



Guide2011

National Centres of Competence in Research

Guide2011

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National Centres of Competence in Research (NCCRs)

Goals and Implementation

In the year 2001 the Swiss National Science Foundation launched the National Centres of Competence in Research (NCCR). The main goal of the currently 27 NCCRs is the promotion of scientific excellence in areas of major strategic importance for the future of Swiss research, economy and society. NCCRs are managed by leading houses institutionally linked to universities or other distinguished research institutions (home institutions). In addition to the research teams at the home institution, an NCCR sets up a network of other research teams across Switzerland. The maximum duration of an NCCR is 12 years. The three underlying principles of NCCRs are:

- **Research:** NCCRs carry out research of excellent quality, spanning basic research to applications. There is a number of individual projects doing the actual research work in each NCCR. The NCCR director ensures the coherence and integration of the individual projects.
- **Knowledge and technology transfer:** NCCRs develop links with the potential users of their results, and involve them in project planning from the outset.
- **Training and promotion of women:** NCCRs create the necessary structures and implement measures required to train young scientists (doctoral and postdoctoral students). Particular attention is paid to the advancement of women in research.

From a research policy point of view, NCCRs should contribute to a better structuring of the Swiss research environment, and to optimised task assignment between research institutions.

NCCRs are funded by the Swiss National Science Foundation (SNSF), participating institutions – in particular the home institutions – and third parties. The 27 existing NCCRs receive a total of CHF 60 million in SNSF funding for 2011.

Calls for submissions to set up NCCRs were first made in January 1999. Priority was given to four areas of research: life sciences, social sciences and humanities, sustainable development and environment, and information and communication technologies. A share of the overall budget was also made available to projects involving promising topics from outside these priority areas. The SNSF assessed the projects in two stages: a pre-proposal stage, with 82 projects submitted, and a full-proposal stage, with 34 submissions. The SNSF presented 18 full proposals of outstanding merit to the Federal Department of Home Affairs, which made the final selection of 14 NCCRs according to federal research policy in December 2000.

A second call for NCCRs in the field of Social Sciences and Humanities was launched in October 2003. After a thorough evaluation of 44 pre-proposals and 17 full proposals 6 new NCCRs started in autumn 2005.

A third call launched in 2008 was open for all scientific fields. It resulted in the submission of 54 pre-proposals in December 2008 and of 28 full proposals in September 2009. In March 2010 another 8 NCCRs were approved for funding.

In summer 2009 several NCCRs could profit from the economic stimulus package decided by the Swiss government and parliament in order to fight the economic crisis. 28 out of 43 projects submitted jointly by NCCRs and companies were accepted. They will run for 2 years and focus on the transfer of results into practical applications.

Within the SNSF, Division IV of the National Research Council is responsible for NCCRs. An international Review Panel is set up for each NCCR to assess its progress regularly.

The NCCRs at a glance

1st Call of NCCRs

Short Name	NCCR-Director	Home Institution	Web Address
Climate	Prof. Stocker Thomas	University of Berne	www.nccr-climate.unibe.ch
CO-ME	Prof. Székely Gábor	ETH Zurich	co-me.ch
FINRISK	Prof. Habib Michel	University of Zurich	www.nccr-finrisk.uzh.ch
Genetics	Prof. Duboule Denis	University of Geneva	www.frontiers-in-genetics.org
IM2	Prof. Bourlard Hervé	Idiap Research Institute, Martigny	www.im2.ch
MaNEP	Prof. Fischer Øystein	University of Geneva	www.manep.ch
MICS	Prof. Aberer Karl	EPF Lausanne	www.mics.org
Molecular Oncology	Prof. Aguet Michel	EPF Lausanne	www.nccr-oncology.ch
Nanoscale Science	Prof. Schönenberger Christian	University of Basel	www.nccr-nano.org
Neuro	Prof. Schwab Martin	University of Zurich	www.nccr-neuro.uzh.ch
North-South	Prof. Hurni Hans	University of Berne	www.north-south.unibe.ch
Plant Survival	Prof. Turlings Ted	University of Neuchâtel	www.unine.ch/plantsurvival
Quantum Photonics	Prof. Devaud-Plédran Benoît	EPF Lausanne	nccr-qp.epfl.ch
Structural Biology	Prof. Grütter Markus	University of Zurich	www.structuralbiology.uzh.ch

2nd Call of NCCRs

Short Name	NCCR-Director	Home Institution	Web Address
Affective Sciences	Prof. Scherer Klaus	University of Geneva	www.affective-sciences.org www.sciences-affectives.ch
Democracy	Prof. Kriesi Hanspeter	University of Zurich	www.nccr-democracy.uzh.ch
Iconic Criticism	Prof. Boehm Gottfried	University of Basel	www.eikones.ch
Mediality	Prof. Kiening Christian	University of Zurich	www.mediality.ch
SESAM*	Prof. Margraf Jürgen	University of Basel	www.sesamswiss.ch
Trade Regulation	Prof. Cottier Thomas	University of Berne	www.nccr-trade.ch

* Terminated in 2010

3rd Call of NCCRs

Short Name	NCCR-Director	Home Institution	Web Address
Chemical Biology	Prof. Howard Riezman	University of Geneva, EPF Lausanne	www.nccr-chembio.ch
Kidney.CH	Prof. François Verrey	University of Zurich	www.nccr-kidney.ch
LIVES	Prof. Dario Spini	University of Lausanne, University of Geneva	www.lives-nccr.ch
MUST	Prof. Ursula Keller	ETH Zurich, University of Berne	www.nccr-must.ch
QSIT	Prof. Klaus Ensslin	ETH Zurich, University of Basel	www.nccr-qsit.ethz.ch
Robotics	Prof. Dario Floreano	EPF Lausanne	www.nccr-robotics.ch
SYNAPSY	Prof. Pierre Magistretti	EPF Lausanne, University of Lausanne, University of Geneva	www.nccr-synapsy.ch
TransCure	Prof. Matthias A. Hediger	University of Berne	www.transcure.org

Output in 2001 - 2009

(1st and 2nd Call of NCCRs)

Type	2001 - 2006	2006 - 2009
Scientific papers	7 100	10 400
Presentations at congresses and fairs	6 700	11 400
Patents/licences	126	142
Start up companies ¹	17	35
Prototypes, demonstrators, processes	131	250
Cooperations with private sector	277	630
CTI projects ²	28 ³	41 ⁴

¹ Built up or encouraged by the NCCRs

² CTI: Innovation Promotion Agency of the Swiss Government funding cooperation projects with industry

³ The total amount of the 28 projects is about CHF 31.7 Mio.

⁴ The total amount of the 41 projects is about CHF 40.8 Mio.

Total of funds in 2001 - 2004

(1st Call of NCCRs)

Funding source (CHF)	2001	2002	2003	2004	Total	%
SNSF funding	51 034 237	57 303 066	58 114 035	57 607 320	224 058 658	37
Self-funding from home institutions ¹	18 685 602	20 762 660	19 157 137	19 722 980	78 328 379	13
Self-funding from project participants	39 364 540	51 884 528	64 851 723	69 156 289	225 257 080	37
Third-party funding ²	8 861 639	16 620 401	27 986 869	29 546 417	83 015 326	13
Total	117 946 018	146 570 655	170 109 764	176 033 006	610 659 443	100

¹ Personnel costs, equipment and consumables, not included infrastructure and basic equipment

² Not included is CTI funding (cf. above)

Total of funds in 2005 - 2008

(1st and 2nd Call of NCCRs)

Funding source (CHF)	2005	2006	2007	2008	Total	%
SNSF funding	66 955 000	65 567 000	63 341 000	61 537 000	257 400 000	35
Self-funding from home institutions ¹	21 117 710	23 852 187	22 725 242	26 198 486	93 893 625	13
Self-funding from other institutions ²	6 095 240	5 677 322	5 153 897	4 729 639	21 656 098	3
Self-funding from project participants	68 003 946	72 138 404	65 352 264	60 880 145	266 374 759	36
Third-party funding ³	30 212 890	20 912 240	22 998 884	19 017 270	93 141 284	13
Total	192 384 786	188 147 153	179 571 287	172 362 540	732 465 766	100

¹ Personnel costs, equipment and consumables, not included infrastructure and basic equipment

² See the NCCRs Molecular Oncology, Neuro and Structural Biology

³ Not included is CTI funding (cf. page 6 and some NCCRs)

Total of funds in 2009 - 2012

(1st and 2nd Call of NCCRs)

Funding source (CHF)	2009	2010	2011	2012	Total	%
SNSF funding	55 547 767 ¹	44 910 000 ¹	34 895 000	21 995 000	156 340 000	31
Self-funding from home institutions ²	22 113 229	24 233 498	19 299 083	20 723 631	85 704 430	17
Self-funding from other institutions ²	2 195 500	2 211 500	2 211 500	2 211 500	8 830 000	2
Self-funding from project participants	83 156 699 ¹	45 543 091 ¹	41 839 720	36 245 686	206 785 196	40
Third-party funding ³	14 374 893 ¹	15 322 612	12 248 754	13 284 465	55 230 724	11
Total	177 388 088	132 714 701	110 973 057	84 954 282	516 030 128	100

¹ Personnel costs, equipment and consumables, not included infrastructure and basic equipment

² See the NCCRs Molecular Oncology, Neuro and Structural Biology

³ Not included is CTI funding (cf. page 6 and some NCCRs)

⁴ Included funding of economic stimulus package projects

Total of persons involved in the NCCRs in the last reporting period (12 months)

(1st and 2nd Call of NCCRs)

Personnel	Total of Persons	Female	%	Male	%	Swiss	Other Nations
Management	76 ¹	118	46	138	54	153	103
Master students	80	40	50	40	50	60	20
Doctoral students	1121	425	38	696	62	395	735
Postdoctoral students	547	182	33	365	67	96	451
Research associates	160	60	38	100	63	75	85
Senior researchers ²	1143	232	20	911	80	196	947
Other staff	416	216	52	200	48	259	157
Total	3580	1273	34	2450	66	1234	2498

¹ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

² Including leaders of the individual projects and other organisational units of the NCCRs

Molecular Oncology – From Basic Research to Therapeutic Approaches

NCCR Molecular Oncology

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EPFL, Lausanne

Start of the NCCR

May 1, 2001

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Public Relations

- Newsletter NCCR
- News and press coverage on website
- Press releases

Research

Cell Signaling in Tumor Development and Metastasis

The progesterone-Wnt connection and early events in human breast carcinogenesis

Head: Brisken C.

Mechanisms controlling tissue homeostasis and their role in cancerogenesis and metastasis

H: Hülsken J.

Sarcoma-development and the role of the tumor stroma

H: Stamenkovic I.

The role of IL-1 in tumorigenesis

H: Tschopp J.

Large-scale analysis of functional genomics data

H: Delorenzi M.

Epigenetics and gene expression signatures in human glioblastoma and glioma stem like cells and implications for tumor biology and treatment of cancer

H: Hegi M.

Regulation of colorectal cancer progression

H: Petrova T.

Heads of Individual Research Projects

Aguet Michel, Prof.

Brisken Cathrin, Prof.

Christofori Gerhard, Prof.

Delorenzi Mauro, Dr.

Hegi Monika, Dr.

Hülsken Jörg, Prof.

Kraehenbuhl Jean-Pierre, Prof.

Michielin Olivier, Prof.

Petrova Tatiana, Dr.

Romero Pedro, Prof.

BCL9/BCL9L as targets for suppression of cancer stem cells and restoring susceptibility to therapy in colon and other cancers

H: Aguet M.

Tumor Angiogenesis

Impact of antiangiogenic treatments on tumor evolution and tumor microenvironment

H: Rüegg C.

The molecular regulation of tumor lymphangiogenesis and lymphnode metastasis

H: Christofori G.

Role of lymphatic vessels in cancer invasion and metastasis

H: Swartz M.

Tumor Immunity and Cancer Immunotherapy

Analysis of in vivo differentiation and function, and molecular dissection of antigen specific CD8 T cells before and after immunotherapy of melanoma patients

H: Speiser D.

Rufer N.

Structural design of peptide/MHC and T cell receptor interactions

H: Michielin O.

Economic stimulus package

Integrative data analysis in development of prognostic lung cancer assay

H: Delorenzi M., Kroll W.

Cancer stem cells as research and diagnostic targets

H: Huelsken J., Donzé O.

Education

Oncology Online: Development of a web-based oncology teaching program

H: Kraehenbuhl J.-P.

Topics

Cancer cells are defective in basic processes controlling cell differentiation and proliferation, genome stability and programmed cell death. They acquire capacities to invade tissues, to stimulate angiogenesis, and to elicit innate and in some instances specific immune responses. The Swiss Institute for Experimental Cancer Research (ISREC), an institute of the School of Life Sciences of the Ecole Polytechnique Fédérale de Lausanne (EPFL), forms together with several partner institutes (Ludwig Institute for Cancer Research, Department of Biochemistry of the University of Lausanne, Swiss Institute of Bioinformatics) a biomedical research network in Lausanne. The re-

search focuses on different aspects of basic tumor biology and the host response to cancer. Work at ISREC centers on the discovery of genes that play important roles in tumorigenesis and metastasis, using genetic approaches in human cancer cell lines and model organisms. A research module integrating projects from the EPFL and the Universities of Basel and Fribourg investigates the role of blood and lymph vessels in tumor invasion and metastasis. Other groups in the ISREC and the Ludwig Institute for Cancer Research elucidate the mechanisms that control immune responses to cancer. Research projects in external institutes and clinics, also in other parts

of Switzerland, complement the research portfolio of this cancer research program.

The projects of the NCCR Molecular Oncology form a basis for the design of novel approaches to cancer therapy, and the program provides us with the means to explore such prospects, through cooperation with our partners in different University hospitals. The NCCR has also been essential for supporting technology development and core facilities necessary for such clinically oriented research. Finally, the program provides training opportunities for MD/PhDs to foster the development of translational oncology in Switzerland.

Third Party Cooperation

(in progress)

Programs

- CCRP
- LYMPHANGIOGENOMICS
- TuMIC (FP7)

Research Institutions

- A.I. Virtanen Institute for Molecular Sciences, University of Kuopio, FI
- Brain Tumor Group, European Organization for Research and Treatment of Cancer, Brussels, BE
- Brain Tumor Group, Radiotherapy Oncology Group, Philadelphia, US
- Cerebral Tumor Research Group, Cancer Genetics Laboratory, Institute of Medical Research, Royal North Shore Hospital, St. Leonards, AU
- Department of Immunohematology and Blood Transfusion, Leiden University Medical Center, NL
- Department of Molecular Embryology, Max-Planck Institute for Immunobiology, Freiburg, DE
- Department of Physics of Complex Systems, Weizmann Institute of Science, Rehovot, IL
- Department of Public Health, University of California, San Francisco, US
- Department of Surgical Oncology, Erasmus University Hospital, Rotterdam, NL
- European School of Oncology, Milan, IT
- Faculty of Medicine and Science, Garvan Institute of Medical Research, Sydney, AU
- HIV Vaccine Trials Network, Seattle, US
- Hubrecht Laboratory, Utrecht, NL
- IFOM-IEO, Milan, IT
- Impact du Microenvironnement sur l'Angiogenèse et l'Invasion Tumorale, Centre de Recherche INSERM, Strasbourg, FR
- Institut de Génétique et de Biologie Moléculaire et Cellulaire, Université Louis Pasteur, Illkirch, FR
- Institute of Molecular Medicine, University of Lisbon, PT
- Instituto de Investigaciones Biomedicas, Madrid, ES
- Laboratory of Cellular Oncology, National Cancer Institute, Frederick, US
- National Institute of Allergy and Infectious Diseases, National Institutes of Health, Bethesda, US
- Research and Development Center, National Cancer Institute, Frederick, US
- University of Japan, JP
- US National Institutes of Health, San Francisco, US

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Department of Biochemistry, University of Lausanne
Institut of Bioengineering, EPF Lausanne

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Department of Biochemistry of the University of Lausanne DB, UNIL
Swiss Institute of Bioinformatics SIB, Lausanne Branch
Centre Pluridisciplinaire d'Oncologie CePO
Centre Hospitalier Universitaire Vaudois CHUV
Department of Medicine, University of Fribourg

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Rommelaere Jean, Prof. Deutsches Krebsforschungszentrum DKFZ, Heidelberg, DE

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Molecular Oncology – From Basic Research to Therapeutic Approaches

NCCR Molecular Oncology

Economy / Industry

- Adipogen SA, Epalinges, CH
- Animatrix GmbH, Basel, CH
- Apoxis SA, Lausanne, CH
- AstraZeneca (UK) Ltd, London, GB
- Bayer-Schering Pharma, Wuppertal, DE
- Boehringer Ingelheim Pharma, Vienna, AT
- Bracco Research SA, Geneva, CH
- BTG International Ltd., London, GB
- Cytos Biotechnology Inc, Zürich, CH
- Diagnoplex Sàrl, Epalinges, CH
- Glaxo Smith Kline, PA, US
- Ipsogen SAS, Marseille, FR
- Merck Serono International S.A., Geneva, CH
- Merck-Serono, Darmstadt, DE
- Novartis AG, Basel, CH
- Novartis Pharma, Bern, CH
- OncoMethylome Sciences, Inc., Liège, BE
- Pfizer, La Jolla, CA, US
- Pfizer AG, Zurich, CH
- Pfizer, Inc., New London, US
- Roche AG, Basel, CH
- Sanofi-Aventis, Paris, FR
- Transgene S.A., Strasbourg, FR
- Xigen SA, Lausanne, CH

Others

- Association pour la recherche sur le Cancer, Villejuif, FR
- Bourse Basque, France, FR
- Emma Muschamp Foundation, Lausanne, CH
- European School of Oncology, Milan, IT
- EuroVacc Foundation, Lausanne, CH
- Fondation ISREC, Epalinges, CH
- Fondation Leenaards, Lausanne, CH
- HIV Vaccine Trials Network, Seattle, US
- International Clinical Study Program, New York, US
- Medic Foundation, Lausanne, CH
- Office Fédérale de la Santé public, Bern, CH
- OncoSuisse, Bern, CH
- Swiss Group for Clinical Cancer Research, Bern, CH
- Wilhelm Sander Stiftung, Munich, DE

Achievements of the previous years

New spirit

The NCCR has created a new spirit of greater mutual interest across the borders between basic and clinical research. Several collaborative projects involving scientists at ISREC and more clinically oriented research groups at the University Hospital Lausanne (CHUV) and other Swiss university clinics have been started. Some of these projects include partnerships with pharmaceutical companies (e.g. Pfizer).

New insights

Novel molecular events underlying the development of certain tumour types have been elucidated. Cell types from which these tumours arise have been identified. Mechanisms, which control cell division and the degree of specialization of normal cells have been unravelled and may prove relevant for malignant tumour progression. New models to investigate the development of tumour metastases in distant organs have been established. These discoveries provide a basis for the identification and validation of novel therapeutic approaches.

New therapeutic developments

A clinical study has been completed to investigate how tumours control their blood supply. A further clinical trial is currently

underway to assess the efficacy of anti-angiogenic therapy in patients with head and neck tumours. Novel strategies have been developed to direct the patient's immune system against the tumour. Immunisation of melanoma patients with tumour derived antigens proved to be successful in eliciting a strong tumour specific immune response.

A vaccine against papillomaviruses has been developed as treatment against cervix carcinomas, which in a vast majority are associated with papillomavirus infections. The vaccine has been proven to be safe and is currently being tested in patients.

The pattern of differentially regulated genes has been analysed in several human tumour types (breast, brain, skin). Results from such studies allowed identifying new tumour subtypes and in some cases new prognostic markers. They may eventually lead to the identification of gene profiles, which are predictive of a response to therapy.

New research groups

Five new positions for junior research group leaders equivalent to assistant professorships have been created to strengthen advanced biocomputing and research that is directly cancer relevant.

New technologies

The NCCR Molecular Oncology allowed to establish or strengthen important technology platforms. The animal facility allowed the development of novel cancer mouse models, which mimic the genetic alterations and the behavior of human tumours and are indispensable for the validation of new therapeutic targets. The DNA array and bioinformatics core facilities supported several novel cancer relevant projects at the interface to the clinic.

Training

The NCCR Molecular Oncology provides education and training in cancer research at several levels. It participates and strengthens the ISREC International PhD Programme and the MD/PhD programme of the University of Lausanne, providing medical doctors with an opportunity to carry out a PhD thesis in molecular oncology. The NCCR presently supports the training of approximately 30 PhD students and 30 postdoctoral fellows. NCCR advanced courses in microscopy, imaging and morphology have been carried out by the NCCR imaging facility (MIM) for users including students from the University of Lausanne and the EPFL.

Further information see www.nccr-oncology.ch

Statistical Input – Output Data

Funding source (CHF)	Year 9	Year 10	Year 11	Year 12	Total	%
SNSF funding	490 000	3 490 000	3 000 000	1 500 000	8 480 000	30
Self-funding from home institution ¹	1 139 682	793 205	793 205	793 205	3 519 297	12
Self-funding from University of Lausanne	700 000	700 000	700 000	700 000	2 800 000	10
Self-funding from project participants	2 302 262 ⁶	1 687 911 ⁶	1 687 911	1 687 911	7 365 995	26
Third-party funding ²	1 213 666 ⁶	1 700 721 ⁶	1 700 721	1 700 721	6 315 829	22
Total	5 845 610	8 371 837	7 881 837	6 381 837	28 481 121	100

Personnel ³	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							FR	DE	IT	US	ES	
Management	1.70 ⁴	1	14	6	86	4	0	1	0	1	0	0
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	28	17	61	11	39	11	1	1	4	0	0	9
Postdoctoral students	49	26	53	23	47	7	7	3	5	2	4	20
Research associates	5	4	80	1	20	2	1	2	0	0	0	0
Senior researchers ⁵	31	9	29	22	71	1	1	0	3	0	0	3
Other staff	28	18	64	10	36	12	4	5	1	1	2	2
Total	142.70	75	51	73	49	37	14	12	13	4	6	34

¹ Personnel costs, equipment and consumables, not included infrastructure and basic equipment

² Not included is CTI funding (cf. page 6). Since the start of the NCCR 1 project has been funded by CTI at a total amount of 1.1 million CHF.

³ Persons involved in the NCCR in the last reporting period (12 months)

⁴ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁵ Including leaders of the individual projects and other organisational units of the NCCR

⁶ Included funding of economic stimulus package (cf. project list)

Evaluation and Monitoring by the Swiss National Science Foundation (SNSF)

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Frontiers in Genetics – Genes, Chromosomes and Development

NCCR Genetics

Home Institution

University of Geneva

Start of the NCCR

July 1, 2001

NCCR Management

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Knowledge and Technology Transfer

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Rodriguez Ivan, Prof.

Advancement of Women

Suarez Mougli, Dr.

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Public Relations

- New section on our web site: "Genetics for All"
- Forum of biology (in coordination with the Swiss television - TSR1)
- Press Releases, news and advertisements
- Leaflets (English & French)
- Weeks of study for secondary school students
- Public events (open doors, teachings, trainings, exhibitions)
- Meetings

Research

Work Package 1

Novel approaches in functional genomics

Coordinator: Trono D.

Members: Antonarakis S., Basler K., Deplancke B., Dermitzakis E., Duboule D., Karch F., Rodriguez I., Roska B., Schibler U., Wahli W.

Work Package 2

Energy homeostasis

Coordinator: Thorens B.

Members: Hernandez N., Herrera P., Nef S., Schibler U., Wahli W.

Work Package 3

The dialog between DNA and the nucleus influences gene expression and replication

Coordinator: Shore D.

Members: Gasser S., Halazonetis T., Laemmli U., Lingner J., Stutz F.

Technological Platforms, Programs etc.

Genomics platform (Genotyping and transcriptome profiling)

Manager: Descombes P.

Bioimaging platform (Image analysis)

Manager: Bauer C.

Fly C31

H: Basler K.

Metabolic Evaluation Facility

H: Torens B.

Lentiviral Vectors

H: Trono D.

Doctoral School

Supervisors: Rodriguez I., Suarez M.

Heads of Individual Research Projects

Antonarakis Stylianos E., Prof.

Basler Konrad, Prof.
Deplancke Bart, Prof.
Dermitzakis Emanouil, Prof.

Duboule Denis, Prof.

Gasser Susan M., Prof.
Gonzalez-Gaitan Marcos, Prof.
Gotta Monica, Prof.

Halazonetis Thanos, Prof.
Hernandez Nouria, Prof.
Herrera Pedro, Dr.
Herr Winship, Prof.

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Laboratoire de Génétique et Biologie des Systèmes, EPFL
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Département de Morphologie, Université de Genève
Centre Intégré de Génomique, Université de Lausanne

Topics

The general goal of the NCCR Frontiers in Genetics – Genes, Chromosomes and Development is to understand the function and regulation of genes during the development of cells and organisms. These fundamental problems are tackled at four different levels, namely at the level of genes, of chromosomes, of the whole cell and of the entire organism. In order to reach excellence in this domain, it is necessary to bridge the gaps between these levels. The NCCR Genetics contributes to diminish these gaps by creating a network of scientist, which work together on

common projects (organized as Work-Packages, WP). These WPs provide an ideal forum for the in-depth discussion of scientific issues by all interested persons (including post-doctoral fellows and students). The aim of the third phase (2009-2013) is to complete the integration of its educational and scientific program within the participating institutions. In this view, three work packages were implemented, in collaboration with the three institutions of the Lemanic region and the on-site technological platforms that have been developed by these institu-

tions in close contacts with the NCCR.

Some projects directly related to technological development are pursued in the context of our technological platforms. These platforms are shared common facilities in which the latest technologies in Genomics and Bioimaging are available for the regional scientific community.

Another major goal is to offer the best graduate school in genetics. We believe that to pursue top science, we need to attract the best students worldwide and “create” the next generation of top scientists by teaching.

Third Party Cooperation

(in progress)

Programmes

- CONSERT
- CRESCENDO
- EUCLOCK
- EUMODIC
- Euro-Bioimaging initiative
- EuroDYNA
- Human Frontiers Science Program
- Persist
- Telomarker

Research Institutions

- Biological Sciences -Neurobiology, Columbia University, New York, US
- Cell Biology and Genetics, Erasmus University Rotterdam, NL
- Cell Biology Division, New York University School of Medicine, US
- Center of Genome Regulation, University of Barcelona, ES
- Clinical Molecular Biology, Kyoto University, JP
- Department Head of Developmental Biology, Hagedorn Research Institute, Gentofte, DK
- Department of Biochemistry and Molecular Biology, University of Georgia, Athens, US
- Department of Biochemistry and Molecular Biophysics, Columbia University, New York, US
- Department of Biochemistry, Erasmus University Medical Center, Rotterdam, NL
- Department of Cell Biology, Albert Einstein College of Medicine, New York, US
- Department of Computer Science, Washington University, St. Louis, US
- Department of Developmental Biology, University of Texas Southwestern, Dallas, US
- Department of Genetics and Microbiology, University of Pavia, IT
- Department of Medicine, Medical University Graz, AT
- Department of Veterinary and Comparative Anatomy, Washington, US
- Developmental Biology Unit, European Molecular Biology Laboratory, Heidelberg, DE
- Division of Gene Therapy, University of Ulm, DE
- Université de Bourgogne, Dijon, FR
- Faculty of Applied Biological Science, Hiroshima University, JP
- Faculty of Pharmacy-Ste-Justine Hospital, University of Montreal, CA

Karch François, Dr.

Laemmler Ulrich K., Prof.

Lingner Joachim, Dr.

Loewith Robbie, Prof.

Nef Serge, Dr.

Rodriguez Ivan, Prof.

Roska Botond, Dr.

Schibler Ueli, Prof.

Shore David M., Prof.

Stutz Françoise, Dr.

Thorens Bernard, Prof.

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Département de Biologie Cellulaire, Université de Genève

Centre Intégréatif de Génomique, Université de Lausanne

Ecole Polytechnique Fédérale de Lausanne

Centre Intégréatif de Génomique, Université de Lausanne

- Gene Expression and Regulation Program, Wistar Institute, Philadelphia, US
- Graduate School of Biological Sciences, Nara Institute of Science and Technology, Nara, JP
- Health Science Center, University of Utah, Salt Lake City, US
- Institut de Génétique Humaine, Université de Montpellier, FR
- Institute for Molecular Biology, Hannover Medical School, DE
- Institut Jacques Monod, Université Paris Diderot, FR
- Institut National de la Santé et de la Recherche Médicale, Université de Lille, FR
- Instituto de Bioquímica Vegetal y Fitoquímica, Universidad de Sevilla, ES
- Jussieu Paris I, FR
- Max Planck Institute for Biophysical Chemistry, Göttingen, DE
- Max Planck Institute for Experimental Endocrinology, Hannover, DE
- Max Planck Institute for Molecular Biology, Munich, DE
- MRC University of Edinburgh, Centre for Inflammation Research, Scotland, GB
- Muséum National d'Histoire Naturelle, Paris, FR
- Neuroscience Center, University of North Carolina, Chapel Hill, US
- European Molecular Biology Organization, Heidelberg, DE
- Genetics and Development, Montreal, CA
- Pathologies Nutritionnelles et Métaboliques, Institut Biomédical des Cordeliers, Paris, FR
- Quantitative Biology and Bioinformatics Group, Technical Research Centre of Finland, Helsinki, FI
- School of Biological Sciences, Nanyang Technological University, Singapore, SG
- Section on Developmental Neurobiology, National Institutes of Health, Washington DC, US
- Stowers Institute for Medical Research, Molecular Biology, Kansas City, US
- Systems Neurobiology Laboratories, Salk Institute for Biological Studies, La Jolla, US
- Telethon Institute of Genetics and Medicine, Naples, IT
- Unité d'Endocrinologie et Métabolisme, Université Catholique de Louvain, Brussels, BE
- Université de Rennes, FR

Achievements of the previous years

Research

NCCR funding not only has reinforced the scientific productivity of many member groups, allowing them to stay at the forefront of international competition in their respective fields of research, but has also allowed the emergence of younger group leaders. Collaborative projects are now delivering and a new culture of networking has been installed.

Education

Our doctoral school is up and running. The organization of an international program, while promoting a strong national participation, was a challenge. This school is unique in Switzerland and its access is extremely competitive. The first PhD's were granted in 2007 and the school is now at cruising speed.

Technological platforms

NCCR funding has been an essential trigger to equip the Lemanic region with state-of-the-art technological platforms, in particular in genomics technologies, which would otherwise

have been beyond our means. These platforms are very successful and heavily used by customers from the entire country, including clinicians or scientists working in research areas unrelated to those pursued by the NCCR itself. Frontiers in Genetics, via its direct link with the SVS program (Life, Sciences and Society), has also been instrumental in launching a common structure for animal houses in the Lausanne-Geneva area.

Infrastructural effects

The NCCR had a major impact on the local scientific priorities within the Faculties of science and medicine of the host institution, in terms of budget, positions and infrastructures. Genetics has been declared as one of the six general research priorities by the new rector of Geneva University. The Centre for Integrative Genomics (CIG), launched via the SVS program at the University of Lausanne, is fully running and the EPFL is actively reinforcing basic research in Genetics.

The NCCR, via Swiss Genomics, an initiative launched by the three Lemanic institutions, was a key partner in the transition from SystemsX, an initiative from the ETH with several Frontiers in Genetics members at its origin, towards a wider and more inclusive program accepted by the federal government, now referred to as SystemsX.ch. Three members of our NCCR are part of the executive board of this operation, and a fourth sits on its board of directors.

Visibility, public understanding of science

Frontiers in Genetics has continued to support numerous scientific events (local or national conferences and public manifestations) and has strengthened its collaborations with the local press. The NCCR's visibility is also ensured all year around through its leading activity of the forum Questions à un biologiste on the website of the Télévision Suisse Romande.

Further information see www.frontiers-in-genetics.org

Statistical Input – Output Data

Funding source (CHF)	Year 9	Year 10	Year 11	Year 12	Total	%
SNSF funding	3 500 000	2 000 000	2 000 000	1 000 000	8 500 000	43
Self-funding from home institution ¹	3 444 725	500 000	500 000	750 000	5 194 725	26
Self-funding from project participants ²	4 850 862	0	0	0	4 850 862	24
Third-party funding	1 336 026	0	0	0	1 336 026	7
Total	13 131 613	2 500 000	2 500 000	1 750 000	19 881 613	100

Personnel ²	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							FR	IT	DE	GB	US	
Management	3.20 ³	3	20	12	80	7	1	2	0	0	2	2
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	54	23	43	31	57	23	7	3	3	5	1	8
Postdoctoral students	41	14	34	27	66	4	11	6	1	2	1	15
Research associates	4	3	75	1	25	1	2	0	0	0	0	1
Senior researchers ⁴	23	3	13	20	87	4	2	0	2	0	0	1
Other staff	42	29	69	13	31	24	14	2	0	0	0	0
Total	167.20	75	42	104	58	63	37	13	6	7	4	27

¹ Personnel costs, equipment and consumables, not included infrastructure and basic equipment

² Persons involved in the NCCR in the last reporting period (12 months)

³ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁴ Including leaders of the individual projects and other organisational units of the NCCR

Evaluation and Monitoring by the Swiss National Science Foundation (SNSF)

Members of the Review Panel

Kléber André, Prof. (Chair)	Swiss National Science Foundation, Berne, CH
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Rosbash Michael, Prof.	Howard Hughes Medical Institute, Brandeis University, Waltham, US
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Economy / Industry

- Bioresearch & Partners, Monthey, CH
- Bitplane, Zurich, CH
- Debiopharm S.A., Lausanne, CH
- Leica Microsystems, Glattbrugg, CH
- Nestlé Research Center, Vevey, CH
- Novartis S.A., Basel, CH
- Phistem, Geneva, CH
- Sero international SA, Genève, CH
- The Genetics Company, Inc., Zürich, CH

Other

- Canadian MRC fellowship, Ottawa, CH
- European Foundation for the Study of Diabetes, EFSD & Merck Sharp & Dohme, Düsseldorf, DE
- Fellowship from the Roche Research Foundation, Bern, CH
- Prix Louis Jeantet de Médecine, Geneva, CH

Molecular Life Sciences – Three Dimensional Structure, Folding and Interactions NCCR Structural Biology

Home Institution

University of Zurich

Start of the NCCR

May 1, 2001

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Public Relations

- Leaflet
- Homepage / eNewsletter
- Newspaper articles
- Appearance on radio and national TV

Research

Areas

Structural biology of membrane proteins

Coordinator: N.N.

