



FEATURES

University of Bergen 2007-2008

Research - Education - International collaboration





With this magazine, the University of Bergen wants to offer a few glimpses of our range of activities in research, education and international collaboration. We have a distinctly international profile that involves close cooperation with other universities all over the world. Our aim is to increase international recruitment and exchanges of both academic staff and students, and to maintain open, wide-ranging and fruitful relationships with professional colleagues in a multitude of nations.

A single issue of a magazine is incapable of covering the whole range of activities of the University. Nevertheless, we hope that the sample we offer here will tempt our readers to become better acquainted with this important centre of research and education on the west coast of Norway, in the heart of Norway's second-largest city. A good place to explore our university a little further is our web-site: www.uib.no

Welcome!

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The city and the university

Founded in 1070, Bergen was for centuries the largest and most influential city of the Nordic countries. A lively port within the Northern European Hanseatic League of trading cities, with the UNESCO World Heritage Site Bryggen at its core, the city built its wealth on international trade. Today the proud Hanseatic era is history, but Bergen's 240,000 inhabitants are still famed for their outgoing personality, shaped by the city's centuries of exposure to the outside world.

Just like the city of Bergen, our university has been internationally oriented since its foundation. In order to attract the best students and researchers, we need to focus on quality, and to focus on quality, we have to keep in close touch with the best research environments abroad. Collaboration and contact with leading universities in other countries are main priorities for the university, as are exchanges of students and faculty and participation in international networks and organisations. We also work continuously to make our research environments internationally attractive by ensuring sufficient funding, modern infrastructure and a balanced age and gender structure among our academic staff.

One of the fields in which our international connections are most important is development-related research. Many of our researchers show a strong commitment in fields such as global health, poverty, the environment and human rights. This is in line with our basic belief that universities share a global responsibility to put their knowledge to work for the best of humanity and take part in the debates shaping our common future.

Our university is indeed a young one, founded in 1946. But it grew out of a much longer academic and scientific tradition that had evolved at the Bergen Museum since its foundation in 1825. A number of internationally famed scholars were affiliated with the museum, including Gerhard Armauer Hansen, who discovered the source of leprosy, Frithjof Nansen, who became world famous for his polar expeditions and was awarded the Nobel Peace Prize in 1922, and Wilhelm Bjerknes, commonly regarded as the founder of modern weather forecasting.

The interests and achievements of eminent researchers such as these three have shaped the history of the university, as has our location on the shores of the North Atlantic Ocean, with the Arctic region close at hand. We have always been at the forefront in medicine, meteorology and climate studies, marine sciences and petroleum-related geology, where we continue to deliver research at the highest international level. Over the years, we have also developed excellent research environments in areas such as medieval history, anthropology and comparative politics, to name but a few.

Not only do we strive to be at the international forefront in selected thematic research areas in which we already display high or excellent standards, we also seek to balance these achievements with high quality research in all disciplines. Comprising seven faculties, the university offers its 16,000 students the classical study programmes you would

expect to find at any traditional European university. Our teaching is based on research and characterised by close interaction between students and academic staff.

The university is still very much a part of old and charming Bergen. Our location in the centre means that our activities are intimately interwoven with the geographical, historical and cultural tapestry of the city. Our students are an important part of Bergen's lively cultural scene, which provides them with rich and varied experiences in return. Should they occasionally tire of the city life, the seven mountains surrounding Bergen offer excellent recreational opportunities just minutes away from the city centre. Heading a little further afield, they will find the wildest, most spectacular nature around Western Norway's famous fjords, to which Bergen is proud to be the gateway.

However, being a part of Bergen and Western Norway means much more to us than that. As a modern educational institution, the University of Bergen places great emphasis on strengthening its dialogue and cooperation with local and regional authorities, the business community, industry and schools. We also endeavour to improve the communication of our students' skills to society at large. Universities and societies are shaped by each other. Only by making the very best of our interaction with our surroundings can we continue to offer academic excellence to the city of Bergen, to the region and to the world beyond.



Regards,
Sigmund Grønmo
Rector

Faculties

The University of Bergen

With its 16,000 students and a good 3,000 employees, the University of Bergen is a medium-sized European university. Central parts of the campus are in the immediate proximity of Bergen city centre. The University of Bergen is both an educational institution and a research institution covering most academic fields. It is organised in seven faculties and about 90 departments and centres.

Global network

The University of Bergen is also part of a global network of students, researchers and institutions of learning. The university is a meeting place and a gateway to other local, national and international academic environments. Internationalisation has been a priority since the mid-1980s, and this has resulted in the University of Bergen's profile being that of an international university in Norway. The university is a member of the Worldwide Universities Network (WUN) and Coimbra, a network consisting of 39 European universities of long standing.

Unifob

UNIFOB is the University of Bergen's research company. It is the university's principal instrument and preferred partner for carrying out externally-financed research and development projects. UNIFOB's centres carry out research and related activities that span all the disciplines studied at UiB departments.



The Faculty of Law

The Faculty of Law focuses on high-quality research and teaching within a variety of legal areas. The faculty has developed a research profile that is adapted to modern day challenges and the legal questions they represent, and it looks forward to initiating new research projects in cooperation with research communities abroad. The faculty offers a three-year PhD programme.

The faculty offers a programme of professional study, and the Master's programme in Law requires five years of full-time study. Each year consists of a number of different courses, followed by a mandatory examination at the end of each course. The faculty also offers a number of courses taught in English.

The faculty has a staff of 80 and approx. 1900 students.



The Faculty of Dentistry

The faculty currently employs a staff of around 250 (42 of whom are academic staff) and it has about 370 students enrolled in the faculty's different educational programmes.

The faculty educates dentists and dental hygienists and provides specialist training for qualified dentists. Teaching and research activities are carried out in close collaboration with the Faculty of Medicine. The faculty runs its own dental clinic and several research laboratories in support of its teaching and research activities. Dental research ranges from basic to clinical research and the Centre for Clinical Dental Research coordinates various research projects in cooperation with five thematic research groups: Biomaterials, Cancer Biology, Craniofacial Development and Function, Behavioural and Community Dentistry, and Inflammation and Infections. The faculty offers organised training of researchers in which PhD candidates and Master's students participate in the research groups. PhD training and the Master's programme are research degrees which are taught in English. The faculty also runs research programmes in association with the Research School of International Health, offering a variety of research courses and activities. As a result of bilateral agreements, the faculty cooperates with various universities in Europe, Africa, Central America, the USA and Asia, and a continuous exchange of researchers, PhD candidates and Master's students takes place.



The Faculty of Social Sciences

The faculty currently employs 260 staff and teaches 3500 students at all levels. Its seven departments offer educational programmes at all levels in sociology, comparative politics, public administration, media studies, information science, economics, geography and social anthropology. The faculty has shared a commitment to development studies with the university for several years. This commitment includes interdisciplinary Bachelor's and Master's programmes in development studies that are bolstered by several large collaborative research projects.

The Department of Information Science and Media Studies is a more recent effort to integrate competence from technological science, social science and the humanities. In conjunction with extensive research efforts, a number of educational programmes address the societal impacts of new information and media technology.

Faculty staff participate in a number of FP6-funded research projects and networks of excellence. UiB is the coordinator of two Integrated Projects under the Citizens and Governance programme, both scheduled to start in 2007. The topics for these projects reflect long-term research efforts at the faculty. They address diversity and the European public sphere in a citizens' Europe on the one hand, and the impact of the new women's movements on contemporary gendered citizenship on the other.

Faculties



The Faculty of Psychology

The faculty has 198 academic staff and teaches more than 1800 students and 100 PhD students. A number of studies that lead to a wide range of academic and professional qualifications are offered. They cover different disciplines, from the introductory courses and professional studies in psychology, to several different Master's degrees ranging from health promotion and pedagogics to gender and development studies. The faculty has established two research schools and others are planned. It has a high level of competence in research and several well established research groups.



The Faculty of Arts

The faculty has over 4200 students and 300 academic staff. The Faculty of Arts concentrates on languages, culture and aesthetic disciplines with a mostly national or Western orientation. Certain disciplines also focus on the Middle East or Latin America. More than 20 different disciplines within cultural and social studies, linguistics and aesthetics are represented at the faculty. The Faculty of Arts is strongly committed to research, both in its individual disciplines and cross-disciplinary programmes and projects, as well as with regard to information and communication technology within the humanities.



The Faculty of Medicine

The faculty has over 1400 students, nearly 300 PhD candidates and 422 academic staff. It offers professional studies in medicine (MD), master's degrees in biomedicine, pharmacy, nutrition, health sciences and international health, and a research programme for medical students. In its research, the faculty covers a broad spectrum of clinical medicine, biomedicine and health sciences, and has established 6 research schools covering its strongest fields of research. The faculty has a high level of competence in some strategically prioritised research areas: biomedicine, translational research, epidemiology (register-based), global health, nutrition and pharmacy. There is a strong and integrated connection with Haukeland University Hospital and other hospitals in Helse Vest (Western Norway Regional Health Authority) in educational and research activities.

The faculty has a well-organized campus concentrated around Haukeland University Hospital, with a new (2004) facility for biomedicine, including national platforms for molecular imaging and proteomics, and two other facilities under construction: the positron emission tomography building (PET) to be finished in 2008, and the new laboratory building (finished in 2009).



The Faculty of Mathematics and Natural Sciences

The Faculty of Mathematics and Natural Sciences carries out research in all the traditional scientific disciplines. Using its prime natural setting to build international expertise, the faculty has chosen to concentrate on the following fields in particular: marine and climatic research, petroleum research, and informatics. The faculty has around 2700 students and 800 employees (220 academic staff). Teaching is offered in all our research fields at undergraduate and graduate (M.Sc. and PhD) levels. In addition to our own facilities and neighbouring areas (oceans, fjords and mountain areas), several courses are organised by UNIS on Spitsbergen/Svalbard. The UNIS courses provide a unique opportunity to study Arctic conditions.

The faculty also participates in several large international science laboratories and projects such as CERN, which provide an opportunity for researchers and students to be at the forefront and take part in the world's most advanced scientific experiments.



This is a sexually mature example of Heteroteuthis dispar. The females can store up to a third of their own body weight in sperm. They can thus fertilize themselves when it is convenient to do so.

