

Guide2013

National Centres of Competence in Research

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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 26 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 26 existing NCCRs receive a total of CHF 55 million in SNSF funding for 2013.

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 run for 2 years and focus on the transfer of results into practical applications. After a fourth NCCR call open to all disciplines 63 pre-proposals were submitted in 2012. In 2013 the SNSF will evaluate the expected 22 full proposals. Those which will be funded can start their work in 2014.

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.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.nanoscience.ch
Neuro	Prof. Schwab Martin	University of Zurich	www.nccr-neuro.uzh.ch
North-South	Prof. Humi 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

* Terminated in 2012

2nd Call of NCCRs

Short Name	NCCR-Director	Home Institution	Web Address
Affective Sciences	Prof. Scherer Klaus	University of Geneva	www.affective-sciences.org
Democracy	Prof. Kübler Daniel	University of Zurich	www.nccr-democracy.uzh.ch
Iconic Criticism	Prof. Ubl Ralph	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.org

* Terminated in 2010

3rd Call of NCCRs

Short Name	NCCR-Director	Home Institution	Web Address
Chemical Biology	Prof. Riezman Howard	University of Geneva, EPF Lausanne	www.nccr-chembio.ch
Kidney.CH	Prof. Verrey François	University of Zurich	www.nccr-kidney.ch
LIVES	Prof. Spini Dario	University of Lausanne, University of Geneva	www.lives-nccr.ch
MUST	Prof. Keller Ursula	ETH Zurich, University of Berne	www.nccr-must.ch
QSIT	Prof. Ensslin Klaus	ETH Zurich, University of Basel	www.nccr-qsit.ethz.ch
Robotics	Prof. Floreano Dario	EPF Lausanne	www.nccr-robotics.ch
SYNAPSY	Prof. Magistretti Pierre	EPF Lausanne, University of Lausanne, University of Geneva	www.nccr-synapsy.ch
TransCure	Prof. Hediger Matthias A.	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, 2nd and 3rd Call of NCCRs)

Funding source (CHF)	2009	2010	2011	2012	Total	%
SNSF funding	77 425 000 ⁴	74 215 000	67 225 000	62 068 000	280 933 000	32
Self-funding from home institutions ¹	33 123 040	36 964 876	36 205 840	32 581 227	138 874 983	16
Self-funding from other institutions ²	5 606 179	7 865 727	7 650 100	7 450 100	28 572 106	3
Self-funding from project participants	99 151 676	100 447 906	91 544 556	66 645 639	357 789 777	41
Third-party funding ³	17 116 163	18 178 038	17 284 049	15 344 965	67 923 215	8
Total	232 422 058	237 671 547	219 909 545	184 089 931	874 093 081	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

⁴ Included funding of economic stimulus package projects, transfer projects (strong Swiss franc package)

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

(1st, 2nd and 3rd Call of NCCRs)

Personnel	Total of Persons	Female	%	Male	%	Swiss	Other Nations
Management	102 ¹	139	45	167	55	193	32
Master students	26	14	54	12	46	22	2
Doctoral students	1106	458	41	648	59	402	311
Postdoctoral students	630	200	32	430	68	95	212
Research associates	203	90	44	113	56	94	46
Senior researchers ²	1163	213	18	939	82	502	226
Other staff	539	305	57	233	43	328	87
Total	3769	1419	36	2542	64	1636	916

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: Fasel N.

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.

Heads of Individual Research Projects

Aguet Michel, Prof.

Brisken Cathrin, Prof.

Christofori Gerhard, Prof.
Delorenzi Mauro, Dr.
De Palma Michele, Prof.

Fasel Nicolas, Prof.
Hanahan Douglas, Prof.

Hantschel Oliver, Prof.

Hegi Monika, Prof.
Hülsken Jörg, Prof.

Meylan Etienne, Prof.

Michielin Olivier, Prof.

Regulation of colorectal cancer progression

H: Petrova T.

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

H: Aguet M.

Identification and Validation of microRNAs important for pancreatic cancer liver metastasis

H: Hanahan D.

Perturbation of adaptor protein complexes by high-affinity monoclonal antibodies in chronic myelogenous leukemia

H: Hantschel O.

In vivo monitoring of the efficacy of genetic and pharmacological NF- κ B inhibition in a preclinical mouse model of human lung adenocarcinoma

H: Meylan E.

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.

Role of distinct macrophage subsets in tumor angiogenesis and progression

H: De Palma 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.

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 research

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, comple-

ment 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

Programmes

- SmArt (FP7)

Research Institutions

- A.I. Virtanen Institute for Molecular Sciences, University of Kuopio, FI
- Biobix: lab for computational genomics & bioinformatics, University of Gent, Gent, BE
- Brain Tumor Group, European Organization for Research and Treatment of Cancer, Brussels, BE
- Center for Human Genetics and Dept. of Gastro-Enterology, University Hospital Gasthuisberg, Leuven, BE
- Center for Molecular Medicine, University of Köln, Köln, DE
- Centre Hospitalier Universitaire Vaudois, Lausanne, CH
- CIBM, Centre Hospitalier Universitaire Vaudois, Lausanne, CH
- Department for Biochemistry and Molecular Biology, University of Chicago, Chicago, US
- Department of Molecular Embryology, Max-Planck Institute for Immunobiology, Freiburg, DE
- Department of Neuropathology, Department of Neuropathology, Valore, IN
- Department of Pathology, University of Geneva, Geneva, CH
- Department of Physics of Complex Systems, Weizmann Institute of Science, Rehovot, IL
- Department of Surgical Oncology, Erasmus University Hospital, Rotterdam, NL
- Department of Oncological Sciences, University of Torino, Torino, IT
- IFOM-IEO, Milan, IT
- Impact du Microenvironnement sur l'Angiogenèse et l'Invasion Tumorale, Centre de Recherche INSERM, Strasbourg, FR
- Institut contre l'arthrose, Lausanne, CH
- Institute of Molecular Medicine, University of Lisbon, PT
- MD Cancer Centre, The University of Texas, Houston, US
- Medical Biochemistry and Molecular Biology, Oulu Center for Cell-Matrix Research, Oulu, FI
- Molecular Life Sciences, Universität Frankfurt, DE
- Neurosurgery, Centre Hospitalier Universitaire Vaudois, Lausanne, CH
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Centre Hospitalier Universitaire Vaudois, CHUV, Lausanne
Institut of Bioengineering, EPF Lausanne

Partner Institutions

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Swiss Institute of Bioinformatics SIB, Lausanne Branch
Centre Pluridisciplinaire d'Oncologie CePO
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- SIB, Ecole Polytechnique Fédérale de Lausanne, Lausanne, CH
- Signalling and cancer, Friedrich Mischer Institute, Basel, CH
- University of Japan, JP
- University of Tübingen, Tübingen, DE

Economy / Industry

- Adipogen SA, Epalinges, CH
- Apoxis SA, Lausanne, CH
- Bracco Research SA, Geneva, CH
- BTG International Ltd., London, GB
- Cytos Biotechnology Inc, Zürich, CH
- Glaxo Smith Kline, PA, US
- Ipsogen SAS, Marseille, FR
- MDxHealth Inc., Liège, BE
- Novartis Pharma, Bern, CH
- Pfizer, La Jolla, CA, US
- The Genetics Company, Schlieren, CH

Others

- Association pour la recherche sur le Cancer, Villejuif, FR
- Fondation Institut Suisse de la Recherche Experimentale contre le cancer, Lausanne, CH
- Fondation ISREC, Epalinges, CH
- German Research Foundation, Bonn, DE
- Krebsforschung Schweiz, Berne, CH

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.

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 ¹	490 000	3 490 000	3 000 000	1 500 000	8 480 000	25
Self-funding from home institution ²	793 206	793 205	793 205	793 205	3 172 821	9
Self-funding from University of Lausanne	700 000	700 000	700 000	700 000	2 800 000	8
Self-funding from project participants	3 635 784	2 926 517	3 480 066	2 291 111	12 333 478	36
Third-party funding ³	2 077 241	1 654 580	2 139 650	1 700 721	7 572 192	22
Total	7 696 231	9 564 302	10 112 921	6 985 037	34 358 491	100

Personnel ⁴	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							IT	FR	DE	ES	US	
Management	1.3 ⁵	1	20	4	80	2	0	0	1	0	1	1
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	28	13	46	15	54	10	4	2	1	0	1	13
Postdoctoral students	45	24	53	21	47	7	6	5	5	4	2	17
Research associates	6	3	50	3	50	3	0	1	1	0	1	1
Senior researchers ⁶	28	8	29	20	71	11	3	1	6	0	3	4
Other staff	27	16	59	11	41	12	3	5	3	1	0	4
Total	135.30	65	47	74	53	45	16	14	17	5	8	40

Type of output ⁷	Totals
Publications > 665 Peer-reviewed 45 Not peer-reviewed 20 Anthology articles 21 Books 3 Reports	754
Presentations at congresses >	965
Cooperations > 16 Programmes 86 Research institutions 51 Private sector 70 Other	223
Transfer activities > 15 Patents 0 Licenses 0 Start-ups ⁸ 11 Prototypes/processes 1 CTI-projects ⁹	27

¹ Included funding of economic stimulus package

² Personnel costs, equipment and consumables, not included infrastructure and basic equipment

³ Not included is CTI funding. Since the start of the NCCR 1 project has been funded by CTI at a total amount of 1.1 million CHF (cf. third table).

⁴ Persons involved in the NCCR in the last reporting period (12 months)

⁵ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁶ Including leaders of the individual projects and other organisational units of the NCCR

⁷ This table displays the major indicators in knowledge and technology transfer; other data is available as well (see text on "achievements"). The output data of NCCRs differ considerably according to disciplinary cultures.

⁸ Start-up companies that have been built up or were considerably supported by NCCRs.

⁹ Projects funded by the Commission for Technology and Innovation (CTI) that have been initiated by members of NCCRs and are thematically linked to NCCR projects.

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

Members of the Review Panel

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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

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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: Docquier M.

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

Dean: Rodriguez I.,
Supervisor: 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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Centre Intégréatif de Génomique, Université de Lausanne
Département de Médecine Génétique et Développement,
Université de Genève
Centre Intégréatif 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 (organ-

ized 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 institutions in close contact with the NCCR.

Some projects directly related to technological development are pursued in the context of our technological platforms. These platforms provide 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 through teaching.

Third Party Cooperation

Programmes

- CAPPELLA
- CRESCENDO
- EUCLOCK
- EUMODIC
- Euro-Bioimaging initiative
- EuroDYNA
- GEUVADIS
- HFSP
- Human Frontiers Science Program
- IMIDIA
- National Institute of Health
- Polish-Swiss Research Programme
- TORNADO

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
- Département des neurosciences cliniques et dermatologie, Haute Ecole ARC – Ingénierie, St. Imier, CH
- 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
- European Molecular Biology Organization, Heidelberg, DE
- Faculty of Applied Biological Science, Hiroshima University, JP
- Faculty of Pharmacy-Ste-Justine Hospital, University of Montreal, CA

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Lingner Joachim, Dr.

Loewith Robbie, Prof.

Nef Serge, Dr.

Rodriguez Ivan, Prof.

Roska Botond, Dr.

Ruiz i Altaba Ariel, Prof.

Schibler Ueli, Prof.

Shore David M., Prof.

Stutz Françoise, Dr.

Thorens Bernard, Prof.

Trono Didier, Prof.

Wahli Walter, 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

- Genetics and Development, Montreal, CA
- Gene Expression and Regulation Program, Wistar Institute, Philadelphia, US
- 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 Fotointesis, Universidad de Sevilla, ES
- Jussieu Paris I, FR
- Max Planck Institute for Experimental Endocrinology, Hannover, DE
- Max Planck Institute for Molecular Biology, Munich, DE
- Mechanisms of cancer, FMI, Basel, CH
- 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
- Oncosuisse, Berne, CH
- 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
- Vanderbilt University, Nashville, US

Economy / Industry

- Affymetrix, Santa Clara, US
- Bioresearch & Partners, Monthey, CH
- Bitplane, Zurich, CH
- Leica Microsystems, Glattbrugg, CH
- L'Oreal, Paris, FR
- Novartis Institute for BioMedical Research NIBR, CH
- Novartis Pharma AG, Basel, CH

Achievements of the previous years

Research

NCCR funding has not only 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 University of Geneva launched a new master of Science program in fall 2010 entitled 'Genetics, development and evolution'. Eight of the 14 researcher groups participating in the program are members of the NCCR.

Technological platforms

NCCR funding has been an essential catalyst to equip the Lemanic region with state-of-the-art technologi-

cal 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 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.

Our NCCR is being integrated within a new institute, named iGE3 (Geneva Institut of Genetics and Genomics). The structure of iGE3 includes most of the scientists of the Faculty of Medicine and the Biology Section of the host institution. Representatives from the faculties have been elected (3 NCCR members out of 5) and the first director will be Professor Stylianos Antonarakis (4- year rotating mandate). iGE3 was inaugurated at the end of 2011.

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

- Phistem, Geneva, CH
- Pyrosequencing AB, Uppsala, SE
- SANOFI PASTEUR SA, Lyon, FR
- SANOFI PASTEUR SA, Montpellier, FR
- Serono international SA, Genève, CH
- The Genetics Company, Inc., Zürich, CH

Other

- Canadian MRC fellowship, Ottawa, CH
- Erwin Schrödinger Fellowships, Vienna, AT
- European Foundation for the Study of Diabetes, EFSD & Merck Sharp & Dohme, Düsseldorf, DE
- Fellowship from the Roche Research Foundation, Bern, CH
- Juvenile Diabetes Research Foundation, US
- NIH, US

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	32
Self-funding from home institution ¹	2 972 903	3 784 688	3 158 349	525 000	10 440 940	25
Self-funding from project participants	3 780 123	3 817 815	4 099 903	0	11 697 841	34
Third-party funding ²	1 542 720	1 037 655	1 542 761	0	4 123 136	10
Total	11 795 746	10 640 158	10 801 013	1 525 000	34 761 917	100

Personnel ³	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							FR	IT	DE	US	ES	
Management	3.7 ⁴	2	18	9	82	8	1	2	0	2	1	2
Master students	1	0	0	1	100	1	0	0	0	0	0	0
Doctoral students	51	26	51	25	49	20	4	7	3	0	1	17
Postdoctoral students	32	11	34	21	66	4	9	6	4	1	0	8
Research associates	3	2	67	1	33	1	2	0	0	0	0	0
Senior researchers ⁵	36	8	22	28	78	19	3	1	0	5	3	9
Other staff	46	32	70	14	30	33	11	2	0	0	0	2
Total	172.70	81	45	99	55	86	30	18	7	8	5	38

Type of output ⁶	Totals
Publications > 925 Peer-reviewed 11 Not peer-reviewed 22 Anthology articles 11 Books 0 Reports	969
Presentations at congresses >	852
Cooperations > 31 Programmes 110 Research institutions 38 Private sector 13 Other	192
Transfer activities > 39 Patents 9 Licenses 5 Start-ups ⁷ 0 Prototypes/processes 1 CTI-projects ⁸	54

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

² Not included is CTI funding. Since the start of the NCCR 1 project has been funded by CTI at a total amount of 80 000.00 CHF (cf. third table).