Supramolecular assemblies/molecular interactions

Coordinator: Ban N.

Technologies

Coordinator: Plückthun A.

Projects

Folding and function of supramolecular systems and membrane proteins

H: Glockshuber R.

Directed evolution of eukaryotic membrane proteins

H: Plückthun A.

X-ray crystallography of membrane proteins and the use of chaperones of crystallization

H: Grütter M.

Chromatin structure:

Genome organization in three-dimensions

H: Richmond T.J.

Macromolecular assemblies involved in central cellular processes; mitochondrial protein synthesis and fatty acid synthesis

H: Ban N.

The structural basis for transmembrane ion transport

H: Dutzler R.

Structure and mechanism of multidrug transporters

H: Locher K.

Structure determination of protein-RNA complexes involved in alternative-splicing by NMR spectroscopy

H: Allain F.

Single molecule spectroscopy of cotranslational protein folding and membrane protein dynamics

H: Schuler B.

Computational biomolecular science

H: van Gunsteren W.F.

Associated Groups & Technology Platforms

Cell-free expression and segmental stable isotope labelling of proteins and RNAs for NMR studies

H: Allain F., Wüthrich K.

High throughput expression lab

H: Plückthun A.

High throughput crystallization facility of the NCCR

H: Grütter M.

Programmes

PhD program Biomolecular structure and mechanism

Supervisor: Allain F.

Annual practical course in structural biology

Supervisor: Glockshuber R.

Annual symposium on new trends in structural biology

Supervisor: Glockshuber R.

Topics

Today, knowledge about biological processes is obtained from functional experiments on a limited number of biochemical systems, and from a rapidly increasing amount of DNA sequence information, generated in several genome projects. To bridge the widening gap between rapidly increasing information on genome sequences and limited knowledge on the function of gene products, a quantitative understanding of the 3D-structure of proteins, their

folding, and their interactions with other molecules is required. Such understanding is the key to develop innovative medicines, such as new antibiotics and vaccines, as well as drugs against cancer and diseases of the central nervous, immune, and cardiovascular systems. In this NCCR specialists in experimental structure determination by X-ray crystallography, NMR spectroscopy and electron microscopy / crystallography, in protein biophysical

chemistry, modern molecular biology, and computational biology will meet the challenge to link the ever increasing biological data generated in the genomics field with related structural and functional information. This NCCR is currently in its third and final funding period until 2013. The major assets resulting from this project will be secured longterm through the foundation of a center of structural biology headquartered in Zürich.

Third Party Cooperation

Programmes

- EDICT (FP7)
- P-CUBE (FP7)

Research Institutions

- Cancer Research (CSHL), Cold Spring Harbour Laboratories, US
- Département de Microbiologie et d'Infectiologie, Université de Sherbrooke, CA
- Department of Biochemistry, University of Groningen, NL
- Department of Biochemistry, University of Washington, Seattle, US
- Department of Biochemistry, Yonsei University, Seoul, KR
- Department of Biology, University of Konstanz, DE
- Department of Biology, University of Science and Technology of China, Hefei, CN
- Department of Biophysical Structural Chemistry, Leiden Institute of Chemistry, NL
- Department of Chemistry, Ludwig-Maximilian-University Munich, DE
- Department of Chemistry, University of Cambridge, GB
- Department of Chemistry, Utrecht University, NL
- Department of Chemistry, Wayne State University, Detroit, US
- Department of Molecular Biology and Biotechnology, University of Sheffield, GB
- Department of Molecular Biophysics and Biochemistry, Yale University, New Haven, US
- Department of Pharmacology, School of Medicine, Cleveland, US
- Department of Physics, University of California, Santa Barbara, US
- Division of Chemistry and Chemical Engineering, California Institute of Technology, Pasadena, US
- Division of Molecular and Health Technologies, Commonwealth Scientific and Industrial Research Organisation, Melbourne, AU
- Faculty of Sciences, Department of Organic Chemistry and Biochemistry, Zagreb, HR
- Howard Hughes Medical Institute, University of California Los Angeles, US
- Institut de Génétique et de Biologie Moléculaire et Cellulaire (IGBMC), Département de Neurobiologie et Génétique, Illkirch, FR
- Institut für Biochemie und Medizinische Molekularbiologie, Friedrich-Alexander-Universität Erlangen-Nürnberg, DE

Heads of Individual Research Projects and Associated Groups

Allain Frédéric, Prof.
Ban Nenad, Prof.
Dutzler Raimund, Prof.
Glockshuber Rudolf, Prof.
Grütter Markus, Prof.
Locher Kaspar, Prof.
Plückthun Andreas, Prof.
Richmond Timothy J., Prof.
Schuler Ben, Prof.
Schertler Gebhard, Prof.
Stahlberg Henning, Prof.
van Gunsteren Wilfred F., Prof.
Weber-Ban Erika
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Institut für Molekularbiologie und Biophysik, ETH Zürich
Institut für Molekularbiologie und Biophysik, ETH Zürich

Molecular Life Sciences – Three Dimensional Structure, Folding and Interactions NCCR Structural Biology

- Institut für Biochemie, Justus-Liebig-Universität Giessen, DE
- Institute for Molecular Bioscience, University of Queensland, Brisbane, AU
- Institute of Biotechnology and Biomedicine, University of Barcelona, ES
- Institute of Membrane and Systems Biology, University of Leeds, GB
- Institute of Molecular Modeling and Simulation, BOKU University, Vienna, AT
- Institute of Molecular Pediatric Science, University of Chicago, US
- Kyoto Institute of Technology, Protein Crystal Corporation, Osaka, JP
- Laboratoire de Maturation des ARN et Enzymologie Moléculaire, Vandoeuvre-les-Nancy, FR
- Laboratoire d'Enzymologie et Biochimie Structurales, Centre national de la Recherche Scientifique, Gif-sur-Yvette, FR
- Laboratory of Molecular Biology, National Institutes of Health, Bethesda, US
- M. D. Anderson Cancer Center, University of Texas, Houston, US
- Max Planck Institute of Coal Research, Mülheim, DE
- Max von Pettenkofer Institute, Ludwig-Maximilians University of Munich, DE
- Medizinische Biochemie und Molekularbiologie der Universität des Saarlands, Homburg, DE
- National Chemical Laboratory (NCL), Central NMR Facility, Pune, IN
- National Institute of Biotechnology, Madrid, ES
- Russian Academy of Sciences, Moscow, RU
- San Diego Joint Center for Structural Genomics, US
- School of Biological Sciences, University of Auckland, NZ
- The Scripps Research Institute, La Jolla, US
- Zentrum für Molekulare Biologie (ZMBH), Universität Heidelberg, DE

Achievements of the previous years

Key biology areas

This NCCR focuses on the structural biology of membrane proteins and supramolecular complexes and interactions. In both areas, major advances could be reported since the start of this NCCR. Methods for cloning, expression, purification, crystallisation and analysis of membrane proteins could be advanced and successes in the structure determination of membrane proteins were achieved. A recent breakthrough in this field is the structure determination of three ABC transporters. Another highlight was the structure determination of a prokaryotic pentameric ligand gated ion channel that serves as a bacterial homologue to the eukaryotic nicotinic acetylcholine receptors. The structures of several supramolecular complexes were determined. Important research fields in this area include the chromatin structure, the ribosome, RNA-protein interactions and fatty acid syntheses.

Technology platforms

Shared infrastructure units for recombinant protein production, stable isotope labelling of proteins and high-throughput crystallisation of proteins for NMR or X-ray studies have been established and are today a major tool for effective structure determination used by many research groups within or outside this NCCR. A successful collaboration with the SLS-synchrotron for high-throughput crystal analysis and protein structure determination complements these technology platforms.

Technology Transfer

Project leaders of this NCCR have various individual collaborations with industry partners. An umbrella-type agreement for long-term collaboration between Novartis and the NCCR has been realized, so far leading to two collaborations. The spin-off company Molecular Partners resulted partly from the NCCR research project on 'ankyrin repeats' which are an alternative to antibodies

as selective binders. Another spin-off, REDbiotec, commercialises MultiBac, a novel expression tool for large eukaryotic multiprotein complexes.

Education

A post-graduate program in structural biology was established and embedded in the Life Science Zurich Graduate School. Thanks to the synergies within this NCCR, a very broad and in-depth education of students in structural biology became possible.

This NCCR established a series of well-recognized structural biology events, namely a yearly symposium and practical courses that are well attended by scientists from within the NCCR and from other research institutes.

Structural Effects

This NCCR offers an excellent opportunity for interdisciplinary and high-standard structural biology research in Switzerland which allowed to attract several outstanding young scientists to Switzerland.

Further information see www.structuralbiology.uzh.ch

Economy / Industry

- Actelion Pharmaceuticals GmbH, Allschwil, CH
- Bruker AXS GmbH, Karlsruhe, DE
- Cambridge Antibody Technology, Cambridge, GB
- Dectris AG, Baden, CH
- F. Hoffmann-La Roche Ltd., Basel, CH
- Global Phasing Limited, Cambridge, GB
- Molecular Dimensions Limited, Newmarket, GB
- Molecular Partners AG, Zurich, CH
- MorphoSys AG, Martinsried, DE
- Novartis Pharma AG, Basel, CH
- Novartis Vaccines and Diagnostics, Research Center, Siena, IT
- Swissci AG, Neuheim, CH

Statistical Input – Output Data

Funding source (CHF)	Year 9	Year 10	Year 11	Year 12	Total	%
SNSF funding	3 600 000	2 000 000	1 500 000	800 000	7 900 000	33
Self-funding from home institution ¹	1 211 862	1 833 434	1 675 865	1 865 865	6 587 026	28
Self-funding from ETH Zurich	558 000	574 000	574 000	574 000	2 280 000	10
Self-funding from project participants	6 533 037	241 207	147 600	147 600	7 069 444	30
Third-party funding ²	0	0	0	0	0	0
Total	11 902 899	4 648 641	3 897 465	3 387 465	23 836 470	100

Personnel ³	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	FR	NL	AT	PL	
Management	3.00 ⁴	1	13	7	88	3	2	1	1	0	0	1
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	63	28	44	35	56	21	24	2	1	2	3	9
Postdoctoral students	43	12	28	31	72	10	11	4	2	1	0	13
Research associates	0	0	0	0	0	0	0	0	0	0	0	0
Senior researchers ⁵	48	9	19	39	81	6	4	3	1	0	0	5
Other staff	12	6	50	6	50	11	6	2	0	0	2	5
Total	169.00	56	32	118	68	51	47	12	5	3	5	33

¹ Personnel costs, equipment and consumables, not included infrastructure and basic equipment

² Not included is CTI funding (cf. page 6). Since the start of the NCCR 1 project has been funded by CTI at a total amount of 1.7 million CHF.

³ Persons involved in the NCCR in the last reporting period (12 months)

⁴ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁵ Including leaders of the individual projects and other organisational units of the NCCR

Evaluation and Monitoring by the Swiss National Science Foundation (SNSF)

Members of the Review Panel

Kléber André, Prof. (Chair)

Eisenberg David, Prof.

Fromm Katharina, Prof.

Hall Mike, Prof.

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Schmid Franz Xaver, Prof.

Widmer Hans, Dr.

Wright Ernest M., Prof.

Wright Peter E., Prof.

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UCLA-DOE Institute for Genomics and Proteomics, US

Swiss National Science Foundation, Berne, CH

Swiss National Science Foundation, Berne, CH

Max-Planck Institut für Biophysik, Frankfurt am Main, DE

Laboratorium für Biochemie, Universität Bayreuth, DE

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UCLA School of Medicine, Los Angeles, US

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Neural Plasticity and Repair

NCCR Neuro

Home Institution

University of Zurich

Start of the NCCR

June 1, 2001

NCCR Management

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Public Relations

- Neurotransmitter Newsletter
- BrainFair Zürich

Research

Neural stem cells: an integrated approach to basic knowledge and therapeutic applications

Head: Suter U.
Fritschy J.-M., Jessberger S.,
Lipp H.-P., Raineteau O.,
Sommer L., Tyagarajan S.

Alzheimer's disease

H: Nitsch R.
Caflich A., Fraering P.,
Glockshuber R., Hock C.,
Knüsel I., Konietzko U.,
Molinari M., Rajendran L.,
Sonderegger P.

Acute-phase predictors and modulators for long-term outcome after stroke

H: Luft A.
Rouiller E., Schwab M.,
Sonderegger P., Wegener S.

Immunotherapy for malignant glioma

H: Weller M.
Aguzzi A., Frei K., Tabatabai G.

Cortical plasticity

H: Martin K.
Helmchen F., Ishai A.,
Jäncke L., Kiper D., Seifritz E.,
Stephan K.E.

Infection and immunity of the central nervous system

H: Fontana A.
Aguzzi A., Becher B., Reith W.,
Suter T.

Spinal cord repair

H: Schwab M., Curt A.,
Kollias S., Micera S., Stoeckli E.,
Wöllner J.

Rehabilitation technology matrix

H: Riener R.
Courtine G., Gassert R.,
Kiper D., Kollias S., Micera S.

Economic stimulus package Robot-assisted neuroreha- bilitation of the arm (RANA): technology transfer to clinics and industry

H: Riener R., Colombo G.

Immunotherapy of amy- otrophic Lateral Sclerosis

H: Nitsch R., Grimm J.

Technological Platforms, Programmes etc.

Center of transgenesis expertise

H: Mansuy I.
Aguzzi A., Becher B.,
Jessberger S., Suter U.

Center for advanced assessment of animal behavior

H: Lipp H.-P.
Pryce C., Wolfer D.,
Zeilhofer H.U.

Center for proteomics

H: Wollscheid B.

Center for animal imaging

H: Rudin M., Ewers H.,
Helmchen F.

International Ph. D. Program in Neuroscience

Administered by the
Neuroscience Center Zurich
Coordinator: Knecht W.

Topics

At present only limited help is available to patients suffering from diseases of the central nervous system. The fundamental goal of the NCCR “Neural Plasticity and Repair” is to gain better insight into the mechanisms and causes of these diseases in order to design

improved therapies for the future. The NCCR investigates in its final Phase 3 (2009-2013) molecular, cellular and system level mechanisms of plasticity, regeneration and functional repair of the damaged nervous tissue focusing on Alzheimer’s disease,

multiple sclerosis, stroke, glioma and spinal cord injury. The key approach of this NCCR is to promote synergies between experimental and clinical research in conjunction with engineering, neuroinformatics and modern brain imaging technologies.

Heads of Individual Research Projects and Subprojects

Aguzzi Adriano, Prof.
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Caflich Amedeo, Prof.
Courtine Grégoire, Prof.
Curt Armin, Prof.
Dietz Volker, Prof.
Ewers Helge, Dr.
Fontana Adriano, Prof.
Fraering Patrick, Prof.
Frei Karl, Prof.
Fritschy Jean-Marc, Prof.
Gassert Roger, Prof.
Glockshuber Rudolf, Prof.

Helmchen Fritjof, Prof.
Hock Christoph, Prof.
Ishai Alomit, Prof.
Jäncke Lutz, Prof.
Jessberger Sebastian, Prof.
Kiper Daniel, PD Dr.
Knüsel Irene, PD Dr.
Kollias Spyros, Prof.
Konietzko Uwe, Dr.
Lipp Hans-Peter, Prof.

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Third Party Cooperation

(in progress)

Programme

- ARISE
- EUCLOCK
- FMTXCT
- NEURONET (ESPRIT 4)
- Plasticise

Research Institutions

- Albert Einstein College of Medicine, Yeshiva University, New York, US
- Alexander Silberman Institute of Life Sciences, Hebrew University, Jerusalem, IL
- Biotech Research and Innovation Centre (BRIC), University of Copenhagen, DK
- Cambridge Centre for Brain Repair, School of Clinical Medicine, GB
- Center for Neural Science, Korea Institute of Science and Technology, Seoul, KR
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- Department of Anatomy, University of Witwatersrand, Johannesburg, ZA
- Department of Biology, University of Konstanz, DE
- Department of Cell Biology and Neurosciences, Istituto Superiore di Sanità, Rome, IT
- Department of Cell Physiology and Pharmacology, University of Leicester, GB
- Department of Chronobiology, Univ. of Groningen, Haren, NL
- Department of Cognitive Neuroscience, Faculty of Psychology, Maastricht, NL
- Department of Computer Science, University College London, GB
- Department of Developmental Biology and Cancer Research, The Hebrew University, Jerusalem, IL
- Department of Experimental Oncology, European Institute of Oncology, Milano, IT
- Department of Human Anatomy and Histology, University of Bari School of Medicine, Bari, IT
- Department of Human Genetics, Leiden Univ. Medical Center, NL
- Department of Infectious Diseases, St. Jude Children’s Research Hospital, Memphis, US
- Dep. of Medical Biochemistry and Biophysics, Karolinska Institute, Stockholm, SE
- Department of Medical Pharmacology, University of Milan, IT

Neural Plasticity and Repair

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- DFG-Forschungszentrum für Regen. Therapie, Dresden, DE
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Mansuy Isabelle, Prof.
Martin Kevan, Prof.
Micera Silvestro, Prof. Dr.
Molinari Maurizio, Dr.
Nitsch Roger M., Prof.
Pryce Christopher, Dr.
Raineteau Olivier, Dr.
Rajendran Lawrence, Prof.
Reith Walter, Prof.
Riener Robert, Prof.
Rouiller Eric, Prof.
Rudin Markus, Prof.

Schwab Martin E., Prof.

Seifritz Erich, Prof.
Sommer Lukas, Prof.
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Wolfer David, Prof.
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Wolscheid Bernd, Dr.
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Biochemisches Institut, Universität Zürich
Institut für Empirische Wirtschaftsforschung, Universität Zürich
Institute of Molecular Life Sciences, Universität Zürich
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Institut für Neuroradiologie, Universitätsspital Zürich
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Institut für Molekulare Systembiologie, ETH Zürich Hönggerberg
Institut für Pharmakologie und Toxikologie, Universität Zürich und Institut für Pharmazeutische Wissenschaften, ETH Zürich

Hocoma AG, Volketswil
Institut für Hirnforschung, Universität Zürich
Zentrum für Neurowissenschaften Zürich, Universität und ETH Zürich

Achievements of the previous years

The power of neuroscience has been brought to bear on the understanding of the diseases of the brain and spinal cord and the possibility of restoring neural functions. The NCCR Neuro has achieved major milestones in translating basic neuroscience into therapy since its beginning in 2001. The collaboration between experimental and clinical neuroscience has been further strengthened and extended to include neuroinformatics, brain imaging and engineering sciences.

Therapeutic advances

Immunotherapy has reached the clinical stage in the treatment of spinal cord injury and NCCR groups are participating in the first clinical trials. Similarly, the stage is set for clinical trials of immunotherapy for Alzheimer's disease. Devices from rehabilitation engineering are in clinical use.

Basic science

Basic neuroscience has been strongly promoted to follow new avenues in stem cell research and neural differentiation as well as in the process of rehabilitation of the injured CNS.

Recognition

The achievements of the NCCR were recognized by a large number of internationally and nationally prestigious prizes awarded to members of the NCCR Neuro.

New professorships

To advance the NCCR, nine new professorships have been created since the beginning: one each in clinical and experimental analysis of multiple sclerosis, two in rehabilitation engineering, one in animal brain imaging, one in stem cell biology, one each in experimental and clinical neurorehabilitation and one in systems biology of Alzheimer's disease.

Central facilities

A core structure provides methodological support for the diverse projects of the NCCR. This facility consists of four integrative units. The center of transgenesis expertise and the center of behavioral assessment were complemented by a center dedicated to animal imaging and a center on systems proteomics.

Education

The Neuroscience Center Zurich (ZNZ) offers the International Ph.D. Program in Neuroscience. About 80 Ph.D. students of the NCCR

Neuro are currently enrolled in this program.

Spin offs

Major efforts have been made to extend joint projects with major pharma companies. In addition, three spin-off companies arose from the NCCR and provide new positions for young scientists: NewBehavior AG in Zurich, Neurimmune Therapeutics AG in Schlieren/Zurich, and YouRehab AG in Zurich. Thirty-nine patents have been issued.

Dialogue with society

The dialogue between the NCCR and society at large is an important aspect. Regular press contacts are organized. The BrainFair Zürich attracts thousands of visitors each year. An informative and balanced communication with the public is essential for our work.

Outlook

Based on the past achievements, the NCCR will continue to promote basic science, provide new insights into disease mechanisms and advance therapies for injuries and disorders of the CNS.

Further information see www.nccr-neuro.uzh.ch

- I. P. Pavlov Institute of Physiology, Russian Academy of Sciences, St. Petersburg, RU
- Institut de Biologie du Développement de Marseille-Luminy, FR
- Institut de Génomique Fonctionnelle, Montpellier, FR
- Institut der Anatomie III, Johann Wolfgang Goethe-Universität, Frankfurt am Main, DE
- Institut für Allgemeine Zoologie und Genetik, Westfälische Wilhelms-Universität Münster, DE
- Institut für Klinische Chemie und Pharmakologie, Universitätsklinikum Bonn, DE
- Institut für Klinische Neuroimmunologie, Klinikum der Universität München, DE
- Institut für Molekulare Regenerative Medizin, Paracelsus Medizinische Privatuniversität, Salzburg, AT
- Institut für Virologie und Immunbiologie, Universität Würzburg, DE
- Institut Pasteur, Paris, FR
- Institute for Pharmacy and Molecular Biotechnology, University of Heidelberg, DE
- Institute for Stem Cell Research, GSF-National Research Institute for Environment and Health, Neuherberg, DE
- Institute für Immunologie, Friedrich-Löffler Institut, Tübingen, DE
- Institute of Biochemistry, Goethe University, Frankfurt, DE
- Institute of Biomaterials and Biomedical Engineering, University of Toronto, CA
- Institute of Cell Biology, Department of Immunology, Tübingen, DE
- Institute of Developmental Genetics, Helmholtz-Zentrum München, DE
- Institute of Experimental Medicine, Hungarian Academy of Sciences, Budapest, HU
- Institute of Experimental Pathology, Univ. of Münster, DE
- Institute of Medical Biology, Medical Biotechnology Centre, Odense, DK
- Interfaculty Institute for Cell Biology, Univ. of Tübingen, DE
- Laboratoire de Neurobiologie de l'Apprentissage, de la Mémoire et de la Communication, Orsay, FR
- Laboratory of Genetics, The Salk Institute for Biological Studies, US
- Laboratory of Molecular Biology, Nencki Institute of Experimental Biology, Warsaw, PL
- Leibniz Institute for Age Research, Fritz Lipmann Institute, DE
- Max Planck Institute for Neurobiology, Martinsried, DE
- Max Planck International Research Network on Aging, Rostock, DE
- MRC Laboratory for Molecular Cell Biology, University College London, GB
- Neurological Clinic, University of Tübingen, DE
- Neurologische Klinik, Technische Universität München, DE

Neural Plasticity and Repair NCCR Neuro

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- NeuroStructural Research Laboratory, Tampa, US
- Newcastle upon Tyne Muscle Centre, Institute of Human Genetics, GB
- Pathologisches Institut, Abteilung für Neuropathologie, Universitätsklinik Freiburg, DE
- Queensland Brain Institute, University of Queensland, AU
- Rehabilitation Inst. of Chicago, US
- School of Biosciences, University of Birmingham, GB
- School of Health Sciences, University of Southampton, GB
- School of Medical Sciences, University of Aberdeen, GB
- University Hospital of Psychiatry and Psychotherapy, University of Würzburg, DE
- Vaccine and Gene Therapy Institute, Oregon Health and Science University, Beaverton, US
- Wallenberg Neuroscience Center, Department of Experimental Medical Sciences, Lund Univ. SE
- Wellcome Trust Centre for Neuroimaging, London, GB
- Zoological Institute, Technical University of Braunschweig, DE

Economy / Industry

- Agilent Technologies Inc., Santa Clara, US
- Alcon Laboratories Inc., Fort Worth, US
- Alea Solutions GmbH, Zurich, CH
- Biogen Idec Ltd, Maidenhead, GB
- Bruker Biospin AG, Fällanden, CH
- Compex Medical SA, Ecublens, CH
- ESBATech AG, Schlieren, CH
- Evotec Neurosciences AG, Hamburg, DE
- F. Hoffmann-La Roche Ltd, Basel, CH
- FBI Science GmbH, Technologiezentrum-Ruhr an der Ruhr-Universität, Bochum, DE
- GlaxoSmithKline AG, Verona, IT
- Hocoma AG, Volketswil, CH
- Invitrogen Dynal AS, Oslo, NO
- Merck KGaA, Darmstadt, DE
- Miltenyi Biotec GmbH, Bergisch-Gladbach, DE
- MorphoSys AG, Martinsried/Planegg, DE
- Neurimmune Therapeutics AG, Zurich, CH
- NewBehavior AG, Zürich, CH
- Novartis Pharma Schweiz AG, Basel, CH
- Philips Medical Systems AG, Zurich, CH
- Sanofi-Aventis, Paris, FR
- Swortec SA, Monthey, CH
- Warren Pharmaceuticals Inc., Ossining, US
- Zühlke Engineering AG, Schlieren, CH

Others

- Consortium of the Christopher and Dana Reeve Foundation, Los Angeles, US
- ETH Foundation, Zurich, CH
- International Spinal Research Trust (ISRT), Surrey, GB

Statistical Input – Output Data

Funding source (CHF)	Year 9	Year 10	Year 11	Year 12	Total	%
SNSF funding	4 115 000 ⁶	3 075 000 ⁶	1 600 000	1 200 000	9 990 000	12
Self-funding from home institution ¹	2 026 880	3 074 204	477 280	623 308	6 201 672	7
Self-funding from ETH Zurich	937 500	937 500	937 500	937 500	3 750 000	5
Self-funding from project participants	19 279 981 ⁶	12 993 598 ⁶	13 143 598	13 019 598	58 436 775	71
Third-party funding ²	747 273	600 000	600 000	2 400 000	4 347 273	5
Total	27 106 634	20 680 302	16 758 378	18 180 406	82 725 720	100

Personnel ³	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	FR	IT	IN	GB	
Management	2.60 ⁴	6	55	5	45	7	3	1	0	0	0	0
Master students	64	36	56	28	44	52	7	0	1	0	0	4
Doctoral students	221	98	44	123	56	91	46	9	13	9	3	47
Postdoctoral students	49	26	53	23	47	10	14	3	2	1	3	16
Research associates	25	13	52	12	48	9	12	0	2	0	0	2
Senior researchers ⁵	139	29	21	110	79	32	48	14	7	2	3	16
Other staff	68	41	60	27	40	42	14	0	1	0	1	10
Total	568.60	249	43	328	359	243	144	27	26	12	10	95

¹ Personnel costs, equipment and consumables, not included infrastructure and basic equipment

² Not included is CTI funding (cf. page 6). Since the start of the NCCR 6 projects have been funded by CTI at a total amount of 12.2 million CHF.

³ Persons involved in the NCCR in the last reporting period (12 months)

⁴ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁵ Including leaders of the individual projects and other organisational units of the NCCR

⁶ Included funding of economic stimulus package projects (cf. project list)

Evaluation and Monitoring by the Swiss National Science Foundation (SNSF)

Members of the Review Panel

Dehio Christoph, Prof. (Chair)
Bonhoeffer Tobias, Prof.
Clarke Hosek Stéphanie, Prof.
Compston Alastair, Prof.
Ghisalba Oreste, Prof.
Götz Magdalena, Prof.

Herrling Paul, Dr.
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Thier Hans-Peter, Prof.
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Novartis Pharma AG, Basel, CH
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Kidney Control of Homeostasis

NCCR Kidney.CH

Research

Modul 1

Oxygen

Leader: Wenger R.

Basic mechanism of renal oxygen sensing

H: Wenger R.
Moch H., Huynh-Do U.

Oxygen sensing in kidney development and disease

H: Cohen C.,
Frew I., Moch H., Huynh-Do U.

Modul 2

Nutrients & Metabolism

Leader: Verrey F.

Control of nutrient and drug bioavailability by the kidney

H: Verrey F.,
Odermatt A., Kullak-Ublick G.A.

Regulation of energy metabolism by the kidney

H: Montani J.P.,
Konrad D., Odermatt A.

Heads of Individual Research Projects and Subprojects

Biber Jürg, PhD
Bonny Olivier, MD, PhD
Burnier Michel, MD
Cohen Clemens, MD
Devuyst Olivier, MD, PhD
Férraille Eric, MD, PhD

Module 3

Acid & Minerals

Leader: Wagner C.

Sensors of phosphate, acid, and mineral homeostasis

H: Biber J.,
Krapf R., Seuwen K., Wagner C.,
Bonny O., Fuster D.G.,
Mohaupt M.

Adaptation of acid and mineral excretion in health and disease

H: Wagner C.,
Fuster D.G., Bonny O.,
Mohaupt M., Devuyst O.

Module 4

Salt & Water

Leader: Férraille E.

Renal mechanisms of oedema formation

H: Frey F.,
Hummler E., Frey F., Martin
P.Y., Burnier M.

Trophic effects of sodium on the kidney and cardiovascular system

H: Férraille E.,
Hasler U., Loffing J.

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Integrative control of potassium homeostasis

H: Loffing J.,
Hummler E., Staub O.,
Forssmann W.G., Frey F.

Technology Platforms & Reference Centres

Imaging & Microscopy

H: Loffing J.

Rodent Transgenesis

H: Hummler E.

Rodent Phenotyping

H: Wagner C.

Human Studies

H: Frey F.

Programmes

International Fellowship Program on Integrative Kidney Physiology and Pathophysiology (IKPP)

H: Huynh-Do U.

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Topics

Keeping the inner body environment in a homeostatic balance is essential for proper body function and thus for healthy life. The National Centre of Competence in Research (NCCR) "Kidney.CH - Kidney Control of Homeostasis" investigates the central role that kidneys play in controlling this vital equilibrium. It in-

tegrates leading Swiss specialist in experimental and clinical nephrology from all Swiss Medical Universities. Chronic Kidney Disease (CKD) has increased dramatically in recent years leading worldwide to an estimated 850 000 deaths every year. Patients with CKD are further at high risk for other diseases such as

hypertension, atherosclerosis and osteoporosis to name just a few. The goal of Kidney.CH is to advance knowledge in order to provide a scientific basis for the potential development of novel preventive, diagnostic and therapeutic approaches.

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Statistical Data and Members of the Review Panel will be published in the Guide 2012.

The synaptic bases of mental diseases

NCCR SYNAPSY

Research

Workpackage 1

Genes and environment

Leader: Papassotiropoulos A.

Genetics of memory

H: Papassotiropoulos A.

Behavioral genetics

H: Sandi C.

Workpackage 2

Building synaptic networks in autism spectrum disorders

Leader: Muller D.

Olfactory processing in mouse models of mental diseases

H: Carleton A.

Regulation of circuit formation by serotonin

H: Dayer A.

Network activity in animal models of autism

H: Markram H.

Dynamics of synaptic networks

H: Muller D.

Cerebellar connectivity in animal models of autism

H: Scheiffele P.

Synaptic integration in auditory system

H: Schneggenburger R.

Workpackage 3

Network interactions in anxiety and addiction

Leader: Luscher Ch.

System homeostasis

H: Caroni P.

Structural cortical plasticity

H: Holtmaat A.

Network interactions in addiction

H: Luscher Ch.

Network activity in fear conditioning

H: Lüthi A.

Cortical activity and integration

H: Petersen C.

Workpackage 4

Astrocyte function and neuron-glia metabolism

Leader: Volterra A.

Neuro-glial metabolism in human brain

H: Gruetter R.

Brain metabolism and astrocyte function

H: Magistretti P.

Astrocyte function in psychiatric disorders

H: Volterra A.

Workpackage 5

Cortical integration

Leader: Michel Ch.

Self consciousness in psychopathology

H: Blanke O.

Cortical integration of multisensory information

H: Clarke St.

Schizotypy and cortical integration

H: Eliez St.

Perceptual learning in psychopathology

H: Herzog M.

Dynamics of cortical activity

H: Michel Ch.

Cortical activity and integration

H: Petersen C.

Workpackage 6

Regulation of system homeostasis

Leader: Caroni P.

System homeostasis

H: Caroni P.

Network activity in fear conditioning

H: Lüthi A.

Brain metabolism and astrocyte function

H: Magistretti P.