Cephalopod workshop

At least one new species has been discovered, more may be in time and a greater number have been described in more detail. This is what happens when cephalopod researchers get together to take part in a workshop in the basement of Bergen Museum.

The Museum's collection is unique by world standards, which is why international researchers decided to meet there, according to Michael Vecchione from the Smithsonian Institute in Washington, DC. Together with other cephalopod researchers, he has compared newly-collected specimens with preserved examples from the collection at the University of Bergen.

This work is absolutely crucial for ensuring that the species found are classified and described in as much detail as possible. For those of you who thought a DNA test would suffice in this day and age, you're actually quite far off the mark. DNA tests are a good tool, but only one of several that researchers have in their tool boxes. And one of the most important of these tools is to compare findings with typical examples of known specimens, and describe the findings in relation to these. It

is thus possible to determine whether an entirely new species has been discovered or merely a variation of a specific species. A DNA analysis alone does not give us this information.

Mr Vecchione is on the steering committee of the MAR-ECO project, which is a large international project coordinated by UiB and the Institute of Marine Research, which aims to survey life around the Mid-Atlantic Ridge. However, he is also heavily involved in several of the many sub-projects under MAR-ECO, and, among other things has participated in research cruises in the Atlantic for the purpose of collection. The cephalopods which were found during these cruises have been under scrutiny at Bergen Museum.

The researchers have sometimes had problems identifying and determining the species of all the specimens found, and they also suspected that they may have stumbled across entirely new species.

The researchers work on determining the doubtful species. But they may put even greater effort into mapping the variation found within a species.

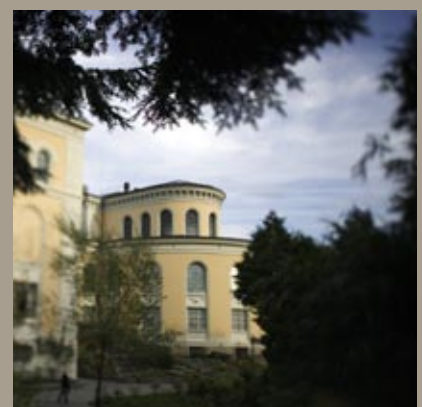
The findings mean that the number of registered species in the Atlantic will have to be increased, and they have already led to the publication of descriptions of new species.

Active research at Bergen Museum

Bergen Museum is a university museum. Research is integrated with and creates the basis for the museum's other core activities: collecting, cataloguing, conservation, research and information.

The museum's research work focuses on a number of disciplines within cultural and natural history. This work is based on the museum collections and the intention is to improve the level of information provided and the public's understanding and awareness. A special priority for Bergen Museum is to encourage research projects in which methods and perspectives in cultural and natural history complement one another.

As regards conservation, cataloguing and collection care, the museum is obliged to maintain the wide breadth and variation of objects which is already evident in our collections. Within Bergen Museum's priority areas, it is the museum's objective to represent the highest competence at an international level.



The key to a better PhD education

Research Schools have contributed to creating productive and internationally oriented research groups across cutting academic environments.

The first Research Schools were established at the University of Bergen (UiB) in 2004, but they have already gained a good footing in academic environments. The University can today offer its doctoral candidates more than thirteen research schools covering a wide spectrum of academic fields, and more are planned. Most of them have an internationally-oriented and interdisciplinary focus.

Academic and social fellowship

While life as a doctoral research fellow previously tended to be a relatively lonely prospect, students attached to the research schools can now participate in an academic and social fellowship. The University of Bergen tries to ensure that the research schools are interdisciplinary and attached to the best research environments around, and that they are a supplement to and further development of the ordinary PhD programmes. The research schools must also have a thematic focus and a sufficiently large group of research students, postdoctoral fellows and senior researchers. Many exciting research environments have arisen through these schools.

A few examples

The International Graduate School in Integrated Neuroscience (IGSIN) is attached to the Faculties of Medicine and Psychology, and draws on expertise from the fields of cognitive and fundamental neuroscience, combined with a clinical approach to mental health. The research school is part of Bergen Mental Health Research Centre (BMH), which is funded by the Research Council of Norway, UiB and Helse Vest. The research school also receives funds from the Alfried Krupp von Bohlen und Halbach Foundation in Germany which is part of an international network of research schools. IGSIN serves as a good example of the fruitful collaboration that can be achieved across academic borders. It transcends traditional faculty boundaries, which is important and necessary in order to understand the brain and the brain's functions from a fundamental and clinical research perspective. Researchers from the Department of Biological and Medical Psychology are able to lock minds with researchers from biological and clinical medicine, and the centre can therefore offer expertise within a wide spectrum of academic areas in medicine and psychology. Today, there are fourteen PhD students attached to IGSIN. The Faculties of Medicine and Psychology also collaborate on other research schools. The Research School in International Health focuses on health problems in deprived areas of the world, in close collaboration with institutions in these countries. The Faculty of Dentistry is also involved in this collaborative project. The Research School in International Health is in the process of establishing an extensive network with universities in other parts of Europe.

Greater academic breadth

At the Faculty of Arts they have also discovered that an interdisciplinary approach cutting across academic and national borders can create a

good climate for research. The Research School in Linguistics and Philology, which has its roots at the University of Bergen, has now become a nationwide research school with extensive collaboration with the other Scandinavian countries, which it wishes to develop further. Linguistics is a heterogeneous science and it is impossible for each individual institution to provide adequately for all its PhD candidates. Collaboration between the different academic areas means greater academic breadth for research fellows. There are almost twenty candidates attached to this research school at UiB. The Centre for Medieval Research, which is an international Centre of Excellence also offers its doctoral research fellows participation in a research school.



An effective education in research

The Faculty of Mathematics and Natural Science offers its PhD candidates the opportunity to participate in several research schools. Physics candidates can participate in the Research School in Development and Application of Intelligent Detectors. The school is a collaboration between the Ruprecht-Karls-Universität in Heidelberg, the University in Mannheim in Germany, the universities in Bergen and Oslo and Bergen University College. Research groups in the fields of Nuclear Physics, Particle Physics, Space Physics and Micro Electronics are involved in the project. The project serves as an effective and interdisciplinary research education at a high level, within a collaborative group which together possess very extensive and balanced expertise. Bjerkes Research School in Climate Studies is a collaboration between the Geophysical Institute, Bjerkes SFF, the University Centre on Svalbard (UNIS) and the Nansen Centre. The research school also interfaces with research groups at the Department of Earth Science. The research school aims to create an environment for research education for Norwegian and international doctoral candidates and postdoctoral fellows in order to educate candidates at the highest international level in climate research.



A world of opportunities

The University of Bergen (UiB) offers 3-year Bachelor's degrees, 2-year Master's degrees, 5-year Master's degree programmes and 3-year PhD degrees. In addition, the Faculty of Medicine at the University offers a six-year degree in medicine. The students' academic achievements are assessed both through final exams and on the basis of oral and written performance during their course of studies. Credits can be transferred via the European Credit Transfer System (ECTS), and an academic year corresponds to 60 credits.

International guidelines

The approval and conversion of foreign education in Norwegian degrees follows the guidelines laid down by the Lisbon Convention and the Berlin Communiqué. At the University of Bergen, all official university degree diplomas are accompanied by a Diploma Supplement. The Diploma Supplement is based on the European Commission model, and it provides a detailed overview of the candidate's education and the Norwegian education system. For this work, the University of Bergen has been awarded the Diploma Supplement Label.

400 courses in English

As a rule, courses at the University of Bergen are taught in Norwegian. The university offers approx. 55 Bachelor's degree programmes in Norwegian and approx. 120 Master's programmes in all the traditional academic disciplines. At the moment, a further 50 full Master's programmes and approx. 400 courses for lower and higher degrees are available in English. The largest number of courses available in English are in the fields of biology, biochemistry and biotechnology, informatics, geology and climate studies, marine studies, informatics and information science, medicine and health subjects, mathematics and physics, and in languages and social sciences.

Approx. fifteen per cent of the new students who enrol at the University of Bergen each year are foreign students. The students come from approx. 70 different countries. The percentage of international students at UiB is increasing all the time.

Quality of studies given top priority

At the University of Bergen, work on the quality of studies is a top priority. Courses are assessed both from an academic and administrative perspective in relation to quality, efficiency and relevance. In February 2004, the University established its own quality assurance system for studies in accordance with the guidelines laid down by the authorities. The system includes a number of processes, sub-areas and measures aimed at providing a basis for systematic work on the maintenance and quality of courses. The system is based on a repetitive process consisting of four phases: planning, implementation, assessment and improvement. Results and assessments from this work are presented in an annual Report on Educational Attainments, which is approved by the University board. One important area of development is work on curriculums. All curriculums must include a description of the students' expected learning outcomes on completion of their studies, and the forms of assessment that will be used to measure the competence attained. The university also participates in international networks on quality assurance of education, e.g. Worldwide University Network (WUN) and through the Coimbra group's task force Education and Training.

Collaboration with developing countries

For more than 30 years, the University of Bergen has participated in extensive and wide-ranging academic collaboration with institutions in developing countries. There has been continuity since the UiB's first major collaboration with the University of Khartoum in Sudan, from 1969-1993, to the framework agreement between UiB and Makerere University in Uganda which runs until 2014. While the collaboration with the University of Khartoum led to UiB developing into the world's leading centre for research and studies on Sudan outside the country itself, the collaboration with Makerere is fast becoming the most binding, extensive and longest collaboration between institutions that UiB has ever been involved in. The collaboration covers research and education, student mobility, library development and human resources and financial management. As the largest Norwegian player in the Norwegian Programme for Development, Research and Higher



Education (NUFU) for 15 years, UiB has been able to contribute, on an academic basis, to developing research competence and to educating a large number of researchers at partner institutions in the Southern hemisphere.

Water and international health

With grants from the Norwegian Agency for Development Cooperation (NORAD) and the Quota Programme, several hundred students from countries in Central and Eastern Europe, Africa, Asia and Latin America have taken Master's or PhD degrees at UiB. In the first call for proposals in the EU's extensive programme for European collaboration on education, Erasmus Mundus, UiB was involved in two consortiums which were approved for joint Master's degree programmes in international health, and water studies/ coastal zone management, respectively. In connection with the Erasmus Mundus Master's degree programme, UiB can admit students from third countries (all countries outside the EU/ EEA area). Through this scheme, all admitted students receive good grants.