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 This table displays the major indicators in knowledge and technology transfer; other data is available as well (see text on "achievements"). The output data of NCCRs differ considerably according to disciplinary cultures.

⁷ Start-up companies that have been built up or were considerably supported by NCCRs.

⁸ Projects funded by the Commission for Technology and Innovation (CTI) that have been initiated by members of NCCRs and are thematically linked to NCCR projects.

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

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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

- Homepage
- Newspaper articles
- Appearance on radio and national TV

Research

Areas

Structural biology of membrane proteins

Coordinator: Locher K.

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 pro-

tein 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 head-quartered in Zürich.

Third Party Cooperation

Programmes

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

Research Institutions

- Biochemistry, Brandeis University, Waltham, US
- Biozentrum, University of Basel, Basel, CH
- Cancer Research (CSHL), Cold Spring Harbour Laboratories, US
- Center for Cellular Imaging and Nanoanalytics, University of Basel, CH
- Centre de Regulació Genòmica, Institució Catalana de Recerca i Estudis Avançats, Barcelona, ES
- Department Biophysical Chemistry, Max-Planck-Institute for Intelligent Systems, Stuttgart, DE
- Département de Microbiologie et d'Infectiologie, Université de Sherbrooke, CA
- Department of Biochemistry, New York University School of Medicine, New York, US
- Department of Biochemistry, University of Washington, Seattle, US
- Department of Biological Sciences, University of Illinois, Chicago, US
- 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 and Molecular Biology, University of Gothenburg, Gothenburg, Sweden
- Department of Chemistry, Ludwig-Maximilian-University Munich, DE
- Department of Chemistry, University of Cambridge, GB
- Department of Chemistry, Wayne State University, Detroit, US
- Department of Genetics, The Hebrew University of Jerusalem, Jerusalem, IL
- Department of Hematology, The Hebrew University of Jerusalem - Hadassah Medical Organization, Jerusalem, IL
- Department of Molecular Biology and Biotechnology, University of Sheffield, GB
- Department of Molecular Cell Biology, Weizmann Institute of Science, Rehovot, IL
- Department of Molecular Biophysics and Biochemistry, Yale University, New Haven, US
- Department of Molecular Medicine, Max Planck Institute of Biochemistry, Martinsried, DE
- Department of Pharmacology, School of Medicine, Cleveland, US
- Department of Physics, University of California, Santa Barbara, US
- Department of Pharmacology, University of North Carolina, Chapel Hill, US

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.

Medalia Ohad, Prof.

Plückthun Andreas, Prof.

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Schuler Ben, Prof.

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Stahlberg Henning, Prof.

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Institut für Biochemie, Universität Zürich

Paul Scherrer Institut, Villigen PSI

C-CINA, Biozentrum, Universität Basel

Laboratorium für physikalische Chemie, ETH Zürich

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

- Department of Physiology, University of Manitoba, Winnipeg, CA
- Department of Plant Molecular Biology, University of Lausanne, CH
- 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
- 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 Botany, Darmstadt University of Technology, DE
- Institute of Membrane and Systems Biology, University of Leeds, GB
- Institute of Microbiology, ETH Zurich, Zurich, CH
- Institute of Molecular Modeling and Simulation, BOKU University, Vienna, AT
- Institute of Molecular Biology and Biophysics, ETH Zurich, Zurich, CH
- Institute of Molecular Pediatric Science, University of Chicago, US
- Institute of Pharmacology, University College London, London, GB
- Institute of Physical Chemistry, ETH Zurich, CH
- Kyoto Institute of Technology, Protein Crystal Corporation, Osaka, JP
- Lab. für Physikalische Chemie, ETH Zurich, Zurich, CH
- Laboratoire de Maturation des ARN et Enzymologie Moléculaire, Vandoeuvre-les-Nancy, FR

Achievements of the previous years

Key biology areas

This NCCR focuses on the structural biology of membrane proteins and supra-molecular complexes and interactions. In both areas, major advances have been reported since the start of this NCCR. Methods for cloning, expression, purification, crystallization and analysis of membrane proteins have been developed and successes in their structure determination achieved. In the field of a class of medically relevant membrane proteins, ATP transporters, studies by different NCCR groups described the crystal structure of two different subclasses of these transporters. Insights into the structure of the vitamin B12 ABC transporter suggest a novel peristalsis-like mechanism of transport. The first structural insight into a class of secondary transporters was obtained by electron crystallography of the bacterial citrate transporter. In the theme of supramolecular complexes, detailed structural information on eukaryotic ribosomes, which are significantly larger and more complex than their prokaryotic counterparts, was obtained by determining the first complete crystal structures of both small and large eukaryotic ribosomal subunits each in complex with an initiation

factor. Furthermore, the structures of enzymes involved in bacterial protein degradation by a pathway specific to actinobacteria were described.

Important research fields in this area include the chromatin structure, the ribosome, RNA-protein interactions and fatty acid synthases.

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

- Laboratoire d'Enzymologie et Biochimie Structurales, Centre national de la Recherche Scientifique, Gif-sur-Yvette, FR
 - Lab. für Physikalische Chemie, ETH Zurich, Zurich, CH
 - Laboratory of Molecular Biology, National Institutes of Health, Bethesda, US
 - Laboratory of Protein Phosphorylation, Katholieke Universiteit Leuven, BE
 - 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
 - School of Chemistry and Molecular Bioscience, The University of Queensland, Brisbane, AU
 - School of Medicine, Stanford University, Stanford, CA, US
 - Structural Biology – VUB, Free University of Brussels, BE
 - The Scripps Research Institute, La Jolla, US
 - UCL Cancer Institute, University College London, GB
 - Zentrum für Molekulare Biologie (ZMBH), Universität Heidelberg, DE
- Economy / Industry**
- Boehringer Ingelheim Pharma GmbH & Co. KG, Biberach, DE
 - Bruker AXS GmbH, Karlsruhe, DE
 - Cambridge Antibody Technology, Cambridge, GB
 - F. Hoffmann-La Roche Ltd., Basel, CH
 - Molecular Dimensions Limited, Newmarket, GB
 - Molecular Partners AG, Zurich, CH
 - MorphoSys AG, Martinsried, DE
 - Roche Deutschland Holding GmbH, Penzberg, DE
 - 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	21
Self-funding from home institution ¹	1 226 033	1 851 950	1 315 865	1 495 865	5 889 713	16
Self-funding from ETH Zurich	577 679	730 227	703 600	703 600	2 715 106	7
Self-funding from project participants	6 537 153	6 663 000	6 277 035	703 600	20 180 788	55
Third-party funding ²	10 552	6 323	47 405	18 100	82 380	0
Total	11 951 417	11 251 500	9 843 905	3 721 165	36 767 987	100

Personnel ³	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	FR	CN	PL	AT	
Management	3.0 ⁴	2	25	6	75	3	2	1	0	0	0	2
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	49	17	35	32	65	18	16	2	2	2	1	8
Postdoctoral students	34	11	32	23	68	7	14	2	2	1	0	8
Research associates	0	0	0	0	0	0	0	0	0	0	0	0
Senior researchers ⁵	36	7	19	29	81	9	8	3	1	1	3	12
Other staff	21	19	90	2	10	12	3	1	0	2	0	4
Total	143.00	56	38	92	62	49	43	9	5	6	4	34

Type of output ⁶	Totals
Publications > 609 Peer-reviewed 9 Not peer-reviewed 13 Anthology articles 25 Books 0 Reports	656
Presentations at congresses >	1561
Cooperations > 4 Programmes 222 Research institutions 41 Private sector 0 Other	267
Transfer activities > 24 Patents 12 Licenses 2 Start-ups ⁷ 1 Prototypes/processes 2 CTI-projects ⁸	41

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

² Not included is CTI funding. Since the start of the NCCR 2 projects have been funded by CTI at a total amount of 2.1 million CHF (cf. third table).

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 This table displays the major indicators in knowledge and technology transfer; other data is available as well (see text on "achievements"). The output data of NCCRs differ considerably according to disciplinary cultures.

⁷ Start-up companies that have been built up or were considerably supported by NCCRs.

⁸ Projects funded by the Commission for Technology and Innovation (CTI) that have been initiated by members of NCCRs and are thematically linked to NCCR projects.

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

Members of the Review Panel

Kléber André, Prof. (Chair)

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Fromm Katharina, Prof.

Hall Mike, Prof.

Michel Hartmut, Prof.

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

Novartis Pharma AG, Basel, CH

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

Alzheimer's disease

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

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

H: Luft A.
Rouiller E., Schwab M.

Immunotherapy for malignant glioma

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

Cortical plasticity

H: Stephan K.E., Ishai A.

Infection and immunity of the central nervous system

H: Fontana A.
Aguzzi A., Becher B., Martin R.,
Suter T.

Spinal cord repair

H: Schwab M., Curt A.,
Raineteau O.

Rehabilitation technology matrix

H: Riener R.
Gassert R.

Transfer projects (strong Swiss franc package)

Development of a Mobile Device for Unsupervised, High-Dosage Inpatient and Outpatient Lower Limb Reha- bilitation

H: Bolliger M.

Recombinant Human Mono- clonal Antibodies for the treatment of Amyotrophic Lat- eral Sclerosis

H: Nitsch R.

Somnomat: an Actuated Bed to Improve Sleep Quality

H: Riener R.

Technological Platforms, Programmes

Center of transgenesis expertise

H: Mansuy I.
Aguzzi A., Becher B.,
Jessberger S., Suter 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.
Becher Burkhard, Prof.
Caflich Amedeo, Prof.
Curt Armin, Prof.
Ewers Helge, Dr.
Fontana Adriano, Prof.
Fraering Patrick, Prof.
Frei Karl, Prof.
Gassert Roger, Prof.
Glockshuber Rudolf, Prof.

Helmchen Fritjof, Prof.
Hock Christoph, Prof.
Ishai Alunit, Prof.
Jessberger Sebastian, Prof.
Knüsel Irene, PD Dr.
Konietzko Uwe, Dr.
Luft Andreas, Prof.
Mansuy Isabelle, Prof.
Martin Roland, Prof.
Nitsch Roger M., Prof.
Raineteau Olivier, Dr.
Rajendran Lawrence, Prof.
Riener Robert, Prof.
Rouiller Eric, Prof.

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Institut für Experimentelle Immunologie, Universität Zürich
Biochemisches Institut, Universität Zürich
Paraplegikerzentrum, Universitätsklinik Balgrist, Zürich
Laboratory of Physical Chemistry, ETH Zürich
Klinische Immunologie, Universitätsspital Zürich
Brain Mind Institute, EPF Lausanne
Neurochirurgische Klinik, Universitätsspital Zürich
Institut für Robotik und Intelligente Systeme, ETH Zürich
Institut für Molekularbiologie und Biophysik, ETH Zürich
Hönggerberg
Institut für Hirnforschung, Universität Zürich
Abteilung für Psychiatrische Forschung, Universität Zürich
Institut für Neuroradiologie, Universitätsspital Zürich
Institut für Hirnforschung, Universität Zürich
Institut für Pharmakologie und Toxikologie, Universität Zürich
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Abteilung für Psychiatrische Forschung, Universität Zürich
Institut für Robotik und Intelligente Systeme, ETH Zürich
Institut de Physiologie, Université de Fribourg

Third Party Cooperation

Programme

- ARISE
- CHIRP1
- EUROSPIN
- INTERACTION
- MUNDUS
- Neurochoice (SystemsX)
- NEUWalk
- REWIRE
- WALK AGAIN

Research Institutions

- Albert Einstein College of Medicine, Yeshiva University, New York, US
- Alexander Silberman Institute of Life Sciences, Hebrew University, Jerusalem, IL
- Biochemistry Center Regensburg (BZR), University of Regensburg, Regensburg, DE
- 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
- Cortical Networks, Max Planck Institute for Neurological Research, Köln, DE
- Département Immunologie, Paul-Ehrlich-Institut, Langen, DE
- Department Neuroscience, San Raffaele Scientific Institute, Milano, IT
- Department of Anatomy and Developmental Biology, University College London, GB
- Department of Anatomy and Neurobiology, Chandler Medical Center, Lexington, US
- Department of Anatomy and Neurobiology, University of California, Irvine, US
- 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 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 Genes and Behavior, Max Planck Institute of Biophysical Chemistry, Göttingen, DE
- 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
- Department of Molecular Cell Biology, Katholieke Universiteit Leuven, NL
- Department of Neurobiology and Physiology, Northwestern University, Evanston, US
- Department of Neurobiology, State University of New York, Stony Brook, US
- Department of Neurology, Johns Hopkins University, Baltimore, US
- Department of Neurology, Medical University of South Carolina, Charleston, US
- Department of Neurology, The University of Texas Medical Branch at Galveston, US
- Department of Neuropathology, Heinrich-Heine-University, Düsseldorf, DE
- Department of Neuropathology, University of Marburg, DE
- Department of Neuroscience, San Raffaele Scientific Institute - DIBIT, Milano, IT
- Department of Neurosurgery, Stanford University, US
- Department of Neurosurgery, University Hospital Hamburg, DE
- Department of Pathology, School of Medicine, San Diego, US
- Department of Pathology, Harvard Medical School, Boston, US
- Department of Pharmacology and Cancer Biology, Duke University Medical Center, Durham, US
- Department of Pharmacy, University of Patras, GR
- Department of Physiology, Anatomy and Genetics, Oxford, GB
- Department of Physiological Sciences, University of California, Los Angeles, US
- Department of Physiology, Anatomy and Genetics, Oxford, GB
- Department of Physiology and Neurobiology, Eötvös Loránd University, Budapest, HU
- Department of Psychiatry, University of California, US
- Dep. of Psychological and Brain Sciences, Neurogenetics and Behavior Center, Baltimore, US
- Dep. of Psychology, Katholieke Universiteit Leuven, BE
- Department of Surgery, University of Toronto, Toronto, CA
- Department of Veterans Affairs, Maryland Health Care System, Baltimore VA Medical Center, US
- Department of Zoology, University of British Columbia, Vancouver, CA
- DFG-Forschungszentrum für Regen. Therapie, Dresden, DE
- Dipartimento di Neuroscienze, Sezione di Fisiologia, Torino, IT
- Division of Clinical Neuroscience, University of Glasgow, GB
- Division of Mental Health Research, Queensland Institute of Medical Research, Herston, AU
- Experimental Therapy, Franz Penzoldt Center, Erlangen, DE
- Faculty for Biomedical Engineering, The Catholic University of America, Washington, US
- I. P. Pavlov Institute of Physiology, Russian Academy of Sciences, St. Petersburg, RU

Neural Plasticity and Repair NCCR Neuro

Rudin Markus, Prof.

Schwab Martin E., Prof.

Sonderegger Peter, Prof.
Stephan Klaas Enno, Prof.
Suter Tobias, Dr.
Tabatabai Ghazaleh, Dr.
Weller Michael, Prof.

Delegates

Colombo Gery, Dr.
Mansuy Isabelle, Prof.
Knecht Wolfgang, Dr.