Dynamics of synaptic network

H: Muller D.

COHORTS

CP1

Endophenotypes of mood disorders

H: Martin Preisig

CP2

Schizotypy and gene deletion syndrome

H: Eliez S., Carleton A., Bezzi P., Caroni P., Michel Ch., Muller D.

CP3

Biomarkers of first episode psychosis

H: Do K., Conus Ph., Merlo M., Holzer L., Clarke S., Gruetter R.

CP4

Developmental stress

H: Ansermet F.

Clinician/scientist program

H: Magistretti P.

Platforms

Behavioral platforms (CHUV and EPFL)

Genetic platforms (UNIGE and UNIBAS)

Bioimaging platform (CIBM)

H: Muller D., Magistretti P., Frackowiak R., Antonarakis S.

Pilot project

Fast antidepressant response

Cognitive impairment

H: Giannakopoulos P.

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The synaptic bases of mental diseases

NCCR SYNAPSY

Topics

The aim of the NCCR “Synapsy”, The synaptic bases of mental diseases is to develop an ambitious translational program linking neuroscience to psychiatry with the aim to uncover the pathogenetic neurobiological mechanisms underlying mental and cognitive disorders. This will be achieved by bringing together a selected group of internationally recognized

basic neuroscientists active in cutting-edge research relevant to higher brain functions with research-oriented academic psychiatrists. In addition to the expected scientific outcomes, the establishment of this NCCR should have an important clinical and societal impact: based on the understanding of the pathophysiological mechanisms underlying mental disorders,

one can expect the development of novel preventive and therapeutic approaches which ultimately will improve the quality of life of patients. It will also contribute to the emergence of a new generation of clinicians with a strong neuroscientific background thus positioning Switzerland as a leader at the international level in neuroscience-based psychiatry.

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Statistical Data and Members of the Review Panel will be published in the Guide 2012.

From transport physiology to identification of therapeutic target NCCR TransCure

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Research

Structure, function and pharmacology of an epithelial calcium channel

H: Hediger M.

Function, pharmacology and pathophysiology of TRPC channels

H: Niggli E.

Physiology, pharmacology and pathophysiology of a calcium-activated non-selective cation channel

H: Abriel H., Heller M.

Role of ion transporter TRPV6 and others in bone homeostasis

H: Hofstetter W.

Structure, function and pharmacology of the sodium/calcium exchangers and other transport proteins

H: Stahlberg H.

Novel sodium/hydrogen exchanger NHA2 – a quest for biological function

H: Fuster D.

Immunohistochemical studies of transporter of therapeutic interest

H: Ackermann D.

Structure, function and pharmacology of calcium-activated chloride channels and divalent metal ion transporters

H: Dutzler R.

Exploiting tumor-specific ion transporters as drug targets

H: Anderle P.

Vesicular neurotransmitter transporters: glutamate and monoamines

H: Volterra A., Bezzi P.

Structure and molecular transport mechanisms of vitamin C and nucleobase transporters

H: Fotiadis D.

Glucose, myo-inositol and urate transporters

H: Thorens B.

Placental transport systems and their impact on fetal programming

H: Surbek D., Baumann M.

Ligand design for TRP channels and various transport proteins

H: Reymond J.

Ligand development for vesicular monoamine transporter

H: Altmann K.

Development of selective fluorescence- and photoaffinity-labeled ligands for transporters and channels

H: Lochner M.

Screening assay development and screening of natural product libraries

H: Gertsch J.

Structural and mechanistic studies of lipid/drug transporters and their therapeutic relevance

H: Locher K.

Role of canalicular lipid secretion in acquired forms of cholestasis

H: Stieger B.

Novel transport routes for nutrients in the mammary gland

H: Albrecht C.

Facilities and Platforms

CardioMet Mouse Metabolic Evaluation Facility (MEF)

H: Thorens B.

Bone and Mineral Research Facility

H: Hofstetter W.

Proteomics Facility

H: Abriel H., Heller M.

Electron Crystallography of Membrane Proteins

H: Stahlberg H.

Screening facility for small organic compound modulators of transporters and channels

Gertsch J.

From transport physiology to identification of therapeutic target NCCR TransCure

Topics

The National Centre of Competence in Research (NCCR) "TransCure – From Transport Physiology to Identification of Therapeutic Targets" seeks to integrate the disciplines of medicine, structural biology and chemistry in order to develop new therapeutic strategies for the treatment

of common human diseases. Transport proteins and ion channels play a key role in most physiological processes in the human body. Malfunctions in these proteins may contribute to the occurrence of diseases like diabetes, high blood pressure, osteoporosis, neurodegeneration, heart dis-

ease and cancers. The NCCR TransCure researchers aim to achieve a more profound understanding of the structures and transport mechanisms of these proteins. By broadening their knowledge of how transport proteins and channels work, they hope to develop new medicines.

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Statistical Data and Members of the Review Panel will be published in the Guide 2012

Visualisation and Control of Biological Processes Using Chemistry

NCCR Chemical Biology

Research

Deep Diversity for Chemical Interference - Generate and discover small molecules interfering with biological processes

H: Gademann K., Dyson P., Reymond J.-L., Heinis C., Lacour J., Riezman H.

System Level Chemical interference - Active compounds inhibiting essential enzymes and proteins involved in signaling and other biological processes will be found using whole cell assays developed through genetic engineering of yeast strains

H: Loewith R., Gotta M., Riezman H., Turcatti G.

Chemical Biology of Membranes: Localization and Endocytosis - Novel compounds affecting lipid metabolism and localisation will be identified by chemical interference and high content screening on tissue culture cells. New sensors for small molecules will be developed

H: Gruenberg J., van der Goot G., Manley S., Reymond J.-L., Johnsson K., Gademann K.

Chemical Biology of Signal Transduction: Monitoring and Manipulating Aurora-A Kinases in Living Cells with High Temporal and Spatial Resolution - New tools for quantitative information on signaling pathways and localisation of active signaling molecules will be developed

H: Gönczy P., Johnsson K., Heinis Ch., Reymond J.-L.

Chemical Biology of Notch Signaling - Quantitative information on the Notch signaling pathway, which is involved in cancer, will be derived using novel chemical approaches.

H: González-Gaitán M., Reymond J.-L., Radtke F., Heinis Ch., Johnsson K.

Quantification of GPCR-Mediated Signaling in Living Cells - New tools for single molecule visualisation and quantification of signaling pathways will be developed

H: Vogel H., Manley S., Riezman H., Johnsson K.

Chemical Biology of Membranes: Dynamic Fluorescent Probes and Cellular Uptake - New probes for examining membrane environments and new technologies to introduce molecules into cells will be developed

H: Matile S., Riezman H., Zumbuehl A., Roux A., González-Gaitán M., Manley S., van der Goot G., Johnsson K., Lacour J.

Platform

ACCESS – Academic Chemical Screening for Switzerland

H: Johnsson K., Riezman H., Gademann K., Zhu J., Lacour J., Turcatti G., Gönczy P., Gruenberg J.

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Visualisation and Control of Biological Processes Using Chemistry NCCR Chemical Biology

Topics

An understanding of life on a molecular level requires the characterisation of all biochemical activities of an organism with high spatial and temporal resolution. Progress towards this ambitious goal is thwarted by a shortage of technologies that permit a spatiotemporal quantification of biochemical activities in living cells and the lack of tools to rapidly and specifically intervene in biochemical pathways to investigate function in situ. In this NCCR we propose to address these widely acknowledged needs by developing chemical approaches for the visualisation, quantification and manipulation of biochemical activities.

Specifically, we will (i) focus on the development of new technologies in chemical interference and complement these approaches with the

establishment of the platform ACCESS, (ii) develop new technologies for the visualization of previously invisible biochemical activities, (iii) develop generalised techniques to deliver bioactive molecules and sensors into cells, and (iv) use advanced spectroscopy and super-resolution microscopy in biological systems. These novel techniques will be applied to model organisms such as yeast, flies and worms, as well as animal cell cultures. Two major biological areas will be addressed with these techniques, intracellular events of signal transduction and membrane biology, with emphasis on endocytosis as this pathway regulates signal transduction. These areas were chosen because they can immediately profit from the new tools of chemical biology. The technolo-

gies developed within this NCCR will be flexible to the needs of and thus available to the larger Swiss scientific community. ACCESS, built on foundations of Biomolecular Screening Facility at the EPFL will possibly have an outstation in Geneva. The NCCR will create a functional high throughput, high content screening facility with a diverse chemical library. Other novel strategies to inhibit enzymes, including natural products, bicyclic peptides and computational approaches will be used.

We are convinced that this multidisciplinary approach will allow us to achieve major breakthroughs in our understanding of biology and that the technologies developed in this NCCR will have an impact on biology and medicine in general.

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Statistical Data and Members of the Review Panel will be published in the Guide 2012

North-South: Research Partnerships for Mitigating Syndromes of Global Change

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- Brochure
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- Outcome highlights
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Thematic Node 1

Institutions, Livelihoods, Conflicts

Heads: Müller-Böker U.,
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Research Projects

Contested rural development

Co-Leaders: Geiser U.,
Ramakumar R.

Livelihood futures

Co-Leaders: Shahbaz B.,
Sharma S.R.

Migration and development

Co-Leaders: Thieme S.,
Ghimire A.

Environmental conflicts

Co-Leaders: Fokou G.,
Mulugeta A.

Negotiating statehood

Co-Leaders: Péclard D.,
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Private-sector peace promotion

Co-Leaders: Iff A., Upreti B.

Thematic Node 2

Health, Services, Planning

Heads: Tanner M., Hering J.,
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Research Projects

Reproductive resilience

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Productive sanitation

Co-Leaders: Nguyen Viet H.,
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User-driven sanitation

Co-Leaders: Lüthi C.,
Koottatep T.

Services for mobile populations

Co-Leaders: Schelling E.,
Bonfoh B.

Thematic Node 3

Resources, Economy, Governance

Heads: Wiesmann U., Hurni H.,
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Research Projects

Land resource potentials

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Landscape transformation

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Rural transformation

Co-Leaders: Rist S., Jimenez E.,
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Access and welfare

Co-Leaders: Kiteme B.,
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Adaptation to climate change

Co-Leaders: Ifejika Speranza
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Integrative Node

Global Change and Sustainable Development

Head: Hurni H. on behalf
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Special Research Projects on Global Issues

Transnational pressure on land

Co-Leaders: Breu T., Upreti B.

Global water challenges

Co-Leaders: Cissé G., Kiteme B.

Food security and sovereignty

Co-Leaders: Béchir M.,
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Beyond the MDGs

Co-Leaders: Geiser U., Suleri A.

Mobility and migration

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Climate change and smallholders

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Horn of Africa (HOA)

Coordinator: Debele B. (Ethiopia)

Central Asia (CAS)

Coordinator: Arynova M.

(Kyrgyzstan)

South Asia (SAS)

Coordinator: Upreti B. (Nepal)

Southeast Asia (SEA)

Coordinator: Koottatep T.

(Thailand)

Caribbean & Central America

(CCA)

Coordinator: Perez Gutierrez

M.A. (Costa Rica)

South America (SAM)

Coordinator: E. Jimenez

Swiss Alps (ALP)

Coordinator: K. Liechti

(Switzerland)

Partnership Actions for Mitigating Syndromes of Global Change (PAMS)

The NCCR North-South is implementing a series of pilot activities that apply research results in concrete development settings. These are proposed by researchers and partner institutions through programme calls, selected by the Board, and executed in collaboration with the Coordinators in the Partnership Regions.

Platforms, Programmes etc.

Secretariat of the Swiss Commission for Research Partnerships with Developing Countries (KFPE)

Executive Secretary:

Lys J.-A., Dr.

North-South: Research Partnerships for Mitigating Syndromes of Global Change

NCCR North-South

Third Party Cooperation

(in progress)

Programmes

- AKDN
- CAMP
- CEIL PIETTE (CONICET)
- ESAPP
- European Observatory for Health Systems
- IHDP
- IWGIA
- KRP LLD
- N-AERUS
- OWC
- UNCHS
- UNISDR
- WOCAT

Research Institutions

- Agrarian Institut, Bishkek, KG
- Agricultural Information Resource Center, Nairobi, KE
- Asian Institute of Technology Center in Vietnam (AITCV), Hanoi, VN
- ASR, Rural Sociology, Guadalajara, MX
- Unité de Formation et de Recherche, Abidjan, CI
- Centre d'Economie et d'Ethique pour l'Environnement et le Développement (C3ED), Laboratoire de recherche de l'Université de Versailles, FR
- Centre for Environmental Engineering in Towns and Industrial Areas (CEETIA), Hanoi University of Civil Engineering, VN
- Centre for Molecular Microbiology and Infection, Imperial College, London, GB
- Institut de recherche pour le développement, Centre IRD d'Orléans, FR
- Centre Régional pour l'Eau Potable et L'Assainissement à faible coût (CREPA), Ouagadougou, BF
- Colegio de la Frontera Sur, Tapachula, MX
- Department of Agricultural Extension, University of Agriculture, Faisalabad, PK
- Department of Anthropology, Kannur University, Kerala, IN
- Department of Environmental Sciences, University of Peshawar, PK
- Department of Epidemiology, Hanoi School of Public Health, VN
- Dept. of Forest Mensuration and Management, Sokoine University of Agriculture, Morogoro, TZ
- Department of Geography, University of Ho Chi Minh City, VN
- Department of Geography, University of Nairobi, KE
- Department of Geography, University of Toronto, CA
- Department of Health Economics, Hanoi Medical University, VN
- Department of Plant Biology, University of Yaoundé, CM
- Dept. of Political Science and International Relations (DPSIR), Addis Abeba University, ET
- Department of Social and Environmental Medicine, Faculty of Tropical Medicine, Bangkok, TH

Head Representatives of Institutional Partners in Switzerland

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Goetschel Laurent, Prof.	swisspeace, Bern, CH
Hering Janet, Prof.	Eawag - Sandec, Dübendorf, CH
Hurni Hans, Prof.	Centre for Development and Environment, CDE, University of Bern, CH
Müller-Böker Ulrike, Prof.	Development Study Group, GIUZ, University of Zurich, CH
Tanner Marcel, Prof.	Swiss Tropical and Public Health Institute Swiss TPH, University of Basel, CH
Wiesmann Urs, Prof.	Centre for Development and Environment, GIUB, University of Bern, CH
Zinsstag Jakob, PD Dr	Swiss Tropical and Public Health Institute Swiss TPH, University of Basel, CH
Zurbrügg Christian, Mr.	Eawag - Sandec, Dübendorf, CH

Coordinators of Partnership Regions

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Bonfoh Bassirou, Prof.	Centre Suisse de Recherches Scientifiques, Abidjan, CI
Debele Berhanu	Regional Coordination Office Horn of Africa, Addis Abeba, ET
Jimenez Elizabeth, Dr.	Centro de Investigación para el Desarrollo (CIDES), La Paz, Bolivia
Kiteme Boniface, Dr.	Centre for Training and Integrated Research in Arid and Semi-arid Lands Development CETRAD, Nanyuki, KE
Koottatep Thammarat, Dr.	Asian Institute of Technology (AIT), Pathumthani, TH
Perez Gutierrez Maria Angelina	Facultad Latinoamericana en Ciencias Sociales FLACSO-CR San José, CR
Upreti Bishnu Raj, Dr.	Regional Coordination Office South Asia, Kathmandu, NP
Wallner Astrid, Dr.	Centre for Development and Environment, GIUB, University of Bern, CH

North-South Partnership Institutions

Agroecologia Universidad Cochabamba AGRUCO, BO
Ayuda Obrera Suiza AOS, La Paz, BO
Central Department of Geography CDG, Tribhuvan University, Kathmandu, NP
Centre de Support en Santé Internationale CSSI, N'Djaména, TD
Centre de Technique de la Planification et d'Economie Appliquée CTPEA, Port-au-Prince, HT
Centre for Development Studies CDS, Kerala, IN
Centre for Security Studies FSK, Swiss Federal Institute of Technology, Zurich, CH
Centre for Training and Integrated Research in Arid and Semi-Arid Lands Development CETRAD, Nanyuki, KE
Centre National d'Hygiène CNH, Nouakchott, MR
Centre Suisse de Recherches Scientifiques CSRS, Abidjan, CI
Centro Bartolomé de las Casas CBC, Centre for Andean Regional Studies, Colegio Andino, Cuzco, PE
Centro de Investigación para el Desarrollo CIDES, Universidad Mayor de San Andrés, La Paz, BO
City Government of Kunming, CN
Departamento de Organización del Espacio DOE, Universidad Centroamericana "José Simeón Cañas", San Salvador, SV
Département de Sociologie et Anthropologie, Université de Yaoundé DSA-UY, CM
Department of Geography, University Dar es Salaam, TZ
Department of Natural Science, Kyrgyz-Russian Slavic University, Bishkek, KG
Department of Urban Water Management UWM, EAWAG, Dübendorf, CH
Directorship of the Sierra de Manantlán Biosphere Reserve DRBSM, Autlán, MX
Ecole Inter-Etats d'Ingénieurs de l'Équipement Rural EIER, Ouagadougou, BF
Ecole Supérieure des Sciences Agronomiques ESSA, University of Antananarivo, MG
Ethiopian Amhara Region Agricultural Research Institute ARARI, Bahr Dar, ET
Facultad de Agronomía, Agroecologia, Universidad Cochabamba AGRUCO, BO

Topics

Humankind and the world ecosystem are confronted by mounting insecurity stemming from rapid global change, unchecked globalisation and global disparities. Particularly in developing and transition countries, a variety of core issues may compound one another and give rise to “syndromes of global change” that hinder sustainable development. Yet the same countries facing the most acute problems are often least equipped to develop ways of mitigating them. Research partnerships between institutions in the North and the South thus offer an efficient way to

overcome disparities in capacity, technology and resources, and enable us to chart a joint path forward towards a sustainable future.

Now in its third phase, the NCCR North-South programme has proven to be an effective means of facilitating mutually beneficial collaboration between institutions and individuals in developing and transition countries and in Switzerland. Displaying a robust network of 350 researchers from about 50 countries, the programme continues to carry out high-quality disciplinary, interdisciplinary

and transdisciplinary research that improves our understanding of global change and promotes sustainable development. Phase 3 of the programme is characterised by a sharpened focus on specific core themes, increased emphasis on integrating and disseminating research to date, intensified work on translating research results into concrete recommendations for policy and practice and sustained efforts towards capacity development and societal empowerment in the South.

- Department of Sociology and Anthropology, University of Dar Es Salaam, TZ
- Department of Sociology, Delhi School of Economics, IN
- Dept. of Sociology, North Eastern Hill University, Shillong, IN
- Department of Sociology, University of Dhaka, BD
- Department of Sociology, University of Nairobi, KE
- Department of Urban and Regional Planning, University of Nairobi, KE
- Directorate of Livestock and Dairy Development, Peshawar, PK
- East Africa Wildlife Society, Nairobi, KE
- Ecole Nationale Supérieure d'Agronomie (ENSAM), Montpellier, FR
- Ecole Supérieure d'Agronomie, Université de Lomé, TG
- Enteric Infections Division, National Institute of Hygiene and Epidemiology, Hanoi, VN
- Environment and Sustainable Development, United Nations University, Tokyo, JP
- Environmental Research Mapping and Information Systems in Africa (ERMIS), Nakuru, KE
- European Association of Development Research and Training Institutes (EADI), Bonn, DE
- Facultad de Ciencias Políticas y Sociales, Universidad Nacional Autónoma, MX
- Faculté des Sciences et Techniques, Université de Nouakchott, MR
- Faculty of Environment and Resource Studies, Mahidol University, Nakhon Pathom, TH
- Faculty of Environmental Studies and Natural Resources, Egerton University, Njoro, KE
- Faculty of Forestry and Nature Conservation, Sokoine University of Agriculture, Morogoro, TZ
- Faculty of Technology, Makerere University, Kampala, UG
- French Institute for African Research (IFRA), Nairobi, KE
- Fundación de la Universidad de Costa Rica para la Investigación (FUNDEVI), San José, CR
- Groupement d'Intérêt Scientifique pour l'Etude de la Mondialisation et du Développement (GEMDEV), Paris, FR
- Hanoi School of Public Health, VN
- Institut d'Ethno-Sociologie, Université de Cocody, Abidjan, CI
- Institut National de Recherche en Santé Publique, Nouakchott, MR
- Institut Supérieur Inter-Etats de formation et de recherche dans les domaines de l'Eau, l'Energie, l'Environnement et les Infrastructures, Ouagadougou, BF
- Institute of Geography, Ministry of Science and Education, Almaty, KZ
- Inst. of Livestock, Veterinary Sciences and Pastures, Bishkek, KG
- Instituto del Conurbano (ICO), Universidad General Sarmiento, Buenos Aires, AR
- Inst. Dr. José María Luis Mor, MX

[Facultad Latinoamericana de Ciencias Sociales FLACSO, San José, CR](#)

[Faculté des Sciences et Gestion de l'Environnement, Université d'Abobo-Adjamé - UAA-FGS, Abidjan, CI](#)

[Gujarat Institute for Development Research, Ahmedabad, IN](#)

[INESA Société Inter-Entreprises, Port-au-Prince, HT](#)

[Institute of Anthropology, University of Basel, CH](#)

[Institute of Economic Growth, University Enclave, New Delhi, IN](#)

[Institute of Social Anthropology ESUZ, University of Zurich, CH](#)

[Institute of Urbanism, Faculty of Architecture and Urbanism, Central University of Venezuela, Caracas, VE](#)

[Instituto de Investigaciones Sociales IIS de la Universidad Nacional Autónoma de México UNAM, Mexico City, MX](#)

[Inter-Municipal Initiative IMI, Autlán, MX](#)

[Kunming Institute of Environmental Science, CN](#)

[Laboratoire de Recherches Vétérinaires et Zootechniques de Farcha LRVZ, N'Djaména, TD](#)

[Laboratory of Hydrology and Land Improvement HYDRAM, ISTE, EPF Lausanne, CH](#)

[Manantlán Institute of Ecology and Conservation of Biodiversity IMECBIO, University of Guadalajara, Autlán, MX](#)

[Mekong River Commission MRC, Vientiane, LA](#)

[Nepal Institute of Development Studies NIDS, Kathmandu, NP](#)

[Pollution Control Department PCD, Ministry of Natural Resources and Environment, Bangkok, TH](#)

[Post-graduate Course on Developing Countries ETHZ-NADEL, Zurich, CH](#)

[Potsdam Institute for Climate Impact Research PIK, Potsdam, DE](#)

[School of Environment, Resources and Development SERD, Asian Institute of Technology AIT, Bangkok, TH](#)

[Sustainable Development Policy Institute SDPI, Islamabad, PK](#)

[Swiss Agency for Development and Cooperation SDC, Regional Cooperation Office, Bishkek, KG](#)

[Tajik Academy of Sciences, Dushanbe, TJ](#)

[UNESCO World Natural Heritage Site, Jungfrau-Aletsch-Bietschhorn JAB, Naters, CH](#)

[Universidad Mayor de San Simón UMSS, Cochabamba, BO](#)

[University of Cocody, Abidjan, CI](#)

[Uzbek Academy of Sciences, Tashkent, UZ](#)

[Yunnan Academy of Social Science, Kunming, CN](#)

North-South: Research Partnerships for Mitigating Syndromes of Global Change

NCCR North-South

- Instituto Tecnológico de Costa Rica, Cartago, CR
- International Atomic Energy Agency (IAEA), Wien, AT
- International Centre for Agricultural Research in Dry Areas (ICARDA), Aleppo, SY
- International Centre for Integrated Mountain Development (ICIMOD), Kathmandu, NP
- Intern. Centre for Research in Agroforestry (ICRAF), Nairobi, KE
- International Water Management Institute (IWMI), Accra, GH
- Journalists for Democracy and Human Rights, Islamabad, PK
- Kenya Agricultural Research Institute, Makindu, KE
- Kenya Forest Working Group, Nairobi, KE
- Kyrgyz Giprozem, Bishkek, KG
- Liverpool School of Tropical Medicine, Vulnerability and Health Alliance, GB
- Naryn State University, Bishkek, KG
- National Centre for Soil and Fertiliser, Hanoi, VN
- Observatoire de l'Ecopolitique Internationale (OEI), Université du Québec, Montreal, CA
- Office of Population Research, Princeton University, US
- School of Environment, Resources and Development, Bangkok, TH
- School of Public Health, Makerere University, Kampala, UG
- Soil Physics and Environmental Resources Conservation, Institute of Land Use, Rostock, DE
- Soil Science Research Institute (SSRI), Agrarian Academy of Science, Dushanbe, TJ
- Tajik Academy of Agricultural Science, Dushanbe, TJ
- Tata Institute of Social Sciences, Mumbai, IN
- United Nations Habitat Programme, Nairobi, KE
- University of Veterinary and Animal Sciences, Lahore, PK
- Water and Forestry Department, Ecole Supérieure des Sciences Agronomiques, Antananarivo, MG

Economy/Industry

- Humer Foundation, Hoffmann-La Roche Holding, Basel, CH
- Nestlé, Abidjan, CI

Others

- Bread for All / Brot für Alle, Berne, CH
- Central Asia Mountain Information Network, Bishkek, KG
- City Medical Office of Health and Dar es Salaam City Council, Dar es Salaam, TZ
- Conflict Prevention and Conflict Transformation, Bern, CH
- Cooperation and Training Division, Urban Research Institute (URI), Vientiane, LA
- Cusanuswerk, Bonn, DE
- Department of Health, Ministry of Public Health, Bangkok, TH
- ENDA-Third World, Relay for Participatory Urban Development, Dakar, SN

Achievements of the previous years

In Phase 3, the research activities of the NCCR North-South programme are organised between three Thematic Nodes grouped around an Integrative Node. The Thematic Nodes combine advanced research on (1) "Institutions, Livelihoods, Conflicts", (2) "Health, Services, Planning", and (3) "Resources, Economy, Governance". Each Thematic Node is supported by at least two Swiss Institutional Partners, together with their partners abroad, and comprises four to six Research Projects. The individual projects are co-led by post-doctoral researchers from the South and the North who jointly oversee an international team of post-doctoral and senior researchers, PhD and master's students. The teams conduct their research in at least two out of nine established Partnership Regions spread across four continents.

Scientific Output

Activities in the first nine years produced over 1260 publications (of which over 380 were refereed), more than 660 reports and 1950 presentations, all of which resulted directly from the research carried out in the programme. A total of 178 PhD studies have been launched so far, of which 81 are now completed. In the past year, 23 new PhD students were selected.

Integration and Synthesis

In Phase 3, the main vehicle for integration and synthesis of all programme activities is the Integrative Node. The Integrative Node forms a hub of exchange between the Thematic Nodes and encompasses a Special Research Project on global development issues, the Transversal Project and a Partnership Regions Project. The Special Research Project on global issues is designed to guide the programme on three levels: on the level of policy and practice, by generating concrete recommendations for both that reflect contextual validity and reach; on the level of synthesis and generalisation, by empirically assessing interregional variation of core sustainability issues and comparing them to current global debates; and on the level of knowledge and research, by refining key concepts, issues and methodologies surrounding sustainable development and reflecting on sustainability science. Within the Transversal Project, individual and institutional partners will implement a number of synthesis projects that aim to capitalise on the results achieved over the life span of the NCCR North-South. Finally, the Partnership Regions Project continues to build and strengthen the network of exchange between the nine regions that provide the actual setting for all of the programme's field-based research and initiatives.

Institutionalisation

Phase 3 promises to bring major developments in establishing permanent institutions to carry on the work of the NCCR North-South. An inter-university doctoral programme on "Global Change, Innovation and Sustainable Development" was launched in 2008, and a corresponding "International Graduate School North-South" is now incorporating the experience of the NCCR North-South and cultivating its international network in the long term.

The doctoral programme and the graduate school are being jointly implemented by the Centre for Development and Environment (CDE, University of Bern), the Development Study Group (University of Zurich), the Swiss Tropical and Public Health Institute and swisspeace (University of Basel). CDE was recently established as an interdisciplinary university centre. With its extended mandate, it will lastingly contribute to a strengthened Swiss role in partnership-based sustainability research and outreach that addresses the needs of developing and transition countries.

Further information see www.north-south.unibe.ch

- Environment and Public Health Organisation, Kathmandu, NP
- Federación Nativa del Río Madre de Dios, Madre de Dios, PE
- FORS, Lausanne, CH
- Fundación Sodis, Cochabamba, BO
- Gerling Foundation for Sustainable Development, Tenna, CH
- German Advisory Council on Global Change, Berlin, DE
- Heinrich-Böll-Stiftung, Mexico City, MX
- Holistic Understanding for Justified Research and Action (HURJA), Mingora, PK
- Institute Dayakologi, Kalimantan Barat, ID
- Interooperation, Peshawar, PK
- Kenya National Bureau of Statistics, Nairobi, KE
- Kyrgyz Sheep Breeding Association, Bishkek, KG
- Lao National Mekong Commission Secretariat, Vientiane, LA
- Maji na Ufanisi (Water & Development), Nairobi, KE
- Ministry of Education, Dar es Salaam, TZ
- Ministry of Gender and Community Development, Dar es Salaam, TZ
- Ministry of Health, Dar es Salaam, TZ
- Municipality of San Salvador, San Salvador, SV
- Pan-American Health Organization (WHO), Environmental Health, Food Security and Sustainable Development, San José, CR
- PROclim, Berne, CH
- Racimos de Ungurahui, Lima, PE
- Republican Center of Veterinary Diagnostics, Bishkek, KG
- Rural Advisory Services "Chui", Bishkek, KG
- Sampark, Bangalore, IN
- Science, Technology and Environment Organization, Vientiane, LA
- Southeast Asian Ministers of Education Organization, Bangkok, TH
- State Secretariat for Economic Affairs, Bern, CH
- Sustainable Development Alternatives, Islamabad, PK
- Swiss Red Cross, Bishkek, KG
- Syngenta Foundation for Sustainable Agriculture, Basel, CH
- UNICEF, N'Djaména, TD
- Urban-Rural Solutions, Hanoi, VN
- Velux Foundation, Zürich, CH
- Vétérinaires sans Frontières, Lyon, FR
- Virtual Academy, Bishkek, KG
- Water for Asian Cities Programme, UN-Habitat, Kathmandu, NP
- Water Supply and Sanitation Collaborative Council, Geneva, CH
- World Conservation Union Tanzania, Tanga, TZ
- World Health Organisation, Nouakchott, MR
- WWE, Kathmandu, NP

Statistical Input – Output Data

Funding source (CHF)	Year 9	Year 10	Year 11	Year 12	Total	%
SNSF funding	3 200 000	2 000 000	1 800 000	1 000 000	8 000 000	25
Self-funding from home institution ¹	564 453	636 721	701 221	937 721	2 840 116	9
Self-funding from project participants	1 137 382	1 551 098	1 448 273	1 044 847	5 181 600	16
Third-party funding from SDC	3 790 703	4 403 313	3 996 336	3 449 037	15 639 389	49
Total	8 692 538	8 591 132	7 945 830	6 431 605	31 661 105	100

Personnel ²	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							KE	CI	DE	ET	TZ	
Management	5.50 ⁴	11	61	7	39	13	0	0	2	0	0	2
Master students	0	0	0	0	0	0	0	0	0	0	0	13
Doctoral students	66	26	39	40	61	14	4	8	3	3	5	27
Postdoctoral students	4	1	25	3	75	0	0	1	0	0	0	3
Research associates	14	8	57	6	43	6	0	0	0	0	0	7
Senior researchers ⁴	121	35	29	86	71	21	3	4	3	3	9	31
Other staff	66	42	64	24	36	20	11	1	2	2	1	26
Total	276.50	123	43	166	57	74	18	14	10	8	15	109

¹ Personnel costs, equipment and consumables, not included infrastructure and basic equipment

² Persons involved in the NCCR in the last reporting period (12 months)

³ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁴ Including leaders of the individual projects and other organisational units of the NCCR

Evaluation and Monitoring by the Swiss National Science Foundation (SNSF)

Members of the Review Panel

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Fachbereich Gesellschaftswissenschaften, Johann Wolfgang Goethe-Universität, Frankfurt am Main, DE

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Plant Survival in Natural and Agricultural Ecosystems

NCCR Plant Survival

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Start of the NCCR

April 1, 2001

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Public Relations

- Plant Survival News (trilingual English, French and German)
- Press releases
- Website

Research

WP 1

Plant fitness and abiotic interactions

Leader: Kessler F.

Chloroplast Metabolism

Head: Kessler F.
Fankhauser C., Hörtensteiner S., Rentsch D., Rochaix J. D., Goldschmidt-Clermont M., Zeeman S.

Dynamics of mycorrhiza formation

H: Martinoia E.
Reinhardt D., Paszkowski, U.

WP2

Plant antagonists and mutualists

Leader: Turlings T.

Exploiting inducible root defenses for pest control

H : Turlings T.
Neuhaus J.-M., Mauch-Mani B., Gindro K., Steinger T., Farmer T., Felber, F., Wolfender, J.-L.

Genetic dissection of pollination syndromes in *Petunia*

H : Kuhlemeier C.
Bshary R., Bernasconi Fusi G., Guerin P.

Host specificity and host-associated differentiation in phytophagous insects

H : Benrey B.
Bacher S., Romeis J.

WP3

Spread and impact of invasive plants

L : Guisan, A.