Reciprocal transfer of competence

UiB's collaboration with institutions in developing countries has been characterised by the reciprocal transfer of knowledge and competence. UiB and the institutions in the South have been both suppliers and receivers of academic knowledge. The academic activities of a considerable number of students and researchers from UiB has been closely linked to and rooted in UiB's collaboration on research and education with institutions in the South.

UiB has exchange agreements with reputable institutions in every continent, and it is an active participant in the Erasmus and Nordplus programmes. UiB wishes to strengthen its international profile in higher education in general, and in student mobility in particular by providing good service both to students coming to Bergen to study and to those going abroad to study.

www.uib.no/info/english/

- UiB is the largest player in the NUFU collaboration.
- UiB accepts approx. 300 students annually through NORAD and the quota programmes.
- Fifteen per cent of the new students admitted to UiB every year are from approx. 70 different countries around the world.
- UiB participates in the joint Master's programmes in international health and water studies through Erasmus Mundus.
- UiB's degree grades and credit system has been adapted to a joint standard as a result of the Bologna Process.
- At UiB, approval and conversion of foreign education is in accordance with the Lisbon Convention and the Berlin Communiqué.
- UiB has been awarded the EU's Diploma Supplement Label.
- UiB offers 50 Master's programmes and approx. 400 courses with English as the tuition language.
- UiB participates in the WUN network and the Coimbra group in its work on the quality assurance of education.
- UiB's goal is that by 2008 20 per cent of all Bachelor degree students shall complete part of their studies abroad.
- UiB participates in the Erasmus and Nordplus programmes.

The biggest fund manager in Norway

UiB has a long tradition as a fund manager. It started with NOK five million in the Meltzer Fund. Today, UiB's total fund assets are around NOK one billion, and the university receives more private donations than any other university in Norway.

The University Board currently manages more than 60 different funds, the largest of which is the Meltzer Fund. Approximately NOK 15 million is awarded annually in grants from this fund to researchers and students. During the period from 1997 to 2003, the Meltzer Fund grew by all of 60 per cent, while the combined assets of the other funds increased by 51 per cent. Fund assets are invested as bank deposits, in bonds and in the stock market.

The most important contributor to the funds in recent years has been Trond Mohn of the family-run company Framo AS. During the course of 2005 and 2006, he donated almost NOK 500 million to research-

related activities. These generous gifts from this Bergen businessman have resulted among other things in two new funds, the Bergen Research Foundation (NOK 250 mill.) and the Bergen Medical Research Foundation (NOK 100 mill.). These funds will be managed in a manner that ensures good and stable returns in the years ahead, and some of the profits will be used for research at UiB. The Bergen Research Foundation awarded a total of NOK 17 million in 2006 to three young researchers in physics, medicine and history. During the course of four years, these researchers will build up research teams at UiB which will be leaders in their fields. In addition to the recruitment programme, the Mohn funds will be used to strengthen international cooperation. Every year the foundation awards grants of up to NOK 500,000 to two researchers who wish to broaden their international network.

The funds in the Bergen Medical Research Foundation will be used for initiatives to expand and strengthen the medical research milieu's relations, networks and collaboration with leading international research milieus. Applicants can receive up to NOK 300,000 in funding for one year, and the awards shall primarily be spent on research stays abroad, although they can also be used to invite guest researchers to Norway.

Major focus on open archives

In 2006, library employees and software developers from nineteen nations gathered in Bergen to share their experience on the use of DSpace, the software behind the open archive system at many research institutions.

The University of Bergen has led the field in the development of an open archive, and the University Library was therefore the natural host for the international conference.

Bergen Open Research Archive

DSpace is an open source product developed by MIT Libraries and Hewlett-Packard Labs and is much used by libraries around the world. Each institution is able to make their own adaptations and changes thereby creating their own "community". The principle is that these adaptations shall also be available to others, and a small unpaid expert group sifts out what is to be included in new versions of the software. The University Library has made several adaptations to DSpace in order to make Bergen Open Research Archive (BORA) more functional.

Better availability

The University of Bergen's archive is connected to foreign academic search engines, e.g. BASE (Bielefeld Academic Search Engine in Germany). Previous surveys have shown that articles which are also

published in an open archive have higher dissemination, often four times as great as when published in a scientific journal alone.

Researchers reporting scientific production can simultaneously submit the article in full text for archiving in BORA.

Libraries playing important role

The open access movement has huge international support. The aim is to ensure the greatest possible availability of research-based knowledge. Researchers are tired of having to surrender copyright to expensive, commercial journals, which means that scientific libraries are only able to buy in a small proportion of the relevant journal literature.

Parallel processes have been in progress to counter this unfortunate trend and to find new communication solutions. So-called "open access journals" have been established on the Internet, providing free user access at the same time as institution-based publication archives are being established around the world. Libraries are playing an important role in this context.

As many as 80 per cent of commercial publishers now allow researchers to publish their work in this type of institution archive. A growing number of important publishers, e.g. Nature and Science, have yielded on this point to strong pressure from researchers.

The Bergen Open Research Archive (BORA) is a digital repository of research output from research institutions in the Bergen area. Contained here are full-text peer-reviewed journal reprints, theses, dissertations and other digital research materials. BORA is part of a world-wide network of Open Access Archive.



Percentage of female staff to triple

The Faculty of Mathematics and Natural Sciences has long had a low percentage of women among its permanent academic staff: barely eight per cent. UiB is now launching a number of measures to help increase the recruitment of women in an effort to achieve the highest percentage of women in Mathematics and Natural Sciences in Norway. In 2006, a plan of action was adopted to improve the gender balance in academic posts. By the year 2016, there should be 40 per cent women in post-doctoral positions (27.49 per cent at present), 20 per cent in permanent academic positions (8.74 per cent at present), and 40 per cent in Associate Professor positions (5.6 per cent at present). Forty per cent of research fellows should be women (38.3 per cent at present).

The plan of action is supported by a number of measures that have already been implemented at the faculty.

In autumn 2003, a separate group called “Realfagsdamer” (Mathematics and Natural Sciences ladies) was established. The group’s goal is to increase the number of women in permanent positions at the Faculty of Mathematics and Natural Sciences, and it is targeting all female students at all levels as well as permanent staff.

The faculty wishes to have more women at all levels, and it is trying to increase the percentage of women by, among other things, the use of “calling” – what is referred to as headhunting in the business world. In

addition, all heads of departments at the Faculty of Mathematics and Natural Sciences are instructed to focus on female recruitment when a new post is to be filled. They must either consider whether they know any competent female candidates who can be called to the post or they can advertise the post in a way which makes it particularly attractive to women.

In addition to these measures, a gender equality committee is also under establishment. The faculty has also allocated NOK 500,000 for equal opportunities measures, aimed in particular at increasing the level of competence among female employees.

According to the management at the Faculty of Mathematics and Natural Sciences, attitudes no longer pose an obstacle to achieving gender balance at the faculty, but the poor resource situation that has prevailed during the last 10 to 15 years has been one of a number of influential factors. This has led to fewer new appointments at the Faculty of Mathematics and Natural Sciences than elsewhere. The faculty has therefore decided to draw up tailor-made equal opportunity plans at departmental level, so that it is possible to choose flexible solutions which are adapted to the unique issues in each individual discipline. The faculty will allocate equal opportunity funds which will serve as a carrot, to be used as an incentive for the departments to achieve their sub-goals.

Popular scientist with new technology

New kind of atomic force microscope to be used in the university's new nanotechnology project.

The instrument uses neutral atoms (helium), and operates at lower energy levels than for example an electron microscope. This makes it easier to avoid problems caused by microscope radiation, which has the capacity to destroy that which is being studied, for example fragile protein structures. Bergen Research Foundation and the Faculty of Mathematics and Natural Sciences have awarded funds to a project which will use this technique for a variety of purposes over the four-year project period.

Bodil Holst took her PhD at Cambridge at the age of 25, and has since been working to develop a new kind of atomic force microscope. Her microscope will form a new addition to the already strong imaging technique expertise available at the University of Bergen.

Ms Holst is originally Danish, and has studied at the University of Copenhagen and at Cambridge, but has more recently worked for the Austrian Graz University of Technology, where she coordinated an EU project aiming to develop and improve imaging techniques used in the helium microscope. In Bergen, Ms Holst has extensive plans for research under the university's Nanoscience Programme. The technique could for example be used to study protein structures and flows in porous media.

The project will involve several partners at home and abroad, but Ms Holst points to the existing academic environments in the fields of biophysics and medical imaging, and particularly the FUGE platform Molecular Imaging Center, as an important reason for deciding to come to Bergen.

"And besides, the project funding is generous, even by international standards," she says.

National proteomics resource

UiB is host to the proteomics platform PROBE, which offers services and training in proteomics to research environments throughout Norway.



Kari Espolin Fladmark

Proteomics involves the identification and characterisation of proteins which the genes in an organism encode. The platform is part of the Research Council of Norway's FUGE programme, a programme for functional genomics research in Norway.

Until a few years ago, proteomics was an almost unheard of concept at UiB. Then Associate Professor Kari Espolin Fladmark (picture), then a post doctoral student, went to Belgium to conduct research. During her stay there, she was inspired to establish a proteomics laboratory in Bergen. In addition to her position as PROBE's general manager, Ms Fladmark also carries out research, primarily in the field of apoptosis. With the help of algae toxins which induce apoptosis by phosphorylating the cells in proteins, she is able to study the order of signals in an effective manner. By phosphorylation is meant that a phosphate group is added to the protein, so that it changes shape and function. It is a reversible process which can happen very quickly, and it is the most important form of cell communication. Natural toxins such as algae toxins often have specific effects on certain proteins, and they can be very effective. It is natural to assume that the proteins which are phosphorylated by the algae toxins are also central in natural cell death.

"Our genes encode proteins. In a sense therefore, it is the protein picture which is most important in the search for the causes of disease. It is possible, for example, to categorise leukaemia patients in different groups on the basis of their protein pictures, even though they all have the same disease. Many diseases are related to protein modifications rather than to the actual amount of proteins, and this cannot be seen by studying gene expression. In the long term, by developing diagnostics based on proteomics we may arrive at more efficient and tailor-made treatments. The interesting, as well as frustrating aspect is that a newly identified phosphorylated protein may generate many new research projects. Every answer raises many questions," says Ms Fladmark.