Institut für Pharmakologie und Toxikologie, Universität und ETH Zürich und Institut für Biomedizinische Technik, Universität und ETH Zürich

Institut für Hirnforschung, Universität Zürich und D- HEST, ETH Zürich

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Institut für Biomedizinische Technik, Universität und ETH Zürich
Klinische Immunologie, Universitätsspital Zürich
Neurologische Klinik, Universitätsspital Zürich
Neurologische Klinik, Universitätsspital 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 and commercial use.

Basic science

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

Awards

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, ten new professorships have been created since the beginning: one each in clinical and experimental analysis of multiple sclerosis (MS), two in rehabilitation engineering, one in animal brain imaging, one in stem cell biology, one each in experimental and clinical neurorehabilitation, one in systems biology of Alzheimer's disease and one in clinical neuroimmunology and MS research.

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, the center of behavioral assessment (closed), the 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

70 Ph.D. students of the NCCR Neuro are currently enrolled in this program.

Knowledge transfer

Major efforts have been made to extend joint projects with major pharmaceutical companies. In addition, three spin-off companies arose from the NCCR and provide new positions for young scientists. From 2009-2011, two applied projects have been carried out within the economic stimulus package (ALS and Robot-Assisted Neurorehabilitation of the Arm). Sixty-one patents have been issued since 2001.

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

- Institut de Génétique Fonctionnelle, Montpellier, FR
- Institut des Systèmes Intelligents et de Robotique, Université Pierre et Marie Curie, Paris, FR
- 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
- Institute for Pharmacy and Molecular Biotechnology, University of Heidelberg, DE
- Institute für Immunologie, Friedrich-Löffler Institut, Tübingen, DE
- Institute of Basic Medical Sciences, Department of Physiology, University of Oslo, NO
- 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
- Institute of Virology, Technische Universität München (TUM)/ Helmholtz-Zentrum, DE
- Interfaculty Institute for Cell Biology, Univ. of Tübingen, DE
- Johann-Friedrich-Blumenbach-Institute of Zoology and Anthropology, University of Göttingen, Göttingen, DE
- Klinik für Neurologie, Universitätsklinikum Essen, 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
- Laboratory of Preclinical Imaging and Imaging Technology, University Hospital Tübingen, Tübingen, DE
- Leibniz Institute for Age Research, Fritz Lipmann Institute, 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
- Neuro-Psychiatry, Institut de Recherches Internationales Servier, Cedex, FR
- Neurorehabilitation, Kliniken Schmieder Allensbach, DE
- Neuroscience Center, University of Helsinki, FI
- Neurosciences Group, Weatherall Institute of Molecular Medicine, Oxford, GB

- NeuroStructural Research Laboratory, Tampa, US
- Newcastle upon Tyne Muscle Centre, Institute of Human Genetics, GB
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- Physiology, Development and Neuroscience, University of Cambridge, Cambridge, GB
- Queensland Brain Institute, University of Queensland, AU
- Rehabilitation Inst. of Chicago, US
- Rehabilitationszentrum für Kinder und Jugendliche des Kinderspitals Zürich, Kinderspital Zürich, Affoltern am Albis, CH
- School of Biosciences, University of Birmingham, GB
- School of Medical Sciences, University of Aberdeen, GB
- Unité de neuroscience, Université Laval, Québec, CA
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- Wallenberg Neuroscience Center, Department of Experimental Medical Sciences, Lund Univ. SE
- Wellcome Trust Centre for Neuroimaging, London, GB

Economy / Industry

- Alcon Laboratories Inc., Fort Worth, US
- Alea Solutions GmbH, Zurich, CH
- Antisense Pharma GmbH, Regensburg, DE
- Biogen Idec Ltd, Maidenhead, GB
- Boehringer-Ingelheim Pharma GmbH & Co., Biberach, DE
- Bruker Biospin AG, Fällanden, CH
- Complex Medical SA, Ecublens, CH
- ESBATech AG, Schlieren, CH
- Evotec Neurosciences AG, Hamburg, DE
- FBI Science GmbH, Technologiezentrum-Ruhr an der Ruhr-Universität, Bochum, DE
- GlaxoSmithKline AG, Verona, IT
- Hocoma AG, Volketswil, CH
- Neurimmune Therapeutics AG, Zurich, CH
- NewBehavior AG, Zürich, CH
- Pathologie Institut Enge, Zurich, CH
- Philips Medical Systems AG, Zurich, CH
- Sanofi-Aventis, Paris, FR
- Swortec SA, Monthey, CH
- TSE Systems GmbH, Bad Homburg, DE
- Warren Pharmaceuticals Inc., Ossining, US
- Zühlke Engineering AG, Schlieren, CH
- 4SC AG, Munich, DE

Others

- Consortium of the Christopher and Dana Reeve Foundation, Los Angeles, US
- ETH Foundation, Zurich, CH
- International Spinal Research Trust (ISRT), Surrey, GB
- Velux Stiftung, Zürich, CH
- Wilhelm-Sander Foundation, Munich, DE

Statistical Input – Output Data

Funding source (CHF)	Year 9	Year 10	Year 11	Year 12	Total	%
SNSF funding ¹	4 115 000	3 075 000	1 600 000	2 780 000	11 570 000	13
Self-funding from home institution ²	1 700 621	1 737 641	997 280	1 520 000	5 955 542	7
Self-funding from ETH Zurich	937 500	937 500	937 500	937 500	3 750 000	4
Self-funding from project participants	13 659 469	17 617 835	14 445 819	16 007 661	61 730 784	69
Third-party funding ³	674 239	827 900	2 228 240	2 155 000	5 885 379	7
Total	21 086 829	24 195 876	20 208 839	23 400 161	88 891 705	100

Personnel ⁴	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	IT	FR	IN	US	
Management	2.0 ⁵	4	44	5	56	5	3	0	1	0	0	0
Master students	19	11	58	8	42	18	0	0	0	0	0	1
Doctoral students	139	69	50	70	50	64	30	6	2	9	2	28
Postdoctoral students	30	13	43	17	57	4	8	3	2	0	2	11
Research associates	34	11	32	23	68	15	12	2	0	0	1	4
Senior researchers ⁶	99	21	21	78	79	34	36	3	8	3	2	13
Other staff	65	43	66	22	34	42	13	0	0	0	2	8
Total	388.00	172	44	223	56	182	102	14	13	12	9	65

Type of output ⁷	Totals
Publications > 1811 Peer-reviewed 53 Not peer-reviewed 193 Anthology articles 27 Books 14 Reports	2098
Presentations at congresses >	3124
Cooperations > 40 Programmes 411 Research institutions 48 Private sector 19 Other	518
Transfer activities > 61 Patents 17 Licenses 6 Start-ups ⁸ 29 Prototypes/processes 14 CTI-projects ⁹	127

¹ Included funding of economic stimulus package and transfer projects (strong Swiss franc package)

² Personnel costs, equipment and consumables, not included infrastructure and basic equipment

³ Not included is CTI funding. Since the start of the NCCR 14 projects have been funded by CTI at a total amount of 23.3 million CHF (cf. third table).

⁴ Persons involved in the NCCR in the last reporting period (12 months)

⁵ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁶ Including leaders of the individual projects and other organisational units of the NCCR

⁷ This table displays the major indicators in knowledge and technology transfer; other data is available as well (see text on "achievements"). The output data of NCCRs differ considerably according to disciplinary cultures.

⁸ Start-up companies that have been built up or were considerably supported by NCCRs.

⁹ Projects funded by the Commission for Technology and Innovation (CTI) that have been initiated by members of NCCRs and are thematically linked to NCCR projects.

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

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 Ghisalba Oreste, Prof.
 Götz Magdalena, Prof.

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 Wallenberg Neuroscience Center, University Hospital of Lund, SE
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Start of NCCR
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Research

Modul 1

Oxygen

Leader: Wenger R.

Basic mechanism of renal oxygen sensing

H: Wenger R.
Moch H., Frew I.

Oxygen sensing in kidney development and disease

H: Cohen C.,
Hoogewijs D., 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.,
Serra 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
De Seigneux Sophie, MD

Ernandez Thomas, MD

Féraille Eric, MD, PhD

Forssmann Wolf-Georg, MD
Frew Ian, PhD
Fuster Daniel, MD, PhD
Hasler Udo, PhD
Hoogewijs David, PhD
Hummler Edith, PhD

Huynh-Do Uyen, MD
Konrad Daniel, MD
Krapf Reto, MD
Pasch Andreas, MD
Vogt Bruno, MD

Module 3

Acid & Minerals

Leader: Wagner C.

Sensors of phosphate by kidney, bone, and intestine

H: Biber J.,
Krapf R., Seuwen K.,
Wagner C., De Seigneux S.

Stones and bones: Renal acid and mineral excretion and its crosstalk with bone

H: Wagner C.,
Fuster D.G., Bonny O., Pasch A.

The role of Uromodulin and the TAL in mineral, salt and uric acid handling

H: Devuyst O.,
Bonny O.

Module 4

Salt & Water

Leader: Féraille E.,
Ernandez T.

Renal mechanisms of oedema formation

H: Vogt B.,
Hummler E., Martin P.Y.,
Burnier M.

Trophic effects of sodium on the kidney and cardiovascular system

H: Féraille E.,
Ernandez T.

Integrative control of potassium homeostasis

H: Loffing J.,
Staub O., Forssmann W.G.

Technology Platforms & Reference Centres

Imaging & Microscopy

H: Loffing J.

Rodent Transgenesis

H: Hummler E.

Rodent Phenotyping

H: Wagner C.

Human Studies

H: Krapf R.

Programmes

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

H: Huynh-Do U.

E-Learning Cours in Basics in Nephrology

H: Rossier B.

Third Party Cooperation

Programmes

- IKPP

Research Institutions

- Department of Physiology and Pharmacology, University of Salamanca, ES
- Dept. of Physiology, University College London, GB
- Division of Osteoporosis, University of Berne, CH
- ETH Zurich, CH
- Human Genetics Unit, Medical Research Council, Edinburgh, GB
- Institute of molecular bioscience, University of Tokyo, JP
- Institute of Physiology, Universität Tuebingen, DE
- Institute of Veterinary Physiology, University of Zurich, CH
- Internal Medicine, National Center of Integrative Biomedical Informatics, Ann Arbor, US
- Internal medicine, CHUV - Centre Hospitalier Universitaire Vaudois, Lausanne, CH
- Mineral metabolism clinic, Ut Southwestern Medical Centre, Dallas, TX, US
- NHLBI, Framingham Heart Study, US
- Oncology - Medical Imaging, University Hospital Zurich, CH

Economy / Industry

- Insphero AG, Zurich, CH
- Novartis, Basel, CH

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 and some major hospitals. 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 Input – Output Data

Funding source (CHF)	Year 1	Year 2	Year 3	Year 4	Total	%
SNSF funding	3 135 000	4 465 000	4 465 000	4 465 000	16 530 000	62
Self-funding from home institution ¹	70 831	140 140	1 960 000	1 160 000	3 330 971	12
Self-funding from project participants	1 122 625	1 275 903	2 230 500	2 230 500	6 859 528	26
Third-party funding ²	146 955	0	0	0	146 955	1
Total	4 475 411	5 881 043	8 655 500	7 855 500	26 867 454	100

Personnel ³	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	FR	IN	BE	CN	
Management	4.1 ⁴	5	50	5	50	4	3	1	1	0	0	1
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	13	5	38	8	62	4	2	2	1	0	1	3
Postdoctoral students	23	11	48	12	52	5	2	3	2	0	1	10
Research associates	4	3	75	1	25	1	2	0	1	0	0	0
Senior researchers ⁵	31	3	10	28	90	19	8	1	0	2	0	2
Other staff	11	7	64	4	36	9	0	2	0	0	0	0
Total	86.09	34	37	58	63	42	17	9	5	2	2	16

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

² Not included is CTI funding. Since the start of the NCCR 1 project has been funded by CTI at a total amount of 200 000.00 CHF (cf. third table).

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)

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The synaptic bases of mental diseases

NCCR SYNAPSY

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October 1, 2010

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Axis 1: gene-mediated developmental psychiatric disorders

Morpho-functional defects in 22q11 DS

H: Eliez S., Michel C., Blanke O.

Genome sequencing in 22q11 and schizophrenic patients

H: Antonarakis S.

Development and function of excitatory and inhibitory networks in a 22q11 mouse model

H: Caroni P., Muller D., Carleton A.

Astrocyte function in the 22q11 mouse model

H: Bezzi P.

Oxidative stress hypothesis and biomarkers of first episode psychosis

H: Conus P., Do K., Murray N., Clarke S., Gruetter R.

Synaptic defects in mouse models of autism

H: Scheiffele P., Schneggenburger R., Markram H.

Axis 2: stress and experience-dependent psychopathology

Early-life stress cohort

H: Ansermet F., Schechter D.

Rodent models of early-life stress

H: Sandi C.

High risk mood disorders cohort

H: Preisig M., Marquet P., Aubry JM., Draganski B., Frackowiak R.

Reward and fear circuits

H: Lüscher C., Petersen C., Lüthi A.

Serotonin neuromodulation

H: Dayer A., Holtmaat A.

Glial plasticity

H: Magistretti P., Volterra A.

KTT projects

H: Bettler B., Eap C., Cardinaux JR., Herzog M.

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Topics

The aim of the NCCR "SYN-APSY, 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 disor-

ders, 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.

Third Party Cooperation

Programmes

- FP7 Eurospin Consortium
- Initial Training Networks (ITN)
- Symbad (FP7-People-ITN-2008)

Research Institutions

- Clinic for affective disorders and general psychiatry, University Hospital Zurich, CH
- Department of Pharmacology, University of North Carolina School of Medicine, Chapel Hill, US
- Department of Psychiatry, Charité, Berlin, DE
- Department of Psychiatry, Tbilisi State Medical University, GE
- Department of Psychiatry, University of Bremen, Bremen, DE
- Institute of Immunology, Alexander Fleming Biomedical Sciences Research Center, Vari, GR
- Institute of Physiology, University of Saarland, Homburg, DE
- Medical Image Processing Lab, University of Geneva, CH
- Nikolaus Weiskopf, Wellcome Trust Centre for Neuroimaging, London, GB
- Signal Processing Lab, EPFL, Lausanne, CH

Economy / Industry

- Life Science Communication AG, Küssnacht, CH

Others

- Fondation de Préfargier, Marin-Epagnier, CH

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Michel Christoph, Prof.

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Statistical Input – Output Data

Funding source (CHF)	Year 1	Year 2	Year 3	Year 4	Total	%
SNSF funding	3 610 000	4 560 000	4 655 000	4 655 000	17 480 000	39
Self-funding from home institution ¹	2 375 000	3 225 000	3 225 000	2 225 000	11 050 000	25
Self-funding from University of Lausanne	200 000	500 000	600 000	750 000	2 050 000	5
Self-funding from University of Geneva	150 000	500 000	600 000	650 000	1 900 000	4
Self-funding from project participants	3 120 253	3 245 246	2 381 000	2 371 000	11 117 499	25
Third-party funding	599 300	579 894	140 000	140 000	1 459 194	3
Total	10 054 553	12 610 140	11 601 000	10 791 000	45 056 693	100

Personnel ²	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							FR	DE	IT	GB	ES	
Management	2.6 ³	3	50	3	50	5	0	1	0	0	0	0
Master students	3	1	33	2	67	2	0	1	0	0	0	0
Doctoral students	24	16	67	8	33	8	3	0	5	1	2	6
Postdoctoral students	24	11	46	13	54	2	9	2	0	1	0	11
Research associates	18	17	94	1	6	13	2	0	1	0	1	1
Senior researchers ⁴	75	18	24	57	76	41	9	5	7	3	2	13
Other staff	40	31	78	9	23	21	7	5	1	2	0	4
Total	186.56	97	51	93	49	92	30	14	14	7	5	35

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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-----------------	--

From transport physiology to identification of therapeutic target NCCR TransCure

Research

Projects:

Transporters as targets for cancer therapy (part A)

Glutamate transporters as therapeutic targets (part B)

H: Hediger M. A.

