is found in the 3 research programs on epidemiology and Environmental medicine, Airway disorders and Environmental analytical chemistry. In contrast, the 2 research programs on Ergonomics and behavioural medicine have very low productivity (10 publications in scientific journals per 10 years).

The 3 main research programs: Epidemiology and environmental medicine, Airway disorders and Environmental analytical chemistry are closely related. These programs are internationally highly respected and have impact on environmental research worldwide. They represent the core and prime research activity of the Division.

### ***2.6.8 Recommendations***

The Division of Occupational and Environmental Medicine should reform the organization in two ways. First, the integration and cooperation in the 3 main research programs should be optimized. This may be done by fusion of the 3 programs into one program on Epidemiology and environmental medicine with one PI and 2–4 group leaders on selected topics like cancer, respiratory diseases, reproduction and analytical research. This research program will attain sufficient size for competitive, high performance and cutting edge research.

The two small research programs on work-related Musculoskeletal and Behavioural disorders should be united into one program with one PI. The research activities in the two areas are similar in aim, approach and methods. They would benefit from the synergy in a larger research group with >10 researchers. Selected topics like physical and mental workload and stress factors and their psychological and biological effects should be directed by

2–3 group leaders. The united program would meet the criteria of critical mass for competitive, high performance and cutting edge research.

Two larger research programs in the Division of Occupational and Environmental Medicine would also increase the capacity to implement and further develop demanding technologies of large scale like mass spectrometry, spectroscopy and bioinformatics.

Increased interactions with other departments at Lund University in particular in relation to cancer, respiratory diseases and reproduction are encouraged. This would enable interaction between medical researchers with different expertise to come together and increase their collaborations.

### 2.6.9 Scoring:

Epidemiology and environmental Medicine:	<i>Excellent</i>
Airway disorders:	<i>Excellent</i>
Environmental analytical chemistry:	<i>Excellent</i>
Ergonomics:	<i>Insufficient</i>
Behavioural medicine:	<i>Insufficient</i>

## 2.7 Division of Psychiatric Epidemiology

### 2.7.1 Organization

The Division of Psychiatric Epidemiology, Department of Laboratory Medicine, Lund is the smallest of the six Divisions. According to the home page the division has a staff of 4 researchers in 2008 including one professor, who are principal investigator and 3 researchers at postdoc level and above.

According to the Evaluation material the Division of Psychiatric Epidemiology is a unique unit within the Department of Laboratory Medicine, based on a research group structure, with one central administrative unit at The University Hospital in Lund (-3 people on a daily basis), with clinical researchers in psychiatry at St. Lars Hospital in Lund (-6 researchers in total) and at The University Hospital in Malmö (2 researchers), plus the 20% contribution of an adjunct researcher from Astra Zenica in Mölndal. There is no information available on PhD students and other personnel working in the division.

### *2.7.2 Research activities*

The research activities in the Division of Psychiatric Epidemiology are focused on Psychiatric risk research: Risk factors for psychosis and their importance for treatment and prevention. The purpose of the research program is to investigate 1) what role selected early life factors (e.g. genetic influence, perinatal trauma, congenital malformation, early infection, maternal distress, etc) play in the etiology of different psychoses, 2) how such etiological factors influence the premorbid and adult characteristics of psychosis patients, 3) what factors provide protection against the development of psychosis in high-risk individuals/conditions, and 4) whether augmental anti-viral treatment of psychosis effectively improves mental health.

The studies have been conducted for the past 35 years including clinical, prospective, retrospective, and register-based research of the evidence of neuro-developmental deviation in psychosis and the multitude of genetic and early and later environmental factors that influence this development. The program uses "triangulation", with strategic overlapping of research questions, hypotheses and methods over eight major research projects, investigating genetic high-risk and normal risk cohorts, comprehensive urban psychosis samples, representative patient samples, large register based anonymous patient samples from four countries and patient samples given a new directed etiologically based treatment. Extensive international research collaboration and funding exists.

### *2.7.3 Researchers*

The report in the main document of the evaluation material lists the 2 most successful researchers in the Division of Psychiatric Epidemiology: Principal investigator, department Head Thomas McNeil and docent Elizabeth Cantor-Graae, which are well-known international class experts in their specialty areas (based on grants, invitations and awards). Thomas McNeil received the David Ingvar Prize in Clinical Neurosciences from the Swedish Läkarsällskapet 2005 and the adjunct clinical professorship in Perth 2007, in recognition of his work.

### *2.7.4 Interactions with other research groups at Lund University*

The Division of Psychiatric Epidemiology has active collaboration with image analysis researchers at the Technical school at Lund University in developing MRI analysis methods (brain and cranial analysis). Furthermore, the Division interacts with clinical researchers in psychiatry at St. Lars Hospital in Lund and at the University Hospital in Malmö.

### *2.7.5 Technologies*

The Division of Psychiatric Epidemiology has not applied specific technologies in their own laboratories, but is developing techniques like MRI analysis with other institutions.

### *2.7.6 Evaluation*

The research at the Division of Psychiatric Epidemiology has high quality, is internationally recognized and has innovative power. In general, the principal investigators are leading scientists in their field varying international reputation. The scientific productivity of the principal investigator and other researchers is moderate as documented by the number of original publications of 39 in the period of 1998–2007 by the principal investigator. All research areas are relevant in terms of scientific, social and socioeconomic significance. The research projects have actuality. The vitality and ability to manage research is well documented. Translational strength of the research is documented by the nature of the individual projects and the interactions with other departments at Lund University and elsewhere.

### *2.7.7 Criticism*

The Division of Psychiatric Epidemiology is small with 1 principal investigator and 3 researchers at post doc level. On an international level this group does not have the critical mass for competitive, high performance and cutting edge research.

The research profile of the Division is thin with narrow focus and purpose. The claim in the Evaluation material that “the program represents a multifaceted, integrated and partially unique approach to the study of the nature and importance of a range of early life influences in the development of schizophrenia and related psychoses” is not documented by the publications over the past 10 years. The publications are limited to four areas of epidemiological research on 1) cranial dysmorphology, 2) neurological abnormalities, 3) obstetric and perinatal complications, and 4) immigration and the risk for development of schizophrenia.

The methodological approaches are characterized by traditional epidemiological methods and small-scale analysis. There is no capacity for the small Division to implement and conduct epidemiological studies of large scale.

The research organization of the Division of Psychiatric Epidemiology is

not clear. First, it is not clear why the Division is part of The Department of Laboratory Medicine, Lund. It has nothing in common and no scientific relation with the other Divisions. Only the Division of Occupational and Environmental Medicine conducts epidemiology research. Second, the role of the clinical researchers at St. Lars Hospital, Lund and University Hospital in Malmö are not clear.

The four areas of research on 1) cranial dysmorphology, 2) neurological abnormalities, 3) obstetric and perinatal complications, and 4) immigration are not well connected and integrated.

### **2.7.8 Recommendation**

The Division of Psychiatric Epidemiology should reform the organization and merge with other psychiatry research groups at Lund University in order to increase synergy, interaction and collaboration in the field of psychiatry. The size of the research group should be increased from 4 researchers to >10 researchers with 1 principal investigator. This would meet the criteria of critical mass for competitive, high performance and cutting edge research.

The research profile should be evaluated and focus on the study of the nature and importance of neuro-developmental deviation in psychosis. Research topics could be genetic and early and later environmental factors that influence the development of schizophrenia and related psychoses. The research projects should be interconnected and carefully selected in order to increase synergy and interaction between researchers in the Division.

Score: *Very good*

## **3. DEPARTMENT OF LABORATORY MEDICINE MALMÖ**

### **3.1 Overall assessment**

The Department of Laboratory Medicine in Malmö gives an overall impression of a dynamic milieu well suited for translational research. The Department is strongly research oriented. This is reflected by the fact that 75 % of the total budget comes from external funding to different research projects.

The research at the Department of Laboratory Medicine, Malmö holds a high quality, is internationally competitive and has innovative power.

Many of the PIs are internationally recognized scientists in their field. Several of the PIs are in their most creative age. The scientific productivity by the PIs is high as documented by the number of original publications in the last 5–10 years. The research areas under investigation are relevant in terms of scientific, social and socioeconomic significance. The vitality and ability to manage research is difficult to evaluate from the material. Translational strength of the research is documented by the nature of some projects and the interactions with the Departments of Clinical Sciences at the Faculty. The double affiliation of the PIs both to the academic and to the hospital Microbiology Pathology and Clinical chemistry provides a good platform for pursuing translational research.

### **3.2 Research infrastructure**

The Department of Laboratory Medicine, Malmö is the smallest of the six departments that constitute the Medical Faculty at Lund University. The department has a total staff of 88 persons in 2007. These include 29 professors and researchers, 35 PhD students and 24 other personnel working in 12 defined research groups according to the Departmental report in the main document of the evaluation material.

A board that suggests a Chair, which is appointed by the Dean, directs the department. The department is characterized by a flat organisation, meaning that the individual research groups are directly organised under the Chair and lack a formal subdivision into distinct sections. This organisation is cost-beneficial and makes it easier for young scientists to start up their own research group within the department.

The Organization chart for the Laboratoriemedicin on the Malmö campus is divided into twelve (12) Divisions/Sections (D/S) while the information provided with detailed information lists fourteen (14) D/S. The list of PIs contains 19 scientists. It seems that the research groups have been formed over the years with no clear plan and purpose depending on the presence of successful and productive researchers. They originated probably in the 3 clinical laboratories: Biochemistry, Microbiology and Pathology at the Malmö Hospital and have now proliferated into 19 individual research groups.

The strategy for external funding adopted by the Swedish Research Council and the system of academic promotion excreted by the Faculty



may offer an explanation to the emergence of numerous small research groups in Malmö.

The newly opened CRC in Malmö provides an excellent environment for conducting successful translational research. The Department of Laboratory Medicine, Malmö has developed a “Tissue Micro-Array” centre that was initiated by Professor Göran Landberg with the support of the Swegene consortium. This unit is now run by associate professor Karin Jirstrom, who has established a close collaboration with the Human Protein consortium at Uppsala University and KTH in Stockholm.

Professor Joakim Dillner is a national and international authority in bio banking and has made a major effort in organising and making these materials easily accessible to all interested scientists

### **3.3 Research quality**

The report in the main document of the evaluation material lists the 4 most successful researchers in the Department of Laboratory Medicine, Malmö: Anna Blom working on inhibitors of human complement system; Björn Dahlbäck studying the regulation of blood coagulation and endothelial cell functions by the anticoagulant protein C and Gas6-Axl pathways as well as structure-function of a novel apolipoprotein ApoM; Joakim Dillner working on the importance of virus infections in the etiology of cancer; Göran Landberg studying multiple functions for cell cycle regulators and associated pathways in cancer as well as therapeutic targets for improved efficiency of endocrine treatments in breast cancer.

These four principal investigators are internationally recognized for their scientific discoveries and impact in their respective research areas. Their research is overall characterized by originality, high quality, productivity and impact. Their contributions have resulted in international recognition of the Department of Laboratory Medicine, Malmö.

In particular the Dahlbäck group is very well known and is worldwide regarded on of the leading groups in its field. The activity, which was extremely high ten years ago, has levelled out, but the group still produces research of *excellent* quality.

The other 15 PIs at Department of Laboratory Medicine, Malmö are characterized by originality, *very good* quality, productivity and impact in their research

### **3.4 Collaboration**

The Department of Laboratory Medicine, Malmö is steadily interacting with the Department of Clinical Sciences at Malmö University Hospital. There are plans to join the administrative offices to increase the effectiveness and reduce the costs for the administration. Apart from this the Department has no direct interaction with other departments.

The interaction with researchers in other departments and institutions at Lund University is claimed to be “numerous” in the main document of the evaluation material. However, there is no documentation or examples of these interactions.

### **3.5 Research activities**

The research activities at the Department of Laboratory Medicine, Malmö are primarily related to two main areas: cancer and infection/inflammation. A closer look at the research activities reveals that nine of the D/Ss are involved in what could be defined as general tumor biology/oncologic pathology. These include the D/S of Experimental Pathology (PI: Tommy Andersson), D/S of Tumor Biology (PI: Pirkko Härkönen), D/S of Pathology (PI: Göran Landberg), D/S of Molecular Medicine (PI: Sven Pählman) D/S of Tumor Cell Biology (PI: Christer Larsson), D/S of Molecular Tumor Biology (PI: Håkan Axelson), D/S of Experimental Clinical Chemistry (PI: Lars Rönstrand), D/S of Cell Pathology (PI: Anita Sjölander) and D/S of Experimental Cancer Research (PI: Jenny Liao Persson).

The cancer area covers a number of topics including tumour invasion and metastasis, Wnt and Notch signalling, specific inflammatory mediators, cell cycle regulation, growth factor receptor signalling, genes expression in tumor cells due to low oxygenation and/or reduced nutrient supply, importance of virus infections in the etiology of cancer, preventive HPV testing and HPV vaccination, and inflammatory conditions such as ulcerative colitis leading to cancer.

The infection/inflammation area has focus on the complement system, development of complement inhibitors, structure-function relationship of coagulation factor V, activated protein C, protein S, role of a novel apolipoprotein ApoM, regulation of blood coagulation and endothelial cell functions by the anticoagulant protein C and Gas6-Axl pathways, and Haemophilus influenzae and Moraxella catarrhalis affinity for soluble human IgD.

It is emphasized that there is no strict division between these two research areas: cancer and infection/inflammation since several scientists involved in infection/inflammation are also performing cancer research and scientist that are primarily working with cancer have published important papers in the area of inflammation. Furthermore, several scientists in the two fields have collaborated and published papers in both research areas. Finally, one research project relates to inflammation-induced cancer.

### **3.6 Criticism and evaluation of future plans**

The research groups of the Department of Laboratory Medicine, Malmö are small with one principal investigator surrounded by 1-3 post docs and 1-3 PhD students giving a total of 3-7 researchers in each group. On an international level these groups do not have the critical mass for competitive, high performance and cutting edge research. The research profile of some groups is thin with narrow focus and purpose. The methodological approaches are characterized by traditional methods, small-scale analysis and limited equipment. There is no capacity for the single group to implement and develop new demanding technologies of large scale. Many of the PIs do not have a medical background, which at its worst can restrain efficient clinical contacts that are a prerequisite for fruitful translational research.

The two main areas of research: cancer and infection/inflammation are not related apart from one project in the department studying the role of virus infections in the etiology of cancer. Another important project on the role of inflammation in malignant tumours for cancer cell growth and metastasis is not studied in the department. Presumably, the two research areas were initiated by successful and productive researchers in either field and have since remained the main focus.

### 3.7 Recommendations

The Department of Laboratory Medicine, Malmö should reform the organization and reduce the number of small independent research groups. In particular the nine groups /Sections listed above that all are investigating a common theme of general tumor biology could merge into a larger unit. The size of the research groups should be increased from 3–7 researchers in each group to >10 researchers with one principal investigator. This would meet the criteria of critical mass for competitive, high performance and cutting edge research.

The research profile each group should be broader and encompass several projects. The projects could be coordinated, and benefit from development of new methods. This would increase the capacity for each group to implement and develop new demanding technologies.

The material provided for evaluation does not contain any information on Molecular Pathology, an internationally rapidly evolving field. With only superficial insights into the research activities at the Department of Pathology in Lund, a close collaboration or even a unification of the academic Pathology in Malmö and Lund is strongly recommended. A special emphasis should be put in Molecular Pathology that not only is an expanding field of research but also provides core facility service to both basic and clinical research. The creation of a strong group of Molecular Pathology may, however, imply strategic new recruitments.

The two main areas of research: cancer and infection/inflammation should be separated and form two independent divisions within the Department of Medicine, Malmö. Alternatively, the research groups on infection/inflammation could be merged with other groups in the Laboratory of Medicine in Lund like Division of Medical Microbiology.

Increased interactions with other Departments at Lund University in particular in relation to cancer and infection/inflammation are encouraged. A good example of this occurs in the “Research School of Pharmaceutical Sciences” in which the Technical Faculty and the Faculties of Medicine and Natural Sciences join forces.

Score: *Very good – Excellent*

## 4. STEM CELL CENTER LUND

### 4.1 Overall assessment and infrastructure

The Stem Cell Center was initiated approximately 6 years ago. It was directed until recently by Prof Sten Eirik Jacobsen an established investigator in the field of hematopoietic stem cells. Since the departure of Prof Jacobsen, Dr. Henrik Semb was appointed as interim director. Prof. Semb is an established investigator in beta cell biology and differentiation of embryonic stem cells (ESC) to beta cells.

The Stem Cell Center is comprised of a number of well established basic researchers, a number of young promising scientists, and a smaller number of investigators in translational research with appointments both in the Faculty and the University Hospital, encompassing the fields of hematopoietic stem cells (HSC), hematopoietic and neural cancer stem cells (CSC), neural stem cells and neurobiology (NSC) and developmental biology. In addition, a program exists in functional genomics and computational biology, which also serves as a core facility to the larger University Community. Core facilities are also present within the Center for FACS, genetic mouse models and gene transfer are present. Among the faculty are 7 full professors, 8 researchers and 2 senior lecturers.

The Center has done extremely well during the first period of its existence, with

1. recruitment of a number of outstanding young investigators in the different subprograms, both by international searches and from within the own ranks
2. very significant external funding (50,600 MSEK in 2007) has been obtained, of which more than 42,000 MSEK in external grant funding. This includes funding as one of the 10 CoEs in Sweden and organization (?)/ and 5,000 MSEK from participation in European funding schemes; In addition the Center was awarded a Linne award
3. scientists within the Center have published cutting edge science in outstanding journals, 6 of which in journals with IF of >20 in a number of the programs; and a large number of papers in journals with IF>10
4. 54 PhD students are in training at the institute.

## 4.2 Review of the four main programs

divided based on publication records obtained, not according to the programs as described in the description of the Center.

### **Hematopoietic Stem Cell and Regulation, and Gene Transfer Program:**

The **hematopoietic stem cell program** has produced numerous publications in journals with IF>20. These publications represent very important contributions to the field of HSC biology. Somewhat concerning in view of the departure of one of the senior scientist is that the publication record of the more junior faculty members independent of their postdoc mentor, whether at the Center or abroad is relatively weak, and it is not obvious that the line of high quality, cutting edge science will be continued in the absence of the departed senior scientist. However, many of the junior faculty members have only been recruited recently, which may explain the relatively low number of independent publications. In addition, it appears customary that the mentor is included on papers in the Swedish system. It will, however, be important that other senior faculty at the Center take on a mentoring role for the different junior assistant professors and researchers.

Score: *Outstanding*

The program in **hematopoietic stem cell transplantation**. Publications from the group encompass a number of publications in IF>10 journals even though some of these papers are reports from working groups in Sweden or in Europe, wherein investigators from the Lund Stem Cell Center partake. In view of the future goals of the Center to emphasize translational science, this part of the HSC program is very important to the Center and should perhaps be strengthened further. Although the publication record suggests some interactions between the clinical and basic biology program in HSC, chiefly due to the fact that some of the junior investigators recruited to the Center have a dual appointment, it is clear from the literature list provided that these programs will need to collaborate more closely to accomplish the translational goals (home grown therapies applied in the clinic).

Score: *Good – Excellent*

Related to the HSC program is the **Gene transfer and therapy program**.

This is a program comprising one senior and several more junior investigators (assistant, associate professors and researchers), many of whom publish in IF>10 journals. Although the fact that many of the publications are co-authored by multiple members of this subprogram might suggest

that interactions between members of this group is good, the inclusion of the senior investigator/mentor on most manuscripts raises some concern as to the independence of the junior investigators. However, as was true for HSC biology, many of the junior faculty have only been recruited/appointed recently and only recently developed an own laboratory.

Score: *Excellent to outstanding*

### **Neurobiology and Neural Stem Cell Program**

The neurobiology and neural stem cell program are headed by three very strong senior investigators who have accomplished translation of neurobiology insights in preclinical and clinical practice in the areas of Parkinson and are developing a similar line of research, more recently, in the area of stroke. In the field of Parkinson they have been the leaders in the field as well as in a number of other areas of basic neural stem cell biology. Aside from the two senior investigators a number of more junior investigators partake in this program, some of who also have an excellent publication record. Although there are very strong connections with some of the investigators in the developmental biology program, interactions with the HSC program are less obvious.

Score: *Outstanding*

### **Developmental Biology and Human Embryonic Stem Cells in Diabetes Etiology and Therapy**

The developmental biology group includes investigators throughout the HSC and NSC programs, with in addition investigators using model organisms such as the fly and xenopus, and embryonic stem cells. The investigators in model organisms have an *outstanding* publication record and have contributed significantly to the field.

The investigators in ESC biology and pancreatic differentiation have a *good* publication record, even though the impact of studies by this group in this highly competitive field is felt to be lower.

### **Functional genomics**

Although this area is not listed as one of the programs in the description of the Center, the literature list obtained identifies this as a separate group. It is obvious, that the investigators in this area go across the different programs in the Center, and also collaborate with many investigators in other areas of the University of Lund and internationally.

Score: *Good to excellent.*

### **Cancer Stem cell Program**

No separate description is provided for this program. Review of the publications provided it is obvious that throughout the HSC and NSC programs, as well as in the area of functional genomics, significant effort is placed in study of cancer stem cells, in the areas of leukemia, CNS cancer and breast cancer. A number of *excellent to outstanding* senior and young investigators are involved in this research line.

### **4.3 Strategic planning**

The Center has excelled in the development of basic research lines in HSC and NSC biology, cancer stem cells and to a lesser degree developmental biology.

The Center plans to continue to build on the existing programs that are focused chiefly on basic science, and develop the Center to include translational research. They identify five areas wherein development of basic-translational research is planned. The areas identified are of great basic science interest to the Center and the field in general, and have obviously even greater clinical impact significance. This was apparently also strongly supported by the EAB to the Center.

- a. The area of hematopoiesis and cancer stem cells, in particular in the area of leukemia, are a logical extension from the studies that are currently ongoing in the labs of the basic biologists, and the existing strengths in more clinical research.
- b. During discussions with the department head, it became clear that the move to include more translational research in neurobiology, is well reasoned, and well planned, and should become possible due to the fact that clinicians have been enthused regarding the idea, and some of the junior as well as more senior faculty have been able to exploit the Linne funds to have a direct clinical link. Moreover, European funding was also secured in this area.
- c. The area of cardiovascular research is to some extent new to the Center, even though one of the members of the hematopoietic stem cell program has been active in the area. Offline discussions have indicated that European funding has been secured in this area to allow indeed the development of this line of research.
- d. Although work is being done in the area of beta cell differentiation from embryonic stem cells, only two investigators are listed in this area. Moreover, the move to clinical application of stem cell research



in this area will require significantly more time than the translational aspects of neurobiology as well as in the cardiovascular area. Nevertheless, the faculty of laboratory medicine, especially in Malmö, in endocrinology and specifically diabetes research is very strong, and this should allow the link-up between the stem cell Center and translational aspects of diabetes research in this area.

Despite what is discussed above, this plan will require significant adjustments from the investigators both in the Center and the clinical faculty:

- a. Unclear at the time of the review was what the strengths are of the clinicians in the university hospital in these areas, in particular in innovative therapies for cardiovascular disorders and in the area of diabetes therapy.
- b. What resources are available for the very significant investments that will be needed to be competitive in all these areas.
- c. As it is likely that specific faculty recruitments will be needed to fulfill this mission, what resources and space resources are available for recruitments.
- d. Are local resources available to develop clinical trials (such as statistics support, trial nurse support, support as it relates to regulatory issues from the EU and EMEA).
- e. Are local resources available to fund clinical trials, and / or what additional outside funding can be obtained in these areas.

#### **4.4 Challenges**

- a. One of the challenges that appear to be facing the Center became clear via discussions with the Department heads. The Center was funded via an independent line of funds from the Swedish government, which ends at the end of 2008. From the description it is clear that the Center has been financially independent, bringing in more than sufficient funds to cover all expenses. It appears that negotiations are ongoing to now include the Center in the Department of Laboratory Medicine, where it would maintain its independence, but the Faculty of Medicine would cover the administrative costs.
- b. A second challenge as it relates to the development of translational research in stem cell biology, has been elaborated upon in the previous section.

- c. A third obvious challenge is the departure of the director, Dr Sten Eirik Jacobsen in 2008. From discussions with the department heads, it became clear that an interim director was currently in place, but that significant effort will be put into determining who should be the future leader of this Center. This will also include advice from the EAB appointed to the Center. It was less clear from discussions with the Faculty leaders, whether Dr Jacobsen would be replaced with an internal candidate or whether resources could be put together to recruit an outside candidate, to continue to build one of the very outstanding 6-7 year old programs at Lund University, at a time where many other Universities are just starting to develop such programs, and at a time where it is becoming clear that results from basic stem cell research will likely affect clinical medicine in the not too far a future.
- d. Other external reviews have identified a number of possible weaknesses/challenges.
- Mouse Genetics and Mouse Transgenic facility
  - Molecular Biology and Developmental Biology: It has been pointed out through external evaluations as well as by our SAB, that not only our program, but the faculty in general must strengthen its expertise in molecular biology and developmental biology.
  - Lack of funding of Ph.D. students
  - Lack of a clear and competitive structure for career development
  - ALF system for funding of translational research
  - Commitments to Translational Recruitments
  - Lack of external evaluation of research at the faculty

Based on the information given in the material provided for evaluation, these are more difficult to assess, but should obviously be addressed.

# PANEL 11 – MEDICINE | HEALTH SCIENCES

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## 1. OVERALL ASSESSMENT

The Department of Health Sciences was transformed in 2005 to become one of the six departments within the medical faculty. Its organizational form is complex, being composed of 6 divisions each consisting of one or more research groups. In addition there are four educational groups which started in 2005–2007, and four formal research centres hosted by the Department. The Department carries out comprehensive research and teaching activity, and is seen as an important site for research and education in these subjects in Sweden. There are 1200 full-time students enrolled in six programmes leading to professional and BSc/MSc/Master degrees within medicine, midwifery, nursing, radiography, occupational therapy, and physiotherapy.

A significant decline in staff members has occurred during the period of assessment (2003–2007) from 293 (FTE 213) to 218 (FTE 158). This includes a reduction in the number of doctoral students paid by the university from 28 FTE to 14 FTE, which causes some concern even though the total number of registered doctoral students was 67 in 2007. However, the number of doctoral examinations increased from 47 in 1998–2002 to 67 in 2003–2007, which is a sign of increased research activity. The strong PhD programme is also recognized as an important resource for the strengthening of research in the future.

The number of academic staff remained stable over the assessment period, being 62 (47 FTE) in 2007 (62 % women, mean age 53), although not all staff were permanently employed. The description of the size of the

different research groups represents the distribution of the staff of the department; the actual size of the research groups is often significantly larger when their extensive collaboration is considered. The low proportion of professors (3 out of 13) funded from the university budget is of particular concern, especially when the current budget deficit of about 50 MSEK at the medical faculty may reduce the prospect of strengthening the professoriat in the near future.

The department has also experienced significant financial contraction from the total revenue of 174 MSEK in 2003 to 136 MSEK in 2007 including income decline in both teaching and research. The proportion of external funding was about one third of the total income, which is lower than average (about 50 %) in the medical faculty. The supplementary income from the Vårdal Institute was about 30 MSEK during the assessment period. (The overall yearly funding from the Vårdal Institute for Lund University Medical Faculty has been about 23 MSEK). Nevertheless in 2007 there were on average about 4 articles in refereed journals per year/FTE number of academic staff, showing a strong record of productivity.

The Department of Health Sciences is a place where dynamic research is taking place across many diverse but often neglected areas, but which are of vital concern to a healthy society. Some of the areas are relatively new to science. Work of the department includes studies across the life span, from perinatal science to the palliative care of the very old. Major research topics include family support for children, interventions for drug dependence, mental health (including occupational patterns), physical rehabilitation, exercise and activities for public health, health of older people, aetiology of dementia, and environmental studies into sustaining older people in their own homes and neighbourhoods.

The quality of the research is mostly *very good*. Given the great diversity in the research areas the evaluations reflect quality in the international context rather than between the different research areas. Amongst the ten established research areas the Panel has identified several areas with very strong potential for the future (if the department deals successfully with staff age and career stage profiles and retirement policies). This is a considerable achievement when many of the divisions are relatively new to university level work, coming out of hospital-based healthcare practice. The department has had to invest heavily in developing the research culture in these allied health subjects while at the same time building

new sustainable educational programmes, which themselves have the additional demands of preparing graduates for professional practice. These programmes have recently been appraised as very high quality, not a common achievement in departments which have had to simultaneously build up their research infrastructure.

The productivity is fair, and certainly compares very favourably with similar departments throughout Europe, however the department still has some way to go to bring some of their research to the international level. The base platform has now been built, paving the way for increased publication rates and more external research grants. There are obvious concerns such as reduced numbers of FTE- research students in recent years, and the need to limit expansion through enhanced departmental management.

The panel thought that there are too many research areas, and the department is advised to create a more coherent strategy for the future with even more collaboration. However, collaboration is already at an unusually high level. The gender balance is the opposite to the usual, with women predominating, due to the nature of the gender balance of the professions represented in the department. This provides an opportunity for the university to demonstrate that it can develop policies specifically to support females to reach and sustain their academic potential.

The broad visions and strategies for the future at the medical faculty level have been described in two recent documents. The submission from the head of the department maps the current situation and also presents ideas about and approaches for strengthening the research capacity, paving the way for new research initiatives. Specific plans for future research were however not presented. The description of the total research profile of the department is repeated in the description of the most successful research areas with the strongest national or international impact, which suggests that the management is finding it difficult to compare the different research areas and to make decisions about its priorities.

## **2. RESEARCH INFRASTRUCTURE**

The submission describes research work at the department within ten established research areas led by principal investigators who represent different disciplines. The logic of placing different disciplines present in the

medical faculty under the umbrella of health sciences was not clear to the Panel. It seems that there have been personal, historical, institutional and teaching related preferences rather than strategic planning, in choosing the intellectual and physical environments for different disciplines within both the medical faculty and the divisions within this department. The core disciplines, i.e. nursing and caring sciences, occupational therapy and physiotherapy represent those health professions which worldwide have only rather recently attained academic status. Thus the department has had to invest considerable energy into building the research infrastructure in these subjects, which created many challenges to the development of research and education programmes in collaboration with other disciplines such as gerontology, mental health and health economics.

The development of different research areas seems to have resulted from a bottom-up approach, where a professor or a senior researcher creates a research group around him/her. This was confirmed in the discussions with the researchers during the site visit. While the panel members sympathise with this approach, and realizes that this process is similar in many other universities, they also raised questions regarding, for example, the need for 3 different research areas focusing on elderly people. It can also be argued that the bottom-up approach is leading to numerous small research groups with an insufficient capacity to implementing large research programmes.

The establishment of the research centres on the other hand places the department in a position enabling them to counteract these disadvantages by promoting interdisciplinary, multiprofessional and translational research and initiating research through a top-down approach. Of the existing four centres CASE (Centre for Aging and Supportive Environments, one of two national centres of excellence for research on ageing) has received funding for the coming 10 years and has a great potential to develop a successful new research culture on an interdisciplinary basis. The other centre CEPI (Centre for Evidence Based Psychosocial Interventions) has gained funding for the next 5 years and also has the potential to carry on important research work in its research field depending, however, on what the overall development in the area of mental health research will be. Within physiotherapy the MOVE-platform also strengthens resources for future research.

It is obvious that concentrating more activities in the House of Care Sciences in Lund (Vårdvetenskapens Hus) would further facilitate

communication and collaboration between the different disciplines and research areas. The decision of the county Region Skåne to create a Regional Geriatric Centre and a Primary Health Centre will strengthen the preconditions for translational and clinical research. The establishment of an institutional board from January 1, 2008 facilitates decision making related to initiatives aimed at strengthening the research infrastructure, and is seen by the Panel as an excellent initiative.

The ongoing generation shift creates a substantial challenge to the sustainability of the attained research strength, and the low number of senior researchers in many research areas is also of concern to the Panel. However this situation provides an ideal opportunity for further reorganization of research work into more streamlined groups and concentration of research into fewer foci, which from an outsiders' perspective, is needed.

### **3. RESEARCH QUALITY**

In summarizing the Panels' observations it has become very clear that the research carried out in the Department of Health Sciences has already contributed and has great potential to contribute in the future at the national and international level to the advancement of knowledge and its application into social practice in its research fields. This is demonstrated by the theoretically and methodologically solid level of research in several areas and by the many examples of successful translational research. The evaluations of the different research areas revealed great variability and therefore the gradings range from poor to very good or approaching excellent in several research areas, indicating research of high quality which attracts significant national and also international attention. Therefore it is difficult to generalize the grading of research quality for the department as a whole. The productivity of the research is at a high level when related to the number of staff in different research areas or when compared with corresponding institutes in Sweden or in other countries. The Panel observed many innovative approaches regarding the development of new research cultures on an interdisciplinary basis.

#### **3.1 Health care of women and children**

This research area ranges from preterm birth and illness in childhood to studies with adults who became ill when they were children.

**Quality.** There are two main fields in this area, a) Reproductive and perinatal care and b) Child health and family care, closely connected with each other. The first focuses on parents' experiences of care during pregnancy, childbirth and postnatal care both in normal and abnormal situations as well as research related to parents' autonomy and decision making. The research in experience of ultrasound during pregnancy is particularly successful. The second focuses on the health of children and young people. The research around caring for children with long-term illness at hospital and at home is of high quality. Methodologically, in this area they also use randomised controlled trials, having special importance to nursing research and health sciences. They publish in international high impact journals, educate new researchers and have earned research funding.

**Productivity.** Papers are of good quality. The numbers of publications in 2000s seem to be 4–7/year/PI and 2–3/year/others, indicating continuous outcomes of research. The external funding amounted to 6.9 MSEK during the assessment period. There are currently 1 professor, 2 senior researchers, 7 junior researchers, 10 PhD students and 2 other employees.

**Relevance.** This research area is relevant from the international perspective and it also has translational impact in the paediatric clinical practice. This area has discovered some important aspects in the care of children and it makes a clear contribution both nationally in Sweden and internationally.

**Vitality and organisational capacity.** This area is organised in two main fields, both having a clear structure. They attract PhD-students, they have research seminars and active collaboration with hospitals, other professionals and other Swedish and international universities.

**Overall grading:** *Very good*

### **3.2 Mental Health**

The sub-unit has a clear focus on serious mental health problems and all its research concerns this area. Collaboration within the national centre CEPI (Centre for Evidence Based Psychosocial Interventions) is thought to be the most promising future activity.

**Quality.** There are a number of high quality publications in each of recent years and evidence of collaboration in an international research



group, stimulated by a highly esteemed international researcher. Other work by the group concerns stigma, quality of life and case management and is evidenced by recent high quality inter-disciplinary publications. Methodologically, the group do not provide evidence of carrying out independent randomised clinical trials.

**Productivity.** The number of staff is 6–7 (1 prof., 2 senior researchers, 1 junior researcher, 2–3 PhD students, 1 other employee). The external funding was 18,2 MSEK during 2003-2007 including CEPI. Unfortunately, the number of publications in this area is not readily available, suggesting that the unit needs to make its achievements more apparent to the outside world.

**Relevance.** The work of the sub-unit is relevant to mental health research for people with severe mental illness such as psychoses. Research in this area has been of great prospect nationally and internationally and has a mature international evidence base. The follow up of case management for this group is important. However, in the 21st century there is more concern internationally for high-prevalence mental disorders and the group has no work in this area. The research seems to reflect the interests of the leading workers in the sub-unit rather than the current international concerns.

**Vitality and organisational capacity.** Considerable resources are now available for CEPI but how this will be utilised is unclear. The objectives of CEPI appear more translational with a focus on the implementation and dissemination of evidence based practice. Whilst this is an extremely important activity it may not enhance the research aims of the department, which are to conduct more high quality clinical randomised controlled trials. CEPI's focus on implementation may distract key researchers from conducting more trials, although it may provide a basis for translational observational research.

**Overall grading:** *Good/Insufficient*

### **3.3. Disability and Rehabilitation**

The studies of the group have focussed on disability and working life and employment, and several research programmes are established in vocational rehabilitation and work participation.

**Quality.** The quality of research in this area is difficult to evaluate because only a few papers are published and in Swedish.

**Productivity.** The PI has been actively involved in leading international organizations in the field (e.g. Rehabilitation International), is a member of the board of GLADNET (Global Applied Disability Research and Information Network on Employment and Training) and coordinator for the Swedish network of researchers in this field. There is collaboration within HAREC (Centre for Handicap and Rehabilitation). The external funding including HAREC amounted to a significant sum of 24,6 MSEK during the assessment period. The group consists of 3 persons; 1 prof., 1 PhD student, 1 other employee.

**Relevance.** This research area is very socially important, considering the growing number of people throughout the world living with chronic disabilities (at least 15% in Western countries, many more in poorer societies). There is increasing need for evidence-based knowledge regarding prevention of disability, maintenance and restoration of functional ability and quality of life among disabled people.

**Vitality and organisational capacity.** There are plans to include HAREC and the research within the disability area into the disability platform after the present PI retires and transform it to a disability platform with the aim of strengthening research in this area.

**Overall grading:** *Insufficient* regarding quality at an international level.

### 3.4 Drug dependence

The studies in this area, including RCT's, focus on the long-term progress of alcohol and drug dependence and the development of better intervention and treatment methods.

**Quality.** The sub-unit is highly focussed and provides good evidence of clear thinking across different methodologies to provide evidence for the effects of alcohol and treating alcohol problems. They use state of the art health services research methods to develop and test their interventions. They collaborate with health economics to test economic effects. Many of their published papers are in international journals of high standing.

**Productivity.** The group produces high quality papers, and in high numbers. Funding has been in the mid range or at the higher end of the department's share of external funding (22,4 MSEK during the assessment period. The papers and other outputs suggest a very productive group. The leading researcher has published many articles including 11 papers in 2007 demonstrating high productivity but the unique contribution of other members of the group which consists of about 11 persons (1 prof., 3 senior researchers, 3 junior researchers and 3 doctoral students and 3 other employees) is unclear from the information given.

**Relevance.** The work is highly relevant to social concerns in modern society. Addictions or overuse of alcohol cause severe health and social difficulties and this group have targeted at-risk groups for successful interventions.

**Vitality and organisational capacity.** The long-term prospects of this group is threatened by the imminent retirement of the lead professor. This however is also an opportunity to recruit a new Chair from the international arena.

**Overall grading:** *Excellent*

### 3.5 Health Economics

*(Forensic Medicine is also included in this research area)*

**Quality.** The sub-unit mainly provides health economics expertise to other researchers undertaking empirical investigations, including randomised clinical trials. There is a great deal of good quality work supporting the alcohol team. The submission makes claims for international leading edge contributions to health economics science but this is not supported by evidence (for example there are no publications associated with the EuroQol/EQ5D despite claims in the submission). There are, however, a small number of high quality publications around the human capital model which support the submission.

**Productivity.** The group produce some high quality papers themselves and are included in other papers produced by research teams as collaborators, a situation common to health economics researchers. As such they are productive. Eight refereed papers were published in 2007 which shows good productivity in relation to the size of the basic group

consisting of 5 persons (1 prof., 1 junior researcher, 3 PhD students). The group are attracting reasonable sums of funding (15,2 MSEK during 2003–07).

**Relevance.** Some work is relevant but the major theoretical developments are on the interesting fringes of health economics, rather than being at the centre of modern techniques. These new developments seem to reflect the speciality of the leading researcher and are important but unlikely to lead to Lund being placed in the centre of mainstream health economics developments.

**Vitality and organisational capacity.** Health economics is an important research area with great potential for the future and it could be used as a link between different research areas and centres.

**Overall grading:** *Good*

**Forensic Medicine.** This research area does not demonstrate significant research activity. No research group is presented and no information is available about productivity or other aspects of activity needed for evaluation.

**Overall grading:** *Poor*

### **3.6 Physiotherapy**

Research focuses on 4 main areas – rehabilitation for people of all ages with functional limitations, physiotherapy interventions and outcomes; health promotion for society – through exercise; falls prevention in elderly persons; and physical therapy for breast-cancer arm lymphodema. Some of these projects have, one year ago, been better harmonised into a new research ‘platform’ called MOVE, which will guide the domains of all future projects.

**Quality.** The output is of an international importance level in some areas, such as the oncology research. The publications cover a very wide range of topics, and unusually include several diverse studies focusing on particular areas, such as the knee – knee condition after stroke, injury, football activity, cycling, advancing age. Several studies focus on issues of work capacity. Journals which publish the work are mainly national,

although increasingly are higher ranking international, such as the Journal of Bone and Joint Surgery. Methodology for these studies seem to be mostly quantitative, usually smaller rather than large studies. There are also some appropriate qualitative studies and an interesting feature of this unit is its qualitative work in psychosocial aspects of physiotherapy – such as motivation, or patient-therapist relationships, which internationally is quite rare. As yet there are, it seems, few publications in some declared areas of expertise, such as falls prevention.

**Productivity.** There is 1 professor, 2 senior researchers, 3 junior researchers and 7 PhD students, plus 8 additional PhD students within the MOVE platform. 35 PhDs have graduated from this research area – a high number in comparison with such groups internationally. The publication rate is quite high: 14 articles in English in 2007. The external funding amounted to 9.4 MSEK during the assessment period of 2003–2007.

**Relevance.** The research topics are holistic compared with physiotherapy departments internationally. Relevance to today's society is strong- eg. health promotion, working environment, psychosomatics. Some of the outcomes of the research have demonstrated cost benefits to society, such as reduced sick leave. The MOVE platform has the potential to further harmonise and focus topics in the future.

**Overall grading:** *Very good*

### 3.7 Occupational Therapy

This research area is placed within the Division of Occupational Therapy and Gerontology. The occupational therapists classify their research areas under HOW – Health, Occupation, and Wellbeing – exploring the relationships between engaging activities and health, measuring outcomes of interventions, and developing instruments, models and theories. The links between the individual's experience of occupational dysfunction and that individual's health and wellbeing is a particularly strong area. This division is seen as an important national centre for occupational therapy research.

**Quality.** In a relatively short time they has developed research in topics such as occupational science to a level which compares very favourably

with work done internationally. A lot of projects/topics described as ongoing mostly relate to researchers' doctoral work. The mental health research is particularly impressive, mostly using the latest advances in qualitative methodology. They publish in the range of highest quality journals in this field, including medical journals. Close scrutiny of the publications reveals that reliance on Scandinavian journals has become much less apparent recently.

**Productivity.** The HOW group consists of 1 professor who is working for 10% at the Department and 90% at another University College, 6 junior researchers and 4 doctoral students. The team has produced about 12 publications in English in 2007 which is remarkable for its size. The publications reveal a different pattern of research topics – aspects of living with chronic mental health problems having major impact. The external funding amounted to 8.4 MSEK during the assessment period which, when combined with the publication rate, signifies a productivity level uncommonly found in occupational therapy departments in continental Europe.

**Relevance.** The strong occupational science element – such as activity patterns within different health problems - is much needed in society, considering the rise in mental ill health. There are innovative approaches to human occupation, such as looking at the ecological impact of how humans carry out everyday activities. The variety of topics researched are all relevant to today's problems but perhaps they could become even more focused within domains, while the theoretical developments deserve to be more widely disseminated. The doctoral work seems to be led by individual interests – such as hand injuries – rather than fitting within a strand within the area, although these have the potential to turn into bigger stands.

**Overall grading:** *Very good*

### **3.8 Gerontology; Ageing and Supportive Environments**

This group studies environmental gerontology focusing on housing, assisting technology, outdoor environments, public facilities, public transport.. From 2007 the research has been conducted by an innovative interdisciplinary group (CASE).

**Quality and productivity:** The group is prolific in its output of papers in scientific journals and the PI has listed 15 papers published in English in 2007 in major journals of gerontology and occupational therapy. The professor heading up the CASE group is the first occupational therapist internationally to be granted a Chair in Gerontology. Many papers have also been published in the Scandinavian journals. The external funding is outstanding, 35.6 MSEK during the assessment period.

**Relevance:** Given the burgeoning number of old and very old adults there is the need to enable them to live safely and comfortably at home as long as possible. The societal impact of the work of this research group is thus very high, with international cross cultural studies being conducted into the components of homes and neighbourhoods for elderly persons (including the very old) which support and sustain their everyday living activities. This can extend into town planning, transport and local government policies. This criterion is rated as *excellent*.

**Vitality and organizational capacity:** This interdisciplinary group, in which gerontologists, occupational therapists and engineers are working together with experts, for example, from Geriatric and Rehabilitation Medicine, is a very unique and promising initiative. Without any doubt this research area has the potential to develop as an excellent center.

**Overall grading:** *Excellent/Very good*

### 3.9 The Elderly, Chronically Ill and Palliative Care

**Quality.** Despite of a fairly short history of about 10 years the unit has been able to gain a nationally and internationally highly recognized status in its 4 research fields, all under the canopy of ageing: care of the elderly and the oldest old, palliative care and people living with long term diseases. The overall picture suggests new and innovative approaches focusing on important issues with remarkable skill and competence particularly in the qualitative research methodology. Research on quality of life, health complaints, and informal and formal care have emerged as the most promising research areas.

**Productivity.** The number of papers recently published in high-level international scientific journals shows high productivity regarding the relatively small number of researchers in the group. It has been calculated

that during 2003–2007 about 130 papers have been published in peer reviewed scientific journals on the above-mentioned research topics, and about 20 papers currently submitted for publication. The work of the group can be judged to be in the frontier of research in its research field both in Sweden and internationally. The amount of external funding during 2003–2007 was about 16 MSEK for a research area, which in 2008 consists of two professors and two senior researchers, two junior researchers and 7 doctoral students with 4 more PhD students currently joining the unit.

**Relevance.** The results of the studies have succeeded in integrating care and social service provided by the municipalities and the county councils. A new RCT-study testing the effects of Case Manager and integrated care has attracted significant external funding. Another socially significant approach focuses on the prioritization in health care. The research field is relevant seen from the international development of the research field and also is socially important having impact on the quality of life of old people.