Ground-breaking techniques in new centre

Renate Grüner uses her research experience from experimental nuclear physics and MR imaging to build up research in connection with a PET centre in Bergen.

She wants to use and develop state-of-the-art techniques in both PET and MR, and she expects that maximum new knowledge will be gained by combining different kinds of brain imaging. It is hoped that this will make it possible to determine as early as possible whether or not a treatment method is effective, and how effective it is. The project also includes work on establishing radiochemical research in Bergen, and on improving signal detection in the PET scanner.

The PET centre in Bergen has been funded by a private donation, and it will be the first centre outside of Oslo. The centre is a collaboration between the University of Bergen and Haukeland University Hospital.

Renate Grüner took her Master's in experimental nuclear physics, and her PhD in MR imaging. Bergen Research Foundation has given her a grant of NOK 1 million to build up research around the PET centre. The foundation allocates funding to outstanding young researchers in order to provide the framework conditions that will help them develop into leading world-class researchers. The Faculty of Medicine is contributing a corresponding sum to Ms Grüner's project. The goal of the project is to increase sensitivity and specificity in brain tumour diagnostics.

"PET scanning will provide new opportunities for research on for example cancerous tumours. A cancerous tumour needs sugar in order to grow. The tumour's development and absorption of nourishment can be monitored by labelling sugar with a radioactive substance and injecting it into the body, and then monitoring the movements of the radioactive substance. These radioactive particles must be produced on the premises, using a particle accelerator. This means that the centre needs a lot of space and equipment," Grüner explains.

Even though the goal is to eventually put the techniques resulting from this research to clinical use, it will still take a while. Routine operation of the PET centre as well as the research taking place around it requires a strong academic environment and interdisciplinary cooperation. There is already a long-standing tradition of brain imaging research in Bergen, where a lot of the activity consists of studying healthy brains in order to learn more about basic brain functions.



Renate Grüner has received a sum of money from the Bergen Research Foundation and the Faculty of Medicine which will be used on research at the PET Centre in Bergen.

Aiming to starve cancerous tumours

For cancerous tumours to grow, they need nourishment from blood vessels in and around the tumour. The EU project “Angiotargeting” looks into how the tumour can be attacked via these blood vessels.

“Angiotargeting” is an integrated project under EU’s Sixth Framework Programme, and it is being coordinated by the University of Bergen. The project is attempting to identify new genes and proteins that control the growth of blood vessels in cancerous tumours, and to test whether treatment can target them specifically. New treatment methods are being tested both in the laboratory and through clinical trials. The hope is that it will be possible to offer cancer patients better treatment by developing molecular treatment methods directly targeting the blood vessels in the tumours.

The project has 14 European partner institutions, and 19 different research groups each doing their part of the work. The University of Bergen is coordinating the project through the neuro-oncology group at the Department of Biomedicine, led by Professor Rolf Bjerkvig. The project period lasts until spring 2009.

Over the last few years, there has been growing scientific interest in targeting cancer treatment at the genetically stable blood vessels instead of at the cancer cells. The processes through which cancer cells and normal cells communicate with each other to form blood vessels have attracted much attention. Greater understanding of the mechanisms behind angiogenesis is seen by many scientists as a promising strategy in fighting cancer. In traditional chemotherapy, the cancer cells may develop resistance to the chemotherapy. By attacking the genetically stable blood vessels instead, the likelihood of such resistance developing is reduced. In this way, one can efficiently cut off the supply of nourishment to the tumour, thereby killing the cancer cells.

The research has been divided into work packages, which have been divided between different institutions. At the University of Bergen, methods have been developed for studying the formation of blood vessels in living models. These methods are also used to monitor the effect of the treatment. Work is also underway on characterising angiogenesis in mice which lack a particular protein which is important in the development of new blood vessels. In the next project period, the scientists at the University of Bergen will work in particular on animal models with different angiogenesis processes, and on developing specially adapted treatment methods. New imaging methods are also being developed.

Technology at the University of Bergen

Bergen is situated in the heart of the most industrialised region in Norway. This has had consequences for the University of Bergen's priorities. The unusual aspect of the university's efforts devoted to technology is that they have largely been integrated with the basic disciplines, and that they have most often originated in these disciplines, with respect to both research and education. No separate “engineering faculties” have been established, which is often the case elsewhere. In the scientific context, technology is quite simply the most expedient use of the basic disciplines to develop devices and methods for use in society. At the same time, technological devices have been decisive in moving the boundaries of research forward within the basic disciplines. The integrated organisation of technology has made it possible to exploit this interaction to the full, with respect to professional development and results. It has also resulted in an excellent ability to restructure and helped maintain close links with the Norwegian business community, at the same time as research has had a clear international foundation in large and long-established networks. Another natural consequence of this is that technology at the

University of Bergen has developed in niches where the academic environments are strong, rather than on a wider front. This has taken place in collaboration with other environments in Bergen, which has a University Hospital, several university colleges and a number of highly esteemed research institutes, and not least, a number of high-tech companies with products and services which are sold the world over.

Bergen has a rich tradition to maintain in climate research and environmental monitoring, petroleum and gas, marine subjects, information and communication technology, instrumentation and biotechnology, while at the same time new challenges await. Several of the ground-breaking new innovations now take place at the interfaces between the basic disciplines, in so-called interdisciplinary research. The University of Bergen handles this aspect among other things through the peripheral zone, through departments in Unifob and Christian Michelsen Research. Together with a number of companies in the peripheral zone, they are also tools for bringing technological solutions from the laboratory to the market.



Scientists are now trying to find out more about the functions of the nanotube, and if they are also to be found in living tissue and not just in cell cultures. From left: Professor James Lorens, research fellow Lasse Evensen, research fellow Nickolay Bukoreshtliev and Professor Hans-Herman Gerdes.

Investing in nanoscience

In spring 2006, UiB launched its multi-disciplinary research programme in nanoscience. Five faculties are involved in the programme, covering areas from basic research to ethics.

Nanoscience is a new area of focus at UiB, but the programme is built around academic environments that already have expertise in various fields in nanotechnology. In the course of the five-year start-up phase, substantial funds will be channelled through the programme. So far, there are research projects in progress in biomedicine, material technology, modelling and visualisation, as well as the societal issues involved in the use of nanotechnology.

The Centre for the Study of the Sciences and the Humanities at UiB is coordinating the project "Interdisciplinary Studies of Ethical and Societal Implications of Nanotechnology", which has been allocated funding from the Research Council of Norway for a three-year period. The project will look at the types of potential consequences nanotechnology may have, study possible health effects of nanotechnology, and discuss how the use of nanotechnology may be influenced by political changes. A network for nanoethics, among other

things, will be established. It will be a meeting place for researchers from different academic fields. The Centre for the Study of the Sciences and the Humanities has traditionally enjoyed a good relationship with the different research environments, and it therefore has the best qualifications for this type of work.

The head of the project, Roger Strand, says that the goal is to see nanotechnology from an overriding perspective rather than to discuss specific regulation of nanotechnological applications. What do we really want from nanotechnology, for better or worse? By allowing researchers to meet on an interdisciplinary basis, he hopes to develop better understanding of the phenomenon and to avoid the debate becoming characterised by misunderstandings and trench warfare. The programme has already been involved in organising an international workshop on academic uncertainty, and more seminars are in the offing.

"The debate about nanotechnology is to a great extent about putting what we don't know into words. If we can speak clearly about the things we are uncertain of, we can become better at implementing new technology in a smart way in our technology-based society. The choice is not always between banning or not banning a specific type of technology. Sometimes it is simply a matter of using technology in a smart way. This requires us to be able to talk about what kind of society we really want," says Mr Strand.

CERN expects great revelations

The flagship of experimental physics, the LHC accelerator at CERN in Switzerland, will be formally opened in 2007. Scientists from all over the world, including some from the University of Bergen, have put an incredible effort into planning the experiments.

The physics laboratory CERN (the European laboratory for particle physics), which is situated outside Geneva, is the world's largest particle physics laboratory. For the last few years, they have been building a new and more powerful particle accelerator: the Large Hadron Collider (LHC). The power will be switched on sometime in the second half of 2007 and the experiments will begin. Hopefully, they will bring us a little closer to answering why the world is the way it is.

The University of Bergen's main involvement is in the work on ATLAS, one of the four detectors to be installed in the 27-kilometre long circular tunnel where the experiments will take place. The University of Bergen has supplied some of the components for the detector, and it has also taken part in the planning of the experiments that are to be carried out. ATLAS is a general detector intended to detect everything that happens when high energy protons collide with each other.

Dark matter

Associate Professor Anna Lipniacka of the Department of Physics and Technology is particularly interested in finding dark matter. Dark matter is invisible matter which does not interact with the visible world, but which still makes up almost a quarter of all matter in the universe. The stars in our galaxy would be flung in all directions had the dark matter not held them together.

"Only a very small part of the matter in the universe consists of visible matter. We know that the dark matter must consist of heavy particles that hardly react with anything, otherwise we would already have proven its existence. Using the LHC accelerator we will hopefully be able to recreate the conditions of the Big Bang well enough to create dark matter as well," she hopes.

In addition to searching for dark matter, ATLAS will be used to look for answers to other fundamental questions: Why do particles have mass? Are there more dimensions? Are there so-called supersymmetric particles?

Making the impossible possible

The protons which will collide come in small bunches that are accelerated to a speed close to the speed of light. When the experiments have started, there will be a collision 40 million times a second, and the amount of data from the detectors will exceed the sum of all telephone networks in the world. There are no computers powerful enough to handle this. The solution to the problem is a so-called GRID: The data will be sent to interconnected computers all over the world, and each of these computers will process a part of the data. The system is presently being tested by processing



Experiments from The Large Hadron Collider (LHC) will hopefully bring us a little closer to explaining why the world is the way it is.

dummy data generated by a simulation program. These analyses will result in dummy articles in preparation for the final articles which must be written when the results from the experiments start arriving.

Even though the amount of data is enormous, only a small part of it, about one collision in a million, will be interesting enough to be worth storing. The electronics associated with the detector must therefore be capable of separating the interesting events from the rest, and not store all the useless data which will be produced by the detector. Still, the amount of data to be stored will be equivalent to 1,200 CDs a minute. The GRID network must be capable of processing this.