Function, pharmacology and pathophysiology of the TRPC1 channel

H: Niggli E.

Physiology, pharmacology and pathophysiology of the calcium-activated non-selective cation TRPM4 channel

H: Abriel H.

Structure, function and pharmacology of sodium / calcium exchangers (SLC8, SLC24)

H: Stahlberg H.

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

H: Fuster D.

Structure, function and pharmacology of anoc-tamines, divalent metal ion transporters and vesicular neurotransmitter transporters

H: Dutzler R.

Vesicular neurotransmitter transporters: glutamate and monoamines

H: Volterra A.
Bezzi P.

Structure and molecular transport mechanisms of selected solute transporters

H: Fotiadis D.

Glucose, myo-inositol and urate transporters

H: Thorens B.

Transporters in pathologies during pregnancy, part A

H: Surbek D.
Baumann M.

Transporters in pathologies during pregnancy, part B

H: Albrecht C.

Ligand design for TRP channels and glutamate, monoamine, metal ion, vitamin C, nucleobase and myo- inositol transporters

H: Reymond J.-L.

Ligand development for the vesicular monoamine transporter VMAT2 and the putative endocannabinoid transporter

H: Altmann K.-H.

Development of selective fluorescence- and photo-affinity-labeled ligands for transporters and channels

H: Lochner M.

Screening assay development and targeting of the endocannabinoid transporter

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.

Role of ion transporter TRPV6 and other transporters in bone homeostasis

H: Hofstetter W.

Facilities

Screening and assay development facility

H: Hediger M. A.

Bioinformatics facility

H: Anderle P.

CardioMet Mouse Metabolic Evaluation Facility (MEF)

H: Thorens B.

Bone and Mineral Research Facility

H: Hofstetter W.

Natural product libraries facility

H: Gertsch J.

Electron Crystallography facility

H: Stahlberg H.

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Start of the NCCR

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- Newspaper articles and press releases
- BioMedical Transporters Conference Series:
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From transport physiology to identification of therapeutic target NCCR TransCure

Third Party Cooperation

Programmes

- EUROCORES (ESF)
- IFF TransCure

Research Institutions

- Cellular Neuroscience, Max Delbrück Center for Molecular Medicine, Berlin-Buch, DE
- Center for Arrhythmia Research, University of Michigan, Ann Arbor MI, US
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- Département de Pathologie, EPFL Lausanne, CH
- Department of Biochemistry, University of Cambridge, GB
- Department of Nephrology and Hypertension, University Hospital, Bern, CH
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Topics

The National Centre of Competence in Research (NCCR) "TransCure" is a joint effort of a multidisciplinary team of Swiss academic experts who are focused on cellular membrane transporter research and its application to the treatment of human diseases. Using the approach "from transport physiology to the identification of therapeutic targets" researchers are working collaboratively, sharing ideas, and focusing on common proteins and cellular pathways related to membrane transport. Transport proteins and ion channels play key roles in most physiologi-

cal processes in the human body. They are gatekeepers in the membranes of cells and organelles and their dysfunction contributes to the pathogenesis of major human diseases such as diabetes, hypertension, cardiovascular diseases, cancer, preeclampsia, osteoporosis and neurodegenerative diseases. Thus, these proteins have a great, unexplored potential for the development of novel therapeutic strategies. The collaborative efforts of TransCure combine a unique interdisciplinary skill set to be applied to the developing therapeutic strategies by controlling the

function of strategically important transporters in the diseased states. The skillset encompasses three major disciplines, referred to as "TransCure Trias": Physiology/Medicine, Structural Biology and Medicinal Chemistry. TransCure members and programs are localized in many institutions across Switzerland and the TransCure approach is designed to facilitate collaboration and coordination of activities with an entrepreneurial spirit. The outcome of the NCCR TransCure project is expected to help develop strategies to improve human health.

Heads and Co-Leaders of Individual Research Projects and Facilities

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- Institute of Physiology, University of Saarland, Homburg, DE
- Institute Physiology Chemistry, University of Mainz, Mainz, DE
- Membrane Research Group, Hungarian Academy of Sciences, Budapest, HU
- Neuroscience, Columbia University, New York, US
- Ninewells Medical School, University of Dundee, Dundee, GB
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- Pediatric Cardiology, Hôpitaux de Lyon, FR
- Pharmacology, Universidad Guadalajara, Guadalajara, Mexico
- Pharmacology and Physiology, University of Medicine and Dentistry of New Jersey, Newark, US
- School of Life Sciences, University of Warwick, Coventry, GB
- Swiss Institute Bioinformatics, Université de Lausanne, CH

Economy / Industry

- Dr. August Wolff GmbH, Bielefeld, DE
- Dr. Willmar Schwabe Pharmaceuticals, Karlsruhe, DE
- HiQScreen, Geneva, CH
- Labormedizinisches Zentrum Dr. Risch AG, Liebfeld, CH
- MercaChem Inc., Nijmegen, NL

Statistical Input – Output Data

Funding source (CHF)	Year 1	Year 2	Year 3	Year 4	Total	%
SNSF funding	3 040 000	3 705 000	3 705 000	3 705 000	14 155 000	51
Self-funding from home institution ¹	2 007 035	823 976	758 060	541 200	4 130 271	15
Self-funding from project participants	2 751 488	3 360 415	1 624 500	1 624 500	9 360 903	33
Third-party funding	81 484	95 000	77 000	77 000	330 484	1
Total	7 880 007	7 984 391	6 164 560	5 947 700	27 976 658	100

Personnel ²	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	IT	FR	AT	IN	
Management	3.8 ³	4	31	9	69	10	3	1	0	0	0	0
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	25	12	48	13	52	8	1	3	0	2	3	9
Postdoctoral students	30	12	40	18	60	7	5	4	4	1	1	9
Research associates	0	0	0	0	0	0	0	0	0	0	0	0
Senior researchers ⁴	29	4	14	25	86	19	3	3	3	2	0	3
Other staff	21	14	67	7	33	16	3	1	1	0	0	2
Total	108.78	46	39	72	61	60	15	12	8	5	4	23

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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Visualisation and Control of Biological Processes Using Chemistry

NCCR Chemical Biology

Home Institutions

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Start of the NCCR

December 1, 2010

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Research

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

H: Gademann K.
Dubikovskaya, E., Dyson P.,
Reymond J.-L., Heinis C.,
Turcatti G., Johnsson K.,
Lacour J., Riezman H., Zhu J.,
Waser J., Winssinger N.

System Level Chemical interference – Novel active compounds inhibiting essential enzymes and proteins involved in signaling and other biological processes using whole cell assays developed through genetic engineering of yeast strains

H: Loewith R.
Dyson P., Gotta M., Riezman H.,
Turcatti G., Gademann K.

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

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

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

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

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

H: Radtke F.
Reymond J.-L., González-Gaitán M.,
Heinis C., Johnsson K.,
Turcatti G., Zhu J.

Biophysics of Cell Division - Using physics and chemical biology to understand asymmetric division in model organisms

H: González-Gaitán M.
Vogel H., Manley S., Riezman
H., Roux A., 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

H: Matile S.
Riezman H., Zumbuehl A.,
Roux A., 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.,
Reymond J.-L.

Transfer projects (strong Swiss franc package)

Determining the intracellular concentration of therapeutic peptides with sub-cellular resolution

H: Johnsson K.

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 technologies 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 the Biomolecular Screening Facility at the EPFL will have an outpost 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.

Third Party Cooperation

Programmes

- Fellowship EMPO (EMBO ALTF 816-2009)
- IEF SupraL SAS
- LipidX
- PSRP
- QuanTissue (European Science Foundation)

Research Institutions

- Swiss Téléthon, Telethon Institute of Genetics and Medicine, Berne, CH

Economy / Industry

- Lyncée Tec SA, Lausanne, CH

Others

- FCI Fonds der Chemischen Industrie - Stiftung Stipendien-Fonds, Frankfurt, DE

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Loewith Robbie, Prof.

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Matile Stefan, Prof.

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l'Institut de physique des systèmes biologiques, EPF Lausanne

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Section des sciences de la vie, EPF Lausanne

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Département de biochimie, Université de Genève

Département de biochimie, Université de Genève

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Département de chimie, Université Fribourg

Statistical Input – Output Data

Funding source (CHF)	Year 1	Year 2	Year 2	Year 4	Total	%
SNSF funding ¹	2 660 000	4 180 000	3 450 000	3 230 000	13 520 000	49
Self-funding from home institution	500 000	600 000	950 000	1 100 000	3 150 000	11
Self-funding from EPF Lausanne	750 000	2 250 000	1 750 000	1 250 000	6 000 000	22
Self-funding from project participants	974 348	929 347	1 578 750	1 578 750	5 061 195	18
Third-party funding	0	27 000	0	0	27 000	0
Total	4 884 348	7 986 347	7 728 750	7 158 750	27 758 195	100

Personnel ²	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							FR	DE	IT	ES	CA	
Management	2.8 ⁴	3	43	4	57	2	2	2	1	0	0	1
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	36	18	50	18	50	9	1	5	5	3	1	12
Postdoctoral students	30	14	47	16	53	3	5	4	3	2	1	12
Research associates	10	2	20	8	80	3	4	1	0	1	1	0
Senior researchers ⁵	22	4	18	18	82	7	3	3	1	1	1	7
Other staff	7	5	71	2	29	2	3	0	1	0	0	1
Total	107.80	46	41	66	59	26	18	15	11	7	4	33

¹ Included funding of transfer projects (strong Swiss franc package)

² Personnel costs, equipment and consumables, not included infrastructure and basic equipment

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)

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

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Public Relations

- Website
- Brochure
- Policy briefs: evidence for policy
- Outcome highlights
- Newsletters
- Media releases
- Flyer

Research

Thematic Node 1

Institutions, Livelihoods, Conflicts

Heads: Müller-Böker U.,
Goetschel L.

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.,
Akindès F.

Private-sector peace promotion

Co-Leaders: Iff A., Upreti B.

Thematic Node 2

Health, Services, Planning

Heads: Tanner M., Hering J.,
Zinsstag J., Zurbrugg C.

Research Projects

Reproductive resilience

Co-Leaders: Pfeiffer C.,
Ahorlu C.

Productive sanitation

Co-Leaders: Nguyen Viet H.,
Kengne I.M.

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., Carbonnier G.

Research Projects

Land resource potentials

Co-Leaders: Wolfgramm B.,
Yिताferu B.

Landscape transformation

Co-Leaders: Heinimann A.,
Zelege G.

Rural transformation

Co-Leaders: Rist S., Tapia N.

Access and welfare

Co-Leaders: Kiteme B.,
Epprecht M., Sy I.

Adaptation to climate change

Co-Leaders: Ifejika Speranza C.,
Koné B., Ur-Rahim I.

Integrative Node

Global Change and Sustainable Development

Head: Hurni H. on behalf
of the Board of Directors

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: Bonfoh B.,
Zinsstag J.

Beyond the MDGs

Co-Leaders: Geiser U., Suleri A.

Mobility and migration

Co-Leaders: Schelling E.,
Thieme S.

Climate change and smallholders

Co-Leaders: Goetschel L.,
Ur Rahim I.

Research in Partnership Regions

Within the Partnership Regions Project, the NCCR North-South continues to carry out integrated, context-specific, sustainability-oriented research in the following regions:

West Africa (WAF)

Coordinator: Bonfoh B.

(Côte d'Ivoire)

East Africa (EAF)

Coordinator: Kiteme B. (Kenya)

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: Jimenez E. (Bolivia)

Swiss Alps (ALP)

Coordinator: Liechti K.

(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

Programmes

- AKDN
- CAMP
- CEIL PIETTE (CONICET)
- ESAPP
- European Observatory for Health Systems
- FSC
- 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
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- Dept. of Forest Mensuration and Management, Sokoine University of Agriculture, Morogoro, TZ
- Department of Geography, University of Ho Chi Minh City, VN
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Zurbrügg Christian, Mr.	Eawag - Sandec, Dübendorf, CH

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Debele Berhanu	Regional Coordination Office Horn of Africa, Addis Abeba, ET
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Kiteme Boniface, Dr.	Centre for Training and Integrated Research in Arid and Semi-arid Lands Development CETRAD, Nanyuki, KE
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Perez Gutierrez Maria Angelina	Facultad Latinoamericana en Ciencias Sociales FLACSO-CR San José, CR
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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 EIIE, 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, 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
- Environment and Sustainable Development, United Nations University, Tokyo, JP
- Environmental Research Mapping and Information Systems in Africa (ERMIS), Nakuru, KE
- Environmental Thematic Group, Ifakara Health Institute, Dar es Salaam, TZ
- 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
- Food security, Sustainable Development Policy Institute, Islamabad, PK
- 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 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
- Institute of Physical Geography, University of Freiburg, Freiburg, DE
- Instituto del Conurbano (ICO), Universidad General Sarmiento, Buenos Aires, AR
- Inst. Dr. José María Luis Mor, MX
- Instituto Superior de Estudios Avanzados en Desarrollo, La Paz, BO

[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 Simon UMSS, Cochabamba, BO](#)

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

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

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

- 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
- National Soil Testing Centre, Ministry of Agriculture, Addis Ababa, ET
- Observatoire de l'Écopolitique Internationale (OEI), Université du Québec, Montreal, CA
- Office of Population Research, Princeton University, US
- School of Bio-Chemical Engineering and Technology, Srinidhorn International Institute of Technology, Thammasat University, Pathum Thani, TH
- School of Earth and Environment, University of Leeds, Leeds, GB
- School of Environment, Resources and Development, Bangkok, TH
- School of Geography and the Environment, University of Oxford, Oxford, GB
- 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
- Sustainable Livelihoods, Sustainable Development Policy Institute, Islamabad, PK
- 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
- Urban Sociology Department, Autonomous University of Mexico, Azcapotzalco, MX
- Water and Forestry Department, Ecole Supérieure des Sciences Agronomiques, Antananarivo, MG

Economy/Industry

- Alter Ego, Lausanne, CH
- 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
- Femina/HIP, Dar es Salaam, TZ
- Conflict Prevention and Conflict Transformation, Bern, CH
- Cooperation and Training Division, Urban Research Institute (URI), Vientiane, LA

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

NCCR North-South

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 ten years produced over 1500 publications (of which over 517 were refereed), more than 850 reports and 2886 presentations, all of which resulted directly from the research carried out in the programme. A total of 231 PhD studies have been launched so far, of which 120 are now completed. In the past year, 11 new PhD students with external funding were associated to the programme.