**Vitality and organizational capacity.** The work of the unit seems to have been well-structured and has attracted new doctoral students to join the group. However, the research group seems to be at present in an important transitional phase with changes in the leadership, approaching generation shift and some senior researchers being in the phase of building up their research groups. In this situation it would be very important to make a strategic plan how best sustain the achieved strong research area and how to further strengthen it.

**Overall grading:** *Excellent/Very good*

### **3.10 Geriatric Medicine**

**Quality.** Longstanding research work on cognition and ageing has produced significant new knowledge about risk factors and pathogenic pathways for vascular dementia and Alzheimer’s disease. The research group has demonstrated excellent ability to conduct and publish in international peer reviewed journals controlled clinical studies, longitudinal studies using the data of several unique longitudinal cohorts, and population based cohort studies. Another strong research line focuses on nutrient-disease interactions including development of dietary assessment



methods to be used, for example, for osteoporosis and prospective fracture research. There are in Sweden a few strong research units in geriatric medicine focusing partly on the same topics as geriatric medicine in Lund (particularly Karolinska Institutet and Umeå University).

**Productivity.** The research group, established over 20 years ago, is located at the Department of Community Medicine at the Medical Research Centre in Malmö University Hospital. During the last 6 years the unit has published about 60 papers in international scientific journals, suggesting good productivity. The number of researchers appearing as authors in these publications is about 50, indicating good collaboration and very significant contribution from researchers/experts not belonging to the small staff of geriatric medicine. Fourteen doctoral dissertations have been completed since 1987, which means less than one per year. The unit/division has managed to get external funding amounting to about 40 MSEK during 2003–2007.

**Relevance.** Given the increasing number of older adults and their numerous health problems and need for services the research work of the unit obviously has great social relevance, which is also reflected in the successful applications of the results in social and health care. Most research topics also have a high scientific relevance as judged from the perspective of the international development of the field.

**Vitality and organizational capacity.** The quality of research plans and the ability to implement plans successfully have been good. The research profile of the unit suggests that the origin of many research themes is related to problems where translational research is needed for the development of services for older people. New and innovative approaches might be obtained through a closer collaboration with the other units and the newly formed research centres at the department working in the near problem areas (such as CASE).

**Overall grading:** *Good/Very good*

### 3.11 Growing research areas

There are several initiatives for developing research in new areas, such as autism spectrum disorders, pedagogical research, different areas of nursing and descriptions of normal ageing of organ functions. These

cannot yet be evaluated and there is no information about the criteria for focusing particularly on these items.

#### **4. COLLABORATION**

The supplementary submissions which were requested from different research areas revealed that the researchers at the Department in many research areas are fairly well connected within Lund University and to the outside world at both local, national and international levels. Interaction between the research areas within the department is demonstrated in joint publications, but there is a need for its further strengthening, as emphasized in the department's self-evaluation. Very clearly the orientation to increasing interdisciplinary collaboration is visible in the initiative of CASE, which attracts researchers not only from the department of health sciences but also, e.g. from engineering and behavioral and social sciences creating in this way new research cultures. Collaboration with other departments of the medical faculty could be stronger, and in particular more in depth co-operation with clinical sciences should be promoted.

Widespread collaboration at national and international level is demonstrated by joint publications and also active involvement in networking and international organizations (also in leading positions) in many research areas (e.g. research on elderly and ageing and health and care of women and children). There is close collaboration at the level of Region Skåne in implementing interventions and otherwise developing services not only within social and health care but also in a broader societal context related, e.g., to living conditions of older adults. Collaboration at national level is also well developed in several research areas. This arena might be further developed by creating, for example, larger consortia and alliances between departments and units working in the same research fields.

The number of international collaborating institutes with joint publications is large; about 100 during the assessment period. This extensive collaboration was confirmed by the additional submissions from different research areas. The number of foreign scholars and doctoral students visiting the department has, on the other hand, been fairly low in relation to the number of collaborating institutes. The department does not recruit many staff from outside Sweden. The Panel felt that this situation would deserve more attention in the future.

Engagement in the scientific society seems to be active; altogether about 170 individuals have contributed during the assessment period in these activities. The high number of text books and popular writings and governmental/societal assignments point to a significant societal relevance of research carried out at the department. This is further indicated by the important financial contribution from the Swedish Council for Working Life and Social Research (FAS). Challenges regarding the development of translational research are great, but there seems to be potential for responding to that both in terms of required infrastructures and the need for technological and social innovations and product development in health sciences.

The Panel rates the level and results of collaboration as *very good*

## 5. RESEARCH ACTIVITY AND TEACHING

The teaching load seems to be high in this department, at least in some education programmes, with the balance weighed in favour of teaching. The teaching has been recently highly graded, which indicates an exceptional achievement in a department which has also been prioritising enhancements in the quality and extent of its research. In universities around the world, the quality of teaching is too often sacrificed when research productivity grows. The highly rated teaching in this Department at Lund is therefore quite a special achievement from which even greater capital could be made, in the form of pedagogic research, and marketing of courses. The Panel appreciates that a lot of energy has had to be concentrated into the actual developmental stage of many of the research areas, including increasing the academic qualifications of the staff. It seems that the senior researchers are also actively involved in producing teaching material and textbooks (even for international use) and have provided teaching also at nearby universities and university colleges.

Introduction to research work is part of both Bachelor's and Master's study programmes, and special attention has been paid to develop post graduate studies (e.g. the roles of the Vårdal institute and the Graduate School for Ageing Research). Within the pedagogical groups development work is also carried out to enhance the impact of research on education programmes. We recommend that research groups should

develop and contribute to specific teaching programmes related to their research and provide evidence of where this is happening, such as within their problem-based learning, which is itself a research-informed approach to teaching and learning. Furthermore, we recommend that the relationship between teaching and research will be strengthened by encouraging researchers and especially PhD students to do more teaching and stimulating more lecturers to become research active.

We rate the relation between research activity and teaching as *good*.

## **6. EVALUATION OF FUTURE PLANS AND POTENTIALS AND POSSIBILITIES**

The philosophy, visions, strategy and criteria for setting priorities for the future development of the department are based on the values of Lund University and on the recent documents prepared by the medical faculty (The future of the Faculty of Medicine Strategic Plan 2007–2011, and The Way Forward – Staff strategy for the Faculty of Medicine 2007–2012).

These documents provide good starting points for planning work at the department level. The plans for the future focus on the continuation and extension of work in the different research areas and on the increase of research to support the established education programmes described indicating increasing diversity in the already existing multidirectional, multiprofessional and multidisciplinary structure and approach.

The plans reflect contemporary problems as starting points regarding, for example, the need to develop evidence base for policy, care, health promotion and science to support optimal health and wellbeing, create additional centres of excellence, apply multiple research methodologies and in particular focus more on interventions and use of RTCs, and increase resources through extensive collaboration nationally and internationally. From the Panel's viewpoint the strategic planning and visions for the future are in general feasible and oriented towards the right directions.. The Panel is, however, concerned about the lack of information on strategies and criteria regarding decision making on research priorities and selecting themes for new research initiatives.

Strong leadership will be needed to maintain a proactive attitude to change, to increase the number of permanently employed professors and senior researchers and to ensure long-term funding in the current situation of a significant budget deficit at the medical faculty, to deal successfully with the already ongoing generational shift and to decrease the high average age (43 years) of doctoral students, to further increase cross-disciplinary research, which seems to be important for getting external funding, to ensure effective management and quality assurance of new research projects, and to further strengthen infrastructures for translational research. The institutional board formed early in 2008 is seen as an important step in this direction.

The department of health sciences has significant potential and good possibilities to reach a leading status nationally and internationally in its many research areas. There are a few research areas and environments that already have turned out to be successful and have potential to develop towards the highest level of international research in the field of health sciences. Several research areas, as indicated in this evaluation, have already shown nationally and internationally recognized status and possess very good potential for future development. The contribution of nursing science has become strong in a short time and has much potential for future research in Sweden and Europe.

The panel felt that more consideration ought to be put forward to streamline the research areas, brought together to focus on fewer issues and also concentrating activities to fewer physical environments, as already planned. There are several ways of approaching this challenge. Many research areas are dealing, for example, with important issues of ageing and old age, and even though significant overlapping does not seem to exist in research questions a closer collaboration between them might result in increased capacity to run major research projects and develop effective interventions, which usually require plenty of resources. The expertise of occupational and physiotherapy could also significantly contribute to this research field.

Similarly a closer collaboration between disciplines and research areas focusing on different aspects of mental wellbeing and mental health (including also behavioral and social sciences) might result in improving quality in carrying out RCTs and developing interventions. The two research fields, reproductive and perinatal care and child health and

family care, should be combined more clearly. They have the same goals and same relevance, but it would be possible to create a stronger research team for health and care of women and children.

The present work in rehabilitation and disability needs to be enhanced through the new platform for the study of disabilities, for, with the advances in life-saving medical techniques, the number of people with chronic disabilities is set to increase, especially if the demographics of the ageing population is included. CASE and the planned disability platform should be encouraged to collaborate, for many of the solutions found for supporting elderly in their chosen environments apply equally to physically disabled people. HOW and MOVE could also combine forces more often, for occupational and exercise sciences hold common elements. PhD-education seems to be well arranged. The numbers of graduating students, however, are rather low and their research work should be integrated more clearly with the research projects and with each others. This has to do with the strategy of selection of new PhD-students, not clearly expressed in evaluation material. Post-doc students also should be involved and strategies for improving the maturation of researchers should be made (not only PhD-education).

The decisions of the county Region Skåne to establish A Regional Geriatric Centre and a Primary Health Centre and to create a Platform for Disability Studies signal important progress for further strengthening of translational research in the field of social and health care. Additional discussions and planning work seem to be required in order to strengthen collaboration with clinical medicine. The three joint appointments for senior researchers to be established in 2008 will presumably create a significant resource for strengthening translational research in the development of services.

Management and quality assurance of research areas needs to be given more importance. This means, that more emphasis should be given to quality management of the project, recruitment of new researchers and management of the project (process, structure, actors, roles, support).

The future development of the newly established research centres, and possible new ones, might play an important part in the success of research activities, and in the creation of new research cultures. Great expectations, therefore, exist regarding the quality of their research plans, not

being more ad hoc. For each centre it will be important to build up an infrastructure and collaboration that best promotes the implementation of the planned research. The roles, orientations and placement of different disciplines and research groups in this context should be carefully and evaluated without prejudice. The Panel felt that more discussions and strategic planning are needed at the department level for the further development of research contents and infrastructures including the combination of different research groups under broader umbrellas.

The overall rating of future plans in their present form is *good*

## **7. GENDER AND EQUAL OPPORTUNITY ISSUES**

Of the total staff (N=218) 75 % were women in 2007. The corresponding proportion for academic staff was 63 % and for professors 36 %. The proportion of women among professors has doubled between 2003 and 2007 and it is expected to grow in the future. The percentage of women among the registered doctoral students was 78 in 2007. Perhaps more positive capital can be made from this situation where female academic staff are in the majority in this department, and are obviously being successfully supported in very specific ways, at a time when most university departments are striving to achieve better equality for women scientists. The predominance of women is related to the establishment of certain allied health sciences (e.g. caring science, occupational therapy, physiotherapy) as academic disciplines in the Swedish universities (along with others internationally). The future development of the gender balance depends mainly on the gender structure among the applicants to the educational programmes of the department.

# PANEL 12 – SCIENCE BIO / GEO

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## 1. DEPARTMENT OF CELL AND ORGANISM BIOLOGY (COB)

### 1.1 Overall assessment

The 6 year old department of Cell and Organism Biology (COB) comprises more than 100 employees ( about 40 scientists , 46 PhD students and 29 technical staff), and as a result of its merger history consists of several diverse research groups that still reflect the formerly independent departments: Integrative Zoology (more or less Lund Vision Group including taxonomy and systematics), Microbiology, Genetics, Plant Biology (Molecular Plant Biology) and Zoological Cell Biology (including neurobiology). The teaching load seems high, thus leaving only a small amount of official working time for research. The ratio between the number of PhD-students and the number of full time staff seems reasonable and corresponds to international standard. Together, scientists of COB have produced a total of 101 publications in 2007 which is a very satisfactory output.

### 1.2 Research quality

The internationally most renowned and by all standards most visible group within department of Cell and Organism Biology (COB) is the Lund Vision Group This is the world's leading group of a most important part of vision research namely comparative research on vision systems of different animals, their functional principles as well as their evolution. As a consequent and most innovative extension of its research strategy, the Lund vision group has now teamed up with members from other disciplines and departments and formed a Center for Animal and Machine Vision (CAMVIS). This is a particular promising new area. Therefore, in our opinion this group gets a grading as *outstanding*.



Under the heading “Integrative Zoology” the Lund Vision Group is certainly dealing with aspects of neurobiology as well as groups that are found under the heading “Zoological Cell Biology”, which study nerve regeneration with extensions into very new and also innovative areas such as brain-machine interface. In addition, one further group is concerned with cell proliferation and is involved in research on the control mechanisms of cell-cycle and programmed cell death. There is also a group on gut development with international contacts and collaboration. These groups publish regularly in very good to good scientific journals and therefore can be ranked *good to very good*.

The research in genetics encompasses work on a very heterogeneous set of topics, from cell genetics to theoretical research on evolution of genetic systems. Many of the groups have had good, some excellent publication records, but for the rather small groups it is not easy to rise to the very top, especially as the groups are so heterogeneous. It seems that there is rather little actual interaction between the groups. Each group has their collaborations mostly outside their own department. Some of the research has potential for interaction, such as the evolutionary genetics group, evolutionary aspects of the yeast work or vertebrate phylogenomics. The group studying yeast genetics and enzyme evolution occupies a rather unique niche in the field of evolution and comparative research on yeast. It is one of the few European laboratories which combines a good knowledge of systematics based not only on classical phylogeny but also on physiological and biochemical approaches combined with genome sequence analyses. The publication output is very good and the group had a tradition of international collaborations. Its scientific status is increasing. In particular, vertebrate phylogenomics and the studies based, especially, on the mitochondrial genome, have been traditionally a very strong area in the department and have resulted in highly visible publications. The group continues to be active on an international level and to produce very good to excellent publications. The former head of this group has recently retired, directions by the new group leader include putting more emphasis on studying the nuclear genome. This necessary change in direction is just starting to show up in the publication record. In general, our rating for groups in genetics is from *very good to excellent*.

Microbiology was one of five independent departments that merged in 2002. Research in Microbiology is specialised about Gram-positive bacteria, and aimed at increasing knowledge about basic processes in

biology and detailed understanding of bacteria. ‘Aspects of Gram-positive bacteria are in focus also in several research groups at the Technical and Medical Faculties at Lund University’. From the information provided by the department information on Microbiology is rather poor. Microbiology of COB does not seem to be involved in special multi- and interdisciplinary activities of Genomic Ecology. This part of the department is also not described as a particularly strong and successful research area. Some good publications were found on the web and on-site discussions resulted in our overall assessment as *very good*.

In general, for an outside reviewer the diversity of COB is difficult to justify from a functional point of view as there exist collaborations across departmental borders (CAMVIS, experimental evolution, genomic ecology/ evolution) and much less within the department itself. As far as research is concerned the department could easily split or merge according to the future research areas pointed out by the department. Teaching should be organised across departmental borders, and should not be taken as an excuse for maintaining “old” structures which may not work. In particular, some subjects, for example genetics, can be found in various departments without clear collaborative connections. Potential for more collaboration certainly exists between COB and Ecology. Having all these groups centred in one location (“Biology Center”) would help immensely. However, at the level above the Department, there is an expressed wish to merge the Department of Ecology with Cell and Organism Biology. For two reasons, we caution against a precipitate merger without the full agreement of both Departments. First, the Departments themselves are still struggling to deal with the consequences of previous mergers. Second, across the world there is a trend for Biology Departments to divide into Cell and Molecular on the one hand and Whole Organism on the other. Despite its name, Cell and Organism is essentially Cell and Molecular while Animal Ecology has the potential to be rebranded Whole Organism.

### **1.3 Research infrastructure**

According to their own assessment the research infrastructure of the department is very good to good, and this seems to apply for all the different groups including those working in molecular biology, for example (microscopes, equipment for growth of microbial cells, equipment for cell disintegration, fractionation and component purification, large-scale production of recombinant proteins). The potent Lund Vision Group

requires a strong and state-of-the-art microscopy center with equipment ranging from confocal laser-scanning microscopy to transmission and scanning electron microscopy. It cannot be emphasized strongly enough that such a technical core unit should have enough technical support-staff and must not be affected by the “under-staffing in technical personnel” deplored by the department. As far as physiology, biochemistry, microbiology and molecular biology is concerned the list of resources given by the department sounds impressive and seems to be adequate for maintaining a high research profile. The rapid turnover of techniques and fast progressing sophistication of technical equipment makes it necessary that enough funds will be available for maintaining, repairing and replacing instruments, something that often seems to be a scarce resource once equipment has been bought.

#### **1.4 Collaboration, Research activity and teaching**

Again, from data and descriptions provided by the department itself, the activities within this given category can only be called impressive although this may vary enormously between the different groups of the department. In particular, the number of foreign visitors underline the attractiveness of this department for international guest scientists. In addition, the department also keeps a high number of contacts and collaborations with other institutes that may also be taken as a good indicator for the international as well as interdisciplinary approach in this department.

We believe that within the department the collaboration between individual groups is very different, perhaps with the Lund Vision Group being the most collaborative (as they all share a common research theme) with other areas in the department more or less consisting of individual groups forming the other extreme. This in itself is no problem as long as the individual group has a very high and international reputation and remains collaborations between other universities. From a departmental point of view it is certainly desirable if the department can be structured more around the future research directions. Usually retirements give an opportunity to adjust to future research plans and the department should be allowed to come up with its own ideas and solutions.

As far as we can tell the department is heavily engaged in teaching and we can only sympathize with this. It is one of the most formidable tasks of a university to teach and do research and, therefore, all attempts to separate

teaching and research should be strongly resisted. However, there should also be enough time for research, and administrative duties for research personnel including professors should be kept at a minimum. That in the text provided by the department such a statement was noteworthy, actually shows that indeed imbalances exist. Usually such imbalances do affect the research output.

### **1.5 Evaluation of future plans and future potentials and possibilities**

It is very clear that the Lund Vision Group with its already existing and planned activities into the field of biorobotics will be a real stronghold in the foreseeable future. It is a splendid idea to combine aspects of neurobiology and engineering in a teaching program (Master program) in neurobiology and robotics. We are convinced that this unique endeavour will be very attractive for students and hold enormous future potential. If such a master program is implemented fast this certainly would be a “first”, and correspondingly would attract talented students with special interests in this field. (*Outstanding*).

In our opinion a similar high potential for the future have the groups in neurobiology that deal with brain-machine interfaces. We feel that they should closely relate to the biorobotics groups and interactions between the CAMVIS program and the groups that are involved in attempts to study brain-machine interfaces should be strongly encouraged. Such studies also have enormous future potentials although, at the moment, they may still be only at the very beginning and, perhaps, less advanced than many of the biorobots that use vision or mechanical senses for orientation. Nevertheless, these groups will definitely contribute to further research progress. (*Very good*).

The department also points out cellular signaling as one of its future research areas, and we completely agree to its goals outlined in the provided material. Indeed, cellular signaling, which in many ways deals with basic principles in many different organisms, can act as a unifying theme for a lot of diverse groups. This diversity of approaches and systems is, of course, the result of a certain history. Although we do sympathize with this diversity, as it is still important for the purpose of teaching and can also bring in views and perspectives from other usually distant disciplines, we could imagine a more coherent organisation with respect to this topic.

If one wants to increase collaboration between the cellular signaling and the vision groups, for example, one could think of one additional group in neurobiology which examines signaling pathways of photoreceptors or related retinal cells and, thus, would act as an ideal “bridge”. (*Good*)

There is also a center for genomic ecology as an important possibility for collaborations between ecologists and geneticists. Some more projects could benefit from using genome wide resources, such as those on evolution in relatives of model plant *A. thaliana*. The genetics activities are carried out by 4 research groups; three of which focus on evolution. Such a focus on evolution appears very appropriate as an increasing wealth of untapped genomic data become available. In addition, the activity of the other genetics groups seems interesting, including those related to brain tumor, anti-cancer and anti-viral therapies but the provided data do not allow a further in depth assessment.

The plant biology activities concern 4 topics: Transgenesis, Redox biology, Map kinases, Calcium homeostasis. These rather classic topics are all important but one has to ask about collaborations and about the standing on the individual groups. As no further data were supplied and not much can be found in the text provided by the department nothing can be concluded.

### **1.6 Gender and equal opportunity issues**

There is always room for improvement on this particular aspect, although the percentage of women as research fellows, researchers and senior lecturers is quite impressive. On the professorial level, however, these percentages drop dramatically which is the usual picture in many European universities. This will only change slowly, we are afraid. One way of aiding improvement of more women choosing an academic career is to create some special programs which are designed for women and encourage them to plan a scientific career. Prerequisite of this is that the university provides enough help so that science and family can be combined. This should allow women scientists to be able to accumulate enough results for being competitive.

### **1.7 Concluding remarks**

If we understand the history of this department correctly it is the result of a merger between previously independent departments, and this may

explain its rather unusual “diversity” that ranges from neurobiology and genetics to plant physiology. In its own assessment the department points out that such diversity is required for maintaining the standards of teaching. Apparently, there was some pressure for this merger, which in our opinion only makes sense if the “teaching argument” is accompanied by some “functional research arguments”. However, such research arguments we can only see in a few subgroups.

At present the department is located in four separate buildings which clearly does neither aid the collaboration between groups nor does it provide a lot of arguments for a merger. The formation of a real department with its own identity, with true interdisciplinary collaboration and with a novel and innovative research plan can only be achieved if all groups will be located together in one building i.e. in very close proximity. In fact, as outlined by the department itself, moving the various groups of COB and the other mentioned departments such as Ecology and Undergraduate Studies in Biology, to one large building, thus forming a “Biology Center”, is the precondition for a successful and future fruitful merger. If such a single location or “Biology Center” does not materialise, all attempts in this respect are bound to fail as “virtual” units tend to remain “virtual”. In addition, only if groups share the same location can synergies in sharing large and expensive equipment be achieved. Thus, only if there is a clear commitment for a “Biology Center” can a merger and further new innovative research be successful beyond what are already successful research areas.

## **2. DEPARTMENT OF ECOLOGY**

### **2.1 Overall assessment**

The very large Department of Ecology is highly heterogeneous. The total number of scientists is listed as 150 (including Ph.D. students). The department resulted from a merger of six sections, which are even now quite independent (Plant Ecology and Systematics, Microbial Ecology, Animal Ecology, Limnology, Theoretical Ecology and Chemical Ecology and Ecotoxicology). Many of the scientists work on external funding, as a high proportion of the departmental funding comes from outside sources (about 50%). Collaboration between divisions seems good. Teaching is exceptionally well integrated.

Overall this group has produced about 200 scientific papers per year. During 2002–2007 the scientists have been involved in more than a dozen Nature or Science papers.

There are several groups with a high publication record, and a strong profile of their own. The animal movement group is at the very top internationally in its own original area. Parts of the animal ecology also rank in this group. The microbial ecology group has a strong original profile and an excellent publication record. Others publish extensively, but with less of an original Lund profile. Productivity overall is *very good*, quality ranges from *good to outstanding*. The department has a low level of external recruitment and scientists make few sabbatical or other long term visits. This poses a threat for the vitality and renewal of the department.

At the level above the Department there is an expressed wish to merge the Department of Ecology with Cell and Organism Biology. For two reasons, we caution against a precipitate merger without the full agreement of both Departments. First, the Departments themselves are still struggling to deal with the consequences of previous mergers. Second, across the world there is a trend for Biology Departments to divide into Cell and Molecular on the one hand and Whole Organism on the other. Despite its name, Cell and Organism is essentially Cell and Molecular while Animal Ecology has the potential to be rebranded Whole Organism.

## 2.2 Research infrastructure

The department has outstanding infrastructure for the different types of work. The specialty infrastructure, the wind tunnel, is a prerequisite for high quality research output in one specialist area. The basic greenhouse and animal growth facilities seem sufficient. The sequencing facility deals with a rather low number of sequences annually. For work on non-model organisms, in house facilities are useful. Chemical ecology also has its specialty needs fulfilled. There is no mention of plans to use high throughput sequencing methods for various research questions. This will certainly be a need for the future – the actual sequencing could possibly be from an outside (or at least university wide facility).

## 2.3 Research quality

Plant Ecology and Systematics papers are in general published in good and very good specialist journals of the field. The research combines plant

ecology and genetic approaches. The work also contains a conservation biology aspect. This represents solid work in its own area, combining the strong natural history background with population and quantitative genetics. More recently, an exciting small scale study in moss sperm movement by soil arthropods has received much attention. Rating is *good to very good*.

**Soil microbial ecology** has a long standing strong tradition in this area, including very well cited studies relating e.g. to assessing growth and activity of micro-organisms. The effects of anthropogenic changes have also been addressed. On this tradition, the division has built programs reaching into genomic ecology, where it now has a very good international standing. They were important partners in sequencing the *Laccaria* genome, and coordinate the *Paxillus* sequencing. Importantly, the division also has recruited expertise in bioinformatics. They are a well known group with their own strong profile. *Excellent to outstanding*.

**Chemical ecology and ecotoxicology** are two rather distinct areas. The well established insect pheromone work examines chemical communication and speciation. The recent papers seem to be published in rather specialist insect ecology journals, and a strong connection to the theoretical issues is not evident. The other group works on soil invertebrate ecology and communities: they have a rather applied direction and are involved in European collaboration. Publication is in good and very good specialist journals. *Good to very good*.

**Limnology** has a high diversity of topics, connected by the aquatic environment. The areas range from dissolved organic carbon to speciation issues, predator-prey-environment interactions, origin of dissolved organic matter. There is a strong component of environmental issues. Important collaboration on terrestrial sources of carbon to lakes (with leading US partners) resulted in a Science paper. Publication is mostly in general ecology or in aquatic ecology journals. The group has produced a research-based educational textbook by Oxford University Press. Productivity and quality overall are rated *very good to excellent*.

**Animal Ecology** lists among its prominent research groupings: **Avian immunology and parasites** (malaria). The key studies here are on avian malaria. The Department is certainly a player on the world stage but given the potential of this subject the impression is that the level of output should have been higher. An important research paper appears



less often than once a year, often in collaboration with other research groups. Immune mediated competition and cryptic speciation are important topics here and more should have been done to develop them as well-funded central research themes, rather than the subject of occasional papers. The current grading is *very good*.

**Biodiversity and conservation ecology.** This is a very mixed group of research projects, generally working at a local or national level. Research papers tend to be either very specialist or published in specialist journals or both, although there are exceptions when populations in different countries are compared. For such a diverse grouping, not many papers are published each year, and few are in top-flight journals. Taxonomic coherence is weak – it seems that individuals stick to working on their own taxon, and the grouping has been put together for pragmatic reasons rather the use of common methodologies or tools. The current grading is *insufficient to good*. However, it is important to bear in mind that conservation biology must be carried out on the ground and local centres are desirable, so the relatively parochial nature of the group at Lund does not mean it should be abandoned.

**Molecular evolution.** This is a huge and varied area, which is virtually impossible to evaluate as a whole because it is so heterogeneous in quality of work. Very standard molecular tools are being used to answer the sorts of questions that are being tackled in many other universities. Evolutionary ecology is a case in point, with Lund being perfectly adequate but having no identity of its own. In contrast the avian malaria work has the potential to mark the Department apart. Conservation ecology is an area that no organismic ecological department can ignore, but there is a lack of focus with a clear need to identify the Department's potential position as a world research leader. The overall assessment is somewhere *between good and insufficient* for an overall grading, with the exception of those working on migration and flight energetics, which are in a different class.

Within the subdivision Animal Ecology of the Department of Ecology very strong and internationally known groups on animal migration and flight energetics exist. This special area of animal migration and movement is a unique endeavour with also unique facilities such as a special wind tunnel equipped with state of the art velocimetry. This unit is also equipped with radar and satellite-based radio telemetry including GPS-based location systems for studying migrating birds. There are also good facilities

for experiments in the laboratory. From its international standing, field of research and from some very good publications in high ranking scientific journals this group gets our ranking *excellent with a tendency to outstanding*.

These unique technical opportunities and the collaboration within the department makes the group on biomechanics and functional morphology one of the best known international groups for the evolution and kinematics of animal flight such as birds and bats. In this combination of theory and practice and with respect to its international visibility this group certainly merits the rank *outstanding*.

There may also be interesting collaborative potential and “cross fertilization” with the CAMVIS groups. This could be taken as a further argument for a closer collaboration of the Department of Cell and Organism Biology and Ecology, in particular there should be a commitment to have the two in one location, i.e. a “Biology Center”, without the need for a formal merger.

## **2.4 Collaboration**

This broad department offers many opportunities for collaboration between different groups. The animal migration and movement group has collaborates with theoretical ecologists and molecular ecologists. Plant ecologists and soil ecologists joined forces in an interesting report on sperm movement by arthropods. Further collaborations are between departments, e.g. with Physical Geography and Ecosystems. However, collaborations with the COB geneticists or evolutionists seem scarce. The department has attracted a high number of visitors. It seems, however, surprising that of this very large group of scientists altogether 18, (i.e. 3/year) made a research visit abroad. Not surprisingly, such faculty or post doctoral visits can be very fruitful for renewal of the department and its research themes (see Råberg et al. 2007 *Science*).

## **2.5 Research activity and teaching**

The Department engages in broad undergraduate and graduate teaching, seemingly better integrated with research than in many other Swedish universities. The recent starting of a Research School in Genomic Ecology is a welcome addition. The department lists about 50 Ph.D. students as personnel, but nearly a 100 Ph.D. students are registered, and the number 75 is given on p. 8. On average 17 Ph.D. are produced. Mostly Ph.D. training seems quite efficient, with average time of 4.5 years.

## 2.6 Evaluation of future plans

Overall, most of the future plans are presented at a general level, and it is not easy to evaluate them.

**The Center for Genomic Ecology** and the associated Research School represent very good initiative. The center will serve many groups in the department. It will provide possibilities for e.g. gene expression studies. Importantly, there is also bioinformatics expertise for genome annotation or comparative genomics etc.

Most genomic centers would be busy thinking about how best to take advantage of the high throughput sequencing applications to tackle important questions with the new tools. The plans here are at a very general level, and do not seem to engage very much in sequence level methods for within population studies (as also suggested by the moderate numbers of sequences analysed at the center). If the plan is to get such analyses done outside the university, one would still have expected to see this discussed.

It seems that Lund ecology lacks in depth expertise in analysis of population genetics of sequence variation, or of population genomic studies. Many of the groups list topics such as speciation and adaptation at the molecular level. For these topics, analysis of sequence variation is a very powerful tool, naturally combined to other approaches.

**Experimental evolution.** The plans for are so vaguely describe it is not possible to really evaluate them.

**Plant Ecology and Systematics.** The studies on gene diversity and habitats will aim at moving to a more explicitly genomics based approach. It is clear that this approach will demand much focus, in terms of species and systems. Since quite much work is already going on internationally in this area, the groups need to consider where their special strength is. The plans to expand studies related to the recent findings of sperm transfer in mosses are also quite vague.

**Chemical ecology and toxicology.** The future plans of this division are a mixture of rather vaguely stated general issues (speciation), but then go on to discuss technical issues such as heterologous expression of genes. Speciation studies are widely conducted, it is not clear what the specific Lund contribution will be here. The section on soil ecology also gives just very general description.

**Microbial ecology.** The genomics of fungal interactions with plants or colonization of litter will provide extensive opportunities for exciting research. The group has wisely already focused on a specific important species, *Paxillus*, and the expertise is there to take much advantage of the soon to be available full genome sequence. The plans are quite broad ranging, also for the other areas of microbial ecology.

**Animal ecology.** The department maps out futures for three components of animal ecology:

**Molecular and evolutionary ecology.** Within this, the suggestion is that avian malaria should do well as a research topic – that seems correct – but the suggestion is to move forward into emerging diseases, virulence, host resistance and tolerance. That is a far too wide a potential portfolio. Many large departments, often with medical support are working on those topics. Avian malaria is different and we suggest that it is used as a model system to study particular, defined problems.

The second area here is whether the same genes are involved in the evolution of similar adaptive traits in related species. Five broad taxa are suggested using four lines of approach. Again, that is wildly optimistic. A proper consideration of the literature is needed here because recent work in development means that it should be related specifically to the questions asked here – you are ignoring evo-devo, which has already said a lot about this research area. If this whole section is properly re-evaluated, it has the potential to develop successfully.

**Conservation biology.** The proposal here is to develop further a series of international collaborations. That is generally a good thing, but the lack of specifics concerning the questions to be answered by the different parties of the collaborations means that this is impossible to evaluate. Landscape ecological approaches to conservation biology are not, as argued here, new.

It is clear that the excellent areas of animal migration and movement research should enjoy the continuing strong support by the university. In addition, according to the information given by the department, the animal movement research group also collaborates with groups exploring the genetic basis of orientation behaviour. This is a “hot-spot” of research on migration and a very promising future area that combines behaviour

with genetics. Therefore, a Center for Genomic Ecology (CGE) is a very welcome addition, also for this research group.

**Limnology.** The plan lists many important areas, but at a very general level. They plan to continue in the areas of strength. Plans on how to include molecular genetic tools are not described.

**Theoretical ecology.** The section on the future of theoretical ecology is poor. The paragraph on community ecology and evolution is vacuous. How are we supposed to map genes on to communities! The role of theory in ecology is well established as is the role of theory in evolution, and in evolutionary ecology. Generally, theoretical biologists work well in association with active observation, or experimental research groups who need their support to formulate testable models. The value of neural networks has long been posited and is currently frequently criticised as not having delivered. There is no explanation for why it should deliver here.

## 2.7 Future potentials and possibilities

The department has a very broad agenda, which allows for multiple collaborations. Combining expertise between areas has already had interesting results, but many more such opportunities can be found in the future. To efficiently combine the genomics possibilities with the existing expertise e.g. in animal migration still lies ahead.

The very good ecology base is now being combined with genomics. It seems that overall, relative to the number of ecologists, there is very little quantitative genetics or population genomics. These seem like very necessary ingredients for bridging between ecology and genomics. Bringing in more of such expertise could be quite productive.

During the last five years, there have been 22 recruitments (not specified at what levels), of which 15 have been filled with internal candidates. Visits (longer than 3 months) to other labs were rare. This may pose a threat to the renewal of the research in the department. The lack of external recruitment may be a serious (university wide) issue.

Lund University in general has been quite successful in obtaining “Centre of excellence (Linnaeus, Berzelius)” support in many areas. However, there is currently no such center in ecology, even if this is a very

large department. This issue requires certainly some consideration of the department's leadership.

## **2.8 Gender and equal opportunity issues**

Statistics show that there are 2–3 females among the about 20 professors, 22 % of academic staff are women, which is quite low. Half the doctoral students have been women for many years, but even the younger researcher classes contain few women. With the predominant internal recruitment, it will be difficult to change this situation rapidly. The committee recommends that the University puts extra effort to recruiting outstanding female scientists.

## **3. DEPARTMENT OF GEOLOGY**

### **3.1 Background**

The Department of Geology forms part of the Geobiosphere Science Centre (CGB) along with the Department of Physical Geography and Ecosystem Analysis (INES). From 2009 the two departments will form a federation and will be unified into a single department in 2012. Research activities are divided into two sub-areas: Quaternary Science and Lithosphere-Palaeobiosphere Science.

The number of academic staff has remained steady between 2003 and 2007; however the number of permanent positions has fallen. The number of doctoral students has also remained largely steady over the reporting period, but there has been an increase over the past two years. Production of publications per academic FTE has risen over the reporting period. For peer-reviewed journal articles the figure has risen from two to three per person per year, which is very good for this field. Nevertheless it is clear that not all members of the academic staff are equally active in terms of research outputs. A parallel drop in conference papers, book chapters and papers in national journals may partly reflect a switch in publishing strategy.

There is a promising upward trajectory of research income for the reporting period (almost doubled). Until recently EU income has represented only a small proportion of total research income.

The department has exceptional research facilities in some areas, including world-class Ar-Ar and C14 dating laboratories that serve both

sub-departments, attracting research collaborations both nationally and internationally. It has maintained post-graduate enrolment against national and European trends. There has been a drive to recruit promising younger staff, which has created a department, especially in Quaternary Sciences, that is dynamic and relatively young in average age. The new generation of scientists is interdisciplinary in outlook, which promises well for intra-and inter-departmental and institutional collaboration. The major threat to strong future development is the insecure employment situation that underlies a lack of recruitment to permanent positions, potential high levels of stress among staff, and an inability to plan clearly for the future

### 3.2 Summary evaluation of research

#### Quaternary Science

Quality:	<i>Outstanding</i>
Productivity:	<i>Outstanding</i>
Relevance:	<i>Outstanding</i>
Vitality:	<i>Outstanding</i>

#### Lithosphere-Palaeobiosphere Science

Quality:	<i>Very good with some aspects excellent-outstanding</i>
Productivity:	<i>Very good with some aspects excellent-outstanding</i>
Relevance:	<i>Very good with some aspects excellent-outstanding</i>
Vitality:	<i>Very good; some aspects excellent-outstanding</i>

### 3.3 Comments at sub-departmental level

#### 3.3.1 Quaternary Sciences

Quaternary Sciences includes seven definable groups with strong overlap among groups.

##### 3.3.1.1 Research infrastructure

Quaternary Sciences is exceptionally well equipped with major infrastructure units that support departmental, national and international research, and which also make contributions to other disciplines (e.g. archaeology): a new state-of-the-art Accelerator Mass Spectrometry (AMS) dating facility, and a palaeomagnetic/mineral magnetic laboratory and an Argon-Argon dating laboratory, all of which are unique within

Sweden, international in reputation, and which support both the major disciplinary themes in Lund Geology. Two further nationally important units focus on wood and ceramics.

### 3.3.1.2 Research Quality

Quaternary Sciences highlights three themes of particular importance, all of which emphasize physical processes and change in the Earth system.

#### **Glacial and climate history of glaciated areas with emphasis on polar regions**

- Quality: *Outstanding*; a well-established reputation for studies in this area is continued today. Major contributions to understanding of responses of glacial and related systems to climate change, especially in arctic and amphi-atlantic regions. Publications in highly-ranked journals are well cited.
- Productivity: *Excellent* (particularly as regards research theses)
- Relevance: *Outstanding*; advancing knowledge in this area has gained substantially in international importance with the awareness of impending climate change.
- Vitality: *Outstanding*; a strong group that has input to the international science arena through participation in international committees.

#### **Palaeomagnetism and cosmogenic radionulides**

- Quality: *Outstanding*; this is a relatively new field and major contributions in development of technique and applications have been made by the Lund group.
- Productivity: *Excellent*, high-quality.
- Relevance: *Outstanding*; knowledge of solar variability is critical to climate change issues and to accurate dating of past events. Findings published in the most highly-ranked general interest science journals (Science, Nature) and used by the IPCC AR4.
- Vitality: *Outstanding*; exciting new field.

#### **Palaeoclimate, palaeoecology, palaeoceanography, biogeochemical cycles since the last ice age**

- Quality: *Outstanding/excellent*; a broad range of issues addressed, many within international collaborations, some at the forefront of reconstruction techniques.



- Productivity: *Outstanding*, especially with regards to PhD theses. This is a broad area with numerous staff involved and encompasses many of the articles produced by Quaternary Sciences.
- Relevance: *Outstanding*; wide-ranging implications for understanding climate change, and responses and mechanisms of physical and biotic systems to change, including human-induced change.
- Vitality: *Outstanding*; large group with several new junior staff.

### 3.3.2 Lithosphere & Paleobiosphere Sciences

Lithosphere & Paleobiosphere Sciences includes three main research groups, between two of which (B & C) there is significant overlap:

- A: Magmatism, large-scale deformation and terrane analysis in space and time
- B: Faunal and floral evolution and environmental change in the geological record with particular emphasis on the Palaeozoic and Mesozoic (60-600 Ma)
- C: Global environmental events

Included within this grouping is the core expertise needed to support the undergraduate curriculum in Geology.

#### 3.3.2.1 Research infrastructure

Research activity is supported by the world-class Ar-Ar geochronology laboratory and the palaeomagnetic/mineral magnetic laboratory. Many of the research facilities that one might expect to see in a Geology department with interests in “hard-rock” geology are, however, conspicuously absent (e.g. XRF, ICP-MS, electron microprobe, radiogenic isotope geochemistry), although access to such facilities is possible via collaboration with other universities in Sweden and internationally.

#### 3.3.2.2 Research Quality

Lithosphere and Palaeobiosphere Sciences highlights three research areas of strong national/international impact.

#### **An astronomical perspective on the evolution of life**

- Quality: *Outstanding*; recent high profile recent publications in Nature and Science involving collaborations with leading scientists in this field internationally.

Productivity: *Excellent-outstanding*.

Relevance: *Outstanding*; Lund's research in this exciting new research field has gained substantial international interest; unique research niche.

Vitality: *Outstanding*; a relatively small group that has significant input to the international science agenda; ranked in the top 2% of all science disciplines by the Swedish Research Council.

### **Evolution of the biosphere**

Quality: *Excellent*; Lund has a long history of research in this field extending back to the 19th Century. The emphasis of the research has shifted in recent years away from more traditional palaeontological and taxonomic activities to a more integrated Earth System science approach.

Productivity: *Excellent-outstanding*; high-quality outputs (over 100 publications in international journals since 2003) and a good record of PhD theses (7).

Relevance: *Outstanding*; essential to understanding the Deep Time aspects of environmental change

Vitality: *Excellent*; exciting renaissance and revitalisation of a core research strength of the department; strong international collaboration.

### **Timing of break-up and assembly of continents**

Quality: *Excellent*; this represents one of the traditional strengths of the Geology department in Lund. Although some of the strong research leaders in this field now have Emeritus status they continue to publish prolifically.

Productivity: *Good* (50 papers), especially with regards to PhD theses(6). This is an interdisciplinary research area.

Relevance: *Good-excellent*; provides fundamental understanding of the evolution of the Earth; However, whilst there remains important research to be done, this type of research is receiving less attention internationally and will become increasingly difficult to fund. Much of the work described will provide incremental additions to the knowledge-base but is unlikely to lead to paradigm shifts.

Vitality: *Good*; although there are a number of senior academic staff in this area whose research can be categorised as fairly traditional.

### 3.4 Evaluation of future plans

#### 3.4.1 Quaternary Science

**Choice and formulation:** *Good* (but room for improvement – see below).

The formulation is broad; current interest in climate change and the Earth system means that Quaternary Science sensu lato promises to be an expanding field in the future. Strategically, a number of highly qualified junior staff members have been hired in recent years. Their expertise, coupled with existing expertise, covers a wide range of techniques and questions. A flexible model is advocated, which should allow an opportunistic response to VR and EU funding calls.

**Integration:** *Very good* – integration has been demonstrated to date and promises to continue in the future, but this is not explicitly stated.

**Infrastructure:** *Outstanding* in the area of Quaternary Science – state-of-the-art infrastructure and dating facilities places this department ahead of any others in Sweden and gives it international standing.

**Room for improvement:** There might be room for improvement in the formulation of their strategy. The description provided is a ‘shotgun’ approach to planning for the future. There is no clear mapping on to national or international research priorities in basic research or applied research that is related to global environmental change (past, present and future). Environmental change is becoming a fast-moving field technically, and the current expertise covers many angles, which is clearly beneficial. One reason for the lack of a more focussed strategy may be the insecurity of tenure mentioned in the SWOT: hopefully some of the new staff will be made permanent, but this is not guaranteed.

In Quaternary Science, the list of 10 (or more) areas of interest could be more tightly aligned into several overarching issues, for example, i) refinement of dating and chronologies of environmental change to improve understanding of mechanisms of change, ii) understanding key components of the Earth system under climate stress, and iii) understanding of humans in the Earth system (links clearly to INES). A clearer statement of the key themes in which Lund is already or could be a world leader might strengthen/maintain the potential the Quaternary Sciences clearly has (and is intimated elsewhere in the submitted materials) to lead large research bids and shape new themes, rather than being merely responsive.

### 3.4.2 *Lithosphere & Palaeobiosphere Science*

**Choice and formulation:** The group has identified two research areas which it would like to develop in the next 5–10 years:

#### **Earth system and Planetary Changes: impact on life**

##### **Timing of geological events and calibration of the geological time-scale**

These research areas complement each other very well and could help to position Lund as one of the internationally leading departments in the field of global environmental change and Earth System Science research. Research activity is centred around a dynamic group of young researchers who could secure a promising future for the CGB if permanent positions can be found for them.

**Integration:** Significant work is needed to build an interface with the Quaternary Science and INES research groups.

**Infrastructure:** Whilst there is state-of-the-art infrastructure in geochronology (Ar-Ar and C14 dating), elsewhere there could be a need for significant investment in analytical infrastructure (for example in O and radiogenic isotope facilities and major/trace element analysis) if the centre is to realise its research ambitions. Such facilities would need to be supported by the hiring of appropriately skilled academic and technical staff.

**Room for improvement:** There needs to be some radical strategic thinking about the relationship between the research and teaching agendas and also about future hiring strategies; also about whether there needs to be a better research base in analytical geochemistry.

### **3.5 Future potentials and possibilities**

**Lund Quaternary Science** has tremendous potential. Technically it is one of the most advanced centres of Quaternary and related studies in the world, with its concentration of key infrastructural resources and expertise. The hiring of a range of new staff promises innovation, but there should also be integration around key research areas of national and international importance. The concern about reliance on basic funding is to be noted; however, understanding the Earth system and climate change requires basic and applied approaches and the department is in an outstanding position to carry out such research. Possibilities for applied research appear promising via integration and collaboration within INES, where

themes in Geography overlap (e.g., terrestrial processes in the climate system, and climate/land-use change impacts on ecosystems and society). Furthermore, the largely empirical emphasis in Quaternary Science could be complemented by the modelling capability within INES.