Counting down to start

In cooperation with other Nordic universities, the University of Bergen has supplied some of the electronics. They compete with the best in the world to produce and supply detector components, and they have no choice but to deliver high quality. Despite the fact that ATLAS will examine the smallest particles in the world, the detector has to be the size of a five-storey house. ATLAS must have time to measure the path, the energy and the charge of the particles before they leave the detector. As ATLAS has grown, people have had to put on climbing gear and take safety courses to be able to work on its assembly. It is now being tested by measuring cosmic radiation to make sure that all the parts function as intended. The magnetic field around the detector, which will steer the proton beams and ensure precise collisions, has also been tested. In addition, great demands are made on the cooling system used to cool down the magnets and make them superconductive. It uses liquid helium, and is the largest of its kind in the world.

No one knows what this effort might help us reveal. But for the physicists, excitement is growing day by day.



Welfare and ecology in the Nile countries

The Nile Basin Initiative is a new international initiative, aiming at a more rational and fair utilisation of the water from the Nile.

The University of Bergen has expanded its extensive research cooperation with Africa through the new Nile Basin Research Programme.

Increased insight into the climate, nation building processes, health issues, religions and cultures of the Nile valley is of comparative interest to many parts of the activities of the University of Bergen. The university can also contribute to strengthening the work for peaceful and rational exploitation of the resources of the Nile valley.

The Nile Basin Initiative is a completely new international initiative that has strong support, aiming at a more rational and fair utilisation of the water from the Nile. The central importance of the Nile is demonstrated by the fact that several countries have special ministers for this resource. The use of the Nile and the distribution of the water from it are crucial issues on the political agenda of all the countries, and many people have feared that serious conflicts would arise.

Great challenge

There are more than 300 million inhabitants in the ten Nile countries. Strong increase in population growth increases the danger of a shortage of resources in the future. The primary goal of the Nile Basin Initiative is to achieve sustainable socio-economic development through responsible and peaceful utilisation of the Nile's resources. Research can create the climate of trust and knowledge that is required. The challenge is a formidable one: Knowledge from many different disciplines is needed to make optimal use of the world's longest river, which runs through three climate zones, in a situation where all the countries want more water from an already heavily utilised river. Academic environments in Bergen have a central role in this work.

Our long-standing research collaboration with Africa will be significantly strengthened by the establishment of the Nile Basin Research Programme (NBRP). NBRP is interdisciplinary and covers the fields of the humanities, social sciences, law, science, health and technology. Water-related research in general, and the Nile in particular, is naturally at the top of the research agenda.

Focus will be on resource exploitation and resource shortages, the environment and climate, water and health, socio-economic conditions, and the relationship between the state and society.

Researcher exchange

The Ministry of Foreign Affairs has allocated NOK 44 million for operating expenses for the first four years. Most of the money will cover costs relating to international researchers' stays in Bergen to conduct research, costs of establishing and operating the infrastructure, and the project secretariat at UiB. A new generation of researchers from Bergen will meet colleagues from the countries in the Nile valley in a big research community at the University of Bergen.

NBRP aims to link together researchers from the ten countries in a cooperation programme in which the researchers will stay in Bergen for periods of three to nine months. Short stays at UiB will also be possible for researchers from other countries. Each year during the project period, 20 researchers from the Nile countries will come to UiB. The first group will come in 2007. Many of our employees have contributed to the Nile Basin Research Programme being established in Bergen. The expertise of the academic environments is a critical prerequisite, as is the fact that the governments of all the countries involved have endorsed Bergen as the base for the programme.

Researching shape

What is it that makes us change from a spherical clump of cells to the elongated shape we have as fully-formed individuals? That is the question behind Di Jiang's research.

At some point after conception, when the fertilised egg has split several times, the cells are differentiated and assigned different tasks. But how do they organise themselves in order to form the different organs and tissue types? That is the question which interests Jiang. In his endeavours to find the answer, he is working on a simple model system: Sea squirts (Ascidians).

Model for vertebrates

Ascidians are marine, barrel-shaped, transparent creatures that attach themselves to surfaces. They have two openings, a mouth opening and an anal opening, and they eat algae which they obtain by filtering sea water through their bodies. They reproduce by releasing sperm and eggs into the sea (each individual has both), where the eggs are fertilised. The fertilised egg develops into a tadpole-like larva equipped with a tail, which it uses to swim with in order to find a suitable place to settle and remain for the rest of its life. It is this larva that Jiang is using in his research.

Although it is difficult to imagine, sea squirts belong to the same phylum as human beings: the chordates. The notochord is a cartilage-like support structure with large fluid-filled cells. In humans, the notochord is gradually replaced by a more complex spinal column. Since sea squirts are based on the same principle as vertebrates, although much simpler, they constitute a good model system for studying development processes in the body.

From round to elongated

The question to which Jiang seeks an answer is how a fertilised egg develops into a complex, elongated structure with a head, tail and direction. It turns out that if the notochord cells are removed, the embryo will never elongate. But the notochord also has other functions: It is fluid-filled and therefore provides tension in the larva body. When the muscles contract on one side, the notochord will bend the body backwards. The larva would be paralysed without the notochord. It is useful, therefore, to watch the notochord when studying swimming movements.

The notochord of a sea squirt larva consists of only 40 cells, which is a manageable number. Jiang is studying the process called morphogenesis, when the notochord cells develop into a notochord. This occurs by the cells narrowing, elongating, becoming tube-shaped and finally binding together. The notochord is created in the course of approx. 12 hours.



The internal structure is important

The project period at the Sars International Centre will be used to describe the process in detail, and to find the genes which control morphogenesis. Jiang is studying a species (*Ciona intestinalis*), whose entire DNA has been sequenced, thereby making it suitable for genetic studies. This can then be tested by removing the relevant gene to prove that the larva will not end up the shape it should have had. By creating different mutations and transgenic lines of the species, the process can be studied in many ways.

The actual structure in the cells is also relevant to morphogenesis, and this will also be studied during the course of the project period. This can be done, for example, by using a fluorescent substance which binds with specific proteins in the cell, therefore making it possible to find again later under the microscope.

“The internal structure of a cell has a purpose, just like the furnishing of an office. We will describe in detail how the shape changes, and what happens to the mutants. Will they turn out completely wrong or just a bit wrong? By using this technique to localise different proteins, membranes, secretions through the membrane etc., we hope to be able to map the dynamic changes that occur during the formation of the notochord,” says Jiang.


The Sars International Centre:

The Sars International Centre for Marine Molecular Biology was established in 1997 with the help of funding from the Research Council of Norway, the Norwegian Ministry of Education and Research, and the University of Bergen. The centre is organised into six independent research groups led by an internationally-recruited head of research. Each group has a project period of six years.

The Sars International Centre is a partner in the European Molecular Biology Laboratory (EMBL).



Sea squirts belong to the same phylum as human beings: the chordates. That is why sea squirts constitute a good model system for studying development processes in the body.



Trying to understand mental illness

New techniques can improve our understanding of the cognitive processes in the brain. The biological and medical psychology environments at the University of Bergen would like to use these techniques to improve treatment for mental illness.

Under the leadership of Professor Kenneth Hugdahl, researchers connected to the Bergen fMRI Group have already been studying brain activity and cognitive functions for a long time. Using an interdisciplinary approach, they hope to achieve improved understanding of how cognitive functions such as language and memory change as a result of mental illness. The centre is looking for characteristics of schizophrenia and manic-depressive illness which can contribute to improving diagnosis, prognosis, treatment

and care. This will be done by studying patients who come into contact with the Norwegian public health service, as well as by collecting information from various patient registers.

Cognitive neuroscience has uncovered more aspects of the functional capacity of the brain. The different methods used to map this activity have, however, given an incomplete picture. Today, scholars know a lot about how and when the brain processes information, but the question of how these two qualities relate to each other is still difficult to answer.

Researchers from the fMRI Group have recently shown how fMRI and ERPs (event-related potentials) can be integrated to determine the function's place and time in the brain simultaneously. This makes mapping of mental processes more accurate. In November 2005, this result was published in the journal PNAS, and it has formed the basis for a more complete understanding of the cognitive functions of the brain.

New centre for research-driven innovation

As the requirements for precision in industry and research become more stringent, someone has to make the instruments which can carry out these precise measurements.

Christian Michelsen Research (CMR) and the University of Bergen are collaborating on research which will provide a basis for new instruments in a separate *Centre for Research-driven Innovation*. The fishing industry and the petroleum industry are just two of the sectors which will be able to take advantage of the new innovations.

“Irrespective of the scientific field, there is always a need for more information. Measurement technology is the first step in the information and communications technology (ICT) chain. If you wish to obtain good information about a system or process, you must have good measurements,” says Professor Geir Anton Johansen of the Department of Physics and Technology. He is the University of Bergen’s project manager at the Centre for Research-driven Innovation, coordinated by Christian Michelsen Research; *Industrial Measurement Science and Technology*.

For example, what do environmental monitoring, fisheries management and oil production have in common? Well, their success depends on good measuring instruments. And although the instruments which are used appear to be entirely different from one another, they share a number of important properties.

“The same basic principles are the basis for the technology,” says Professor Johansen. At the centre, they wish to both carry out more research on general underlying principles and to use them in collaboration with industrial partners to develop new, precise and reliable instrumentation technology.

This is called generic technology, which is the foundation and has many applications. The academic environments can then use their expertise to

adapt this technology to a specific need. Look at the fisheries sector for instance: An important challenge for the fishermen and the authorities alike is to have access to good tools with which to measure catches. It would be far too time-consuming for the crew of fishing boats to take one fish at a time out of the net to be measured, weighed and registered, even though this would be the best method.

There is however a better alternative, which was actually developed for use in the North Sea, admittedly in an entirely different sector: Oil production. The same technology which is used to measure how much oil is pumped up from a well can also be used to measure the size of a catch pumped up from a net. Together with researchers at the Department of Biology at the University of Bergen, CMR has developed methods for adapting this technology.

Herein lies the key to the Centre for Industrial Measurement Science and Technology: it has a sound technological base, with specialists who know how this technology can be adapted, as well as representatives of industry and researchers who know where the problems of measurement lie – where there is room for more precise measurements and a more innovative use of the technology that already exists.