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 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), Swisspeace and the Swiss Tropical and Public Health Institute (University of Basel) and the Development Study Group (University of Zurich). CDE was established in 2009 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 www.igs-north-south.ch

- Department of Health, Ministry of Public Health, Bangkok, TH
- Ecocenter Pamir, Khorog, Tajikistan, TJ
- ENDA-Third World, Relay for Participatory Urban Development, Dakar, SN
- 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
- Ghana Health Service, Accra, GH
- Heinrich-Böll-Stiftung, Mexico City, MX
- Holistic Understanding for Justified Research and Action (HUUJA), Mingora, PK
- Institute Dayakologi, Kalimantan Barat, ID
- Interooperation, Peshawar, PK
- International Land Coalition, Rome, IT
- 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
- SDC Health, Bern, CH
- 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
- WWF, 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	24
Self-funding from home institution ¹	474 735	547 655	695 885	1 081 742	2 800 017	9
Self-funding from project participants	1 242 453	1 677 818	1 414 680	1 433 742	5 768 693	18
Third-party funding from SDC	3 392 554	4 147 360	4 171 252	4 461 187	16 172 353	49
Total	8 309 742	8 372 833	8 081 817	7 976 671	32 741 063	100

Personnel ²	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							CI	DE	NP	TZ	VN	
Management	6.0 ³	8	53	7	47	11	0	2	0	0	0	2
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	57	25	44	32	56	9	4	4	3	4	2	31
Postdoctoral students	3	0	0	3	100	0	1	0	0	0	0	2
Research associates	26	15	58	11	42	6	0	0	1	0	2	18
Senior researchers ⁴	74	22	30	52	70	23	5	6	3	0	4	34
Other staff	88	48	55	40	45	19	4	3	7	9	6	41
Total	254.00	118	45	145	55	68	14	15	14	13	14	128

Type of output ⁵	Totals
Publications > 517 Peer-reviewed 281 Not peer-reviewed 544 Anthology articles 165 Books 859 Reports	2366
Presentations at congresses >	2886
Cooperations > 35 Programmes 201 Research institutions 4 Private sector 98 Other	338
Transfer activities > 1 Patents 0 Licenses 4 Start-ups ⁶ 98 Prototypes/processes 0 CTI-projects ⁷	103

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

⁵ This table displays the major indicators in knowledge and technology transfer; other data is available as well

(see text on "achievements"). The output data of NCCRs differ considerably according to disciplinary cultures.

⁶ Start-up companies that have been built up or were considerably supported by NCCRs.

⁷ Projects funded by the Commission for Technology and Innovation (CTI) that have been initiated by members of NCCRs and are thematically linked to NCCR projects.

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

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Plant Survival in Natural and Agricultural Ecosystems

NCCR Plant Survival

Home Institution

University of Neuchâtel

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., 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.

Transfer projects (strong Swiss franc package)

Hydrocapsules as Trojan horses for the application of biological control agents against root pests

H: Turlings T.

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: Grant J., Held M.

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.
Bersier Louis-Félix, Prof.
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.

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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

Programmes

- ANGENL
- Arabidopsis Starch Metabolism Network
- COST 858
- Croplife
- DAISY
- GIN
- IGGP
- InvaVol, ESF
- ISCB
- NEOBIOTA
- NIOO-knaw
- PNETOX
- RVVS
- SCOPES
- Sinergia - Benzoxazinoids
- SiTraMaisBT
- SMARTER
- SPSW

Research Institutions

- Abteilung Pflanzenernährung, Leibniz-Institut für Gemüse- und Zierpflanzenbau, Grossbeeren, DE
- Arbeitsgemeinschaft zur Förderung des Futterbaus, c/o Agroscope Reckenholz, Zürich, CH
- 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
- Centre for Organic Agriculture, University of Newcastle, GB
- Centre Interprofessionnel de la Vigne et du Vin, Nîmes, FR
- Campus Puerto Escondido, Universidad del Mar, Oaxaca, MX
- c/o Agroscope Reckenholz, Arbeitsgemeinschaft zur Förderung des Futterbaus, Zürich, CH
- Departement de Ciències Agràries i del Medi Natura, Universitat Jaume I, Castellon, ES
- Departamento de Ingeniería Genética, Center for Research and Advanced Studies of the National Polytechnic Institute, Irapuato, MX
- Department of Animal and Plant Sciences, University of Sheffield, GB
- Department of Biochemistry, Linköping University, SE
- Department of Biology, University of Massachusetts, Boston, US
- Department of Biology, University of Technology of Darmstadt, DE
- Department of Botany, University of British Columbia, Vancouver, CA
- Department of Ecology and Evolution, State University of New York, US
- Department of Horticulture and Landscape Architecture, University of Colorado, US
- Dipartimento Scientifico e Tecnologico, University of Verona, IT
- Diversité et Génomes des Plantes Cultivées, Institut National de la Recherche Agronomique, Montpellier, FR
- 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
- Ecological Systems Laboratory, University of Besançon, FR
- Ecotoxicology, Ecological Sediment and Soil Assessment, München, DE
- Entomology Department, National University of Cordoba, Cordoba, AR

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.

Hörtensteiner Stefan, Dr.
Kessler Felix, Prof.
Kuhlemeier Cris, Prof.
Martinoia Enrico, Prof.
Mauch-Mani Brigitte, Dr.
Müller-Schärer Heinz, Prof.
Neuhaus Jean-Marc, Prof.

Paszkowski Uta, Dr.
Reinhardt Didier, Dr.
Rochaix Jean-David, Prof.
Romeis Jörg, Dr.
Schaffner Urs, Dr.
Steinger Thomas, Dr.
Turlings Ted, Prof.
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Wolfender Jean-Luc, Prof.

Zeeman Samuel C., Prof.

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Pflanzenbiologisches Institut, Universität Bern
Labor für Molekulare Pflanzenphysiologie, Universität Zürich
Institut de Biologie, Université de Neuchâtel
Département de Biologie, Université de Fribourg
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Dép. de Biologie Moléculaire Végétale, Université de Lausanne
Département de Biologie et Zoologie, Université de Fribourg
Département de Biologie Moléculaire, Université de Genève
Agroscope ART Reckenholz, Zürich
CABI Bioscience Swiss Centre, Delémont
Agroscope ACW, Changins Nyon
Institut de Biologie, Université de Neuchâtel
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Institut für Pflanzenwissenschaften, ETH-Zentrum, Zürich

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Plant Survival in Natural and Agricultural Ecosystems

NCCR Plant Survival

- Entomology Department, Commonwealth Scientific and Industrial Research Organisation, Wembley, AU
- Entomology, International Maize and Wheat Improvement Center, Mexico, MO
- Evolution et Systématique Laboratoire ES, University of Paris Sud, Orsay, FR
- Facultad de Agronomía, Universidad Mayor de San Andrés, La Paz, BO
- Fisiologia Vegetal, Universitat Jaume, Castillon, ES
- Genetics Research Unit, United States Department of Agriculture, Geneva, US
- Institut de Biologie Physico-chimique, Centre national de la recherche scientifique, Paris, FR
- Institut de Chimie Moléculaire, Université de Bourgogne, Dijon, FR
- Institut de Recerca i Tecnologia, Centre Universidad de Lleida, ES
- Institut für Biowissenschaften, Universität Würzburg, DE
- Institut für Umweltforschung, Rheinisch-Westfälische Technische Hochschule, Aachen, DE
- Institute for Wetland and Water Research, Radboud University Nijmegen, NL
- Institute of Biochemistry and Biology, University of Potsdam, DE
- Institute of Biology, University of Tromsø, NO
- Institute of Botany, Slovak Academy of Sciences, Bratislava, SK
- Institute of Molecular Biology, Academia Sinica, Taipei, TW
- Institute of Plant Protection, Chinese Academy of Agricultural Sciences, Beijing, CN
- Istituto di Ingegneria Biomedica del CNR, Università di Padova, IT
- Laboratorio Ecotono, National University of Comahue, Bariloche, AR
- Laboratory for Electron Microscopy, University of Chicago, US
- Legume Gene Technology Research, Commonwealth Scientific and Industrial Research Organisation, Canberra, AU
- Lehrstuhl für Biologie, Technische Universität Kaiserslautern, DE
- Lehrstuhl für Pharmazeutische Biologie, Universität Würzburg, DE
- Lethbridge Research Center, Agriculture and Agrifood Canada, CA
- Molekulare Biotechnologie, University of Bonn, DE
- Molekulare Physiologie, Max-Planck Institute of Molecular Plant Physiology, Golm, DE
- Mycorrhiza, Institute of Botany, Pruhonic, CZ
- National Research Laboratory of Plant Functional Genomics, Pohang University of Science and Technology, KP
- Physical Oceanography Research Division, Scripps Institution of Oceanography, San Diego, US
- Physical Oceanography Research Division, University of Davis, California, US
- Plant Energy Biology Institute, University of Western Australia, Perth, AU
- Research Unit Mt Albert, HortResearch, Auckland, NZ

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. In 2012, two research teams were honoured by publications in *Nature* and *Science*. The first one is the group led by Enrico Marinoia, Professor of plant physiology at the University of Zurich. Their discovery deals with mycorrhiza, a symbiosis between plants and soil fungi, which increases the plants' access to water and nutrients.

The second topic refers to a research carried out by the group of Antoine Guisan at the University of Lausanne in collaboration with researchers from the ETH Zurich and from the University of Hawaii (USA). With the analysis of fifty invasive plant species introduced worldwide, this study confirms that it is possible, for the most part, to predict the regions of potential invasion based on the principle of climatic niche conservation. "This study offers the strongest empirical evidence to date that climate is a determining factor in the geographic distribution of invasive plants", states Antoine Guisan.

In the same field, the European research organisation COST has given in Summer 2012 the green light to a large project aimed at controlling ambrosia – one of the most notorious invasive plants. With the support of NCCR Plant Survival and under the direction of Professor Heinz Müller-Schärer, a coordinated action against this weed will be carried out in collaboration with Urs Schaffner at CABI Delémont. Entitled SMARTER (Sustainable management of Ambrosia

artemisiifolia in Europe), this COST action will integrate new control strategies, such as biological pest control and promoting strongly competitive plants.

It is also worth mentioning the work of Brigitte Mauch-Mani and her team the University of Neuchâtel published in the journal *Plant Physiology*. This study highlighted an epigenetic phenomenon of heritable disease resistance. The researchers have shown for the first time that stimulating a plant's natural defences also increases the capacity for disease resistance in its offspring. The substances used for stimulating the defences are harmless to the environment and easy to apply.

Technology transfer

The technology transfer activities linked to the NCCR aim at consolidating what has been achieved by the partners in the previous two phases, at continuing to raise awareness of the NCCR partners to intellectual property issues and at ensuring better exploitation of current projects. Particular emphasis is put on exploiting the results and the intellectual property 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. Coordination with technology transfer offices of the partner institutions is encouraged.

Public relations

More than 136 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 in 2011. We note very regular quota-

tions of our research activities along the year. We got a worldwide success with the story about the identification of genes controlling the accumulation of arsenic in plants. This success is explained by the great concern that raises the pollution of drinking water by arsenic in developing countries, and by the fact that this research is the result of an international collaboration from South Korea, USA and Switzerland. In addition, we noticed 7 invitations of NCCR Plant Survival members by the media as experts in their research field. These kinds of interventions contribute to the fame of our research network.

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 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 is supported through courses and workshops, while different programmes and a nursery grants family life and career balance for all NCCR scientists.

Further information see www.unine.ch/nccr/

Statistical Input – Output Data

Funding source (CHF)	Year 9	Year 10	Year 11	Year 12	Total	%
SNSF funding ¹	2 265 000	2 215 000	1 600 000	800 000	6 880 000	33
Self-funding from home institution ²	589 621	1 191 778	773 849	428 883	2 984 131	15
Self-funding from project participants	2 656 038	3 192 670	3 163 895	0	9 012 603	44
Third-party funding ³	17 812	1 388 824	296 000	0	1 702 636	8
Total	5 528 471	7 988 272	5 833 744	1 228 883	20 579 370	100

Personnel ⁴	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	FR	NL	GB	IT	
Management	5.0 ⁵	9	56	7	44	10	2	1	1	0	0	2
Master students	1	0	0	1	100	1	0	0	0	0	0	0
Doctoral students	20	10	50	10	50	9	3	3	0	0	1	4
Postdoctoral students	15	4	27	11	73	5	2	2	0	0	1	5
Research associates	7	2	29	5	71	1	1	1	1	0	2	1
Senior researchers ⁶	44	6	18	27	82	17	7	0	3	3	0	3
Other staff	5	2	40	3	60	5	0	0	0	0	0	0
Total	97.00	33	34	64	66	48	15	7	5	3	4	15

Type of output ⁷	Totals
Publications > 864 Peer-reviewed 126 Not peer-reviewed 2 Anthology articles 40 Books 0 Reports	1032
Presentations at congresses >	1455
Cooperations > 45 Programmes 196 Research institutions 41 Private sector 30 Other	312
Transfer activities > 10 Patents 1 Licenses 0 Start-ups ⁸ 59 Prototypes/processes 4 CTI-projects ⁹	74

¹ Included funding of economic stimulus package and transfer projects (strong Swiss franc package)

² Personnel costs, equipment and consumables, not included infrastructure and basic equipment

³ Not included is CTI funding. Since the start of the NCCR 4 projects have been funded by CTI at a total amount of 5.1 million CHF (cf. third table).

⁴ Persons involved in the NCCR in the last reporting period (12 months)

⁵ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁶ Including leaders of the individual projects and other organisational units of the NCCR

⁷ This table displays the major indicators in knowledge and technology transfer; other data is available as well (see text on "achievements"). The output data of NCCRs differ considerably according to disciplinary cultures.

⁸ Start-up companies that have been built up or were considerably supported by NCCRs.

⁹ Projects funded by the Commission for Technology and Innovation (CTI) that have been initiated by members of NCCRs and are thematically linked to NCCR projects.

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

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- Umweltforschungszentrum Leipzig-Halle GmbH, DE
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- 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
- BASF Chemical Company, Ludwigshafen, DE
- Bio-Protection & Development on Vineyards, Bettendorf, LU
- BIOREBA AG, Reinach, CH
- Burri Agricida, Ligerz, CH
- Carlsberg Research Center, Copenhagen, DK
- Cosmotec SA, Collombey-Le-Grand, CH
- Delley Semences et Plantes SA, Delley, CH
- Diethelm Keller Siber Hegner DKSH Ltd Switzerland, Zurich, CH
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- 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
- Norddeutsche Euro Grass Breeding GmbH & Co. KG, Asendorf, DE
- Norddeutsche Pflanzenzucht Hans-Georg Lembke KIG, Holtsee, DE
- Omya AG Agro, Oftringen, CH
- Smart Nose Ltd., Marin, CH
- Suterra LLC, Bend, US
- Xirrus, Zürich, CH

Others

- Amt für Landwirtschaft, Landschafts- und Bodenkultur Offenburg, Offenburg, DE
- Center for Applied Biosciences, Delémont, CH
- CimArk SA, Sion, CH
- Consortium Biodiversity Exploratories, Potsdam, DE
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- Edmund Mach Foundation, San Michele all'Adige, IT
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- RACINES, Geneva, CH

Climate Variability, Predictability and Climate Risks

NCCR Climate

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April 1, 2001

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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: Grosjean M.
Brönnimann S., Schwikowski M.