Invasiveness and ecosystem impact below and above the species level: refining and extending the *Centaurea maculosa* model

H : Müller-Schärer H.
Guisan A., Schaffner U.

Determinants and impacts of plant spread and invasion: a comparative and experimental approach

H: Fischer M.
van Kleunen M.

WP4

Statistics and modelling

Leader: Davison A.
Bersier L.-F., Goldstein D.

Economic stimulus package Optimizing the control of the Western corn rootworm with entomopathogenic nematodes

H: Turlings T., Burger R., Manukian A., Betran J.

Technological Platforms, Programmes etc.

Sequencing and microarrays facilities

H: Neuhaus J.-M.

SPSW Chemical analytical service

H: Glauser G.

Analytical service of the Faculty

H: Vallat A., Furrer J.

ICP-MS service

H: Matera V.

Greenhouse facilities

H: Felber F., Bernasconi-Fusi G.

Phytotron facilities

H: Kessler F., Turlings T.

Data analysis

H: Davison A.

GIS facilities (ECOSPAT lab)

H: Guisan A.

Doctoral Programme

H: Turlings T.

Heads of Individual Research Projects and Subprojects

Bacher Sven, Dr.
Benrey Betty, Dr.
Bernasconi Giorgia, Prof.
Bersier Louis-Félix, Dr.
Bshary Redouan, Prof.
Davison Anthony C., Prof.
Fankhauser Christian, Prof.
Farmer Edward E., Prof.

Fischer Markus, Prof.
Gindro Katia, Dr.
Goldschmidt-Clermont Michel, Prof.
Goldstein Darlene, Dr.
Guerin Patrick, Dr.
Guisan Antoine, Prof.

Zoologisches Institut, Universität Bern
Institut de Biologie, Université de Neuchâtel
Institut de Biologie, Université de Neuchâtel
Département de Biologie, Université de Fribourg
Institut de Biologie, Université de Neuchâtel
Département de Mathématiques, EPF Lausanne
Center for Integrative Genomics, University of Lausanne
Département de Biologie Moléculaire Végétale, Université de Lausanne
Institut für Pflanzenwissenschaften, Universität Bern
Agroscope ACW Changins, Nyon
Département de Biologie Moléculaire, Université de Genève
Département de Mathématiques, EPF Lausanne
Laboratoire de Physiologie Sensorielle, Université de Neuchâtel
Département d'Ecologie et d'Evolution, Université de Lausanne

Third Party Cooperation

(in progress)

Programmes

- ANGEL
- Arabidopsis Starch Metabolism Network
- COST 858
- DAISY
- GIN
- IGGP
- ISCB
- NEOBIOTA
- NIOO-knaw
- NRP59
- PNETOX
- PRATIQUE
- RVVS
- SCOPES
- SINO
- SiTraMaisBT
- SPSW

Research Institutions

- Abteilung Pflanzenernährung, Leibniz-Institut für Gemüse- und Zierpflanzenbau, Grossbeeren, DE
- Bioinformatics and Information Technology, Leibniz-Institute of plant genetics and crop plant research, Gatersleben, DE
- Botanica e Patologia vegetale, Facoltà di Agraria, Napoli, IT
- Center for Environmental Science, Appalachian Laboratory, Frostburg, US
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- Div. of Biological Sciences, University of Montana, Missoula, US
- Div. of Genome and Biodiversity Research, National Institute of Agrobiological Sciences, Tsukuba, JP
- Division of Molecular And Cellular Biology, Nagoya University, JP
- Division of Plant Sciences, National Institute of Agrobiological Sciences, Tsukuba, JP

Topics

Plants are the primary producers of organic matter on land and central to almost all ecosystems. The survival and performance of plants is of fundamental importance to both the preservation of biodiversity and sustainable agriculture. We explore interactions between plants, insects and pathogens, and also among plants, from the molecule to the ecosystem and landscape level. Research on plant fitness and abiotic interactions focuses on chloroplast metabolism

under changing light conditions and nutrient acquisition, the latter being improved by symbioses with arbuscular mycorrhizal fungi.

The field of plant-insect interactions deals with chemical defence compounds produced by the plant that attract natural enemies of its pests at the leaf-air and root-soil interfaces. Identifying the genes that play a role in pollinator selection is another aspect of this topic. Studies

on the spread and impact of invasive plants consist in refining and extending the investigations on the causes of invasiveness. The aim is also to understand why, in contrast to invasive alien species, many native species are declining in the landscape. To support these research efforts, novel statistics and modeling methods are being developed, thereby providing an impetus for such interdisciplinary collaborations in Switzerland.

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- Physical Oceanography Research Division, University of Davis, California, US
- Plant Energy Biology Institute, University of Western Australia, Perth, AU

Plant Survival in Natural and Agricultural Ecosystems

NCCR Plant Survival

Achievements of the previous years

Interdisciplinary and applied research

The NCCR Plant Survival, initiated in 2001, enabled the creation of an interdisciplinary network of skilled scientists around the general theme of plant survival.

The large efforts made by all participants in this network led to numerous groundbreaking publications and discoveries during the first two phases. In its Third Phase a particular emphasis is put on the exploitation of the intellectual property and the transfer of knowledge and technology into application.

Our research into the enhancement of plastoglobule content in leaves is valuable for the development of pharmaceutical and cosmetic products, whereas our current research on starch quality and quantity is used in the domain of human nutrition or biofuel as well as for the improvement of forage crops.

In another project different plants were selected for their ability to enter mycorrhizal associations even in fertilized soils. The research on genes involved in the transport of secondary metabolites within these interactions will be exploited to improve natural colonization processes.

By studying the mechanisms of plant root defences new crop protection strategies are being developed. One of the successes has been the manipulation of a root signal that is attractive to insect killing nematodes and could thereby significantly improve the control of a major root pest.

In the field of invasive plants, new predictive models were developed for the management of invasive or rare species, providing guidelines and screening protocols for the stakeholders and practitioners.

The statistics and modelling group continues to further work on procedures for the analysis of high-dimensional data, for example metabolite profiles or genetic data. They aim to tackle the dynamic modelling of food- and pollination-webs and to work on novel approaches for the spatial modelling of species distributions.

Technology transfer

The technology transfer activities aim at consolidating what has been achieved by the partners in the previous phases. Particular emphasis is put on increasing the efforts to financially exploit the results and the intellectual property generated in the different phases of the NCCR through an efficient policy of licensing to or partnering with third parties. For the Phase III the organisation of the TT activities is taken over by the Technology Transfer Office of the University of Neuchâtel in collaboration with the NCCR coordination.

Public relations

A brochure describing our main research results achieved during the second phase has been published in April 2010. Our success stories are regularly reported in the media. In 2009, more than 130 quotations in the media (web, written press, radio and TV) on activities, results and interviews of

members of the NCCR Plant Survival have been recorded. Radio and TV represented 13% of this coverage. One third of the citations were in French, followed by German and English (one fourth each). Half of the quotations were published on non-specialised websites and in the written press, followed by websites dealing with agriculture and science.

Doctoral programme

The financing and management of the doctoral programme have now been taken over by the University of Neuchâtel, becoming one of the regular inter-university programmes within the CUSO. Mobility grants are awarded to allow Ph.D. students to visit and work in other laboratories and to present their research at international congresses.

Equal opportunities

A network of Equal Opportunity Offices at the Swiss universities currently provides optimal conditions for the female scientists of our NCCR to pursue an academic career. In Neuchâtel, the Equal Opportunity Office offers scholarships and mentoring programs, and promotes part-time employment opportunities. The advancement of women in academic careers and the reintegration of women after maternity leave is supported with courses, workshops and seminars that can be attended by all NCCR scientists.

Further information see www.unine.ch/nccr/

- Research Unit Mt Albert, HortResearch, Auckland, NZ
- Risø National Laboratory, Technical University of Denmark, Roskilde, DK
- School of Biological and Conservation Sciences, University of KwaZulu-Nata, Pietermaritzburg, ZA
- School of Crystallography, University of London, GB
- Technische Umweltchemie, Umweltforschungszentrum Leipzig-Halle GmbH, DE
- Trait Fonctionnels Végétaux et Dynamique des Ecosystèmes Alpin, Laboratoire d'Ecologie Alpine, Grenoble, FR
- Umweltforschungszentrum Leipzig-Halle GmbH, DE
- Unité de Phytopharmacie et Médiateurs Chimiques, Institut National de la Recherche Agronomique, Versailles-Grignon, FR
- Unité Mixte de Recherche, Plante-Microbe-Environnement (PME), Institut National de la Recherche Agronomique, Dijon, FR
- University of Athens, Europe and South America Consortium, Athens, GR

Economy / Industry

- Affymetrix, Inc., Santa Clara, US
- AgriSense-BCS Limited, Pontypridd, GB
- Analytical Research Systems, Micanopy, Florida, US
- BASF Chemical Company, Ludwigshafen, DE
- Bio-Protection & Development on Vineyards, Bettembourg, LU
- BIOREBA AG, Reinach, CH
- Burri Agricide, Ligerz, CH
- Cosmotec SA, Collombey-Le-Grand, CH
- Delley Semences et Plantes SA, Delley, CH
- Diethelm Keller Siber Hegner DKSH Ltd Switzerland, Zurich, CH
- ECOGENICS GmbH, Zurich, CH
- Fenaco, UFA-Samen Winterthur, Winterthur, CH
- Givaudan, Dübendorf, CH
- Isagro S.p.A., Milano, IT
- Kael Cosmetic SA, San Francisco, US
- MONSANTO Company, Ecological Technology Center, St. Louis, US
- NimbleGen Systems Inc., Madison, US
- Omya AG Agro, Oftringen, CH
- Smart Nose Ltd., Marin, CH
- Suterra LLC, Bend, US
- Syngenta, Basel, CH
- Syngenta Crop Protection, Stein, CH

Others

- Amt für Landwirtschaft, Landschafts- und Bodenkultur Offenburg, Offenburg, DE
- Bundesamt für Umwelt, Bern, CH
- Center for Applied Biosciences, Delémont, CH
- CimArk SA, Sion, CH
- Consortium Biodiversity Exploratories, Potsdam, DE
- DLR-Rheinpfalz Phytomedizin / Biotechnologischer Pflanzenschutz, Neustadt, DE
- Office cantonal d'agro-écologie, Service de l'Agriculture, Châteauneuf, CH
- RACINES, Geneva, CH

Statistical Input – Output Data

Funding source (CHF)	Year 9	Year 10	Year 11	Year 12	Total	%
SNSF funding	2 265 000 ⁵	2 215 000 ⁵	1 600 000	400 000	6 480 000	59
Self-funding from home institution ¹	557 658	573 683	576 270	478 883	2 186 494	20
Self-funding from project participants	2 320 310 ⁶	0	0	0	2 320 310	21
Third-party funding ²	0	0	0	0	0	0
Total	5 142 968	2 788 683	2 176 270	878 883	10 986 804	100

Personnel ³	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	FR	NL	IN	IT	
Management	5.23 ⁴	7	47	8	53	9	1	1	1	0	0	2
Master students	9	3	33	6	67	5	0	2	0	0	0	0
Doctoral students	41	16	39	25	61	16	6	6	1	3	2	6
Postdoctoral students	18	4	22	14	78	6	3	2	0	1	1	5
Research associates	2	1	50	1	50	1	0	1	0	0	0	0
Senior researchers ⁵	16	2	13	14	88	3	0	1	1	0	0	0
Other staff	3	0	0	3	100	3	0	0	0	0	0	0
Total	94.23	33	32	71	68	43	10	13	3	4	3	13

¹ Personnel costs, equipment and consumables, not included infrastructure and basic equipment

² Not included is CTI funding (cf. page 6). Since the start of the NCCR 2 projects have been funded by CTI at a total amount of 2.7 million CHF.

³ Persons involved in the NCCR in the last reporting period (12 months)

⁴ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁵ Including leaders of the individual projects and other organisational units of the NCCR

⁶ Included funding of economic stimulus package projects (cf. projet list)

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Climate Variability, Predictability and Climate Risks

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Research

Work Package Reconstructing and modelling past drought variability

Leader: Raible C.

MONALISA-3 Modelling and Reconstruction of North Atlantic Climate System Variability

Head: Raible C.
Stocker T.F.

PALVAREX-3 PALEoclimate VARIability and EXTreme Events

H: Brönnimann S.
Schwikowski M., Luterbacher J.

DE-TREE Drought effects and PDSI reconstruction from Southern and Central Euro- pean trees

H: Frank D.C.

Work Package Future Climate

Leader: Schär C.

HYCLIM Intensification of the water cycle: Scenarios, processes and extremes

H: Wild M.
Schär C.

CCC Global climate processes: role of cirrus clouds for present and future climate

H: Lohmann U.
Peter T.

PRECLIM-3 Probabilistic climate change scenarios for mean and extremes in the Alpine region

H: Appenzeller C.
Liniger M., Knutti R.

Work Package Ecosystem Impacts and Adaptation

Leader: J. Fuhrer

PLANT/SOIL-3 Drought effects on Swiss grasslands and adapted plant mixtures as management options under changing climate conditions

H: Feller U.
Buchmann N.

AGRISK Climate change and agricultural production risks

H: Calanca P.
Fuhrer J., Lehmann, B.,
Finger R.

ECOWAT Impacts of changing drought conditions on catch- ment ecology and water cycle

H: Bugmann H.
Körner C., Seneviratne S.I.,
Wolf A.

Work Package Integrated assessment analysis of global climate change, economy and society

Leader: G. Stephan

CITEL Climate change and international trade from an economic and legal perspective

H: Cottier T.
Stephan G.

R-3 Climate vulnerability, risk assessment and management in a Post-Kyoto World

H: Stephan G.
Buob S., Turton H.

MIADAC-3 Modelling Climate Change Policies: Mitigation, Adaptation, and Acceptance

H: Thalmann Ph.

CLER Climate Lessons from radiocarbon data

H: Joos F.

SOLAR Solar Forcing and Climate Change of the last 1000 years

H: Beer J.

Integrated Projects and Fast Track Studies

SECOND CHANCE-3 Socio- economic Consequences Due to Changing Climate and Extreme Events

H: Beniston M.

Programmes

Yearly Summer School

H: Grosjean M.

PhD student meetings

H: Martin L.

Workshops co-organized with ProClim

H: Grosjean M.

Topics

Comprehensive insight and sound understanding of 1) natural climate variability, modelling and high-resolution climate reconstruction over the last 1000 years, 2) global and regional climate processes, seasonal and inter-annual climate variability and more accurate predictions, including extreme events, 3) assess implications of climate variability and change for ecosystems and to evaluate possible adaptive strategies

for the management of forests and agriculture and, 4) potential perspectives for regional and global post-Kyoto climate policies, vulnerability of regional and global economies to the adaptation to global climate change. The NCCR Climate links four work-packages: "Past Climate Variability", "Climate Predictability, Processes, and Projections", "Ecosystem Impacts and Adaptation", and "Climate Risks". The NCCR

Climate is a research network of institutions within Switzerland and collaborates with national and international programmes (ProClim, WCRP-CLIVAR, IGBP, UNFCCC, IPCC). The NCCR Climate commits itself to a firm effort in education, to knowledge transfer and interaction with administration, politics, the private sector and the public. The NCCR Climate is in the last phase (2009-2013).

Third Party Cooperation

Programmes

- AMIP II
- AustroClim
- CarboEurope-IP (FP6)
- CARBO-Extreme (FP7)
- CARBOOCEAN IP (FP6)
- CECILIA (FP6)
- CIRCE (FP6)
- COSMO-LEPS
- COST 725
- COST 733
- COST 734
- DILPA
- ECOCHANGE (FP6)
- ECSN
- ENSEMBLES (FP6)
- GEOMON (FP6)
- GrassGas
- IGBP - PAGES
- Lignin Turnover
- MAIOLICA
- MedCLIVAR
- MILLENNIUM (FP6)
- NDACC
- NICOLA
- SoilGas
- TOCSIN (FP6)
- WCRP-BSRN
- WCRP-CLIVAR
- WMO-LRF

Research Institutions

- Agenzia Regionale Prevenzione e Ambiente dell'Emilia Romagna (ARPA), Bologna, IT
- Alfred Wegener Institut, Bremerhaven, DE
- British Antarctic Survey, Cambridge, GB
- Canadian Institute for Climate Sciences, University of Quebec, Montreal, CA
- Center for Environmental Prediction, Rutgers University, New Brunswick, US
- Centre for Marine and Climate Research, University of Hamburg, DE
- Climate and Global Dynamics Division, National Center for Atmospheric Research, Boulder, US
- Climate Research Unit, University of East Anglia, Norwich, GB
- Danish Meteorological Institute, Copenhagen, DK
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- Département Energie et Politiques de l'Environnement du LEPII, Université Pierre Mendès-France, Grenoble, FR
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- Department of Earth Science, University of Bergen, NO

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Esper Jan, Prof.
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Joos Fortunat, Prof.
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Körner Christian, Prof.
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- Ecosystem Modelling and Biodiversity Studies Group, Lund University, SE
- Environmental Change Institute, University of Oxford, GB
- European Centre for Medium Range Weather Forecast, Reading, GB
- Fachbereich Volkswirtschaftslehre, Universität Trier, DE
- Fondazione Eni Enrico Matte, Milano, IT
- Fraunhofer-Institut für System- und Innovationsforschung, Karlsruhe, DE
- Geographical Institute, University of Mainz, DE
- Geology and Geophysics Department, Woods Hole Oceanographic Institution, US
- GKSS Research Centre Geesthach, DE
- Groupe d'Etudes et de Recherche en Analyse des Décisions (GERARD), Mc Gill University, Montréal, CA
- Hadley Centre for Climate Prediction and Research, Exeter, GB
- Institut d'Economie et de Politique de l'Énergie (IEPE-CNRS), Grenoble, FR
- Institut für Energiewirtschaft und Rationelle Energieanwendung, Universität Stuttgart, DE
- Institut für Umweltpolitik, Universität Heidelberg, DE
- Institut National sur la Recherche Agronomique, Clermont-Ferrand, FR
- Institute of Geography, Justus-Liebig-Universität Giessen, DE
- Institute for Energy Environment Economy, Tsinghua University, Beijing, CN
- Institute of Geography, University of Augsburg, DE
- Institute of Geography, University of Würzburg, DE
- Institute of Geophysics, University of Copenhagen, DK
- Institute of Soil Science, TU Berlin, DE
- International Institute for Applied Systems Analysis (IIASA), Laxenburg, AT
- International Pacific Research Center, University of Honolulu, US
- International Research Institute for Climate Prediction, Columbia University, New York, US
- Joint Research Center, Ispra, IT
- Judge Business School, University of Cambridge, GB
- Laboratoire de Glaciologie et Géophysique de l'Environnement, Grenoble, FR
- Laboratoire des Sciences du Climat et de l'Environnement, Gif-sur-Yvette, FR

Climate Variability, Predictability and Climate Risks NCCR Climate

Achievements of the previous years

The SNSF Review Panel stated in the Assessment Report 2004: "The NCCR Climate is unique in its interdisciplinary focus, not just for Switzerland or Europe, but globally". Building on firm structural and institutional foundations, the NCCR Climate network led to significant achievements in four areas: distinct scientific impact, international leadership through networks, sustained education at postgraduate level, and extended public relations. The Graduate School "Climate Sciences" (M.Sc. and Ph.D. University of Bern) concerted with the M.Sc. "Atmospheric and Climate Sciences" (S-EN ETH) opened in 2006/2007.

Science

The NCCR Climate shaped the profile of Swiss climate research through collaborative novel and timely scientific contributions with a high impact. Examples are the reconstruction of temporally highly-resolved European temperature and precipitation

fields back to AD 1000 or the assessment of extreme climate such as the European summer 2003 being the hottest of the last 500 years. Simulations with different climate models show that about every second summer can be as warm or warmer in 2070 - 2100 than the summer 2003. With a focus on Switzerland, a set of scenarios for severe climate events (heat-waves, wind, drought, heavy precipitation, flood) has been produced, and the impact on society, agriculture and forests has been assessed. Information about extreme events in a changing climate is vital for risk assessment in financial business (e.g., investment and insurance). Operational tools for the climate forecast of up to six months were developed, novel ways of coupling climate and economic models were explored, and future ways of the Kyoto process were studied. Evidently, a hierarchy of state-of-the-art models (global and regional climate models, regional

and local impact models) and large observational datasets are a prerequisite to address such targets.

Other Aspects

NCCR Climate researchers take leadership in the UNFCCC, IPCC process and in international programmes (IGBP, WCRP, WMO, ERA). The NCCR Climate Summer School is a highly competitive internationally recognised platform for young scientists and attracts distinguished teachers. The NCCR Climate works closely with stakeholders, governmental agencies and the private sector. Public interest in NCCR Climate research is unprecedented. In 2007 the NCCR Climate had its first major structural impact: the University of Bern inaugurated the Oeschger Centre for Climate Change Research! In 2008 the Center for Climate System Modelling C2SM was inaugurated at ETH Zurich.

Further information see www.nccr-climate.unibe.ch

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- School of Computing, National University of Singapore, SG
- School of Environmental Sciences, University of East Anglia, Norwich, GB
- U.S. Arid-Land Agricultural Research Center, Maricopa, US

Economy / Industry

- BKW FMB Energie AG, Bern, CH
- KANLO Consultants, Lyon, FR
- Ordecys Sàrl, Chêne-Bourgeries, CH
- Swiss Reinsurance Company Ltd, Zürich, CH

Others

- Beratendes Organ für Fragen der Klimaänderung (OCC), Bern, CH
- Bundesamt für Energie, Bern, CH
- Bundesamt für Landestopographie, Wabern, CH
- Bundesamt für Umwelt, Bern, CH
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- MeteoSwiss, Zürich, CH
- Past Global Changes of IGBP, Bern, CH
- ProClim Forum for Climate, Bern, CH
- Wissenschaftlicher Beirat der Bundesregierung Globale Umweltveränderungen (WBGU), Berlin, DE

Statistical Input – Output Data

Funding source (CHF)	Year 9	Year 10	Year 11	Year 12	Total	%
SNSF funding	1 800 000	1 700 000	1 600 000	400 000	5 500 000	36
Self-funding from home institution ¹	370 821	310 500	320 500	326 250	1 328 071	9
Self-funding from project participants	4 978 393	1 483 398	1 193 792	201 860	7 857 443	51
Third-party funding	239 000	190 000	190 000	90 000	709 000	5
Total	7 388 214	3 683 898	3 304 292	1 018 110	15 394 514	100

Personnel ²	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	IT	FR	US	AT	
Management	2.21 ³	3	38	5	63	6	1	0	0	0	0	1
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	57	27	47	30	53	31	11	1	2	2	1	2
Postdoctoral students	19	6	32	13	68	4	8	1	0	0	1	5
Research associates	10	7	70	3	30	3	4	1	0	0	0	2
Senior researchers ⁴	35	3	9	32	91	10	5	1	1	1	1	0
Other staff	9	7	78	2	22	8	1	0	0	0	0	0
Total	132.21	53	38	85	62	62	30	4	3	3	3	10

¹ Personnel costs, equipment and consumables, not included infrastructure and basic equipment

² Persons involved in the NCCR in the last reporting period (12 months)

³ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁴ Including leaders of the individual projects and other organisational units of the NCCR

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Materials with Novel Electronic Properties – Basic Science and Applications

NCCR MaNEP

Home Institution

University of Geneva

Start of the NCCR

July 1, 2001

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Research

Novel phenomena at interfaces and in superlattices

Head: Triscone J.-M.
Participating members:
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Jaccard D., Morenzoni E.,
Morpurgo A., Paruch P.,
Triscone J.-M., Willmott Ph.

Materials for future electronics

Head: Morpurgo A.
Participating members:
Büttiker M., Giamarchi T.,
Morpurgo A., Paruch P.,
Renner Ch., Sigrist M.,
Triscone J.-M., van der Marel D.

Electronic materials for energy systems and other applications

Head: Fischer Ø.
Participating members:
Abplanalp M., Cors J., Decroux
M., Eckert D., Fischer Ø.,
Flükiger R., Kenzelmann M.,
Patzke G., Renner Ch., de Rooij
N., Triscone G., Triscone J.-M.,
Weidenkaff A., Yvon K.

This project is carried out with
six participating industries.

Electronic properties of oxide superconductors and related materials

Head: van der Marel D.
Participating members:
Baeriswyl D., Batlogg B.,
Degiorgi L., Fischer Ø., Gian-
nini E., Karpinski J., Keller H.,
Kenzelmann M., Mesot J.,
Morenzoni E., Niedermayer
Ch., Rice T.M., Sigrist M.,
van der Marel D.

Novel electronic phases in strongly correlated electron systems

Head: Sigrist M.
Participating members:
Baeriswyl D., Blatter G.,
Giannini E., Jaccard D.,
Kenzelmann M., Sigrist M.,
Troyer M., van der Marel D.

Magnetism and competing interactions in bulk materials

Head: Mila F. and Zheludev A.
Participating members:
Giamarchi T., Mesot J.,
Mila F., Ott H.-R.,
Rønnow H. M., Staub U.,
Troyer M., Zheludev A.

Electronic materials with reduced dimensionality

Head: Forró L.
Participating members: Aebi Ph.,
Degiorgi L., Fischer Ø., Forró L.,
Griioni M., Giamarchi T.

Cold atomic gases as novel quantum simulators for condensed matter

Head: Giamarchi T.
Participating members:
Blatter G., Esslinger T., Gia-
marchi T., Gritsev V., Troyer M.

Economic stimulus package Cut-and-coat process by wire-EDM

H: Cors J., Perez R.

Electrochemical sensors with higher resolution

H: Cors J., Tsitos G.

Development of MgB₂ wires with high critical current densities for economical NMR magnets at 4.2 and at 20 K

H: Flükiger R., Eckert D.

Neutron optical devices for small samples

H: Kenzelmann M., Böni P.

Platforms, Programmes etc.

Industry Network

Swiss Workshop MaNEP «Les Diablerets»

Winter School MaNEP «Saas-Fee»

MaNEP Mobile Post-Doc Program

Advancement of Women MaNEP Summer Internships MaNEP Doctoral School

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Topics

In the last twenty years, numerous new electronic materials have been discovered with interesting and often complex crystalline structures and outstanding new electronic properties. These new striking properties are found in some magnetic, ferroelectric and superconducting compounds. All these compounds have a large potential for applications and we believe that they will play a key role in advanced future electronic devices. Among

the materials displaying these unexpected exceptional properties, many share in common a low dimensionality and a low carrier density. Most of them are complex oxide systems and, in many of these materials, electronic interactions play an important role making these systems very difficult to treat theoretically. Another characteristic of these systems is that they often have competing ground states, for instance magnetic and superconducting, which

makes them very sensitive to many external parameters, leading to interesting functionalities. In MaNEP, the main goals of our NCCR are to develop a basic understanding of these new materials, to prepare for their applications, and to train young scientists in this important field for future electronic applications. After the end of the third phase, these topics will be pursued at the University of Geneva with many of the present members of MaNEP.

Communication

- The SupraFête in 2007: a big event to celebrate 20 years of high temperature superconductors
- The PhysiScope: official inauguration in 2008
- Movie: "Superconductivity: a short story of an enduring enigma"
- Exhibition and brochure illustrated by Swiss cartoonist "Mix&Remix"
- Partnerships with CERN: open doors, special exhibition, conferences
- Participation in the events of UniGE's 450th anniversary
- Telecom World 2009: exceptional KTT conference "A Quantum Leap for Telecommunications – Today and Tomorrow", organized by three NCCR
- MaNEP brochures: general presentation & KTT
- Electronic Newsletter
- Website: regular updates and improvements

Third Party Cooperation

(in progress)

Programme

- CMA (FP6-NMP)
- EuCARD
- INTAS (FP6-NIS)
- ISJRP
- MAQUIS
- Materials World Network (NSF)
- NES (ESF)
- OxIDES
- PNANO-ANR
- SCOPES (SNSF)
- SINFONIA (FP 6)
- THIOX (ESF)

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- Centre de Recherches sur Tres Basses Températures, Grenoble, FR
- Centre for Nanotechnology, University College London, GB
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Achievements of the previous years

Science

The scientific activities of MaNEP phase III are organized around eight projects. The idea is to centre our efforts on the key questions in the area of MaNEP. Project 1, "Novel phenomena at interfaces and in superlattices" wants to demonstrate novel functionalities at oxide and organic interfaces. The specific aim is the discovery, understanding, and control of novel properties at artificially engineered interfaces. In Project 2, "Materials for future electronics", electronic devices and nanostructures for the investigation of materials with novel electronic properties will be used. The two main classes of materials addressed are heterostructures of transition metal oxides and carbon-based materials. New collaborations with the industry have started in the frame of Project 3, "Electronic materials for energy systems and other applications". They are based on technologies developed in MaNEP Phases I and II. Project 4, "Electronic properties of oxide superconductors and related materials", focuses on the microscopic origin of superconductivity and other states of matter with which it competes. Project 5, "Novel electronic phases in strongly correlated electron systems", complements Project 4 with work on the wide class of materials exhibiting special properties due to the presence of strong local correlation between the position and the motion of electrons. The goal of Project 6, "Magnetism and competing interactions in bulk materials", is to investigate a panoply of remarkable phenomena due to conflicts and competition between various degrees of freedom of the electrons. The leitmotif for Project 7, "Electronic materials with reduced dimensionality" is based on the fact that low-dimensional systems have features which are ab-

sent or less expressed in 3D materials, such as spin-charge separation or strong fluctuations. The aim of Project 8, "Cold atomic gases as novel quantum simulators for condensed matter", is to use cold atoms to realize model systems with an unprecedented level of control and tunability, allowing many issues pertinent to the field of strong correlations to be tested.

Know-how and technology transfer

MaNEP has set-up several collaborations with industry and the HES-Geneva in different domains where its skills and knowledge are needed. They are carried out within project 3 described above. A first spin-off company "PHASIS" is active in the field of thin film fabrication and built on know how developed in MaNEP. MaNEP is also the originator of a project of reinforced collaboration between the Office de Promotion des Industries et des Technologies (OPI), the HES-Geneva and the University of Geneva.

Education and advancement of women

Having co-organised a summer school with PSI in 2002 in Zuoz, MaNEP organized two successful summer schools (2004, 2006) and one winter school (2009) at Saas-Fee. About 70 students attended lectures given by international experts. Many students were MaNEP doctoral students, but the school also enrolled students from other countries. The 4th MaNEP winter school entitled "Emergent States of Electronic Matter" took place from January 9 to 14, 2011, in Saas-Fee.

The MaNEP doctoral program was launched at the University of Geneva and the first courses began in autumn 2008.

Since 2004, MaNEP has organized summer internships for female students, giving the

opportunity to integrate research groups at the different universities and federal institutes in MaNEP. These internships are highly rated by the participants. A survey prepared together with the Equality Office of UniGE was sent to all women researchers in MaNEP in order to evaluate the current work and promote activities devoted to the advancement of women.

Communication and outreach

MaNEP has initiated many ambitious communications and outreach projects. The SupraFête is a very special event when 1500 people were able to discover superconductivity and which provided many new PR tools, namely a movie, a fun exhibition and a brochure illustrated by the well-known Swiss cartoonist Mix&Remix. The PhysiScope, created by MaNEP and with the collaboration of the Physics Section UniGE was launched in the autumn of 2008. There were also fruitful collaborations with CERN. In 2009, MaNEP in partnership with Exos, demonstrated an artistic performance featuring superconducting levitation, during the ITU Telecom 2009. This performance was also shown at an international event in 2010.

During the very successful Night of the Science in Geneva, July 2010, MaNEP, the Physics Section UniGE and the PhysiScope joined forces to show off to a general public many exciting highlights of physics research.

The centenary of the discovery of superconductivity will be celebrated and organized by MaNEP in collaboration with the Physics Section UniGE and several other partners (PSI, CERN, SPS etc.) in 2011 with many electrifying events.

Further information see www.manep.ch

Statistical Input – Output Data

Funding source (CHF)	Year 9	Year 10	Year 11	Year 12	Total	%
SNSF funding	4 615 000 ⁶	3 615 000 ⁶	2 500 000	800 000	11 530 000	15
Self-funding from home institution ¹	1 545 672	4 034 713	4 462 624	5 889 072	15 932 081	20
Self-funding from project participants	14 989 114 ⁶	10 922 950 ⁶	10 588 550	8 920 550	45 421 164	58
Third-party funding ²	851 145 ⁶	1 918 205 ⁶	1 058 205	1 058 205	4 885 760	6
Total	22 000 931	20 490 868	18 609 379	16 667 827	77 769 005	100

Personnel ³	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	FR	IT	RU	PL	
Management	6.84 ⁴	10	48	11	52	15	0	1	2	0	0	0
Master students	1	0	0	1	0	1	0	0	0	0	0	0
Doctoral students	111	18	16	93	84	34	25	4	5	0	3	39
Postdoctoral students	88	16	18	72	82	10	9	14	9	6	1	36
Research associates	0	0	0	0	0	0	0	0	0	0	0	0
Senior researchers ⁵	94	7	7	87	93	22	6	6	11	8	3	19
Other staff	46	8	17	38	83	33	33	3	4	0	0	1
Total	346.84	59	16	302	84	115	73	28	31	14	7	95

¹ Personnel costs, equipment and consumables, not included infrastructure and basic equipment

² Not included is CTI funding (cf. page 6). Since the start of the NCCR 3 project has been funded by CTI at a total amount of 2,8 million CHF.