The Michelsen Centre for Industrial Measurement Science and Technology

Main research areas:

Measurement science and technology applied for oil and gas, fisheries and the environment, with special focus on:

- subsea systems for processing oil and gas
- systems for measuring fish catches and characterising their quality
- real-time monitoring of the environmental parameters at great ocean depths.

Big in development-related research

Projects coordinated by the University of Bergen received 35 per cent of the national funds allocated by the Norwegian Programme for Development, Research and Education (NUFU).

NUFU has allocated nearly NOK 221 million for the period 2007-2010, NOK 72 million of which will go to research projects at the University of Bergen and the university’s partners. These projects include countries such as Uganda, Tanzania, Ethiopia, South Africa, Bangladesh, Nepal and Vietnam. For the first time, Sudan is also included in a NUFU-project involving the University of Bergen. These allocations also mean that 30 institutions in 18 different countries in the South will receive funds together with their Norwegian partners.

Five network projects and 13 bilateral projects are coordinated by the University of Bergen. In addition, two ongoing projects have received funds through so-called “Supportive Measures”.

The Centre for International Health coordinates eight of the projects, but the whole list is characterised by interdisciplinary cooperation, and

nearly all the faculties are represented. The projects cover health, culture, the environment and marine resources.

The committee at the University of Bergen which has ranked the applications from the university emphasises that the allocations to the projects closely match the priorities and ranking of the institution itself.

Kjersti Fløttum, the University of Bergen’s Vice-Rector for International Relations, emphasises that this gratifying outcome is largely the result of good cooperation between the various faculties and disciplines.

“The preparations and the application process are the result of many people’s effort and work, academically as well as administratively,” says Ms Fløttum. She points to the project “Gender, generation and social mobilisation: Challenges of reproductive health and rights among vulnerable groups in Ethiopia, Sudan and Tanzania” as an example. In this project, UiB is also cooperating with Bergen University College. Astrid Blystad of the Centre for International Health is the project manager. The project, which is now entering its second NUFU period, includes anthropologists, psychologists, historians, social scientists, and nursing science researchers.



World's leading documents in climate research

The Bjerknes Centre for Climate Research (BCCR) seeks to play an active role in the Intergovernmental Panel on Climate Change (IPCC) as part of its strategy to be a leading international research centre in climate research.

The central work of the panel consists of the IPCC reports, which are recognised as the central scientific documents used by politicians all over the world in local and international climate negotiations.

The leader of the IPCC, Dr Rajendra Pachauri, believes that an agreement such as the Kyoto Protocol wouldn't be attainable without the IPCC reports. He visited Bergen when he participated in a working meeting for the Fourth Assessment Report – an event that was hosted by the Bjerknes Centre. The report is expected to be decisive in the negotiations on new measures to curb greenhouse gases scheduled to kick in when the Kyoto pact expires at the end of 2012.

“The Bjerknes Centre is active within the international community of climate research, and its contributions concerning the Arctic area are of particular value. The IPCC also benefits from these contributions. Norway covers a large geographical area with varied weather conditions, and its closeness to the polar circle and high level of skills puts Norway in a beneficial position from which to conduct climate research,” says Dr Pachauri.

The key is in the past

For the first time, a separate chapter is devoted to the paleoclimate, or climate of the past, in the IPCC report, work on which is being led by the director of the Bjerknes Centre, Dr Eystein Jansen. According to him, climate changes now taking place may be as much as five to ten times faster than natural variations of the past.

“A number of recent studies of past climate changes have provided scientific evidence that underline the uniqueness of the ongoing climate changes. It is highly unlikely that the rapid climate changes taking place, with patterns of increasing global temperatures, warming ocean, and melting ice at the poles, are primarily a result of natural changes,” says Dr Jansen.

More extreme weather

A warmer climate is related to more frequent and intense extreme weather such as storms, heavy rainfall, flooding, erosion, heatwaves and drought. There is little doubt among researchers studying processes of climate change that the rapid changes are at least in part a result of CO₂ emissions, or that the consequences will be very serious if we are unable to make extensive cuts in greenhouse gases.

“We need more research on the consequences of climate change; in particular this knowledge is poor for the countries in the South, which are especially vulnerable areas for climate change,” emphasises the leader of the IPCC, Rajendra Pachauri.

Democracy and the Rule of Law

The new priority area, "Democracy and the Rule of Law" provides a good opportunity to consolidate and further develop established academic environments at the Faculty of Social Sciences. Over a long period of time, these environments have built up wide-ranging and solid expertise in systems of government, public administrative policy, administrative reforms and institutional change processes. Attention has also been paid to the media as constitutive of the public space. At the same time, the university's strategic prioritisation of democracy and the rule of law paves the way for academic renewal by recognising the interconnectedness of the social sciences, the humanities and law.

Important participation in "Citizens and Governance"

Two UiB projects have received four million euros each from Eu's Sixth Framework Programme "Citizens and Governance". European citizenship and gendered citizenship are keywords in these projects.

The subject of the EUROSHERE project is the development of European citizenship and how the citizens can participate in supranational communities and politics without coming into conflict with local democratic and political practises. The project has 17 European partners, and it has a new diversity perspective on the public domain, citizenship and participation.

According to the project coordinator, Professor Yngve Lithman, the project will challenge the old idea of the nation state as limited system in Europe, and look into how the public domain can relate to the EU.

More than 150 researchers in Europe take part in EUROSHERE – ranging from lawyers to political scientists, media scientists, social psychologists, anthropologists, sociologists, ethnographers, philosophers and historians. Most of them have backgrounds from studies of citizenship and the public domain. At the University of Bergen alone, between eight and ten researchers will be working on the project, which has a time frame of five years.

The FEMCIT project has 15 partners from nine different countries, and is an extensive European research collaboration which has the women's movements in a multicultural Europe as its topic.

Coordinator Tone Hellesund explains that FEMCIT focuses on how the different women's movements from the 1970s up to the present have laid the foundations for the different types of gendered citizenship in Europe today. Which strategies have been successful, and what has failed? How does this look in different European regions? In order to understand gendered participation in society, one must have a wide concept of what it means to be a citizen, according to Ms Hellesund. In addition to looking into political, social and economic conditions, the project will also emphasise the importance of what one might call multicultural citizenship, physical circumstances and personal sphere to active citizenship. All of these aspects work together in complex

interaction with the gender factor, and create openings for and barriers to participation in society.

- EUROSHERE: Diversity and the European Public Sphere – Towards Citizens Europe. Coordinator: Yngve Lithman. Supervisor: Hacan Sicakkan, both from IMER at the University of Bergen
- FEMCIT: Gendered Citizenship in Multicultural Europe: The Impact of Women's Movements. Coordinator: Tone Hellesund, University of Bergen. Supervisor: Beatrice Halsaa, University of Oslo
- EUROSHERE and FEMCIT are both so-called "integrated projects" within EU's Sixth Framework Programme, and the international competition for project support has been fierce. Out of about one hundred applicants, only 14 were finally accepted, and two of these are from the University of Bergen



FEMCIT-coordinator Tone Hellesund

Putting a price tag on health

The health sector accounts for increasingly large amounts of the public budgets. In the wake of this development, there has been an explosive increase in attention to health economics in recent years.

A combination of tight budgets and rapid developments in medicine and technology brings questions about priorities to the fore. In addition, Norway has been through an extensive reorganisation of the Health Authorities, and this has also created several new health economic problems. The Programme for Health Economics (HEB) will, among other things, help the national health service to prioritise correctly.

“Spectacularly successful”

In the late 90s, the Research Council of Norway initiated a health economic research effort. The University of Bergen and the University of Oslo were both granted funding to establish centres concentrating on this type of research. Six years later, the “Programme for Health Economics” is a well-functioning centre with an academic staff of 34. In an external evaluation report submitted to the Research Council of Norway, HEB was described as being “spectacularly successful”. A Nordic panel of experts carried out an evaluation of the health economic initiative. On the basis of these results, the panel recommended that both the Bergen and the Oslo centres should remain in operation after the trial period ended in 2004. The Research Council acted on the expert panel’s recommendations and awarded the centre an annual grant of NOK 5 million. There are plans to continue the work until 2011.

The Programme for Health Economics is based at the Department of Economics, but is a collaboration between the University of Bergen and the Norwegian School of Economics and Business Administration.

“The answer to the question of whether it pays to start using new medications and new technology is not always yes. It is questions like these that we take a stand on,” says research director Jan Erik Askildsen.

International orientation

At HEB, extensive international cooperation is emphasised. Four members of staff are affiliated with other universities in Europe, which strengthens the international orientation. The centre cooperates particularly closely with the academic environment at the University of York, and there is a desire to recruit researchers from other countries.

The centre recently concluded a research project, partially funded by OECD, which looked into whether there is a connection between social status and the way in which health services are used. Norway is known as a society with a low degree of social inequality. Despite this, results from comparative studies of socio-economic inequalities and health show that Norway is in line with other European countries. The differences between people with low incomes and people with high incomes are small in terms of the use of primary health services. The differences first become apparent in the use of specialist services. Those with high incomes are referred to specialist services much more frequently than those with lower incomes. This corresponds with similar studies conducted other places in Europe.

HEB is planning a more extensive study which will look into the connection between health early in life and health later in life, and the degree to which socio-economic factors influence people’s health.





The Dutch abortion vessel visits Dublin in Ireland. The doctors aboard the boat carry out abortions in international waters. Scientists believe that differences in religious viewpoints regarding sexual roles, is one of the main obstructions to providing Europe with a common constitution.

Europe divided by gender roles

The unification of Europe under one common constitution proved to be a difficult project. Regional gender role variations are pointed out as one of the obstacles on the road to a new constitution, and researchers blame religion.

Researcher Jan Erik Grindheim of the Department of Comparative Politics at the University of Bergen and Professor Kari Elisabeth Børresen of the University of Oslo are coordinating a new research project which looks into the connection between religion and gender role patterns in Europe. The project, which is currently awaiting EU funding, is a collaboration between researchers from 11 European universities. Participants come from a large European network where we are looking into the differences in gender role patterns between the European countries, and how these differences can be explained by the ways in which the patterns are constructed on the basis of a religious perspective. The project has already received top evaluation for relevance in EU's Sixth Framework Programme.