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.
Knutti R.

Work Package Ecosystem Impacts and Adaptation

Leader: J. Fuhrer

PLANT/SOIL-3 Drought ef- fects 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., Dumondel M.

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

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

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.

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

H: Stephan G.
Turton H.

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

H: Thalmann Ph.

Integrated Projects and Fast Track Studies

CLER Climate Lessons from radiocarbon data

H: Joos F.

SOLAR Solar Forcing and Climate Change of the last 1000 years

H: Beer J.

Programmes

Yearly Summer School

H: Grosjean M.

PhD student meetings

H: Riffler M.

Workshops co-organized with ProClim

H: Grosjean M.

Third Party Cooperation

Programmes

- ACQWA (FP7)
- AGWAM
- ALARM (FP6)
- AMIP II
- AustroClim
- CarboEurope-IP (FP6)
- CARBOCEAN IP (FP6)
- CARMA
- CIRCE (FP6)
- ClimPol
- COSMO-LEPS
- COST 725
- COST 733
- DILPA
- ECOCHANGE (FP6)
- ECSN
- ENSEMBLES (FP6)
- ERA-CLIM
- ERMITAGE
- EURO-AGRIWAT (COST ES1106)
- FasMeF
- FUPSOL
- GEOMON (FP6)
- GrassGas
- IGBP - PAGES
- Lignin Turnover
- MAIOLICA
- MedCLIVAR
- NDACC
- NICOLA
- SoilGas
- VALUE (COST ES1102)
- 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 Global Environmental Research, National Institute for Environmental Studies, Tsukuba, JP
- 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
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Topics

Comprehensive insight and sound understanding of 1) natural climate variability, modelling and highresolution 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 is a research network of institutions within Switzerland and collabo-

rates 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).

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Brönnimann Stefan, Prof.
Buchmann Nina, Prof.
Bugmann Harald, Prof.
Calanca Pierluigi, Dr.
Cottier Thomas, Prof.
Dumondel Michel, Dr.
Feller Urs, Prof.
Frank David, Dr.
Fuhrer Jürg, Prof.
Grosjean Martin, Prof.
Joos Fortunat, Prof.
Knutti Reto, Prof.
Körner Christian, Prof.
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Waldökologie, ETH Zürich
ART, Reckenholz
World Trade Institute, Universität Bern
Institute for Environmental Decisions, ETH Zurich
Institut für Pflanzenwissenschaften, Universität Bern
WSL, Birmensdorf
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Institut für Atmosphäre und Klima, ETH Zürich
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- Ecosystem Modelling and Biodiversity Studies Group, Lund University, SE
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- Energy and Climate Change, Centre for European Policy Studies, Brussels, BE
- 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
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- 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 für Energiewirtschaft und Rationelle Energieanwendung, Universität Stuttgart, DE
- Institut für Umweltphysik, Universität Heidelberg, DE
- Institut National sur la Recherche Agronomique, Clermont-Ferrand, FR
- Institute of Geography, Justus-Liebig-University 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 Meteorology and Geophysics, University of Vienna, Vienna, AT
- 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 tempe-

rate 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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- Laboratory of Tree-Ring Research, University of Arizona, Tucson, US
- Massachusetts Institute of Technology, Cambridge, US
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- Max Planck Institute for Meteorology, Hamburg, DE
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- Natural Resource Ecology Laboratory, Colorado State University, Fort Collins, US
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- Systems Analysis Group, Research Institute of Innovative Technology for the Earth, Kyoto, JP
- U.S. Arid-Land Agricultural Research Center, Maricopa, US

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	24
Self-funding from home institution ¹	345 821	329 677	329 324	329 499	1 334 321	6
Self-funding from project participants	5 328 392	4 498 873	4 247 579	1 046 672	15 121 516	65
Third-party funding	599 988	100 074	218 044	365 500	1 283 606	6
Total	8 074 201	6 628 624	6 394 947	2 141 671	23 239 443	100

Personnel ²	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	FR	AT	CA	IT	
Management	1.8 ³	2	29	5	71	6	1	0	0	0	0	0
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	37	22	59	15	41	21	10	1	0	1	2	3
Postdoctoral students	27	6	22	21	78	12	6	1	2	1	1	5
Research associates	7	5	71	2	29	4	2	0	0	1	0	0
Senior researchers ⁴	42	6	14	36	86	26	9	3	2	0	0	3
Other staff	11	8	80	2	20	8	2	0	0	0	0	0
Total	125.80	49	38	81	62	77	30	5	4	3	3	11

Type of output ⁵	Totals
Publications > 792 Peer-reviewed 250 Not peer-reviewed 0 Anthology articles 160 Books 127 Reports	1329
Presentations at congresses >	2120
Cooperations > 100 Programmes 131 Research institutions 11 Private sector 41 Other	283
Transfer activities > 0 Patents 0 Licenses 0 Start-ups ⁶ 7 Prototypes/processes 0 CTI-projects ⁷	7

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

⁵ This table displays the major indicators in knowledge and technology transfer; other data is available as well (see text on "achievements"). The output data of NCCRs differ considerably according to disciplinary cultures.

⁶ Start-up companies that have been built up or were considerably supported by NCCRs.

⁷ Projects funded by the Commission for Technology and Innovation (CTI) that have been initiated by members of NCCRs and are thematically linked to NCCR projects.

Economy / Industry

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

Others

- Beratendes Organ für Fragen der Klimaänderung (OcCC), Bern, CH
- Bundesamt für Energie, Bern, CH
- Bundesamt für Landes-topographie, Wabern, CH
- Bundesamt für Umwelt, Bern, CH
- Bundesamt für Wasser und Geologie, Bern, CH
- Commissariat à l'Énergie Atomique, Toulouse, FR
- Dendrolabor Wallis, Brig, CH
- Eidgenössisches Departement für auswärtige Angelegenheiten, Bern, CH
- European Organisation for the Exploitation of Meteorological Satellites, Darmstadt, DE
- German Advisory Council on Global Change, Berlin, DE
- Institut Français des Relations Internationales, Paris, FR
- Intergovernmental Panel on Climate Change, Geneva, CH
- International Atomic Energy Agency, Wien, AT
- MeteoFrance, Toulouse, FR
- MeteoSwiss, Zürich, CH
- Met Office Hadley Centre, Exeter, GB
- National Development and Reform Commission, Beijing, China
- Past Global Changes of IGBP, Bern, CH
- ProClim Forum for Climate, Bern, CH
- Schweizerischer Erdbebendienst, Zürich, CH
- Wissenschaftlicher Beirat der Bundesregierung Globale Umweltveränderungen (WBGU), Berlin, DE
- World Energy Council, London, GB
- World Trade Organisation, Geneva, CH

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Hartmann Dennis, Prof.
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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:
Aebi Ph., Bernhard Ch.,
Giamarchi T., Morenzoni E.,
Morpurgo A., Niedermayer Ch.,
Paruch P., Triscone J.-M.,
Willmott Ph.

Materials for future electronics

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

Electronic materials for energy systems and other applications

Head: Fischer Ø.
Participating members:
Abplanalp M., Aebi Ph., Cors J.,
Decroux M., Eckert D.,
Fischer Ø., Flükiger R., Hulliger J.,
Kenzelmann M., Patzke G.,
Renner Ch., de Rooij N.,
Senatore C., 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.,
Georges A., Giamarchi T.,
Giannini E., Karpinski J.,
Keller H., Mesot J. Rice T.M.,
Sigrist M., van der Marel D.

Forum Members (full members, participating to the research projects)

Abplanalp Markus, Dr.
Aebi Philipp, Prof.
Baeriswyl Dionys, Prof.
Batlogg Bertram, Prof.
Baumberger Felix, Prof.

Bernhard Christian, Prof.
Blatter Johann W., Prof.
Büttiker Markus, Prof.
Cerny Radovan, Prof.
Decroux Michel, Prof.
Degiorgi Leonardo, Prof.
De Rooij Nico, Prof.
Eckert Daniel, Dr.
Esslinger Tilman, Prof.
Fiebig Manfred, Prof.
Fischer Øystein, Prof.
Flükiger René, Prof.
Forró László, Prof.

Georges Antoine, Prof.
Giamarchi Thierry, Prof.

Novel electronic phases in strongly correlated electron systems

Head: Sigrist M.
Participating members:
Baeriswyl D., Blatter G.,
Forró L., 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., Kenzelmann M.,
Kollath C., Mesot J., Mila F.,
Morenzoni E., Ott H.-R., Rønnow H. M., Rüegg C., Staub U.,
Troyer M., Zheludev A.

Electronic materials with reduced dimensionality

Head: Forró L.
Participating members:
Aebi Ph., Degiorgi L., Forró L.,
Giamarchi T., Grioni M.,
Renner C.

Cold atomic gases as novel quantum simulators for condensed matter

Head: Giamarchi T.
Participating members:
Blatter G., Esslinger T.,
Giamarchi T., Gritsev V.,
Kollath C., Mila F., Troyer M.

Transfer projects (strong Swiss franc package)

Epitaxial Piezoelectric MEMS Energy Harvester in a Watch System - WATCHERGY

H: Briand D.

Surface treatments and thin films for micromachining electrodes

H: Cors J.

Novel nanocomposite materials with low ecological impact for highcurrent contact applications

H: Giannini E.

Neutron focusing within sample environment

H: Kenzelmann M.

Development of YBa₂Cu₃O_{7-x} superconducting test coils: the path towards all-superconducting magnets above 23.5 T

H: Senatore C.

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 mate-

rials 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 sensi-

tive 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

- 2007: The SupraFête 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
- 2009: Participation in the events of UniGE's 450th anniversary
- Telecom World 2009:
- Artistic performances by the company Exos using superconducting levitation (2009, 2010, 2011)
- 2011: SUPRA100 exhibition and documentary around a novel sculpture by Etienne Krähenbühl at UniMail, Geneva
- 2011: SUPRAQUOI to celebrate 100 year of the discovery of superconductivity
- 2013: SUPRA100 exhibition and documentary at the Muséum d'Histoire Naturelle, Neuchâtel
- MaNEP brochures: general presentation & KTT
- Electronic Newsletter
- Website: regular updates and improvements

Third Party Cooperation

Programme

- CMA (FP6-NMP)
- EuCARD
- ISJRP
- NES (ESF)
- PNANO-ANR
- Sinergia research grant - advanced thermoelectric oxide materials for high temperature applications
- SSSTC

Research Institutions

- Centre de Recherches sur Très Basses Températures, Grenoble, FR
- Centre for Nanotechnology, University College London, GB
- Centro Atomico Bariloche, Bariloche, AR
- Chimie du Solide et Inorganique Moléculaire, Univ. de Rennes, FR
- CSIC, Institut de Ciència de Materials de Barcelona, Bellaterra, ES
- Condensed Matter Physics and Materials Sciences Department, Brookhaven National Laboratory, New York, US

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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 absent or less expressed in 3D materials, such as spin-charge sepa-

ration 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 Zuoq, MaNEP organized two successful summer schools (2004, 2006) and three winter schools (2009, 2011, 2013) 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 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 2011, the centennial of the discovery of superconductivity has been celebrated. MaNEP has launched a large programme of collaboration with different partners such as UniGE and the Physiscope, PSI, SPS, CERN, or EuroPhysicsFun. In April, in Geneva, MaNEP, UniGE and the Physiscope have organised daily one hour shows on superconductivity for the general public welcoming 500 visitors. In autumn, the exhibition SUPRA100 about superconductivity presenting an artwork by the artist Etienne Krähenbühl, was shown at UniMail in Geneva, as well as an artistic performance by the company Exos, a family day with experiments, demonstrations, laboratory visits, shows, which welcomed more than 1200 visitors, and a grand conference for the general public by Prof. Koichi Kitazawa. Superconductivity was also one theme of those presented at the PSI Open Doors in October. In 2013, the exhibition SUPRA100 takes place from 19 January to 20 May at the Muséum d'Histoire Naturelle in Neuchâtel.

Further information see
www.manep.ch

Statistical Input – Output Data

Funding source (CHF)	Year 9	Year 10	Year 11	Year 12	Total	%
SNSF funding ¹	4 615 000	3 615 000	2 500 000	2 235 000	12 965 000	15
Self-funding from home institution ²	2 883 030	3 245 903	3 064 344	5 889 072	15 082 349	18
Self-funding from project participants	15 151 828	15 599 834	13 806 309	8 870 550	53 428 521	62
Third-party funding ³	1 198 607	2 104 952	298 450	1 058 205	4 660 214	5
Total	23 848 465	24 565 689	19 669 103	18 052 827	86 136 084	100

Personnel ⁴	Total of Persons	Female	%		CH	Most Represented Nations					Other Nations	
			Male			DE	FR	IT	CN	RU		
Management	10.3 ⁵	5	24	16	76	18	0	1	1	0	0	3
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	99	25	25	74	75	31	21	4	6	7	2	30
Postdoctoral students	69	9	13	60	87	5	10	13	10	4	2	28
Research associates	1	0	0	1	100	0	0	0	0	0	0	1
Senior researchers ⁶	104	7	7	97	93	42	13	8	8	0	7	28
Other staff	36	7	19	29	81	29	1	3	1	0	0	5
Total	319.30	53	16	277	84	125	45	29	26	11	11	95

Type of output ⁷	Totals
Publications > 2465 Peer-reviewed 206 Not peer-reviewed 73 Anthology articles 23 Books 24 Reports	2791
Presentations at congresses >	3658
Cooperations > 33 Programmes 241 Research institutions 32 Private sector 1 Other	307
Transfer activities > 31 Patents 1 Licenses 1 Start-ups ⁸ 53 Prototypes/processes 7 CTI-projects ⁹	93

¹ Included funding of economic stimulus package and transfer projects (strong Swiss franc package)

² Personnel costs, equipment and consumables, not included infrastructure and basic equipment

³ Not included is CTI funding. Since the start of the NCCR 7 projects have been funded by CTI at a total amount of 5.4 million CHF (cf. third table).

⁴ Persons involved in the NCCR in the last reporting period (12 months)

⁵ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁶ Including leaders of the individual projects and other organisational units of the NCCR

⁷ This table displays the major indicators in knowledge and technology transfer; other data is available as well (see text on "achievements"). The output data of NCCRs differ considerably according to disciplinary cultures.

⁸ Start-up companies that have been built up or were considerably supported by NCCRs.

⁹ Projects funded by the Commission for Technology and Innovation (CTI) that have been initiated by members of NCCRs and are thematically linked to NCCR projects.