**Lund Lithosphere-Palaeobiosphere** research has significant potential within the framework of the new Geobiosphere Science Centre in providing a Deep Time complement to the research in Quaternary Science. However to achieve its full potential further radical changes will be required which will involve more careful focussing of research activities. These have implications for staffing levels in key areas and the need to maintain sufficient breadth of expertise to teach the undergraduate curriculum in Geology.

### **3.6 Comments at departmental level**

#### *3.6.1 Gender and equal opportunity issues*

The percentage of degrees awarded to female doctoral students has remained steady at 35-40% over the past 10 years. The proportion of women in academic positions is lower and most are represented in the Research Fellow category, which is not a guaranteed permanent position. There are no female professors. Ideally, this situation should be improved. The Faculty states there are programmes in place to enhance the environment for women and encourage promising young academics, e.g., mentoring, dedicated funds. However, the current insecurity in the academic job market, as mentioned in the SWOT, may affect women disproportionately.

#### *3.6.2 Collaboration*

Individuals and groups collaborate with other institutions nationally and internationally and participate in international activities. Staff members are well networked, and the world-class dating facilities enhance collaboration within and beyond the University. Staff members have realized the potential for intra-departmental collaborations that is reflected in the overlapping interests of research themes.

#### *3.6.3 Research activity and teaching*

Academic staff members are active researchers, which feeds into teaching at all levels. The department produces a steady stream of MS students

whose thesis projects largely reflect and form part of ongoing research. A post-graduate studies committee oversees provision of training and post-graduate courses. They appear to be maintaining numbers in post-graduate education, despite a European trend of declining interest (no data on undergraduates).

## **4. DEPARTMENT OF PHYSICAL GEOGRAPHY AND ECOSYSTEMS ANALYSIS (INES)**

### **4.1 Overall assessment**

The current department (from 2002) is a result of a strategic merger of the former Department of Physical Geography with a group of plant ecologists from the former Department of Ecology. This merger appears to have led to re-invention of the department, which is now strongly focused on the basic understanding of earth-system processes and the human impact on the earth system, with particular emphasis on terrestrial vegetation. These themes fit well with future research directions at national and international level. The department comprises a total staff of 59 (24 academic staff, 11 doctoral students, 24 other personnel), with specific breakdowns by job title, age, gender and permanency of post as follows.

#### **Academic staff:**

Four Professors, mean age 56, 0% female, 100% permanent

Eleven Senior Lecturers, mean age 46, 18% female, 91% permanent

Nine Research Fellows, mean age 38, 56% female, 0% permanent

#### **Doctoral students:**

Eleven, mean age 32, 73% female, 0% permanent

#### **Other personnel:**

Twenty-four, mean age 42, 33% female, 63% permanent

Using this analysis, the age structure among researchers appears slightly more balanced than for some of the departments at Lund in the biogeosciences. There is a recent appointment as an adjunct professor to expand an ongoing close collaboration between the Swedish Meteorological and Hydrological Institute (SMHI) and INES. Further appointments concerning ocean carbon cycling and biogenic volatile compounds / aerosol measurement are in progress.

INES is a forward-looking, go-ahead department. Its research is multi-disciplinary, interdisciplinary, spans a range of scales, and has a reputation for being leading edge. The department contains a mix of experimentalists and modellers, ideal for combining and integrating process and impact studies.

Overall, the department appears good at winning grants for research income. This funding stream has increased 2006–2007. The number of original articles in refereed journals has increased markedly (from 29 to 70) from 2006–2007. Indeed, the publication rate has risen from ~2 per capita to >3 per capita over the reporting period, with the strongest increase in peer-reviewed academic journals: there is also an increase in popular science publications. Doctoral exams and thesis publications have remained relatively steady in the face of declining national/European student interest (although it is likely that climate change is an area of greater interest than some others).

The organisation of staff within INES is impressive. Academically, the department has a 'flat organisation with the individual researchers as the basic unit' that results in the department being 'more flexible and dynamic than having divisions'. Six team leaders stimulate cross-fertilisation/collaboration and aid better co-ordination of applications and future directions for research. From an administrative viewpoint, INES has a small administrative team of ten people, including a professional economist, which now (since 1 Jan 2008) manages the department jointly with Geology (a total of 50 academic staff). If this works well, this is remarkably efficient. One aim of this impressive internal organisation is to aid in increasing and maintaining the department's position in rankings and assessments.

Senior academics are active leaders in international research programmes of multidisciplinary character. INES has the co-ordinating role in a Nordic Centre of Excellence for the study of the C cycle and its interaction with the climate system. Members of INES lead 40 national projects, and are actively participating in 21 EU projects 2003–2007. INES hosts a Marie-Curie Excellence Team on surface-atmosphere exchange processes. Basic and applied research is carried out. INES has a high profile within the wider research community and with the general public. Results have supported policy initiatives and international climate assessments (e.g. IPCC, Arctic Climate Impact Assessment). The list of publications is

impressive: the publications are broad-ranging, international and at the forefront of the area in a range of high quality journals.

The authors of the self-assessment state that INES is within the top 10% of similar departments of this type in the world, and this is undoubtedly correct. The research has world-leading qualities. [It is therefore surprising that there are no significant prizes or awards (2003–2007), but perhaps this is because the research lies within a novel discipline].

#### **Overall assessment**

Quality: *Outstanding*

Productivity: *Excellent to outstanding*

Relevance: *Outstanding*

Vitality: *Outstanding* (see Opportunities in SWOT analysis) with reservations [see Weaknesses in SWOT analysis e.g. is the future based on one or two key people, there is a high dependency on short-term external funding (this may improve with the new funding model based on the number of teachers), Swedish funding is not promoting multi-institute projects].

#### **4.2 Research infrastructure**

The department has strongly invested in (outstanding) infrastructure related to quantification of atmospheric gas composition, and land-atmosphere gas fluxes. These areas are strong components of the current research agenda. The laboratories are well equipped by the department's own assessment, with very good special capabilities. The advanced computer cluster is critical for modelling activities. It is very good that the experimental chambers have freezing capacity. The department has an interesting seminar programme, containing international speakers.

#### **4.3 Research quality**

##### **Terrestrial processes in the climate system**

This focus (ecosystem carbon sink/storage/release at large scales) has attracted major political attention. The research concerns the sound scientific basis for implementation of political actions to mitigate climate change. Another strong research theme is measurement of trace gas fluxes, including biogenic volatile organic compounds, and their feedbacks to climate change.



Quantification of greenhouse gas sources and sinks, emissions, and feedbacks are critical to earth system science and the understanding of climate change. The department has a strong international profile in this area and this research theme has resulted a paper published in Philosophical Transactions of the Royal Society in 2007. The Head of Department leads the Nordic Centre of Excellence for the study of the carbon cycle.

Quality: *Outstanding*  
 Productivity: *Outstanding*  
 Relevance: *Outstanding*  
 Vitality: *Outstanding* (with reservations)

### **Vegetation-land surface characterisation**

The second theme is less clearly articulated. There is an emphasis on the LPJ-GUESS vegetation model (originated in Lund) for which the Lund group deservedly maintains an international reputation. Other current work includes remote sensing of land cover (data and technique), the incorporation of remote sensing data and field data, together and separately, in modelling various land-surface and land-atmosphere processes. There is clearly much potential for intra-departmental collaboration, but key questions for this theme are not articulated. Papers are highlighted in Geophysical Research Letters, Global Change Biology.

Quality: *Outstanding in part*, but rather dependent on one or two key people  
 Productivity: *Excellent to outstanding*  
 Relevance: *Outstanding*  
 Vitality: *Outstanding with reservations*

### **Collaboration**

Within the department: 'New scientific management group is intentionally set up in order to improve internal interactions'.

Within University: Active collaboration with Departments of Ecology, Physics, Environmental Sciences and Geology. Collaboration is mostly in joint research projects and shared PhD students. INES hosts the GIS Centre for the University of Lund.

International research programmes: *Excellent*, as detailed above in Overall Assessment.

### Research activity and teaching

A new curriculum appears to be in operation, based on the department's research profile. All bachelors and masters students come into close contact with high quality research, performed with active research groups. Permanent research sites are used for field studies for teaching: this is an excellent idea, benefiting all concerned. Successful international masters' programmes operate e.g. Joint Nordic Masters' programme. According to the self-assessment document, INES is one of the few departments within the biogeoscience field that has been able to increase the number of students during the last five years.

## 4.4 Evaluation of future plans

### 4.4.1 Promising research directions:

Some of these are in opportunities of SWOT analyses e.g. (1) Linné grant and joint research effort with geologists, physicists and microbiologists in a Centre of Excellence on Carbon Cycle and Climate Interactions [Could include freshwater C balance and thus link with limnology in Department of Ecology], (2) leading role in SWECIA, a new interdisciplinary research programme expected to become a national flagship for climate, impacts and adaptation research and stakeholder support in Sweden, (3) establish a new research field on marine carbon balance modelling, (4) Establish collaborations with other centres e.g. Bjerkenes Center for marine models, Swedish Meteorological and Hydrological Institute (SMHI) and other universities for Earth system models.

### (a) Processes and geochemistry-climate feedbacks in the fully coupled surface-atmosphere system

Paper in *Geophysical Research Letters, Journal of Ecology*

#### Future plans:

Formulation of plans:	<i>Excellent</i>
Integration of plans:	<i>Very good</i>
Adequacy of infrastructure:	<i>Excellent</i>
Suggested improvements:	How about an integrated research effort with limnology (freshwater ecology/ hydrology in Department of Ecology) in relation to the carbon cycle?

(b) The societal feedbacks on the Earth System. Put together with (c) because similar to (b).

(c) The impacts of climate / land use change on ecosystems, services and society

#### 4.4.2 Future plans:

Formulation of plans:	<i>Excellent</i>
Integration of plans:	<i>Very good</i> – seems more risky, little done so far by this Dept on societal feedbacks
Adequacy of infrastructure:	<i>Very good</i> . Excellent within Sweden, otherwise depends on European collaboration / funding
Suggested improvements:	Is there any University-provided start-up money for this subject? Perhaps to help provide links to Europe?

#### Future potentials and possibilities

The future strategy unites the current internationally recognized strengths of the department around an area of global importance: modeling trace gases within the earth system with an emphasis on terrestrial ecosystems. The department can also currently deliver on impacts of change on ecosystem services. To bring in the human dimension would be excellent and undoubtedly map onto key national and international priorities, but it is less clear how this would be done (but see suggested action to merge with Environmental Sciences).

The future strategy should focus on the most interesting and rewarding avenues of research out of the several highlighted, especially if the opportunities in the SWOT analysis are included. It is very important that basic support for lab, field and computing facilities is maintained. There is a high dependency on external funding within INES, although the department is very good at gaining this type of support. The fact that funding within Sweden is not promoting large multi-institute projects may hinder development of particular themes.

Related questions and comments: What is the future of research at Abisko Research Station, linked with the future of Abisko Research Station? What is the future relationship with the Environmental Science Department?

#### **4.5 Gender and equal opportunity issues**

In INES, there is a familiar, slightly depressing, story of the highest proportion of females being in non-permanent posts. INES state as a SWOT opportunity to: ‘Create permanent positions in (narrow) fields where we have strong female candidates with large potential’. This would be helpful, but is a ‘quick fix’ in a way. There is a need at Department/ University level to provide as supportive environment as possible to convert 73% female doctoral students to research fellows to permanent posts. (Would it be possible for the University of Lund to provide flagship initiatives within Sweden on this?)

Noted in the self-assessment document, there is a ‘good mix of different nationalities’ within the department. This appears to be true from the INES web pages.

### **5. BIOLOGICAL MUSEUMS**

#### **5.1 Introduction**

We are assessing the botanical and zoological museums on the basis of their research performance. The museums have other functions. For example, they house large numbers of specimens, many of them type specimens, and thereby provide a necessary service for researchers.

The Museums describe in their joint research profile the effort that has gone into developing their searchable databases. We acknowledge that has happened, but the databases are not themselves significant research enterprises in that they are not path breaking and likely to be copied by others. They have, however, allowed the collections to be accessed by the worldwide web’s Global Biodiversity Information Facility (gbif).

Another component of the Museums’ research profile is the work performed on the systematics and taxonomy of two taxa: lichens and dipterans. This is classificatory work, which needs to be done, but the extent to which it should be considered primary research is difficult to assess. Our examination of the publications records of the two museums shows that while output has increased over the time period, the work is not published in high impact journals or ones that are widely cited. It can be argued that taxonomic treatises are scholarly works that will not be referred to frequently but are invaluable in the much longer-term.

World-leading museums generally have research scientists of the highest calibre leading research groups that do work associated with the mission of the museum. They may work on biological questions related to the collections (e.g. biogeographic or evolutionary) or on questions relating to any similar collections (e.g. how best to construct evolutionary trees that demonstrate phylogenetic relationships).

We believe that it would be wrong to destroy the traditions of taxonomic or systematic expertise that the Museums have accumulated over many years, but we also believe that the time has come to determine biological research questions of international profile that involves, for example, lichens and dipterans. We note that the average age of the two professors and three researchers is 63 and 53 respectively. It would seem that a relatively painless transition period might be envisaged if the appointment of the new professors involved a panel that was cognisant of the needs for the museum staff to be involved in internationally-recognised high-impact research.

## **5.2 Overall assessment**

The two museums hold internationally valuable collections. At present the research base at the museums is not of high international quality, but with impending retirements there is the potential for new appointments who seek to answer scientific research questions of contemporary interest.

## **5.3 Research infrastructure**

Until new appointments are made it is impossible to say what research infrastructure will be needed.

## **5.4 Research quality**

The current research quality is *insufficient*, focusing as it does on classification and systematics of specific taxa, without addressing broader methodological issues of systematics or more general evolutionary questions.

## **5.5 Collaboration**

National and international collaborations are in place, but in our view the collaborations are not the ones necessary for tackling cutting-edge

scientific questions. For the efficient use of the collections, collaborations with nearby Danish and other Swedish systematists will be important

### **5.6 Research activity and teaching**

The museums cannot take on their own graduate students and do not teach their own undergraduate courses, though staff do contribute to supervision and teaching elsewhere in the University.

### **5.7 Evaluation of future plans**

We found the future plans insufficiently specific for comment. We agree that DNA comparison for the basis for contemporary phylogeny reconstruction and a facility in a museum, or access to a facility elsewhere, is very likely to be necessary. Construction of a new museum is not just a research question, because the new building will be there to house collections and give access. Research facilities should be properly incorporated in the design of the new building and the new professors should be involved in that design.

### **5.8 Future potentials and possibilities**

The Museums hold internationally important collections with many type specimens. As such, it should be fairly easy to attract visiting research workers with dynamic leadership. The research fields of replacement appointees might be very different from their predecessors: research excellence should take precedence. However, we feel that part of the assessment process should involve considerations of continuity, perhaps involving dipterans and lichens. Research at the Museums seems ready for revitalisation and the possibilities are only limited by the calibre of new staff that are appointed.

### **5.9 Gender and equal opportunity issues**

The numbers here are very low, but traditional systematics and taxonomy has a majority of male scientists. If the research profile of the museum is broadened, this may provide wider appointment opportunities (male and female).

# PANEL 13 – PHYSICS / MATHEMATICS

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## 1. INTRODUCTION

### 1.1 General introduction

The panel felt it was a great pleasure to review the physics related activities at Lund University. Physics is not centred in a single department but spread over four different departments, where the Department of Physics by far is the largest, but physics is also included in the Department of Theoretical Physics, Lund Observatory and the Department for Electrical Measurement. The evaluation in panel 13 also included the Department of Mathematics, although that is not directly related to Physics. The Department of Physics also includes MAX-lab.

The physics related research at Lund University is *excellent to outstanding* and is one of the crown jewels of the university. Several groups are not only at the cutting edge of international research but are setting the cutting edge. This includes in particular the Lund Laser Centre, the Nanoscience Consortium MAX-lab and accelerator physics, but also the combustion physics, high energy physics and computational biology.

### 1.2 Staff

The Department of Physics and the Department of Theoretical Physics have outstanding scientists among their staff. These scientists have had the vision, outlook and skills to create and open new scientific areas and to attract and educate excellent students and new staff.

The staff of the physics departments is to a large extent educated at Lund University. This is a special artefact due to low mobility not only present in Sweden but in all of the Nordic countries. This can potentially be very

dangerous and lead to inbreeding unless the senior staff and management are aware of the difficulties and take the necessary precautions. This must have been the case in the physics sector. The senior staff and the management have had a careful and strong focus on quality in the selection and education of the new staff. This has proven successful and new areas in i.e. combustion physics and nanoscience have flourished. However, the future job market will be very competitive and there might be a very serious problem if the quality criterion has to be relaxed in order to get teaching personnel. This is an issue that needs to be addressed not only by the University but also by the Government.

Therefore it is mandatory also to hire international staff. The practice of funding academic staff, including full professors, with a combination of University and Research Grants money is highly undesirable. This skews the role of the university in hiring senior staff and could have an adverse effect on hiring the very best staff. The university should address this problem urgently. This might become particular urgent in the coming decade when key staff will retire. There is clearly great merit in replacing key staff not only promptly, but wherever possible with overlap with the retiring or leaving member. This not only ensures continuity but also allows for key skills to be passed on.

### **1.3 Publications and productivity**

The publication record of all departments shows a very high productivity containing both quality and quantity. The amount of external funding is very impressive and in the Swedish research system necessary in order to create new initiatives. A bit of warning here; the amount of external funding that can be attracted is dependent on having an internally funded strong base. This base must have a certain proportion of the total budget. If the external component has too large a proportion of the total budget strategic planning becomes impossible and research quality suffers.

### **1.4 Future**

The physics groups are very well positioned for future challenges. Some of the key future research areas are e.g. nanoscience, materials, nanobiosystems, sustainable energy, free electron lasers and synchrotron radiation, ultra fast science, LHC, astronomy and computational biology. These are all areas where the physics groups at Lund University have a strong posi-



tion and a clear vision for the future. One exception here might be nuclear physics, where the visions for the future are not so clearly expressed.

One exceptional challenge for Lund University is the ESS and the MAX IV synchrotron radiation complex. A unique opportunity for Lund University and the Öresund region exist for attracting a significant international scientific powerhouse. The visions and plans for the ESS was not so clearly expressed in the strategy papers received by the panel, however, during the site visit it became clear the Faculty of Science has just launched a strategy initiative that will lay out possible plans for the future. This also includes the potentials of the MAX IV project. Although not being directly discussed in the papers, MAX IV can be clearly recognised as a potential international leading facility with synchrotron radiation properties unsurpassed by any other storage based facility either in operation or in planning. This concerns in particular the potential of nano beams. Exploiting this potential requires strategic planning of the faculty and the university. During the site visit the panel members clearly felt that a coherent initiative within materials science and within life science needs to be taken for the benefit of both ESS and MAX IV. This could take form of two new centres based on present activities within the faculties: A Materials Science Centre and a Centre for Life Science. The former should include both synthesis and characterisation activities, where the life science centre ought to be much broader based than protein crystallography. Both initiatives could be taken by a wider collaboration in the Öresund region

### **1.5 Organisation**

The organisation of the University seems a bit heavy and the organisation within physics somewhat complicated as seen from the outside. The panel had difficulties in understanding the division between LTH and the Faculty of Science, and whether this created any difficulties. However, during the site the panel members were convinced that this was not an issue that seemed to cause any problems on the daily basis. On the contrary, the joint physics activities were run very smoothly in a collegial way between the two faculties and actually made collaboration possible that might not have been possible in an organisation where the walls between the faculties had been stronger.

The organisational structure in scientific areas seems to be based on tradition and history. Nano science and solid state physics are spread over

several divisions and are for instance evaluated jointly in this report. It makes no sense separating them as they are so interlinked. Whether this calls for a reorganisation of the physics department is not so clear. The outstanding quality of the research performed in physics groups at Lund University indicates that the loose organisation does not hinder excellent science, but that the good groups are able to work across apparent barriers. Therefore an incentive based structure could be devised in order to create more synergies. For instance more synergies between the Department of Electrical Measurements and the Nanobioscience activities in the Department of Physics could be an option.

### **1.6 Gender and equal opportunity issues**

It is heartening to note that gender and equal opportunity issues are given a high priority at Lund University. It is already a step forward that there is a realization that gender equality is essential for future well being of the division. Efforts should be made to create better working conditions that would help in retaining and attracting excellent female PhD students and scientists. From conversations with junior women in the departments, it appears that job insecurities, extended years at low level positions, and lack of mobility in the system, cause a number of women to think twice about sticking to academic positions in the sciences. This is particularly true of women of child bearing ages, as they continue to be the fundamental care givers, despite the fact that Swedish/nordic men are much more involved in family matters than their counterparts elsewhere. The availability of paternal leave is fantastic. However, in fields like physics it is not possible to take a complete break for 6 to 18 months and still retain a competitive edge. These are subtle issues and require broader discussion, more flexible working conditions, and supportive environment. With some concerted thought, it is the opinion of the panel that Sweden and Lund University can address gender gap issues in relatively short time in the future. Unlike countries like the US, Sweden already has a basic frame work which makes it possible for women to assume non-traditional careers (like professors of physics) if they can work out details that hinder them at the beginning of their careers and child bearing ages.

## 2. DEPARTMENT OF PHYSICS

### 2.1 Division of Atomic Physics

#### 2.1.1 Overall assessment

This active group of 7 professors, 4 other staff members, and a good number of PhD students carries out world class research centered around laser spectroscopy with programs ranging from basic atomic physics, to biomedical optics, quantum optics, time-resolved X-ray diffraction and high-power laser- matter interaction. The division is participating in two Linnaeus grants. The overall quality of research as reflected through publications in high impact journals and pioneering contributions to the field is outstanding. In several areas such as ultrafast (picosecond) X-ray studies of lattice vibrations in complex solids, laser applications in biomedical photonic, and of attosecond quantum stroboscope in measurements such as the coherent electron scattering, the contributions of the Lund group are simply seminal. In short, this group can compete favourably with any other worldwide.

#### 2.1.2 Research infrastructure

This division has access to several large experimental facilities, such as the Lund High Power Laser Center and MAX laboratory which is engaged also in the development of the free electron laser. These are state-of-the-art facilities which offer a strong competitive edge to these scientists. The rating for the infrastructure is *outstanding*.

#### 2.1.3 Research Quality

The overall research quality of this division is *outstanding*. An example is the development of one of the most flexible attosecond pulse sources in the world that can produce pulses with central energy varying from 20 to 80 eV and duration as small as 130 as, which can be used to probe ultrafast electronic processes. The group was among the first to carry out phase determination of electronic wave functions by interferometric techniques, and capture and control of the motion of electrons using a “quantum stroboscope” technique. Use of high-order harmonics in the development of time-resolved imaging techniques is another impressive achievement. Furthermore, the group’s pioneering work in time-resolved X-ray diffraction has enabled the examination of the inertial motion occurring during the first 2 ps when the bonds are severed in a semiconductor. The group has also participated in the first ground-breaking

experiments at the Stanford ultrafast picosecond source. The Quantum Information group within the division has been instrumental in developing quantum computing and quantum memory hardware based on rare-earth-ion-doped inorganic crystals.

#### ***2.1.4 Collaboration***

Senior members of the Division of Atomic Physics appear to have a number of internal and external collaborations. The Lund Laser Center infuses interdepartmental collaborations also through Linnaeus programs. Several European Union grants are also instrumental in promoting international collaborations. There are existing collaborations with several groups in the US and very good contacts with the future x-ray free electron source at Stanford. Furthermore several of the groups have collaboration with industries and have created spin-off companies. The efforts of the group in this regard are *very good*.

#### ***2.1.5 Research activity and teaching***

The division offers an impressive number of courses in almost all modern aspects of the research they carry out. This is very impressive as the development of these courses is by no means trivial. It reflects a commitment of behalf of the division professors to integrate research and education. The rating would be *excellent*.

#### ***2.1.6 Evaluation of future plans***

Unfortunately, we were not provided with detailed information of the Division's future plans. However, given the track record, it is difficult to imagine that they will not continue to carry out research and education at the highest levels, provided adequate resources are available. The combination of the Lund laser center and the upcoming possibilities at the MAX IV synchrotron including the ultrafast source look extremely promising.

#### ***2.1.7 Future potentials and possibilities***

Given the potential in the group to carry out pioneering research and given the outstanding research facilities, the panel would recommend that the group extend its borders further and engage in even more challenging projects through larger collaborative initiatives. Of course, that would require acquisition of more funds than presently available.

## 2.2 Division of Combustion Physics

### 2.2.1 Overall assessment

The Division of Combustion Physics is based upon using mainly laser or optical techniques for fundamental and advanced studies of combustion processes. The division originates from a successful spin-off initiative in the Division of Atomic Physics more than a decade ago. The group has developed a number of new techniques that enable characterisation of fundamental processes. The group is at the international forefront of combustion related research and seems to have a well established position. The achievements are very impressive, considering the size of the group. The core group consisting of the permanent staff is rather small with only two professors, but an impressive number of students.

The overall assessment is *excellent*.

### 2.2.2 Research infrastructure

The division has the modern advanced laser equipment necessary and includes also theoretical methods to model chemical reaction. The division is in particular well off with advanced equipment through the Lund University Combustion Centre and the Lund Laser Centre. Both are unique facilities on an international level.

### 2.2.3 Research Quality

The publication record of the group demonstrates a very high level of activities. The publications range from papers describing very fundamental work to more applied work. The standing of the group has been recognised internationally by i.e. Marcus Aldèn elected as chairman of the Gordon Research Conference on Laser Diagnostics in Combustion in 2003.

### 2.2.4 Collaboration

The group is well located within several excellent networks and has strong ties to the division of atomic physics and the Lund Laser Centre. The division participates strongly in CECOST and was instrumental in the creation of Lund University Combustion Centre. Furthermore the division has collaboration with the combustion-related activities at Lund University, in particular the Division of Combustion Engines. The division also has collaboration with industrial partners.

### *2.2.5 Evaluation of future plans*

The division plans to have stronger activities within renewable fuels. The plans are not very concrete yet, but it is certainly an area where basic science and basic understanding is necessary in order to make the significant large progress that is needed for our future society.

## **2.3 Division of Experimental High Energy Physics**

### *2.3.1 Background*

In the recent past the Division has been involved in experiments at CERN (DELPHI), at DESY (H1) and at Brookhaven (PHENIX). This programme is coming to an end and has been replaced by ATLAS and ALICE at the LHC at CERN and an R&D programme towards a detector for the International Linear Collider (ILC). On top of this there is a vigorous programme on Grid computing.

There is no doubt that the past programme of the division has been of very high quality, the experiments themselves DELPHI, H1 and PHENIX, are all large international collaborations and are at the forefront the subject. In each case the Lund group has made essential intellectual, technical and managerial contributions which certainly are commensurate with the size of the group involved.

The present programme of ATLAS and ALICE are well chosen. It is clear that any first rate university particle physics department must have an important stake in the areas of the subject that appear to maximise the possibilities of new discoveries leading to new understandings. Therefore involvement in an LHC all-purpose detector (ATLAS) is a “must”. The involvement in ALICE follows on from the work on PHENIX, and addresses the new state of matter – the quark-gluon plasma, a fundamental question.

Both these programmes are huge international enterprises of which the Lund group is only a small part (as are essentially all other individual groups). The pertinent question is not whether the programme is of the highest international standards (it clearly is), but has the Lund group’s contribution also been up to this standard? In both cases the answer is yes. In ATLAS the fairly small group has had impact in hardware, software and more recently in preparing for the analysis of the truly

stupendous amount of data. It should also be mentioned that there has also been a large managerial contribution.

In ALICE an even smaller group has been similarly successful, with a high profile in the organisation and running of the experiment as well as in the design and provision of hardware.

A general point should be made here since these collaborations are run on very democratic lines, having high profile roles in an experiment, such as deputy spokesperson, chair of the publications board etc., as members of the Lund group have, clearly indicates the stature and respect that these physicists have among their peers, who elect them.

Apart from the main experimental areas described above, the group is involved in developing GRID middleware, again very successfully judging by the uptake by NORDUGRID and others and also in R&D for detectors for the future international linear electron-positron collider.

### *2.3.2 Grading of the recent past and present programme of the Division of Experimental High Energy Physics (In Department of Physics)*

The criteria used are quality, productivity, relevance and vitality and organisational capacity.

There is no doubt that the “quality”, “productivity” and “vitality” of the research carried out in Experimental High Energy Physics is *outstanding*. The question of “relevance” when interpreted as relevant in this area of science, ie scientific, technical and cultural rather than clinical, social and socioeconomic, would also merit on *outstanding*

### *2.3.3 Plans for the future*

The future plans of the group concentrate on the LHC programme, both in analysing the data and presumably in upgrading the detectors and for the more distant future the ILC. This is a very sensible programme and should keep the group in the forefront of the field for the next 5-10 years, however they have a very real problem in the fact that two of their senior researchers will be leaving/retiring very soon, including one who has spearheaded the b-physics analysis preparation in ATLAS, and another one within the next two years. This is a large fraction of the senior members of group. As the group itself points out, it is crucial that these positions get filled immediately, with first rate researchers.

The group is a relatively small one by international standards and so the programme should not be too extensive so that their contribution in each area is substantial. Never-the-less, there are whole areas of particle physics that are missing, eg neutrinos and particle astrophysics. It might be worthwhile to consider joining with the astronomers, as is done elsewhere, in participating in some astrophysics. Also there is a rather curious separation between two areas of Nuclear Physics; the quark-gluon plasma, studied by the Experimental High Energy Physicists and Nuclear Structure, studied by the Nuclear Physicists. This might be rationalised.

#### *2.3.4 Grading for the future programme of the division of High Energy Physics*

The criteria used are those listed concerning the research plans, research projects, infrastructure and leadership. The panel would rate their plans for the future to be *very good*.

### **2.4 Division on Mathematical Physics**

The division is divided into three groups. In this paragraph the assessment of the Nuclear Structure Theory group is given, the two other groups are assessed together with the Division of Solid State Physics.

#### *2.4.1 Overall assessment*

The group of Nuclear Structure Theory has over many years been one of the leading groups in theoretical nuclear physics in Europe. The group has despite its fairly small size been able to manifest itself in numerous international collaborations, showing its very high visibility on the international scene. They have made fundamental contributions to the field of superdeformed nuclei which has been one of the most important subjects in nuclear physics in recent years. The members of the group are constantly invited to international conferences, a very significant sign of a central international position. It is of course well known to everybody in the scientific community that the high peak of research in nuclear physics was in the period 1960-90. However, the field is still very active internationally and new interesting research topics are constantly coming up, also touching new exciting areas such as chaotic dynamics for instance (as mentioned above). At this point one has to remember that Sweden has many nuclear power plants and given the global energy situation several new plants might be build. In order to have sufficient scientific background for such an expansion, theoretical nuclear physicists



are needed. It is therefore a wise decision to keep the research activity in Nuclear Structure Theory at Lund University at a good level, to keep its international position. The age profile of the group is such that a few new positions are clearly needed in the coming years. The overall rating of this group lies between *very good and excellent, tilting towards excellent*.

#### 2.4.2 Research

The main research effort of the group is oriented towards nuclei at their extremes, i.e. extreme values of angular momentum or isospin. At high values of angular momenta – rapidly rotating nuclei – the nuclear shape may be very different from the ground state. For example, the shape may become superdeformed (long axis to short axis ratio is 2:1) or triaxial (all three nuclear axes having different sizes), with correspondingly special modes of rotation. Due to the finite number of nucleons rotational bands may terminate at some high angular momentum value. At high values of isospin, i.e. very different numbers of neutrons and protons as compared to stable nuclei along the beta-stability line, the nucleons may be weakly bound, and unique quantum phenomena can be studied. In another research project special effects from chaos in the nucleus are studied. Large parts of the research are traditionally carried out in close collaboration with experimental groups in Lund and around the world.

The group has been instrumental in showing that some observed bands have triaxial superdeformation. In other studies some different features of these bands were discussed, while the interpretation of bands of this kind recently discovered in  $^{157,158}\text{Er}$  was described as 'a new class of many-body symmetries describing nuclei at the phase transitional region'. Other highlights include the study of superdeformed and terminating bands with a close collaboration with the experimental nuclear structure group at Lund University and the development of a theoretical model which exhibits degenerate so called chiral bands, which is a manifestation of dynamical spontaneous symmetry breaking.

Another important work is the investigation of a possible chaotic component in nuclear masses which might be one reason why it has so far been impossible to get a global description of nuclear masses with a mean error smaller than 0.6 MeV. Using tools from semiclassical physics, a periodic orbit theory could be developed to describe fluctuations of the BCS pairing gap in nuclei as well as in other finite many-body systems, where the chaos/order dynamics was found to be important.

### *2.4.3 Research quality*

The research of the group has for many years been of high international level. For example, 8 highly cited articles (> 200 citations) are co-authored by researchers who are still active at the division. In total, the four professors have collected over 17000 citations, a really impressive number. The main results are regularly published in the high ranking journal *Physical Review Letters* (11 in total during 2002–2007), and in total 95 papers were published in refereed journals during this time. Two invited News and Views contributions to *Nature* have been written by the group. Members of the nuclear structure theory group are regularly invited speakers at international conferences, and in the last five years 35 invited talks have been given.

As mentioned above, the group has steadily over many years published in high-ranking international journals. The group has an extremely good publication record, taking its small size into account. In particular they have an impressive list of publications in recent years in *Physical Review Letters*, the highest ranking journal in physical sciences.

Furthermore, for the last five years (2003–2007) the group has obtained a quite impressive list of external funding which in total amounts to 6 mill SEK. This is particularly impressive giving the small size of the group.

### *2.4.4 Teaching*

The group has produced 4 master and 3 PhD exams in the last five years, which is on the low side of what could have been expected.

### *2.4.5 Challenges for the group.*

Experimental nuclear structure physics has a strong support by the Swedish research council (e.g. the FAIR project at GSI, Darmstadt), and it is important to match this by a corresponding theoretical support. Mathematical physics in Lund has an important role to play with its established strong research in nuclear structure theory that is well coupled to the experimental groups. Two of the professors of the group will retire within the next 2–3 years, so new recruitment is recommended. The group plan to focus on modern nuclear many-body theory including density functional theory, developments of no core shell models, and self-consistent mean field theories. Another important focus is the ability to work in close contact with experimental developments. The division of mathematical physics has strong activities in many-body theory for

other types of finite-size systems, such as cold atoms and quantum dots, as well as in density functional theory. Several methods and ideas can be transferred between the mentioned fields and the nuclear system which constitutes another finite-size many-body system. This transfer of knowledge is already going on, but mainly from nuclear physics to the other fields. However, utilizing this knowledge transfer in both directions may provide nuclear theorists in Lund with advantages in international competitions, where one sees a strong development in nuclear structure theory with new ideas and concepts. One example is the American initiative (involving more or less all strong American nuclear theorists) to develop a universal nuclear energy density functional, where the goal is to be able theoretically to describe and calculate ground-state properties one order of magnitude better than is possible today. A focused effort from the Lund side could here make important contributions.

## 2.5 Division of Nuclear Physics

### 2.5.1 Overall assessment: *Very good*

The Division of Nuclear Physics is divided into three rather small groups, aerosol physics, applied nuclear physics and experimental nuclear physics. While the two first groups are very focused on applied research, the latter is involved in cutting-edge research areas within nuclear physics. The interactions and synergies between the three groups are apparently not so well established. The experimental nuclear physics group has good connections to theoretical nuclear structure activities within the division for mathematical physics. A more in-depth evaluation could maybe have been able to shed more light on collaboration and network within the various parts of nuclear physics and high energy physics. However, the panel suggests that the university considers how more synergies between the different activities could be obtained for instance by creating new projects.

One such project is suggested concerning detector development for the ESS and maybe also for the MAX IV projects. Large, efficient and fast detectors for photons and neutrons have become the bottleneck at many facilities and it has been shown to be as important to develop new detectors as new accelerator beam physics. Hence it is strongly encouraged that the division of nuclear physics could be a coherent effort to back the ESS and MAX IV projects, but the projects have to be initiated very soon.

### *2.5.2 Aerosol Physics Group*

The aerosol physics group is rather small – 2 Senior Scientists, 2 Junior Scientists and 4 PhD students. The research concentrates on atmospheric aerosols and negative effects on human health. The Aerosol Group is locally organised in the Consortium for Aerosol Science and Technology (CAST), where both the Divisions of Combustion Physics and Solid State Physics are members and participates in a Nordic Centre of Excellence.

The group is very productive and publishes mostly in geophysical or environmental journals. The citation rate is high. In the light of collaboration with international Groups, the research seems to be world-class.

### *2.5.3 Applied nuclear physics*

The AMS group uses the  $^{14}\text{C}$  low energy facility established as part of the accelerator-based research within the Nuclear Physics Division. This was a pioneering effort at the time the facility was established but by now it is a rather limited (e.g. compared with the Uppsala facility) but apparently well used infrastructure, providing services to and collaborating with many research fields inside and outside the department. It is one of many AMS facilities around Europe and cannot be considered as a leader in the field. Nuclear microprobe group activities are based on the 3 MV Pelletron accelerator providing focused ion beams.

The development towards increased external collaborations for both groups would be of highest importance to re-establish and maintain the vitality and attractiveness of the activities in the future. Strong international collaborations within FAIR and later ESS projects will play a vital role and will help to complete successfully the generation change.

The participation in FAIR facility will be of vital importance to expand the department in order to establish the critical mass for the ESS involvement.

### *2.5.4 Experimental Nuclear Physics*

This is the only group in the Division that performs research in the traditional areas of nuclear physics. The group is active all over the world participating in accelerator-physics-based experiments. The research is mainly performed at the international facilities.

The group is also very active and many publications in well respected journals and has many citations.

Given the strong use of international facilities, the group has strong ties to international collaborators and a good network. Internally at Lund University the group collaborates with the nuclear theory group in the division of mathematical physics.

The group is very engaged in the upcoming FAIR experiments, where a great part of the future European nuclear physics will be performed and where Sweden also is planning to become a member. This will secure the future research directions for the group.

## **2.6 Division of Solid State Physics, parts of the Division of Mathematical Physics and the Division on Synchrotron Radiation Research including the Nanometer Scale Consortium.**

Solid state physics and nanophysics is interlinked through many divisions throughout the Department of Physics. Since the panel is not able or has not the intention to give an in-depth review down on the level of individuals the panel has decided to give an overall review of all solid state and nanophysics.

### *2.6.1 Overall assessment*

This group of professors, other staff members, and PhD students carries out cutting-edge research mostly in nanoscale semiconductor physics. They are known worldwide through their work in the optical and electron transport properties of materials, synthesis and characterization of semiconductor nanostructures, and the physics of ultra-small semiconductor structures, including nano-devices and -sensors. Research in biophysics and photonics is also noteworthy. The overall quality of research as reflected through publications in high impact journals and pioneering contributions to the field is *outstanding*.

### *2.6.2 Research infrastructure*

This division has access to several large experimental facilities, such clean rooms and characterization and synthesis facilities in the Lund Nanolab. MAX laboratory is, of course, another important resource. The award of the Linnaeus in Nanometer Scale Consortium has provided resources for further enhancement of the research infrastructure. These are state-of-the-art facilities which offer a strong competitive edge to these scientists. The rating for the infrastructure is *outstanding*.

### 2.6.3 Research Quality

The overall research quality of the entire portfolio of activities in Solid State Physics and Nanoscience under the Nanometer Scale Consortium is *outstanding*. In the area of semiconductor nanostructures, the Lund group was the first to establish that mono-layer sharp hetero-interfaces can give rise to novel electronic device structures. Their work has provided new understanding of semiconductor nanowire growth processes and their control. Their work in the area has also enabled much needed integration with Si technology. Similarly in the area of nanophotonics they are renowned for their pioneering work in single quantum dot spectroscopy, and in the characterization and optimization of the optical properties of nanowires. They were the first to measure spectroscopically the photocurrent of a single nanowire. They have also designed a unique optical method for time-resolved imaging of a vibrating nanowire, which has opened up new research avenues. By attaining highly tunable artificial atoms and molecules with semiconductor nanowires and measuring electron transport in them the group has been able to extend its horizons to atomic physics and molecular physics. Their discovery of a novel nonlinear effect of ballistic electron transport in semiconductor branched structures has found interesting applications in nanodevices. The work on the physics of spin transport in semiconductor nanostructures with strong spin-orbit interaction has applications in spintronic devices. Focused effort in combining bio-physics with nanotechnology has pioneered work at the chip-level, in nano-scale lab-on-chip applications. The group has also initiated impressive work in nanolithography.

The Condensed Matter Theory group, starting with Lars Hedin, has been one of the leading groups in the world in developments of density functional theory. In particular, the GW approximation and implementation of time-dependent density functional theory, so relevant to understanding transport properties of materials (nanoscale and beyond), are all products of the Lund group. The efforts of this group of theorists are rated as *outstanding*.

The surface science group at Lund have also been at the cutting edge in the field and have been the pioneers in a number of areas. They do fantastic work using high resolution core level spectroscopy where they are pioneers in identifying the chemical environments of the atoms and where on the surface they are located on the surface. This work is very nicely combined with state-of-the-art STM on surfaces and nano objects

like nanowires. The group is also entering more in-situ related work investigating single crystal surfaces under realistic catalytic conditions. This work show great promises for the future. The achievements of the surface science group have also been profound because of Maxlab and theoretical support. In fact in surface and nanoscale science it is difficult to think of many other institutions anywhere that have played such pivotal roles. The research profile of the surface science group is thus *outstanding*.

#### **2.6.4 Collaboration**

The Division of Solid State Physics has very strong interactions with other departments in Lund through the Nanometer Structure Consortium and through other Strategic Centers funded by SSF. Individuals are also engaged in collaborations with scientists in several other countries. Collaborative efforts of this division are *very good*.

#### **2.6.5 Research activity and teaching**

The division offers an impressive number of courses in almost all modern aspects of the research they carry out. This is very impressive as the development of these courses is by no means trivial. It reflects a commitment of behalf of the division professors to integrate research and education. The rating would be *excellent*.

In the report there was no indication whether Problem-Based Learning (PBL) was being used in the division. It would be a good idea to implement this, as has been done in other divisions of Physics.

#### **2.6.6 Evaluation of future plans**

As is to be expected the future research plans of the division and the consortium involve continuation of prime quality research in the areas already familiar to them and in which they are among the best in the world. The proposed work in the growth of complex heterostructures and 3D branching structures to create novel materials and self-assembled neural-network model structures is to be commended. Further investigations of transport and optical properties of low-dimensional structures to investigate spin transport and excitonic properties are also very timely. The efforts in nanoelectronics, nanophotonics and nanobiophysics should also continue to provide the researchers with competitive edge. Given that the group is already accepted as pioneers in the types of work that they have carried out, they might want to broaden their areas of expertise by extending their research beyond semiconductors to provide themselves

with further opportunities in novel materials. This statement should be taken only as positive criticism.

### *2.6.7 Future potentials and possibilities*

The proposed research on high quality quantum dots leading to experiments on individual quantum objects is one example of the tremendous potential of researchers in this division and consortium. High quality innovative work is to be expected from the group and should be financially supported.

## **2.7 Division of Accelerator Physics and Synchrotron Radiation Instrumentation.**

The accelerator physics research and teaching at Lund University is one of the very few places where a student can get an education in this field. This is a unique asset for Lund University and is recognized internationally as such.

**Overall assessment:** *Outstanding*

### *2.7.1 Research Infrastructure*

MAX-Lab is an important asset for the accelerator physics research and education. Lund University's strong involvement and interest in the accelerator based large research facilities such as MAX IV and ESS make this field strategically important and a prime candidate for the near-term reinforcement and expansion.

### *2.7.2 Research Quality*

The accelerator physics research carried out in the department and at the MAX-Lab is of the highest standing and enjoys wide international recognition. Pioneering concepts developed here have for years enjoyed that highest degree of flattery – being copied and implemented in other facilities around the world.

### *2.7.3 Collaboration*

Intra-departmental collaboration between the Lund Laser Center and the MAX-Lab in both the accelerator physics and synchrotron radiation instrumentation is a union blessed in heaven. It has the potential to become a model internationally of how to approach the future light source development. With this combination Lund University has the unique potential to become a world leading center for development of



the laser-based new techniques and methods into the X-ray domain. Strong international collaborations with e.g. FERMI Free Electron Laser in Trieste, as well as with a large number of the synchrotron radiation centers around the world have placed MAX-Lab firmly on the world map of light sources.

#### *2.7.4 Research activity and teaching*

The accelerator R&D is tightly coupled with the MAX-Lab facilities. It is a very attractive place for a student who is interested in accelerator physics and many have been drawn to Lund, coming not only from Europe, but also from the Americas and Asia.

#### *2.7.5 Evaluation of future plans*

The plans for MAX-IV are truly innovative and represent one of the most advanced and audacious approaches world-wide to the development of future synchrotron light sources. Storage-ring-based light source with a record brightness is complemented by an FEL to be run using the same linear accelerator that is used as an injector for the MAX IV ring.

#### *2.7.6 Future potential and possibilities*

The future plans involving the MAX IV project is certainly an area to be strongly recommended for investments in the next 5 years. Suitable replacement of the soon-to-be-retired accelerator physics chair should be given a very high priority. Furthermore, an additional tenure track professorship in accelerator physics will help to meet better the growing needs in this sector.

#### *2.7.7 Gender and equal opportunity issues*

The MAX Lab has traditionally been a very open place, where students from all over the world and of both genders could truly enjoy equal opportunity in education and research.