³ Persons involved in the NCCR in the last reporting period (12 months)

⁴ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁵ Including leaders of the individual projects and other organisational units of the NCCR

⁶ Included funding of economic stimulus package projects (cf. project list)

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- Laboratoire de Physique Théorique et Modèles Statistiques, Paris, FR
- Laboratoire de Physique Théorique, Université Paul Sabatier, Toulouse, FR
- Laboratory for High Energy Technologies, Russian Academy of Sciences, Moscow, RU
- Laboratory of Applied and Solid State Physics, University of Groningen, NL
- London Center for Nanotechnology, University College London, GB
- Los Alamos National Laboratory, US
- Manchester Centre for Mesoscience and Nanotechnology, University of Manchester, GB
- Microelectronics Technology, The Aerospace Corporation, US
- Naval Research Laboratories, Washington, US
- Neutron Scattering Sciences Division, Oak Ridge National Laboratory, US
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- Walther Meissner Institut, Garching, DE

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- Boost Consulting Inc., Somerville, US
- Bruker BioSpin AG, Fällanden, CH
- Bruker Optics GmbH, Fällanden, CH
- IBM Research Laboratory GmbH, Rüschlikon, CH
- Institut Technologies du vivant, Sion, CH
- METROLAB Instruments SA, Geneva, CH
- Microsoft Research, Santa Barbara, US
- NIRVA Industries SA, Geneva, CH
- Omicron Nanotechnology, Taunusstein, US
- Phasis Sàrl, Genève, CH
- ROLEX SA, Genève, CH
- SwissNeutronics, Klingnau, CH
- Vacheron Constantin SA, Geneva, CH

Nanoscale Science – Impact on Life Sciences, Sustainability, Information and Communication Technologies

NCCR Nanoscale Science

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June 1, 2001

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Research

Module Nanobiology

Heads: D. Klostermeier, R. Lim

Bio-Synthetic Cellular Nanomachines

H: R.Y.H. Lim

Observing Biological Nanomachines by Single Molecule Spectroscopy

H: D. Klostermeier

Mechanical Control of Cell Division

H: D. Müller

Photonic Force Nanospectroscopy in Living Systems

H: S. Jeney

Correlating Tumorigenic Effects with the Mechanobiology of Cells in 3D Cultures

H: C.-A. Schönenberger

Applying Cantilever-Array Technology

H: Ch. Gerber

Complex Nanosystems for Medical Application based on Polymer Carriers

H: P. Hunziker

Structural systems biology of neurodegenerative diseases with nanotechnological tools

H: H. Stahlberg

Module Quantum Computing and Quantum Coherence

Heads: D. Loss, K. Ensslin

Qubit and Spintronics (theory)

H: D. Loss

Experimental Manipulation of Quantum Systems

H: K. Ensslin

Interference of Spin-Orbit Interaction

H: G. Salis

Quantum Coherence in Nanoscale Systems

H: D. Zumbühl

Mesoscopic Nuclear Spin Ensembles

H: A. Imamoglu

Quantum Coherence and Quantum Computing in Superconducting Nanostructures (theory)

H: C. Bruder

Entanglement and quantum interface on atom chips

H: P. Treutlein

Module Atomic and Molecular Nanosystems

Heads: E. Meyer, H.-J. Hug

Energy Dissipation of Nanosystems

H: E. Meyer

Nanomagnetism

H: H.-J. Hug

Molecular Machinery

H: G. Meyer, R. Fasel

Atomistic Simulations

H: S. Goedecker

Coupling Ultrasensitive Cantilevers to Mesoscopic Devices

H: M. Poggio

Module Molecular Electronics

Heads: C. Schönenberger, T. A. Jung

Molecular Thin Film Devices

H: T. A. Jung

Molecular Nanowires

H: C. Schönenberger

Molecular Junctions

H: M. Calame

Plasmonic Junctions

H: O.J.F. Martin

Single Molecule Switches and Potentiometers

H: M. Mayor

Donor-Acceptor Architectures for Photovoltaics

H: F. Diederich

Module Self-Assembly at Surfaces

Heads: F. Diederich, W. Meier

Self-Assembly at Surfaces

H: F. Diederich, T. Jung, E. Constable

Self-Assembling Peptides and Polymers

H: W. Meier, H. Wennemers, T. Ward, T. Pfohl

Metal-based self-assembled nanostructures

H: K. M. Fromm, F. Montagne, R. Pugin, M. Textor

Module Supplementary Research Activities

Head: C. Schönenberger

Nanosafety

H: B. Rothen

Economic stimulus package Multimodal AFM for Applied Material Recognition (MAAM)

H: Meyer E., Brändlin E.

Development of Robust and Standardized Cantilever Sensors (RSCS)

H: Gerber Ch., Hubler U.

Nanocomposite Polymer Additives: Characterization and Enhancement of Dispersion Performance

H: Gobrecht J., Height M., Siegenthaler H.U.

Biophysical and immunological profiling of a nanoparticle nicotine vaccine

H: Aebi U., Forer K.

Platforms

Industrial Applications

H: J. Gobrecht, P. Reimann

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Topics

Nanoscale science's research focuses at the nanometer scale. This is the scale of the matter building blocks, namely, atoms and molecules. Therefore, at this scale the traditional scientific disciplines merge, giving place to a highly interdisciplinary interaction between physicists, chemists, physicians, biologists, pharmacologists, computer scientists and engineers. This is clearly reflected in the very interdisciplinary work carried

out within the NCCR Nanoscale Science. Scientists from different disciplines come together to gain insight in this field further develop methods and scientific tools. The goal of the teams taking part in this network is to come up with outstanding scientific achievements that will secure the position of the NCCR as a leader in the nanoscale science. The different and strongly interconnected topics covered by the

researchers include: Impact of nanoscale science on life sciences and medicine, biology at the nanoscale, molecular machinery and nanorobotics, quantum devices and systems for computing and communication and quantum coherence, nanoscale science at the ultimate limits, nanomaterials ranging from biological systems, carbon-nanotubes to nanoclusters and molecular electronics.

Third Party Cooperation

(in progress)

Research Institutions

- Anorganische Chemie, Universität Heidelberg, DE
- Applied and Environmental Chemistry Department, University of Szeged, HU
- Biophysical Engineering, University of Twente, NL
- Center for Nanoscience, Ludwig-Maximilians-Universität, Munich, DE
- Center for Spintronics and Quantum Computation, University of California, Santa Barbara, US
- Centre d'Elaboration de Matériaux et d'Etudes Structurales, Centre National de la Recherche Scientifique, Toulouse, FR
- Centre for Research on Adaptive Nanostructures and Nanodevices, Trinity College Dublin, IE
- Centre Scientifique de Saint Jérôme, Université Paul Cézanne Aix-Marseille, FR
- Chemical Engineering, Tel Aviv University, IL
- Consiglio Nazionale delle Ricerche, Istituto per la Sintesi Organica e la Fotoreattività, Bologna, IT
- Département de Chimie, Institut de Science et d'Ingénierie Supramoléculaires, Strasbourg, FR
- Department of Bionanoscience, Delft University of Technology, NL
- Department of Chemistry, Clemson University, US
- Department of Chemistry, Columbia University, New York, US
- Department of Chemistry, Copenhagen, DK
- Department of Chemistry, McMaster University, Hamilton, CA
- Department of Chemistry, University of Durham, GB
- Department of Condensed Matter Physics, Josef Stefan Institute, Ljubljana, SI
- Department of Physical Chemistry, University of Mainz, DE
- Department of Physics, McGill University, Montreal, CA
- Department of Physics, Bilkent University, TR
- Department of Physics, Budapest University of Technology and Economics, HU
- Department of Physics, Columbia University, New York, US
- Department of Physics, Harvard University, Cambridge, US
- Department of Physics, Korea University, Seoul, KR
- Department of Physics, Ohio State University, Columbus, US
- Department of Physics, University of Aarhus, DK
- Department of Physics, University of Konstanz, DE
- Department of Physics, University of Rochester, US
- Department of Solid State Physics, University of Ulm, DE

Heads of Individual Research Projects and Subprojects

Bruder Christoph, Prof.
Calame Michel, Dr.
Constable Edwin, Prof.
Diederich François, Prof.
Ensslin Klaus, Prof.
Fasel Roman, Dr.
Fromm Katharina, Prof.
Gerber Christoph, Prof.
Gobrecht Jens, Prof.
Goedecker Stefan, Prof.
Hug Hans Josef, Prof.
Hunziker Patrick, Prof.
Imamoglu Atac, Prof.
Jeney Sylvia, Prof.
Jung Thomas, Prof.
Klok Harm-Anton, Prof.
Klostermeier Dagmar, Prof.
Lim Roderick Y.H., Prof.
Loss Daniel, Prof.
Martin Olivier F., Prof.
Mayor Marcel, Prof.
Meier Wolfgang, Prof.
Meyer Ernst, Prof.
Meyer Gerhard, Dr.
Montagne Franck, Dr.
Müller Daniel, Prof.
Pfohl Thomas, Prof.
Pieles Uwe, Prof.
Poggio Martino, Prof.
Pugin Raphaël, Dr.
Rothen Barbara, Prof.
Schönenberger Christian, Prof.
Schönenberger Cora-Ann, Dr.
Salis Gian, Dr.
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Wennemers Helma, Prof.
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Institute of Quantum Photonics, ETH Zürich
Biozentrum, Universität Basel
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- Faculty of Physics, University of Regensburg, DE
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- Physical Chemistry, Hungarian Academy of Sciences, Budapest, HU

Nanoscale Science – Impact on Life Sciences, Sustainability, Information and Communication Technologies

NCCR Nanoscale Science

Achievements of the previous years

Daniel Loss wins Benoist prize 2010

In November, our vice-director Prof. Daniel Loss, has been awarded the prestigious Marcel Benoist prize, often referred to as the Swiss Nobel prize, from federal council Didier Burkhalter. Loss has been honored for his groundbreaking work on quantum computing and spintronics. He will bring in his expertise into the newly founded NCCR Quantum Science and Technology, which will start in 2011. Jointly with the ETH Zürich the Physics department of the University of Basel will act as co-leading house of this new NCCR with Prof. Richard Warburton as co-leading director.

The research success of the NCCR Nano allowed us to assign permanent positions to young researchers working in the field of nanoscale science. The new professors Richard Warburton and Philipp Treutlein work in the field of nano-optics. Additionally, Profs. Daniel Müller and Henning Stahlberg joined our NCCR and guarantee a strong link to ETH and C-CINA. Our NCCR member Helma Wennemers has been awarded the Leonidas Zervas Award,

one of the most important prizes in the field of peptides.

Scientific Highlights

In collaboration with the University of Budapest and the Nanoscience Center in Copenhagen we reported the first successful experiment to separate entangled electrons. The experiment could be an important milestone in the verification of quantum mechanics. It could be shown that slightly modified porphyrine molecules could be used as individually controllable nanoscale switches. This technique might have important applications in magnetic mass storage devices and even for the realization of a quantum computer. A new process for the precise and individual control of all important degrees of freedom of individual molecules has been developed. This technique delivers important insights into the basic processes in chemistry.

Collaboration with industry

The Argovia program for applied research, financed by the canton of Aargau, has reached its full extent. During the current year, ten applied projects in collaboration with industry could be carried out. The demand of industrial re-

search grows and proofs the importance of this kind of collaboration.

Outreach Activities

In 2010, the University of Basel celebrated its 550th anniversary with a science road show through North-Western Switzerland and a large science festival in Basel. The NCCR Nano presented its research activities with exhibitions and talks and reached an audience of several thousand people. Due to this success, our outreach team has been invited to a variety of additional events like the OLMA in St. Gallen and the Technoseum in Mannheim.

Education

The curriculum in nanoscience has successfully reached a first consolidation phase. In terms of the Erasmus exchange program, our students have the possibility to acquire credit points at TU Delft (NL) or at the University of Aarhus (DK). Besides the traditional courses, new courses were added to the program due to an enhanced collaboration with our partners from CSEM, FHNW, PSI and DBSSE (ETH).

Further information see www.nanoscience.ch

Statistical Input – Output Data

Funding source (CHF)	Year 9	Year 10	Year 11	Year 12	Total	%
SNSF funding	4 705 000 ⁶	3 285 000 ⁶	1 700 000	1 500 000	11 190 000	25
Self-funding from home institution ¹	498 529	2 791 135	1 623 632	1 623 632	6 536 928	15
Self-funding from project participants	5 667 285 ⁶	5 800 500 ⁶	5 045 000	5 045 000	21 557 785	48
Third-party funding ²	908 562 ⁶	1 697 485 ⁶	1 394 800	1 394 800	5 395 647	12
Total	11 779 376	13 574 120	9 763 432	9 563 432	44 680 360	100

Personnel ³	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	FR	CN	IT	IN	
Management	5.73 ⁴	10	36	18	64	24	4	0	0	0	0	0
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	64	19	30	45	70	25	16	2	3	1	3	13
Postdoctoral students	72	20	28	52	72	12	11	5	6	5	4	27
Research associates	2	1	50	1	50	1	0	0	0	1	0	0
Senior researchers ⁵	67	12	18	55	82	22	16	3	1	1	1	8
Other staff	21	4	19	17	81	21	0	0	0	0	0	0
Total	231.73	66	26	188	74	105	47	10	10	8	8	48

¹ Personnel costs, equipment and consumables, not included infrastructure and basic equipment

² Not included is CTI funding (cf. page 6). Since the start of the NCCR 9 projects have been funded by CTI at a total amount of 7.3 million CHF. In addition there was close collaboration with TOP NANO 21. At least in 25 projects of this programme technology transfer to the NCCR took place.

³ Persons involved in the NCCR in the last reporting period (12 months)

⁴ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁵ Including leaders of the individual projects and other organisational units of the NCCR

⁶ Included funding of economic stimulus package (cf. project list)

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- BASF Ludwigshafen, DE
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- Nanoworld AG, Neuchâtel, CH
- Novartis Institutes for BioMedical Research (NIBR), Cambridge, US
- NTT Basic Research Laboratories, Atsugi-shi, JP
- Schering AG, Berlin, DE
- Sony Deutschland GmbH, Materials Science Laboratory, Stuttgart, DE

Others

- Cleven-Becker-Stiftung, Baar, CH

Quantum Photonics

NCCR Quantum Photonics

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Start of the NCCR

July 1, 2001

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Research

Quantum Optics

Quantum coherence in semi-conductors nanostructures

H: Deveaud - Plédran B.

Theory of quantum coherence in polaritonic nano devices

H: Savona V.

Quantum communication

H: Gisin N.

Single photon detectors

H: Zbinden H.

Coupling quantum dot spins to nano-cavities

H: Imamoglu A.

Quantum Devices

Cavity quantum optomechanics (cQOM)

H: Kippenberg T.

Photonic crystals devices

H: Houdré R.

Heads of Individual Research Projects

Deveaud-Plédran Benoît, Prof.

Faist Jérôme, Prof.

Gisin Nicolas, Prof.

Grandjean Nicolas, Prof.

Houdré Romuald, Dr.

Imamoglu Atac, Prof.

Keller Ursula, Prof.

Kippenberg Tobias, Prof.

Savona Vincenzo, Prof.

Zbinden Hugo, Dr.

Advanced Light Sources

Nitride based light emitters

H: Grandjean N.

Quantum cascade interlevel sources

H: Faist J.

Ultrafast sources from near infrared to X-Rays

H: Keller U.

Economic stimulus package

High-speed single photon counting module

H: Zbinden H., Ribordy G.

TERASCOPE

H: Scalari G., Hvozdar Lubos

Epitaxial structures for blue photonics (EPIBLUE)

H: Grandjean N., Feltin E.

Single mode plasmonic VCSEL's

H: Stanley R., Moser M.

Second generation QKD engine

H: Gisin N., Ribordy G.

Hybrid Light

H: Feurer T., Krainer L.

Technology Platforms, Programmes etc.

Summer School & Workshops

"Monte Verità", "Muenchen-wiler"

Science Bus

Moser F.

Industrial Project and 7P Programs

Pochon S.

Doctoral Program in Quantum Photonics

Martin O.

Scientific camps for young girls: 7-10 and 11-13 years old

Moser F.

Members of the Advisory Board

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Paul Drude Institut, Berlin, DE

University of Sheffield, United Kingdom

University of California, Santa Barbara, USA

Topics

Since Einstein's famous discoveries in the early 1900s, we know that light exhibits a double nature – it can be considered as both a wave and as a stream of photons. This is the so-called quantum behavior. In the very same way, particles such as electrons bear the same duality. Therefore, at an infinitesimal scale, the interaction of light with matter can be manipulated, revealing novel phenomena that might prove useful. From this starting point, scientists at the NCCR Quantum Photonics conduct fundamental research as well as

develop novel technologies that carry the potential for numerous future applications. Such as: Quantum Cryptography guaranteeing transaction security by preventing hackers from intercepting messages transmitted through an optical link. Quantum Cascade Lasers will take part in NASA's Mars Exploration Program, to study the red planet habitability to assess whether Mars ever was, or is still today, an environment able to support microbial life. For the third phase 2009-2013 the NCCR QP International

Advisory board opted for 10 Projects covering a wide range of fields such as quantum optics, quantum devices and advanced light sources. Besides oriented research and technology transfer, the NCCR Quantum Photonics also supports workshops and scientific camps for 11-13 year old girls demonstrating that mathematics and physics are rewarding. These activities promote and strengthen long-term excellence in the field of photonics in Switzerland.

Third Party Cooperation (in progress)

Programmes

- CLERMONT4
- COST P21
- COST MP0702
- COST288
- EPIXNET
- EU CA-QUROPE
- EU-ANSWER
- FEMTOBLUE
- IST-VISTA
- MORGAN
- NanoTera
- NITWAVE
- QON
- RAINBOW
- STIMSCAT
- STREP-Symphonia
- Teramobile
- ULTRAGAN
- UNITRIDE

Research Institutions

- Abteilung Festkörperphysik, Universität Magdeburg, Magdeburg, DE
- Advanced Technology and Nanoscience, Trieste, IT
- Applied Physics Integrated Optics Group, Paderborn University, DE
- Centre d'Etudes de Saclay, CEA, Gif-sur-Yvette, FR
- Centre for Quantum Technologies, National University of Singapore, SG
- Centre Lasers Intenses et Applications, University of Bordeaux, FR
- Clarendon Laboratory, University of Oxford, GB
- Department of Applied Physics, Stanford University, Palo Alto, US
- Department of Chemistry, Massachusetts Institute of Technology, Boston, US
- Department of Chemistry, Princeton University, US
- Department of Electrical and Electronical Engineering, University of Bristol, GB
- Department of Electrical Engineering, Cornell University, Ithaca, US
- Department of Management and Engineering, University of Linköping, SE
- Department of Physics and Astronomy, Cardiff University, GB
- Department of Physics and Astronomy, University of Calgary, CA
- Department of Physics, Harvard University, Cambridge, GB
- Department of Physics, Università di Trento, IT
- Department of Physics, University of Torino, IT
- Department of Optoelectronics and Instrumentation Group, PC University de Rio, Rio de Janeiro, BR
- Dipartimento Fisica della Materia e Tecnologie Fisiche Avanzate, University of Messina, IT
- Dipartimento di Fisica A. Volta, University of Pavia, IT
- Dipartimento di Ingegneria dell'Informazione, University of Padova, IT
- Foundation for Fundamental Research on Matter (FOM), Amsterdam, NL
- Fraunhofer IAF Freiburg, DE

Achievements of the previous years

Research results

The Quantum Photonics NCCR allows strengthening the quality of research in the field in Switzerland, with outstanding scientific achievements. Since the beginning of the NCCR, more than 1000 papers (out of which 9 hot papers) have appeared in scientific journals and more than 1000 conference presentations have been given by scientists of the different teams. To select just a few, the NCCR is proud of the following ones: 3 of the Project Leaders of the NCCR QP are winners of the European Research Council grants: Prof. Atac Imamoglu, Prof. Nicolas Gisin and Prof. Tobias Kippenberg. 3 Project Leaders participated in 2009 to CLEO/IQEC conference as tutorial and invited speakers. NCCR research groups are actively involved in 30 Projects sponsored by the European Community that are a strong foundation for the future of Photonics in Switzerland and for the European Research and Development Programmes: FP7.

Following the impact of IWN 2008 and considering that LED is presently a very hot topic, The NCCR QP decided

to organize a dedicated event for professionals and open to the public, the event gathered 350 people and was widely featured in the news (radio, TV and Newspapers)

Spin Offs and Technology Transfer

Many Spin-off companies have been created by NCCR QP Scientists: AlpesLasers, BeamExpress, id Quantique, Timebandwidth. Recently two start ups have been launched by NCCR QP PostDocs: Attolight (Samuel Sonderegger) and NovaGan (Eric Feltin).

Bridging the gap between the fundamentally oriented researches carried out within the NCCR QP and the industrial world has been achieved with the NCCR QP Industrial Project Program. For instance in 2008 BeamExpress secured a first round of investment of 1.3 Mio US\$, once the joint industrial project was finished. The successes encountered during the second phase of the NCCR QP, pushed us to further develop this existing program with a new one: "7P Program", whose goal is to promote PostDocs of our network to develop their career in the

Swiss Photonics Industry.

Education and training / Advancement of Women

The Photonic Doctoral School is developing a "Tandem Partner Program" allowing PHD's from all over Switzerland to share and exchange their scientific experience. Strong collaboration with the Equal Opportunity Office and the NCCR MICS allows us to leverage on existing initiatives to promote women and youngsters in the scientific world through tangible actions: 6 scientific camps are organized each year; industry visits, networking events and invited guest's seminars. The "Polythèque" has been created in order for youngsters to get in touch with scientific Medias, to learn and to ask questions around afternoon themes. Two major events have been organized the exhibition "Women in Sciences", who gathered around 3000 visitors from March to May 2008, and in May 2009, the "Science Bus" has been launched on the road to improve the contact with the population, and bring science to the people.

Further information see <http://nccr-qp.epfl.ch>

- Ginzton Lab, Stanford University, US
- Institut für Kernphysik, Universität Frankfurt, DE
- Institut für Physik, Theoretische Physik, Berlin, DE
- Institut für Physikalische Chemie, Universität Würzburg, DE
- Institute of Photonic Science, University of Barcelona, ES
- Institute of Photonics and Nanotechnology, Italian National Research Council, Roma, IT
- Institute of Technology, University of Lund, DK
- Laboratoire Aimé Cotton, University of Paris-Sud, Orsay, FR
- Laboratoire de Chimie de la matière condensée de Paris, Ecole Nationale de Chimie de Paris, FR
- Laboratoire d'Etude des Microstructures, l'Office National d'Études et Recherches Aéronautiques, Chatillon, FR
- Laboratoire Physique de Nanostructures, Marcoussis, FR
- Laboratoire Physique du Solide, Université de Toulouse, Montpellier, FR
- l'Ecole Polytechnique, University of Nice, FR
- Lund Laser Center, STINT Lund University, SE
- Matériaux et Phénomènes Quantiques, University of Paris Diderot, FR
- Max Planck Institute for the Physics of Complex Systems, Dresden, DE
- National Research Group, University of Lecce, IT
- Optoelectronics Department, University of Ulm, DE
- Photonics and Semiconductor Nanophysics, University of Technology Eindhoven, NL
- Quantum Optics, Institute of Photonic Sciences, Barcelona, ES
- School of Engineering and Applied Science, Yale University, New Haven, US
- Unité de Formation et de Recherche en Physique, Université Claude Bernard Lyon, FR

Economy / Industry

- Aerodyne Research Inc, Billerica, US
- Alpes Lasers SA, Neuchâtel, CH
- Attolight Sarl, Lausanne, CH
- Avalon, Zurich, CH
- Beamexpress, Lausanne, CH
- Dätwyler/Silitec, Boudry, CH
- Daylight Solutions, Poway, US
- Delong Instruments a.s., Brno, CZ
- Exalos AG, Schlieren, CH
- EXFO Inc., Ontario, CA
- HP International, Geneva., CH
- Id Quantique SA, Geneva, CH
- Laboratoire Optique Electronique Appliquée (OPEA), Vincennes, FR
- Lasag Inc, Thun, CH
- Lovalite, Besancon, FR
- Namiki Precision Jewel Co., Tokyo, JP
- Novagan, Lausanne, CH
- Onefive, Zurich, CH
- Rolex SA, Geneva, CH
- SolSens, Bern, CH
- Swisscom Group, Geneva, CH

Others

- Swiss Federal Office for Metrology, Bern, CH

Statistical Input – Output Data

Funding source (CHF)	Year 9	Year 10	Year 11	Year 12	Total	%
SNSF funding	3 905 000 ^e	2 825 000 ^e	1 700 000	1 500 000	9 930 000	43
Self-funding from home institution ¹	2 482 152	1 638 500	1 289 000	1 299 000	6 708 652	29
Self-funding from project participants	4 752 778 ^e	336 600 ^e	0	0	5 089 378	22
Third-party funding ²	1 106 244 ^e	276 400 ^e	0	0	1 382 644	6
Total	12 246 174	5 076 500	2 989 000	2 799 000	23 110 674	100

Personnel ³	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	FR	IT	CN	CA	
Management	3.07 ⁴	7	78	2	22	6	0	1	0	0	1	0
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	59	7	12	52	88	13	17	5	7	4	2	11
Postdoctoral students	24	6	25	18	75	1	2	6	6	1	2	6
Research associates	0	0	0	0	0	0	0	0	0	0	0	7
Senior researchers ⁵	51	5	10	46	90	4	2	3	5	0	0	0
Other staff	37	24	65	13	35	29	0	2	0	0	0	3
Total	174.07	49	75	131	73	53	21	17	18	5	5	27

¹ Personnel costs, equipment and consumables, not included infrastructure and basic equipment

² Not included is CTI funding (cf. page 6). Since the start of the NCCR 7 projects have been funded by CTI at a total amount of 8,5 million CHF.

³ Persons involved in the NCCR in the last reporting period (12 months)

⁴ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁵ Including leaders of the individual projects and other organisational units of the NCCR

^e Included funding of economic stimulus package projects (cf. project list)

Evaluation and Monitoring by the Swiss National Science Foundation (SNSF)

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Molecular Ultrafast Science and Technology

NCCR MUST

Research

Application of Ultrafast Spectroscopic Techniques for Investigating Liquid Interfaces and Photoinduced Electron Transfer Reactions

Head: Vauthey E.

Charge Transfer Reactions at Molecular Interfaces

H: Girault H.

Coherent Control in Complex Molecular Systems

H: Wolf J.-P.

Dynamics of Light-Induced Interfacial Electron Transfer and Charge Transport in Molecular Materials

H: Moser J.-E.

Electronic and Structural Dynamics of Chemical and Biological Systems

H: Chergui M.

Femtosecond and Attosecond VUV-XUV Spectroscopy

H: Keller U.

Femtosecond IR Spectroscopy

H: Hamm P.

Intense THz Science and Spectroscopy

H: Feurer Th.

Nonlinear fs Spectroscopy and Time Resolved PES

H: Gerber Th.

Pilot Time-Resolved Experiments for the SwissFEL

H: Patterson B., Abela R.

Quantitative Atomistic Simulations

H: Meuwly M.

Simulations of Ultrafast Quantum Dynamics in Gas and Condensed Phase

H: Röthlisberger U.

Theoretical Methods for Ultrafast Quantum Dynamics

H: Vanicek J.

Ultrafast Dynamics on Surfaces

H: Hengsberger Matthias, Osterwalder J.

Ultrafast Structural Dynamics Observed with Femtosecond X-Rays

H: Beaud P.

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Topics

The National Centre of Competence in Research (NCCR) "MUST – Molecular Ultrafast Science and Technology" opens up new perspectives for the study of molecular systems and time-resolved structural investigations in physics, chemistry and biology. The NCCR MUST focuses on the multidisciplinary

development of experimental and theoretical tools. Therefore researchers will investigate chemical reactions and energy-transfer processes at the atomic and molecular level, as well as electron and proton transfer processes with ultra short temporal and spatial resolution. A deeper understanding

of matter at microscopic level is crucial for dealing with important social challenges such as the quest for alternative energy sources, the synthesis of complex functional medicines and the development of new electronic devices.

Heads of Individual Research Projects

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Beaud Paul, Dr.

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Feurer Thomas, Prof.

Gerber Thomas, Dr.

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Hamm Peter, Prof.

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Département de Chimie Physique, Université de Genève

GAP-Biophotonics, Université de Genève

Statistical Data and Members of the Review Panel will be published in the Guide 2012.

Intelligent Robots for Improving the Quality of Life

NCCR Robotics

Research

Bio-mimetic Sensing, Actuation, and Mobility

Leader: Iida F.
Co-leader: Ijspeert A.

Neuromorphic color vision

Head: Douglas R.

Sensory-motor tissues

H: Floreano D.

Artificial bacteria

H: Nelson B.

Passive dynamic locomotion

H: Iida F., Pfeifer R.,
Siegwart R.

Learning locomotion

H: Iida F., Ijspeert A.,
Siegwart R.

Adaptive morphology for mobility

H: Floreano D., Pfeifer R.,
Ijspeert A.

Interaction and Manipulation

Leader: Billard A.
Co-leader: Gassert R.

Human centered robotic assistance using motion intention estimation

H: Riener R.

Multi-modal haptic feedback for efficient human-machine interaction, sensory rehabilita- tion, and substitution

H: Bleuler H.

Programming by demonstration of fine manipulation

H: Billard A.

Neuromorphic motor control of interactive reaching

H: Douglas R.

Prosthetic Robotics

Leader: Millán J.,
Co-leader: Riener R.

Brain-controlled robots and prosthetics

H: Millán J.

EMG-based hand prosthetics

H: Pfeifer R.

Lower extremity prosthetics

H: Riener R.

Assistive walking devices for the elderly

H: Bleuler H.

Variable impedance joints for assistive devices

H: Gassert R.

Distributed Robotics

Leader: Martinoli A.
Co-leader: Gambardella L.

Evolvable multi-cellular robots

H: Floreano D.

Morphology adapting to user – Roombots

H: Ijspeert A.

Evaluative distributed adapta- tion in 2D environments

H: Martinoli A.

Model-based distributed adaptation in 3D environ- ments

H: D'Andrea R.

Symbiotic human-swarm cooperation

H: Gambardella L.

Robots for Daily Life

Leader: Mondada F.
Co-leader: Dillenbourg P.

Interaction analysis

H: Dillenbourg P.

Robots for daily life in homes

H: Mondada F.

Robots for daily life in education

H: Mondada F., Pfeifer R.

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Intelligent Robots for Improving the Quality of Life NCCR Robotics

Topics

The National Centre of Competence in Research (NCCR) "Robotics - Intelligent Robots for Improving the Quality of Life" encompasses a promising field of engineering which aims at developing new, human-oriented robotic technology. In the near future, intelligent robots will play an important role in improving quality of life. For example, "care robots" will help elderly people to stay in their familiar surroundings longer; "neuroprosthetic" and "exoprosthesis" robots will increase the mobility and autonomy of people with disabilities; "educational robots" will support the training of a new generation of scientists and engineers; "environmental robots" will keep our world cleaner and safer. In order to

progress towards this vision, in the first phase, the NCCR Robotics is working towards developing fundamental design principles, approaches, and technologies required for the conception and design of human-oriented robots, the materials and components they are made of, and the control methods that enable them to interface and operate with humans. These coordinated research efforts are complemented by systematic field studies targeted to better understand the psychological, societal, and economic factors involved in bringing robotic technology closer to our daily life.

In order to ensure long-term benefits to society as a whole, the NCCR Robotics aims to

integrate and strengthen the Robotics educational programs at all levels in Switzerland and to utilize the innovative combination of technical, creative, and societal aspects of robotics research to attract young students, women and other under-represented population segments to science and engineering studies. Lastly, the NCCR Robotics will capitalize on the Swiss tradition in micro-engineering, precise manufacturing, and human-friendly technology, creating tremendous opportunities for knowledge and technology transfer at a point in history when human-oriented robotics is in a situation strategically similar to that of the nascent personal-computer industry 30 years ago.

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Gassert Roger, Prof.
Hauser Helmut, Dr.
Iida Fumiya, Prof.
Ijspeert Auke, Prof.
Kaplan Frédéric, Dr.
Lambercy Olivier, Dr.
Martinoli Alcherio, Prof.
Millán José, Prof.
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Möckel Rico, Dipl. Ing.
Nelson Bradley, Prof.
Pericet Ramòn, Dr.
Pfeifer Rolf, Prof.
Pradalier Cédric, Dr.
Riener Robert, Prof.
Samur Evren, Dr.
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Statistical Data and Members of the Review Panel will be published in the Guide 2012.

Quantum Science and Technology

NCCR QSIT

Research

Section 1 Spectroscopy of single and few quantum systems

Sub-section 1A Cavity optomechanics – Quantum measurements and backaction

H: Bruder C., Esslinger T., Kippenberg T., Poggio M., Wallraff A.

Sub-section 1B Quantum Spintronics

H: Büttiker M., Ensslin K., Fontcuberta i Morral A., Fuhrer A., Ihn T., Imamoglu A., Loss D., Morpurgo A., Salis G., Schönemberger C., Wegscheider W., Zumbühl D.

Section 2 Entanglement and strong correlation in few and many quantum systems

Sub-section 2A Atoms and molecules in lattices: New approaches to quantum simulation

H: Blatter J., Bruder C., Esslinger T., Merkt F., Troyer M.