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- University of Genoa, Genoa, IT

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- Asulab The Swatch Group R&D Ltd., Marin, CH
- Boost Consulting Inc., Somerville, US
- Bruker Optics GmbH, Fällanden, CH
- IBM Research Laboratory GmbH, Rüschlikon, CH
- Kugler Bimetal SA, Geneva, CH
- Manufacture d'Outils Dumont SA, Montignez, CH
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- Omicron Nanotechnology, Taunusstein, US
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- Winterthur Instruments GmbH, Winterthur, 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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Bio-Synthetic Cellular Nanomachines

H: R.Y.H. Lim

Nanocrystals

H: P. Pantazis

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

Spins in self-assembled quantum dots

H: R. Warburton

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

Two-dimensional electronic materials

H: A. Kis

Controlling Spins in Adsorbed Molecules by a Chemical Switch

H: T.A. Jung

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-Ruthishauser

Module Nanotechnology and Applications

H: J. Gobrecht, U. Piesles

Module Supplementary Research Activities

Head: C. Schönenberger

Nanosafety

H: B. Rothen

Transfer projects (strong Swiss franc package)

Biomimetic membranes designed from supported amphiphilic block copolymers and aquaporins as new materials for environmental applications
H: Glaied O.

Remineralisation of carious lesions by self assembled peptide supramolecular networks and Hydroxyapatite nanocrystals

H: Piesles U.

BioPrint - Reinforced biomimetic 3D composite bone scaffolds by rapid rototyped nanoporous ceramic powder and electrospun collagen nanofibrils
H: Schumacher R.

Platforms

Industrial Applications

H: J. Gobrecht, P. Reimann

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- NanoBio-RAISE
- Pico-Inside

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- 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
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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 car-

ried 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 de-vices 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.

Heads of Individual Research Projects and Subprojects

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Ensslin Klaus, Prof.
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- Nano Ethics Network, University of Aarhus, DK

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

NCCR Nanoscale Science

Achievements of the previous years

Transition of the NCCR to a sustainable doctorate school

In parallel with the termination activities of the NCCR Nano in May 2013, the structure of research funding started its transition from the module based mid-term scheme to a long term funding scheme by means of a doctorate school at the University of Basel. This transition guarantees the sustainable preservation of the achieved research competences and the continuity of the research networks that have arisen during the NCCR. The realization of a first PhD workshop on career complemented the preparation to the upcoming transition.

ERC grants

Christian Schönenberger, director of the NCCR Nano received an ERC grant for his research on entangled electrons. After Dominik Zumbühl and Edwin Constable, he is already the third NCCR member to receive one of the prestigious ERC research grants.

Scientific Highlights

Making use of scanning probe technology, researchers of the NCCR Nano could identify a specific fingerprint for breast cancer. These fingerprints are responsible for the formation of metastases and finally for the deadly consequences of a tumor. The understanding of the underlying basic processes will be of important use for

the future development of cancer therapies.

Researchers of the NCCR Nano have synthesized nanometer sized containers that can be to treat arteriosclerotic blood vessels. The lens shaped containers are able to transport active pharmaceutical ingredients to the blood vessels affected of a stenosis. The pharmaceutical ingredients are specifically released at the site of the stenosis. This technique allows avoiding side effects.

Atoms at step edges are chemically more reactive than bulk atoms. Physicists of the NCCR Nano in collaboration with scientists from Finland could investigate the chemical forces of these step edge atoms and were able to move individual atoms by means of scanning probe methods.

In quantum mechanical systems, two particles may be in entangled states. This entanglement is of importance for quantum information processing. A team of the NCCR Nano presented the first source for entangled particles with a reasonable high efficiency. This source, based on the combination of a superconductor and separated quantum dots might be essential for the implementation of future quantum mechanical experiments.

A research team of the NCCR Nano has presented the coolest fridge for nanostructures that has ever

been built. Very low temperatures are of importance in the research of basic processes in nature. The researchers could show that important effects are present at these temperatures. These effects change the behavior of nanostructures qualitatively. Recently, researchers could proof that the Koringa law doesn't hold at temperatures below 0.1 Kelvin. This finding could be a further milestone in the realization of a quantum computer.

Collaboration with industry

During 2012 we could foster partnerships with representatives of small and middle sized companies in the region of north-western Switzerland. The Argovia research program attracts increasingly more companies to start projects in strong collaboration with academia.

Rise of interest for outreach activities

We were active in the communication and broadcast of nanoscience. More than 2000 visitors and spectators joined our public events on nanoscience, nanomedicine and science & innovation in general. Beside the visit of school classes and associations, our presence at science fairs like TuN Basel, Science Days Rust and the Techdays organized by the SATW, reached a broad public audience.

Further information see www.nanoscience.ch

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Statistical Input – Output Data

Funding source (CHF)	Year 9	Year 10	Year 11	Year 12	Total	%
SNSF funding ¹	4 705 000	3 285 000	1 700 000	2 398 000	12 088 000	28
Self-funding from home institution ²	1 628 008	1 529 610	1 043 618	1 234 400	5 435 636	12
Self-funding from project participants	7 083 709	4 438 715	2 901 152	5 045 000	19 468 576	45
Third-party funding ³	1 661 526	1 929 214	1 929 414	1 164 800	6 684 954	15
Total	15 078 243	11 182 539	7 574 184	9 842 200	43 677 166	100

Personnel ⁴	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	FR	IT	US	CN	
Management	6.3 ⁵	15	43	20	57	31	4	0	0	0	0	0
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	54	13	24	41	76	20	16	1	2	1	0	15
Postdoctoral students	20	3	15	17	85	1	4	2	1	1	2	10
Research associates	3	1	33	2	67	1	1	0	1	0	0	0
Senior researchers ⁶	54	7	13	47	87	20	17	4	1	4	1	11
Other staff	16	3	19	13	81	16	0	0	1	0	0	0
Total	153.30	42	23	140	77	89	42	7	6	6	3	36

Type of output ⁷	Totals
Publications > 1639 Peer-reviewed 73 Not peer-reviewed 44 Anthology articles 72 Books 25 Reports	1853
Presentations at congresses >	3422
Cooperations > 4 Programmes 268 Research institutions 39 Private sector 4 Other	315
Transfer activities > 30 Patents 2 Licenses 8 Start-ups ⁸ 11 Prototypes/processes 10 CTI-projects ⁹	61

¹ Included funding of economic stimulus package and transfer projects (strong Swiss franc package)

² Personnel costs, equipment and consumables, not included infrastructure and basic equipment

³ Not included is CTI funding. Since the start of the NCCR 10 projects have been funded by CTI at a total amount of 8.0 million CHF (cf. third table).

⁴ Persons involved in the NCCR in the last reporting period (12 months)

⁵ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁶ Including leaders of the individual projects and other organisational units of the NCCR

⁷ This table displays the major indicators in knowledge and technology transfer; other data is available as well (see text on "achievements"). The output data of NCCRs differ considerably according to disciplinary cultures.

⁸ Start-up companies that have been built up or were considerably supported by NCCRs.

⁹ Projects funded by the Commission for Technology and Innovation (CTI) that have been initiated by members of NCCRs and are thematically linked to NCCR projects.

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- Technische Universität Kaiserslautern, DE
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- Polish Academy of Science, Warsaw, PL
- Quantum Optics Theory Group, University of Innsbruck, AT
- School of Chemistry, University of Sydney, AU
- School of Mechanical Systems Engineering, Chonnam National University, Gwangju, KR
- Science and engineering school, Jacobs University, Bremen, DE
- Science et Analyse des Matériaux (SAM), Centre de Recherche Public Gabriel Lippmann, Belvaux, LU
- Scuola Normale Superiore, Pisa, IT
- Simulation group, Cambridge University, GB
- Sony Materials Science Laboratories, Stuttgart, DE
- Structural Studies Division, MRC Laboratory of Molecular Biology, Cambridge, US
- Surfaces and Thin Films, University of Groningen, NL
- Surface Science Research Centre, University of Liverpool, GB
- T. J. Watson Research Center, IBM Research Lab, Yorktown Heights, US
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- IBM Zürich Research Laboratory, Rüschlikon, CH
- Nanonis GmbH, Zürich, CH
- Nanosurf AG, Liestal, CH
- Nanoworld AG, Neuchâtel, CH
- Novartis Institutes for BioMedical Research (NIBR), Cambridge, US
- NTT Basic Research Laboratories, Atsugi-shi, JP
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Quantum Photonics

NCCR Quantum Photonics

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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.

Transfer projects (strong Swiss franc package)

High Volume Production of Single Frequency Mid-Infrared Sources

H: Faist J.

TURQUOISE

H: Grandjean N.

Acoustocomb - Acousto-optics based optical frequency comb stabilization

H: Lecomte St.

Technology Platforms, Programmes etc.

Science Bus

Moser F.

Industrial Project and 7P Programs

Schläppy M.-L.

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

Rosencher Emmanuel, Prof. (President)

De Silvestri Sandro, Prof.

Erman Marko, Dr.

Heffernan Jon, Dr.

Kröll Stefan, Prof.

Riechert Henning, Prof.

Skolnick Maurice, Prof.

Weisbuch Claude, Prof.

ONERA, Université Paris-Sud, FR

Politecnico di Milano, Italy

Thales Communication, Orsay, FR

Sharp Laboratories, Oxford, UK

Lund Institute of Technology, Sweden

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. 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. Scientists at the NCCR Quantum Photonics conduct funda-

mental research and develop novel technologies that carry the potential for numerous future applications: quantum Cryptography guaranteeing transaction security, quantum Cascade Lasers will take part in NASA's Mars Exploration Program to study the red planet habitability and assess whether Mars or is an environment able to support microbial life. For the third phase 2009-2013 the NCCR QP the International Advisory board opted for 10 Pro-

jects 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

Programmes

- CLERMONT4
- COST P21
- COST288
- EPIXNET
- EU CA-QUROPE
- EU-ANSWER
- IST-VISTA
- NanoTera
- NITWAVE
- OFSESA
- Q-CERT
- QON
- STIMSCAT
- STREP-Simphonia
- Teramobile
- ULTRAGAN
- University of Cologne, Germany, SFB 956

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, Aarhus University, DK
- Department of Physics and Astronomy, Cardiff University, GB
- Department of Physics and Astronomy, University of Calgary, CA
- Department of Physics and Astronomy, University of Rochester, US
- Department of Physics, Harvard University, Cambridge, GB
- Department of Physics, Università di Trento, IT
- Department of Physics, University of Torino, IT
- Department of Physics, Max-Planck-Institut für Quantenoptik, Garching, DE
- Department of Optoelectronics and Instrumentation Group, PC University de Rio, Rio de Janeiro, BR
- Dipartimento Fisica della Materia e Tecnologie Fische Avanzate, University of Messina, IT
- Dipartimento di Fisica A. Volta, University of Pavia, IT

Achievements of the previous years

Research results

The NCCR quantum photonics (NCCR QP) has, over its 11 years of existence, been instrumental in strengthening the quality of research in photonics in Switzerland. The NCCR QP is now in its last year of operation, with scientific activities finishing at the end of June 2013. The quality of the research over the course of the NCCR has been demonstrated through several key performance indicators. The NCCR QP has seen 5 new full professors, 4 new assistant professors and 2 promotions of junior group leaders. Six junior group leaders have been supported within the NCCR QP over the years. The 180 doctoral students and 120 post-doctoral fellows published more than 1000 publications in peer-reviewed journals along with the 98 senior researchers and the 44 group/project leaders. In the last phase of the NCCR QP (2009-2013) 449 scientific presentations were made at conferences and fairs and 4 books were written. Five European Council Grants have been awarded to NCCR QP project leaders. To celebrate such outstanding results NCCR QP management organised a conference in June 2012 "Photonics without frontiers" (<http://nccr-qp.epfl.ch/page-79814-en.html>), where more than 300 people attended, attracted by the presentations of 3 Nobel Prize Winners and other renowned researchers. The highlights of the NCCR QP research can be viewed at nccr-qp@epfl.ch.

Technology transfer

The industrial Program of the NCCR QP has had resounding success bridging the gap between fundamental research and the industry. NCCR QP scientists have created 5 start-ups which are still in operation today: Alpes laser, ID Quantique, Beamexpress, Attolight, and Novagan. During the second phase of the NCCR QP the 7P program was created with the goal to increase the chances of NCCR QP postdoctoral fellows to gain employment in the Swiss photonic industry by funding their salaries for one year in the industry. The NCCR QP had, over the 3 project phases, 21 joint projects and 20 projects involving technology transfer with various companies.

Education & training / Advancement of women

The training of PhD students has been of importance in the NCCR QP and was achieved through different means, one of which was the photonics doctoral program at the EPFL. Other instruments for networking such as the tandem partner program where students were paired-up and exchanged their scientific experience over two weeks in each other's laboratory have been very well received and successful.

Collaboration with the EPFL's equal opportunity office and the NCCR MICS resulted in many initiatives to promote women in science and encourage young people towards science ca-

reers. Yearly «girls only» programs are run at the EPFL with the goal of introducing girls to scientific disciplines, increase their confidence and faith in their own abilities and breaking gender stereotypes. The evaluation of these programs is very positive and many young people are repeat participants. The activities are fully booked a year before they take place and have received praise from the press, the parents and the children alike. The Polytèque has been created in order for young people to have access to scientific media. The science bus has been touring the French-speaking Switzerland for months in Vaud, Neuchâtel, Valais and Jura with 2500 children partaking in scientific activities.

Women advancement has been fostered through mentoring and career planning programs, meetings with role models, some of which Nobel Prize Winners, practical information such as child care strategies, funding, associations and mentorships. Courses to improve specific desirable skills and opportunities for networking have been organized. Within the NCCR QP 29 % of PhD students were females, 40 % of postdoctoral fellows and 10 % of group leaders.

Overall, the NCCR funding instrument has been of tremendous benefit to the field of photonics in Switzerland.

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

- Engineering School, University of Alcalá-Madrid, Alcalá de Henares, ES
- Foundation for Fundamental Research on Matter (FOM), Amsterdam, NL
- Fraunhofer IAF Freiburg, DE
- 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'Étude des Microstructures, l'Office National d'Études et Recherches Aéronautiques, Chatillon, FR
- Laboratoire Kastler-Brossel, Ecole Normale Supérieure, Paris, 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
- Avalon, Zurich, CH
- Beamexpress, Lausanne, CH
- CSEM, Neuchâtel, CH
- Dätwyler/Silitec, Boudry, CH
- Daylight Solutions, Poway, US
- Delong Instruments a.s., Brno, CZ
- Exalos AG, Schlieren, CH
- EXFO Inc., Ontario, CA
- Id Quantique SA, Geneva, CH
- Laboratoire Optique Electronique Appliquée (OPEA), Vincennes, FR
- Lasag Inc, Thun, CH
- Lovelite, Besancon, FR
- Namiki Precision Jewel Co., Tokyo, JP
- Novagan, Lausanne, CH
- Phocone AG, Zurich, CH
- Rolex SA, Geneva, CH
- SolSens, Bern, CH
- Swisscom Group, Geneva, CH
- Wilco AG, Wohlen, CH

Statistical Input – Output Data

Funding source (CHF)	Year 9	Year 10	Year 11	Year 12	Total	%
SNSF funding ¹	3 905 000	2 825 000	1 700 000	2 055 000	10 485 000	31
Self-funding from home institution ²	2 539 220	2 366 459	1 358 663	1 299 000	7 563 342	22
Self-funding from project participants	4 967 272	4 011 920	2 231 002	2 000 000	13 210 194	39
Third-party funding ³	1 035 728	648 739	608 632	500 000	2 793 099	8
Total	12 447 220	9 852 118	5 898 297	5 854 000	34 051 635	100

Personnel ⁴	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							FR	DE	IT	ES	CA	
Management	1.5 ⁵	2	50	2	50	2	1	0	0	0	0	1
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	43	6	14	37	86	11	4	11	4	1	1	11
Postdoctoral students	28	7	25	21	75	2	8	2	7	1	2	7
Research associates	0	0	0	0	0	0	0	0	0	0	0	0
Senior researchers ⁶	37	2	5	35	95	14	6	6	2	0	0	9
Other staff	28	16	57	12	43	22	4	0	0	2	0	1
Total	137.50	33	24	107	76	51	23	19	13	4	3	29

Type of output ⁷	Totals
Publications > 1010 Peer-reviewed 132 Not peer-reviewed 105 Anthology articles 20 Books 14 Reports	1281
Presentations at congresses >	1467
Cooperations > 77 Programmes 92 Research institutions 69 Private sector 2 Other	240
Transfer activities > 34 Patents 2 Licenses 5 Start-ups ⁸ 11 Prototypes/processes 12 CTI-projects ⁹	64

¹ Included funding of economic stimulus package and transfer projects (strong Swiss franc package)

² Personnel costs, equipment and consumables, not included infrastructure and basic equipment

³ Not included is CTI funding. Since the start of the NCCR 12 projects have been funded by CTI at a total amount of 13.5 million CHF (cf. third table).