## **3. DEPARTMENT OF THEORETICAL PHYSICS**

### **3.1 Division of Computational Biology and Biological Physics**

#### *3.1.1 Overall assessment*

The group of Computational Biology and Biological Physics is one of the most visible and active groups not only at the science faculty of Lund

University but also in Sweden as a whole. In fact, it is also very visible within the European scientific community. The group is fairly new as its research topics are new but it has through extremely hard and focused work over the last ten years managed to built up to a group of the highest international standards. This effort has undoubtedly been very elaborate – it is not easy to start from scratch in a new and still not completely well-defined field – but the head of the group has done a fantastic job to put this effort on the international scene. There are several aspects of fundamental importance to a successful research effort of high standards where the group has performed on the highest level. These include publication record, external funding, collaborations, interdisciplinary engagements, new research-based courses, and so on. One might speculate that very few groups within the Swedish scientific community can show a similar impressive record. By the very definition of the research field of the group the effort has a strong interdisciplinary record. There is no question that the group in the coming years will put itself in a very strong position at Lund University, in the core between physics, biology, computer science and medicine. There is also no question that this is one of the groups that will point to a bright future. However, in order to maintain the steam, the group needs new positions. The group has educated excellent young researchers that have been on successful post-doc positions in USA for instance. Some of these promising scientists ought to come back to the group. It is important that the group takes advantage of this opportunity by incorporating the networks that each individual has built up in USA and Europe. This could be extremely useful in the years to come. There is no question that this group will be one of the leading groups at Lund University in the coming decade. The overall rating of this group is *outstanding*.

### 3.1.2 Goals for the group

The group has for many years tried to create an integrated environment between scientists with computational and biomedical skills, covering:

1. Different levels of resolution ranging from atoms, molecules, network motifs to entire pathways to organs and organisms.
2. Both pure biological problems and their translation to the clinical reality.
3. A variety of species ranging from *E. coli*, *A. thaliana* to mouse and human. In addition, state-of-the-art toolboxes have been maintained and further developed and, very importantly, been disseminated to the biomedical community.

There is no question that this program will generate ground breaking research results. In part, this is due to the enthusiasm and energy that a new generation of scientists will feel being part of the computational revolution within biology and also when extrapolating the excellent track record of the senior investigators. It is a cross-disciplinary engagement where this group will take a lead. It is conceivable that during the next ten years, the field will gradually percolate into different biomedical areas as a new generation of scientists being trained in a dual way emerges.

### *3.1.3 Productivity*

The computational biology group has an extremely good publication record seen over the last 5–7 years. They have published in the absolutely highest-ranking journals within the field of biological physics and biology, such as "Nature Medicine", Proceedings of the National Academy of Sciences, and PLoS Biology. Furthermore, one notices that the group has a long list of collaborators both from the physical, biological and medical sciences. Clearly, the group has been extremely active in pursuing collaborative efforts outside their group, both in Sweden and in other countries all over the world.

The group has received an impressive series external grants in recent years and at present roughly 60–70% of the group funding is external. Clearly the group has been extremely active in pursuing external support. The very high success in obtaining external grants both indicates that the research topics of the group are of fundamental timely importance and that the group has excellent judgement in applying to those sources. Currently the group has around ten external grants.

### *3.1.4 Teaching*

The computational biology group has produced a good list of PhD students in recent years. Clearly the group has the potential to attract very good students. The students educated in the group do very well afterwards, going for post-docs abroad or going into industry. Already, some of their previous students are back in the group after very successful post-doc periods abroad.

Furthermore, the group participates vigorously in undergraduate teaching both in the physics major programme and also in the biocomputing/bioinformatics niche sector.

### *3.1.5 Challenges*

The field of Computational Biology and Biological Physics is in these years being expanded at basically any university in the world and as such it is one of the most competitive disciplines presently in science. It is simply hard to get the very best people in the field as there is almost an infinity of possibilities for young researchers. One major challenge for the group is therefore an international recruitment on post-doc and junior faculty levels. The group needs constantly to monitor its research directions such that a healthy balance is maintained between pure modeling work and collaborative activities with their biomedical partners.

Whereas one at first sight might get the impression that the group should be organized within a biomedical department, it might be an advantage neither to the group nor to the university for the following reasons: (i) computational biology is a field with an identity that might get lost in huge biomedical organizations; (ii) it is crucial to recruit young mathematics/physics majors at an early stage; (iii) it is also important that the group's association with the physics part of the university occurs through theoretical physics and not through applied physics. In the latter case less appreciation of wider subjects like computational biology is expected. Within a theoretical physics department the group benefits from a wide interest in modeling and conceptual science in general.

### *3.1.6 Collaborations*

This group shows an impressive interdisciplinary aspect of its activities. The group has strong collaborative efforts in biology, medicine and computer science. In fact, more than most groups in the world working on biological physics this group has shown a great ability to be engaged in medical research, almost at the clinical level. They have attracted substantial grants in order to pursue this effort. That is very impressive indeed. For the coming years this interdisciplinary effort will undoubtedly be expanded. Based on the research record of the group, one can imagine a huge umbrella of future projects with other faculties, the number of projects only being limited by the lack of sufficient man-power in the group. Among the very strong Scandinavian groups in biological modeling and bioinformatics outside Lund one should mention Stockholm, Uppsala and Copenhagen. In comparison, Lund is extremely well suited as a site for a computational biology programme. As is the case for the other sites, the research quality is excellent. However, Lund stands out when it comes to well balanced and integrated

modeling and bioinformatics activities ”under one roof” and with a huge network of associated biomedical groups located within 5 minutes from the department.

### 3.2 Division of Theoretical High Energy Physics

The past, present and future programme of the division of Theoretical High Energy Physics is in the field of strong interaction phenomenology, ie challenging theoretical (or model) calculations with data. This is in two areas, firstly in the development of QCD-based models for multiparticle production, eg at HERA or LHC, and secondly in the study of nonperturbative effects, ie at lower energies, using effective field theory methods.

In the area of QCD models for multiparticle production, the Lund group initially under Anderson, produced the early Monte Carlo based event generators (the Lund model) which allowed easy comparisons between the model and data. These event generators have over the years become much more sophisticated and are essential tools not only for analysing data but also for designing detectors, ie they are used in simulations. It is very gratifying that the Lund group continues to be at the very forefront of this essential activity, producing the world’s generator of preference – PYTHIA. The influence of this work and the deep understanding integral to it cannot be overemphasised. The group is also providing an excellent service to the community of users.

There is no doubt that this is *outstanding*.

The study of nonperturbative effects in the strong interaction using chiral perturbation theory is also an area of excellence. The group is small but it has players at a World level and the work of the group is influential and very well regarded. Again this ticks all the boxes for *outstanding*.

Clearly this phenomenology group is outstanding and there will be a need for the development of both areas in the years ahead. The mark for the future plans of the group is *excellent*.

From the above assessments it is clear that these activities in Particle Physics both experimentally as well as theoretically do great credit to Lund University and strengthening them in the future should be an option which the University should consider.

## 4. LUND OBSERVATORY

### 4.1 Introduction

The Lund Observatory staff is relatively small, 12 FTE researchers, with half the total at professorial level. Income is dominated by contributions from “Government Faculty” and “Grants for Research”, with undergraduate-related income just 10% of the total. From the information provided, the Observatory apparently no longer maintains a traditional observational programme employing its own facilities. Such an approach is the norm for many small research departments and the staff have access to world-class optical/infrared facilities through Sweden’s membership of the European Southern Observatory (ESO) and the Nordic Optical Telescope (NOT).

Within Europe, many larger astronomical departments/observatories maintain significant national facilities, or, now, more commonly, are involved in development and construction of instrumentation for major international telescopes and satellites operated by organisations such as ESO and the European Space Agency (ESA). Within the last two decades there has also been a growth in the number of relatively small astronomical groups/departments. Such new groups have generally combined the acknowledged benefit of i) providing “astro”-elements to the teaching of physical sciences at undergraduate level, often within a larger physics department, with, ii) the ability of active astronomical researchers to secure research funding from national science research council sources. Often, the research focus is one of exploitation of data provided by international and national facilities through the (relatively) modest level of funding required to cover postdoctoral researchers and Ph.D. students along with departmental overheads. Given the absence of any significant experimental programme, such a funding model has proved viable in many universities.

Lund Observatory is relatively small but does not have access to a government-funded source of funds for exploitation research that is adequate to employ postdoctoral researchers. Neither does the Observatory possess the scale, or the funding, necessary to provide a significant contribution to major international instrumentation projects. Thus, there is a difficulty of positioning the Observatory’s research activity in order to make a substantial international impact. A recent positive development has been the success of the Observatory in attracting European Union (EU) –funded

postdoctoral researchers. Such success is undoubtedly a good thing but does not result in any significant income over and above that necessary to fund the salary and (some of the) directly associated costs associated with the young researcher.

#### **4.2 Nature of the research**

The Observatory's research activity is broken down, using its own categorisation, into three areas: Observational and Theoretical Astrophysics, Atomic Astrophysics, and Astronomical Telescopes and Instruments.

The Observational and Theoretical Astrophysics (OTA) group has seen recent appointments at senior and junior/postdoctoral level. The personnel are probably at the point of achieving critical mass, with research activity in key research areas for the subject and publications of a high international standard. An individual of the highest reputation has a key involvement in the ESA Gaia space-mission. The associated expertise is critical to the success of the mission and it is encouraging to see the activity billed as part of the OTA group, albeit that the highly technical, and long term, nature of the activity does not readily lend itself to exploitation science for probably the best part of a decade. It is probably fair to say that the OTA group most closely follows the model of activity in many small European astronomy departments without a significant instrumentation programme.

The Atomic Astrophysics group consists of just two active academic personnel and offers a complete contrast. The fundamental nature of the research, providing reference data for use, via various international databases, throughout astrophysics has an extended history and represents one of the very few experimental branches of what is a predominantly observational science. The Lund Observatory experimental programme is very rare indeed within Europe. It is fair to say that a large fraction of the modern astrophysical community is pleased to see such research to improve fundamental data undertaken. That said, the recognition accorded to such activity is limited and in a number of countries it has proved difficult for groups to secure adequate funding in competition with more high-profile research activity. The Lund Observatory group has experimental collaborations with other facilities associated with the University and there is some indication of, an important, linkage between the specific experimental programme and research topics of current interest within astrophysics.

The Astronomical Telescopes and Instruments group has punched well above its weight for an extended period. The group made a major contribution to one of the two independent design studies for the next pan-European optical telescope facility undertaken under the auspices of ESO. Now the group is under contract to provide expertise in what is effectively the “Phase A” study for the Extremely Large Telescope (ELT) facility that, realistically, should see completion (or first light at least) around 2020. However, once the project moves from the initial study phase to development and fabrication, activity will be concentrated within industry and at large astronomical departments/observatories. It is unclear how a very small group will participate effectively in such a huge project. The age structure of the group is also such that retirements must surely also be a feature at around the time (2010-2012) that the present commitments to the ELT design programme are likely to end.

#### 4.3 Publication/Reputation

Astronomical research, although modest in scale compared with many other branches of science, is a truly international enterprise, in terms of collaboration, access to facilities and publication. Lund Observatory participates generally in such international interactions but there would be something very seriously awry if such were not the case.

The Observatory has been very successful in maintaining an international presence in several different areas, particularly given the small number of academic personnel. The quality of the three primary research groups falls predominantly in the *excellent* category. There is some activity that would fall in the *very good* category but an equal fraction of the Observatory’s output would probably rate an *outstanding*.

The mix of activity is somewhat unusual and two of the three main research groups, Atomic Physics and Telescopes and Instrumentation, participate in research fields that are widely regarded as very important but that result in a relatively small number of publications that receive relatively few citations. Given the make-up of the research activity, the productivity is certainly *very good*, with a few elements achieving an *excellent*.

The number of postgraduate students is modest but the best products of the Observatory’s programme are competitive with those of the very top institutions in Germany and the United Kingdom (and likely other countries).



#### 4.4 The Future/Questions

The SWOT documentation is necessarily brief but does make reference to likely changes in the research profile.

OTA: is making impressive headway in becoming a self-sustaining “exploitation” research group. Attracting external researchers, such as EU Marie Curie fellows, as has recently been the case, will certainly help. There must potentially be a real opportunity to increase interaction with the Theoretical Physics department, increasing the research activity, in the “extreme objects” area for example, to the benefit of both sets of researchers.

Atomic Astrophysics: has strong links with other facilities within the University but the research apparently involves just two current academic staff at the Observatory. It is not immediately clear what level of support the programme requires from among “Other Staff”. There are a number of strong arguments for maintaining a research programme in the field but the future must be unclear given the present scale of the effort. What are the plans for the future?

Telescopes and Instrumentation: has achieved an impressive level of involvement with the preparations for the major next generation international ground-based optical/infrared facility. In the short term the work will continue but in the medium term the combination of the age structure of the group and the end of the initial development phase of the ELT raise questions concerning the future of an internationally competitive programme at the Observatory. What are the plans for the future?

The panel have genuinely become more impressed with the achievements of the Observatory as it has explored the broad range of research undertaken over the last decade, particularly given the relatively small number of academic personnel. As outlined above, there must be significant questions concerning the future of two of the three main sub-groups making up the current research profile. The answer to the questions may well be positive; for example, the Atomic Astrophysics group may strengthen ties with other experimental facilities/activity within the University and further develop the linkage between the fundamental data obtained and the interests of the theoretical astrophysicists at the Observatory as the way to ensuring the future of the research.

On the other hand, the SWOT submission, and the Faculty summary of likely future “mergers” of the smaller departments, makes reference to establishing closer ties between the Observatory and both Theoretical Physics and the much larger Physics department. The present level of personnel resource at the Observatory is likely to be inadequate to embrace major new research areas. However, there may be significant scope for developments in inter-disciplinary fields. Perhaps the most obvious of these, in terms of activity world-wide, would be astro-particle physics and the questions of the origin and nature of dark matter and dark energy. Is there any interest/ambition within Theoretical Physics or Physics in pursuing such research in concert with the Observatory personnel?

The overall assessment of Lund Observatory is *excellent*.

## 5. CENTRE FOR MATHEMATICAL SCIENCES

### 5.1 Introduction

The center seems to be a rather fractured patchwork. It consists of 2 main patches with largely little interaction: The groups from LTH and from NF. NF in itself is homogeneous in the sense classical pure math departments are. LTH consists of the “Applied and Industrial Mathematics” group (AIM), the Statistics group, the Numerical Analysis group and some more pure mathematicians from analysis, geometry and algebra. However, the panel found visible interactions between AIM, Statistics and Analysis. Of course, in education there is much cooperation, but again only inside LTH. The teaching load there seems to be much higher. The numbers found were not always coherent, but roughly, the employee relation between LTH and NF is 3:1, for the students to be taught 3:1, the total income is 5:2, where the research funding from LU is 1:1. Even, if these figures are not exact, they point to the fact, that something is out of balance; for sure, the research funding for LTH is too low.

### 5.2 Mathematics at the Faculty of Science

The division once had several famous, outstanding mathematicians, including a Fields medallist. An attempt to follow up this great tradition has turned out to be problematic, in the sense that two of the recently employed very good mathematicians have left, or are about to leave (this is not visible from the report!). But still, the remaining group is, without

any doubt, scientifically very good, has many international contacts and, in any meaning, earns the research support it gets from Lund University. As already said, there seems to be no interaction with LTH. Why this is so – and it is certainly not generic – cannot be seen from the reports.

### **5.3 Applied and Industrial Mathematics at LTH**

This group has some homogeneity, mainly driven by exterior projects. The computer vision group is very strong, also at an international scale; it is well known, also outside of Sweden. AIM has a high teaching load, does obviously very good teaching and keeps nevertheless active research on interior and exterior projects. It interacts with Statistics and with Analysis at LTH; it is hard to understand, why no cooperation is seen with the Numerical Analysis Group.

### **5.4 Numerical Analysis group**

They are internationally well visible, but in our opinion, the group is far too small to cover this area, which has become so extraordinarily important for science and technology. That there is no larger activity in "scientific computing" at a university like Lund is not understandable. Maybe, the size of the group is an obstacle to more cooperation.

### **5.5 Statistics group**

The statistics group has been top in Swedish statistics, but has also lost some of its best people by retirement or by moving to other places. It has good cooperation with image processing in AIM. As all groups at LTH, they have high teaching loads, which, again, may be responsible for the loss of quality due to loss of people (which, obviously, could not be fully compensated). Also Statistics does an excellent job in teaching, keeping its research activities going.

### **5.6 Analysis group**

The Analysis group at LTH, mainly dealing with dynamical systems and partial differential equations (pde), is good, but again rather isolated, in spite of the fact that pde normally has many applications in industry. Algebra and Geometry are even more singular patches and we assume, that they are mainly there to deal with the teaching load.

### 5.7 Overall assessment

The current state of the Centre of Mathematics gives the impression of a loosely connected collection of individuals and individual groups. Some of them have been outstanding, but have lost capacity during the last decade. Some are still very good, but have to fight with other burdens. There is surprisingly little contact between them, even if this would be easily possible. A restructuring of the Centre of Mathematics, thinking carefully about what is necessary for a good education, what may be the main topics, which cooperate with each other and, at the same time, can get or maintain international reputation, seems to be really necessary.

In spite of the loss of outstanding analysts, classical mathematical analysis still maintains a strong position in Lund, as in Sweden in general. But even here, the combination of these fields at the Centre of Mathematics seems to be accidental. Some fundamental disciplines such as topology, algebraic geometry, and logic are missing. Some central disciplines for application, which are also missing, are for example stochastic analysis, which would provide a natural link between statistics, probability and measurement theory, functional analysis, mathematical physics, mathematical biology and mathematical finance. We believe, that research and cooperation within the MC and with the whole LU would, in the long run, benefit from the inclusion of such central mathematical disciplines.

In the applied field, the panel miss mainly scientific computing as an extension of Numerical Analysis, and miss a stronger group on mathematical modeling, which could interact with scientific computing in developing simulations etc. Optimization is also an important area not well represented at the Centre of Mathematics. All these fields are also crucial for a better interaction with other departments and centres.

It is an important principle, that teaching and research belong together at all schools and institutions at good universities. Therefore, it is recommended that Lund University abolishes the pure teaching positions, and that all faculty positions have approximately equal commitments to both teaching and research. Moreover, they should all be provided with good working conditions for the research. Too high teaching loads reduce the quality of the university.

The financial support for research should be made approximately the same for all faculty members of the same rank, especially independent

whether they originally come from NF or LTH. This will be an important step towards a real unification for the two former faculties, which today seem to be frozen in an almost hostile relationship.

Lund University has been a jewel in the Scandinavian Mathematical landscape; it is still strong, but weakened. We believe that restructuring, strengthening new fields which trigger cooperation and another distribution of necessarily more money is crucial to turn the present trend around.

## 6. DEPARTMENT OF ELECTRICAL MEASUREMENTS

### 6.1 Introduction

The Department of Electrical Measurements is rather small compared to e.g. the Department of Physics and is located at LTH. The department consists of two groups described below. The staff of the department has a broad background involving many scientific disciplines enabling interdisciplinary collaborations in particular of a medical character. This is a real strength that has must be maintained.

The Department is not located near the other physics-related activities. According to the impression the panel got there are no plans to coordinate all the presently-separate nanoscience and nanotechnology activities at the University. For instance it was not clear to the panel whether the possible synergies between the nanoscience activities in the Department of Physics and Department of Electrical Measurements had been fully exploited.

The overall assessment is *very good*.

### 6.2 Nanobiotechnology group

The research in the group is concentrated on mind-controlled prosthetics and neural probe technology, Lab-on-a-chip, microacoustics and microfluidics and nanobiology and clinical proteomics. The group is small to medium sized consisting of one professor, three associate professors, four senior scientists and seven PhD students. The group has adequate research facilities such as a clean room, a laser lithography system, a bioanalytical laboratory and a proteomics mass spectrometer. The group wants to exploit the new opportunities resulting from the creation of the Biomedical Centre, which should be strongly encouraged.

The group has a long record of achievements, particularly in micro-reactors, application to microdispensing of methods based on ink-jet technology, low-volume high-sensitivity mass-spectrometry bioanalysis and proteomics research, ultrasonic standing-wave cell separation in blood washing and fractionation and in stem cell separation. The group does front line work on lab-on-a-chip mass spectrometry, where two staff members are international leaders

#### **6.2.1 Quality**

It is pleasing to note that the Lund Nanobiotechnology Group was given top ranking in the Swedish Research Council's 2003 Biotechnology Evaluation. Lund's expertise in ink-jet technology is the basis of the Group's high-quality research into microdispensing and related devices. There is also internationally-leading research into lab-on-a-chip mass spectrometry.

#### **6.2.2 Productivity**

The group is not large (8 academics and 7 students), so it would not be realistic to expect productivity to be high except in the research areas in which the Group is specialised. However, judged on the number of publications, invitations for lectures and conferences, the group does very well.

#### **6.2.3 Relevance**

"Nanobiotechnology" is a highly topical subject. Practically every major university has initiatives in this area, many of which have involved very substantial investments. In this context, the Lund nanobiotechnology activity is rather small (see, for example, the London Centre for Nanotechnology – a joint venture of Imperial College London and University College London – [www.london-nano.com](http://www.london-nano.com) – which occupies a large purpose-built facility and which accommodates a wide range of biotechnology research). Potentially, nanobiotechnology will have considerable scientific, social and socioeconomic significance and it might be sensible for the activities not only at Lund but also in all the Swedish universities to be combined into a virtual centre in order to coordinate the national effort so as to be internationally competitive.

#### **6.2.4 Vitality and ability to manage research**

It is apparent that the morale of the Group is adversely affected by recruitment difficulties and an underlying sense of insecurity caused by the impossibility of long-term planning and the perceived failure of politicians to appreciate the strategic significance of their work. Despite this,

however, they are doing good work and seem to be much encouraged by the opportunities opened up by the new Biomedical Centre.

### **6.3 Ultrasound/Biomedical Engineering Group**

This group is small consisting of one Professor, one Professor Emeritus, one Associate Professor and two Assistant Professors. The group concentrates on (i) vessel wall characterisation: the Group was the first to observe and measure longitudinal arterial wall movements and on (ii) blood perfusion and pressure measurements using micorbubbles. Other activities are within dolphin sonar studies

#### **6.3.1 Quality**

As a result of the pioneering of echocardiology at Lund, the Group has a longstanding and preeminent position in medical ultrasonic research. Current work of arterial wall characterisation is internationally-leading. The dolphin work is in what is currently a rather neglected niche. The research aspirations of the Group have been too vaguely described to allow any more in-depth evaluation of quality.

#### **6.3.2 Relevance**

Clinical ultrasonic diagnostic examinations are second in number only to traditional X-radiography and so the technique is hugely important.

#### **6.3.3 Vitality and ability to manage research**

It must be difficult to maintain the momentum of a small Group of researchers with a 50-year history of achievement in a single field of research. In view of the socioeconomic importance of medical ultrasound, perhaps there would be a good case for introducing some “new blood”, without in any way negating the immense value of the existing expertise built up over very many years.

It seems to be likely that there is a huge amount of research at Lund which qualifies as “biomedical engineering”, in addition to that being carried out by this Group. It would be interesting whether there is any plan to bring it together into a coherent virtual or real centre.

# PANEL 14 – CHEMISTRY

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## 1. PREFACE

At its plenary meeting, it became clear to the Panel, that the information received was not sufficient to make the evaluation. It required information concerning: (a) the structure of research and (b) some synthesis information on dimension and productivity. Relevant material was subsequently provided, whilst the Panel also conducted their own separate enquiries. The Panel regretted not being able to evaluate and highlight individuals, but being asked to focus on a more general level, i.e. evaluating research areas and groups. Such a general evaluation might cause a perfunctory report and can easily hide outstanding scientists, who are member of a group doing “mediocre research”, or scientists with a low productivity and not receiving scientific attention may be concealed in a group doing excellent research. Based on the material provided, and especially under the conditions that no individuals should be addressed in the evaluations, the Panel felt that its assessments could not have been as thorough as it would have wished.

## 2. DEPARTMENT OF CHEMISTRY

### 2.1 General

The Department of Chemistry is currently in a state of reorganization involving a merger of a large number of divisions into 4 main units having the following 12 divisions:

1. **Basic chemistry:** Divisions of Organic Chemistry, and Polymer and Material Chemistry, and part of Analytical Chemistry.



2. **Physical and Theoretical Chemistry:** Divisions of Physical Chemistry 1, Theoretical Chemistry, and Chemical Physics.
3. **Biotechnology:** Divisions of Biotechnology, Applied Microbiology, and Pure and Applied Biochemistry.
4. **Center for Molecular Protein Science:** Divisions of Biophysical Chemistry, Molecular Biophysics, and Biochemistry, as well as one group from Analytical Chemistry.

Partly for historical reasons, the structure of the Chemistry Department is complex since chemistry is done both at the faculty of science and that of engineering. This has led to a large number of groups and some duplications in teaching and research. Clearly, it is essential that these activities are now combined and first measures have been undertaken to concentrate and to optimize the respective activities. Currently, 12 units are defined according to the web page, 9 research areas are given as the most successful ones according to the science reported, and the 4 large units enumerated above are planned for the future.

Even though the Department of Chemistry at Lund University (KILU) is a very large one (with more than 100 faculty members), the Panel has the impression that certain important areas of chemistry are not encompassed in any of the given structures.

The “basic chemistry” unit is not a research direction and as it is currently constructed (as seen by the people assigned to it), it will remain an agglomeration of all those people who do not fit neatly into the other three units! We do not believe that this is in the long-term interests of chemistry at Lund. Organic and inorganic chemistry are major fields of chemistry and they are the basis for nearly all other activities. They cannot be reduced to a part which, it seems, in future will cover just basic teaching requirements. This seems to us to be very unusual in such a large chemistry department with more than 50 professors and a total of 109 academic staff.

In general, the KILU has a strong bias towards biology and biotechnology, as well as in understanding basic chemical processes. The tendency may be rather too strong and one has to make sure that competence in classical chemistry (e.g. organic, inorganic and material chemistry)

remains high enough and of high scientific quality addressing also new areas in research (not just focusing on teaching). These research areas are of utmost importance for a chemistry department and for the development of attractive collaborations with the industry and society as well as for attracting excellent students. Otherwise, the future development of KILU will be in danger, since life science might just take over. Chemistry has to be a strong partner in life science bringing in the core chemistry (possibility to combine synthetic chemistry with biology) and a materials part, as well as the basic understanding of chemical processes. It must guard against possible mutation itself into life science and biology. In this regard the Panel is also concerned about the plans for building a high-class mammalian cell lab in a chemistry department, with the involvement of the faculty members.

KILU has been, and is still to a substantial degree, highly research productive in several fields. The strong research fields at KILU include chemistry at the borders with biology and physics: biophysical and physical chemistry, molecular biophysics and chemical physics that taken together, address various fundamental problems related to biological functions. There is also a strong research in computational chemical methodology, to some extent in material chemistry, and in various fields of biochemistry and microbiology, and their more technologically oriented disciplines.

KILU has a unique profile with, on one hand outstanding scientific competence in the fundamental physico-chemical core, and on the other, a strategic strength in a number of interdisciplinary directions, from biochemical and analytical methodology devoted to life and environmental sciences to solid-state and material chemistry connected to nano-science.

Many of these fields are characterized by “measuring and calculating properties” of molecules using highly advanced and sophisticated equipment and computers.

KILU has enviable “Special Resources” which have, and will provide researchers at Lund University with world-leading scientific equipment. The MAX-lab, NMR, nCHREM and ESS are outstanding and the quality of the research done across the board in these “Special Resources” is clearly world class. Moreover, their existence greatly facilitates collaborative

research and associated opportunities, like advanced teaching, within the four defined units. These “Special Resources” place KILU at the very highest level of attainment and potential.

KILU has also a good profile in the organic synthesis of biologically active compounds and those with other specific functions. However, the number of scientists devoted to preparative chemistry is very limited.

Thus, there is an imbalance between research performed to “measure and calculate molecular properties”, compared to efforts carried out for “making molecules”.

## 2.2 Major structural issues

We believe that KILU has a number serious problems:

### Faculty age

The numbers of professors and their mean age (57 y) have increased by 20% since 2000. The Panel has been informed that the increase is due to an internal promotion of mainly lecturers. In the same period the numbers of lecturers and research fellows have decreased by 27% and 70%, respectively. For the lecturers and researchers the mean age is 47 y and 39 y, respectively. The Panel is concerned over the increase in number of professors by internal promotion and the high mean age of professors, lectures and researchers.

### Research profile

The research profile at KILU has too much focus on properties of molecules, rather than making molecules. The basic preparative research areas in organic, inorganic and material chemistry are under-represented. These areas are important, not only for the department, but also for the interaction and knowledge-transfer for KILU with industry and society.

### Decreasing student numbers

The number of students at both undergraduate and graduate level has decreased significantly. For the Ph.d. students, a reduction of 40% has taken place. Ph.d. students and post.docs constitute a community that constitutes vitality, enthusiasm, creativity and innovations in any department. This reduction in the Ph.d.-population will have significant impact on the scientific output of the department.

### **Faculty to PhD student ratio**

The faculty to Ph.d. student ratio is 1:2 (113 academic – 202 Ph.d. students) – if only professors and lecturers are counted the numbers are 79 to 202. The Panel is to some extent concerned about this ratio, there seems to be too many faculty members relative to the Ph.d. students. A well-balanced department with about 200 Ph.d. students might be operated efficiently by a staff of ca 60.

### **Reduction in scientific output and external funding**

Scientific output has decreased over recent years. The Panel is not able to ascertain, if the contribution to papers in top-journals has also decreased, i.e. the quality of the research performed have decreased, as no list of publications has been available to it. The papers published over the last 3 years include work performed by the Ph.d. students over the last 4-6 years and with the drop of Ph.d. students, the number of papers will probably decrease further. Furthermore, the grants for research have decreased, from 172 Mill. S.Kr in 2003 to 147 Mill. S.Kr in 2007.

### **A budget deficit of ca 70 mill S.Kr**

The department has an accumulated deficit of ca 70 M. S.Kr. The Panel has proposed to the University to cancel this deficit, because it is and will be a millstone around the neck of the department to “survive, rejuvenate and restructure” at the same high scientific standard, which has hitherto been a trademark for the department. The Panel has been informed that the department has to pay back this large amount of money with interest. However, no plan for this has been available to the Panel. If the department has to pay back these ca 70 M. S.Kr including interest over e.g. 10 y, this can probably only take place with a significant reduction of the faculty members. Furthermore, a department having such a tight economy will deter many external scientists from applying for a position there, because no “attractive package” can be provided and will encourage the younger scientists to apply for positions at other and more attractive universities. The Panel understands that younger scientists are already applying for positions for moving away from Lund University.

The Panel feels that it cannot offer one all-embracing solution to this acute financial problem; it must be put right internally, if the department's future is to be safeguarded.

The Panel considers that the budget deficit and the economic consequences that flow from it, as well as and the falling number of students are the major problems for KILU. It will require significant and drastic changes for the department, in order to be able to sustain it as an attractive national and international department for education and research.

## 2.3 Specific Comments

### 2.3.1 Theoretical chemistry, and surface and colloid chemistry

This division consists of 23 staff members. The theoretical chemists at KILU have been internationally well-known and respected for their outstanding and seminal research on especially quantum chemical methodology, leading to e.g. the MOLCAS-program suite. The group has also been applying accurate quantum chemical calculations and Monte-Carlo simulations for studying electrostatic interactions leading to a number of important contributions where theoretical work has been combined with experimental work on complex systems as proteins and biopolymers. The Panel has noted that many of the scientists who contributed to the excellent-outstanding standard have retired or are at the end of their career.

**Total work done:** Quality *excellent to outstanding*; relevance *excellent*.

**Present and future:** Activities seem to be going somewhat down and many of those who contributed to the high standard have retired or are at the end of their career.

For the “poly(ethylene oxide) – water systems group, the achievements made are very significant and influence strongly the methodology used in this area. However, this is relatively old work and it seems that it not so much the focus anymore. The transfer of the knowledge gained there to new systems seems to be a bit limited.

**Total work done:** Quality *excellent*; relevance *excellent*.

**Present and future:** Activities seem to be going down significantly; a major player is retired.

Very significant contributions in the field of “interactions in model membrane systems” has been made regarding e.g. NMR methodology for detection of phase-equilibria in multicomponent systems. These, are however, from late seventies, early eighties. Nevertheless, their relevance

in quality is excellent and the work was at the time outstanding and has still very high relevance to the study of biomembrane interactions. No doubt, also the Israelachvili bilayer work from the nineties is outstanding and cited in nearly all the present publications in that field.

**Total work done:** Quality *excellent to outstanding*; relevance *outstanding* for the old work.

**Present/future:** No discernible activities?

The surface-adsorption group has made important methodology and theory development. A major part of the papers have been published over the last years in leading journals and are well-cited high quality papers!

**Total work done:** Quality *very good to excellent*; relevance *excellent*.

**Present/future:** Seems to be going on rather well; younger promising researcher available.

Very important method development and pioneering work in NMR relaxation have been carried out; however some of it 25 years ago. Highlights are significantly less now.

**Total work done:** Quality *excellent–outstanding* (20–25 years ago); relevance: outstanding.

**Present/future:** *Very good*.

### 2.3.2 Ultrafast and single molecular science – elementary molecular processes and interactions

The group (6 staff members) has performed internationally acknowledge research studying the excited state down to very short time scales of biological systems, produced very good to excellent work in the area of material science related to photo-induced electron transfer in dye sensitized semi conductors and in organic polymeric materials. It has invested successfully in new directions of research related to reaction control and coupling of time and space resolution down to the single molecule. Both directions have led to promising results. Based on the information provided in the description of their contributions many seem to be published in very good to excellent journals.

It is encouraging to note that in the future directions of the program the division intends to invest further and develop new methodologies such as

ultrafast X-ray spectroscopy and to further develop single molecule spectroscopy. These methodologies should be of interest of other groups in the department that could benefit greatly from a better collaboration and sharing of know-how between this and other divisions such as physical chemistry 1 or biomolecular interactions and dynamics.

**Total work done:** Quality *excellent*; relevance *excellent*.

**Present/future:** Going very well; younger promising researcher available.

### 2.3.3 Biomolecular interactions and dynamics

The division consists of 14 members. They have contributed at a high international level in the area of interactions and dynamics of biological macromolecules using specialized NMR techniques, with papers in internationally leading journals.

The future program proposed is to a large extent a continuation of the current ongoing research with emphasis on water in biology and protein folding, but important targets are not identified. We note that they have expressed interest in studying biological risk of nanoparticles. This is certain to become an even more important area in the future, one in which in-house research and already know-how and expertise can be profitably exploited for its own sake and also facilitate interdisciplinary projects.

The age structure of the division is good and already younger staff members with international standing can be recognized.

**Total work done:** Generally the quality *very good to excellent*, but *some outstanding contributions* have also been performed; relevance *excellent*.

**Present/future:** Going very well; younger promising researcher available.

### 2.3.4 Exploring structure, function and dynamics in key proteins and protein assemblies

The goals of current and future programs are lucidly expressed by this impressive research team. Pursuing the structural basis of specific biological functions in large protein assemblies is of great importance. The use of MAX-lab and intended exploration of the 4th generation MAX IV synchrotron radiation is laudable. Workers in this group are demonstrable world class.

**Total work done:** *Excellent to outstanding*.

**Present/future:** Timely and exciting and likely to maintain outstanding prior reputation.

### *2.3.5 Plant plasma membranes and aquaporins*

Work on subtle and centrally-important structural changes exhibited by various aquaporins has been of world class. It has, inter alia elucidated the gating mechanism employed by these entities.

**Total work done:** *Excellent to outstanding.*

**Present/future:** *Excellent.*

### *2.3.6 Mediated and Direct Electrochemical communication between Redox Enzymes, Biological Membranes, Whole Living Cells and Electrodes*

This is a very small group of maximum 3 people. Part of the mediated and direct electrochemical communication group of analytical chemistry is studying bioelectrochemical investigations of redox enzymes. The research has been recognized internationally and a substantial number of papers are highly cited.

The proposed strategic plan really is only a very general statement and does not contain elements for scientific growth. Collaborations with other divisions sharing the existing know how e.g. combining single redox-enzyme catalysis with luminescence detection, now an area of strong development could allow to keep some the acquired expertise and make a closer to the frontier area of research.

**Total work done:** *Quality very good; relevance very good.*

**Present/future:** Only very general statements are provided. Collaborations with other divisions sharing the existing know how e.g. combining single redox enzyme catalysis with luminescence detection, now an area of strong development, could allow to keep some the acquired expertise and make a closer to the frontier area of research. Seems not to be going well and they can disappear in basic chemistry unit.

### *2.3.7 Biotechnology*

The division consists of 13 members. The focus on “biocatalysis in low-water media”, seems to be a research area which is addressed for many years constantly on a rather high level with high publication activity. However, limited information have been provided for the panel.



**Total work done:** Quality *very good to excellent*; relevance *excellent*.

**Present/future:** seems to be going well; but difficult to evaluate.

The research area “stimuli-responsive polymers in biotechnology” is an interesting field which has been consequently applied for optimizing separation technology with really focusing on the aspects that it works. Well recognized publications.

**Total work done:** Quality *very good to excellent*; relevance *excellent*.

**Present/future:** Going very well; high potential for the future even though one has to make sure that young people will follow up.

“Supermacroporous gels for biotechnology” is again, a highly interesting field with very high expertise shown which is really driven to working systems. As in the topic above, here real materials expertise is showing up; it is disappointing, that the materials activities shown in the biotechnology area are not combined with the material science group and also not made more visible in the future plans.

**Total work done:** Quality *very good to excellent*; highly relevance.

**Present/future:** Going very well, should be placed better within the aspect of material science.

No doubt KILU has an outstanding reputation in molecular imprinting! This group is leading world wide. It also looks that with the partial retirement of the leading person it was possible to keep up the expertise and to have now a promising younger researcher.

**Total work done:** Quality *outstanding*; highly relevant

**Present/future:** Present still profiting from one highly acknowledged expert who is least partly retired; should be placed better within the aspect of material science.

The field of “monitoring and control in biotechnological processes” can not fully be judge by the Panel. Looks like on a *good to very good* level.

The research group in “extremophilic microorganisms” is internationally recognized and has the potential to develop towards a strong internationally competitive group. The group has been very active and productive

in the last five years. The research field is of high strategic value for Sweden in view of the valorization of plant and industrial biomass.

**Total work done:** Quality *very good to excellent*; highly relevant.

**Present/future:** Going very well; high potential for the future.

### 2.3.8 *Microbial Physiology and Metabolic Engineering*

The division consists of 10 members. The “bioenergy carrier production: bioethanol and biohydrogen” area is a very relevant research area of high strategic value for Sweden in view of the valorization of renewable resources derived from forestry, agriculture and waste material. The research group is internationally recognized and has the potential to develop towards the highest level of international research.

**Total work done:** Quality *very good to excellent*; highly relevant.

**Present/future:** Going very well; very high potential for the future.

“Food-borne microbial virulence: rapid detection methodology, food preservation, quantitative risk assessment” is a very important and strategic research area directly related to public health in which many groups are active all over the world. The group performs internationally competitive research. The quantitative risk assessment is of particular importance but seems to be still in development.

**Total work done:** Quality *very good to excellent*; highly relevant.

**Present/future:** Going very well; high potential for the future. Strong collaboration with the Department of Food Technology, Engineering and Nutrition on this aspect is recommended.

A very important, strategic and competitive research area is “health promotion: pro- and prebiotics, starter cultures”. From the material available, it seems as this group has published more on probiotics than on prebiotics. The research performed belongs to the international top with in this field.

**Total work done:** Quality *very good to excellent*; highly relevant.

**Present/future:** Going very well.

The “chiral bioreductions: stereo-specific pharmaceutical synthesis” is an interesting research niche. From the information the Panel has been

able to find on the web this research is quite young. It seems as the group has published 5–10 papers on this subject which have not yet been cited much. The strategic value for KILU is important for future decisions about this research.

**Total work done:** Quality *very good to excellent*; highly relevant.

**Present/future:** Going well, but difficult to evaluate.

### 2.3.9 Nanotechnology and functional polymers

From the additional material one can conclude that only 5 faculty members are active in this field with one of those being actually more into biophysics and one is retiring 2008. This seems to be below the critical mass.

In the report it is stated that. "18 years ago, we launched a cross-disciplinary nanotechnology initiative; the nanometer structure consortium, where we contributed with our knowledge in inorganic chemistry, crystallography, atomic scale characterisation and materials properties. Other partners are Solid state physics, cell- and organism biology, electro- and information techn., mathematical physics and medicine, in all ca 40 senior scientists."

It looks like the chemists are partners in this, but maybe not the major player as a very low number of faculty members are involved. From that initiative, a major achievement out of the chemistry department is the production of nanowires and nanotrees where it is claimed now that the KILU group belongs to the top 3 groups in that field (publications are convincing, citation is excellent but output is still limited). The contributions come here mainly from catalysis, which is important, but future development needs a more interdisciplinary approach to go into application e.g. building nanoelectronic based devices.

**Total work done:** *Excellent, some parts outstanding*, but under the critical mass; highly important and relevant.

**Present/future:** Going well, but needs expansion! Major player retired?

It is not possible for the Panel to identify the leading KILU person from those 4.5 faculty members being involved in this research field. Only one of those was a coauthor of the high ranking publications but his own publication list is too small.

The "functional polymer" part can be divided into two: There is a highly active synthetic group represented by one lecturer who focuses on the

synthesis of a variety of functional polymers, with high recognition of the work on sulfonated polymers with ion and proton conducting properties; activities are also on different polymer architectures and amphiphilic polymers. This a very important group being nearly the only one which is clearly focusing on making new materials (beside the activities in the biotechnology area) and material design for important applications. The group is very productive and the publications are well cited. It remains a little unclear if this group has appropriate partners e.g. in the field of energy production but it can be assumed that this is the case.

**Total work done:** *Excellent*; highly relevant.

**Present/future:** Going very well but needs to be expanded.

The other group, again represented by only one professor, deals with the characterization of important polymer properties e.g. free volume which is especially important in the field of membranes e.g. for gas separation. This is also a highly acknowledged activity, but the output could be higher. It does not become fully clear if these activities are well connected to any ongoing membrane technology activities within the chemistry department or the chemical engineering department. The present focus which shifts to nanocomposites seems rather isolated and is certainly addressed with too low man power missing the part which addresses the making of the nanocomposite (membranes).

**Total work done:** *Very good to excellent*.

**Present/future:** Going well but certainly subcritical in man power.

General remark to “nanotechnology and functional polymers”: It looks like the nanotechnology and especially the functional polymer part is not well-integrated in the general strategy and planning of the chemistry department. It could, and actually, it should be better developed and integrated. Otherwise it does not make use of its potential; the chemistry department could certainly profit from these activities much better than presently given.

However, it could be that the groups involved here find their partners not at all in the chemistry department but maybe in the solid physics department, or in engineering! This would also be ok, but is not outlined in the provided material.

## 2.4 Most promising areas for the future or those which should develop – future work

The Panel feels that in this section not all activities which are planned for the future are really outlined. They focus on their three “to be” research areas but in many cases it seems to be just a minimal extension of what has been done in the past and lacks in several areas vision or really new ideas.

### 2.4.1 Ultrafast and single molecule science

It is promising to see that in the future directions of the program the division intends to further invest and develop new methodologies such as ultrafast X-ray spectroscopy and to further develop single molecule spectroscopy. These methodologies should be of interest of other groups in the department that could benefit greatly from a better collaboration and sharing of know how between this and other divisions such as physical chemistry 1 or biomolecular interactions and dynamics.

**Overall:** *Excellent* and with a vision.

### 2.4.2 Organizing Molecular Matter

This is a well-structured and thought through research plan and combines excellently expertise; it is just a little surprising that this “center” is not reflected in the new organization structure (in the 4 new units planned!). In this field theory (very strong), study on model systems (methods and expertise available, high ranking physical/chemical analysis) as well as application aspects will be addressed. The Panel is very satisfied with all aspects, however, one might get the impression that in principle the present expertise is more in the bio field and not so much e.g. in the cohesion of concrete. But we fully agree that in nearly all, even very technical applications, understanding of organizing matter in complex heterogeneous systems will play an extremely high role. The Panel notes that there is no clear statement of intention concerning synthesis of new materials.

**Overall:** Plans are *very good*; hopefully the department can really go in the direction as planned.

### 2.4.3 Biomolecular interaction

Very much in direction of biology and where is the chemistry?

Water in Biology: The topics are highly important and relevant e.g. the role of water and the understanding of the interactions and the department have the equipment and the competence and experience to make a significant progress there.

Protein unfolding is also a very important field with a big potential. However, it seems also to be very focused towards the bio- and medicinal fields.

Biological risk of nanoparticles: very important area. The department has a very good ground here and the Panel considers this an excellent strategy to focus on this topic.

The study of large protein complexes and related fields are also highly important research areas. However, it seems also to be very focused towards the molecular-biology fields.

**Overall:** Plans are *very good*, but fit not very well into a chemistry department.

#### 2.4.4 Organic chemistry

It has already stated earlier that preparative chemistry is extremely important for the future.

The Panel is happy that organic chemistry is listed under the most promising area; nevertheless, it is a small and rather limited activity as it is described (studying biological active secondary metabolites). The field is certainly important and fits well in the general strategy of the department, but the Panel would like to see that organic and related fields in chemistry are even more expanded. These fields – making e.g. new molecules – are highly important for many of the research areas in the department and of fundamental importance for Swedish industry and society.

**Overall:** Plans are *very good*

#### 2.4.5 Biotechnology

The department has an excellent standing in the area of production of chemical and energy from biobased feedstock. The Panel agrees with the statement that this will have a strategic importance for the coming years. The vision is “to develop some demonstration cases involving integrated

production of chemicals and energy.” The Panel think this is the right way to go (at least here a clear vision is given!), but we would have expected a somewhat stronger statement and a more clear commitment to work together with the chemical engineering department. The programs look so similar between the two departments but somehow they do not refer a lot to each other.

The same comments are also valid for the other visions: Biosensors (certainly very important) and environmental separation (e.g. waste-water treatment from pharmaceutical industry), similar/identical topics are addressed in the chemical engineering department and the Panel can only assume that they work together.