Sub-section 2B Fractional quantum Hall states for topological quantum information processing

H: Ensslin K., Ihn T., Imamoglu A., Loss D., Renner R., Troyer M., Wegscheider W., Zumbühl D.

Section 3 Hybrid quantum systems

Sub-section 3A Hybrid quantum systems using microwave frequency on-chip resonators as a coupling bus

H: Ensslin K., Ihn T., Imamoglu A., Loss D., Merkt F., Wallraff A.

Sub-section 3B Quantum repeaters for quantum communications

H: Gisin N., Renner R., Wolf S., Zbinden H.

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Topics

The National Centre of Competence in Research (NCCR) “QSIT – Quantum Science & Technology” is active in a field which unites the key discoveries of the 20th century: quantum physics and information theory. In future, research in this field will strongly influence science and technology. Potential ap-

plications are primarily focused in the area of computer science and sensors. The NCCR QSIT takes an multi-disciplinary approach, combining concepts from physics, chemistry, engineering and computer sciences. Researchers from many Swiss universities and basic researchers from industry

work together in the NCCR network. Their two common goals are to develop applications in the area of quantum computer science and to investigate new paradigms in physical basic research such as the order and states of material.

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Statistical Data and Members of the Review Panel will be published in the Guide 2012.

Interactive Multimodal Information Management NCCR IM2

Research

Integrated Multimodal Processing

H: Billard A.

Human Centered Design and Evaluation

H: Lalanne D.

Social Signal Processing

H: Vinciarelli A.

Economic stimulus package

K-Content: Content abstraction and retrieval for largescale mobile service

H: Van Gool L., Quack T.

Measuring Consumer Behaviour for Marketing and Advertising Research

H: Thiran J-P, Sorci M.

Platforms, Programmes etc.

Doctoral School

Supervisor: Bourlard H.
Co-Supervisor: Ebrahimi T.
Female Fellowship: Bourlard H.

Visitor exchange program with ICSI, Berkeley, US

Supervisor: Bourlard H.

Smart Meeting Room

Supervisor: Bourlard H.

Multimedia File Server

Supervisor: Popescu-Belis A.

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IM2 Deputy Director, EPFL
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Vice-dean of the Faculty of Sciences of the University of Geneva
ETHZ, Katholieke Universiteit Leuven (B)

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Public Relations

- Newsletter IM2, www.im2.ch
- IM2 Flyer
- Festival "Science et Cité" 2005
- Brochure IM2
- Public Day at the "Foire du Valais"
- "Let's talk about your future"

Third Party Cooperation

(in progress)

Programmes

- 3D-COFORM
- AMI (EU-FP6)
- BACS (EU-FP6)
- BIOMET
- BioSecure
- CHIRON (EU-FP6)
- COMTIS
- COST 2101
- COST 276
- COST 277
- EARS
- ECRYPT (EU-FP6)
- ERGOMIND (EU-FP7)
- EURON (EU-FP6)
- HISDOC
- HOARSE
- Humanitics
- Humavips
- IURO
- MAIA (EU-FP6)
- METISS
- MOBIO (EU-FP7)
- NeuroMath (COST)
- PASCAL (EU-FP6)
- PASCAL2
- PetaMedia (NoE EU-FP7)
- Qualinet
- RADHAR
- SCOVIS (EU-FP7-ICT)
- SIMILAR (EU-FP6)
- TACT (EU-FP6)
- TANGO
- TIVIPOL
- TOBI (EU-FP7)
- URUS (EU-FP6)
- Vanaheim
- VISMATER (EU-FP7)

Research Institutions

- Agence Spatiale Européenne, Paris, FR
- Center for Speech Technology Research, School of Informatics, Edinburgh, GB
- Center for Vision, Speech and Signal Processing, Guildford, GB
- Civil and Environmental Engineering, Massachusetts Institute of Technology, Boston, US
- Communication and Remote Sensing Laboratory, Université catholique de Louvain, BE
- Department of Applied and Computational Mathematics, California Institute of Technology, Pasadena, US
- Department of Computer Science, József Attila, Szeged, HU
- Department of Computer Science, University of Sheffield, GB
- Department of Computing, Hong Kong Polytechnic University, HK
- Department of Computing, University of Lancaster, GB

Topics

The National Center of Competence in Research (NCCR) on Interactive Multimodal Information Management, in short IM2, is concerned with the development of natural multimodal interfaces for human-computer interaction. By “multimodal”, we mean the different technologies that coordinate natural input modes (such as speech, pen, touch, hand gestures, head and body movements, and eventually physiological sensors) with multimedia system output (such as speech, sounds, and images). Ultimately, these multimodal interfaces should flexibly accommodate a wide range of users, tasks, and environments for which any single mode may not suffice.

The field of multimodal interaction thus covers a wide range of critical activities and applications, including recognition and interpretation of spoken, written and gestural language, particularly when used to interface with multimedia information systems, and biometric user authentication (protecting information access). As addressed by IM2, management of multimedia information systems is a wide ranging and important research area that includes not only the multimodal interaction described above, but also multimedia document analysis, indexing, and information retrieval. The development of this technology is necessarily multi-disciplinary, requir-

ing the collaborative contributions of experts in engineering, computer science, linguistics and, more recently, in social sciences and psychology.

As a particular kind of complex multimodal interaction, and to foster collaboration, IM2 decided to focus on the common vision of “computer-enhanced human-to-human interaction” and, more specifically, on the analysis, understanding and retrieving of face-to-face and remote (videoconferencing) multimodal meeting data. Indeed, understanding human-human interaction is fundamental to the long term pursuit of powerful and natural multimodal interfaces for human-computer interaction. In addition to better understanding of group processes, our progresses in language and video processing, multimedia indexing, as well as the advanced tools for working with multimodal data, will improve research and development in numerous related areas.

In this context, IM2 thus aims to enhance the value of multimodal meeting recordings and to make human interaction more effective in real time. These goals will be achieved by developing new tools for computer supported cooperative work and by designing new ways to search and browse meetings as part of an integrated multimodal group communication, captured from a wide

range of devices. Several technology prototypes, able to record meetings and to automatically generate searchable multimedia meeting archives are now available and some of the resulting technologies are being exploited by IM2 spin-offs or have been adopted by companies working in the multiple fields of Information and Communication Technology (ICT), including, e.g., video-conferencing and meeting facilitation. During its last 3-years phase, IM2 will further research and improve key multimodal technologies, while also testing its generalization properties on new domains related to brainstorming and tutorials. It will also investigate further new areas related to Social Signal Processing, a new research area which naturally arose from IM2.

The IM2 NCCR, headed by the Idiap Research Institute in Martigny, combines many partners from a number of university institutions (EPFL, ETHZ, University of Geneva, University of Fribourg, and University of Bern), the HES (Universities of Technology) of Fribourg, Sion and Sierre, and a range of commercial companies. The NCCR also has numerous international contacts, including an agreement for the exchange of young researchers with the International Computer Science Institute (ICSI) in Berkeley, California.

Achievements of the previous years

Multimodal Processing

IM2 has significantly contributed to the development of a new research field referred to as multimodal processing, which is now viewed as increasingly important at the international level. IM2 is also recognized worldwide for its contributions in related areas such as speech and language understanding, computer vision, multi-channel processing and fusion, and multimedia indexing.

Meeting Recordings

IM2 was among the first projects worldwide to focus on multimodal meeting recordings, which is now attracting more and more attention. IM2 thus works on large multimodal meeting databases, and makes them available to the scientific community. IM2 is not only significantly contributing to the field, but is also in a good position to set up international research and development standards.

Knowledge Dissemination/Technology Transfer

In addition to new university courses and doctoral programs, IM2 was also among the initiators of the series of international Multimodal Interaction and

Related Machine Learning Algorithms (MLMI) workshops. In 2008, it also initiated a joint summer institute in collaboration with the Affective Sciences NCCR, already resulting in new collaboration. In terms of technology transfer, IM2 also fostered the creation of several start-up companies, such as Anteleon Imaging, Klewel, Kooaba, Keylemon. Thanks to IM2, Idiap Research Institute and its subsidiary IdeArk S.A. are core components of the new Economic Development strategy of the Canton of Valais.

Young and Female Researchers

The exchange programme supported by IM2 helped create a privileged relationship between Swiss institutions, researchers and the International Computer Science Institute (ICSI) in Berkeley/USA. IM2 has made significant efforts to increase the visibility of women active in science (public events, publications, meeting recordings). IM2 supported (until 2007) a successful Female Fellowship programme aimed specifically at boosting the careers of female researchers.

Structural Impact

IM2 is having a strong and visible structural impact in several of the IM2 institutions. Based on its growing reputation, Idiap is now recognized by SER (Federal Government) as part of a "strategic alliance with the EPF-ETH domain" (since January 2008). This came with a joint, Idiap-EPFL development plan (signed July 2008), involving common research activities, development of a common doctoral program and including the provision for 2 to 3 new joint EPFL/Idiap assistant professor tenure track positions. In addition, the Individual Project in Brain machine Interaction yielded the creation of a new chair at EPFL. New (assistant) professor positions directly related to IM2 were created at ETHZ and University of Geneva. Finally, the University of Fribourg is seriously considering the creation of a new "institute" (Human-IST) directly leveraging on IM2 activities. Several of the IM2 partners have an excellent integration in the ERA (European Research Area) as key partners in, and often coordinators of, several key FP6 and FP7 projects.

Further information see www.im2.ch

- Department of Physiology, University of Arizona, Tucson, US
- Universidad Politecnica de Catalunya, Barcelona, ES
- Deutsche Forschungszentrum für Künstliche Intelligenz (DFKI), Kaiserslautern, DE
- Deutsche Forschungszentrum für Künstliche Intelligenz (DFKI), Saarbrücken, DE
- Dipartimento di Ingegneria Elettrica ed Elettronica, Università degli Studi di Cagliari, IT
- Ecole Nationale d'Ingénieurs de SFAX, Tunisie, TN
- French Ministry of Research and Education, University of Avignon, FR
- Human Dynamics Group, MIT Media Lab, Cambridge, US
- International Computer Science Institute (ICSI), Berkeley, US
- Istituto per le Tecnologie Informatiche Multimodali (ITIM), CNR, Milano, IT
- Laboratoire de Télécommunications et Télédetection (TELE), Université catholique de Louvain, BE
- Laboratoire d'Informatique pour la Mécanique et les Sciences de l'Ingénieur (LIMSI), Paris, FR
- Natural Language Processing Laboratory, Faculty of Informatics, Brno, CZ
- Speech, Audio, Brisbane, AU
- Unité de Physique Mathématique, Université catholique de Louvain, BE

Economy / Industry

- Alro Engineering SA, Martigny, CH
- Alto-Service, Vufflens le Château, CH
- Anteleon Imaging SARL, Geneva, CH
- Atonce Capital Management AG, Bätterkinden, CH
- Canon CH, Zürich, CH
- Cinetis SA, Martigny, CH
- Deutsche Telekom Laboratories, Berlin, DE
- EyeP Media SA, Yverdon, CH
- Fastcom Technology SA, Lausanne, CH
- Fastnet, St-Sulpice, CH
- France Telecom R&D, Lanion, FR
- Google Inc., Mountain View, US
- Ibermatica SA, Madrid, ES
- IBM TJ Watson Research Center, New York, US
- Ima-Sys SA, Lausanne, CH
- Intel Corp., Santa Clara, US
- Invacare International Sàrl, Gland, CH
- KeyLemon SA, Martigny, CH
- Kooaba AG, Zürich, CH
- Logitech - Corporate Business Development, Morges, CH
- Memoria, Sion, CH
- Mentor Graphics Inc., Wilsonville, US
- MHT Optic Research AG, Niederhasli, CH
- Microsoft, Lausanne, CH
- NASA, Ames Research Center, Moffett Field, US
- Nestlé Research Center, Vevey, CH
- NEXThink SA, Fribourg, CH
- Odermatt AG, Hunzenschwil, CH
- Odysis SA, Lausanne, CH
- Procedural AG, Zürich, CH
- Qualcomm Inc, San Diego, US
- Siemens Corporate Research, New Jersey, US
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- Sowoon Technologies Sàrl, St-Imier, CH
- Spiderphone SA, Martigny, CH
- SVOX AG, Zürich, CH
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- TATA Infotech, Bombay, IN
- TBS Holding AG, Pfäffikon, CH
- Telecontrol AG, Bern, CH
- Toyota Motor Engineering & Manufacturing Europe, Zaventem, BE
- Veovox Sàrl, Pully, CH
- Vision Objects SA, Saint Luce s/Loire, FR
- VisioWave SA, Ecublens, CH
- VoxAccess SA, Martigny, CH

Others

- Armaswiss, Bern, CH
- Banque Cantonale Vaudoise (BCV), Foundation, Lausanne, CH
- CimArk, Sion, CH
- HASLER Foundation, Bern, CH
- International Standards Organization (ISO), Genève, CH
- University of Applied Sciences of Fribourg, Fribourg, CH

Statistical Input – Output Data

Funding source (CHF)	Year 9	Year 10	Year 11	Year 12	Total	%
SNSF funding	2 205 000 ⁶	1 295 000 ⁶	1 000 000	800 000	5 300 000	37
Self-funding from home institution ¹	397 050	698 000	698 000	698 000	2 491 050	17
Self-funding from project participants	1 089 495 ⁶	647 587 ⁶	627 000	627 000	2 991 082	21
Third-party funding ²	1 257 633 ⁶	950 200 ⁶	745 000	745 000	3 697 833	26
Total	4 949 178	3 590 787	3 070 000	2 870 000	14 479 965	100

Personnel ³	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							FR	IT	CN	IN	BE	
Management	2.35 ⁴	3	30	7	70	7	1	0	0	0	1	1
Master students	4	1	25	3	0	1	1	1	1	0	0	0
Doctoral students	28	7	25	21	75	6	1	4	3	3	0	11
Postdoctoral students	10	1	10	9	90	2	1	2	0	0	0	5
Research associates	2	0	0	2	100	1	0	0	0	0	0	1
Senior researchers ⁵	29	3	10	26	90	5	3	3	0	1	0	6
Other staff	13	0	0	13	100	5	3	1	1	0	0	3
Total	88.35	15	16	81	84	27	10	11	5	4	1	27

¹ Personnel costs, equipment and consumables, not included infrastructure and basic equipment

² Not included is CTI funding (cf. page 6). Since the start of the NCCR 19 projects have been funded by CTI at a total amount of 10 million CHF.

³ Persons involved in the NCCR in the last reporting period (12 months)

⁴ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁵ Including leaders of the individual projects and other organisational units of the NCCR

⁶ Included funding of economic stimulus package (cf. project list)

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Martin, E., Poulidakos, D.,
Rudin, M., Werner, B.

Ophthalmology

Head: Nelson, B.
Buechler, P., Kowal, J.,
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Patient Specific Intervention Planning in CMF Surgery

Head: Zeilhofer, H.F.
Baur, C., Cattin, P., Gross, M.,
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Aguirre, M., Scheffler, K., Vetter,
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Oto-Rhino-Laryngology

Head: Caversaccio, M.
Baur, C., Ferguson, S., Weber, S.,
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The Virtual Skeleton Database

Head: Büchler, P.
Pfahner, M., Reyes Aguirre, M.,
Székely, G., Tannast, M., Thali,
M., Vetter, T., Weber, S.,

Economic stimulus package

Patient-Specific Model Generation for Surgical Training Simulation

H: Harders M., Tuchschnid S.

A new Planning and Navigation System for CMF Surgery

H: Cattin P., Zeilhofer H.F.

Haptic guided ORL force guided robot

H: Baur C., Helmer P.

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- Contra Cancrum (FP7)
- HYDROMEL (FP6)
- NANOMA
- VPHOP (FP7)

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Institute for Surgical Technology & Biomechanics, Universität Bern
Neurologie, Universitätsspital Zürich
MR-Zentrum, Kinderspital Zürich
Klinik für Kiefer- und Gesichtschirurgie, Kantonsspital Basel
Institute for Surgical Technology & Biomechanics, Universität Bern

Topics

Improving medical image guidance, surgical navigation and patient specific treatment through information technology are the primary goals of the Co-Me network. The methodological strengths of the NCCR are simulation, navigation and instrumentation, including robotics. In its third phase Co-Me concentrates on the challenges of com-

puter aided surgery around the head (CAS-H). It relies on selected clinical problems for driving the technological development and strengthening the clinical and commercial translation. The key questions relate to the reliability and accuracy of intervention procedures, tissue protection with regard to minimal invasive surgery, reduction

of tool size and therapy development for clinical routine.

A further objective is to consolidate the structural impact on the national science landscape and to phase-out the NCCR into a self-sufficient, collateral spin-off network.

Achievements of the previous years

Co-Me has achieved an international reputation and visibility which is also represented by the performance figures for research (600 publications with a field impact index significantly above world average: 1.8), for knowledge and technology transfer (60 industrial partners, 28 patents and 10 start-up companies) as well as for education and career building.

Research

During the past nine years of Co-Me R&D activities, advanced cutting edge technologies and new high-fidelity surgical tools for training, planning, and intraoperative support have been developed. Their focus is on the translation to the practical use in the operating room.

Some highlights are:

- A successful first set of clinical trials, validating the usage of MR-guided focused ultrasound technology for the treatment of

functional neurological disorders. This novel technology now opens up new horizons allowing to develop non-invasive intervention procedures for a variety of brain diseases including brain tumors.

- The virtual reality based hysteroscopy training system resulting in the start-up Virtamed which won the first place at the Swiss venture kick seed capital competition. A collaboration agreement with Simbionix allows the world-wide distribution of the HystSim training system.

- A method for orthopedic implant design based on the statistical description of the human skeleton giving rise to high interest of implant industry.

- A planning and navigation module for cranio-maxillofacial osteotomies in daily clinical routine application at the University Hospital Basel supported by the ARTORG Center/ISTB Bern.

Knowledge and Technology transfer

The close cooperation between research labs and clinical sites guarantees the effective transfer of scientific results to patient care.

Education and Training

The NCCR Co-Me is training undergraduates, graduate students, and postdoctoral fellows for future leadership roles in teaching, research, and industry. A main achievement in the field of education is the successful establishment of Master's programs in biomedical engineering at ETH Zürich and the Universities of Bern and Basel, educating a continuously rising number of students every year.

Several surgical seminars were established on a continuous regular basis as a platform for the transfer of Co-Me technologies into the clinical practice.

Economy / Industry

- Adoptics AG, Port, CH
- Atracsys SARL, Bottens, CH
- Bien-Air Surgery SA, Le Noirmont, CH
- Bischoff Textil AG, St. Gallen, CH
- Bracco Research Laboratory, Geneva, CH
- Cadfem GmbH, Grafing b. München, DE
- Camlog Holding AG, Basel, CH
- Crisalex Sarl, Lausanne, CH
- Disney Research Zurich, Zurich, CH
- Force Dimension, Lausanne, CH
- General Electric Health Care, Milwaukee, US
- InSightec - Image Guided Treatment Ltd., Tirat Carmel, IL
- Integrated Scientific Services, Ziemer Group, Port, CH
- Intellect Medical, Cleveland, US
- Materialise GmbH, Pfaffenhofen, DE
- Mentor Corporation, Santa Barbara, CA, US
- Minolta GmbH, Langenhagen, DE
- Naviswiss AG, Laufen, CH
- Oertli Instrumente AG, Berneck, CH
- Orangedental GmbH&Co. KG, Biberach, DE
- Pantec Biosolutions AG, Ruggell, LI
- Phonak Acoustic Implants SA, Lonay, CH
- Polymed Medical Center, Glattbrugg, CH
- pSivida Inc., Watertown MA, US
- Sensoptics SA, Losone, CH
- Steinbichler Optotechnik GmbH, Neubeuern, DE
- Stryker Leibinger GmbH&Co. KG, Freiburg, DE

Others

- AO-Spine, Davos, CH
- Focused Ultrasound Surgery Foundation, Charlottesville, US

Computer Aided and Image Guided Medical Interventions NCCR CO-ME

Members of the Scientific Advisory Board

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Statistical Input – Output Data

Funding source (CHF)	Year 9	Year 10	Year 11	Year 12	Total	%
SNSF funding	4 575 000 ^a	2 665 000 ^a	1 500 000	1 000 000	9 740 000	37
Self-funding from home institution ¹	1 303 634	1 191 210	1 200 930	1 219 280	4 915 054	19
Self-funding from project participants	2 631 243 ^a	2 115 500 ^a	1 767 130	1 658 780	8 172 653	31
Third-party funding ²	399 226 ^a	1 402 895 ^a	1 019 090	910 290	3 731 501	14
Total	8 909 103	7 374 605	5 487 150	4 788 350	26 559 208	100

Personnel ³	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	GR	CN	FR	IN	
Management	3.53 ⁴	4	57	3	43	5	1	0	0	0	0	1
Master students	1	0	0	1	100	0	0	0	0	0	0	1
Doctoral students	33	8	24	25	76	7	6	3	1	1	2	13
Postdoctoral students	9	1	11	8	89	4	1	0	0	0	1	3
Research associates	36	5	14	31	86	18	4	2	1	1	1	9
Senior researchers ⁵	60	4	7	56	93	19	14	0	1	3	0	7
Other staff	15	8	53	7	47	14	0	0	0	1	0	0
Total	157.53	36	19	131	81	67	26	5	3	6	4	34

¹ Personnel costs, equipment and consumables, not included infrastructure and basic equipment

² Not included is CTI funding (cf. page 6). Since the start of the NCCR 22 projects have been funded by CTI at a total amount of 24.6 million CHF

³ Persons involved in the NCCR in the last reporting period (12 months)

⁴ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁵ Including leaders of the individual projects and other organisational units of the NCCR

⁶ Included funding of economic stimulus package projects (cf. project list)

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Mobile Information and Communication Systems

NCCR MICS

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Public Relations

- Web site
- Bimonthly newsletter

Research

Environmental monitoring for scientific purposes

H: Süssstrunk S.
Ancey C., Fua P., Parlange M.,
Vetterli M.

End-to-end sensor data management

H: Barrenetxea G.
Aberer K., Ailamaki A.,
Parlange M., Thiran P.,
Vetterli M.

Permasense

H: Beutel J.
Gruber S., Mattern F., Römer K.,
Thiele L.

High-throughput UWB localization for mobile robots

H: Botteron C.
Dehollain C., Farine P.-A.,
Martinoli A., Robert S.,
Skrivervik A.

Participants to the research projects

Aberer Karl, Prof.
Ailamaki Anastasia, Prof.
Alonso Gustavo, Prof.
Ancey Christophe, Prof.

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Basin David, Prof.
Beutel Jan, Dr.

Botteron Cyrille, Dr.
Capkun Srdjan, Prof.
Dehollain Catherine, MER
Farine Pierre-André, Prof.
Fua Pascal, Prof.
Gruber Stefan, Dr.
Hubaux Jean-Pierre, Prof.
Kossmann Donald, Prof.
Martinoli Alcherio, Prof.

Mattern Friedemann, Prof.

Security for wireless networks

H: Basin D.
Capkun S., Hubaux J.-P.,
Meier W., Vaudenay S.

Customizing the world of pervasive data

H: Alonso G.
Kossmann D., Tatbul N.,
Wattenhofer R.

Economic stimulus package

P2P streaming of scalable content for PCs and consumer electronics

H: Wattenhofer R.,
von Rickenbach P.

Tamperproof monitoring solution for weather risk management

H: Vetterli M., Barrenetxea G.

PermaSense Rugged Sensor Technology

H: Beutel J., Schmid R.

Distributed Algorithm for Vehicle Detection

H: Buhmann J., Meier R.

Programmes

Doctoral Program in Computer, Communication and Information Sciences

Direction: Urbanke R., Bovay J.

Undergrad Research Opportunity Program

Direction: Bovay J.

Internship Program for Female Undergraduate Students

Direction: Berseth N.,
Albertini M.

Industrial Liaison Program

Direction: Pesty R.

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Faculté Informatique et Communications, EPF Lausanne

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EPF Lausanne

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Third Party Cooperation

(in progress)

Programmes

- AEOLUS (FP6)
- ARTIST2 (FP6)
- ARTISTDesign
- ASSIST
- AVANTSSAR
- COMBEST
- CONET (FP7)
- COST 2100
- DEPLOY
- DustBot (FP6)
- ECRYPT II
- EuQoS (FP6)
- EURETILE
- Euro FGI (FP6)
- Euro-NF
- FlexSMELL
- Hydrosys - STREP
- MASTER
- MEGAFRAME (FP6)
- MINAml (FP6)
- Nano-Tera
- Noe ArtistDesign (FP7)
- Predator
- pro3d
- SHAPES (FP6)
- SwissEx
- ULTRASponder
- WASP (FP6)
- WISEBED

Research Institutions

- Centre spatial de Toulouse, Centre National d'Etudes Spatiales, FR
- Communication Sciences Institute, University of Southern California, Los Angeles, US
- Computer Science and Artificial Intelligence Laboratory, Massachusetts Institute of Technology, Cambridge, US
- Computer Systems Laboratory, Stanford University, US
- Carnegie Mellon University, Pittsburgh, US
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- Department of Computer Science, Université Libre de Bruxelles, BE
- Department of Computer Science, University of California, Los Angeles, US
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- Dipartimento di Informatica e Sistemistica, Università di Roma, IT
- Division of Computer Science, Nanyang Technological University, Singapore, SG
- Electrical Engineering Department, University of California, Los Angeles, US
- Department of Systems Engineering, Technical University of Dresden, DE
- Department of Telecommunications, Faculty of Electrical Engineering and Computing, Zagreb, HR

Topics

Wireless communication is fundamentally changing the way we use information technology: information becomes embedded in our physical environment by means of personal devices and embedded computers, and the physical environment becomes increasingly intertwined with the Internet information space through sensor and actuator technology. In parallel with this qualitative change, the number of devices and the amount of information is growing exponentially.

Classical models of designing and controlling centralized IT systems will not be

able to scale up. Decentralized approaches, based on self-organization principles, need to be studied and developed in order to master the complexity of the resulting systems.

The NCCR MICS is tackling exactly these problems, combining the study of the fundamental principles (network structures, distributed algorithms, information and communication theory) that will underlie this next-generation systems, and an engineering and empirical approach by developing and deploying platforms (wireless sensor technology, ad-hoc networks, in-network

information processing) and testing technologies in applications. A particularly interesting class of applications, from a Swiss perspective, is the environmental monitoring of the behaviour of landslide, permafrost and glaciers.

In its 3rd phase, the NCCR MICS is pursuing the technological developments and deployments started in phases 1 and 2, and strongly believes that the mutual exchange between theoretical work and systems/applications will lead to fruitful technology transfer.

Meier Willi, Prof.
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Pesty Roland, Dipl. Ing.
Robert Stephan, Prof.

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Skrivervik Anja, Prof.
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Thiran Patrick, Prof.
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- Instituto de Matemáticas - Universidad Nacional Autónoma de México, MX
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- Laboratory for Dependable Distributed Systems, Rheinisch-Westfälische Technische Hochschule Aachen, DE
- Laboratory for Information and Decision Systems, Massachusetts Institute of Technology, Cambridge, US
- Lehrstuhl für Rechnernetze, Heinrich Heine Universität Düsseldorf, DE
- Parallel and Distributed Systems Group, Technische Universiteit Delft, NL
- Institut National de Recherche en Informatique et Automatique, Sophia Antipolis, FR
- Rice Networks Group, Rice University, Houston, US
- School of Engineering and Applied Science, Harvard University, Cambridge, US
- School of Informatics and Engineering, Flinders University, Adelaide, AU
- School of Mathematics, University of Manchester, GB
- Shannon Laboratory, American Telephone and Telegraph, Florham Park, US
- Swedish Institute of Computer Science, Stockholm, SE
- Telecommunication Networks Group, Technical University of Berlin, DE
- Telecommunications and Networks Laboratory, Foundation for Research and Technology Hellas, Crete, GR
- United States Geological Survey, Vancouver, US
- Wireless Intelligent Systems Laboratory, Cornell University, Ithaca, US

Economy / Industry

- Agilent Technologies Deutschland GmbH, Böblingen, DE
- Amadeus Information Technology (IT) Group SA, Sophia-Antipolis, FR
- Amstein+Walthert SA, Lausanne, CH
- Art of Technology AG, Zürich, CH
- BridgeCo AG, Dübendorf, CH
- Brugg Kabel AG, Brugg, CH
- Compaq Cambridge Research Laboratory (CRL), Cambridge, US
- Cottet SA, Monthey, CH
- Crédit Suisse, Zurich, CH
- Cyberbotics Sàrl, Ecublens, CH
- DaimlerChrysler AG, Ulm, DE
- Danfoss A/S, Nordborg, DK

Mobile Information and Communication Systems NCCR MICS

Achievements of the previous years

The center achieved excellent scientific productivity with a steadily increasing number of publications (about 1400 accepted/published peer-reviewed papers by now). 40 new PhD theses funded by MICS have been completed over the last year. MICS has also remarkable achievements in applications and technology transfer, particularly in the area of wireless sensor networks for environmental monitoring. As a result, MICS is not only recognized as a world-wide leading and well-connected research center in mobile information and communication systems, but also as highly-reputed partner for conducting projects in the domain of wireless sensor networks.

Key areas in which we achieved these results are theory of wireless communications, wireless communication systems, security in wireless networks, embedded software systems and networked information management. The impact of MICS research is documented by academic awards, technical breakthroughs, impact on education, application projects (such as the projects funded by the Swiss federal stabilization pro-

gram) leading to the creation of several companies, and recognition by industry (such as the creation of the Nokia Research Center at EPFL with strong involvement of MICS research groups, and an important funding by Microsoft Research).

We are proud of the success encountered by our Spin Fund initiative, aiming at fostering the creation of start-up companies out of MICS research results, which found overwhelming interest. As technology transfer is a major goal in phase 3, we have also revised our Industrial Liaison Program, in order to make it evolve from a technology-watch orientation to a collaborative offering to industry.

MICS continued to actively reach out to young people. The program "Internet pour the filles" has been continued successfully and for the first time has been organized outside EPFL (in Jura). The Science Bus partially supported by MICS has already reached out to over 3000 young people, raising their interest in science and engineering.

Wireless sensor networks have a fundamental impact

on how environmental monitoring will be done in the future. They transform a science which has traditionally starved for data, but has always been rich in computational models, into a science in which data is easily accessible and readily available. Environmental monitoring has a very tangible societal impact; it is essential for informed predictions of local conditions (glaciers, permafrost, water cycles) but also delivers some of the necessary data to confirm global meteorological models.

To that end MICS has established successful interdisciplinary research projects with environmental science, such as the Swiss Experiment platform project supported by the CCES of the ETH Board and two nanotera projects in the areas of urban air pollution and alpine landslide monitoring. These projects benefit from our unique interdisciplinary and collaborative approach, and integrate many important MICS developments, such as SensorScope, Sensor Network Platform Kit, Global Sensor Networks, and PermaSense.

Further information see www.mics.org

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ETH Zürich, CH
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Statistical Input – Output Data

Funding source (CHF)	Year 9	Year 10	Year 11	Total	%
SNSF funding	3 170 000 ⁶	2 550 000 ⁶	1 200 000	6 920 000	34
Self-funding from home institution ¹	1 443 078	1 482 640	639 620	3 565 338	18
Self-funding from project participants	3 709 575 ⁶	3 310 920 ⁶	1 781 880	8 802 375	43
Third-party funding ²	780 096 ⁶	286 000 ⁶	0	1 066 096	5
Total	9 102 749	7 629 560	3 621 500	20 353 809	100

Personnel ³	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	FR	IN	IR	RO	
Management	3.44 ⁴	5	56	4	44	5	0	3	0	0	0	0
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	67	13	19	54	81	16	10	3	6	5	7	19
Postdoctoral students	26	8	31	18	69	5	2	2	1	2	0	14
Research associates	17	1	6	16	94	13	0	0	0	0	0	4
Senior researchers ⁵	59	5	8	54	92	1	1	0	0	0	0	5
Other staff	8	1	13	7	88	5	0	0	2	0	0	1
Total	180.44	33	18	153	82	45	13	8	9	7	7	43

¹ Personnel costs, equipment and consumables, not included infrastructure and basic equipment

² Not included is CTI funding (cf. page 6). Since the start of the NCCR 7 projects have been funded by CTI at a total amount of 8.3 million CHF.