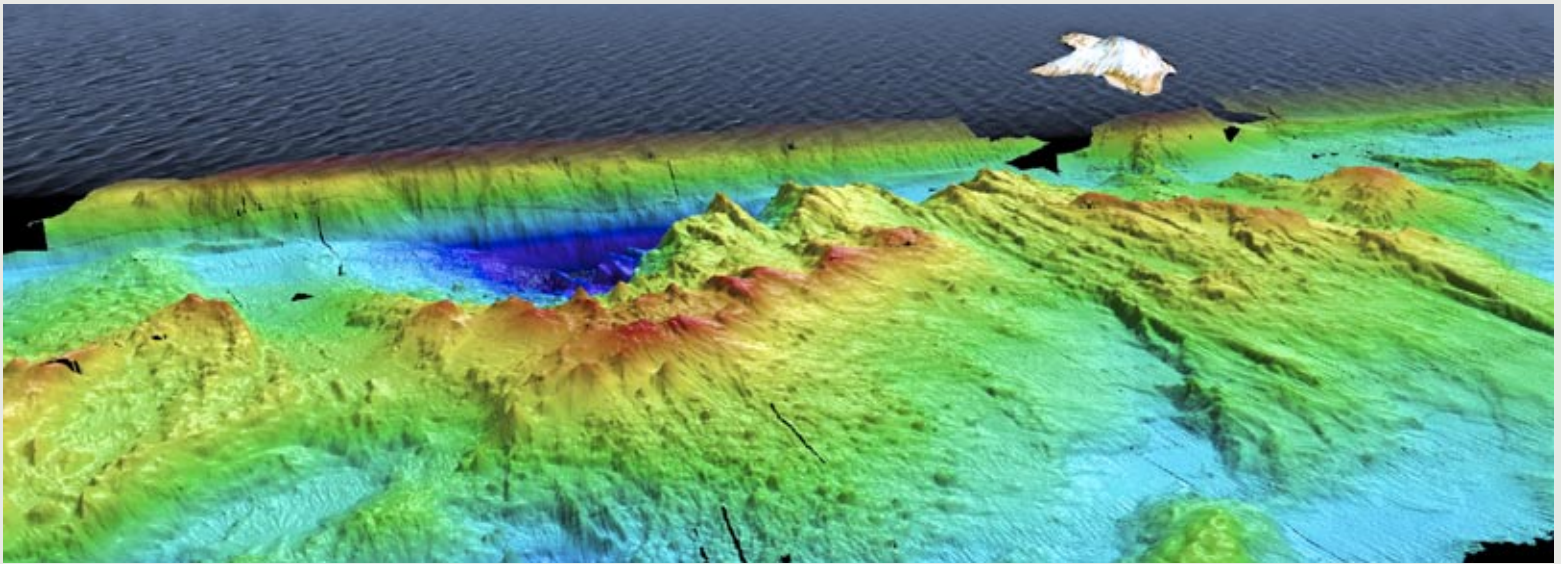
It is common knowledge that there are differences between religions when it comes to views on gender roles and the rights of women.

“There are differing opinions about women’s place in society, both among present and potential EU members, and this European gender role pattern follows religious dividing lines.”

There is a direct causal relationship between the interpretation of religious texts and gender equality politics, according to Jan Erik Grindheim. He feels that gender roles may be a more important source of conflict in the constitution debate than the more traditional political areas.

“The financial issues are not the most difficult ones, for capitalism will always find a way. The major challenges lie in people’s different perspectives on human life, and especially in their views on women’s rights.

These differences in people’s views on women are so great that they will pose problems for the EU constitution project,” says Mr Grindheim.



A research expedition in 2005 discovered the world's northernmost hydrothermal field, north of Jan Mayen.

Fairy-tale world on the seabed

The discovery by the research team on G.O. Sars of a fairy-tale world on the seabed of the Atlantic Ridge in summer 2005 caused an international stir.

The enormous ocean depths are a desert, desolate and pitch black. The floodlight on the mini-sub is showing nothing but desolate wilderness. But then something happens. Suddenly the seabed is carpeted with large mats of rust. The rust mats are iron deposits from iron-oxidising bacteria. The seabed comes to life. The researchers in the instrument room can see sea anemones and shrimp-like crustaceans. Then, suddenly, shadows as tall as factory chimneys rise from the seabed. Close up, jet streams of hot water can be seen streaming out of the chimneys. The minerals in the hot water resemble clouds of smoke when they react with the sea water around them. They are sub-sea hot springs.

The hunt for hot springs

This was the sight that met chemical scientist Rolf-Birger Pedersen and the other participants in the 2005 research expedition which discovered the world's northernmost hydrothermal field, north of Jan Mayen. Mr Pedersen, who is Professor at the Department of Earth Science, led the expedition on the research vessel, G.O. Sars. Along with geologists

and microbiologists from UiB and Oregon State University, he hunted for the sub-sea hot springs along the North Atlantic Ridge. The mini-sub which travelled along the seabed sent up images from a fairy-tale world. Most hydrothermal fields have been found at more southerly latitudes, and the life found there appears to differ from that found further north.

Heated by volcanoes

Hydrothermal fields are driven by sub-sea volcanoes. The water permeates the seabed crust and is heated up by magma with a temperature of 1,200 °C, which has gathered several kilometres below the seabed. It then comes back up wherever it finds an outlet. The water which comes out of the chimneys near Jan Mayen maintains a temperature of 250 to 300 degrees. Down in the crust, the hot water loosens minerals, making it highly toxic when it emerges. The minerals are precipitated when the water comes into contact with sea water and cools down. The tall chimneys are formed by such mineral precipitation, and the bacteria use the mineral-rich water to create energy. In this way, the hot springs create the basis for life. The organisms create energy by means of so-called chemosynthesis, based on chemical energy from the earth's core. Here, we are at the interface between earth science and biology. Micro-organisms affect the conversion of rock types; they form minerals, dissolve rock types and live on the water and minerals.

New sub-sea observatory

The hunt for new hydrothermal fields continues. In summer 2006, researchers from the University of Bergen returned to the field on the Atlantic Ridge to examine the seabed in more detail. Temperature probes were put into place to measure the variations in temperature on the seabed as well as water samplers which continuously take samples. It is necessary to use custom-made titanium bottles in order to be able to take samples of the water which has a temperature of 270 °C.

The researchers at the University of Bergen are involved in an extensive collaboration with the University of Washington in Seattle. On the basis of their expertise and the experience gained from the

Atlantic Ridge project, they have been invited to help establish a sub-sea observatory in the form of a fibre-optic cable in the Pacific Ocean, which will make it possible to study oceanographic, geological and ecological processes in a wide area.

The hunt for more hydrothermal fields in the Atlantic starts in summer 2007. This time the researchers will move northwards in the Arctic environment, right up under the ice in the Arctic Ocean, where they will descend to a depth of 2,000 to 3,000 metres to see if they can find other hydrothermal fields and examine what type of life is to be found there.

Small answers to big questions

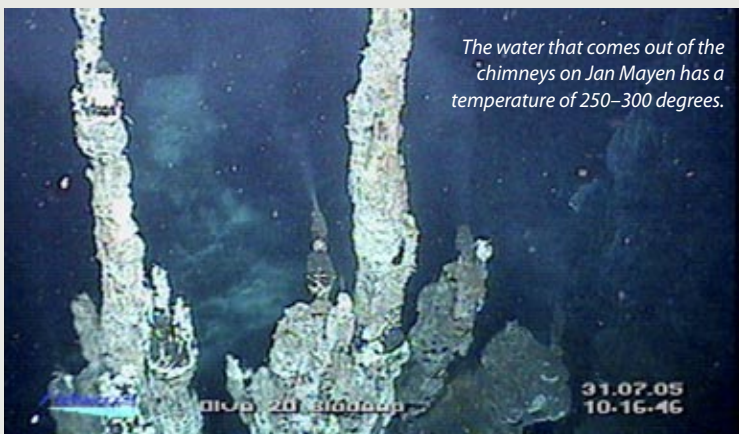
Many of the answers to how the world will develop in the future can be found in micro-organisms and fossils at ocean depths of many hundreds of metres. This area is now being investigated by researchers from the University of Bergen.

The "Biodeep" project is a four-year project funded by the Research Council of Norway. So far, the project has funding until summer 2008.

While cooperation between the academic fields of earth science and microbiology is a relatively new trend at universities in the western world, researchers from these academic fields at the University of Bergen have cooperated for years. This cooperation has now been formalised in a separate geomicrobiology research team. The research team consists of researchers from the Departments of Biology and Earth Science. The goal is for the university to educate its own experts in this young academic field. There are currently eleven academic employees and three PhD students attached to the geomicrobiology team.

It has proved an exciting challenge to get researchers with different backgrounds and terminology to work together. This cooperation is now beginning to bear fruit in the form of exciting finds of micro-organisms and fossils at depths of many hundred metres. Microbiologist Lise Øvreås and Associate Professor in Earth Science, Ingunn Thorseth, head the research team.

"If we are to understand how the conditions for life on earth can be maintained and developed in the future, we must understand the processes that control them. Many of the answers to the earth's unanswered questions are to be found in the micro-organisms and fossils in the ocean depths. Such information will also be important in investigating the possibility of life on other planets," say Ms Øvreås and Ms Thorseth.



The water that comes out of the chimneys on Jan Mayen has a temperature of 250–300 degrees.

Getting to the bottom of political EU language

A large multidisciplinary group of scholars are conducting comparative analyses of political texts concerning the European Union. There is a lot to be read between the lines in political language usage.



Professor Kjersti Fløttum

What are the main differences between Mr Blair's speeches to the British people and the ones he gives in the EU parliament? How does Mr Chirac put his thoughts about the European project into words, and what determines his choice of words? These questions are not riddles reserved for linguists or social scientists. In order to be able to describe, compare and explain political usage of language, it is necessary to unite resources across disciplines.

Seven scholars, headed by Professor Kjersti Fløttum, are in the process of expanding their European network and linking up with a number of Master's students and potential future academic researchers at the University of Bergen. Together, they will analyse different countries' contribution to the European Union debate and look into similarities and differences between a shared European language usage on the one hand and specific national/regional usages on the other. To begin with, they will be looking at political speeches, debates, party programmes and media reports from England, Ireland, Germany and France, but EU-related texts from Sweden and Denmark will also be studied. In addition to the strictly linguistic approach, they also want to increase their knowledge about what triggers the differences in linguistic expression.