The Panel shares the analysis given; the possibilities are high. However, the actions could be stronger than outlined e.g. in a concerted actions with the chemical engineering department.

**Overall:** plans are *very good to excellent* (as it can be judged from the short text) but need more collaboration to become valid.

#### 2.4.6 Functional Materials

Outstanding results could be achieved regarding nanowire production which might be extremely interesting for nanoelectronics. Nanotrees are actually a little less challenging than well-defined wires which one can place and arrange effectively. Progress there would need also a strong link to nanoelectronics, meaning suitable engineering departments, as well as to the physics departments. The future planning regarding the chemistry department/materials seems to be rather weak but certainly one should investigate if it is possible to access additional funding from high ranking sources and the field is certainly of extremely high relevance.

The Panel has difficulties in seeing the necessary multidisciplinary approach, at least not outlined in the papers given. We assume that the activities of the chemistry department are just a smaller part in the nanotechnology initiative launched at KILU with major player coming from solid state physics, cell- and organism biology, electro- and information technology, mathematical physics and medicine, in all ca 40 senior scientists and the chemistry department contribution “with our knowledge in inorganic chemistry, crystallography, atomic scale characterisation and materials properties”

#### 2.4.7 Biopolymers:

No real vision given, just a general statement;

### 2.5 SWOT analysis

- S: Front line and impressive research on the borders of biology, with strong emphasis of the physical and theoretical properties of the systems studied.
- W: Lack of focusing in future planning, absence of making of molecules and material science as a core element in their strategy.
- O: Use the age structure to start a well designed tenure track system combined with a proactive post-doctoral program trying to attract excellent scientist from abroad for a limited stay (not tenure track).
- T: Financial structure. Aging of staff. Low number of Ph.d. students. Lack of innovation in several programs proposed, the feeling of we are excellent hence continuing will keep us excellent. Too high number of staff in certain areas which were successful in the past leaving little room for new areas

### 2.6 Recommendations

1. A major initiative is required to improve and attract undergraduate students from the high schools. The Chairman will be prepared to amplify the various proven options available.
2. Commitment from the faculty and institutions to young scientists embarking on the scientific careers, including:
  - a) A clear career path.
  - b) Mentorship programme
  - c) Substantial start-up funding
3. Serious considerations to change the name of the department to Department of Chemistry and Chemical Biology.
4. Greater emphasis be given to making new molecules and materials.
5. Re-examination of methods used to recruit new members of staff.
6. Clear instructions from the Faculty concerning procedural and strategic matters for the staff to implement.



7. Less time be devoted by individual researchers to administrative purposes and more to scientific activities.
8. Provide financial support for re-vitalizing and re-structuring the department.

### **3. DEPARTMENT OF CHEMICAL ENGINEERING**

#### **3.1 General**

The Department of Chemical Engineering (DCE) was formed out of two previous divisions (covering mainly unit operations, heat and power technology, process chemistry and reaction engineering) in 2003. The department was later expanded by the inclusion of the Division of Water and Environmental Technology in 2005.

This department is very small compared to the chemistry department. The department is engaged in a significant number of research projects, covering a wide range of research topics in chemical engineering and related areas. The research activities are mainly into the principal categories: energy, environmental technology, process and product design, and water and environmental engineering. There are substantial overlaps and many of the research projects cover several fields. The nature of the work ranges all the way from fundamental studies, e.g. in catalysis, to applied projects in the process industry.

DCE has some clusters of significant success. However, as stated earlier due to very limited information obtained especially for DCE further information such as (i) full listing of projects active in the period of analysis, (ii) highlighting the research effort of the different researchers in the different projects; (iii) well-documented list of research papers, including impact factors and citations; (iv) scientific and technical productivity per research line or research area, would have increased the level of evaluation significantly.

It would help to learn more about the Research Centers (the Centre for Membrane Technology and the Center for Chemical Process Design and Control), namely in what they represent and how they relate to the main research profiles reported (Energy; Environment Technology; Process and Product Design and Water and Environmental Engineering).

The Panel has tried to obtain some information through the DCE web-site. It has helped significantly, yet it did not provide the full picture of the research organizational structure. Indeed, though it included a general overview of on-going research projects grouped in different areas, it did not give information concerning full dimension of such projects and further introduced a few elements of difficulty since some projects are repeated in different areas.

### **3.2 Some specific issues**

The research themes cover very many relevant fundamental studies, processes and products, but seem not to cover in significant dimension and in a structured way some also relevant topics, namely in fluid mechanics, mixing, optimization and control, systems engineering approaches (in this case even considering the Center for Process, Optimization and Control, which seems to be or potentially is very relevant, but of which little is mentioned in the report).

The Department seems to lack some interfaces (or it has to improve them) that may be necessary to increase productivity and visibility.

It is not clear to the Panel, what is the full dimension of the interface with other disciplines, though there are indicators of cooperation with the Department of Automatic Control and with material scientists.

The cooperation with industry seems significant, though this statement lacks clear evidence. Furthermore, the Panel is surprised by the relatively small number of Patents that have been filed.

The department has an outstanding “Special Resources” – a large apparatus hall, which is unique in its kind for Chemical Engineering in Sweden. The apparatus hall was completely renovated in 2005 and it allows the department to conduct experiments at a relatively large scale. This has been important for work on membrane technology, and for the establishment of the National Process Development Unit – financed by the Swedish Energy Administration

DCE has had 20 academic staff members over the last 5 years, of which 11 are professors. The mean age of the professors has increased from 53 y to 56 y during this period. For the lectures – only 4 – the mean age is 49 y.

The number of students on both undergraduate and graduate level has decreased significantly. For the Ph.d. students, a reduction of 46% has taken place. The Ph.d. students and post.docs are those who are the main contributors of vitality, enthusiasm, creativity and “bringing ideas into science” in a department.

The faculty to Ph.d. student ratio is 1:1 (20 academic – 20 Ph.d. students) – if only professors and lectures are counted the numbers are 22 to 11. The Panel is concerned about this ratio, there are too many faculty members relative to the Ph.d. students and the number of Ph.d. students compared to the faculty members is definitely too low!

DCE has obvious clusters of high quality, with groups that are leading nationally and fully internationally recognized. However, the overall dimension of this quality is not well identified in the report (and in the complementary information available).

Bioconversions, catalysis, separations, sustainable and/or energy efficient processes represent areas where the Department seems to have very good to excellent activity.

DCE has indicators of very good internal and national collaboration, mainly with industry. The extent of international scientific collaboration is not so clear and the Panel rate this as an area where progress can be envisaged.

The department has decided somehow to re-organize its structure (or its form of presenting it?), in three main development areas – (i) biorefineries; (ii) environmental engineering; (iii) process engineering.

The Panel would like to address that the following complementary concepts and issues also represent major opportunities of chemical engineering (of course that chemical engineering thought of in *lactus sensus*): (i) (sustainable) processes; (ii) (bio) products; (iii) materials (bio, nano, poly); (iv) energy; (v) systems (including knowledge engineering).

The organization of the research activity should promote the creation of synergies, as example: (i) environment with health and products; (ii) energy with processes and again products; (iii) biotechnology and its interfaces; (iv) systems engineering, on their own, apart from all the relevant influence that systems engineering tools have in all areas.

This example of organisation paves the way for obvious links with areas that in Lund are in other departments (mainly chemistry). Then, we have the difficult issue of linking this layer of organization with the layer of what is emerging areas and new fundamental knowledge (and skills) – nanosciences, surface sciences, chemistry of trace compounds, environmental biotechnology and molecular biology, new energy technology, advanced hybrid modeling, advanced process control, novel products and energy sustainable processes (process design, waste treatment)

It is clear that several of these concerns can be identified in the future development areas (for example, water quality is there), but some are (apparently) left out (product engineering seems to be one such example).

It seems that the planned organization, as reported, is not excellent, as it seems not to promote, to the extent that it could or should, some of these key areas of development. On the contrary, and that should be mentioned, though the structure does not put in evidence the interfaces, the written plans show clearly that DCE feels and understands (as stated in the report's form 2) this requirement for strong complementary, multi-disciplinary effort (with material scientists, biologists and biological engineers, just to mention few).

Opportunities are not really unique, but there are clear opportunities in areas where Lund (and Sweden) are naturally prepared: (i) The production chain associated to lignocellulose; (ii) environmental processes (environmental catalysis), water quality issues and waste treatment issues. Opportunities are wider than ever. It is for sure not possible to tackle all of them, but the key for the future is to a large extent on the combination of chemical, biochemical, material and environmental expertise for the development of novel products, energy sustainable processes and flexible operation.

DCE has basic know-how and conditions to go along this way, but it needs to create conditions for attracting more young people and bringing in the expertise that it lacks.

### **3.3 SWOT-analysis**

S: CDE strengths are on some key areas of specialization (bioconversions, catalysis, energy efficient processes), where productivity is relatively high, and on the cooperation with relevant industry.

W: DCE has to fight hard for an increase of temporary researchers, be it Ph.d. students or post.docs., to change and improve the current ratio no-permanent vs. permanent researchers. DCE will have to self-evaluate and reverse the conditions that have led to this decrease of such ratio. Also, as weakness, the not so clear internal organization and strategy of research, that leads to not exploring apparently important cooperation, namely with sections of the Chemistry Department.

O: The fact that the DCE has recognized know-how in areas that are relevant for Sweden and for the Region should be seen as an opportunity to attract financing and good researchers, at least national researchers. The indicators given by the reported plans for future research show that staff is aware of the requirements for complementary multi-disciplinary efforts, which in itself represents a strength and will promote opportunities. DCE will have to invest in improving internal organization in order to maximize synergies with close and complementary areas. As example, there are opportunities in joining environment with health and product engineering projects, or interfacing more strongly with biotechnology, that are not yet (seem not to be) explored.

T: There will be a threat of slowing research activity if conditions for attracting young researchers are not improved.

### **3.4 Recommendations**

More thoughts should be given to pursuing areas of research relating to sustainable developments and educating scientists for Swedish industry in general.

DCE should be vigilant about internal structure.

Mutual efforts between DCE and the Chemistry Department should be made to improve links and cooperation in the several interface areas of their activity.

## **4. DEPARTMENT OF FOOD TECHNOLOGY, ENGINEERING AND NUTRITION**

### **4.1 General Comments**

The new structure for Department of Food Technology, Engineering and Nutrition (DFTEN) implemented in 2003 is a sensible one and seems to work quite well. As already reported many publications are authored by scientists coming from the 3 divisions which merged in the department and thus evidences multi- and interdisciplinary collaborations. The establishment of the structure is underlined by the description of the research activities under a general title: “Research for design and production of foods with health benefits”. The Panel considers this as a good mission for the future.

DFTEN is also very small compared to the chemistry department. Nutrition research at Lund University is characterized by a functional and fruitful collaboration between Applied Nutrition and Food Chemistry and a clear focus on the optimization of the nutritional properties of carbohydrates/dietary fibers and proteins in food products. In particular the research on the health benefits of carbohydrates/dietary fibers is very good to excellent and is internationally recognized from a nutritional point of view, as well as from a food chemistry point of view. The research on heterocyclic amines is outstanding and getting more and more international recognition.

In the food technological research 3 main areas are indicated:

1. Food process engineering.
2. Structure-function relationships with emphasis on cereal, meat and dairy products.
3. Emulsions.

The aim of the food technological research is to produce foods with the desired quality attributes as perceived by the consumer. The research within the structure-function relationships area is of international standing, this is also true for membrane technology and the research on emulsions is getting more and more international recognition.

With respect to the management of DFTEN it appears that this department has a better financial position (no negative figures) than the other Chemical Departments although keeping the equipment infrastructure

state of the art needs attention. This infrastructure looks very good with many unique instruments.

#### 4.2 Structural issues

DFTEN has had 10-20 academic staff members over the last 5 years, of which 13 are professors. The mean age of the professor has increased from 53 y to 57 y during this period. For the lectures – now only 2 – the mean age is 49 y. A point of serious concern is the mean age of particularly the category of academic professors. In the near future a number of professors will retire. This is an opportunity to restructure the department and bring it in line with Lund University expectations. This can only be done by adapting your HR management system and not to rely on the automatism in the career development of the academic staff from lecturer to professor. Professorships should fit in the strategic plan and the best candidates should be selected in an open procedure allowing national and international candidates to apply.

The establishment of the structure is substantiated with shared supervision of Ph.d. students, special multi- and interdisciplinary activities like collaborations in competence and excellence centers, national and regional research funding and joint courses in undergraduate teaching. Ph.d. students are also supervised with scientists from other departments within the faculties of Engineering, Science, Medicine and Management thus enabling strengthening of the expertise of the department with basic disciplinary science.

However, the Panel is concerned that the number of students on graduate level has decreased significantly. For the Ph.d. students, a reduction of 48% has taken place. Striking to the Panel is especially the high mean age of 40 y for the 8 Ph.d. students in 2007; however, the lower mean age of 34.6 y for 2002–2007 of the Ph.d. students is more satisfactory, although this is still quite high in comparison to many other countries. However, the Panel was pleased to read that the scientific publications have increased from 60 to 70 from 2002 to 2007.

The faculty to Ph.d. student ratio is 1:0.85 (20 academic – 17 Ph.d. students) – if only professors and lectures are counted the numbers are 13 to 17. The Panel is concerned about this ratio, there are too many faculty members relative to the Ph.d. students and the number of Ph.d. students compared to the faculty members is definitely too low! With this number,

from an international perspective, DFTEN does not belong to the top. However, with 4 professors in the list of ISI Highly cited they do!

The evaluation of the scientific quality based on the material for DFTEN was not easy to make, particularly not since no individuals should be addressed while in reality often excellence and leadership are connected to outstanding scientists. The Panel has collected additional information from the web. In going through the publication lists many publications come back under various subjects. On the one hand this demonstrates multi- and interdisciplinary collaborations which is very good, but on the other hand it makes the evaluation complex.

### **4.3 Specific Comments**

The research performed within the field of cereals and starches is strong research area of DFTEN. The group is competent and the research is of high international standard, and with good collaboration with Nutrition and Biomedical Nutrition.

The “dairy engineering and technology” is also a strong research area at DFTEN. It is a competent group, performing research of high international standard with the right attention for health aspects of (modified) constituents in milk.

The research done within dispersed food systems is an important research topic. The group has the potential to develop to international competitive group. However, the Ph.d. projects listed under this group deal predominantly with cereal and starch processing and constituents of cereals and only one project which fits the definition of dispersed food systems as described by the group. This is confusing and focus on the subject is recommended.

Emerging Technologies is an important research area. Today the group is not internationally competitive. The leading professor will retire in the near future. Focus and long term commitments and investments are necessary to pursue this field.

Fluid dynamics and flow effects in processing equipment: Important research area, international recognition modest. Leading professors will retire in near future. Long term commitments and investments are necessary to pursue this field.



Handling and processing of fruits and vegetables: Applied research, international recognition modest. In future introduction of pulse electric field treatment is proposed which is a relevant technique. Long term commitments and investments are necessary to pursue this field.

Meat- and fibre products: Important research area, although combination of the two subjects is only sensible when fibre products are seen as ingredients with favorable functionalities in meat products. Emphasis on the latter aspect would fit in the future most promising research areas identified (see below). The research is internationally competitive.

Membrane technology: Important research area. International competitive group. Leading professor will retire in near future. Long term commitments and investments are necessary to pursue this field. This competence fits in the future most promising research areas identified (see below).

Modeling, measurement and control: No track record recognizable. Enforcement of technological and engineering research by mathematic modeling is very relevant, but then long term commitments and investments are necessary to pursue this field.

The food technological research needs more focus around the strongest and most strategic areas and choices have to be made meaning discontinuation of some areas and investments in strategic areas. The upcoming vacancies in this research field give opportunities to do this. In the description of future most promising research areas and research directions (see below) some choices have already been indicated which the Panel supports.

#### **4.4 Most promising future research areas or research directions:**

Interaction between indigestible food components, gut microbiota and food technology aimed at designing food with disease preventive properties is indeed an emerging area and is a logical choice because the department can, for part of the anticipated research, build on excellent competences and expertise already present and has also the potential to acquire a prominent position in the area of cognitive performance and potentially bioactive components. In the coming years some professor

positions will become vacant and attention should be given on the one hand to maintain competences and expertise and on the other hand to attract new competences and expertise to realize the research ambitions.

DFTEN finds new challenges in developing new, more sustainable technologies for producing food that is more healthy, more tasty, convenient and more fresh. As research areas are mentioned membrane emulsification, development of new technologies e.g. pulsed electric field in fruit and vegetable processing to retain important constituents effecting health and sensory properties, and development of new ingredients based on dietary fibre for structure and texture formation in foods. These are indeed very relevant research areas. These intentions also mean a choice for more focus in the technological research which the Panel very strongly supports. Research on membrane emulsification and dietary fibre as structure and texture ingredient can build on existing competence and expertise. There is also quite some application experience in fruit and vegetable processing but in our opinion this needs a more fundamental basis. It is already anticipated to enforce the technological research with mathematic modeling.

Also in the technological and engineering research some vacancies will arise with the risk to lose competences and expertise. This has partially been anticipated by appointing young researchers but it is important to use the opportunity to create more focus and attract new competences.

#### **4.5 SWOT analysis:**

**S:** Research quality is good to excellent but can improve for some areas. More focus in the research program will help in this and is already partly anticipated in the future research intentions (see below). The international reputation of LU can be improved (as mentioned above) and also the external funding.

**W:** The Panel agrees with the points made. that Short term projects should be avoided. The Panel also wants to mention here the automatism in career development and recruitment of new professionals and the relatively high average age of Ph.D. students. From form 3: “Quality summary of research activities and academic reputation” it appears that in the period 2003–2007 for the academic staff 6 positions were renewed all by internal recruitments. It is also mentioned

that there are too few technicians. Many specific competences and expertise are mastered and kept by the technicians for as long as they stay with group. These positions are quite crucial for the functioning of a research group and have to be present in the right proportions. Researchers including post-docs and Ph.d.s are crucial in carrying out most of the actual research and they determine to a great extent the research output. Post.doc. positions are flexible and make it possible to bring in new expertise.

The Panel would like to advice to critically evaluate the balance between professor positions, researchers, lecturers and Ph.D.'s.

O: The Panel can agree with most points made. We would like to add the effect of stronger regulations with respect to health claims (EU and international bodies), more sustainable food manufacture and the growing demand by the consumer for less processed, fresher, tastier and healthier food.

T: We agree with most points made. However, the faculty funding at DFTEN is still relatively high compared with many universities outside Sweden.

#### 4.6 Recommendations

The vision of DFTEN is expressed in the following two statements: “DFTN finds new challenges in developing new, more sustainable technologies for producing food that is more healthy, more tasty, convenient and more fresh” and DFTN wants to perform “Research for design and production of foods with health benefits”. The panel supports this vision. This means however that more focus is needed in the research areas, particularly in the technological research. Therefore strategic choices must be made leading to investments in areas identified as strategic and discontinuation of areas which are not selected.

The personnel structure of the academic staff should be improved with respect to age structure, balance ratio of numbers of professors, lecturers, researchers and Ph.d.s and maintaining sufficient support of technicians. This improvement should be in line with the choice of the future focus areas. Professors should be selected in an open procedure allowing national and international candidates to apply.

More external funding should be attracted building more on the research areas where DFTN has strong competences and expertise. Short term research projects should be avoided.

More and younger Ph.d. students and external post-docs should be attracted. The international status of DFTN can be improved by more teaching in English. This makes DFTN more accessible and attractive for foreign students also leading to a larger pool of PhD students.

*Additional Panel Report*<sup>15</sup>

## **5.1 DEPARTMENT OF IMMUNOTECHNOLOGY**

### **5.1 Background**

The aim and objective of the RQ08 review is the first research evaluation of Lund University as a whole. The long-term aim of this review is to strengthen the University as a research organisation of international high standing and a similar review will be carried out in the future, every 5 years.

It is noted that this review takes place following a period (between 2003–2007) which has seen decreases at all levels in the numbers of researchers, due to the University's financial constraints and its requirement in this period to reduce costs. In light of this, the University has now correctly identified as strategically important that it should restore the balance in its employment structure and maintain/enhance excellence in its education and research capabilities following this period of weak finances and high costs.

In addition, it is noted that it is expected that there will be a 'generation shift' in the higher research positions in the coming six to seven years. In light of this, this reviewer considers that this (on-going) review of research performance within Lund University is a highly valuable and important exercise to plan and critically focus support, critical mass

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15. At the panel meeting, Panel 14 declared that it did not have the competences to perform a scientific evaluation of the Department of Immunotechnology. Therefore, an external scientist was appointed to perform the scientific evaluation of this department.

and faculty collaboration within the University, nationally and internationally.

In the competitive globalized world of education and research, this requirement to identify, focus and expand on areas of excellence, whether at the level of faculty, departments, groups and individuals is critical. This will be an important component to delivering the overall aim of ensuring the University focusses on areas that have the potential to attain research and education of the highest international standard.

## 5.2 Overall assessment

The overall quality assessment of the Department of Immunotechnology is 'excellent'. The department is internationally recognized for its research excellence, technology developments, its commercialization and the relevance and importance of its biomedical and clinical applications. It has been at the international fore-front in its areas of research over many years. This department is known internationally for the high quality and rigor of its research and critically combines multi-disciplinary and interdisciplinary expertise in complementary areas of technology development, antibody libraries, arrays and applications, proteomics, clinical and commercial collaborations, biomarker discovery and bioinformatics analysis.

## 5.3 Research infrastructure

Organisation: The Department of Immunotechnology was formally inaugurated in 2007, when the Department of Immunotechnology (previously part of the Chemical Center) and the Unit for Protein Technology (previously part of the Department of Electrical Measurements) merged and re-located to be closer to the medical faculty to increase and strengthen the inter-faculty collaborative programs. The department is organized into 5 research groups headed by a Full Professor level, Prof. Carl Borrebaeck; comprising;

- (i) Cancer targets
- (ii) Antibody engineering/molecular evolution
- (iii) Allergy
- (iv) Proteomics
- (v) Antibody microarray

This department's research strategy has been to address complex biological questions based on developing and applying cutting edge technology platforms. The department includes 3 Professors, 1 Lecturer and 6 researchers, (comprising 8 men and 2 women). The total number of employees is 35 and 5–10 additional undergraduates.

The Special Resources set up within and by the department is impressive, including a GLP cell culture facility, fully equipped laboratories designed for antibody engineering and biomedical research, a fully equipped protein/microarray facility, and an extensive proteomics and mass spectrometry facility. The department houses the SCIBLU Unit called MARC (Micro-Array Resource Center – a core facility servicing southern Sweden with global genome analysis) and the Strategic Center for Translational Cancer Research (CREATE Health), with Prof. Borrebaeck as its Director. The vision and ability to develop such complementary expertise, critical mass and infrastructure is impressive and requires significant resources in the expertise of its researchers and staff and to maintain this equipment. These resources are world-class and will ensure that this Dept can continue to compete internationally at the highest level now and in the future.

#### 5.4 Research Quality

The departments research is in the areas of Identification of Cancer targets, Antibody engineering/molecular evolution, Allergy research, Proteomics, Antibody microarrays. The research quality of the department can be rated as *'excellent'* to *'outstanding'* as within each of these areas, the research carried out in the department has an international reputation for excellence in its innovation, quality and impact. It is at the forefront of its area of research as is evidenced by its high-impact publications, the Dept members are regularly involved and actively participate in international collaborations and conferences and the biomedical, clinical and commercial relevance of its research is high.

The Productivity of the department in its research areas is *excellent* as evidenced by its increasing numbers of publications, with 27 original publications in 2007, many in top journals of high impact such as Nature Biotechnology and Molecular Cellular Proteomics.

The combination of the multi-disciplinary nature of the research and its application areas in biomedical and clinical fields ensures the

Relevance of the department's research is '*outstanding*'. It has also been at the forefront of the discovery of biomarkers in the areas of cancer, auto-immunity and allergy research. Its advances in the areas of antibody engineering and antibody microarray technologies are highly innovative and have far-reaching applications within the field, for example to potentially develop and improve the diagnosis of cancers and is currently at the forefront of research globally in these areas.

From the evidence of the international standing of the researchers within this department and their research expertise and track record, including its multi-disciplinary nature, I would rate the vitality and organisational capacity of the department as '*excellent*'.

### **5.5 Collaboration**

The researchers in the department have an excellent record of leading, coordinating and participating in high quality international and national organisations and conferences, such as within HUPO, the EU and within Sweden. The researchers have reputations for establishing, maintaining and managing strong and successful national and international collaborations and consortia. I would rate the reputation, profile and quality of the collaborations as *excellent*.

### **5.6 Research activity and teaching**

This area of research of this department is internationally highly competitive and is inter- and multi-disciplinary requiring extensive expertise, critical mass and infrastructure. The department focuses on post-graduate and advanced training of researchers. This is in line with international practice in such areas, as members within this department would be in a position to give advanced level training in areas of cutting edge research. As such the department acknowledges that it is involved in relatively little undergraduate education, but is very much involved in post-graduate and advanced level training. For example, it participates and organizes many national and international courses, conferences and workshops, such as developing a Proteomics Masters education program for the Human Proteome Organisation (HUPO) and the European Proteomics Association (EuPa), in addition to developing and delivering a number of 1 week courses.

### 5.7 Evaluation of future plans

The future plans exploit and expand the existing research areas and are well chosen and are *very good to excellent*. The future plans include applying the technology platforms in the department, not only to the discovery of disease related biomarkers such as in Breast Cancer, but the future aims are to expand the application areas to predict tumor relapse and resistance to therapy. The ultimate aim is to be able to select the optimal treatment for individuals, based on a simple blood test (personalized medicine). These aims build on recent advances using new areas of research which are highly innovative and promising, such as the Global Proteome Survey system that will enable array based proteomics to be converted into a discovery tool and Context Independent Motif Specific antibodies, that react to motifs in proteins and protein families.

### 5.8 Future potentials and possibilities

An additional area to be include in future research could include assay development and the qualification or validation of the biomarkers (or biomarker panels) identified by the department. Such validated assays could allow the determination of the significance of the results in the clinical setting. To further expand on the applications and biomedical relevance of the targets and biomarkers identified in the research programmes, increased involvement in clinical trials would be beneficial in the future to determine the potential to translate the research results into the clinic.

### 5.9 Gender and equal opportunity issues

From the details given, the department consists of 36 members (35 Full Time Equivalents), of these 61% are women (of which 67% of the total number of employees are not permanently employed). In the period, 1998–2002 the number of PhD students were 50%; from 2002 to 2007, there were 58% women; and in 2007, 75% of the PhD students were women. However, at the more senior positions, of the 3 members of Academic staff of professorial level and the 1 lecturer position, (all of which are permanently employed), there are no women. While the numbers are low, these figures are in line with the dramatic fall-off of Women researchers at the higher levels internationally (as detailed for example by the EU, in its annual ‘She-Figure Reports’). Sweden has had specific recruitment incentives to increase the numbers of Females in higher positions within academia in the past. While these were controversial at the time, they



were seen to have been effective. Perhaps Lund University could consider such methods to increase the numbers of women at the higher levels, if this trend is found throughout the University. Other standard methods that are known to be successful internationally such as the availability of flexible working hours, increasing child-care facilities within the University, dialogue with funding agencies to assist females return to work incentives following career breaks, increased administrative supports for individuals with demonstrated caring responsibilities, etc. to assist in the administrative duties of grants, etc. are all known to assist in female participation at higher levels in the researcher career structures.

# PANEL 15: LTH – PRODUCT DEVELOPMENT

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## 1. DEPARTMENT OF DESIGN SCIENCES

### 1.1. Background

The evaluation for this Department has been very difficult due to the fact that only two (out of 5) Divisions had to be evaluated and that most of the data were provided for the Department, with only limited information on the two Divisions, combined or separately. Therefore, an Overall Assessment was made on the Department, while for the detailed assessments the two Divisions were evaluated, separately where possible.

The Department of Design Sciences (DDS) as a whole is a broad inter/multidisciplinary organization dealing with design of products and systems, and their interaction with society. It has 100 staff, 11 of which are Professors, 7 adjunct professors, and 44 postgraduate students. Packaging Logistics (DPL) and Machine Design (DMD), were the subjects of this evaluation. The Department’s website indicated that the active research staff in DPL consisted of, 1 Professor, 1 Associate Professor, 3 Assistant Professors and 3 Adjunct Professors and two researchers, while DMD has 2 professors, 4 researchers and 5 staff members mainly dealing with teaching.

### 1.2 Overall Assessment (Department DDS) *Very good (4)*

DDS is quite young (1999) and has experienced a fast growth to reach a present level of 100 people. The Department has managed, in less than 10 years, to develop a unique teaching and research environment on the design of artifacts (products and systems) and their interaction with society,

and become a high-level player at the national and international level. It is housed in a modern and well-equipped Ingvar Kamprad Design Centre. The lab facilities are extensive and in several respects unique.

The interdisciplinary nature of the research field is reflected in the very extensive cooperation network of the Department: national research schools and projects, international projects (14 EU projects), organization of national and international conferences.

The academic staffs has grown from 17 in 2003 to 28 in 2007, clearly demonstrating the vitality of the Department. In 2007, DDS was one of the biggest Department's of the LTH in terms of number of academic staff, doctoral students in 2007 (46), and having one of the best gender ratios at 43%. The high average age of the Professors (57 for the overall department and 59 for Division Packaging Logistics and Machine Design) is of concern especially for the two divisions with` only 3 professors. The number of PhD students is at the low side and has remained stationary over the last five years.

The publication output of DDS has steadily increasing. Articles in refereed journals increased from 19 in 2003 to 43 in 2007, which, with more than 1.5 publications per academic per year, is close to excellent. Conference papers remain constant at a high level of 35 per year. Several books have been published, mainly in English.

### **1.3 Research Infrastructure** *Very good (4)*

In 2002, the Department moved into the Ingvar Kamprad Design Centre, a new building and an attractive place to work in. The Department has well-equipped laboratory facilities, some of them with unique infrastructure making them unique and world-class. The main labs are: Aerosol Lab, Virtual Reality Lab, Thermal Environment Lab, Usability Lab, Workshops and halls, Video Conferencing Facility. Apart from the availability of computer facilities for students there is no mention of special computing facilities to support research, or facilities (i.e. robotics lab, or packaging testing lab) to support the two Divisions; Packaging Logistics and Machine Design. Having to maintain, develop and update such extensive research infrastructure is a heavy burden for a Department. The self-evaluation document does not say much about the financial arrangements in place for depreciation and equipment renewal.

The department's organization and governance seem excellent. Its profile, culture and values seem attractive for students, companies and academics alike.

#### **1.4 Research Quality**

In view of the completely different nature of the two Divisions, and the fact that the three other Divisions of the Department are dealt with by another Panel, each is assessed separately. The external R&D revenue for DPL and DMD in 2007, per academic staff member, was only alarmingly around 31% of the 2003 level. A major point of concern.

##### **1.4.1 Quality**

###### **a) Division Packaging Logistics (DPL) *Excellent (5)***

In spite of the fact that it was established in the mid-1990s, DPL has developed into a respected research group. Their holistic approach, integrating packaging and its logistics, makes them unique on a global scale. They are participating, as programme leaders, in two major Swedish projects: Product Innovation Engineering (PIEp), a 10-year Swedish national program with the purpose of strengthening the ability in innovative product and business development; and the VINN Excellence Centre NGIL (Next Generation Innovative Logistics), which proves their standing in the national research arena on the subject. Their coverage of the subject is quite comprehensive, including Traceability, Risk management, E-commerce, Packaging and the environment, and Simulation of packaging logistics.

###### **b) Division Machine Design (DMD) *Insufficient (2)***

As there is very little on DMD in the self-evaluation document, the website of Maskinkonstruktion, available only in Swedish, was consulted. The Division, founded in the 1960s, still claims its main achievements to be the development of design theory and of a product development methodology. The teaching activity around these subjects seems to be an important asset for the department for attracting students to the department. There is growing research collaboration on packaging development with the Division of Packaging Logistics. Any trace of recent publication activity on the subjects of design theory or product development could not be found. Presently, the main research activity of DMD seems to be in the field of industrial and service robotics and simulation of manufacturing systems.

### 1.4.2 Productivity

For the two Divisions (DPL and DMD) the ratio of publications in refereed journals per academic staff has decreased from 1.67 (in 2003) to 1.29 (in 2007) while conference papers have almost constant.

#### a) Division Packaging Logistics (DPL) *Good (3)*

DPL, with 7 academics, published some 19 international journal papers, with 3 more under review, and some 28 papers in proceedings of international conferences.

In the DPL website we can find that 5 PhDs dissertations have been published over the period 2003-2007 (only 1 in 2007), which is quite low. The combined productivity score, including journal papers, conference papers and PhD's is good.

Impact of publications – best five.

- **Citations** *Poor (1)*  
All of the five selected papers had zero citations, although some of them dated all the way back to 2002.
- **Type of Journal (impact factor)** *Insufficient (2)*  
The impact factor of the journals ranged from 0 to 0.552
- **Hirsch-index** *Insufficient (2)*  
The authors of the best-five papers were not from the academic staff of the Division, but probably PhD-students. Therefore an h-index analysis was made for all the academics of the Division. Only one has any citations (5 in total), and has an h-index of 2.
- **PhD/Researcher Ratio** *Good (3)*  
There are 9 (7?) PhD students (in industry) for 7 academic staff, which is low. The historical data for the period 2003–2007 could not be traced from the self-evaluation document

#### b) Division Machine Design (DMD) *Insufficient (2)*

DMD, with 6 academics, produced 12 international papers and 2 conference papers (retrievable from the website of 1 professor).

Impact of publications-best five

- **Citations** *Good (3)*  
The number of citations ranges between 0 and 5, with an average of 3. Citations per publication.
- **Type of Journal** (impact factor) *Insufficient (2)*  
The impact factor of the journals ranged between 0,265 and 5.151. If the medically oriented paper (which is an exception) is not considered the average of 0.627 is low for the discipline.
- **Hirsch-index** *Good (3)*  
Only three of the (6) academics of the Division had a non-zero citation score. The average citation score for them was 47 (9,5,127) and the average h-index is 2.7 (2,1,5)
- **PhD/Researcher Ratio** *Insufficient (2)*  
There are 4 PhD students (in industry) for 6 academics, which is quite low.

**1.4.3 Relevance** *Very good (4)*

The two Divisions have an extensive portfolio of contracts with industrial companies in Sweden and abroad. This amounts, for the period 2003-2007, to 18 projects for DMD and 39 for DPL. Unfortunately, the size and type of these contracts could not be inferred from the provided data, but these numbers clearly demonstrate the high industrial and/or societal relevance of the two Divisions.

As an outcome of their R&D efforts between 2003 and 2007, DPL was granted one (1) patent while DMD got five (5) patents, however no spin-offs were established from the research out put of these two Division's were found. Since the research topics (both current and foreseen) are of high relevance, potentially significant more patents and spin-offs should be forthcoming.

DPL cannot meet the demand for graduates for research and industry.

**1.4.4 Vitality**

The Department as a whole has seen its academic staff grow from 17 in 2003 to 28 in 2007, with an equivalent increase in PhD students from 17 to 46. It is unclear how the two Divisions DMD and DPL have evolved.

It can be said however that the number of PhD students per researcher is at the low side in both Divisions should be greater. The main reason seems to be competition for candidates from industry.

**a) Division Packaging Logistics (DPL) *Excellent (5)***

DPL is clearly orientated towards the future, with active participation in PIEp (Product Innovation Engineering program, a 10-year Swedish national program with the purpose of strengthening the ability in innovative product- and business development, and the VINN Excellence Centre NGIL (Next Generation Innovative Logistics), and by taking subjects like ‘Packaging logistics and the environment’ in their research portfolio. They have academic partners in the US (Georgia Tech, MIT, Michigan State), UK (Cranfield) and Sweden (Chalmers). They are active in international research networks such as NOFOMA and LRN.

Their focus is well defined: the integration of packaging and logistics, making them fairly unique in their approach, and successful in industry because of the increasing societal relevance of the subject.

**b) Division Machine Design (DMD) *Good (3)***

DMD’s research focus is unclear. As can be inferred from the Division’s website, mainly in Swedish (no information on DMD was available in the self-evaluation document), the Division, founded in the 1960s, still claims its main achievements to be the development of design theory and of a product development methodology. There is traceable research collaboration on packaging development with the Division of Packaging Logistics. Evidence of recent publication activity on these subjects could not be found. The teaching activity around product development and design theory seems to be an important asset for the Department to attract students and as such constitutes an important value for the vitality and viability of the Department.

Presently, the main research activity of DMD seems to be in the field of industrial and service robotics, and simulation of manufacturing systems, with some excursions into machine vision. This research is predominantly application orientated. The number of industrial collaborations is a clear indication that this research line is vital for Swedish industry.

**1.5 Collaboration** *DPL: Very good (4)/DMD: Good (3)*

The level of academic collaboration of DPL is very good, nationally as well as internationally. This level is much more restricted for DMD both international as national. Very little evidence of joint publications could be found (one in 2005 for DMD, with EPFL, Switzerland).

**1.6 Research Activity and Teaching**

**a) Division Machine Design (DMD)** *Excellent (5)*

DMD offers an extensive number of courses on CAD/CAM, design theory, product development, digital factory, robotics, which are partly based on past and present research programmes, attracting many students from different disciplines.

DMD is responsible for a large portion of the undergraduate courses in Mechanical Engineering (50% of the students choose to concentrate on product development).

**b) Division Packaging Logistics (DPL)** *Very good (4)*

DPL also offers several courses on Packaging Technology and Packaging Logistics, partly based on ongoing research. It's noteworthy that the DPL School of Packaging offers courses to students from Michigan State University. DPL also participates in the Logistics Services Management and the Technology Management program [See DPL website].

**Evaluation of Future Plans** *DDS: Excellent (5) / DPL&DMD: Very good (4)*

Central in the future plans of the department is the intention for increased collaboration between subject areas. Central to that plan is design theory and product development. This again emphasizes the importance of the Division of Machine Design in this plan. (This Division was virtually impossible to assess due to the very limited information provided in the self-evaluation documents).

The integral vision put forward in the future plans and programmes: 'Elderly people and design', 'Integrated product and packaging development', 'Product Innovation', 'Sustainable society', shows the clear vision of the Department, that a holistic view on design is the way to go. However, there is a clear need on more basic reflections about the identity and common theoretical basis of the design sciences to solve the identity problem of the department, which is a weakness.



It is not clear, in view of the high average age of the DPL and DMD professors, as to long in the future the standing of DMD in design theory and product development will be safeguarded. Some of the topics for future research are very clearly outlined and highly relevant, but there seem to be no clear vision or mechanism as to how to achieve them. Some critical issues that need to be addressed in the near future are: i) How to solve the vital problem of balancing teaching and research in the two divisions, in particular in DMD, and ii) How to renew the academic staff.

### **1.7 Future Potentials and Possibilities** *Good (4)*

A continued and increased collaboration between DMD and DPL is essential for the viability of both Divisions. Collaboration with the Department IML could also be developed since there are overlaps on many topics (e.g. risk management, visibility in SCs).

The future of the robotics activity of DMD is less clear. It would be advisable to explore the service robotics track, next to the industrial robotics track that deserves to be continued, more systematically. This might require the recruitment of specialists in the more ‘soft’ directions (AI), and enhancement of opportunities for collaboration with other Divisions of the Department, such as Division Rehabilitation Technology and Ergonomics. At a more general level, the department should increase its basic efforts to reach a clarified vision of what are the specificities of the Design Sciences in order to gain a more grounded image of what design research is about.

### **1.8 Gender and Equal Opportunity Issues**

With 30% female (43% in DPL and DMD) academic staff the Department scores very well.

### **1.9 Viability**

#### **Achievements**

The DDS Department has been able, in less than 10 years, to generate a unique teaching and research environment on the design of artifacts (products and systems) and their interaction with society, and has achieved national and international prominence. DPL has developed into an equally unique and relevant-for-society research group on the integration of packaging and logistics. DMD is capitalizing on its

previously acquired unique knowledge base on design theory and product development. Its robotics research is industrially driven and therefore predominantly application oriented.

### **Strengths**

Department: interdisciplinarity, society-oriented subjects, strong culture and identity with attractive values considering contemporary societal hot topics. DPL: integrated vision on packaging, society-oriented with a lot of research topics with easy-to-find funding from companies and UE (green logistics, sustainable development, waste management, eco-design of products and packaging, etc.). DMD: research-driven education in design theory and product development, industry-relevant, application oriented robotics research.

### **Weaknesses**

As a whole the Department has a poor publication record there are too many non-publishing researchers. DPL and DMD: impending retirement of senior researchers, difficulty to compete with industry to recruit people, publication policy not enough directed towards refereed international journals with high impact. DMD: questionable future of design and product development research, narrow scope of robotics research.

### **Future potential**

The Department is ideally suited for increased research into ‘the sustainable society’ with a high prospect of success. Increased synergism between DPL and DMD has great potential.

## **2. DEPARTMENT OF INDUSTRIAL ELECTRICAL ENGINEERING AND AUTOMATION (IEA)**

### **2.1 Overall Assessment** *Excellent (5)*

The, relatively small, IEA Department occupies a leading role, nationally as well as internationally, through high-level research, based on an integrated approach, in three research areas of high relevance to society: electric power systems, waste and wastewater systems and electrical machines and drives. It is well equipped and houses some unique laboratories such as the Drives Laboratory and the Distribution Systems Laboratory. Collaboration, academic and industrial, is extensive. The publication record of IEA is impressive, both quantitatively as well as qualitatively.

They have extremely successful in transferring their research knowledge to education by writing several successful and internationally acknowledged textbooks. The staff is very mobile and many guest researchers are welcomed at the Department. The project portfolio is extensive, funded by national and international funding agencies, as well as by industry, although bilateral industrial collaboration is surprisingly limited. Of great concern is that the academic staff is stagnating in number, is exclusively male, and that the number of PhD students is declining.

## **2.2 Research Infrastructure** *Very good (4)*

The Department has an advanced research infrastructure at their disposal in the three research fields: electrical power systems, water and waste water systems and electrical machines and drives. Their electric drives lab is unique in that it contains smaller machines (kW range rather than 10-kW range), making it very flexible and affordable, but still allows to test combinations of AC and DC systems and to mimic real distribution systems. They also have a privately sponsored Distribution System Laboratory, to be used for research in distributed energy systems research, for teaching purposes and for training practicing engineers.

## **2.3 Research Quality** *Excellent (5)*

In spite of the fact that in 2007 almost all factors related to R&D functions, namely revenue, PhD students, and publications are on the decline from 2003 levels the Department has still maintained a level of excellence. External R&D funding in 2007, per academic staff member, decreased by almost 35% from the 2003 level, however significantly increased EU helped make up some of this loss.

### **2.3.1 Quality** *Excellent (5)*

Most of the research at IEA is application oriented. The emphasis is on integration aspects of electric power systems, electric drive systems and control of industrial processes (mainly waste and waste water treatment). IEA also wants to be academically competitive.

The quality of the industrially oriented research cannot be inferred from the few industrial projects they run (SAAB, Energinet.dk), although it seems that the number of bilateral projects directly sponsored by industry is relatively low. The Department is much more successful in ascertaining

research funding from EU Framework Programmes, EU Interreg, Grön Bil, SSF/ Proviking (Strategic Fund), The Swedish Research Council, and this is a better measure of scientific standing and quality.

The Departments quality international publications is good, and in journals with impact factors around 1, and with a moderate number of citations. A special mention deserve the highly successful textbooks, on ‘Computer systems for control’ and on ‘Wastewater treatment systems’, which are considered as standards in their fields. It is noteworthy that several faculty members have received prestige’s scientific awards.

### **2.3.2 Productivity** *Very good (4)*

The Department, with 7 academics in 2007, published some 9 papers in refereed journals and 12 papers in conference proceedings, i.e. 1.29 journal papers per researcher. This is slightly lower than the 1.67 per researcher achieved in 2003. Citations ranged between 0 and 29.

### **Impact of publications – best five**

The best-five (in fact best-four) list provided by the department contains two books. These are ‘bestsellers’ in their field, with many citations in Google Scholar (62 and 105), but they cannot be considered as peer reviewed publications. Of the other two publications, one is a conference paper, not cited in SCI, and the fourth one is published in a journal with impact factor 0.9 and with no ISI citations. Therefore it was not possible to evaluate citations, type of journal (impact factor), Hirsch Index for the best five publications. However, for the whole Department it is noteworthy that of the 7 academics + Prof. G. Olsson (emeritus) faculty, with 2 having no citations, the 6 others have 531 citations (1+27+190+13+27+273), and an average h-index of 5 (1,1,8,1,4,6).

### **PhD/Researcher Ratio** *Insufficient (2)*

The number of PhDs is 8, with no PhDs in 2007 and the number of licentiates 11, with 2 in 2007. These are low numbers, too low for a Department of that standing, and a cause for serious worry.

### **2.3.3 Relevance** *Excellent (5)*

The industrial relevance of their research is clearly shown by a staggering figure of 45 patents filed and 5 spin-off companies created. It is therefore strange that the number of industrial partnerships that could be identified from the IEA website is quite limited. On the other hand, 3 adjunct

professors have been attracted from industry, which shows a close relationship with industry. The potential social impact of the research, e.g. in hybrid vehicles and distributed electric power systems, is considerable.

#### **2.3.4 Vitality** *Very good (4)*

The academic staff has slightly increased from 6 to 7, with an average age of 55. The department has a clear strategic plan to promote younger faculty members to full and associate professorships. Three persons from industry are applying for associate professorship in 2008. How the plans to strengthen the collaboration with Swedish power industry will be realized remains to be seen.

The absence of long-term financing is considered by the EIA Department as a major threat to its vitality

#### **2.4 Collaboration** *Excellent (5)*

The international research collaboration is very intensive, with 6 visiting researchers at post-doc level and higher, three visiting PhD students, and 5 visits by IEA staff abroad. The department has collaborated with 23 institutes out of which several joint publications resulted.