³ Persons involved in the NCCR in the last reporting period (12 months)

⁴ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁵ Including leaders of the individual projects and other organisational units of the NCCR

⁶ Included funding of economic stimulus package (cf. project list)

Evaluation and Monitoring by the Swiss National Science Foundation (SNSF)

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- Intel Research, Cambridge, GB
- IBM Deutschland Research & Development GmbH, Boeblingen, DE
- IBM Research & Development Laboratories, Haifa, IL
- IBM Research GmbH, Rüschlikon, CH
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- Microsoft Research Cambridge, Cambridge, GB
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- Rincon Research Corporation, Tucson, US
- Samsung Advanced Institute of Technology (SAIT), Suwon, KR
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- Sensoria Corporation, San Diego, US
- SensorScope Sarl, Lausanne, CH
- Shockfish SA, Lausanne, CH
- Siemens AG, München, DE
- Siemens Schweiz AG Building Technologies, Zug, CH
- STMicroelectronics NV, Geneva, CH
- Streamforge GbmH, Oberägeri, CH
- Sun Microsystems Inc., Menlo Park, US
- Swisscom AG, Bern, CH
- Thales Optronique SA, Elancourt, FR
- Thales Research & Technology Ltd., Weybridge, GB
- Trialog SA, Paris, FR
- TriReme International Ltd, Stockport, GB
- Von Roll AG, Breitenbach, CH
- Withestein Technologies AG, Zürich, CH

Others

- Advanced Process UNderstanding and prediction of hydrological extremes and Complex Hazards (APUNCH), Zürich, CH
- Digital Games Research Association, Tampere, Finland, FI
- European Space Agency, Noordwijk, NL
- Extremes project, Competence Center Environment and Sustainability, Lausanne, CH
- MeteoSwiss, Zurich, CH
- FLOWR Foundation, Zürich, CH
- Haslerstiftung, Bern, CH
- International Game Developers Association (IGDA), Frankfurt, Frankfurt, DE
- Office Fédéral de la Communication, Bienne, CH
- Office fédéral de l'énergie, Bern, CH
- Serious Games Initiative, Washington DC, US
- Centre Suisse d'Electronique et de Microtechnique, Zürich - Neuchâtel, CH
- STMicroelectronics NV, Plan les Ouates, CH

Financial Valuation and Risk Management

NCCR FINRISK

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Start of the NCCR

November 1, 2001

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Vanini Paolo, Prof.

Education and Training

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Advancement of Women

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Public Relations

- Folder "NCCR FINRISK"
- "FINRISK Letter"
- Booklet "Risk and Risky Management"
- Booklet "Challenges to Executive Compensation"
- Booklet "FINRISK – Competence in Finance"

Research

Module "Asset Pricing and Portfolio Management"

Coordinator: Trojani F.

Behavioural finance

Head: Hens T.

Macro risk, capital flows and asset pricing in international finance

H: Bacchetta P.

New methods in theoretical and empirical asset pricing

H: Trojani F.

Dynamic Asset Pricing

H: Filipovic D.

Module "Corporate Finance"

Coordinator: Fahlenbrach R.

Corporate finance, market structure and the theory of the firm

H: Habib M.

Dynamic corporate finance: theory and tests

H: Morellec E.

Module "Risk Management"

Coordinator: Mancini L.

Credit risk and non-standard sources of risk in finance

H: Gibson Brandon, R.

Volatility and stability in financial markets

H: Barone-Adesi G.

Module "Quantitative Methods in Finance"

Coordinator: Scaillet O.

Mathematical methods in financial risk management

H: Schweizer M.

Financial econometrics for risk management

H: Scaillet O.

Computational financial economics

H: Kuebler F.

Module "Banking and Regulation"

Coordinator: Rochet J-C.

Systemic risk and dynamic contract theory

H: Rochet J-C.

Programme

Swiss Doctoral School in Finance

Supervisor: Degeorge F., Morellec, E. and Paoletta, M.

Heads of Individual Research Projects, Modules and Supervisors of Doctoral School

Bacchetta Philippe, Prof.
Barone-Adesi Giovanni, Prof.

Degeorge François, Prof.

Fahlenbrach Ruediger, Prof.

Gibson Brandon Rajna, Prof.

Habib Michel, Prof.

Hens Thorsten, Prof.

Kuebler Felix, Prof.

Mancini Lorian, Prof.

Morellec Erwan, Prof.

Paoletta Marc, Prof.

Rochet Jean-Charles, Prof.

Scaillet Olivier, Prof.

Schweizer Martin, Prof.

Trojani Fabio, Prof.

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Institut für schweizerisches Bankwesen, Universität Zürich

Institut für schweizerisches Bankwesen, Universität Zürich

Institut für schweizerisches Bankwesen, Universität Zürich

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Departement Mathematik, ETH Zürich

Facoltà di Scienze Economiche, Università della Svizzera Italiana, Lugano

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Stanford University, California, US

University of Toronto, CA and CREST, Paris, FR

University of Napoli, IT

Universität Wien, AT

Ohio State University, Columbus, US

Topics

Assessing risks and modelling their impact on agents' micro- and macro-economic decision-making processes represents the central theme that unites the research topics covered by FINRISK. Thus, the main research questions during its final phase III (2009-13) relate to the analysis and the modelling of risks. They are examined in

five FINRISK research modules as follows:

- Asset Pricing and Portfolio Management: How do risks affect asset prices and investors' portfolio decisions?
- Corporate Finance: How do risks affect corporations' fundamental decisions?
- Risk Management: How should financial and non-

financial risks be quantified and managed?

- Quantitative Methods in Finance: Which are the mathematical, statistical and computational tools that are necessary to provide meaningful answers to the above cited research questions?
- Banking and Regulation: How to prevent systemic crises?

Achievements of the previous years

In the following we identify four main areas in which substantial achievements have been generated since the start of FINRISK in 2001.

Research

Within nine years of operation, FINRISK has led to the competitive establishment of 12 research projects in areas of great significance to the financial services industry. Our research output further comprises more than 600 working papers and 400 publications in internationally renowned academic journals. For detailed information on our research achievements please visit our website.

Knowledge transfer

FINRISK promotes a mutually beneficial dialogue between academics and practitioners interested in the application of modern finance. Through targeted publications as well as the

organization of joint conferences, workshops and collaborative projects FINRISK has strengthened the cooperation between the Swiss universities and the financial services industry. Each year, the annual meeting organized together with the Swiss Finance Institute, attracts more than 200 practitioners and features presentations by both researchers and practitioners on topics of central interest to the finance community.

Education

A close cooperation between the doctoral programmes in Geneva, Lausanne, Lugano and Zurich has been established over the past years. We now offer a large variety of specialised doctoral courses in finance to more than 100 students from Swiss universities. Furthermore, the annual Swiss Doctoral Workshop in Finance provides an ideal forum for our

students to present their research to a mix of local and international faculty. Ultimately, our efforts have led to the launching of the Swiss Finance Institute PhD program in finance.

Structural Effects

The activities of FINRISK have contributed to the fact that several Swiss universities have declared Finance to be one of their top priority research areas. In 2006, the Swiss Bankers Association, recognising the importance of research and high level education in finance for the reputation of the Financial Centre Switzerland, has launched the Swiss Finance Institute that aims to secure and extend the research and educational efforts of FINRISK in the long-term, see also www.swissfinanceinstitute.ch.

Further information see www.nccr-finrisk.ch

Third Party Cooperation

(in progress)

Research Institutions

- California Institute of Technology, Pasadena, US
- Département de Finance, École des Hautes Études Commerciales, Montréal, CA
- Département de Sciences Économiques, Université de Montréal, Montréal, CA
- Department of Neurophysics, University of Marburg, DE
- University of Trier, DE
- Department of Economics, Anderson School of Management, Los Angeles, US
- Department of Economics, London School of Economics and Political Science, GB
- Department of Economics, Simon Fraser University, Burnaby, CA
- Department of Economics, University of Napoli, IT
- Department of Economics, University of Siena, IT
- Department of Economics, University of Virginia, Charlottesville, US
- Department of Finance, Bocconi University, Milan, IT
- Department of Finance, Boston University, Boston, US
- Department of Finance, California Institute of Technology, Caltech, US
- Department of Finance, Carnegie Mellon University, Pittsburgh, US
- Department of Finance, Columbia University, New York, US
- Department of Finance, Cornell University, Berkeley, US
- Department of Finance, Duke University, Durham, US
- Department of Finance, George Mason University, Fairfax, US
- Department of Finance, HEC Montreal, CA
- Department of Finance, HEC Paris, FR
- Department of Finance, Norwegian School of Economics and Business Administration, Bergen, NO
- Department of Finance, University of California, Berkeley, US
- Department of Finance, University of Maryland, Washington, US
- Department of Finance, University of Minnesota, US
- Department of Finance, University of Rochester, US
- Department of Finance, University of Toronto, CA
- Department of Finance, Washington University, St. Louis, US
- Department of Management Sciences, HEC Montréal, CA
- Department of Mathematics and Statistics, Boston University, US
- Ecole Nationale de la Statistique et de l'Administration Économique, Paris, FR
- Finance Department, Columbia Business School, New York, US
- Finance Department, School of Business, Madison, US

Financial Valuation and Risk Management NCCR FINRISK

- Finance Department, The London Business School, GB
- Finance Department, The Wharton School, Philadelphia, US
- Fisher College of Business, Ohio State University, US
- Graduate School of Business, Stanford University, US
- Graduate School of Business, University of Chicago, US
- Haas School of Business, University of California, Berkeley, US
- Harvard Business School, Harvard University, Massachusetts, US
- Institut für Mathematik, Humboldt Universität zu Berlin, DE
- Institute of Finance and Accounting, London Business School, GB
- Manchester School of Accounting and Finance, University of Manchester, GB
- Paris School of Economics, FR
- Research Department, European Central Bank, Frankfurt, DE
- Research Department, International Monetary Fund, Washington, US
- School of Economics, Fudan University, Shanghai, CN
- School of Mathematics, University of Leeds, GB
- Sciences Po, Paris, FR
- Sloan School of Management, Massachusetts Institute of Technology, Cambridge, US
- Tanaka Business School, Imperial College, London, GB
- The Graduate School of Business, Stanford University, US
- The Robert Day School of Economics and Finance, Claremont McKenna College, California, US

Economy / Industry

- Associazione Bancaria Ticinese, Lugano, CH
- Banque de France, Paris, FR
- Banque Nationale de Paris (BNP) Paribas, London, GB
- Caisse des Dépôts et Consignations (CDC) Ixis Capital Markets, Paris, FR
- Cédric Bancaire Privée, Geneva, CH
- CEPRES, Frankfurt am Main, DE
- Cortal Consors S.A., Paris, FR
- Credit Suisse Group, Zurich, CH
- CSS Krankenversicherungen, Luzern, CH
- Federal Reserve Bank of New York, New York, US
- LGT Capital Management AG, Zürich, CH
- Risk Solution Division - Standard and Poors, Leeds, GB
- Standard and Poors, London, GB
- Swissquote Bank SA, Gland, CH
- Wilshire Associates, Los Angeles, US
- Zurich Financial Services, Zürich, CH

Others

- Ausbildungszentrum für Experten der Kapitalanlage (AZEK), Bülach, CH
- Banca della Svizzera Italiana (BSI) Gamma Foundation, Lugano, CH
- Fondazione della Svizzera italiana per la ricerca scientifica e gli studi universitari, Lugano, CH
- Swiss National Bank, Bern, CH

Statistical Input – Output Data

Funding source (CHF)	Year 9	Year 10	Year 11	Year 12	Total	%
SNSF funding	2 300 000	2 100 000	2 100 000	0	6 500 000	50
Self-funding from home institution ¹	954 514	864 916	689 750	689 750	3 198 930	25
Self-funding from project participants ⁵	1 081 000	19 093	0	0	1 100 093	8
Third-party funding	454 965	688 000	560 000	500 000	2 202 965	17
Total	4 790 479	3 672 009	3 349 750	1 189 750	13 001 988	100

Personnel ²	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	IT	FR	BE	RU	
Management	2.72 ³	5	42	7	58	4	2	1	1	1	0	3
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	55	18	33	37	67	8	9	10	2	1	4	20
Postdoctoral students	15	5	33	10	67	2	4	1	1	1	1	3
Research associates	1	0	0	1	100	0	0	0	1	0	0	0
Senior researchers ⁴	88	8	9	80	91	17	10	12	12	2	1	12
Other staff	4	2	50	2	50	3	0	0	0	0	0	1
Total	165.72	38	22	137	78	34	25	24	17	5	6	39

¹ Personnel costs, equipment and consumables, not included infrastructure and basic equipment

² Persons involved in the NCCR in the last reporting period (12 months)

³ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁴ Including leaders of the individual projects and other organisational units of the NCCR

Evaluation and Monitoring by the Swiss National Science Foundation (SNSF)

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The Power and Meaning of Images

NCCR Iconic Criticism

Research

Image Boundaries and Image Sequences

Head: A. Beyer

Notation and Script

Heads: B. Schellewald,
M. Schmidt

Ornament

Heads: C. Spies, V. Beyer

Perception, Implicit Visual Knowledge and Cognition

Heads: M. Hagner, A. Schubbach

Image and Sociality

Head: C. Bohn

Image and Model

Heads: M. Merz, T. Vetter, I. Hinterwaldner

Design Process

Heads: M. Renner, N. van der Meulen

Image Theory

Head: G. Boehm

Art and the Arts

Head: R. Ubl

Graduate School „Image and Time“

01.01.09 - 31.12.11

Supervisor: A. Schubbach

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Bohn Cornelia, Prof.

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Hinterwaldner Inge, Dr.

Merz Martina, Prof.

Renner Michael, Prof.

Schellewald Barbara, Prof.

Schmidt Matthias, Prof.

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Chair for Science Studies, ETH Zürich

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Third Party Cooperation

Programmes

- Forschergruppe "Bild – Schrift – Zahl", "Das Technische Bild"
- Forschergruppe "Das wissende Bild"
- Graduiertenkolleg "Bild Körper Medium. Eine anthropologische Perspektive"
- Graduiertenkolleg "Körperinszenierungen"
- Graduiertenkolleg "Mediale Historiographien"
- SFB/FK 427
- SFB 447
- SFB/FK 615
- SFB 626
- SFB 447

Research Institutions

- Ägyptologisches Institut, Universität Leipzig, DE
- Center for Art and Media, Karlsruhe, DE
- Centro Internazionale di Studi di Architettura Andrea Palladi, Vicenza, IT
- Datenströme GbR, Berlin, DE
- Department of Adult and Continuing Education, University of Glasgow, GB
- Department of Art History, University of Chicago, US
- Department of Egyptology, Hebrew University, Jerusalem, IL
- Department of German, Northwestern University, Chicago, US
- Dipartimento di Discipline storiche, artistiche, archeologiche e geografiche, Università di Verona, IT
- Ecole des Hautes Etudes en Sciences Sociales (EHESS), Paris, FR
- Fachgebiet Formale Modelle, Logik und Programmierung, Berlin, DE
- Facultad de Arquitectura, Diseño y Urbanismo, Buenos Aires, AR
- Fakultät Bildende Kunst, Hochschule der Künste Berlin, DE
- Fakultät Medien, Bauhaus-Universität Weimar, DE
- Hermann von Helmholtz-Zentrum für Kulturtechnik, Berlin, DE
- Institut für Ägyptologie, Universität München, DE
- Institut für deutsche Sprache und Literatur, Humboldt-Universität Berlin, DE
- Institut für Film- und Theaterwissenschaften, Freie Universität Berlin, DE
- Institut für Informatik, Humboldt-Universität Berlin, DE
- Institut für Mathematik, Humboldt-Universität Berlin, DE
- Institut für Neuere deutsche Literatur, Justus-Liebig-Universität, Giessen, DE
- Institut für Philosophie, Technische Universität Darmstadt, DE
- Institut für Philosophie, Universität Wien, AT

Topics

The digital revolution, which has been unfolding globally since the beginning of the nineties, turns the old, inert image into an extremely flexible instrument that everyone can use, serving global communication and, above all, the generation of knowledge. Especially in the natural sciences, many new insights can only be realized with iconic methods. Images no longer illustrate what was first thought; they now represent an independent mode of thinking.

The knowledge society has become a society of images. This transformation can probably only be compared

with such epochal moments as the invention of the printing press or the general spread of literacy since the eighteenth century. Now we are all users and producers of images – but without necessarily understanding how they create meaning, how their power is generated, and what becomes of reality when it is understood as a function of the flexible perspective of the image. That is the starting point for our project: the image-oriented society is increasingly dependent on iconic criticism if it wants to master its problems.

The paradigm of the image, which had not previously

existed, deserves the scholarly attention language has received for centuries. Linguistics is a matter of course; iconic criticism must be one, too. The two complement each other – but only if the particular capacity of the image can be determined. This demands a fundamental reorientation, for we are used to identifying knowledge with language. The meaning potentials of the image create new openings to the present, to history and tradition, and into the future. An iconic criticism that addresses epistemic principles and exemplary applications is – as mentioned above – the task of a generation.

Achievements of the previous years

After completing its setup phase and fully consolidating its work in the whole range of its modules, the NCCR Iconic Criticism has now established itself as a visible, recognized research competence center, the heart of a network with regional, national, and international connections. In only a few years, the project has succeeded in assuming a position as one of the leading institutions in image research. The great frequency of its scholarly events and publications, including a Summer School, cooperation with

institutions all over the world, intensive collaboration between senior scholars and younger researchers, and last but not least a Graduate School, have made it possible to create a first-class interdisciplinary academic institution. The projects suggested in the first proposal have proven successful and are now being extended, supplemented, and developed further. The overall project's trademark is an exciting balance between empiricism and theory, between individual research and a general critical inter-

est in images. The NCCR has a group of all its members that meets regularly and is dedicated to the common interest in basic issues of the image and the task of "iconic criticism". The project defines itself in terms of the overall coherence of its results, connecting basic research with case studies and theories with applications. In terms of both organization and content, the NCCR has steadily adapted to new challenges and changing situations.

Further information see www.eikones.ch

Statistical Input – Output Data

Funding source (CHF)	Year 5	Year 6	Year 7	Year 8	Total	%
SNSF funding	1 875 000	1 875 000	1 875 000	1 875 000	7 500 000	42
Self-funding from home institution ¹	870 121	1 081 000	1 081 000	1 081 000	4 113 121	23
Self-funding from project participants	955 501	1 143 000	1 143 000	1 093 000	4 334 501	24
Third-party funding	369 968	494 000	479 000	494 000	1 836 968	10
Total	4 070 590	4 593 000	4 578 000	4 543 000	17 784 590	100

Personnel ²	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	IT	AT	AR	BE	
Management	8.00 ³	7	37	12	63	9	8	1	0	0	0	1
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	29	12	41	17	59	7	17	0	2	1	1	0
Postdoctoral students	16	5	31	11	69	1	8	4	1	0	0	1
Research associates	0	0	0	0	0	0	0	0	0	0	0	0
Senior researchers ⁴	18	5	28	13	72	0	1	0	0	0	0	0
Other staff	3	2	67	1	33	2	0	0	0	0	0	1
Total	74.00	31	36	54	64	19	34	5	3	1	1	3

¹ Personnel costs, equipment and consumables, not included infrastructure and basic equipment

² Persons involved in the NCCR in the last reporting period (12 months)

³ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁴ Including leaders of the individual projects and other organisational units of the NCCR

Evaluation and Monitoring by the Swiss National Science Foundation (SNSF)

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- Kunsthistorisches Institut Florenz, Max-Planck-Institut, IT
- Kunsthistorisches Institut, Universität Köln, DE
- Kunsthistorisches Seminar, Humboldt-Universität, Berlin, DE
- Kunsthistorisches Seminar, Ruhr-Universität Bochum, DE
- Kunsthistorisches Seminar, Universität Hamburg, DE
- Leerstoelgroep Theaterwetenschap, Faculteit der Geesteswetenschappen, Amsterdam, NL
- Max-Planck-Institut für Hirnforschung, Frankfurt a. M., DE
- Museo Gregoriano Egizio, Vatican Museum, Vatican City State (Holy See), VA
- Max-Planck-Institut für Wissenschaftsgeschichte, Berlin, DE
- Seminar für Archäologie und Kulturgeschichte Nordostafrikas, Humboldt-Universität Berlin, DE
- Seminar für Ästhetik, Humboldt-Universität Berlin, DE
- Historische Wahrnehmungsformen in Text und Bild, Universität Leipzig, DE
- Vakgroep Duits, Universiteit Gent, BE
- Zentrum für Bewegungsforschung, Institut für Theaterwissenschaft, Berlin, DE
- Zentrum zur Erforschung der Frühen Neuzeit, Johann Wolfgang-Goethe-Universität Frankfurt a. M., DE

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- Freiwillige Akademische Gesellschaft, Basel, CH
- IG Tanz - Tanzbüro Basel, CH
- Mediathek tanz.ch, Zürich, CH
- Schaulager, Basel, Münchenstein, CH
- Stiftung Bibliothek Werner Oechslin, Einsiedeln, CH
- Thyssen-Stiftung, Köln, DE

International Trade Regulation: From Fragmentation to Coherence

NCCR Trade Regulation

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Research

Work Package Trade governance

H: Kaufmann C.
Gehne K., Bernauer T., Elsig M.,
Ruoff G.

The creation of the DSU

H: Elsig M.

Dispute initiation

H: Bernauer Th.

Judicial governance at the WTO

H: Elsig M.

Compliance with WTO dispute rulings

H: Bernauer Th.

Human rights as drivers for corporate governance

H: Kaufmann C.

Investment contracts and human rights

H: Gehne K.

Linking corporate governance and WTO law

H: Aaronson S.

Work Package Preferential trade

H: Sauv  P., Milewicz K., Ziegler A.

PTAs: drivers, design and effects

H: Elsig M.

The optimal provision of regional public goods

H: Estevadeordal A.

Regional safe havens in a fragmented trade world

H: Dupont C.

Regional dispute settlement bodies in trade and invest- ment and their interference with the WTO DSU

H: Ziegler A.

Mapping the universe of services disciplines in PTAs

H: Sauv  P.

Completing the international investment architecture

H: Echandi R.

Regional integration and the global downturn

H: Gasiorek M.

Vertical specialisation and regionalism

H: Holmes P.

Work Package Innovation and creativity in international trade

H: Burri M.
Cottier T., Aerni P.

Access to content (A2C) in the digital environment

H: Burri M.

The role of interoperability in international trade

H: Gasser U.

Revisiting patent law and policy

H: Cottier Th.

The protection of intellectual property rights through international investment agreements

H: Boie B.

Rights to animal genetic re- sources for food and agriculture

H: Biber-Klemm S.

The law, economics and policy of financial innovation

H: Delimatsis P.

Testing selected innovation- targeted tools in practice

H: Aerni P.

The role of IPR protection in encouraging FDI spillovers in developing countries

H: Hold A.

Work Package Trade, development and migration

H: H berli Ch.
Panizzon M., Karapinar B.

The enabling clause revisited

H: H berli Ch.

South-South Regional Trade Agreements in Services

H: Panizzon M.

References to domestic labour standards in preferential trade agreements

H: H berli Ch.

Food security, WTO and FDI in agriculture

H: Karapinar B., H berli Ch.

Tax breaks as trade policy tools

H: Cottier Th.

Migration partnerships in multilayered migration governance

H: Panizzon M.

Temporary labour mobility in the new generation of bilat- eral migration agreements of France & Spain

H: Panizzon M.

France and Spain bilateral agreements on migration: current state of application in Senegal

H: Panizzon M.

Swiss migration and European mobility partnerships compared

H: Panizzon M.

Work Package Trade and climate change

H: Cottier T.
Stephan G.

Impact of global climate change on international trade

H: Stephan G.

Climate change adaptation in agriculture and international trade

H: Karapinar B.

Role of technology and innovation in restructuring agriculture to climate change

H: Aerni P.

Climate change risk management and regulation of services

H: Nartova O.

International trade in water resources

H: Temmerman F.

An institutional framework for the global carbon market

H: de S pibus J.

The access of renewable en- ergy sources to the grid in a liberalised European electric- ity market - "smart grids"

H: de S pibus J.

WTO negotiations and EGS

H: Baracol-Pinhao D.

Subsidization of fossil fuel and renewable energy

H: Cottier Th.

Implementing and monitoring PPMs

H: Cottier Th.

Work Package Impact assessment

H: Brühlhart M., Cadot O., Shingal A.

Trade, wages and location

H: Brühlhart M.

Trade preferences and adjustment at the firm level

H: Porto G.

Regionalism and governance

H: Cadot O.

Trade indices and trade patterns

H: Cadot O.

Threshold impact analysis and progressive trade regulation

H: Shingal A.

Legal dimension of trade and investment impact assessments

H: Gehne K.

Financial markets and their regulation

H: Föllmi

Horizontal Research

H: Cottier T., Oesch M.

Third Party Cooperation (international cooperations only)

Research Institutions

- Berkman Center for Internet and Society, Harvard University, Cambridge, US
- Centre d'Etudes Politiques de l'Europe Latine, Université de Montpellier, FR
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Topics

NCCR Trade Regulation aims to provide a better understanding of how the world trading system functions and to explore the sources and drivers of fragmentation and coherence. The rules and principles of the World Trade Organization (WTO) provide the main institutional framework, although it constitutes only one of many potentially applicable international regimes. As international trade regulation tran-

scends law and politics, the project is based on insights from the disciplines of law, economics and political science. NCCR Trade Regulation aims to develop long-term solutions and offer innovative policy recommendations that will improve the balance between economic and other regulatory objectives in an evolving architecture of regional and multilateral trade rules. The research in phase 2 of the NCCR Trade Regulation

involves a global network of more than 80 researchers addressing six broad thematic research areas: regulatory challenges and shifting powers in trade governance; preferential trade; innovation and creativity in international trade; trade, development and migration; innovative responses to trade and climate change; and impact assessment in international trade regulation.

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International Trade Regulation: From Fragmentation to Coherence NCCR Trade Regulation

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- Research Center for Educational Innovation and Development, Tribhuvan University, Kathmandu, NP
- Research School of Social Sciences, Australian National University, Canberra, AU
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- Trade Policy Training Centre in Africa, Arusha, TZ

Economy / Industry

- I.A. CO Environmental and Water Consultants Ltd, Nicosia, CY
- Keller & Parnter Patentanwälte AG, Bern, CH
- Nestlé SA Switzerland, Vevey, CH

Achievement of the previous years

Until fairly recently, international trade regulation has been undertaken as a specialized field of international law and economic policy, insufficiently interlinked with other areas of law and policy that WTO rules increasingly affect, as well as the institutions that generate these norms. We are establishing a unique, multidisciplinary research network that seeks to bring greater coherence to the study of these fragmented interfaces.

Research accomplishments final book project

The results of the research in the first phase appeared in a book entitled, *"The Prospects of International Trade Regulation: From Fragmentation to Coherence"*; published by Cambridge University Press. Each of the original 12 individual projects has contributed one chapter to this book, which examines fragmentation in international trade regulation across regulatory fields. It uses a conceptually coherent theoretical framework to bring about greater coherence among different policy goals and fields, and thus to embed the multilateral trading system within the broader framework of international economics, law and relations. It offers a forward-looking discussion of the most pressing issues of the international trade agenda, proposes concrete amendments of various WTO agreements and recommends avenues that the international trade agenda should pursue. It also provides up-to-date information on the different areas of trade regulation, which enables informed judgments to

be made about the advantages and drawbacks of fragmentation.

JIEL special issue

The 2007 -2009 financial crisis triggered a worldwide recession and slump in international trade, leading to loss of jobs, savings and opportunities. The crisis demonstrates the need for financial and monetary regulatory reform; for appropriate mechanisms for settling financial disputes and for regulating cross-border financial institutions. NCCR researchers have contributed to a special issue of the *Journal of International Economic Law*, which will be published in late 2010. The articles are the outcome of a symposium on "The Quest for International Law in Financial Regulation" held in London in May 2010.

Other successes

The Swiss Academies of Arts and Sciences award for trans-disciplinary research was won by the 'eDiversity' project, which was part of NCCR Trade Regulation's first phase jointly with the University of Lucerne. NCCR Researchers were honoured with awards from the Swiss Network for International Studies (SNIS) for their personal research. Funded by the Swiss Confederation and the Canton of Geneva, SNIS promotes academic research in International Studies with a particular interest in phenomena that transcend nation-state boundaries.

Knowledge transfer

The Swiss State Secretariat for Economic Affairs (SECO) joined the NCCR / in implementing a four-year academic cooperation

project in three advanced developing countries, Peru, South Africa and Vietnam. Funded by a five million CHF grant from SECO and designed, inter alia, to serve as a key KT outlet for the NCCR. The project's overall objective is the creation of regional knowledge hubs and competence centres in international trade regulation in these SECO priority countries. Training, research and infrastructure are crucial elements. The objectives are the strengthening of the educational capacities of the host institutions, their human resources - students, faculty and researchers - as well as their research infrastructure. Teaching and training will be supported by academic scholarships to MILE programme (Master of International Law and Economics) or to pursue PhDs on trade-related matters. Exchange of academic staff, curriculum development and the design of graduate programmes in trade regulation (law, economics and international relations) shall be promoted. Institutional cooperation will enhance inter-disciplinary research and allow the supervision of doctoral students by members of the NCCR/WTI network. Research fellowships, joint research projects, conferences and workshops complement these efforts to integrate foreign researchers into ongoing work under the NCCR-Trade Regulation project.

Further information see
www.nccr-trade.org

Statistical Input – Output Data

Funding source (CHF)	Year 5	Year 6	Year 7	Year 8	Total	%
SNSF funding	2 345 000	2 345 000	2 345 000	2 345 000	9 380 000	85
Self-funding from home institution ¹	579 216	202 000	160 000	160 000	1 101 216	10
Self-funding from project participants	303 072	0	0	0	303 072	3
Third-party funding	2 400	119 246	54 978	49 776	226 400	2
Total	3 229 688	2 666 246	2 559 978	2 554 776	11 010 688	100

Personnel ²	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	GB	US	IT	BE	
Management	4.91 ³	13	68	6	32	11	1	2	2	0	0	1
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	16	9	56	7	44	6	2	0	0	1	2	3
Postdoctoral students	2	2	100	0	0	0	2	0	0	0	0	0
Research associates	10	7	70	3	30	7	1	0	1	0	0	1
Senior researchers ⁴	97	41	42	56	58	7	2	4	2	2	2	13
Other staff	0	0	0	0	0	0	0	0	0	0	0	0
Total	129.91	72	50	72	50	31	8	6	5	3	4	18

¹ Personnel costs, equipment and consumables, not included infrastructure and basic equipment

² Persons involved in the NCCR in the last reporting period (12 months)

³ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁴ Including leaders of the individual projects and other organisational units of the NCCR

Others

- Asian Development Bank, Manila, PH
- Basel Institute of Governance, Basel, CH
- Berne Declaration, Berne, CH
- Centre for Genetic Resources, Wageningen, NL
- Ecoscientia, Zug, CH
- Federal Administrative Court, Division II, Berne, CH
- Federal Office of Agriculture, Berne, CH
- Food and Agriculture Organization (FAO), Rome, IT
- Inter-American Development Bank, Washington, D.C, US
- International Centre For Trade And Sustainable Development, Geneva, CH
- International Institute for Sustainable Development, Geneva, CH
- IQSensato, Geneva, CH
- Swiss Federal Department of Foreign Affairs, Berne, CH
- Swiss Federal Institute for Intellectual Property, Berne, CH
- World Bank, Washington DC, US
- World Intellectual Property Organisation, Geneva, CH
- World Trade Organisation, Geneva, CH
- WTI Advisors, Geneva, CH

WTI / NCCR International Research Council

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Research

Interference

Mythological Interference

H: Glaser J.

Diagrammatic structures

H: Lutz E. C.

Plastic Writing

H: Glaser E., Rübekel L.

Urban Sounds

H: Roeck B.

Display

Medial Metonymies

H: Kiening Ch.

Texts, Images, and Propaganda

H: Zey C.

Mapping Territories

H: Stercken M.

Literary Effects of Presence

H: Schneider S.

Dynamics of Cinematic Display

H: Schweinitz J., Tröhler M.

Instrumentalization

Monarchic Enthronement and Consecration

H: Thier A.

Media of Order

H: Teuscher S.

Peculiarities of Charter Language

H: Glessgen M.

Mediality of Stained Glass Ensembles

H: Kurmann B.

Transference

Figurations of the Chosen Ones

H: Naumann B.

Rhetoric of Transference

H: Müller Nielaba D.

Charismatic Figures

H: Wagner K., Gamper M.

The Artistic Transplant

H: Stoichita V.

Narrations of the Foreign Holy

H: Schnyder M.

Reception of Arabic Music

H: Hinrichsen H.-J.

Iconology of the Textile

H: Weddigen T.

Common Field

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Senior Researchers

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Mediated Origins

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Medialising death

H: Stoellger Ph. (Rostock)

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Topics

Historical Perspectives

In its second phase the NCCR focuses on the historicity of media and mediality. It investigates forms of communication, transfer, and perception before the era of mass-media dominance and modern teleologically and technologically oriented media discourses, whose historical reach goes no further back than the introduction of film, radio, or television. The aim of the NCCR is a historical mediology which particularly examines change in communication practices, new dynamics in medial forms, and reflection on the conditions of communication. Special moments and constellations will be analysed, in which the medial can be grasped and described, as well as longer periods of change.

The task of the historical mediology already in progress is to develop pat-

terns of description that allow us to understand how mediality has formed cultural meaning. The question is not so much what media are, but rather, what in which situations and processes works as a medium, and what are the specific conditions that make the medial possible. Emphasis is put therefore not only on the images that media present of the world, but also on those images of the medial that shape our notions of what media are. The historicity and imagination of the medial, as well as the particular historical dynamics and logics of mediality will be brought to light. Organised into a general overall field (A.) and four issue-related fields (B. Interference, C. Ostentation, D. Instrumentalisation and E. Transference), texts, images, maps, sculptures, architecture, textiles, sounds and films will serve to de-

velop different but related perspectives on medial peculiarities of the premodern period. The period between the 12th and the 15th centuries forms the focus of research in the second phase of the NCCR as it did in the first. At the same time, however, the borders of European-Christian cultural traditions will be brought into focus, perspectives on the early modern period will be opened, and selected aspects of modernity will provide a basis to observe those phases of modernity in which in literature, art, and science media discourses begin to take shape - discourses which in turn formed the idea of a premodern mediality. Participating fields of the NCCR are: German Literature and Linguistics, History, History of Art, Film Studies, Musicology, Scandinavian Studies, Romance Literature and Linguistics, and Law.