"Political texts are so complex that it is difficult to fully appreciate their contents and see them in a greater political and historical context without interdisciplinary cooperation. We have found that this exciting interaction between disciplines from the Faculty of Arts and the Faculty of Social Sciences has opened our eyes to new perspectives and helped us ask the right questions," says Professor Fløttum.

The project is linking up with Master's students from a number of different academic environments who are preparing relevant doctoral projects

Outstanding research on the origin of life

The Centre for Geo-biosphere Research, headed by Prof. Rolf Birger Pedersen, was awarded Centre of Excellence status towards the end of 2006.

The Centre for Geo-biosphere Research: Deep seafloor, deep biosphere & roots of life will gather outstanding researchers from the fields of geo-chemistry, microbiology and molecularbiology, and explore the interaction between the biosphere and the geosphere – the origin of all life.

This presents us with the possibility of further developing the collaboration between geospheric scientists and biologists that has come about during the last five to ten years. We look forward to promoting a new generation of scientists, who will be able to cross the barriers between these two disciplines, says centre head, Prof. Rolf Birger Pedersen. He adds that the new centre is a monument to the long-term construction of strong specialist milieus within the fields of microbiology and geology at UiB, in addition to the commitment to marine studies.

The centre plans, among other things, to develop new instruments for sea bed observatories together with international partners, and a number of laboratories and other experimental setups are also being considered.

See page 28 in this edition of Features

Centre for International Health

Research and training programmes at the Centre for International Health (CIH) focus on poverty-related health problems in low- and middle-income countries. The centre has adopted a broadly-based approach to dealing with international health issues that include the promotion of health, prevention and treatment of diseases, palliative care, rehabilitation and health policy and health services administration.

Topics targeted by students and researchers cover a wide range of disciplines, including public health, clinical and nursing sciences, nutrition, tropical medicine, medical anthropology, demography, epidemiology, and health economics.

www.cih.uib.no

Centre of Excellence

Centre for Medieval Studies (CMS)

CMS vision is to enhance our understanding of Europe as a whole, in the Middle Ages as well as today, from a peripheral point of view. The present transformation of Europe calls for new emphases on the continent's past, not least the period of European origin, the Middle Ages, when the tension between unity and diversity came into being.

About 25 persons are associated with the Centre. Apart from the core staff, doctoral / post doctoral positions and visiting professors/scholars will be associated with CMS. CMS hosts the The Nordic Centre for Medieval Studies (NCMS), a NCoE, that was established in September 2005. The Centre is based on a group medieval scholars from the University of Gothenburg, the Finnish Literature Society & the University of Helsinki, the Centre for Medieval Studies at the University of Southern Denmark, and the Centre for Medieval Studies at the University of Bergen.

www.cms.uib.no

The Holberg International Memorial Prize

The Ludvig Holberg Memorial Fund was established on 1 July 2003. On its inception, the fund's capital was NOK 200 million. The main purpose of the memorial fund is to raise the status of the academic fields of the arts and humanities, social sciences, law and theology.

Professor **Shmuel N. Eisenstadt** was awarded the Holberg International Memorial Prize for 2006. The prize is worth NOK 4.5 million. The Board of the Ludvig Holberg Memorial Fund also awarded the Nils Klim Prize for younger Nordic researchers to Dr art. **Linda Wedlin**. The prize is worth NOK 250,000. A Holberg Prize School Project is also organised annually in order to stimulate interest among children and young people in these academic fields.

The two previous Holberg Prize laureates are Julia Kristeva and Jürgen Habermas.

www.holbergprize.no



Centre for Integrated Petroleum Research (CIPR)

- The Norwegian Centre of Excellence in Petroleum

The main focus for CIPR is to contribute to extending production by increasing recoverable reserves in existing oil and gas fields. Its mission is to combine geology, chemistry, physics and mathematics in order to improve understanding of multiphase flow phenomena in porous media.

CIPR develops reservoir models that provide faster and more reliable reservoir simulations, with the emphasis on heterogeneous reservoirs.

The centre contributes to increased oil recovery by improving understanding of oil recovery mechanisms. CIPR is a collaboration that utilises the combined strengths of experienced petroleum researchers and more than 40 researchers from the following departments at the University of Bergen: Geoscience, Chemistry, Mathematics, Physics and Microbiology.

www.cipr.uib.no

Modern research vessel

The hyper-modern research vessel G.O. Sars is operated by the Institute of Marine Research and is jointly used by ocean scientists, climate researchers and geologists from the Institute and the University of Bergen. The new vessel, which came into operation in 2003, represents the very latest in ocean-going research vessels, as it is capable of performing all types of tasks ranging from seismic measurements to trawling and routine sampling. The vessel replaces the two old ocean-going ships G.O. Sars and Michael Sars. This has brought about a significant improvement in efficiency, not least in terms of a reduction in the number of cruise days. G.O. Sars has been especially important for the performance of major integrated interdisciplinary projects in fisheries, geosciences and climate, such as MAR-ECO.

www.uib.no/gosars



Worldwide Universities Network

International collaboration is a very important part of the University of Bergen's activities and the university is, among other things, a member of the Worldwide Universities Network (WUN). WUN offers partnerships with excellent research institutions around the world, and new collaboration projects are constantly being instigated. WUN is a bottom-up network, in which the initiative for projects comes from the researchers themselves. The network does not finance the research, but initiation funds have been earmarked in the network and at the institutions.

Climate researchers at the University of Bergen were pioneers in the network, as well as staff in the fields of medieval research, education and health. Grid technology at UiB is one of the fields to make most active use of the network. Many of these academic fields are very demanding in terms of resources and, through WUN, the researchers are able to take advantage of each others' facilities.

The University of Bergen and the WUN network have the same overriding goal, i.e. to contribute to research into the major global challenges facing the world. In 2006, the University of Bergen took the initiative to establish a new research group in WUN: Critical Global Poverty.

WUN is an international alliance of leading higher-education institutions. The WUN alliance:

- builds on its partners' commitment to research excellence and innovation in order to develop collaboration in multi-disciplinary areas of global significance
- brings faculties together in communities of interest, and provides the brokering, support, and intellectual venture capital required to facilitate international projects
- provides support for student and faculty exchanges, both within the alliance and with corporate partners
- delivers graduate-level collaborative learning
- enhances student choice and pedagogical effectiveness by sharing learning materials, pooling expertise and developing frameworks for quality assurance and accreditation

www.wun.ac.uk



Research building of the future

The University of Bergen's Building for Basic Biological Research (BBR Building) houses some of the best-isolated test-rooms in the world, as well as state-of-the-art special rooms for research on infectious viruses.

The imposing building, which stands adjacent to Haukeland University Hospital, provides ideal conditions for carrying out advanced medical research.

An extremely advanced ventilation system ensures that air-flows do not become mixed, and in some rooms the atmosphere is kept below ambient pressure, in order that any air carrying infectious agents will not leak out through cracks in the walls and ceiling, in those premises, for example, where research is being done on antibiotic-resistant tuberculosis. The special rooms in the BBR Building are some of the most advanced of their kind anywhere in the world. They are screened against electromagnetic radiation by means of earthed steel plates, in order to allow electrical measurements to be made all the way down to cellular level without interference from external signals. There are also dedicated rooms for dissection practicals and studies of radioactive isotopes, and specially built rooms for making measurements of human brain activity, for example. The physiologists' experimental animals also live in the building, which is equipped with sluices where visitors and users have to shower and change their clothes in order to avoid spreading animal allergens.

www.uib.no/bbb

Technology transfer office in Bergen

Bergen Techtrans Office AS (BTO) is the technology transfer office for the University of Bergen (UiB) and six other research institutions. BTO helps researchers to protect and develop their inventions into commercial products and services. This includes the follow-up and management of Intellectual Property Rights (IPR) in connection with commercially interesting results of research at the respective institutions. BTO also works proactively with a view to building an innovative culture at the university.

Different inventions require different commercialisation strategies. Depending upon the field of the invention, BTO will direct the process towards a spin-out company or collaborate with industry through a license agreement, sale etc.

BTO, which was formed in December 2004, now has a staff of nine. The BTO team is a dedicated group of experts with extensive experience of commercialising new technology, providing legal advice and cultivating a broad network with industry and investors. By acting as the link between research institutions in Bergen and industry, BTO can help researchers with groundbreaking discoveries to introduce their technology to the market, thereby making it available to individuals and society at large.

www.bergento.no



The science centre VILVITE is a new and exciting visitor centre aimed at generating and stimulating interest in the natural sciences and experimental subjects. The science centre, which opened in autumn 2005, aims to be a centre of high international standard. The name VILVITE is a summary of two Norwegian words that plays with the concept of "inquisitiveness".

Science centre of high international standard

The science centre VILVITE is a new and exciting visitor centre aimed at generating and stimulating interest in the natural sciences and experimental subjects.

The science centre, which opened in autumn 2005, aims to be a centre of high international standard.

The University of Bergen is co-owner of the centre, which has received great financial support from Norsk Hydro. Through curiosity and experiments, children, young people and adults can learn more about the natural sciences and technology. Part of the idea behind VILVITE is that it will not be a static experience. Visitors will have an opportunity to use all their senses when exploring the interactive exhibitions on nature, the environment and technology. They can touch, feel, smell, taste, listen and look – basically, they are in direct physical contact with the natural sciences. The science centre also aims to inspire teachers of all grade levels to think in new and different terms about teaching methods and communication.

The centre offers a wide variety of activities. In addition to the exhibitions, pupils and students can try their hand at age-appropriate experiments in the laboratory. Among other things, the centre features a research course for primary-school children, a further education course for teachers, a mobile planetarium and a technology workshop for children and young people.

The exhibitions at VILVITE are concentrated on three main themes: energy, the ocean and weather. There are also other exhibitions focusing on universal themes such as health, food and nutrition.

VILVITE has already entered into cooperation with like-minded science centres such as Experimentarium in Copenhagen and TechniQuest in Wales, thus enabling the centre to take advantage of the experiences of these established science centres, while also developing its own distinctive character. In early 2007, VILVITE will move into completely new premises at Marineholmen, in close proximity to the research milieu.

www.bergenvitensenter.no