#### **2.5 Research Activity and Teaching** *Excellent (5)*

The excellent record of IEA in transferring knowledge from research to teaching is illustrated by the publication of two bestselling textbooks, one on ‘Computer Systems for Automation and Control’, and another on ‘Wastewater Treatment Systems’, both from Prof. G. Olsson (now retired) and co-authors. Besides these, IEA academics have produced 5 other textbooks.

#### **2.6 Evaluation of Future Plans** *Excellent (5)*

The vision of the department is to be national leader –which it is already– in its three areas of research: control and automation in wastewater systems, electrical distribution systems, electric drive systems in hybrid vehicles. This is a logical decision in view of the interest and prominence of Swedish industry in these three future-oriented subjects.

## **2.7 Future Potentials and Possibilities** *Very good (4)*

The three research subjects are completely in line with some of the (Swedish) societal problems of the 21st century: energy scarcity (hybrid vehicles, distributed energy generation), waste and waste water treatment. The integrated approach they advocate makes them eminently suited to take a leading role, nationally but also internationally. Information technology will have a large impact on the way future distributed local energy sources (cogeneration) will be exploited. Interesting opportunities exist for the Department in the field of drives for hybrid vehicles.

## **2.8 Gender and equal opportunity issues**

With zero percent women in the academic staff, the department scores very badly. The share of women among the doctoral students is around 25%, which is quite satisfactory.

## **2.9 Viability**

### **Achievements**

The IEA Department occupies a leading role, nationally as well as internationally, through high-level research, based on an integrated approach, in three research areas of high relevance to society: electric power systems, waste and wastewater systems and electrical machines and drives. They have succeeded in transferring their research knowledge to education by writing several successful and internationally acknowledged textbooks.

### **Strengths**

The Departments interdisciplinary and integrated approach to research that is current and society-relevant.

### **Weaknesses**

More a threat than a weakness is the declining number of PhD students. There is a danger for the department to become subcritical in size. A lot will depend here on the success of the strategic plans for recruitment of new faculty.

### **Future Potential**

The increasing attention for energy saving in the entire society provides excellent opportunities for the Department to expand their activities and serve the Swedish industry and the society at large.

### 3. DEPARTMENT OF ENERGY SCIENCES

#### 3.1 Overall Assessment *Very good (4)*

The department of Energy Sciences is one of the oldest (1963) and one of the biggest in the College of Engineering. It seems to be a very active Department that does not hesitate to change to keep in tune with its local and international environment. Over the period 2003–2007, the academic staff remained stable (21) as well as the number of doctoral students (36 vs.35) but the other personnel declined (24 to 14) which is probably linked to the decline of the revenues of the department. Dependence on external funding is a problematic issue since almost 75% of income is from external funding. It is therefore a major problem to plan future activity and maintain every-day operation as well as temporary staff. In spite of this the governance of the department seems clear and helps the department to reach its objectives and to evolve. The Department is excellent for PhD education but the level of involvement in undergraduate teaching is low. Since undergraduate education is a strategic issue, which is essential for future development, and a source for revenues, it should be actively pursued.

#### 3.2 Research Infrastructure *Very good (4)*

The governance of the department of Energy Sciences seems clear. The department has 5 research groups (each with a professor as the scientific leader) with a common administration. The groups are responsible for creating financial support for their research activities and to define their research subjects that are pursued for PhD education. There are collaborations between groups and common resources are handled and controlled at the department level.

The department seems well equipped with good laboratories for combustion research, fluid mechanics and heat transfer. A new laboratory for combustion engines is planned and the laboratories for heat transfer research will be renovated. The advanced laser based instrumentation for fluid flow and the thermographical equipment for heat transfer measurements are appropriate for research in these areas. The facilities for numerical modelling are also good. But in these research areas, it is necessary to maintain, develop and update research infrastructure that, again, puts pressure on the funding question. It is not clear what financial arrangements are in place for depreciation and equipment renewal.

### 3.3 Research Quality *Very good (4)*

External R&D revenue for the Department in 2007, per academic staff member, decreased by almost 28% from the 2003 level, although EU funding was significantly higher. This trend is of major concern since the Department is highly dependent on the quality and quantity of its R&D efforts via the PhD program, which will no doubt be the first to suffer.

#### 3.3.1 Quality *Excellent (5)*

The reputation of the department, in particular the combustion engines group, seems to be excellent. It has been the leader in the field of ‘combustion engine’ (HCCI) with numerable pioneering studies of high relevance for many companies. The heat transfer research group is also highly regarded, with leadership and a strong level of engagement with the international heat transfer research community.

The Department has an impressive publication record with publications in journals such as; *Int. J. Heat Mass Transfer*, *Physics of Fluids*, *ASME – J. Heat Transfer*, *J. Fluids Structures*, *Int. J. Multiphase Flow*, to name a few. All these journals are well regarded and range from Excellent to a few in the Good category. However, it is noteworthy that some of the most important (at least in the USA) Journals currently ranked as the top in Energy (*J. of Power Sources*, *J. of Fuel Cell Tech.*, and *Int. J. of Hydrogen Energy*) do not feature strongly. This is related to the Departments traditional area of R&D, but highlights the need to continue their early stage research efforts in biofuels and hydrogen, fuel cells etc.

Hirsch Index for researchers in the department was in the 0 to 19 ranges. Two staff members were over 10, which is excellent.

#### 3.3.2 Productivity *Excellent (5)*

In 2007, the department published (43) papers in refereed journals, and (35) conference papers, i.e. around 2.05 per academic staff member, as compared to 1.05 in 2003. Which is excellent relative to other departments in LTH. The ratio of conference publications increased from 1.42 in 2003 to 1.67 in 2007. There were also 4 edited volumes, but no books. The most important change concerning article productivity occurred between 2006 and 2007; it is important that this step increase in productivity is sustained. Among ‘other publication’, doctoral thesis represent 58,4% of the publications over the years 2002 to 2007, and 53% in 2007. The department is one of the leaders in the Faculty of Engineering for Doctoral thesis publications



which is coherent with the doctoral student staff and the academic staff. The level of doctoral thesis production of around 10/year had been constantly maintained from 2003 to 2007, which is excellent.

### 3.3.3 *Relevance Very good (4)*

The department of Energy covers a wide range of the energy area, thus research combines fundamental and applied research, theoretical and experimental research. The 5 research groups develop industrial partnerships with companies that fund projects and support PhD students (8 PhD students among the 12 that are currently in the department are employed by a company). It is unfortunate that most of the reports (that are classic outputs in industrial partnerships) are unavailable and not published.

The department benefit from the support of many companies, some of them with substantially research projects. Social impact of the research is very good as the results are of high concern for modern lifestyle, its relation to the environment and sustainable development. But the department seems to focus mainly on ‘classic energy’. Although this is still pertinent, in the long run it is not a sustainable position and the department needs to strengthen its research in current and future energy domains.

The department has a good interaction with the society but needs to be considerably more active. Their engagement in the society can be further developed. Reliance on a few individuals for a major part of the contributions and networking needs to be addressed and resolved. The combustion engines group seems active in interacting with society (newspapers articles, communication with journalists).

### 3.3.4 *Vitality Good (3)*

The Department of Energy Sciences is a recognized global leader in specific areas of technology. It is an active department with good networking both locally and internationally. It has numerous collaborating institutes, and visiting researchers. The number of invitations to lecture at international conferences, the invitations to chair sessions, present plenary or keynote lectures, are all signs of vitality. However, the department urgently needs to move into new and cutting edge areas of energy science. This is not only necessary for it’s very existence but will also help generate considerable funding opportunities (since most of the funding is now directed to these areas) and help resolve it’s most critical issue, namely funding.

### **3.4 Collaboration** *Excellent (5)*

The level of national and international collaboration seems to be excellent. The Department of Energy Science actively works with other research centres and collaborative organisations in Sweden as well as at the European level. There have been 20 visiting researchers staying for three months or more, and 4 researchers that worked at other institutions for three or more months. The guest professors program has had 4 visitors. The department even contributes for research outside the energy sector.

The 5 research groups within the Department have several collaborative programs, joint proposals, joint papers and teaching. The department also has strong collaboration with other departments within LTH and LU under the umbrella of the Combustion Centre FTC, and the CECOST (one of the SSf strategic centers).

### **3.5 Research Activity and Teaching** *Very good (4)*

Academic staff and PhD students are not involved enough in the undergraduate teaching process (undergraduate teaching is about 10% of the departments budget). Revenues from undergraduate teaching have slightly increased from 2003 to 2007 but the ratio of revenue for undergraduate education per researcher is still poor. PhD education, on the contrary is excellent and the department is probably very attractive for national and international students.

### **3.6 Evaluation of Future Plans** *Very good (4)*

The department has detected interesting promising research areas (e.g. in the transportation sector that is looking for environmentally acceptable engines, low fuel consuming vehicle and alternative fuels) that could may be sustain its current level for the near future. New collaboration could result in the developed new funding sources and may be some diversification of their R&D effort. Furthermore, developing collaboration with economics, organization and human behaviour is a good idea. But improving modelling competences thanks to new tools or techniques to deal with complex process is relevant and should be actively pursued.

The plan for a new laboratory for combustion engines and the renovation of laboratories for heat transfer research will be right on. In this kind of sciences it is necessary to continuously upgrade the research

infrastructure and be current. The departments target to increase the level of undergraduate teaching from 10 to 25% engagement is excellent. Apart from added income, most importantly it will enhance and further spread knowledge of energy related issues, one of the most critical global problems facing mankind.

### **3.7 Future Potentials and Possibilities** *Very good (4)*

With respect to the development of research dealing with sustainable development in transport, logistics and supply chain management, the department probably could develop joint research with the related department in LU. The department needs to carefully watch its environment to anticipate changes in funding rules and to detect research opportunities outside the Energy sector.

The most active research of the department is conducted in the ‘classic energy’ areas. Projects concerning renewable energies (photovoltaics, biomass, wind, solar power, ocean, etc.) which are research areas that benefit from EU funding need to be considerably expanded. In general the Department should expand into the cutting edge technologies related to energy. Through additional collaboration within LTH and national and international institutions the department could get involved with new trends and emerging areas such as clean energy and climate change.

### **3.8 Gender and Equal Opportunity Issues**

In respect of gender, the department is one of the worst in the College of Engineering, with regard to the academic staff (women=0%). But considering the decreasing % of women in PhDs it is probably not so easy to find women in Energy Sciences compared to other fields. Although disappointing, these figures look typical of trends in many countries. There is insufficient information to address this matter further but the department is encouraged to strive towards good gender balance, of both staff and research students.

### **3.9 Viability**

#### **Achievements**

- Publications (articles, conferences, doctoral thesis)
- PhD educations
- Collaborations

### Strengths

- Department governance
- Competence that cover a wide range of the energy area.

### Weaknesses

- Research funding (decreasing)
- Undergraduate teaching
- Gender

### Future potential

- Develop European research community
- Scope for development of research activities and funding in clean energy and climate change related issues (e.g. renewable energies)
- Strengthen networking in Education
- Increase participation of Enterprises in education programmes
- Strong Department with plenty of potential but it is critical that research funding is put on a firmer footing and that all academic staff engage with the scientific research community

## 4. DEPARTMENT OF INDUSTRIAL MANAGEMENT AND LOGISTIC

### 4.1 Overall Assessment *Very good (4)*

The Department of Industrial Management and Logistics is heavily involved in undergraduate teaching, which seems to be a major activity and source of revenue. The department has also been successful in research and has published in top journals, both in production management and logistics. However, the overall scientific research productivity in spite of increased revenue has been stagnant. Although it has been selected as a member of a new Excellence Center in Logistics, with important grants, these achievements have been too dependent on a small number of scholars who are going to retire soon. Moreover, during the last years the productivity, vitality, and the capacity to attract PhD students or international scholars, have been below the potential of the department. All this suggests that future plans are too uncertain and the viability issue is a concern. The quality of past academic records suggests that strategic planning issues and actions need critical attention of the faculty.

#### 4.2 Research Infrastructure *Not graded*

Lack of available information made it impossible to make a reliable evaluation. The department is the outcome of two merged divisions in 2001, having different research methods and belong to different research communities: the PM Division which mainly builds on purely theoretical models in the tradition of Optimization; the EL Division which was more oriented towards grounded management research (strategies, processes, risks, value) with a small engineering component. In the Department EL and PM are still two separate Divisions with separate research areas that have collaborations and share infrastructure. Due to considerable revenues from teaching in teaching, the Department is less dependent on external funding than other Departments of LTH.

#### 4.3 Research Quality *Very good (4)*

Due to the diverse nature of research activity of the two divisions separate evaluation are reported. It is noteworthy that the Department of Industrial Management and Logistics, was among the few, if not the only Department in LTH that had increased revenue in 2007, per academic staff, in both teaching and R&D over it's 2003 level, and still had a negative total revenue in 2007. It's external R&D revenue in 2007, per staff, increased by 35% over 2003. However EU funding was almost half in 2007 as compared to 2006 level.

##### 4.3.1 Quality *Very good (4)*

Both Divisions have publications in the best journals (top 10) in their discipline. However, it should be noted that logistics and production management journals are not highly ranked compared to other fields. PM Division (publishing in Operations Research, Management Science) has developed a leading position in the special field of optimization methods for multi-echelon inventory policies and systems. While the EL Division (publishing in *Int. J of Physical Distribution & Logistics Management*, *J of Business Logistics*) has contributed to a large scope of contemporary research issues in the field of logistics. Unfortunately publication contribution is limited to a few individuals. To achieve excellence this trend need to be rectified.

##### 4.3.2 Productivity *Very good (4)*

Publications: From 2002 to 2007 (6 years) the department published 31 articles in refereed journals. During the same period, the average number

of full time academic staff was 7 (2003 and 2007 mean). This makes a ratio of 0.75 papers by senior researcher. The article ratio has improved over the period 2003-2007 (from 0,75 to 0,86), while the conference ratio has slightly decreased.

Since in management and logistics the average citation index, Hirsch Index, and Journal Impact factor are almost irrelevant compared to other fields, they have not been evaluated. The quality of journals is the best proxy for evaluating, which was very good.

#### PhD/Researcher Ratio *Insufficient (2)*

The department has produced 6 PhD (1/year) which is less than one per senior researcher. However, the trend seems to be positive since in 2007 there were 14 registered doctoral students, which resulted in 4 publications (Doctoral and Licentiate).

#### 4.3.3 Relevance *Very good (4)*

Some research in the EL Division has been of direct industrial and social relevance, resulting in 8 patents and two start-ups. However, it seems that this is due to the contribution of one researcher. The amount of commissioned research in 2007 has decreased by more than 50% from 2003 level, in spite of the substantial industrial partnerships and management research orientation of the EL Division. However, this may be to a certain extent be related to the parallel increase of research grants. The Department has very good interaction with the society, and it's academic staff is often invited to give lectures at international conferences.

#### 4.3.4 Vitality *Very good (4)*

The department has a national and international leading position in logistics. It is also part of the new NGIL centre. Yet, several elements suggest declining vitality. The research activity seems too concentrated on a small number of academics, leading to a lower average rate of publication for the whole Department. The participation to international conferences is declining. There has been no visiting researcher (for at least three months) during the last six years; the capacity to attract PhD's is limited; the replacement of the academic leaders is uncertain. In spite of all these issues the 'very good' level of grade is based on the excellent productivity of a few of the staff.

#### **4.4 Collaboration** [*International*] *Very good (4)*; [*National*] *Excellent (5)*

Within the NGIL centre the two divisions of the department collaborate between themselves and with other departments of LTH. Additionally, both Divisions collaborate in teaching and separately in research with several groups within LU. The department is also active in National and Nordic collaborations, and with researchers from UK and US for maritime risk research and developed, an EU project. The Oresund Logistics project seems interesting and should lead several developments in the future.

#### **4.5 Research Activity and Teaching** *Excellent (5)*

The link between research and teaching seems to be excellent as the content of research is directly and easily transferable to courses. The involvement of research faculty in teaching is substantial at every level (undergraduate, graduate and PhD). Students do industry and research projects at the Master level. However, the low number of PhD students is alarming, and can pose a major threat for future development of the department.

#### **4.6 Evaluation of Future Plans** *Good (3)*

The involvement of the department within the new VINN Excellence Centre NGIL is an important and positive asset for the future in terms of grants and interdepartmental collaborations. However, the Department has clearly indicated that there is no clear plan as to how they will have, or be able to attract, the academic capacity (staff and PhDs) that will be needed to be a full partner in NGIL. This is a critical issue and needs immediate attention. Furthermore, another critical issue is the renewal of academic staff since 3 professors will retire within the next 2 years.

#### **4.7 Future Potentials and Possibilities** *Very good (4)*

The department produces high quality research on well-established domains of logistics research and is developing new issues such as risk, security and visibility on the one hand and sustainable SCs on the other hand. Bridging SC design and Law is also a pertinent project, highly relevant. Yet some important areas of contemporary logistics research seem not to be addressed, and should be developed in the context of NGIL: the influence of logistics models and organizations on the design of new products in high tech and high velocity environments; the

logistics of new urban mobility solutions (share driving, public shared bicycles or cars...). Networking with other important academic centers in the Oresund region could be attractive for academics looking for new positions.

#### **4.8 Gender and Equal Opportunity Issues**

With respect of gender, the department is one of the worst in the College of Engineering, in particular for the academic staff (women=0%). In several countries, management research has attracted a growing number of women. The grounded style of logistic research should improve the gender ratio in PhD students.

#### **4.9 Viability**

The future plans of the IML department clearly raise issues about its viability. The department has achieved high research quality, it has attracted important grants and it is involved in major new projects of the University. Yet, there is an organizational threat that could endanger in a short term the sustainability of the department. It is critical that the faculty conduct strategic discussions in order to build and develop a vision for the department within the next six years: special focus should be made on the constitution of a new leading team, and on how to increase the number of PhD students. Furthermore, in terms of substance, the department should focus more on emerging areas of research.

### **5. DEPARTMENT OF MECHANICAL ENGINEERING**

#### **5.1 Overall Assessment** *Good (3)*

The Department of Mechanical Engineering has 15.5 research staff, split into two broad research groupings. In each of these groupings there are specific areas in which the research quality is high, as evidenced by journal publications and by the international profile of the researchers. There is a good level of engagement in international conferences and much of the research involves industrial partnership, indicated the relevance of the work. The main weaknesses of the department, from a research perspective, are the low number of doctoral research students and the falling research revenue from some external sources. In addition, the level of international research collaboration is low.



## 5.2 Research Infrastructure *Very good (4)*

The experimental resources available to the department appear to be very good, with a broad range of standard and specialized equipment in the manufacturing laboratory, covering a wide range of manufacturing methods, and a unique metal cutting research lab for measuring dynamic cutting forces and for machinability studies. Furthermore, special equipment for studying induction heating and for high-pressure tribology is available. In Materials Engineering, the laboratory facilities and support engineer are shared with the Division of Solid Mechanics (Department of Construction Science). No information is supplied on the computing facilities for numerical modelling.

## 5.3 Research Quality *Good (3)*

The organization of the department has undergone a number of changes over the last several years, a factor which makes it difficult to establish patterns of research activity and output. The rationale for this restructuring is not clear and the end result is a small department without a critical mass, with four separate divisions that combine to form two research groupings. This fragmented structure, particularly in the Materials Science area, must contribute to administrative complexity and seems to have restricted research potential. External R&D revenue in 2007, per research staff, decreased around 8% from 2003, while EU funding decreased by more than 70%.

### 5.3.1 Quality *Good (3)*

In terms of international comparability, the department performs well, for its size, and has an international profile in a couple of focused areas such as fatigue (thermo-mechanical, short crack propagation) and metal cutting (tool wear). In Machine Elements, the department has had a strong international reputation in tribology, however the research leader in this area retired in 2006. Much of the research activity in the DPME/ME group is applied and the spread of research projects is large for a relatively small research group. Although this interdisciplinary research is valuable, the range of interests makes it difficult to make an impact in any particular area, which is mandatory to achieve international research excellence.

The Materials/Mechanics research group is actively pursuing research in the field of nano mechanics, an important area with potential for growth.

This is a recent change in research direction but has already produced a publication in a high impact journal (Phys. Rev. B). There appears to be no research activity in biomaterials or biomechanics, an area in which there is currently considerable scope for attracting research funding.

### 5.3.2 Productivity *Good (3)*

The 15.5 researchers staff produced 8 journal and 2 conference papers between them in 2007, i.e. 0.52 journal papers per researcher. [The record in earlier years was better, e.g. 18 journal and 13 conference papers for the 19 academic staff in 2003.] From the information available, it appears that most of the journals have good impact factors for their specific areas and the overall rating is good.

#### Impact of publications – best five

- **Citation** *Very good (4)*

For the five selected papers in Production Engineering/Machine Elements the maximum number of citations were 14, for a paper published in 2004 (Scopus). None of these papers has fewer than 3 citations. In Materials/Mechanics, the maximum number of citations for any of the five selected papers was 3. Most of the selected papers are very recent, which explains the low number of citations. However, a paper published in 2001 received 55 citations, which is unusually high for an individual paper.

- **Type of Journal** (impact factor) *Good (3)*

The journal impact factors quoted range from 1 to over 3 for the papers selected in the Materials/Mechanics research area. These are good impact factors for journals in this area and the journals themselves are highly regarded. For the Production/Machine Elements group, the journal impact factors for the selected papers range from around 0.6 to 1.2. Again, these impact factors are good for publications in this area and the specific journals are suitable.

- **Hirsch Index** *Good (3)*

The average Hirsch index from the 15 staff members was 3.1, with the research leaders having indices of 5 or 6 (Scopus). These low Hirsch indices for most of the staff may reflect their high teaching loads and the lack of job security.

- **PhD/Researcher Ratio** *Insufficient (2)*

There are 8 registered students for 15.5 research staff (2007); this is low. The historical record looks better, with 19 completed PhDs within the period 2003–2007 but the number of academic staff was also higher during some of this period, with 19 academic staff in 2003.

### 5.3.3 Relevance *Very good (4)*

There is a very good level of relevance to the research, with 3 patents taken out and 3 spin-off companies over the period 2003–2007. Evidence of industrial partnerships is presented, with several companies sponsoring research in the department. In terms of social impact, several staff has contributed to Governmental Inquiries. In addition, 19 text books and 4 popular science papers/books have been prepared by members of the department, an impressive contribution to the engineering profession and to society.

### 5.3.4 Vitality *Insufficient (2)*

The documentation produced by the department shows a strong focus and determination to grow certain research areas, nano mechanics, for example. Plans are in place to recruit staff, an urgent issue considering the decreasing academic staff from 19 in 2003 to 15.5 in 2007, and to seek funding for additional research students in this area. This initiative is important, as the overall trend for doctoral research students has been negative over the period 2003–2007 (even allowing for reduction in staff numbers). There were no visiting professors (incoming or outgoing) for visits of greater than 3 months duration; there are only 3 collaborating institutes with joint publications. Only 2 members of staff were recruited externally during the period under consideration. A positive indicator of vitality is the engagement with the international research community and Swedish scientific society, as indicated by a high number of lectures, keynote lectures and session chairing at international conferences, research council and editorial board membership, etc. However, the number of individuals involved in these activities is not high and the potential for growth of the department's research depends on the active engagement of all academic staff.

## 5.4 Collaboration *[International] Poor (1); [National] Good (3)*

The level of international collaboration is poor, with no research visits (scholars or doctoral students) of greater than 3 months duration; there

are only 3 collaborating institutes with joint publications. There may be shorter or less formal collaborations in existence but this was not evident from the information supplied. The lack of a formal sabbatical system is not helpful in this regard. The strong engagement with international conferences and editorial boards of international journals provide opportunities to develop useful international research collaborations. There is evidence of internal collaboration with other departments within Lund University (Biochemistry, Solid State Physics, Industrial Electronics); these should be strengthened as a means of building critical mass in specific research areas.

### **5.5 Research Activity and Teaching** *Excellent (5)*

The department is to be commended for its very high output of research based educational material, such as textbooks (19 from 5 staff in a 4 year period) and course literature for advanced courses at both undergraduate and graduate level. Although the amount of information available on the teaching activity is limited, research work appears to contribute strongly to advanced courses at undergraduate level, as well as to doctoral research programmes. The contribution to teaching in the Nano-program is welcome.

### **5.6 Evaluation of Future Plans** *Poor (1)*

There is a need for a mission statement and for a clearly articulated strategic research plan or vision for the Department of Mechanical Engineering. Although one specific area is highlighted for growth potential (nano mechanics) and the work in thermo-mechanical fatigue is to remain a strong focus, there is a need for an overall vision and clear targets for future research funding, doctoral students and research outputs. Identification of strategic research areas should be linked to future staff recruitment plans, and should take cognizance of the research strengths of other research groups within the Faculty.

### **5.7 Future Potentials and Possibilities** *Good (2)*

In the Materials/Mechanics area the research in fatigue is of high quality and should continue. Likewise, the recent research in nano mechanics is promising and should be supported in the manner proposed by the department. This research group might also consider the possibility of initiating research activity in other material science areas, such as

biomechanics/biomaterials, where attractive possibilities exist for considerable research funding and for collaboration with the Division of Solid Mechanics.

In the DPME/ME group, the research activity in metal cutting and forming is good and should be continued. The evidence in support of the other research areas identified is less clear. In Machine Elements, the retirement of the professor in 2006 together with the lack of recent publications makes it difficult to predict continued success in this area. The research activities in manufacturing systems are clearly valuable in a national context (industrial projects, Swedish Production Academy) but this area has yet to make an international impact.

Overall, there are a lot of research areas to be supported by a relatively small department. The department might consider consolidating its research activities into a smaller number of strategic research areas, in order to maximize its research impact. Alternatively, a significant increase in collaboration, both national and international, might provide a way to enhance the research quality and impact.

### **5.8 Gender and Equal Opportunity Issues**

Out of 11 academic staff, 4 are female; this is quite a good gender balance for a Mechanical Engineering department. With regard to research students the situation is, poor at best, with no female doctoral research students currently on the register and 21% of doctoral exams completed over the 2003–2007 period being female. These figures look typical of trends in many countries. There is insufficient information to address this matter further but the department is encouraged to continue striving towards good gender balance, of both staff and research students.

### **5.9 Viability**

The main research achievements of the department are the publication output in fatigue and metal cutting and the growing research activity in nano mechanics. The strong level of engagement in international conferences, albeit by a limited number of research leaders, is also a positive indicator. The relevance of the research, as indicated by the level and extent of the interaction with local industry and the Swedish research community, is strength.

The fragmentation and less than critical mass of the department, falling number of doctoral research students, together with uncertain research income, is a major weakness. It is clear from the documentation that the department is concerned about these issues but it is not clear what steps are being taken to address them. The viability of the Department of Mechanical Engineering is dependent on finding a means to turn around the current negative trends, especially in graduate student numbers and research funding. The solution to these problems may require action at administrative level.

The research grouping DPME/ME should consider the possibility of focusing or consolidating their research activity into a few strategic areas, rather than pursuing the large number of subjects listed in the self-evaluation document, taking into consideration the opportunities for attracting and supporting doctoral research students in these areas. The ability of the current research groupings in machine elements or manufacturing systems to make an impact on the international scale is not clear.

Overall, the identification of strategic research areas should perhaps be considered on a broader basis than departmental, i.e. a faculty wide research plan might be of value. This is particularly relevant given the way in which the current departmental structure has evolved over the past several years. It is possible that a broader consideration of research priorities might identify opportunities for fruitful collaboration between smaller research groups and the creation of critical mass in key areas, such as material science.

## 6. DIVISION OF SOLID MECHANICS

### 6.1 Overall Assessment *Very good (4)*

In 2007 the Division of Solid Mechanics contained 12 academic staff including four postgraduate students and one visiting professor. It is a research active division which occupies a centrally critical position in relation to teaching and interaction with a wide number of departments. It is responsible for courses in elasticity viscoelasticity, fracture mechanics, plasticity, kinematics and dynamics, numerical methods of solution, non-linear equations, and as such plays a pivotal role in the development and training of many different types of engineer. Remarkably, in 2007, (with two understandable exceptions) every member of

the division published a peer reviewed paper in an international journal with a good impact factor. The division has active collaborations locally, nationally and internationally. Its members are very active participants at international conferences, whether as invited speakers or chairs of sessions. Typically, one Ph.D., one Licentiate and four Masters candidates graduate annually.

There are two surprising things: the relatively small number of Ph. D. candidates graduating each year; the fact that no member of staff is on the board of editors of a journal.

### **6.2 Research Infrastructure** *Good (3)*

Two members of staff have co-authored a large text book on the “Mechanics of Constitutive Modelling”. This excellent book covers a very broad range of topics: elasticity, strain, stress, tensors, viscoelasticity, plasticity, creep. This means that there is an extensive very valuable body of expertise and knowledge in a wide variety of topics. Such expertise is clearly available to everyone in the division. This opens the doors to new areas of research, particularly at the boundaries between subject areas (e.g. visco-plasticity, thermo-plasticity, biomechanics) and also to interactions and valuable collaborations outside the division. The first half of the textbook is used for the presentation of basic course material. Then topics are taken from the second half of the text book to stimulate the research of graduate students. Clearly the system works very well.

There is a well equipped laboratory available. However, in 2007 there seems to be only one experimental publication – in nanotechnology - and the work was done in a special laboratory.

### **6.3 Research Quality** *Very good (4)*

The division performs an integral and critical service to the entire College of Engineering (LTH) in teaching core courses in solid mechanics. In spite of this load on its academic staff, it is noteworthy that almost all of them seem to be actively involved in research which is quite unique within the College of Engineering. The R&D revenue for the division in 2007, per academic staff member, decreased by almost 50% from 2003 levels. To achieve excellence the division needs to considerably add to its PhD pool, and continue it's high level of R&D activity.

**6.3.1 Quality** *Very Good (4)*

Almost everyone in the division who should be active in research is indeed active. The division performs well internationally. Publications are all in good journals. The expertise in constitutive modelling means that staff members can easily adapt to new areas. Their expertise is recognised in the many invitations to lecture at international conferences (13 in 2003–2007), and the many invitations to organise and chair sessions at international conferences (23 in 2003–2007). Further quality recognition is evidenced by the election of two members to an academy during 2003–2007.

**6.3.2 Productivity** *Very good (4)*

All active members of the Solid Mechanics Division publish at least one peer-reviewed paper in a good journal each year. The ratio of refereed journal publications per staff member has increased from 0.5 in 2003 to 1.22 in 2007. Additionally members of this division presented papers at 14 international conferences in 2007.

**Impact of publications – best five**

- **Citation** *Very good (4)*

There is a total of 36 citations for the “five most significant” papers in refereed journals. It is clear that they are all substantial contributions – 4 in plasticity theory and 1 in experimental nanotechnology. The journals in which they appear have impact factors 4.113 (three papers), 3.04 and 2.11. As for the remaining six papers, there is a total of 7 citations. Their recent appearance in 2007 and 2008 may account for this low number. The impact factors for the journals in which they appeared are 4.012, 2.015, 1.5219, 1.510, 1.50 and 1.020.

- **Type of Journal (Impact factor)** *Very good (4)*

In 2007 there were eleven peer reviewed papers- with impact factors 4.113 (two papers) {The fourth highest ranked journal in Mechanics has an impact factor of 4.113}, circa 2 (two papers), circa 1.5 (five papers) and circa 0.7 (two papers.) The journals in which the best five papers appeared are all highly regarded with high impact factors.

- **Hirsch Index** *Excellent (4)*

The two most senior members of the division have the Hirsch indices of 9 and 10 (Using Web of Science). These are excellent indices in Mechanics. Other members are much weaker.



- **Ph.D.Researcher Ratio** *Poor (1)*

The division is not producing enough Ph.D.'s. On average there is just one Ph.D completion each year. There seems to be some kind of a unexplainable disconnect with this poor ratio since the division seems to be well suited for research and already has a very good publication record.

### 6.3.3 *Relevance Good (3)*

There seem to be no spin off companies, and only 3 new contracts with companies in the period 2003–2007. Understandably most of the research is basic science, but the diversity of expertise and knowledge in the division, and the industrial need for modelling, mandates enhanced industrial activity. Three text books were published in period 2003–2007. In particular the textbook “Mechanics of Constitutive Modelling” is excellent. One staff member assisted with a Government inquiry.

### 6.3.4 *Vitality Very good (4)*

This is a very active division with good networking both locally and internationally. There will always be demand for its expertise in constitutive modelling. The number of invitations to lecture at international conferences, the invitations to chair sessions, the election of two members to the Academy are all signs of vitality. It is clear that the senior people are planning the future of the division by asking for the appointment of high quality replacements. The present leadership have shown initiative in research and collaboration.

## 6.4 *Collaboration Very good (4)*

During 2003–2007 there were 2 visiting researchers to Lund for at least three months, 3 researchers from Lund for at least three months, one visiting professor for an extended period. In the area of publications during that time, there were collaborations with eleven institutes worldwide- in USA, Israel, Germany and India. This is excellent. It is greatly to be regretted that the sabbatical leave system has been discontinued because such a system has the effect of enhancing international collaboration and cooperation.

## 6.5 *Research Activity and Teaching Very good (4)*

There is a broad range of teaching activities which are informed by research by staff members. Three text books have been published. The

constitutive modelling textbook is linked to doctoral teaching and research. It is a pity that there are not more Ph.D. students to benefit. There are four postgraduate students mentioned in the staff list so that there is a good balance between young and old teachers.

### **6.6 Evaluation of Future Plans** *Good (3)*

The division should continue doing its fundamental work in constitutive modelling. If there are vacancies perhaps they would be filled by experts in this area.

### **6.7 Future Potentials and Possibilities** *Very good (4)*

There is a very solid foundation in basic research in place. With encouragement, and an active pursuit by the Division to increase graduate student enrolment, there is little reason why this should not continue and flourish. The Division's focus seems to be shifting towards the fundamental understanding of materials and phenomena. They plan to strengthen the micromechanics, coupled phenomena and smart materials with application in the biological systems. This shift is of a positive nature and should translate into changes in research and education, enhancing both graduate student and industrial involvement.

### **6.8 Gender and Equal Opportunities Issues**

There is a problem here. The percentage of women employed has dropped from 38% in 2003 to 15% in 2007. This problem must be addressed with account being taken of the fact that generally there are very few female candidates for posts in this area.

### **6.9 Viability**

The division is well known for constitutive modelling. There is a good solid foundation in research. There is likely to be continued demand for people with expertise in constitutive modelling. A major problem is the decline in numbers of postgraduate students. An active campaign to attract postgraduate students is of the highest priority. The division's web site highlighting current and future R&D efforts, and an internationally organised annual conference on constitutive modelling could help increase visibility. The papers presented at the conference could be

edited locally, a first step towards an international journal, based in Lund. Similarly, an annual short instructional conference could be directed at Masters level postgraduate students.

The division should strengthen its presence in European projects and networks in terms of Research and also Education.

# PANEL 16 – SYSTEMS SCIENCE

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## 1. FOREWORD

The structure of the report was discussed and we came up with the following adjustments with regard to the proposed generic format. One of the main issues was that of the best grain for consideration: department or group? We have decided differently for the different departments.

## 2. REMARKS REGARDING THE MATERIAL THAT WAS GIVEN TO US

This material consisted of the Report for each panel. This report contained text answering questions such as: achievements, SWOTs, future plans, plus links to selected papers and other web site material. This report had more or less adequate length, as we think. We have, however, struggled finding the following information that we needed:

- Up to date publication lists
- Faculty for each group or each department; who did what for each item in the report; sometimes it was hard to correlate the publication lists that we had with the groups as they showed up in the report; without names attached to the groups (or topics) our life was difficult.

Of course we'd have been much helped in having a bibliometric study. We know how to trust and distrust it but it prevents us from expressing totally wrong statements. Also, having productivity ratios (per individual) would have been useful.

Funding has emerged as being a central issue in the life of Lund faculty people. We got no information regarding your grants and contracts, however. Consequently we could not get a clear picture of the kind and amount of fund each activity gets. We believe that much of this information can be made available with no or little pain to the faculty people, by properly populating a Web information system that we think the university anyway lacks. Then, only the scientific report as it has been delivered remains to be prepared specifically for this evaluation.

### **3. OVERALL ASSESSMENT OF PANEL 16**

#### **3.1 Research Quality**

On a global basis the quality of research in systems sciences as a whole falls in the good to very good range. The department of Automatic Control has been stable for a long period. In contrast, organizations and reorganizations have been undertaken that result in the two new departments of EIT and Computer Sciences. While these moves are approved by the panel, it was felt that the reorganization of EIT needs to be pushed to its end and create more synergies. Also, the Computer Science department should probably consider better focusing.

#### **3.2 Areas of Excellence**

Traditionally, areas such as Control Science and Information Theory have been operating at the highest international standards. Some such as Control Science will clearly continue in spite of recent retirements, but there are concerns that others may not be in the position to do so, depending on key retirements.

Focused and homogeneous groups, with critical mass, were found to be in a position of secure sustainable funding for their activities and therefore have the ability to move into innovative and high risk areas. Unfortunately, this desirable situation is limited to only a few groups in the college.

#### **Potential Development Areas**

In spite of limited faculty the Computer Graphics group has achieved international prominence and could excel with further planned expansion of the group with a defined focus.

The EIT department has had recent reorganization. As a result interesting and potentially outstanding resources were gathered. But the overall vision is still lacking that could provide the additional synergy to put this department at the highest international level.

### **3.3 Areas in need of Development**

There is a (sub)group that appears to be in a more difficult situation, namely the networking activity within Networking and Security group. The areas of networking and security have been treated in the past almost everywhere separately. However, both have a strong common background in architecture. For that reason, security has to be embedded in network architectures from the very beginning. It may take some time that experts of both heritages find a common view, common visions and a common research strategy. As "Quality of Experience" embraces aspects as performance, reliability, availability, resilience, security and privacy, it is a very wise decision to have these research areas combined.

### **3.4 Strategies and Processes to Promote Achievement of Goals**

Based on factors that are specific to LTH only, the working of the Automatic Control Group/Department could be used as a standard to improve the research and graduate study programs in most of the other departments.<sup>16</sup>

In spite of social trends, we feel that the low female to male student ratio in engineering is positively addressed and we recommend increasing these efforts considerably.

With the exception of Automatic Control department, Systems Sciences is not doing a good job in attracting international PhD students because of inadequate PR and advertising.

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16. On organization: It is noted that the Automatic Control Department is much smaller than the other departments and is of outstanding quality. There are historic reasons for this, regarding its initial establishment, its continuing international reputation, and its academic goals of both theoretical advances and applications across a wide range of domains. It would be inappropriate to draw any general organizational conclusions except to say that the structure needs to be sufficiently flexible to allow such anomalies rather than conclude either that this model be more widely adopted or that this department should become a group within a larger department

We feel that the current funding structure within the University and the country is hindering not only graduate research but also long range innovative strategic planning.

Teaching requirements seem to be totally arbitrary and vary from group to group and Department to Department. Although it is evident that to a major extent these are controlled by budget constraints, some level of equity would help the staff feel invested and could promote their research output and external funding.

#### **4. GENDER & EQUAL OPPORTUNITIES ISSUES**

The fraction of female students studying engineering is traditionally small, hence it is expected that the fraction of female faculty staff is also small. In the three departments considered by this panel 5 out of a total of 87 academic staff are female (6%). From these 5 there are 3 Senior Lecturers, 2 Researchers and no Professors. About 16% of the registered doctoral students are female. Hence, it is clear that women are more under represented the higher the academic position. Perhaps this is partly explained on historical grounds. It is to be expected that some of the female Senior Lecturers might promote to the Professor level in the not too distant future.

It seems that the Swedish society and the University are offering a wide range of support for female employees. From the university side the one year course in leadership for female academic and the higher reward for female PhDs are very much appreciated. Also the efforts by the Faculty of Engineering to attract more female students are considered very positive.

It is recommended that the University (e.g. by the Department of Gender Studies) performs a detailed and University wide study to bring the severity of the steady decrease of females with increasing professional level in chart and to investigate the causes and remedies of this phenomenon by conducting a general survey. It is further recommended that the Faculty increases its efforts to attract more female students.

## **5. ELECTRICAL AND INFORMATION TECHNOLOGY**

### **5.1 Opening remarks regarding the grain for the evaluation**

This department is the result of a sophisticated split-and-merge. Essentially, it aimed at putting aside activities related to software – these moved to the computer science department – and gathering all other activities related to telecommunications. This occurred recently and consolidation has not been achieved yet. Therefore, the panel has decided to assess this department on a per group basis.

### **5.2 Research infrastructure and organization**

The IET Department is the result of a significant reorganization to rationalize a number of related activities for both academic and financial reasons. It is probably too early to assess the ultimate success of this exercise but the rationale and implementation have been well thought through and give a coherent structure.

It is not clear from the supplied data as to which entities the 2003 baseline refers, however the number of academic staff has been maintained in 2007 but the number of ‘other personnel’ has been reduced from 41 in 2003 to 21 in 2007. Much of the research in IET requires extensive experimental equipment and specialized laboratories and this is generally available in the Department to a high level. The above reduction in support staff might jeopardize the maintenance and enhancement of these facilities and continuing streams of research funding will be necessary in the future (it is noted that this is not identified as a ‘threat’ by the Department, although the more generic issue is mentioned in the Faculty submission).

### **5.3 Research activity and teaching**

According to the department website in the academic year 2007–2008, 82 undergraduate courses of which 9 project courses were organized by the EIT department. With 39 FTEs of staff this seems a course load which is comparable to international standards. However, the teaching load seems to vary largely among the various research groups of the department. We like to stress our appreciation for the project based courses which are showing an intense interaction with the research work. It would be a good idea to investigate how research-based education could be further expanded. Also the involvement of PhD students in the



teaching of these courses is considered as a positive point contributing to the development of important competences. Of the courses in the academic year 2007–2008, 21 were suitable for foreign students. We strongly support the international character of the undergraduate program and, although detailed figures were lacking, we believe that the department is having some success with it as a fair amount of international PhD students could be identified. There also seems to be an extensive program of PhD courses, organized per research group.

## 5.4 Group Broadband communications

### 5.4.1 Research quality

Grade: *Good*

This is a rather small research group dealing with a number of topical research projects on access networks, vehicular technology, server systems and multicarrier modulation. The group played an important role in the development of VDSL in collaboration with Ericsson and Telia. New research on web-server systems with HP and IBM has been started.

The work of the group has been published in a fair amount of international journals and in many proceedings of international conferences without being exceptional. P.O. Börjesson co-authored several highly cited publications in IEEE journals.

### 5.4.2 Collaboration

Grade: *Good*

The group has a good visibility and collaborates with important industrial players. The group is also active in important national and European research projects. It has also collaboration with industries and universities in the USA. The starting collaboration with the Automatic Control department within LTH is especially noteworthy.

### 5.4.3 Evaluation of future plans, potentials, and possibilities

Grade: *Very good*

Together with Ericsson and British Telecom this research area is on top of the development of the 4th Generation broadband systems which will play an important role in the telecommunication needs from 2020. The new idea to collaborate with the Department of Automatic Control to explore the area of model predictive control of communication systems

is highly appreciated and has great potential. The focus on activities in vehicular networks is very important and could lead to important future research developments.

The group is small and in that sense could benefit from merging with another group in order to obtain a larger critical mass. There might be a potential in closer collaboration with the communication research group within EIT.

## **5.5 Group Circuits & systems**

### *5.5.1 Research quality*

Grade: *Good*

Judging from the web pages, the circuit & Systems group consists of 1 Professor, 3 Visiting Professors, 4 Associate professors, 2 Assistant Lecturers, 1 post-doc and 3 PhD students. The number of PhD students seems low compared to the teaching staff.

The group is active on the following research topics: digital baseband architectures for wireless communications, digital image processing architectures, low power architectures, reconfigurable computing, digital holographic imaging, asynchronous custom DSP, RF and mixed signal, and digital information systems and knowledge architectures. This seems a large number of different topics for the current staff. It could therefore be a good idea to better focus the activities of the group and also seek closer collaboration with other groups and departments. Although the research topics are relevant, they rather target incremental innovations instead of breakthroughs. Digital holography might be an exception. The group regularly publishes its research results (40 papers in 2007) but the citations for these papers are rather limited. No patents of the group were found. However the research already resulted in one spin-off company (Phase Holographic Imaging).

In summary, the circuits & systems group is a good quality research group, mainly of national significance, and with strong ties to industry.

### 5.5.2 Collaboration

Grade: *Very good*

A strong point of the group is the close collaboration with industry. The last ten years this was organized via the VINNOVA Competence Centre for Circuit Design. Also the visiting professors are instrumental in the close collaboration with industry. With the start of the new VINNOVA Industrial Excellence Center for System Design on Silicon the continued interaction with industry is guaranteed.

The group has also an extensive collaboration with other groups and departments, for example with the physics department on the topic of nanomaterials for low-power circuits, with the communication group on the topic of circuits for communications and with the biomedical signal processing group on low power signal processing in implantable devices.

The group is member of the HERMES partnership, a network of leading European independent telecom research centers in Europe. The group is also effective in attracting national and European funded projects.

### 5.5.3 Evaluation of future plans, potentials, and possibilities

Grade: *Good*

The plans for the future are only vaguely described. They center around three topics: CMOS circuits with low static power consumption, efficient architectures for new wireless systems and nanotechnology in CMOS implementations. All three topics are highly relevant, although the third is more speculative, and offer good opportunities for relevant research contributions. Several on-going activities (digital image processing architectures, reconfigurable computing, digital holographic imaging, asynchronous custom DSP, and digital information systems and knowledge architectures) have no relation with these three topics. It should be beneficial to fade these unrelated activities.

## 5.6 Group Communications

### 5.6.1 Research quality

Grade: *Excellent*

The communication group has 22 members, 4 professors, 1 assistant professor, 3 associate professors, 2 lecturers, 3 post-docs, and 9 PhD students. Compared to the staff, the number of PhD students is relatively low.