Third Party Cooperation

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- Geschichte und Ästhetik der Medien, Friedrich-Schiller-Universität Jena, DE
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- Institut für vergleichende Städtegeschichte, Universität Münster, DE
- Institute of Media and Representation, Faculty of Arts, Utrecht University, NL
- Institutet för språk och folkminnen, Nationalmuseum Kopenhagen, DK
- Institutt for lingvistiske og nordiske studier, Universitetet i Oslo, NO
- Institutt for arkeologi, konservering og historie, Middelalderseksjonen, Universitetet i Oslo, NO
- Laboratoire de Français Ancien, Université d'Ottawa, CA
- Maison Méditerranéenne des Sciences de l'Homme, Aix-en-Provence, FR
- Max-Planck-Institut für Wissenschaftsgeschichte, Berlin, DE
- Mediävistisches Institut, Universität München, DE
- Medienwissenschaft, Universität Trier, DE
- Monumenta Germaniae Historica, Munich, DE
- Musikwissenschaftliches Seminar, Humboldt-Universität zu Berlin, DE
- National Fairground Archive, University of Sheffield, GB
- Neuere deutsche Literaturwissenschaft, Goethe-Universität Frankfurt a. M., DE
- Nordeuropa-Institut, Humboldt-Universität zu Berlin, DE
- Nordisk Institut, Aarhus Universitet, DK
- Nordistisk Forskningsinstitut, Københavns Universitet, DK
- Panthéon Sorbonne, Paris, FR
- Pius-Stiftung für Papsturkundensforschung, Akademie der Wissenschaft zu Göttingen, DE
- Romanische Philologie, Freie Universität Bozen, IT
- Seminar für Kunstgeschichte, Heinrich Heine Universität Düsseldorf, DE
- Seminar für Lateinische Philologie des Mittelalters und der Neuzeit, Westfälische Wilhelms-Universität Münster, DE
- Skaldic Poetry of the Scandinavian Middle Ages Project, University of Sydney, US
- Sprach- und Literaturwissenschaften, Universität Augsburg, DE
- Stofnun Árna Magnússonar í íslenskum fræðum, Háskóli Íslands, Reykjavík, IS
- Technology, Innovation and Society, Eindhoven University of Technology, NL
- Universität Konstanz, DE
- University of California at Berkeley, Berkeley, U

Mediality – Historical Perspectives

NCCR Mediality

Achievements of the previous years

The NCCR stimulates research on premodern medial phenomena. Its added value is to concentrate and amalgamate theories, approaches, and observations made in different scientific fields and create a new understanding of mediality before the period of mass media and media theories. Thus it has social relevance and can change traditional knowledge.

Not media but mediality

Unlike most contemporary media studies the NCCR does not focus on single media but on complex media situations. It asks the question of what can be

used as a medium, how in specific situations and constellations meaning can be generated, how the usage of mediality was institutionalized, and in which ways it has been reflected by contemporaries.

Theories and models of mediality

Bringing together researchers from different fields and scientific traditions the NCCR studies historical theories and models of mediality plumbing antique, medieval, and early modern reflection on language, texts, and images of different kind. It also examines

the artefacts themselves and how they reveal knowledge of the ways and means of communication.

Conditions of the possibilities of mediality

Setting the focus on the analysis of historical issues of huge variety the NCCR's single projects considerate the basic conditions that enable communication. Looking into premodern forms of mediality, they widen the modern discussion on media bringing in epistemological and ontological aspects.

Further information see www.mediality.ch

Statistical Input – Output Data

Funding source (CHF)	Year 5	Year 6	Year 7	Year 8	Total	%
SNSF funding	1 500 000	1 500 000	1 500 000	1 500 000	6 000 000	58
Self-funding from home institution ¹	721 857	764 991	765 875	765 875	3 018 598	29
Self-funding from project participants	1 167 502	63 400	63 400	63 400	1 357 702	13
Third-party funding	0	0	0	0	0	0
Total	3 389 359	2 328 391	2 329 275	2 329 275	10 376 300	100

Personnel ²	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	IT	AT	FR	GB	
Management	2.81 ³	8	67	4	33	4	7	1	0	0	0	1
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	24	12	50	12	50	14	7	2	0	0	0	0
Postdoctoral students	5	3	60	2	40	0	3	0	0	0	1	0
Research associates	0	0	0	0	0	0	0	0	0	0	0	0
Senior researchers ⁴	33	11	33	22	67	2	4	0	0	1	0	1
Other staff	3	2	67	1	33	3	0	0	0	0	0	0
Total	67.81	36	47	41	53	23	21	3	0	1	1	2

¹ Personnel costs, equipment and consumables, not included infrastructure and basic equipment

² Persons involved in the NCCR in the last reporting period (12 months)

³ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁴ Including leaders of the individual projects and other organisational units of the NCCR

Challenges to Democracy in the 21st Century

NCCR Democracy

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University of Zurich

Start of the NCCR

October 1, 2005

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Advancement of Women

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Public Relations

- Newsletter (print)
- Public events
- Website
- Press releases
- E-Newsletter

Research

Module “Constituting democracy in multinational polities”

Leader: Lavenex S.

Conceptions of Europe – alternative demos conceptions in the EU

Head: Caramani D., Imhof K.

Designing “democracy” in Europe

H: Cheneval F., Lavenex S., Schimmelfennig F.

Institutional strategies for post-conflict democratization

H: Cederman L.-E., Hug S.

Module “Elected and non-elected political actors in de-nationalized policy-making”

Leader: Kübler D.

Civil society – government interactions in global governance

H: Koubi V., Bernauer T.

Internationalization, mediatization, and the accountability of regulatory agencies

H: Papadopoulos I., Gilardi F.

Cleavages, governance and the media in European metropolitan areas

H: Kübler D., Marcinkowski F.

Heads of Individual Research Projects

Bächtiger André, Dr.
Bernauer Thomas, Prof.

Bonfadelli Heinz, Prof.

Bochsler, Daniel, Prof.
Caramani Daniele, Prof.
Cederman Lars-Erik, Prof.

Cheneval Francis Prof.
Donges Patrick, Prof.

Esser Frank, Prof.

Module “Mediatization – Implications for politics, news media and the public”

Leader: Bonfadelli H.

Mediatization of political reality: Implications of media-centered reporting styles for democracy

H: Esser F.

Mediatization of political interest groups: Changes of organizational structure and communication repertoire

H: Donges P., Jarren O.

The mediatization of political decision-making

H: Sciarini P., Tresch A.

Mediatization of political attitudes: Becoming a democratic citizen in a multi-media environment

H: Bonfadelli H., Esser F., de Vreese C.

Module “Changing processes and strategies of political participation and representation: comparing public debates”

Leader: Wirth W.

Strategies of political actors

H: Kriesi H.

Strategies and processes of issue selection and construction: comparing public debates

H: Siegert G.

Seminar für Politikwissenschaft, Universität Luzern
Center for Comparative and International Studies (CIS), ETH Zürich

Institut für Publizistikwissenschaft und Medienforschung, Universität Zürich

Zentrum für Demokratie Aarau (ZDA), Universität Zürich
Institute of Political Science, University of St. Gallen
Center for Comparative and International Studies (CIS), ETH Zürich

Philosophisches Seminar, Universität Zürich
Institut für Politik- und Kommunikationswissenschaft, Ernst-Moritz-Arndt-Universität Greifswald
Institut für Publizistikwissenschaft und Medienforschung, Universität Zürich

The strategies and processes of attitude formation and public participation in comparative perspective

H: Wirth W.

The antecedents of public opinion expression – a cross-national study of debate participation

H: Matthes J.

Module “The quality of democracy”

H: Ladner A.

Democracy barometer

H: Merkel W., Bochsler, D.

E-voting: Smart-voting 2.0

H: Ladner A.

Deliberative experiments and direct democratic voting

H: Bächtiger A., Steenbergen M., Gautschi T.

Knowledge Transfer Projects

Democracy under the influence of globalisation and mediatization – A series of teaching units for level secondary I

H: Ziegler B.

Narrative space

H: Wyss V.

Challenges to Democracy in the 21st Century NCCR Democracy

Third Party Cooperation

Programmes

- ASCN
- CLIMPOL
- Demanc
- ECRP
- EDP
- GEG
- IMO
- NEWGOV
- RECON
- RRPP
- SFB 597
- SELECTS
- SVC

Research Institutions

- Amsterdam Institute for Advanced Labour, University of Amsterdam, NL
- Bertelsmann Transformation Index, Bertelsmann Stiftung, Gütersloh, DE
- Centre de Théorie Politique, Université Libre de Bruxelles, BE
- Centre for European Governance, University of Exeter, GB
- Centrum voor Mediacultuur en Communicatietechnologie (OE), Katholieke Universiteit Leuven, BE
- Departamento Ciências da Comunicação, Universidade do Minho, Braga, PT
- Department of Communication, University of California, San Diego, US
- Department of Communication, University of Missouri, Columbia, US
- Department of Political and Social Sciences, European University Institute, Florence, IT
- Department of Political Communication, University of Krems, AT
- Department of Political Science, Aarhus University, DK
- Department of Political Science, University of Koblenz Landau, DE
- Department of Public Communication, Vytautas Magnus University, Kaunas, LT
- Department of Social Cultural Studies, Free University of Amsterdam, NL
- Department of Sociology, University of California, Los Angeles, US
- Institut für Kommunikationswissenschaft, Westfälische Wilhelms-Universität Münster, DE

Topics

Well-functioning democratic processes and institutions constitute the backbone of political legitimacy, social stability, economic growth and prosperity. However, these days democracy is faced with serious challenges:

First, the process of **globalization** has undermined the problem-solving capacities of established democracies. Governments no longer have the degree of control that they once had, and their decisions are increasingly affected by decisions taken elsewhere. At the same time, international institutions to which political authority is increasingly transferred lack democratic legitimacy.

Furthermore, the process of extending democracy into unstable countries and regions has proven to be more difficult than expected.

Second, democratic systems are confronting the increasingly powerful role of the media in politics. In this **mediatization** process over recent decades, the mass media have been moving from being merely a channel of communication to being a major actor in the political arena. This can be problematic as the media are able to influence the entire decision-making process and they can assign political relevance and importance to societal problems according to their own logic.

Since 2005, social scientists have been working together for the NCCR Democracy in order to better understand how democracy is developing under these two conditions. While globalization and mediatization pose significant challenges to democracy, they also provide new opportunities for both new and established democracies to adapt to changing conditions and can contribute to a reinforcement of democracy. The researchers' common goal is to give explanations for the current changes and to propose new solutions and therefore improve the quality of democracy.

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Hug Simon, Prof.
Imhof Kurt, Prof.

Jarren Otfried, Prof.

Koubi Vally, Prof.
Kriesi Hanspeter, Prof.
Kübler Daniel, Prof.
Ladner Andreas, Prof.
Lavenex Sandra, Prof.
Marcinkowski Frank, Prof.
Matthes Jörg, Prof.

Merkel Wolfgang, Prof.
Papadopoulos Ioannis, Prof.

Sciarini Pascal, Prof.
Schimmelfennig Frank, Prof.

Siegert Gabriele, Prof.

Steenbergen Marco, Prof.
Tresch Anke, Dr.
de Vreese Claes, Prof.

Wirth Werner, Prof.

Wyss Vinzenz, Prof.

Ziegler Béatrice, Prof.

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Institut für Politikwissenschaft, Universität Zürich
Département de science politique, Université de Genève
Institut für Publizistikwissenschaft und Medienforschung und Soziologisches Institut der Universität Zürich

Institut für Publizistikwissenschaft und Medienforschung, Universität Zürich

Volkswirtschaftliches Institut, Universität Bern
Institut für Politikwissenschaft, Universität Zürich
Zentrum für Demokratie Aarau ZDA, Universität Zürich
IDHEAP, Universität Lausanne

Seminar für Politikwissenschaft, Universität Luzern
Institut für Kommunikationswissenschaft, Universität Münster
Institut für Publizistikwissenschaft und Medienforschung, Universität Zürich

Wissenschaftszentrum Berlin für Sozialforschung
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The Amsterdam School of Communications Research, University of Amsterdam

Institut für Publizistikwissenschaft und Medienforschung, Universität Zürich

Institut für Angewandte Medienwissenschaft, Zürcher Hochschule Winterthur ZHW

Zentrum für Demokratie Aarau ZDA, Fachhochschule Nordwestschweiz

Achievements of the previous years

Multi-disciplinary research

The 24 research projects completed in Phase I show how the two challenges of globalization and mediatisation jeopardize or reinforce democracy: While globalization poses new threats to democracy at the national level, it also allows for the democratization of supranational organizations and of non-democratic countries. However, the projects also indicate the unfavourable consequences of democratization. While mediatisation leads to a commercialization of news and extends the techniques of manipulating public opinion, it also diversifies the sources of news reporting, opens politics to the scrutiny of an ever more sophisticated public, and increases the focus on dialogue. The research results have been or are in the process of being published with leading publishers and in major journals in the fields. Furthermore, the NCCR has launched a refereed e-journal Living Reviews on Democracy, providing up-to-date reviews of the state of research in all fields of democracy studies.

Knowledge transfer

The projects in the Module "The quality of democracy" and the Knowledge Transfer Projects have provided tools either for democracy research or for the transfer of research results to the public: The Democracy Barometer has completed data collection for 75 democracies; the publicly accessible website www.democracybarometer.org presents country rankings and diagrams allowing for an assessment of the qual-

ity of democracy in established democracies. Two projects have produced e-learning tools in order to support courses in Swiss secondary schools or at Swiss universities. One project developed an instrument to monitor mass media performance in modern democracies. Another project developed decision-aids for voters in the domain of e-democracy and identified the risks and potentials of such tools from a legal perspective. Finally, one project promoted knowledge transfer of NCCR research into society by mediating joint meetings with researchers and journalists.

Education and training

The NCCR Democracy provides an interdisciplinary doctoral program in order to enable its participants to obtain Ph.D. degrees of such a quality that they can place themselves at the forefront of their discipline(s) in Switzerland or abroad. In Phase I, the NCCR supported the training of 26 Ph.D. students; the completion rate and professional perspectives of the students are very positive: Most of them completed their Ph.D. in time and plan to continue their academic career. By the end of Phase I, ten students have already accepted a job offer in the academic field. In the future, we will also focus on promoting the postdoctoral researchers. Furthermore, an NCCR assistant professorship in democratization will be created in 2010 at the University of Zurich.

The core of our efforts to promote female researchers is the peer men-

toring program. The peer group Stepping Stone in Phase I consisted of 15 female doctoral students and post-docs aiming to advance the careers of its members in academia and beyond. The group organized a variety of successful activities designed to develop skills vital to building up successful careers and to create networks. Most female doctoral students plan to stay in academia after finishing their dissertation. The program has been a very positive experience for all of its members, and they consider it one of the most effective forms of supporting the advancement of women in academia. The NCCR will therefore continue with its peer mentoring program.

Structural effects

The NCCR Democracy initiated the Zentrum für Demokratie Aarau (ZDA). The ZDA is the first democracy research center in Switzerland and a unique model for a partnership between a municipality (City of Aarau), a canton (Argovia), a university of applied sciences (FHNW) and a university (University of Zurich). The establishment of the center has also led to the creation of a new professorship in Democracy Studies at the University of Zurich. The founding of ZDA is an important measure for institutionalizing the NCCR Democracy and for securing and extending its research and educational efforts in the long run.

Further information see www.nccr-democracy.uzh.ch

- Institute for European Integration Research, Austrian Academy of Science, Vienna, AT
- Institute of Communication Studies, Leeds University, GB
- Institute of Mass Communication and Media Research, Free University Berlin, DE
- Institute of Mass Communication and Media Research, University of Disseldorf, DE
- Institute of Political Science, University of Innsbruck, AT
- Institute of Political Science, University of Munich, DE
- Laboratoire Communication et politique, Centre National de la Recherche Scientifique, Paris, FR
- Political Science Department, University of Mannheim, DE
- Political Science Department, University of Oslo, NO
- Politics and International Studies, Open University, Milton Keynes, GB
- Professorship Theory and History of Democracy, Social Science Research Center Berlin, DE
- School of Politics and International Relations, University College Dublin, IE
- Social Sciences Division, University of Oxford, GB
- Vakgroep Politieke Wetenschappen, Vrije Universiteit Brussels, BE
- Zentrum für Sozialpolitik, Universität Bremen, DE

Economy / Industry

- Bertelsmann Transformation Index, Bertelsmann Stiftung, Gütersloh, DE
- Politools, Bern, CH
- Redaktion Schulfernsehen, Schweizer Fernsehen, Zürich, CH

Others

- Federal Office of Public Health (FOPH), Bern, CH
- Schweizer Jugend forscht, Bern, CH
- Study Group on Democratization, National Intelligence Council and Intelligence Community, US Government, Washington, US

Partner Institutions

FORS, Université de Lausanne

Institut für Völkerrecht, Universität Zürich

Laboratoire de Sociologie Urbaine, Ecole Polytechnique Fédérale de Lausanne

Schweizerisches Institut für Aussenwirtschaft und Angewandte Wirtschaftsforschung, Universität St. Gallen

Soziologisches Institut, Universität Zürich

Università della Svizzera Italiana, Lugano

Zentrum für Demokratie (ZDA), Aarau

Challenges to Democracy in the 21st Century

NCCR Democracy

Statistical Input – Output Data

Funding source (CHF)	Year 5	Year 6	Year 7	Year 8	Total	%
SNSF funding	1 875 000	1 875 000	1 875 000	1 875 000	7 500 000	45
Self-funding from home institution ¹	863 350	1 236 084	1 101 017	1 065 610	4 266 061	25
Self-funding from project participants	1 695 648	1 125 886	1 202 428	735 982	4 759 944	28
Third-party funding	9 396	87 813	47 813	148 313	293 335	2
Total	4 443 394	4 324 783	4 226 258	3 824 905	16 819 340	100

Personnel ²	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	FR	GR	NL	AT	
Management	3.93 ³	6	46	7	54	7	5	0	1	0	0	1
Master students	1	0	0	1	100	1	0	0	0	0	0	0
Doctoral students	37	22	59	15	41	20	12	1	0	1	0	0
Postdoctoral students	10	2	20	8	80	5	4	1	0	0	0	1
Research associates	14	5	36	9	64	7	6	0	0	0	0	0
Senior researchers ⁴	54	12	22	42	78	1	4	0	0	0	0	1
Other staff	9	4	44	5	56	8	1	0	0	0	0	0
Total	128.93	51	37	87	63	49	32	2	1	1	0	3

¹ Personnel costs, equipment and consumables, not included infrastructure and basic equipment

² Persons involved in the NCCR in the last reporting period (12 months)

³ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁴ Including leaders of the individual projects and other organisational units of the NCCR

Evaluation and Monitoring by the Swiss National Science Foundation (SNSF)

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Affective Sciences: Emotion in Individual Behaviour and Social Processes

NCCR Affective Sciences

Research

Work Package Appraisal / Values / Norms

H: Mulligan K.

The neuro-cognitive architecture of emotion elicitation and differentiation

Heads: Sander D., Scherer K.R.

The impact of emotional cues on prosocial behavior and norm compliance

H: Fehr E.

Emotion, feeling & value

H: Mulligan K.

Myths & rites as cultural expression of emotion

H: Borgeaud P.

Work Package Individual differences / Disposition

H: Schmid Mast M.

Experiencing and regulating emotions, issues of self-involvement, and relationships to well-being and performance

H: Semmer N., Tschan F.

The cognitive-affective interplay of self regulation

H: Van der Linden M.

Emotion and gender under a power perspective

H: Schmid Mast M., Kaiser S.

Work Package Systems / Dynamics

H: Vuilleumier P.

Emotional response patterning and its mental representation

H: Grandjean D., Scherer K.R.

Cerebral bases of individual differences in affect perception and regulation

H: Vuilleumier P., Landis T.

Affective dynamics and aesthetic emotions

H: Lombardo P., Soldati G.

Research Foci

H: Steering Board

Aesthetic emotions

Emotion in language and culture

Emotional basis of other-regarding behaviour: Empathy and fairness

The nature and consequences of gender differences

Development of methods

H: Grandjean D.

Programmes

Graduate School

Post-Doc Program

Workshops

Seminar Series

Summer School

Female Careers: Special Stipends and Mentoring

Lab Rotation

Invited Professorships

Home Institution

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Start of the NCCR

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Affective Sciences: Emotion in Individual Behaviour and Social Processes

NCCR Affective Sciences

Public Relations

- Newsletter
- Website
- Participation in radio and TV programs
- Newspaper, magazine interviews and articles
- Nuit de la Science
- Cité des Métiers
- Semaine du Cerveau
- Salon de l'étudiant
- Le temps d'une découverte, Université de Genève
- Journée des filles
- Journée des Collégiens
- Museum exhibitions and workshops
- Montreux Festival Jazz

Third Party Cooperation

Programmes

- ENABLE
- FIGVRA
- ICCRA
- INTACT
- Properemo
- SSPNet

Research Institutions

- Abteilung Arbeits- und Organisationspsychologie, Universität Frankfurt, DE
- Adaptive Systems Research Group, University of Hertfordshire, Hatfield, GB
- Affective Neuroscience Lab, University of Wisconsin, Madison, US
- Brain and Creativity Institute, University of Southern California, Los Angeles, US
- New York University, US
- Center for Neuropolicy, Emory University, Atlanta, US
- Centre for the Study of Emotion at the University of Portsmouth, GB
- Cognitive psychopathology Unit, University of Liège, BE
- Computation and Neural Systems, California Institute of Technology, Pasadena CA, US
- Computational Neuroscience Group, Kings College of London, GB
- Department of Classics, University of Chicago, US
- Department of Comparative Literature, University of Bergen, NO
- Department of History and Archaeology, University of Crete, GR
- Department of Philosophy, University of Lund, SE
- Department of Philosophy, University of Montreal, CA
- Department of Philosophy, University of Toronto, CA
- Department of Psychology, Blaise Pascal University, Clermont-Ferrand, FR
- Department of Psychology,

Topics

This interdisciplinary NCCR investigates a phenomenon playing a central role in human behaviour and social interaction, emotion, on several levels of analysis from the perspectives of many different disciplines: psychology, neuroscience, economics, philosophy, law, comparative anthropology, as well as the humanities and the social sciences.

The following research questions illustrate some of the central topics currently addressed by the NCCR Affective Sciences:

- How are emotions elicited and differentiated into different response patterns? Topics: the role of brain structures, individual predispositions, cognitive appraisals, and situational fac-

tors; the patterning and synchronisation of emotional responses and action tendencies; the expression and communication of emotion;

- How are emotions regulated? Topics: the control of bodily reactions and feelings by social norms and interpersonal expectations; the ability to cope with emotions to avoid stress and burnout; the loss of control as a risk factor for affective disorders such as pathological anxiety and depression; the role of individual personality traits such as impulsivity;

- What role does emotion play in social relations and interactions? Topics: the central role of empathy, affective processes in the family, the workplace, and

society as a whole; the role of social norms and values, such as justice, in shaping the nature of the emotional response; the role of religion and myths; the socializing function of shame; effects of economic and sociopolitical changes on affective experiences and well-being.

Special emphasis is being placed on the application of research findings as well as joint research activities with transfer partners in order to deal with social issues in the areas of health, work and organizations, the family, law, the problem of violence, economics, and the arts. The NCCR is also committed to training the first generation of "affective scientists".

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Achievements of the previous years

Research

During its first phase, the NCCR Affective Sciences has demonstrated a high level of productivity, resulting in many publications in leading international journals and books. The concrete research achievements include: the experimental confirmation of cumulative-sequential processing of external stimuli; the creation of a reference corpus and data bank of emotional expressions; the experimental demonstration of the role of social context and personality on brain responses to other people's emotions; the pioneering ambulatory assessment of emotional reactions and regulation in real life settings (e.g., work place and family); the confirmation that social stressors at work have a powerful and measurable impact on emotions and, consequently, on health and well-being; the experimental confirmation that lack of perseverance and other impulsivity aspects are related to interference in working memory and response inhibition (with potential consequences for emotional stability); the demonstration that the intranasal administration of the neuropeptide Oxytocin, central in social approach behaviour in nonhuman mammals, causes a substantial increase in trust in humans; the conceptual analysis of shame and guilt, establishing a fundamental distinction between them; the analysis of the emotional issues related to individual attitudes towards organ donation; and a comparison of the emotional aspects of myths and rites in different ancient and classical cultures. The newly created interdisciplinary Research Foci have been an outstanding success,

in particular the foci on Aesthetic emotions, Empathy, and Language and culture. In addition to a large number of workshops and symposia, mostly published as books or special journal issues, several major interdisciplinary research projects are currently being conducted. For example, a large intercultural project has established semantic profiles for emotion words in over 30 languages, which, in addition to producing valuable scientific insights, will allow more appropriate translations in cross-cultural research. The Transversal Module Methods has produced several important toolboxes to be shared within the NCCR and the scientific community at large. The NCCR is also a leading partner in the University of Geneva's new Brain and Behavior Laboratory, which combines in a single facility top notch brain imaging, psychophysiological measurement, behavioural interaction and expression analysis with virtual reality tools used to elicit emotions. The NCCR also has a large number of associate members, academics and professionals from inside and outside Switzerland. The research expertise and past achievements of several of our scientists has been acknowledged by prizes and grants such as the Marcel Benoist prize (E. Fehr), the Théodore Ott prize (T. Landis), ERC Starting grants (G. Pourtois, T. Singer), and an ERC Advanced grant (K. R. Scherer).

Education and training & Advancement of women

The NCCR's doctoral program provides many interdisciplinary training for the graduate students working in the NCCR projects. Simi-

larly, the postdoctoral program provides top-level seminars and a forum of exchange for the postdoctoral fellows. Regular thematic and methodological meetings are also organized with invited speakers from Switzerland and abroad. In 2009, the NCCR launched the first International Summer School in Affective Sciences (ISSAS). In order to support women and young researchers with family responsibilities, the NCCR has also implemented stipends to help with day care costs and allow researchers to pursue their academic career.

Knowledge transfer & Public information

The NCCR is strongly committed to transferring scientific knowledge to society. Successful projects are being conducted in collaboration with (and with additional funding from) Firmenich, a world leader in fragrance research and production, the German technology institute Fraunhofer, and the foundation for marketing research Gesellschaft für Konsumforschung.

During the past years, our researchers participated in several major events for the general public organized by the University of Geneva. The Center has also responded to numerous requests from the media, and has collaborated with local museums in several exhibitions. Its large website continues to draw an international audience. Both research results and knowledge transfer activities are featured prominently in the Center's quarterly newsletter.

Further information see www.affective-sciences.org

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- Department of Psychology, University of Berkeley, US
- Department of Psychology, University of Chicago, US
- Department of Psychology, University of Gent, BE
- Department of Psychology, University of Graz, AT
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- Department of Psychology, University of Sheffield, GB
- Department of Psychology, University of Singapore, SG
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- Laboratoire d'Informatique et Communication, Université de Paris, FR
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Affective Sciences: Emotion in Individual Behaviour and Social Processes NCCR Affective Sciences

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 - Maine Medical Center, Portland, US
 - Max Planck Institut Leipzig, DE
 - Memory Resources and Research Centre, University of Lille, FR
 - Neurological Reeducation Centre, Hospital Raymond Poincaré, Paris, FR
 - Nonconscious Information Processing Laboratory, University of Tulsa, US
 - Philosophy Department, University of Manchester, GB
 - Psychiatry III, University of Ulm, DE
 - Psychology Department, Central Michigan University, Mount Pleasant, US
 - Psychology Department, University of California - Berkeley, US
 - Ikerbasque Research Center, Bilbao, ES
 - School of psychology, Cardiff University, GB
 - School of Psychology, Georgia Tech, Atlanta, US
 - School of Psychology, Normal University of Beijing, CN
 - School of Psychology, Queen's University Belfast, IE
 - Section Sciences Religieuses, Ecole Pratique des Hautes Etudes, Paris, FR
 - Service de Neurologie, Université de Rennes, FR
 - Social Cognition Lab, University of Aberdeen, GB
 - Social Psychology Department, Oxford University, GB
 - Textes, Littératures: Écritures et modèles, Université de Bordeaux, FR
 - The Computation Emotion Group, University of Southern California, US
 - Unité Fairburn (Anorexie boulimie), Clinique des Vallées, Ville-La-Grand, FR
 - Walton College, University of Arkansas, Fayetteville, US

Economy / Industry

- Firmenich SA, Genève, CH
- GfK Nürnberg e.V., Nürnberg, DE

Others

- Alliance, Genève, CH
- Association Suisse pour l'architecture émotionnelle, Genève, CH
- Foundation Montreux Jazz, CH
- Lake Innovation Geneva Society (LGIS), Genève, CH
- Musée de la Croix-Rouge et du Croissant-Rouge et Musée de l'Elysée, Genève, CH
- Muséum d'Histoire Naturelle, Genève, CH
- Service de la Formation Continue, Université de Genève, CH
- Service Médico-Pédagogique, Genève, CH

Statistical Input – Output Data

Funding source (CHF)	Year 5	Year 6	Year 7	Year 8	Total	%
SNSF funding	2 500 000	2 500 000	2 500 000	2 500 000	10 000 000	39
Self-funding from home institution ¹	472 964	526 562	543 294	457 180	2 000 000	8
Self-funding from project participants	3 712 259	2 100 443	2 000 158	2 000 158	9 813 018	38
Third-party funding	1 278 558	1 002 334	881 811	838 323	4 001 026	15
Total	7 963 781	6 129 339	5 925 263	5 795 661	25 814 044	100

Personnel ²	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	FR	IT	BE	US	
Management	4.89 ³	8	53	7	47	7	1	2	0	1	0	3
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	66	45	68	21	32	32	11	10	4	1	3	2
Postdoctoral students	47	24	51	23	49	13	9	6	4	2	2	11
Research associates	10	5	50	5	50	6	2	2	0	0	0	2
Senior researchers ⁴	80	29	36	51	64	19	11	1	6	0	0	5
Other staff	29	18	62	11	38	16	3	4	2	0	2	2
Total	236.89	129	52	118	48	93	37	25	16	4	7	25

¹ Personnel costs, equipment and consumables, not included infrastructure and basic equipment

² Persons involved in the NCCR in the last reporting period (12 months)

³ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁴ Including leaders of the individual projects and other organisational units of the NCCR

Evaluation and Monitoring by the Swiss National Science Foundation (SNSF)

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Overcoming vulnerability: life course perspectives

NCCR LIVES

Research

Vulnerability processes across the life course: Cumulative disadvantages, critical events, and socio-psychological resources

H: Spini D.

From youth to adulthood: Second generation immigrants' insertion in the Swiss Society

H: Bolzman C.

The making of educational inequalities: Towards pathways out of vulnerability

H: Falter J.-M.

Overcoming vulnerability to unemployment: Possibilities and limits of the so-called "active" social policies

H: Bonvin J.-M.

Vulnerability at the interface of professional and family life: Gender and occupational differentials

H: Le Feuvre N.

Professional trajectories: Impact of individual characteristics and resources and cultural background

H: Rossier J.

Critical events and family configurations

H: Widmer E.

Facing critical events in early adulthood: a normative approach to vulnerability and life course regulation

H: Staerklé C.

Health trajectories and life transitions: a life course approach to health vulnerability

H: Burton-Jeangros C.

Women facing cancer: The impact of the couple relationship as the primary source of social support

H: Favez N.

Vulnerability and Growth: Development dynamics and differential effects of the loss of an intimate partner in the second half of life

H: Perrig-Chiello P.

Behind the democratization of old age: Inequalities within progress

H: Oris M.

Measuring life sequences and the disorder of lives

H: Ritschard G.

Life transitions in context: Toward an integrated methodological framework for studying the impact of critical events

H: Joye D.

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Start of NCCR

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Topics

The phenomenon of vulnerability in terms of social exclusion or precariousness threatens individual life trajectories. The monetary costs of stress among the Swiss population are estimated to amount 8 billion Swiss francs in the year 2000. LIVES will investigate life trajectories of about 25000 people in Switzerland across domains, such as health, family, work, and institutions in a comparative and longitudinal perspective. The overall objective is to combine socio-economic, psycho-social and socio-political dimensions to capture the complexity of vulnerability dynamics in modern society.

Its interdisciplinary teams are devoted to study individual lives from early to late adulthood and look at critical events and life sequences with respect to three main issues. First, the processes and states of vulnerability are studied by relating social structures, institutions, and individual life course, and policy interventions. Second, the debate on “new social risks” such as growing instability of personal relations, labour market uncertainty, and consequences of the economic crises is linked to the analysis of the life course within various welfare-state regimes. Third, diffusion and accumulation ef-

fects of critical events and the efficacy of individual resources to cope with stress are examined.

The Leading house is the University of Lausanne and the Co-Leading House is the University of Geneva. The two Universities build on a ten-year collaboration and experience in empirical and methodological research within the PaVie Center. The NCCR LIVES collaborates also with the Swiss Centre of Expertise in the Social Sciences (FORS), the Swiss Federal Office of Statistics (FSO) and with several renowned institutes and outstanding life course experts at international level.

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Statistical Data and Members of the Review Panel will be published in the Guide 2012.



Swiss National Science Foundation

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