Andreas Molisch joined the group in 2002 and gave a substantial renewal of the research on channel modeling and characterization. The work on MIMO channel sounder is considered very important. Based on this activity, the group is involved in all key international and European standardization bodies in this sector. Corresponding publication record is good; several papers are also widely referred. Overall, achievements have been internationally recognized by the reception of the Neil Shepherd Memorial Award and an appointment as IEEE Fellow.

An interesting research direction – although seemingly not closely connected to the previous one – is the study of propagation in the body. This activity is part of the Neuronano Research Center, an important trans-disciplinary research entity at the university. It is supported by a grant from the Wallenberg foundation, something considered important and challenging. Results of this research have not been widely published.

In addition, the group is pursuing research in digital communication, with a specific strong position in error coding. The results are widely published and referenced. The involved professors also received multiple awards for their work. However, an important point of attention is the succession of faculty who will retire in the next years.

Note: There was a special international assessment on the center for high-speed wireless communications with detailed outcome (“very positive”) and recommendations for long-term horizon.

### **5.6.2 Collaboration**

Grade: *Excellent*

The group has been extremely active in all sorts of IEEE standardization bodies, COST programs, in exchange programs and in EU projects. The group also collaborates with the biomedical department (propagation in the body) and with the circuits & systems group (implementation of communication systems).

### **5.6.3 Evaluation of future plans, potentials, and possibilities**

Grade: *Good*

For the future the group wants to build further on its strengths and continue the research on antennas and propagation, more in particular multi-element propagation and absorption by the user. Also the efforts on propagation in the body will be continued. These topics are certainly

relevant, but seem rather incremental with respect to the current work. In addition, high frequencies radio circuits are mentioned, although this seems better suited for the circuits and systems group. Digital communication and error coding are not mentioned. Does this imply that these activities will be stopped? In general, the future strategy should be better specified.

## 5.7 Group Networking & Security

This group collects two distinct and quite separated activities: networking and security. The panel has decided to assess them separately.

### 5.7.1 Research quality

Grade: *Poor?* [networking]

As presented in the evaluation document, research on networking seems somehow weak, with low publication record and low funding level. However, the panel was not sure that all research activity at EIT department regarding networking is indeed covered under the considered paragraph – this motivated our question mark when grading. In particular, the panel is aware of the well known work on network planning and optimization, but does not see it mentioned in the document.

Grade: *Excellent* [security]

In contrast, the research on security is of very high standard, with a focus on stream ciphers and cryptology in general. This area at Lund University is leading in Sweden and among the important actors worldwide. Despite the fact that no panel member was a specialist of this area, the activity report of it speaks for itself and clearly shows prominence.

### 5.7.2 Collaboration

Grade: *?* [networking]

For the area on networking, the panel somehow lacks elements based on evaluation report.

Grade: *Very good* [security]

Building on its strong scientific position, researchers in this area have established collaboration at a very high European standard. Also, close cooperation with SonyEricsson has been the tradition for this group.

However, to the panel's opinion, the question regarding this area is not so much its research quality (which is, as we said, impressive), but rather

its much focused scope. In the last ten years, focus on network security has widened, from hard core cryptographic issues, to more general ones involving protocols and architectures. We do not see elements in the report that demonstrates that this group of researchers has considered this move. Opportunities for collaborations with other specialties relevant to security should be considered, both within LTH and in neighboring industry (e.g., SonyEricsson).

### **5.7.3 Evaluation of future plans, potentials, and possibilities**

Grade: *Poor? [networking]*

Networking is at the very center of research in telecommunications. It is therefore unfortunate that future plans as stated for this activity seem rather isolated from the rest of EIT and lacking vision. But again, maybe, this is a false impression due to imprecision in evaluation document?

Grade: *Good [security]*

The panel interprets this part of the evaluation report as manifesting potential problems in the future. On the one hand, the panel is satisfied with the mention of future research activity in close collaboration with SonyEricsson. As said before, the panel believes that this should be taken as an opportunity for widening the focus and skills of this group – such a widening is not mentioned, however. The group is mentioning its limited size as an obstacle toward such a widening of its activity. Maybe the question is not so much an issue of size, but rather an issue of finding, within LTH, the missing skills to address security at a wider scope.

## **5.8 Group Signal processing (including biomedical) and electro magnetic theory**

### **5.8.1 Research quality**

Grade: *Very good*

The signal processing and electro magnetic theory group has 25 members, of which 12 are pursuing a PhD.

The signal processing is focused on biomedical signal analysis of atrial arrhythmias, which has resulted in significant publication output in top international journals and is practically used. Sweden has a long standing tradition on electromagnetic research and the group at LTH has added significantly to that. The focus of their research on more

fundamental and mathematical based research has allowed them to be at the international scientific forefront in the mathematical modeling of physical mechanisms of the interaction of electromagnetic waves with materials and in quantitative inverse scattering. However, this focus has not prevented them from participating in a wide variety of projects with Swedish industry. G. Kristensson is a Fellow of the Institute of Physics. The research is published in the highest standard international journals.

### **5.8.2 Collaboration**

Grade: *Very good*

The biomedical signal processing has for long excellent interdisciplinary activities with the Medical Faculty resulting in the creation of a Center of Integrative Electrophysiology and several joint PhDs with the Medical Faculty. The electromagnetic theory area has been very successful in collaborating with Swedish industry as well as participating in European research projects, it also collaborates with other departments at LU in particular the department of Atomic Physics. They have also excellent informal collaborations with many other international electromagnetics groups.

### **5.8.3 Evaluation of future plans, potentials, and possibilities**

Grade: *Very good*

Both the biomedical signal processing and the electromagnetic theory envision challenging and important research possibilities for the future. The development of individualized treatment of atrial fibrillation and the development of new wireless communication systems are very important future research areas. Although G. Kristensson is retiring in the not too distant future excellent younger senior researchers have been hired at the associate professor level to guarantee a continuation of research quality. There is certainly potential for further collaboration of the electromagnetics research area with other groups within the department, in particular research on antenna systems could be of particular interest to the channel modeling and characterization and the research on materials could connect to the research on propagation in the body.

## **5.9 Summary regarding research**

Grade: *Good*

The overall rating of research within EIT is generally good. International competitiveness and visibility are well underlined by participation in

international research consortia or top-level national research organizations and high quality publication output. The impact of the research is not easy to measure and is indirectly reflected in joint research with industry and other institutions, in contributions to standardizations and/or citations. The recruitment of top-level PhD students is a difficult problem that is not uncommon to electrical engineering. There is a large variation of research quality between groups and sub-groups. It could be desirable to take specific actions to bring all research activities of the department above a minimum quality threshold. Finally, the panel sees a problem with the sub-group on networking within the “networking and security” area.

This given grade is more negative than the grade proposed for some of the different individual groups. This aims at reflecting the impression of the panel that this department still needs to better focus and integrate the work of the various research groups. The panel must acknowledge that the documents provided for the evaluation of this department were not to the expected level of clarity making an assessment sometimes difficult. As the department was only recently established, this is understandable.

As perceived by the panel, both from the documents and the site visit, the EIT department is still in a transient phase where it appears as a juxtaposition of autonomous activities inherited from previous departments. While this is well acceptable for such a transient period, the panel feels that the reorganization should be taken as an opportunity for EIT to define itself as a key leader in some specific but broad aspect of telecommunications. Strong points to build upon include, as we see it, coding and information theory, cryptography and ciphering for security, wireless communications and electromagnetic field analysis. The panel does not see enough skills available at LTH in the area of software science to justify targeting higher layers of telecommunications architectures (P2P, services, etc...). The presence of the Control Science Department can be taken as a unique opportunity to move telecommunications infrastructures toward more adaptability and autonomy. The panel is of the opinion that there are many unexploited opportunities for collaboration among the various research groups within the department that could help in taking a leading role as outlined above. The cooperation among the various groups should be a point of attention in the coming years for the recently established department.



## 6. COMPUTER SCIENCE

### 6.1 Opening remarks regarding the grain for the evaluation

This department is the result of a sophisticated split-and-merge. Essentially, it aimed at gathering activities related to software and other activities related to computer science in general. This move was completed in 2007. Several activities were launched, among them computer graphics and natural language processing (not reviewed here). Today, the department still has several mostly independent tracks. Therefore, the panel has decided to assess this department on a per group basis.

In several areas, the department still lacks critical mass. We therefore advise strengthening the on-going activities rather than engaging in completely new fields of research.

### 6.2 Research infrastructure and organization

The Department of Computer Science is a joint department of the Faculty of Engineering and the Faculty of Science and in 2007 when the IET Department was formed the research group on Software Engineering joined CS and this move is reported to have been smooth and mutually beneficial. It is noted that the Faculty of Science recently decided to close down its Computer Science activity over the next three years, principally as a result of the decline in student numbers for this option in that faculty. The full implications of this decision are not described in the documentation with respect to any consequential changes in the research coverage.

The research activity in this Department is now mostly software based with only modest laboratory requirements such as the robotics laboratory shared with Mechanical Engineering and Automatic Control. As a result the Department's research is not limited by the lack of appropriate infrastructure.

### 6.3 Research activity and teaching

The research impact on teaching is rather visible in the evaluation report. In fact, the research areas of the different groups are well represented at the level of teaching. While this has the advantage of clearly linking teaching to research, it also has the drawback that teaching on computer science at EIT has no “unique color” that would make it the place to learn

a specific area of computer science in Sweden, or possibly Europe. In fact, this problem mirrors the problem with the lack of focus on research for the department.

## 6.4 Group Software development environments

### 6.4.1 Research quality

Grade: *Very good*

This group follows from the original activities of Lund University in computer engineering. The focus of this group in the period of evaluation has been on developing a memory management system (garbage collector) for Real-Time Java. The originality of the approach lies in the scheduling of the corresponding tasks in such a way that the real-time tasks of the underlying application remain handled according to their specified priorities – it is not wanted that garbage collection preempts a task of high priority. This work has resulted in a small publication record; however, in competitive conferences (OOPSLA). In addition, we consider that the effective impact cannot be measured by just publications: the JstAdd tool is an important achievement. Applications targeted industrial robotics with interactions with ABB.

This group also seems to follow an independent track related to natural language text and its interpretation, with an interesting application to reports on car accidents. We have no opinion regarding this track.

### 6.4.2 Collaboration

Grade: *Good*

Main point for notice include a cooperation with SUN and a close cooperation with robotics activities, both regarding the work on Java.

### 6.4.3 Evaluation of future plans, potentials, and possibilities

Grade: *Insufficient*

We have found no clear plans so far related to this group beyond industrial robotics. The report states: Our research agenda is set by identifying problems that are, or are expected to be, relevant for industry. Total lack of proactive future plans is a problem. Does this indicate that this group plans to stop its activities? However, under the Possibilities heading, it is mentioned that this group would like to pursue Pervasive Computing, e.g. related to Lund Hospital. This group was participating in the Pal-

Com project, and with the success of this it is most likely that there will be follow-up activities and projects. Why is this not mentioned?

## 6.5 Group Empirical Software Engineering

### 6.5.1 Research quality

Grade: *Very good*

This group develops studies on the niche topic of empirical software engineering where it is recognized as an international expert. This is substantiated by a good publication record. The work includes developments of methodologies as well as of metrics for software quality and statistical measurement studies regarding faults in software.

In the Form 2 it is not said if this group also teaches methodologies or just studies them. From the homepage of the group it appears that they do, and that they do it the right way, that is the courses are not just on how it could and should be done (based on empirical studies), but students are in fact using a methodology and develops an application. However, the bachelor level course on the development of large systems appears to be based upon outdated technology (SDL-88). It is fine to use SDL instead of UML for this kind of course, but newer versions exist.

### 6.5.2 Collaboration

Grade: *Very good*

This group has put a great deal of effort in gaining international visibility in its area. Also, a major forum for cooperation is the recently established LUCAS/EASE Vinnova center for software where Ericsson has a major role. From the composition of the board and the management group, LUCAS is promising and therefore it seems a good vehicle for cooperation. It would obviously make sense to cooperate with the group on Software development environments.

### 6.5.3 Evaluation of future plans, potentials, and possibilities

Grade: *Poor*

The future plans indicate that the Vinnova center EASE will play a central role in the strategy of this group. Pervasive computing is indicated as a candidate future direction. This does not seem aligned with the research topics of this group so we do not really understand. A good thing with EASE is that it involves more partners than Ericsson, but it appears to be

less mature than LUCAS Pervasive computing is indicated as a candidate future direction. This does not seem aligned with the research topics of this group so we do not really understand. This seems strange. As far as we know, participants from the PalCom project were from the Group Software Development Environments group, not this one.

## 6.6 Group Computer graphics

### 6.6.1 Research quality

Grade: *Excellent*

Computer graphics is a recent area for this department. It got established in 2003/2004 through the hiring of a young faculty (professor). Currently there are 4 PhD students. The group specializes on original techniques for efficient rendering, especially for mobile devices. The paper on culling that has been provided to the panel has been highly appreciated. Optimizations are proposed for rendering that rely on analyses of the code that resemble the type of analysis performed in other areas such as static analysis or abstract interpretation. The latter techniques were developed in a totally different context of object code validation or worst case execution time evaluation. We have been highly impressed by the depth of the analysis performed. A start-up company is being set-up around this technology.

In addition, effectiveness of the results obtained is clearly demonstrated. Impressive success has been achieved at the most competitive conference SIGGRAPH. Several patents have also been filled. This group demonstrates a mix of skills: computer graphics algorithms, low level architectures, code analysis.

### 6.6.2 Collaboration

Grade: *Good*

From the provided material only limited evidence can be found for collaboration with the local industry. However, establishment of a spin-off is reported. Also collaboration with other departments seems limited. For instance collaboration with the circuits and systems group on low level architectures could be beneficial. Therefore we believe that to become more successful the computer graphics group should collaborate more with other research groups in graphics worldwide, as well as local and international industry.

### 6.6.3 Evaluation of future plans, potentials, and possibilities

Grade: *Very good*

Future plans are not detailed at the level they should. However, the few sentences that we have give a pretty clear idea about what is going to happen, namely a clear focus on multi-core graphics architectures. These architectures will clearly be central to graphics and computer graphics will be a major target for such architectures. The panel sees this as an excellent opportunity for the future. However, to remain at the forefront of the technology it is mandatory that the group should further grow.

## 6.7 Group Embedded Systems Design

### 6.7.1 Research quality

Grade: *Good*

This group consists of 7 members, of which 4 are PhD students, and develops research in the area of embedded systems, particular on hardware-software co-design and reconfigurable systems. Emphasis has been on developing algorithms to deal with scheduling and resource allocation under constraints. To this end specific constraint solving methods have been developed together with the tool implementing them. Front-ends to System-C have also been developed. The group has a good publication record, although results are rarely published in journal papers and the work is not frequently cited. This is good research but cannot be considered as leading in the field.

### 6.7.2 Collaboration

Grade: *Poor*

The work somehow lacks synergy with other parts of the department or other departments in engineering. A possible cooperation with the circuits and systems group could be beneficial. The provided material shows very little evidence of cooperation with industry. However, the new VINNOVA Industrial Excellence Centre for Embedded Applications Software Engineering, supported by VINNOVA, offers the opportunity for increased interactions with industry.

### 6.7.3 Evaluation of future plans, potentials, and possibilities

Grade: *Poor*

Future plans are not original and are vaguely formulated. Moving to programmable and reconfigurable hardware is not per se a challenging objective.

## 6.8 Group on Algorithms

### 6.8.1 Research quality

Grade: *Good*

The group consists of 16 members, of which 7 are PhD students. The group develops research on algorithms in various areas including graphs, trees, and other data structures. The group moved away from the faculty of sciences. It has published regularly papers in demanding conferences and journals. Bibliometrical search, however, reveals that the resulting papers do not seem to be widely cited. The panel by itself, however, must acknowledge that its member do not feel qualified for assessing this work in a non superficial way. The group acknowledges lack of funding.

### 6.8.2 Collaboration

Grade: *Poor*

In the provided material no evidence was found that the group collaborates with other departments or with industry.

### 6.8.3 Evaluation of future plans, potentials, and possibilities

Grade: *Insufficient*

There are no future plans listed for this activity. This may indicate either that the group is going to continue working as it did, or that it may stop existing. We hope the first alternative is the right one but we suggest the group reconsiders how it intends to become more effective in its actual environment.

## 6.9 Summary regarding research

Grade: *Good*

This grade is more negative than the grade proposed for the different individual groups. This aims at reflecting the impression of the panel that this department may not get the best from its resources and the resources offered by its environment.

Computer science and engineering was in operation for a long time at Lund. It has been the subject of a deep renewal (with the merger of a group from the faculty of Sciences) and rejuvenation through the arrival of his current department head. It appears (from form 1.3 in the material that we have got) that the part of CS from Faculty of Science has just 1 professor but 11 articles in journals, while the part of CS from LTH has

5 professors but only 14 articles of the same category. Also, the figures show that there has not been a growth in publications and in PhDs from 2003 to 2007, even though the number of professors has doubled. One of the explanations could be that the staff has many teaching obligations, and in that respect they are not alone – this is a well-known problem for Computer Science departments.

Department head has shown considerable dynamicity and energy. He was able to attract external young faculty of very high caliber, e.g., in computer graphics. The department is now composed of a number of mostly independent tracks and the department head has expressed this situation as reflecting his actual policy. Future plans for the department mainly consists in considering which additional tracks could be added, funds permitting. For example the Future Directions section lists Usability and Security. These are hardly related to the other parts of the department and would require building up complete new groups.

It is the feeling of the panel that this is the wrong way to go. We must admit that some of the tracks will remain mostly independent. For example computer graphics is an important but narrow area that will remain so. However, we observe at the same time that a group exists on embedded systems design that will also be faced with multi-core architectures. We hardly understand future plans for the very nice activity around RT-Java: do you want to focus on increasing its impact? Alternatively, do you want to open it? (For example you could consider making its scheduling aspect a room for deeper and more formal investigation, jointly with the automatic control department.) Finally, the track on software development methods may benefit from getting embedded into the larger area, say, of embedded systems design where methods from your side could be combined with the skills of the control department regarding model based design (this is just an example of what you could do, not a suggestion by itself). But in any case, thinking about all those things should be undertaken. Definitely so.

## **7. AUTOMATIC CONTROL**

### **7.1 Opening remarks regarding the grain for the evaluation**

As the department head Anders Rantzer himself suggested, we have decided to evaluate this department as a whole. While several topics and

objectives are pursued, no consistent group emerges and people move across topics and subgroups in an opportunistic way and we see this community as rather homogeneous. Furthermore, the automatic control department is a relatively small department in the faculty of Engineering. Nevertheless, automatic control is a field that requires both fundamental and application oriented research and the interaction between the two types of research is of utmost importance for further developments. If automatic control is located within a department with a specific application domain, it negatively impacts the broad applicability and fundamental developments, due to the limited scope of one particular application domain. This justifies the departmental status of the automatic control research; the visibility is much stronger, and interactions with a wide variety of application domains are made easier.

### **7.2 Research infrastructure and organization**

The organization of this Department is covered in 8.1. The leading edge theoretical research only requires computing resources and most of the experimental facilities for the applied work are located in the laboratories of the domain specific collaborators (e.g. in combustion or bio-engineering). An exception is the robotics laboratory which is more easily managed from within this department.

### **7.3 Research activity and teaching**

By building on its very strong position in research, this department has been able to establish a solid and excellent vision for teaching. Evolution of teaching on control is not simply synchronized with the individual research interests of the faculty members, but rather follows from the understanding of evolution of the discipline in a broader sense. The panel sees this as the best way to couple teaching with research.

### **7.4 Research quality**

Grade: *Outstanding*

The overall picture is well described by the matrix that is provided by the document written by the department, namely:



- **Horizontal axis:**
  - Analysis and control of complex systems, the fundamentals
  - Computer aided modeling and optimization
  - Real-time systems
- **Vertical axis:**
  - Process control
  - Robotics
  - Automotive
  - Medicine
  - Telecoms

In the following we briefly review the horizontal axes.

The fundamental results developed at the border of optimization and control put this department in the top rank worldwide within the control community as identified by the Control and Decision conference (IEEE-CDC). The panel considers that the results regarding density functions and stability of nonlinear feedback systems opens new avenues in nonlinear control. This is really seen as kind of a revolution in the area and Lund, together with Caltech and MIT are the three actors in the forefront in this area. Not surprisingly, this is substantiated by an outstanding impact of the related publications. In addition, the panel considers that this body of research puts bridges toward other disciplines such as optimization as well as several topics in computer engineering such as scheduling and static analysis of programs. All this is rather impressive.

Computer aided modeling and optimization was in the past a major focus of this department with the work that lead to Modelica. This has had a major industrial impact on model based design of embedded systems in the sector of automobile and aeronautics and transportation in general. Modelica is the most important step forward since Simulink was introduced. Several startups were born from this activity, with Modelon AB born in the recent years as a service company. From the perspective of the user community it is a bit of a pity that this activity is no longer a central Departmental theme. We were, however, satisfied to read that this activity has been revitalized by extending it toward optimization techniques, a current area of excellence of this department.

The axis on real-time systems has been developed in the last ten years. Revisiting control design and analysis in close relation with the consideration of computing infrastructure is undoubtedly a central issue now and

in the future. This department is one of the few who tackled this issue, worldwide. Development of TrueTime is an interesting contribution. This part of the research made by the department is, however, not yet of the quality of the other areas.

The vertical axes represent the specific application areas in the department. Cross fertilization between fundamentals and applications is of high importance in the department.

### **7.5 Collaboration**

The vertical axes mentioned above represent the application areas of the department. Some of the staff members have a background in one of the application areas, and there is a direct link with the company Ericsson via Bo Bernhardsson. Furthermore, a number of former Ph.D. students of the department work at other departments within and outside Lund University. There is a strong relation of the department with industry. However, the self evaluation does not further specify the collaboration with other departments in Lund (except brief mention of the work with combustion) and in Sweden nor the industrial collaboration. Finally, both industrial and academic collaboration with an EU Project is mentioned, as well as international academic collaboration within three EU Networks of Excellence. Finally, an exchange of Ph.D. students with Caltech is formalized and frequently used.

The panel is pleased to see the large amount of cross disciplinary work as well as the disciplinary international collaborations. It appears that collaborations with other departments in Lund could be strengthened, in particular in the specific application domains mentioned on the vertical axes.

### **7.6 Evaluation of future plans, potentials, and possibilities**

*Grade: A mix ranging from good to outstanding; overall excellent*

We have been able to discuss future plans while interviewing the department head and a young researcher. The following comments reflect both our reading and these interviews.

The first topic considered as part of future plans is distributed control using pricing mechanisms. This part of the plan is an extrapolation of the

current activities in convex optimization for control. This department is in the position to become one of the world leaders on this topic. Note that aspects of composition are important, thus autonomy and decentralized techniques are preferred. Overall, we consider that the chances that this research direction becomes outstanding are very high.

A second important research direction is the combination of networked embedded systems and modeling support for design and verification. This is an extrapolation of the current direction of research on real-time. As part of the whole research program, event based control (as opposed to the classical paradigm of time-based control also referred to as sampled control) seems the most promising and best opportunity. In our opinion, studies on event based control should consider 1/ the control algorithm and its robustness, in the context of 2/ the given supporting distributed computing infrastructure with its networking aspects. Thus it is important that the group gets close connections to other groups inside or outside Lund leading the research regarding abstract models of such architectures. The close combination of control and architecture models makes this department in the position to become one of the important actors worldwide. We are less convinced by other aspects of the program. They do not seem unique to Lund but are rather well studied in many places and we do not see why Lund would have a better chance in the competition. We see this track having high chances to become a very good one and some chance to become excellent.

In addition, the department considers investing in applications in an opportunistic way. This is fine but we think it is preferable to try to become somehow specialized in a smaller number of well selected application areas. This is considered good.

The panel strongly supports the overall research direction of “model based control system development based on high-level descriptions”. However, the panel was surprised that no mention was found of Modelica in future plans. Some panel members found this embarrassing, considering the strongly increasing momentum of Modelica in industry; other panel members were comfortable with the idea that this topic has been hand over to other actors, be them academic or industrial.

# PANEL 17 – LTH | BUILDING

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## 1. INTRODUCTION

We did the evaluation according to the Terms of Reference and used the Evaluation Material provided by various departments as our main source of information. Therefore, the evaluations are based on a relatively limited amount of information, which also varied among the departments. We received additional information during the site visit; however, there were again large variations among the departments in this respect. In addition, because no bibliometric analyses were available, we evaluated quality mainly based on international visibility and on the number of articles in peer-reviewed international journals.

The average age of professors is quite high in all the departments, 56-58 years, with the exception of the IIIEE where it is 53 years. Thus, there are several professors close to their retirement (this is also true in the IIIEE) and the future plans of the departments should include a strategy for their replacement. This is a sensitive issue and, therefore, it is understandable that it was not included in the written plans given to us. The discussions revealed that many departments are well prepared for the change but this could not be confirmed for all the departments.

The most important background information we obtained for the year 2007 is summarized in the following table (as far as Design Sciences,

Construction Sciences, and Electrical Measurements are concerned, only data of those divisions and groups given to the panel 17 are included). The last two columns of the table, which also include the average numbers in 2003–2007 in parentheses, indicate that the production of doctorates and papers in international journals has remained quite stable during the evaluation period with the following exceptions: the production of PhDs was clearly lower in 2007 than during the whole period (2003–2007) in two departments (Technology and Society and Construction Sciences). There has been a positive trend in the publication activity in two departments, Architecture and Built Environment and Design Sciences.

Department	Professors	Academic Staff	Employed PhD Students	Total Number of PhD Students	PhDs Produced	Total Peer-rev. Papers
Architect.	8	28	17	42	2 (2.8)	22 (15.4)
Bldg&Env.	11	39	18	54	6 (6.1)	49 (43.2)
Tech&Soc	6	18	16	28	2 (4.0)	14 (14.2)
Des.Sci.	6	21	10	30	3 (3.0)	43 (30.6)**
Constr.Sci.	7	14	2	32	0 (3.1)	19 (16.2)**
Electr.Meas.	1	5	1	7	1 (1.0)	*
IIIEE	2	7	8	22	1 (1.4)	16 (18.0)

\* No exact information was available  
 \*\* For the whole department

The human resources available in various departments also need to be considered in the evaluation. The sizes of the departments vary a lot. The outputs (publications and PhDs in 2007) calculated per the number of academic staff and professors (for PhDs/professor the average numbers in 2003–2007 are given in parentheses) are listed in the next table. The ratios of doctoral students to the academic staff are also included in the table.

Department	Peer-rev. Papers/ Academic Staff	PhDs Produced/ Professor	Employed PhD Students/ Academic Staff	Total PhD Students/ Academic Staff
Architect.	0.8	0.3 (0.3)	0.6	1.5
Bldg&Env.	1.3	0.5 (0.5)	0.5	1.4
Tech.&Soc.	0.8	0.3 (0.7)	0.9	1.6
Des.Sci.	1.5 **	0.5 (0.5)	0.5	1.4
Constr.Sci.	0.8 **	0 (0.4)	0.2	2.3
Electr.Meas.	*	1.0 (1.0)	0.2	1.4
IIIEE	2.3	0.5 (0.7)	1.1	3.1

\* No exact information was available  
 \*\* For the whole department

The table indicates that, after taking the human resources into consideration, the publication activity has been high in the IIIEE and Design Science but somewhat smaller in Architecture and Built Environment, Technology and Society, and Construction Science. No doctorates were produced in Construction Science in 2007 but the situation has been better in the other years of the evaluation period. However, this is an alarming signal because the department also suffers from the lack of PhD students. IIIEE has been active in doctoral student recruitment. The total numbers of doctoral students/academic staff are rather low for all the other departments except IIIEE. This allows good supervision of doctoral studies but, on the other hand, this will limit the research output.

LU has a new strategic plan emphasizing the development of multidisciplinary environments and cross-border collaboration. Also, the Faculty of Engineering has recently written its own strategic plan which is consistent with the plan of the university but it does not describe its contribution to the "meta-areas". On the other hand, the faculty level strategy only rarely appears clearly in the future plans of the individual departments.

The recruitment problems faced in the Faculty of Engineering were admitted in the background material. This might be one reason why recruitment of female students and staff has been seen as important, with the long-term goal of achieving gender equality, which, of course, is a worthy goal.

## **2. DEPARTMENT OF ARCHITECTURE AND BUILT ENVIRONMENT**

### **2.1 Overall assessment**

The department has two units: architectural research and urban studies. The research in architecture appears to be dominated by technical studies on energy and building design, especially solar energy, and does not lie in classical architectural issues. There is a mix of soft and hard methodological approaches and activities at the interfaces, exemplified by the way in which environmental psychology studies human response to various environments. This is paralleled in the urban studies side. It is not clear how much collaboration there is across the two units and with other departments, such as the Department of Building and Environmental Technology.

The department claims a special position within LTH due to its long tradition of inter- and multi-disciplinary research focused on the man-techniques-society interaction. However, although there is significant potential in this topic, there is not much evidence that the department has been very active in this respect.

The academic staff numbers have remained at 28, but with a reduction of female members and an increase in staff without permanent contracts. The number of other personnel has dropped significantly from 41 to 29 during the period from 2003 to 2007. The research income has dropped from 35 M SEK to 30M SEK during the same period of time. The department has been fairly active in international recruitments, having 3–4 foreign PhD students (during the whole evaluation period) and two foreign staff members (during 2006–2007).

### **2.2 Research infrastructure**

The department has two special laboratories. The first is a solar simulator and the other is a full scale, whole room facility that allows the effects of alternatives to be studied across a range of interactive variables. It seems that much of the rest of the research is field based or does not require special equipment.

### 2.3 Research quality

**International comparability and innovative power:** The research in energy use, especially solar power, appears to be the predominant research area with a long track record, including significant impact on policy and practice. The research in the urban area has also been quite extensive and involves some interesting cross-cultural work. On the other hand, the environmental psychology research has not yet achieved the critical mass. The department is not very visible internationally.

**Productivity:** Publication activity has not been very high. The number of original articles in refereed journals was reported to be 83 during the period under evaluation. In addition, 93 conference papers and 39 book chapters were produced. However, there clearly has been an increased publication since the department was established in 2005. The growth in research publications has been greatest on the engineering side but there has also been growth in cross-disciplinary studies.

The department produced 16 PhDs and 9 licentiates over the evaluation period at a fairly steady rate (including graduates before the organisation change in 2005). The rate is reasonable but there is a clear potential to increase this production if students can be attracted.

**Relevance:** The topics investigated appear to have relevance and impact; however, the actual architectural research issues did not appear.

**Vitality and ability to manage research:** The department seems to have taken a positive turn in journal paper production since its reorganization. On the other hand, there is the problem of the continuing reduction in research income. The department seems to compensate for the reduction in research funds by increasing commissioned research. However, this does not appear to be a healthy way to deal with the problem.

**Grade:** Considering the relatively low international visibility and lack of research activity in actual architecture, the grade of good seems appropriate. However, our overall rating is *good/very good* due to the strength of energy research in the department.



## 2.4 Collaboration

The department has an expressed goal of exploiting its capabilities in multi-disciplinary research and there is some evidence that this is beginning to happen. The environmental psychology area has great potential for creating synergistic impact when linked with other areas. However, it is not clear how much collaboration there has been between the two units in the department and with other departments. The international collaboration did appear as joint publications with a number of foreign partners; however, international joint projects were not obvious.

**Grade:** The background material does not indicate active and wide collaboration; therefore, overall a grade of *good* is given.

## 2.5 Evaluation of future plans

The plans to create a holistic man-techniques-society approach to the research by addressing major societal issues from a socio-technical perspective, such as energy and human comfort, are well founded. This gives some confidence that the situation can continue to improve. However, the key remaining element is to turn these ideas and capabilities into compelling research proposals that gain funding. There are good opportunities especially for EU funding. A further residual issue is the mobilization of groups that have not engaged in research directed at journal publication.

**Grade:** Future plans do show some strategic thinking for the department as a whole. However, there is an urgent need for plans to address faculty retirements particularly replacements as well as to get more research funding. The grade is *good*.

## 2.6 Future potentials and possibilities

There is good potential and already some evidence of success in fostering synergistic activity between the two units. The possibilities to extend collaboration across LTH and beyond should be exploited further.

## 2.7 Gender and equal opportunity issues

The department has moved towards gender balance in doctoral students but the situation has worsened among academic staff.

### **3. DEPARTMENT OF BUILDING AND ENVIRONMENTAL TECHNOLOGY**

#### **3.1 Overall assessment**

The Department of Building and Environmental Technology has five divisions which are active in research. These are: Water Resources Engineering; Structural Engineering; Building Materials; Building Physics; and Fire Safety Engineering/system safety. They conduct research into a range of issues in the general areas of the built society, physical infrastructure and the environment. The research of the department makes a significant national contribution in all five areas, with some distinct and unique research topics also acknowledged at international level.

The total number of staff has decreased between 2003 and 2007 with significant drops in doctoral students and other personnel. Academic staff numbers are close to stable; however, it is noted that staff replacements and continuity may be a problem in the future. There were 11 professors in 2007. The total number of doctoral students was 54, 18 of whom worked full time.

The Division of Water Resources Engineering has been very active in international recruitments. According to separate information, the division had 22 PhD students, 3 postdocs, and 3 visiting researchers from abroad during the evaluation period.

Total revenue dropped from 82.8 MSEK to 77.6 MSEK and total research funding from 58.0 to 53.1 MSEK between the years 2003 to 2007. Grants for research have fallen from 33.2 to 24.7 MSEK over the same time period. EU funding was lower in 2007 than in 2003 but was highest in 2006.

#### **3.2 Research infrastructure**

The department appears to be well equipped with large laboratories. There is no indication that the facilities are internationally leading but they seem to fit the purpose for which they are used. The laboratories listed are for structural and material testing; calorimetry, building physics, and fire testing.

### 3.3 Research Quality

International comparability and innovative power: Water Resources Engineering appears particularly strong with significant activity including international collaboration and unique contributions in areas such as coastal and lake research. Structural Engineering is known internationally for timber engineering. The panel observed indications of decreasing activities in this field and, therefore, suggests a change in organization in order to maintain this important research area strong. Building Materials and Building Physics play an important national role. Fire Safety Engineering is also respected internationally. A dynamic interaction with international researchers provides a sound environment for innovation in the department.

**Productivity:** There were 262 original articles produced between 2002 and 2007 which can be regarded as high. In addition, there has been an increasing trend in conference papers (25 in 2007). The Department produced 32 PhDs and 28 licentiates over the period 2003-2007 which is a good level, especially when taking into account the relatively large size of the department.

**Relevance:** All of the research topics investigated appear to have relevance and impact. This is a strength of the Department.

**Vitality and ability to manage research:** The high level of productivity implies an effective system of management. Vitality exists over all groups but seems particularly high in Water Resources Engineering and Fire Safety Engineering and Systems Safety.

**Grade:** With particular strengths in Water Resources Engineering, the quality ranges from very good to excellent with an overall grade of *very good*.

### 3.4 Collaboration

Collaboration within LU and nationally is a particular strength of the Department. The Department also collaborates internationally, particularly in Europe.

Water Resources Engineering collaborates with an impressive network of visiting international researchers and formal research networks.

Networking also includes service as key-note speakers at conferences, scientific journal board memberships and links with research projects for which they are internationally respected, for example, a mathematical model for beach processes. The division is also involved in an EU project. Structural Engineering has national collaboration. Building materials collaborates nationally and is involved in an EU network. The Division of Building Physics is involved in two EU (Tempus) projects. Fire Safety Engineering/Safety Systems is involved with the Swedish Rescue Services Agency as well as UN organizations. There are many examples of links with industry.

**Grade:** The level of collaboration ranges from good to very good being best in Water Resources Engineering. The overall grade is *very good*.

### 3.5 Research activity and teaching

The department provides courses to engineering programs at the undergraduate, postgraduate and PhD level. Some of the courses are delivered to professionals and students outside of the University and some internationally. The management of the teaching ensures that there is a strong relationship between research and teaching. Students benefit greatly from being linked to a research-active department.

### 3.6 Evaluation of future plans

There is a stated threat that key staff may leave/retire in the near future and that replacement will be difficult. The drop in research activity (seen in the statistical data) may be the first sign of a problem but it is not clear that plans are in place to protect and enhance the areas of strength. The department has a strategy concerning joint research fields; however, it will be difficult to realize those plans with reduced personnel. Thus, there appears to be a need for action.

**Grade:** The grade is *very good* because of the developed research strategy and as the threat seems to be recognized.

### 3.7 Future potentials and possibilities

The divisions in the department appear to be acting on their own plans, with some successful collaboration between the divisions. There are many

possibilities for the department to build upon its strengths (e.g., energy use, sustainability, risk management). It is recommended that a process be put in place to identify mechanisms for assuring positive developments in future.

### **3.8 Gender and equal opportunity issues**

There is evidence that the department has moved towards gender balance in doctoral students and researchers. There is still more work to do in academic staff profiles.

## **4. DEPARTMENT OF TECHNOLOGY AND SOCIETY**

### **4.1 Overall assessment**

Three different divisions, Traffic and Roads, Environmental and Energy System Studies, and Real Estate Science compose the department. It is quite small with an academic staff of only 18 covering a wide range of different subjects. There are signs of growing collaboration between the two first divisions, but not between these and Real Estate. The research approach is characterized as problem oriented and multi- and interdisciplinary, which is also reflected in the composition of the staff whose backgrounds are in different scientific disciplines covering engineering, social science, science, and health science.

There has been a decreasing trend in research funding. The total funding has decreased from 34M SEK in 2003 to 29M SEK in 2007. The grants for research have dropped from 21M SEK to 13 MSEK during the same period of time.

### **4.2 Research infrastructure**

Most of the research activities do not require special resources. The main exception is the equipment installed for the study of driver behaviour.

### **4.3 Research quality**

Only two divisions, Traffic and Roads, and Environmental and Energy System Studies, provided information about their research activities and strategic research. These two divisions seem to be normal academic

groups doing research with both national and international visibility. This is not the case for Real Estate Science that, according to the report from the department, “has yet to take off”.

The department claims that traffic safety, traffic environment for elderly and disabled people, and transport and energy systems are areas with strong national and international impact. Both divisions seem to be visible on the Swedish as well as on the international (mainly European) scene. They have been quite successful in getting funding from Swedish and European research funds and from European Union financed programmes. However, research depends highly on external funds, which have decreased considerably since 2003.

**Productivity:** Considering scientific publications, that is, original articles (88 in total in 2002–2007) and conference papers (totally 106), the department’s productivity can be rated as rather low. However, besides strictly scientific publications, the department has produced a quite high number of published reports largely from research projects financed by Swedish and European authorities and (less frequently) by private companies. Although this reflects the applied nature of most of the department’s research, the publication situation is not fully satisfactory whereas the production of doctoral theses (21 from 2002 to 2007) is satisfactory.

**Relevance:** Much of the research contributes to producing new knowledge on issues of obvious societal relevance by: 1) providing relevant knowledge for important policy areas (energy and traffic planning), and/or 2) helping to solve practical problems such as traffic safety and the design of traffic solutions to help specific vulnerable groups.

**Vitality and ability to manage research:** The department has been established quite recently (in 1999) by putting together several smaller, previously independent, departments. The department report claims that interactions have been growing ever since the merger. The joint participation of the energy system and transport planning groups in national and international projects is a positive indication of that. However, the continued existence of separate web pages suggests that they are really independent units with a low degree of integration. The ability to get funding from many different sources for applied research indicates vitality and organisational capacity, but it’s difficult to say to what extent

this represents the quality of the department as a whole or of the existing research groups or individuals.

**Grade:** Real Estate Science was started mainly for teaching. While the Division claims that they conduct emerging research in the area of real estate economics we cannot verify this claim and place them into the insufficient category. On the other hand, the other two divisions have produced research of clearly satisfactory quality; thus, we find it justified to use the grade *very good* for the overall evaluation of the research activities of the Department.

#### **4.4 Collaboration**

Even though there seems to be still a low degree of integration between the previous departments, the research groups indicate frequent collaboration within and outside LU. The multidisciplinary composition of the staff facilitates collaboration with different types of research institutions.

**Grade:** We grade collaboration as *very good*.

#### **4.5 Research activity and teaching**

The department claims that research is highly relevant for, and integrated with, their teaching. Sometimes new courses are developed from ongoing research activities. A number of examples are provided to support that claim so we find the connection between research and teaching to be good.

#### **4.6 Evaluation of future plans**

In addition to the existing strong research areas, the department mentions two new ones to be developed in the near future, sustainable transport and green chemistry. The first one will be supported by a new Centre for sustainable transport and seems to be a good idea with the potential to put together not only the competencies in energy and transport systems but also the activities on traffic safety and traffic environment for elderly and disabled people. We do caution, however, that transport sustainability is an extremely topical issue which is being integrated into the research and teaching of many related disciplines and departments, with many such institutes being established around the world. The department

should be vigilant and act to ensure that their institute remains vital, innovative, and productive as the topic becomes more central to so many other departments and disciplines.

The department's goal of developing a second new area, green chemistry, is more difficult to understand based on the written background information; given the competencies of the department its contribution could be only marginal to this field. However, the discussions during the site visit revealed that the term green chemistry is a poor description of planned new activities. Life cycle analysis would be a better term. Therefore, we consider the plans to be realistic.

**Grade:** After the new information obtained, we grade the future plans as *very good*.

#### **4.7 Gender and equal opportunity issues**

The percentage of women on the academic staff has decreased from 45% in 2003 to 28% in 2007; this mainly reflects a decrease in the number of female research fellows and researchers (from 4 to 0), that is, those with the most unstable employment conditions. Slightly more than half of the current doctoral students are female. Only 17% of the professors and 44% of the senior lectures are female. Thus, the department demonstrates the usual gender composition of universities today: women are mainly represented in junior and lower positions. The increasing portion of employed female doctoral students (as much as 75% in 2007) is, however, a sign of balancing development.

## **5. DEPARTMENT OF DESIGN SCIENCES**

### **5.1 Overall assessment**

The department consists of five divisions. It is evaluated by two panels. Here the following three divisions were evaluated: Rehabilitation Technology, Ergonomics and Aerosol Technology, and Industrial Design. The divisions evaluated here consist of about three quarters of the total personnel of the department. The divisions are in different phases of development. The Division of Ergonomics and Aerosol Technology is a well-established and well-known research unit. Rehabilitation engineering also has a long and successful history in LU. On the other hand,



Industrial Design is a new area where no PhDs were completed before the period evaluated.

The research has an interdisciplinary character focused on the design of products, environments and technology systems as well as on the interactions between people and environment. This is a rather unique unit in a faculty of engineering. The department is also characterized by extensive collaboration both within LU and with external partners.

The total number of staff has increased from 52 to 70 and the total number of academic staff from 14 to 21 between the years 2003 and 2007. There were six professors in 2007. The total number of registered doctoral students was 30, ten of whom worked full time. The international recruitments have remained quite low. However, there have been a total of 4 visiting postdocs or professors during the evaluation period.

The total revenue has increased from 48.3 to 61.3 MSEK and total research funding from 33.0 to 40.3 MSEK between the years 2003 and 2007. Grants for research have grown from 16.8 to 20.4 MSEK during the same period of time. However, the percentage of research grants has slightly decreased as a share of total revenue, from 34.8% in 2003 to 33.3% in 2007. However, EU funding has increased significantly from 0.9 (2003) to 3.5 MSEK (2007).

## **5.2 Research infrastructure**

The department has modern spaces in Ingvar Kamprad Design centre (IKDC). These include several well-equipped laboratories, among which the Aerosol and Thermal Environment Laboratories are internationally famous. In addition, the laboratories of other LU departments have been widely utilized.

## **5.3 Research Quality**

International comparability and innovative power: The department focuses on the interaction between humans, technology and design. This provides a good basis for highly innovative research. The Division of Ergonomics and Aerosol Technology has gained good international reputation. To a great extent, this has been achieved by extensive collaboration (discussed below). Their research has been regularly published

in good international journals. The other divisions have been less visible internationally.

**Productivity:** The number of original articles in refereed journals was reported to be 162 in 2002–2007 for the whole department. There has been a clearly increasing trend in publication. The number of original articles published annually has increased from 9 (in 2002) to 43 (in 2007). In addition, 196 conference papers, 33 book chapters, 21 books and 4 edited volumes have been published. There is no clear trend in the annual numbers of these other publications. As a whole, the publication volume is currently good for a department of this size. It was not possible to determine conclusively how the publication activity was divided between various divisions. The separate publication list, however, indicates that the Division of Ergonomics and Aerosol Technology has been productive.

The three divisions evaluated here produced 15 PhDs and 11 licentiates in 2003–2007. The amount of PhDs produced per year has increased from 1 (in 1998–2002) to 3 (in 2003–2007). Unfortunately, the percentage of new female doctors has decreased from 20 to 13% at the same time. The amount of licentiates has remained virtually unchanged (about 2/year) since 1998.

**Relevance:** Many of the topics investigated have large practical impact. Ergonomics and Aerosol Technology have studied important environmental and occupational health problems. Rehabilitation Engineering is trying to create better conditions for people with disabilities. Their knowledge has also been used in design of products and environments. The Department is also a bridge between engineering and other subject areas in LU. In addition, one spin-off company and as many as seven patents were reported. Without doubt, the research activity is highly relevant.

**Vitality and ability to manage research:** Even the most successful division, Ergonomics and Aerosol Technology, is quite small. In this respect, its achievements are really respectable. Its extensive and versatile research network is an indication of outstanding research management. They have also been capable to refocus their research according to the changing needs in society.

**Grade:** The Division of Ergonomics and Aerosol Technology belongs to the leading research laboratories in the world. Thus, its level of research quality is outstanding. The grade for the whole department is *excellent*.

#### 5.4 Collaboration

Active and wide collaboration is a special strength of the department. Ergonomics and Aerosol Technology has achieved synergistic collaboration via the METALUND centre and CAST consortium. The collaboration with Nuclear Physics and Occupational and Environmental Medicine has been especially beneficial. Risk analysis and management is another field where the joint research with the Department of Fire Safety Engineering and Systems safety and the Department of Psychology has been a crucial factor in achieving high status in the field. Ergonomics researchers have also been active participants in several multidisciplinary centres. The collaboration with industry, organizations and the public sector has also been extensive. The participation of Rehabilitation Engineering in research collaboration networks has been less extensive. The same is true for the newest area, Industrial Design.

The Department has participated in 12 EU projects over the last five years.

**Grade:** As a whole, the grade for collaboration is *excellent*.

#### 5.5 Research activity and teaching

The teaching load is rather large because the department offers an extensive program of undergraduate courses and, in addition, is responsible for a collaboration program with the School of Economics and Management. The number of master's theses (94 in 2007) is also large. Compared to the quite small professor resources, the new opening in industrial design in 2003 may prevent achieving a good balance between teaching and research even though this is a postgraduate program.

#### 5.6 Evaluation of future plans

Several new research areas have been listed. All the areas, elderly people and design, product innovation and innovative learning, sustainable society, and tomorrow's health care are very important fields as such and are likely to become even more important in future. On the other hand, it is also important to maintain the high quality of research in the present research areas. All these areas cannot be successfully developed without considerable new resources.

**Grade:** Future plans do not show clear strategic thinking. The grade is *good*.

### **5.7 Future potentials and possibilities**

The Division of Ergonomics and Aerosol Technology, including the thermal environment laboratories, are a particular strength of the department with great potential. It is important that future plans are developed to sustain and invest in these areas so that LU can protect and enhance these areas of international excellence.

Rehabilitation Engineering offers possibilities for much wider collaboration. This could be combined with development of tomorrow's health care. The development of industrial design should be closely followed. One possibility could also be to focus it to rehabilitation engineering to achieve the critical mass.

### **5.8 Gender and equal opportunity issues**

The percentages of female researchers are somewhat low. Even though this is not unusual in engineering, the development is a little bit alarming because there has been no positive development in this respect during the evaluation period. Therefore, we recommend to pay attention to the situation and recruit women actively to improve the gender imbalance.

## **6. CONSTRUCTION SCIENCES**

### **6.1 Overall assessment**

The department consists of three major research units: Construction Management, Solid Mechanics (evaluated under panel 15), and Structural Mechanics, and three minor research units Building Construction, Design Methodology, and Engineering Acoustics. The number of staff for the five units under panel 17 was 32 in 2007. The number of academic staff was 14 in 2007, which is quite small especially compared with the number and variety of subjects the five research units cover. There were only two employed doctoral students in 2007.

The department was formed in 2005, and in 2006 an extra unit was added. The mix of research discipline within the Department is rather unique. Three of the research units (Solid Mechanics, Structural Mechanics, and Engineering Acoustics) are oriented to modelling and solving physical problems whereas the three other units deal with management,

production and methodologies. The department claims that the internal collaboration within the department is successful. However, it seems that the collaboration has more the sign of inter-departmental relations. This may weaken the management as resources have to be dedicated to quite diverse subjects.

The department was forced to reconstruct the Engineering Acoustic unit in 2005 due to a former employee's malpractice. The department has suffered economically and many management resources have been allocated to solve the problems. The problems are now under control and the future plans seem promising, but the negative effects will still be noticeable in the next couple of years.

There has been a decreasing trend in research funding. The total funding has decreased from 27M SEK in 2003 to 22M SEK in 2007. The loss in revenue is due to a dramatic drop in commissioned research from 9M SEK in 2003 to 3M SEK in 2007. The EU-funding is very low. There are signs that the negative trend will change in the near future. The Department has announced 5–7 doctoral students and 2 guest lectures financed by external funding.

## **6.2 Research infrastructure**

The department has a well-equipped Acoustic Laboratory and a quite traditional laboratory for mechanical testing equipped with standard test machines. Furthermore the department has access to High Performance Computing hardware resources through LUNARC, and the department plays a very active role in LUNARC.

## **6.3 Research quality**

International comparability and innovative power: The department deals with quite a diversity of subjects. This has not prevented individual researchers or small groups of researchers from reaching a high international level, but as a whole the department has been too diversified to gain an international role. The department has a long tradition of developing Finite Element Programs for educational purposes, but further development has been difficult to finance through funding. Reinventing this field might lead to an international role.

**Productivity:** The number of original articles in refereed journals was reported to be 98 in 2002–2007 (all 6 research units). The level is almost constant over the years but with a small positive trend. The number of conference papers has increased significantly over the years, and hopefully this will increase the number of journal papers in the near future. The evaluation materials do not allow the panel to directly distinguish between groups or individuals, but on closer examination it seems that the publication rate differs considerably within the department. It might be possible to increase publication rates if all the staff participated actively in publication. The number of PhDs in 1998–2002 was 15 and in 2003–2007 increased to 16. However, the number of PhD was 0 in 2007 and the panel finds this an alarming development. There are signs of improvement through new announcements, but still it is a severe problem.

**Relevance:** Many of the topics investigated have large practical interest for industry. The major production lies within mathematical modelling and numerical analysis of physical problems (structures and fluids), and the department plays an important role in Sweden in these fields.

**Vitality and ability to manage research:** All the different units and subgroups in the units are quite small. There seems to be a great variability in the different groups with respect to research. This underlines the impression that the department has a somewhat fragmented structure.

**Grade:** The overall level of research quality has been very good over the period under evaluation. However, the current situation deserves only to be judged as *good*.

#### **6.4 Collaboration**

The department claims a long lasting reputation for external cooperation with the Industry. This is somewhat contradicted by the large drop in commissioned research, but there are signs of improvement. The collaboration has primarily been within Sweden, and especially the EU-funding is very low. In Lund, the department has been very active in the founding of LUNARC (Center of Computation).

**Grade:** The grade for collaboration is *good/very good*.

### **6.5 Research activity and teaching**

The teaching load is rather large and has been increasing over the years (with a peak in 2006). The department seems to be very well organized to conduct its teaching activities. However, it seems to have been more difficult to attract PhD students. This can also be due to financial problems.

### **6.6 Evaluation of future plans**

The future plans for the department do not seem to be very concrete. It is expected that some of the current projects will continue and develop further (Glass and Timber related), and that cross-disciplinarily interaction will play an increased role. The panel do not agree in the opposition between rational based methods for design of structures and regulations and codes. A more fruitful cooperation with Structural Engineering could lead to better design methods which can be incorporated in regulations and codes.

**Grade:** Future plans do not show clear strategic thinking. The grade is *good*.

### **6.7 Future potentials and possibilities**

The department has good potentials in different fields which could be exploited if the department concentrated and focused its resources more. One example is Acoustics (Fluid-Structure interaction) which has great importance in many areas. Also, Material Mechanics could be seen in a broader context; finally the Finite Element Programs has additional potential for educational purposes.

### **6.8 Gender and equal opportunity issues**

The percentage of female researchers is low compared to the other departments under Panel 17. Viewing the numbers in one way, a little positive trend can be seen in the figures from 2003 and 2007. The management is aware of the problem, and some new recent appointments have addressed the problem. However, the problem seems to remain unresolved since the percentage of female PhD students has declined over the years.

## 7. ELECTRICAL MEASUREMENTS

### 7.1 Overall assessment

The Department of Electrical Engineering is evaluated under panel 13 except for the Division of Engineering of Geology which is evaluated under panel 17.

The Division of Engineering Geology was recently merged; the division claims that this change has been logical due to their strong demand for measuring data. The division is quite small but seems to have found a fruitful niche in dealing with subsurface/subsea investigations. The division is active in different engineering fields such as groundwater engineering, geothermal energy and the development of measurement devices applicable for detecting physical properties of material. The number of academic staff was only 5 in 2007. In addition, there were 9 other personnel and one doctoral student. The research income has dropped from 15 M SEK in 2003 to less than 11 M SEK in 2007. The drop in research income is due to a dramatic change in "Grants for research, Other funding", which might be related to ongoing infrastructure projects. It could be a sign of vulnerability to external sources of funding. The amount of EU funding is relative low.

### 7.2 Research infrastructure

One of the strength of the division is their capability to handle a wide range of geophysical subsurface or subsea measurements. The applications deal with measurements in very deep borehole, non-destructive testing of construction (man made and natural material), test pumping systems in connection with heat exchangers and documentation and analysis of sea and lake bottom. The equipment consists of a wide range of measurement devices. The division has a test drilling unit for all kinds of drilling methods to about 300 m, heavy duty vehicles, and a versatile boat for fast and efficient surveying of sea environments.

### 7.3 Research quality

International comparability and innovative power: The division has in the past been developed new measuring methods and applications, which are internationally recognized. However, the present level is not as high. The division has on-going initiatives, e.g., the internet portal "Havsportalen"



in order to strengthen future collaborations. In general, the research activities have also shifted from more fundamental research into applications. From an engineering perspective, the field has great potential.

**Productivity:** The panel can not directly evaluate the scientific production as we only have numbers for the whole department. However, we have estimated the scientific production based on information on the homepage. The productivity seems to be around average for the departments under panel 17.

The division produced 5 PhDs and 9 licentiates over the evaluation period, which is quite good compared to the other departments under panel 17.

**Relevance:** The division deals with topics with high relevance for society e.g. development of geothermal energy, subsurface investigations serving large infrastructure projects and analysis of groundwater resources. The division plays a central role in Sweden in these matters.

**Vitality and ability to manage research:** The division is rather small and therefore rather dependent on individuals. It seems to be quite vital at the moment but with the age structure in mind, problems may appear in the not so distant future. The new professor in Engineering Geology might be part of a future solution.

**Grade:** The grade for research quality is *very good*.

#### 7.4 Collaboration

The division has an intensive cooperation with national authorities responsible for infrastructure constructions. The division has participated in all major infrastructure projects in the southern part of Sweden such as the Malmö-tunnel and the Öresund-bridge. The division claims to have good cooperation with other divisions in the department, and the on-site visit supported that impression. In addition to that the division cooperates with other departments, groups at Lund University; the internet portal "Havsportalen" is a reinforcement of this cooperation.

**Grade:** The grade for collaboration is *very good*.

### **7.5 Research activity and teaching**

The division is involved in different educational programmes and the division seems to be good in attracting PhD students.

### **7.6 Evaluation of future plans**

According to the written self-evaluation, future plans are primarily to improve existing methods and applications. More information was obtained during the site visit. One of the plans is to increase the international visibility. The division has primarily been dealing with Swedish problems, but in the past, several of their measuring methods have been internationally recognized. There is potential for strengthening the international aspect of their research.

A very central problem for this small division is its age structure. It is a bit alarming that the average age of academic staff is now 53 and it has increased with 4 years from 2003 to 2007. There seems to be no specific plans dealing with this subject, but it should be of concern for the department and faculty.

**Grade:** The grade for future plans is *very good*.

### **7.7 Gender and equal opportunity issues**

All persons in the academic staff are males. However, the potential for more female academic staff is present as the PhD students have a reasonable female representation.

## **8. INTERNATIONAL INSTITUTE FOR INDUSTRIAL ENVIRONMENTAL ECONOMICS**

### **8.1 Overall assessment**

This is a quite young unit that has managed to start with an impressive range of activities. It has been productive with regard to scientific papers as well as other kinds of publications and with regard to the production of PhD degrees. It has very strong relationships with the outside world and has proved to be capable of active involvement in the interface between academia, and the public and private sector. The integration of teaching with ongoing research is prioritized and apparently with success.

The research is divided into three areas: 1) Sustainable Products and Service Systems, 2) Energy for Sustainable Development, and 3) Policies and Systems for Sustainable Buildings. These areas are also reflected in the topics of master theses. The Institute's research is also closely linked to research at other departments as described in their report.

In 2007 there were 2 professors and 5 senior lecturers at the Institute. This represents an increase of approx 100 % since 2003. In the same time, the number of full time doctoral students has decreased from 11 to 8. On the other hand, the average age of doctoral students is 30 years in 2007 compared with 40 years in the period 1998–2002. In addition there were 21 fulltime equivalent (FTE) other personnel which may also include (senior) researchers. The total FTE is 35 in 2007 compared with 38 in 2002. In their Annual Report for 2007 they write: "The faculty consists of 27 people, in total 13.7 FTE. Of this FTE 4.5 are allocated to teaching in the MSc programmes and in courses at the undergraduate level."

## **8.2 Research infrastructure**

The Institute is organized under Special Activities and connected to LTH as required for appointments and dissertations. However, it is governed under a separate Board with an external expert appointed by the University and the Swedish Government. This gives a special position to the Institute; on the other hand, it is very dependent on research grants.

## **8.3 Research quality**

The number of publications has varied throughout the last 6 years, and is quite high taking into account the small number of professors and senior lecturers.

The publications that best represent research activities seem to be quite relevant for two of the three strategic areas: Sustainable Products and Service Systems, and Energy for Sustainable development.

Their achievements have also been reflected in the many prizes and awards achieved in 2003–2007. The information provided also gives a good impression of a high level of national and international activities. This information also gives a very good overview of the activities taking

place in the interface between academia, private and public sectors. To achieve a good reputation in all of these areas is a very demanding task.

**Grade:** We evaluate the quality as *very good*.

#### **8.4 Collaboration**

The institute has divided their research focus into three main areas; their research is also closely linked to research at other departments as described in their report. This gives the institute a special position in both interlinking internally with other researchers at LU, and at the same time having a broader base of knowledge to support industry in external projects. This was also reported as a very successful strategy by the institute.

The institute has managed to maintain both a sterling academic reputation and high integration and influence with society and industry. It has several national and international projects and seems to have managed to utilize the synergies among the various disciplines. The institute has also reported on the strengths, weaknesses, opportunities and threats of the research. Multidisciplinarity is mentioned under each of these headings. By integrating with other departments at the university, the institute has also clearly succeeded in building multidisciplinary skills.

Total revenues and costs increased in 2007 compared with 2003 but the revenues for undergraduates were reduced by 50 % in the same period. However, research grants have increased in the same period. This illustrates that the activities of the institute are of high relevance for the Swedish government, for industry and for EU (since the grants from EU also increased 100% since 2003).

**Grade:** The institute has a very impressive record of collaboration in many directions, and is therefore evaluated as *excellent*.

#### **8.5 Research activity and teaching**

There have been about 30 MSc students each year. Since the MSc program is international, the institute receives students from all over the world. MSc students are urged to select topics for their thesis that are simultaneously related to topics in their homeland and actual research activities at the Institute.

The institute has several national and international projects and seems to have managed to utilize the synergies between the various disciplines in the education.

### **8.6 Evaluation of future plans**

The written research plans describe the institute's goal of making an effective and efficient contribution to changes in modern and developing societies. Unfortunately the research plans did not specify what this means for the Institute and how their strategy would make this possible. However, based on discussions during the site visit, we regard the ideas as well chosen. Research on the impact on society caused by production and products is very important; because the Institute has a wide international network and a good reputation, the plans appear to be realistic.

**Grade:** Based on the discussions, the future plans are considered to be *very good*.

### **8.7 Future potentials and possibilities**

The institute plans to concentrate mainly on its three existing research areas. We find this to be a reasonable plan as the unit is quite new and one of the areas, sustainable buildings, needs additional development.

The institute has several projects with external funding; many research activities are based upon these funding sources. It would be important to prioritize long-term strategic programs within each of the research fields. One of the aims of the institute is to contribute to more sustainable development of the society. The current research areas are very well suited for that. Since the Institute is a young unit, it should allow itself time to develop this further.

### **8.8 Gender and equal opportunity issues**

The Institute has 2 full time professors, one of whom is a woman. This gives a good balance even though the number of people is low. The Institute's educational activities and research topics have traditionally been attractive to both sexes so the Institute should have good opportunities to attract both male and female students in the future.

### 9. SUMMARY

In spite of organizational reforms, the departments remain rather small. In addition, the research groups traditionally have only one professor. The panel was also left with the general impression that the research groups often connect only weakly, even those inside the same department. Thus, optimal synergism between the groups is not always achieved. In many cases, the lack of synergy has led to a diluted research focus.

The grades given by the panel are summarized in the next table.

<b>Department</b>	<b>Grade</b>	<b>Research Quality</b>	<b>Collaboration</b>	<b>Future Plans</b>
Architect.&Built Environ.	good/very good	good	good	good
Bldg&Environ.Technology	very good	very good	very good	very good
Technology&Society	very good	very good	very good	very good
Design Sciences	excellent	excellent	excellent	good
Construction Sciences	good/very good	good/very good	good/very good	good
Electrical Measurements	very good	very good	very good	very good
IIIEE	very good	very good	excellent	very good

The grades given for research quality range from good/very good to excellent. Most departments qualify for the grade very good. Only one department is evaluated as excellent (Design Science). The differences between various divisions are larger in this respect, as could be anticipated. There are two really excellent divisions (Ergonomics and Aerosol Technology in Design Science and Water Resources Engineering in Building and Environmental Technology).

Even though many departments appeared at least somewhat fragmented, the level of collaboration is generally at least satisfactory. There are several examples of extensive and successful collaboration and networking. Two departments obtain the grade excellent.

Future plans seem to be the weakest part. Those often lack strategic considerations and do not reflect the strategy of the faculty. The rating of the future plans of three departments is good and no departments are

graded as excellent. However, it is not entirely clear for the panel if this is really true because it appeared during the site visit that at least some departments actually have quite good plans that those were not presented in the written background information.

## 10. RECOMMENDATIONS

LTH should continue the organizational reform designed to create the larger departments necessary for efficient strategic planning. At the same time, it is essential that the departments narrow their research focus to the most competitive research areas. This would require creation of larger research areas where synergistic collaboration could be achieved. Most departments should also pay more attention to international recruitment of PhD students and staff to strengthen their international profiles. This has not been emphasized strongly enough either in the strategy of the Faculty of Engineering. There is a common need for stronger leadership and strategic planning. Several key-researchers are close to retirement and a strategy how to maintain these strong areas is needed. The gender balance situation is better in the departments evaluated than in European engineering faculties in general. Nevertheless, some departments have actually lost female faculty and researchers so some balancing action is still needed. In the following text, more detailed recommendations for some individual departments are given.

**Architecture and Built Environment:** Even though we understand the focus on solar energy, we see it important to strengthen traditional architecture research as well. Urban planning research should be unified and internal collaboration increased.

**Building and Environmental Technology:** The role of structural engineering and mechanics should be reorganized. Material engineering research on the use of wood also exists in the Department of Construction Sciences. It would be useful to concentrate this research in one department. This is also important because there are indications that the activity in timber engineering research, where the level has been high, is decreasing. Thus, it is important to take this into consideration while planning larger departments. Water Resources Engineering is a strong unit but seems to stay separate from the rest of the department. Therefore, relocation of this division could be considered.

**Technology and Society:** The process to get the previous departments to work more together should be supported. Real Estate Science is not competitive and its situation needs to be examined.

**Design Sciences:** Rehabilitation Engineering has great potential. Its internal and external collaboration should be increased. We recommend that the unit refrain from further new openings and instead concentrate on strengthening this division. There is a need for close follow-up of Industrial Design.

**Construction Sciences:** The recommendation given above to the Department of Building and Environmental Technology also applies to Construction Sciences. Acoustic research offers great possibilities and it should be emphasize more.

**Electrical Measurements (Engineering geology):** The age structure is a severe problem and should be addressed.



## ANNEX 2

### – MEMBERSHIP OF THE REVIEW TEAMS

#### **Overall Chair of the Review Process**

Professor Geoffrey Boulton, University of Edinburgh,  
School of Geosciences, UK.

#### **Chair of the Lund University Management Committee for the Review**

Professor Bengt Söderström, Lund University.

#### **Panel 1 – Law**

Professor Kaarlo Tuori, University of Helsinki, Department of Criminal  
Law and Judicial Procedure, Helsinki, Finland – *Chair*

Dr. Heikki Pihlajamäki, University of Helsinki, Department of Criminal  
Law and Judicial Procedure, Helsinki, Finland – *Vice-Chair*

Professor Heikki E. S. Mattila, University of Lapland, Faculty of Law,  
Rovaniemi, Finland

Professor Linda Nielsen, University of Copenhagen, Faculty of Law,  
Copenhagen, Denmark

Professor Terttu Utriainen, Faculty of Law, University of Lapland,  
Rovaniemi, Finland

Professor Jens Vedsted -Hansen, Aarhus University, School of Law,  
Department of Jurisprudence, Aarhus, Denmark

#### **Panel 2 – Religious Studies**

Professor Oda Wischmeyer, Friedrich-Alexander-Universität Erlangen-  
Nürnberg, Teologische Fakultät, Erlangen, Germany – *Chair*

Professor Egbert Schrotten, University of Utrecht, Centre for Bio-Ethics  
and Health Law, Utrecht, the Netherlands – *Vice-Chair*

Professor Peter B. Clarke, Oxford University, Faculty of Theology,  
Wolfson College, Oxford, UK

Professor Ingvild Saelid Gilhus, University of Bergen, Department of  
Archaeology, History, Cultural Studies and Religion, Bergen, Norway

**Panel 3 – Arts**

Professor Peter Madsen, University of Copenhagen, Department of Arts and Cultural Studies, Copenhagen, Denmark – *Chair*

Professor Ragnar Audunson, Oslo University College, Library and Information Studies, Oslo, Norway – *Vice-Chair*

Professor Nicky Gregson, the University of Sheffield, Department of Geography, Sheffield, UK

Professor Petri Karonen, University of Jyväskylä, Department of History and Ethnology, Jyväskylä, Finland

Professor Björn Sörensen, The Norwegian University of Science and Technology, Department of Art and Media Studies, Trondheim, Norway

**Panel 4 – Philosophy/Languages**

Professor Fred Karlsson, University of Helsinki, Department of General Linguistics, Helsinki, Finland – *Chair*

Professor Göran Sundholm, Leiden University, Faculty of Philosophy, History & Philosophy of Logic, Leiden, the Netherlands – *Vice-Chair*

Professor Kirsti Kock Christensen, the University of Bergen, Rector's Office, Bergen, Norway

Professor Kevin Mulligan, Université de Genève, Département de Philosophie, Genève, Switzerland

Professor Chris Sinha, University of Portsmouth, Department of Psychology, Portsmouth, Hampshire, UK

**Panel 5 – Behavioural Science**

Professor Britt-Marie Drottz Sjöberg, Norwegian University of Science and Technology, Department of Psychology, Trondheim, Norway – *Chair*

Professor David Phillips, University of Oxford, Department of Education, Oxford, UK – *Vice-Chair*

Professor Sigurd Allern, University of Oslo, Department of Media and Communication, Blindern, Norway

Professor Kenneth Hugdahl, Bergen University, Faculty of Psychology, Bergen, Norway

Professor Peter Kemp, School of Education, University of Aarhus, Department of Philosophy of Education, Copenhagen, Denmark

**Panel 6 – Social Science**

Professor Harriet Silius, Åbo Akademi, Women's Studies, Åbo, Finland  
– *Chair*

Professor Nico Stehr, Zeppelin University, Cultural Studies,  
Friedrichshafen, Germany – *Vice-Chair*

Professor Helena Blomberg-Kroll, University of Helsinki, Swedish School  
of Social Science, Helsinki, Finland

Professor Liv Finstad, University of Oslo, Department of Criminology  
and Sociology of Law, Oslo, Norway

Professor Thomas Mathiesen, University of Oslo, Department of  
Criminology and Sociology of Law, Oslo, Norway

Professor Jan Sundberg, University of Helsinki, Department of Political  
Science, Helsinki, Finland

Professor Erik Swyngedouw, the University of Manchester, School of  
Environment and Development, Manchester, UK

Professor Unni Wikan, University of Oslo, Department of Social Anthro-  
pology, Oslo, Norway

**Panel 7 – LUSEM**

Professor Eva Liljeblom, Swedish School of Economics and Business  
Administration, Department of Finance and Statistics, Helsinki,  
Finland – *Chair*

Professor James Foreman-Peck, Cardiff University, Cardiff Business  
School, Welsh Institute for Research in Economics and Development,  
Cardiff, UK – *Vice-Chair*

Professor Stuart Blume, University of Amsterdam, Department of  
Sociology and Anthropology, Amsterdam, the Netherlands

Professor Klaus G. Grunert, University of Aarhus, Aarhus School of  
Business, Department of Marketing and Statistics, Aarhus, Denmark

Professor Hans-Christian Johansen, University of Southern Denmark,  
Institute of History and Civilization, Odense, Denmark

Professor Francesca Sanna-Randaccio, University of Rome “La Sapienza”,  
Department of Computer and Systems Science, Rome, Italy

Professor Matti Sillanpää, Turku School of Economics, Department of  
Economics, Commercial Law, Turku, Finland

**Panel 8 – Medicine/Clinical**

Professor Per E. Lønning, University of Bergen, Institute of Medicine, Bergen, Norway – *Chair*

Professor Doris Henne-Bruns, University of Ulm, Department of Visceral and Transplantation Surgery, Ulm, Germany – *Vice-Chair*

Professor Pieter Sauer, Beatrix Children's Hospital, University Medical Center Groningen, Department of Pediatrics, Groningen, the Netherlands

Professor Roger Hitchings, University College London, Moorfield Eye Hospital, London, UK

Professor Gabriel P. Krestin, Radiology Department, Erasmus Medical Center, Rotterdam, the Netherlands

Professor Russell P. Tracy, Laboratory for Clinical Biochemistry Research, Department of Pathology and Biochemistry, College of Medicine, University of Vermont, Burlington USA,

Professor Hannele Yki-Järvinen, Department of Medicine, Division of Diabetes, University of Helsinki, Helsinki, Finland

**Panel 9 – Medicine/Experimental**

Professor Christian Aalkjaer, University of Aarhus, the Water and Salt Research Centre, Institute of Physiology and Biophysics, Aarhus, Denmark – *Chair*

Professor John Couchman, University of Copenhagen, Department of Biomedical Sciences, Copenhagen, Denmark – *Vice-Chair*

Professor Steven R. Goldring, Cornell University, Medical School, Hospital for Special Surgery, New York, USA

Professor Etienne Hirsch, Université Pierre et Marie Curie, CCRE, Paris, France

Professor Stephen G. Lisberger, University of San Francisco, Department of Physiology, San Francisco, USA

Professor Taina Pihlajaniemi, University of Oulo, Department of Molecular Biology, Oulo, Finland

Professor Wolfgang E. Schmidt, Ruhr-University Bochum, Department of Medicine, Bochum, Germany

Professor Monica Spiteri, University Hospital of North Staffordshire/ Keele University, Directorate of Respiratory Medicine, Staffordshire, UK

**Panel 10 – Medicine/Laboratory**

Professor Leif Andersson, University of Helsinki, Department of Pathology, Haartman Institute, Finland – *Chair*

Professor Catherine Verfaillie, Katholieke Universiteit Leuven, Stamcelinstituut, Belgium – *Vice-Chair*

Professor Steen Gammeltoft, University of Copenhagen, Department of Clinical Biochemistry, Glostrup Hospital, Denmark

Professor Elizabeth Macintyre, Necker Enfants Malades et Université Paris – Descartes, Paris, France

Professor Claire Poyart, Faculté de Médecine, Université Paris V Paris, Centre national de référence des Streptocoques, France

Professor Ulf-Håkan Stenman, University of Helsinki, Department of Clinical Chemistry Finland

**Panel 11 – Medicine/Health**

Professor (em.) Eino Heikkinen, Department of Health Sciences, Finnish Centre for Interdisciplinary Gerontology, University of Jyväskylä, Finland – *Chair*

Dr. Gaynor Sadlo, School of Health Professions, University of Brighton, UK – *Vice-Chair*

Professor Jan P. Hamers, Maastricht University, Care and Public Health Research Institute, The Netherlands

Professor Helena Leino-Kilpi, Department of Nursing Science, University of Turku, Finland

Professor Karl Mann, University of Heidelberg, Department of Addictive Behaviour & Addiction Medicine, Central Institute of Mental Health, Mannheim, Germany

Professor David Richards, Department of Health Sciences University of York, UK

**Panel 12 – Science/BioGeo**

Professor Paul Harvey, University of Oxford, Department of Zoology, Oxford, UK – *Chair*

Dr. Clare H. Robinson, University of Manchester, School of Earth, Atmospheric and Environmental Sciences, Manchester, UK – *Vice-Chair*

Professor Mary E. Edwards, University of Southampton School of Geography, Southampton, UK

Professor André Goffeau, Université Catholique de Louvain, Institut des Sciences de la Vie, Louvain, Belgium

Professor Cathie Martin, John Innes Centre, Metabolic Biology, Colney, Norwich, UK

Professor Hans-Joachim Pflüger, Freie Universität Berlin, Institut fuer Biologie, Neurobiologie, Berlin, Germany

Professor Outi Savolainen, University of Oulu, Department of Biology, Oulu, Finland

### **Panel 13 – Science-LTH/Physics**

Professor Robert Feidenhans'l, University of Copenhagen, Niels Bohr Institute, Copenhagen, Denmark – *Chair*

Professor Talat Rahman, University of Central Florida, Department of Physics, Orlando, Florida, USA – *Vice-Chair*

Professor Paul Hewett, the University of Cambridge, School of the Physical Sciences, Institute of Astronomy, Cambridge, UK

Professor Mogens Høgh Jensen, University of Copenhagen, Niels Bohr Institute, BioNET, Copenhagen, Denmark

Professor George Kalmus, Central Laboratory of the Research Councils. Rutherford Appleton Laboratory, Particle Physics Department, Oxfordshire, UK,

Professor Helmut Neunzert, Fraunhofer Institute Techno- und Wirtschaftsmathematik, Kaiserslautern, Germany

Professor Leonid Rivkin, Paul Scherrer Institute, Department 'Large Research Facilities', Villigen PSI and Particle Accelerator Physics Laboratory, LPAP Swiss Federal Institute of Technology Lausanne, Switzerland

Professor Peter Wells, Cardiff University, School of Engineering, Cardiff, UK

Professor Bernt Öksendal, University of Oslo, Centre of Mathematics for Applications, Oslo, Norway

### **Panel 14 – Science-LTH/Chemistry**

Professor Karl Anker Jørgensen, University of Aarhus, Center for Catalysis, Aarhus, Denmark – *Chair*

Professor Sir John Meurig Thomas, University of Cambridge, Department of Materials Science and Metallurgy, Cambridge, UK – *Vice-Chair*

Professor Sebastião Feyo de Azevedo, University of Porto, Department of Chemical Engineering, Portugal

Professor Frans de Schryver, Katholieke Universiteit Leuven, Departement Chemie, Heverlee, Belgium

Professor Brigitte Voit, the Leibniz Institute of Polymer Research  
Dresden, Dresden, Germany

Professor Fons Voragen, Wageningen University, Agrotechnology and  
Food Sciences, Wageningen, the Netherlands

### **Panel 15 – Product Development**

Professor Vinod Sarin, Boston University, College of Engineering,  
Boston, USA – *Chair*

Professor Maria de Graca Carvalho, Bureau of European Policy Advisers  
(BEPA ) European Commission, Brussels, Belgium – *Vice-Chair*

Professor Hendrik Van Brussel, K.U. Leuven, Department of Mechanical  
Engineering, Heverlee, Belgium

Professor Natalie Fabbe-Costes, Université de la Méditerranée (Aix-  
Marseille II), CRET-LOG, Faculté des Sciences Economiques et de  
Gestion, France

Professor Armand Hatchuel, Ecole des Mines de Paris, Centre de Gestion  
Scientifique, Paris, France

Professor Michael Hayes, University College, Department of  
Mathematical Physics, Dublin, Ireland

Professor Darina Murray, Trinity College, Mechanical & Manufacturing  
Eng., Dublin, Ireland

### **Panel 16 – Science-LTH/Systems science**

Professor Albert Benveniste, INRIA, the French National Institute for  
Research in Computer Science and Control, Rennes Cedex, France –  
*Chair*

Professor Femke Olyslager, Ghent University, Department of Informa-  
tion Technology, Ghent, Belgium – *Vice-Chair*

Professor Anneliese Andrews, University of Denver, Department of  
Computer Science, Denver, USA

Professor Marc Engels, Flanders' Mechatronics Technology Centre,  
Heverlee, Belgium

Professor Keith Glover, University of Cambridge, Department of  
Engineering, Cambridge, UK

Professor Paul Kühn, Universität Stuttgart, Institut für  
Kommunikationsnetze und Rechnersysteme, Stuttgart, Germany

Professor Birger Möller Pedersen, University of Oslo, Department of  
Informatics, Oslo, Norway

Professor Jacquélien M.A. Scherpen, University of Groningen, Faculty of  
Mathematics and Natural Sciences ITM, Groningen, the Netherlands

**Panel 17 – Building**

Professor Pentti Kalliokoski, University of Kuopio, Faculty of Environmental Sciences, Kuopio, Finland – *Chair*

Professor Lars Damkilde, Aalborg University, Esbjerg, Department of Computational Mechanics, Esbjerg, Denmark – *Vice-Chair*

Professor Peter Barrett, University of Salford, Pro-Vice-Chancellor Research, Strategic Leadership Team, Greater Manchester, UK

Professor Ulrike Kühlmann, Stuttgart University, Institut für Konstruktion und Entwurf, Stuttgart, Germany

Professor Annik Magerholm Fet, Norwegian University of Science and Technology, Department of Industrial Economics and Technology Management, Trondheim, Norway

Professor Ole Jess Olsen, Roskilde University, The Department of Environmental, Social and Spatial Change Energy, Environment and Climate, Roskilde, Denmark

Professor Ken Parsons, Loughborough University, Department of Human Sciences, Leicestershire, UK

Professor Sandra Rosenbloom, University of Arizona, Planning Degree Program, Tucson, Arizona, USA

**Expert Advisors**

Professor Graham F Welch, Department of Arts and Humanities, Institute of Education, University of London, London, UK (Panel 5)

Professor John Urry, Dept of Sociology, Lancaster University, Lancaster, UK (Panel 6)

Professor Marjorie Wilson, School of Earth and Environment, Earth Sciences, Leeds University, UK (Panel 12)

Professor Dolores Cahill, School of Medicine and Medical Sciences, UCD Conway Institute, University College Dublin, Dublin, Ireland (Panel 14)



# ANNEX 3 – PANEL STRUCTURE

## DEPARTMENTS, DIVISIONS OR RESEARCH AREAS

### **Panel 1 – Law**

Department of Law

### **Panel 2 – Religious Studies**

Centre for Theology and Religious Studies

### **Panel 3 – Arts**

Department of European Ethnology

Department of Archaeology and Ancient History

Department of History

Department of Art History and Musicology

Department of Cultural Sciences

Centre for Languages and Literature (Research area Literature)

### **Panel 4 – Philosophy/Languages**

Centre for Languages and Literature (Research area Languages)

Department of Philosophy

### **Panel 5 – Behavioural Science**

Department of Psychology

Department of Education

Department of Media and Communication Studies

### **Panel 6 – Social Sciences**

School of Social Work and Social Welfare

Department of Sociology of Law

Department of Sociology (and Social Anthropology)

Department of Gender Studies

Department of Department of Political Science

Department of Social and Economic Geography

Campus Helsingborg – Service Management

(Organisation, Sociology & Social Geography)

Lund University Centre for Sustainability Studies

Centre for East and Southeast Asian Studies

Centre for European Studies

**Panel 7 – Lund University School of Economics and Management (LUSEM)**

Department of Economic History  
Centre of Economic Demography  
Centre for Innovation, Research and Competence in the Learning Economy (Circle)  
Department of Business Administration  
Department of Business Law  
Department of Economics  
Department of Statistics  
Department of Informatics  
Research Policy Institute  
Centre for East and Southeast Asian Studies

**Panel 8 – Medicine/Clinical**

Department of Clinical Sciences, Lund (incl Medical Radiation Physics)  
Department of Clinical Sciences, Malmö

**Panel 9 – Medicine/Experimental**

Department of Experimental Medical Science

**Panel 10 – Medicine/Laboratory**

Department of Laboratory Medicine, Lund  
Department of Laboratory Medicine, Malmö  
Lund Stem Cell Center

**Panel 11 – Medicine/Health**

Department of Health Sciences

**Panel 12 – Science/BioGeo**

Department of Cell and Organism Biology with  
The Biological museums  
Department of Ecology  
Department of Geology  
Department of Physical Geography and Ecosystems Analysis

**Panel 13 – Science-LTH/Physics**

Department of Physics (incl personnel at MAX-lab)  
Centre of Mathematical Sciences  
Department of Theoretical Physics

Lund Observatory  
Department of Electrical Measurements

**Panel 14 – Science-LTH/Chemistry**

Department of Chemistry  
Department of Chemical Engineering  
Department of Food Technology, Engineering and Nutrition  
Department of Immunotechnology

**Panel 15 – Product Development**

Department of Energy Sciences  
Department of Design Sciences (Div Packaging Logistics, Div Machine Design)  
Department of Mechanical Engineering  
Department of Industrial Management and Logistics  
Department of Construction Sciences (Div of Solid Mechanics)  
Department of Industrial Electrical Engineering and Automation

**Panel 16 – Systems science**

Department of Electrical and Information Technology  
Department of Computer Science  
Department of Automatic Control

**Panel 17 – Building**

Department of Architecture and Built Environment  
Department of Building and Environmental Technology  
Department of Technology and Society  
Department of Design Sciences (Div Rehabilitation Technology and Ergonomics, Div Aerosol Technology, Div Industrial Design)  
Department of Construction Sciences  
Department of Electrical Measurements (Div of Engineering Geology)  
International Institute for Industrial Environmental Economics

## ANNEX 4 – TERMS OF REFERENCE

### 1. Background

Lund University is the largest university in Sweden with a total turnover of more than SEK 5 billions (app. € 550 millions). The university was founded 1666 in order to aid the full incorporation in the Swedish national state of the former Danish province. Lund University has three campuses: Lund and two smaller campuses in Helsingborg and Malmö; nine faculties: Engineering, Science, Law, Social Sciences, Medicine, Humanities, Theology, Economics and Management, Performing arts; ca 80 departments; 1,600 single subject courses (300 taught in English), undergraduate and graduate degree programmes; ca 40,000 undergraduate and masters students (ca 25,000 full time equivalents); 2,500 PhD students; 5,500 employees (1400 professors and lecturers, 1100 teachers and researchers).

Lund University is a Member of LERU (League of European Research Universities) and U21 (Universitas 21) and has exchange programs or agreements with a large number of universities.

### 2. Objectives and Aims

RQ08 is the first research evaluation of Lund University as a whole. The long-term aim of the evaluations, which will be carried out every five years, is to strengthen the University as a research organisation of international high standard.

The aims of RQ08 are

- to be an instrument to attain the goals of the Strategic Plan
- to identify research areas and environments where research of the highest international standard is done, and to define conditions for their continued development
- to identify research areas and research environments which have the potential to develop towards the highest level of international research, and to determine what is necessary to ensure such development
- to identify research areas and research environments which are not internationally or nationally competitive and which lack evident development potential

- to identify processes and changes within the University which may promote development towards the goals of the Strategic Plan

The evaluation focuses solely on research pursued at the University: achievement, plans and potential. The evaluation will not highlight individual scientists but will work at a more general level. The reports of the departments (or comparable units) on their own work constitute the basic material for the evaluation. As a complement to RQ08, a bibliometric analysis is planned to be carried out during the spring of 2008. In the first stage to implement the recommendations from the evaluation Panels, the Vice-chancellor will allocate approximately 100 MSEK in the year 2009. Other measures (e.g. reorganisations) will of course also be taken in order to make use of the evaluation results.

### 3. Method

Scientific research will be evaluated by a number of expert Panels, each composed of a number of internationally well-known scientists. Each Panel will have a chairperson and a vice chairperson. Coordination of the Panel evaluation is the responsibility of the main chairperson, who is also appointed from outside of the University. The reports of these Panels will be collected in a report for the whole University.

The material for evaluation includes the documentation and plans of the departments (or comparable units) themselves, publications (registered in Lund University Publications – LUP) and other information from existing databases. All material will be available in March 2008.

All departments are grouped under one of 17 evaluation Panels. Each Panel will have a chairperson, and 3–7 other appointed members. During March and April each Panel will meet for one or two days to plan their working strategy and reporting responsibilities, and to decide on a vice chair person. After this meeting each Panel member writes his or her contribution to a preliminary report which will be compiled by the Chairperson and which the Chairs will have available at their site visit to Lund. Panel Chairpersons and Vice-Chairpersons together with the Main Chairperson visit the University on June 9–13. The program includes meeting university, faculty and departmental leaders and departmental visits can also be scheduled if deemed necessary.

All material and all communication are handled through a web-based project portal (RQ08 ldc.lu.se). The department heads submit their

reports via the portal, and Panel experts access reports, statistics and other material through the portal.

#### **4. Evaluation Criteria**

The chief criteria for evaluation are:

- Quality (international comparability and innovative power)
- Productivity (scientific production)
- Relevance (scientific, social and socioeconomic significance)
- Vitality and ability to manage research (flexibility, control and leadership)

Evaluators are expected to grade research units on a six-point scale (described below) according to these criteria. This is done primarily at department (or comparable unit) level but may also be done at lower or higher organisational levels. Individuals are, however, not to be evaluated. If the evaluation Panel is unable to agree on a grade, they should give reasons for this. Evaluation according to the criteria given must be made with due consideration of the mission of the department or unit in question.

The criteria should be interpreted as follows:

**Quality** is to be understood as a measure of excellence and attention received. It is founded on the reputation and position of the unit within the community of researchers. The quality is assessed on the basis of the ability of the unit to achieve and present clear-cut scientific analyses and results. The assessment reflects the position of the unit in relation to the frontier of research. That position is best judged through peer review. In the analysis, the peers fall back on their own knowledge and expertise.

**Productivity** relates to the total volume of scientific reports of the unit. These are usually in the form of written publications, but other forms of publication are acceptable. The quantification of production may be refined by means of bibliometry, which allows citation frequency to be estimated, or by other means of describing the significance of a publication to the community. Productivity and its impact must be judged in relation to the number of researchers at the department or unit.

**Relevance** is a criterion which includes the scientific, technological, clinical, social, cultural and socioeconomic significance of a publication as well as implementation of research results in the society. The research is to be placed in relation to the international development of the field of study or to important development trends or issues in society. Relevance may be quantified or given a qualitative character.

**Vitality and organisational capacity** are criteria which concern the internal vitality of the unit and its contacts with the rest of the world but also the capacity of the unit to implement successfully the work it has planned. This may include possible changes in departmental research focus as well as flexibility and ability to allow the formation of and possibility to sustain strong research environments. The evaluators are asked to grade the evaluated research on a six-point scale on the basis of the four criteria listed above and further exemplified here.

**Grading scale:**

**Outstanding.** Outstanding research, in a national and in an international perspective. Great international interest with a wide impact, normally including publications in leading journals and/or monographs published by leading international publishing houses. The research has world leading qualities.

**Excellent.** Research of excellent quality. Normally published so as to have great impact, also internationally. Without doubt, the research has a leading position in its field in Sweden.

**Very good.** Research of very high quality. The research has such high quality that it attracts wide national and international attention.

**Good.** Good research attracting mainly national attention but possessing international potential; extraordinarily high relevance may motivate good research.

**Insufficient.** The research is insufficient and reports have not gained wide circulation or do not receive national and international attention. Research activities should be revised.

**Poor.** The research is quite inadequate and lacks development potential. Research activities should be discontinued. In cases where the research

is of a national character and, in the judgment of the evaluators, should remain so, the concepts of "international attention" or "international impact" etc in the grading criteria above may be replaced by "international comparability".

Questions to be answered by the evaluators:

Concerning achievements reported

1. The quality, productivity and relevance of activities
2. The vitality and realism of the unit, including, among other things, leadership, administration, strategy and research programme, placed in relation to resources and how they may be improved (in relevant cases)

Concerning plans for the future

1. Are the research plans of the unit well chosen and well formulated in the light of developments within the field in question?
2. Are the research projects of the unit sufficiently well integrated?
3. Is the infrastructure good enough? This question includes leadership and administration etc.
4. Is there room for improvements of the plans and the infrastructure?  
The Panels are asked to rate the plans for the future according to a 4-grade scale: Excellent, Very Good, Good and Poor.

## **5. Final Report**

A preliminary report from each Panel must be available at the time of the site visits of the Chairs and Vice-chairs. During this visit, a short general report for the whole university will be prepared. The final reports from each Panel and the general university report is expected at the latest August 31, 2008. The final reports might be edited to fit into a common format; no wording will be changed.

## **6. Confidentiality**

The Panel members accept not to misuse any non-official information that might be disclosed. In accordance with Swedish legislation, the Panel reports will be public once they are submitted in their final form.



## **7. Conflict of interest**

All Panel members are required to declare any conflict of interests. Please, observe that Swedish rules of conflict of interest are quite sharp. A special informative document will be distributed to all Panel members.

## **8. Panel Report Outline**

In their reports (one report per department) the Panels are asked to use the following headings:

### **Overall assessment**

Give a short general quality assessment of the unit in question.

### **Research infrastructure**

Comment on special resources, and organisation, and other infrastructure details you find interesting or restricting

### **Research Quality**

Comment on your view on the quality of research. See description above for criteria and grading

### **Collaboration**

Mark if you find local, national and international collaboration Excellent, Very good, Good, Poor or worth developing. If you have specific recommendations, please note them.

### **Research activity and teaching**

Comment if you find remarkable good (or poor) effects/relations between research and teaching.

### **Evaluation of future plans**

Use the grades Excellent, Very good, Good and Poor to the described future plans. Give reasons for your grading

### **Future potentials and possibilities**

Comment on possible potential and directions you recommend the research to take. Mark if you see unused potentials and unique opportunities. Also, note activities with poor future potential and restricted possibilities.

**Gender and equal opportunity issues**

Lund University strives for good gender balance and equal opportunities. Please comment any observations on these issues regarding both the present situation and the plans for the future. Lund University will welcome all suggestions for improvements.

If required, the Panels can introduce new headings for special purposes. The Panels are asked not to give lengthy descriptions of their observations; instead a concise explanation or motivation for their statements and grading is requested. The Panels are asked not to comment on individual researchers.