⁴ Persons involved in the NCCR in the last reporting period (12 months)

⁵ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁶ Including leaders of the individual projects and other organisational units of the NCCR

⁷ This table displays the major indicators in knowledge and technology transfer; other data is available as well (see text on "achievements"). The output data of NCCRs differ considerably according to disciplinary cultures.

⁸ Start-up companies that have been built up or were considerably supported by NCCRs.

⁹ Projects funded by the Commission for Technology and Innovation (CTI) that have been initiated by members of NCCRs and are thematically linked to NCCR projects.

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 Research

H: Hamm P.

Intense THz Science and Spectroscopy

H: Feurer Th.

Nonlinear Femtosecond Spectroscopy and Time Resolved Photo- Electron Spectroscopy

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 M., Osterwalder J.

Ultrafast Structural Dynamics Observed with Femtosecond X-Rays

H: Beaud P.

Transfer projects (strong Swiss franc package)

Two-Pulse

H: Feurer Th.

High-power THz generation in organic crystals based on conventional Ti:Sapphire laser technology

H: Hauri Chr., Abela R.

Heads of Individual Research Projects

Abela Rafael, Dr.
Beaud Paul, Dr.
Chergui Majed, Prof.
Feurer Thomas, Prof.
Gerber Thomas, Dr.
Girault Hubert, Prof.

Hamm Peter, Prof.
Hengsberger Matthias, Dr.
Keller Ursula, Prof.
Meuwly Markus, Prof.
Moser Jacques-E., Prof.
Osterwalder Jürg, Prof.
Patterson Bruce, Dr.
Röthlisberger Ursula, Prof.

Vanicek Jiri, Prof.
Vauthey Eric, Prof.
Wolf Jean-Pierre, Prof.

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Physikalisch-Chemisches Institut, Universität Zürich
Physik-Institut, Universität Zürich
Institut für Quantenelektronik, ETH Zurich
Département Chemie, Universität Basel
Institut des Sciences et Ingénierie Chimiques (ISIC), EPF Lausanne
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Laboratoire de Chimie Physique Théorique (LPTC), EPF Lausanne
Département de Chimie Physique, Université de Genève
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Third Party Cooperation

Programmes

- microCoR (COST)
- Detailed Chemical Kinetic Models For Cleaner Combustion (COST)
- Germaine de Stael (SATW)
- IFP MUST (FP7 COFUND)
- NAMDIATREAM (FP7)
- HINTS (FP7)

Research Institutions

- Advanced Photonics Research Institute, Gwangju, KR
- AIDA, Karlsruhe Institute of Technology, Karlsruhe, DE
- Applied synthetic chemistry, Vienna University of Technology, Vienna, AT
- CELIA, Université de Bordeaux, Bordeaux, FR
- Chemistry, Princeton University, Princeton, US
- Chemistry, University of Madison, Madison, US
- CNRS - Département NANO, Université de Bourgogne Dijon, Dijon, FR
- Combustion Research Facility, Sandia National Laboratories, Livermore, US
- Departamento de Química, Universidad Autónoma Madrid, Madrid, ES
- Department of Chemistry, Durham University, Durham, GB
- Department of Chemistry, Stanford University, Stanford, US
- Department of Chemistry, University of North Carolina, Chapel Hill, US
- Department of Chemistry, University of Wisconsin, Madison, US
- Department of Chemistry & Pharmacy, University Erlangen-Nürnberg, Erlangen, DE
- Department of Physics, Ben-Gurion University, Beer-Sheva, IL
- Department of Physics, University of Ljubljana, Ljubljana, SI
- Department of Physics, Università degli Studi di Roma, Roma, IT
- Department of Physics and Astronomy, Aarhus University, Aarhus, DK
- Department of Physics and Astronomy, University of Rochester, Rochester, US
- Dipartimento di Fisica, Politecnico di Milano, Milano, IT
- Experimentalphysik, Free University Berlin, Berlin, DE
- Faculty of Science and Technology, University of Twente, Enschede, NL
- Fakultät für Physik, University Konstanz, Konstanz, DE
- Freiburg Institute for Advanced Studies, Freiburg, DE
- Fundamental & Computational Sciences, Pacific Northwest National Laboratory, Richland, US
- Geballe Lab for Advanced Materials, Stanford University, Stanford, US
- Institute Methods and Instrumentation for Synchrotron Radiation Research, Helmholtz Zentrum Berlin, Berlin, DE
- Institute of Physical Chemistry, University Wuerzburg, Würzburg, DE
- Institute of Technology and Chemistry, Massachusetts Institute of Technology, Cambridge, US

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.

Statistical Input – Output Data

Funding source (CHF)	Year 1	Year 2	Year 3	Year 4	Total	%
SNSF funding ¹	5 510 000	3 990 000	4 385 000	3 895 000	17 780 000	46
Self-funding from home institution ²	1 280 000	1 230 000	1 030 000	1 030 000	4 570 000	12
Self-funding from University of Bern	585 000	535 000	535 000	535 000	2 190 000	6
Self-funding from project participants	3 320 991	3 975 122	3 451 050	3 449 050	14 196 213	37
Third-party funding ³	0	77 770	0	0	0	0
Total	10 695 991	9 807 892	9 401 050	8 909 050	38 736 213	100

Personnel ⁴	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	IT	FR	GB	US	
Management	3.8 ⁵	5	56	4	44	6	2	0	0	1	0	0
Master students	1	1	100	0	0	0	0	0	1	0	0	0
Doctoral students	41	14	34	27	66	11	11	3	2	0	0	15
Postdoctoral students	41	11	27	30	73	5	5	7	3	4	2	17
Research associates	0	0	0	0	0	0	0	0	0	0	0	0
Senior researchers ⁶	38	4	11	34	89	19	19	4	2	0	2	3
Other staff	7	0	0	7	100	5	0	0	1	0	1	0
Total	131.80	35	26	102	74	46	37	14	9	5	5	35

¹ Included funding of transfer projects (strong Swiss franc package)

² Personnel costs, equipment and consumables, not included infrastructure and basic equipment

³ Not included is CTI funding. Since the start of the NCCR 2 projects have been funded by CTI at a total amount of 2.3 million CHF (cf. third table).

⁴ Persons involved in the NCCR in the last reporting period (12 months)

⁵ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁶ 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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- Laboratoire de Chimie Théorique, Université Joseph Fourier, Grenoble, FR
- Laboratory for Functional Polymers, Swiss Federal Laboratories for Materials Science and Testing, Dübendorf, CH
- Laser Labor Goettingen, Goettingen, DE
- LINAC Coherent Light Source, SXR station, Stanford Linear Accelerator Center, Stanford, US
- LINAC Coherent Light Source, XPP station, Stanford Linear Accelerator Center, Stanford, US
- Los Alamos National Laboratory, Los Alamos, US
- Lundbeck Foundation Theoretical Center for Quantum System Research, Aarhus University, Aarhus, DK
- Max Planck Institute for the Physics of Complex Systems (MPIPKS), Max Planck Institute, Dresden, DE
- Organic Chemistry, Bulgarian Academy of Sciences, Sofia, BG
- Organic Chemistry, University of Kharkov, Kharkov, UA
- Physics Department and Center of Applied Photonics, University of Konstanz, Konstanz, DE
- Physics, Karlsruhe Institut of Technology, Karlsruhe, DE
- Physics, Université de Bourgogne, Dijon, FR
- Physics, TU-Wien, Wien, AT
- Rutgers Center for Emergent Materials, Rutgers University, Piscataway, US
- School of Chemical Sciences, University of Birmingham, Birmingham, GB
- School of Electrical and Computer, University of Purdue, West Lafayette, US
- Swiss Norwegian Beamline, European Synchrotron Radiation Facility, Grenoble, FR

Economy / Industry

- ABACUS Patentanwälte, Adliswil, CH
- Bystronic, Niederoenz, CH
- Novartis, Basel, CH
- OneFive, Zurich, CH
- Rainbow Photonics AG, Zurich, CH

Others

- European Commission, Photonics, Brussels, BE
- European Photonics Industry Consortium, Paris, FR
- European Technology Platform Photonics21, Brussels, BE
- Innovation and Implementation Strategy Photonics21, Düsseldorf, DE
- International Optoelectronics Associations, Tokyo, JP
- Optical Society of America, Washington, US
- Verein Schweizer Laser und Photonik Netz, Wollerau, CH

Intelligent Robots for Improving the Quality of Life

NCCR Robotics

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December 1, 2010

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Research

Bio-mimetic Sensing, Actuation, and Mobility

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

Neuromorphic color vision

Head (H): Delbruck T.,
Scaramuzza D.

Sensory-motor tissues

H: Floreano D., Shea H.,
Lacour St., Paik J.

Artificial bacteria

H: Nelson B., Martinoli A.

Passive dynamic locomotion

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

Learning locomotion

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

Adaptive morphology for mobility

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

Interaction and Manipulation

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

Human centered robotic assistance using motion intention estimation

H: Riener R., Millán J.

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

H: Bleuler H.,
Gassert R., Riener R.

Programming by demonstration of fine manipulation

H: Billard A., Gassert R.

Neuromorphic motor control of interactive reaching

H: Cook M., Billard A.

Finger sensor skin for humanoid robot manipulation

H: Lacour St., Billard A.

Prosthetic Robotics

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

Brain-controlled robots and prosthetics

H: Millán, J. Micera S., Pfeifer R.

EMG-based hand prosthetics

H: Pfeifer R., Millán J., Micera S.

Lower extremity prosthetics

H: Riener R., Billard A.

Assistive walking devices for the elderly

H: Bleuler H., Gassert R.

Variable impedance joints for assistive devices

H: Gassert R., Bleuler H.,
Riener R.

Implantable neuroprostheses

H: Courtine G., Micera S.,
Paik J., Lacour St., Millán J.

Distributed Robotics

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

Evolvable multi-cellular robots

H: Floreano D., Pfeifer R.

Morphology adapting to user – Roombots

H: Ijspeert A., Dillenbourg P.

Evaluative population-based distributed adaptation

H: Martinoli A., D'Andrea R.

Model-based distributed adaptation in 3D environments

H: D'Andrea R., Gambardella L.

Symbiotic human-swarm cooperation

H: Gambardella L., Martinoli A.,
Di Caro G.

Multirobot navigation of heterogeneous robot teams with onboard sensing

H: Scaramuzza D., Buchli J.,
Siegwart R.

Robots for Daily Life

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

Interaction analysis

H: Dillenbourg P., Mondada F.

Robots for daily life in homes

H: Mondada F., Martinoli A.,
Scaramuzza D.

Robots for daily life in school

H: Mondada F., Iida F.

Heads of Individual Research Projects and Key Researchers

Billard Aude, Prof.
Bleuler Hannes, Prof.
Buchli Jonas, Prof.
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Di Caro Gianni, Dr.

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Brain Mind Institute, EPF Lausanne
Institut für Dynamische Systeme und Regelungstechnik,
ETH Zürich
Institut für Neuroinformatik, Universität Zürich
Dalle Molle Institute for Artificial Intelligence, (IDSIA)

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 "exoprosthetic" 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 Robot-

ics 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.

Third Party Cooperation

Programmes

- CURVACE (FP7)
- LOCOMORPH (FP7)
- SSSTC_JRP
- TOBI (FP7)

Research Institutions

- Artificial Intelligence Laboratory, University Zurich, CH
- Biomedical Optics Research Lab (USZ)
- Dept. of Biomedical Engineering, Khalifa University of Science, Abu Dhabi, AE
- Division Microrobotics and Control Engineering, Carl von Ossietzky Universität Oldenburg, Oldenburg, DE
- Interaction Design, Zürcher Hochschule der Künste, Zurich, CH
- Institute of Human Movement Sciences and Sport, ETH Zurich, Zurich, CH
- Institute of Neuroinformatics, University of Zurich, Zurich, CH
- Institute of Plant Biology, University of Zurich, Zurich, CH
- Institute of Plant Science, University of Bern, Bern, CH
- Laboratoire Pluridisciplinaire de Recherche Ingénieur des Systèmes, Mécanique, Énergétique, École National Supérieure d'Ingénieurs de Bourges, Bourges, FR
- Laboratory of Robotics, University of Ljubljana, Ljubljana, SI
- Microsystems for Space Technologies Laboratory, EPF Lausanne, CH
- Nanomedicine Lab, University College London, London, GB
- Orthopedic Center and Balgrist Tec, University Hospital Balgrist, Zurich, CH
- Recherche appliquée & développement, Ecole Cantonale d'Art de Lausanne, CH
- Rehabilitation Engineering Lab, ETH Zurich, Zurich, CH
- Research Center on Animal Cognition, Université Paul Sabatier, Toulouse, FR
- Sensory Motor Performance Program, Rehabilitation Institute of Chicago, US
- Social sciences Institute, Université de Lausanne, Lausanne, CH
- Space Biology Group, Swiss Federal Institute of Technology, Zurich, CH
- Spinal Cord Injury Center, University Hospital Balgrist, Zurich, CH
- TeleRobotics Lab, University of Utah, Utah, US
- UER Médias et TIC, Haute école pédagogique, Lausanne, CH

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Festo AG, DE
Otto Bock Healthcare GmbH, DE
CTI-Start-up, CH
Italian Institute of Technology, IT
Harvard University, USA

Intelligent Robots for Improving the Quality of Life NCCR Robotics

Economy / Industry

- Cyberbotics S.a.r.l, Ecublens, CH
- Domo Safety, Lausanne, CH
- Dynortis, Lucerne, CH
- Equimodus Sàrl,
La Croix sur Lutry, CH
- Hocoma AG, Volketswil, CH
- K-Team SA, Vallorbe, CH
- The Walt Disney Company
(Switzerland) GmbH, Zurich, CH

Others

- armasuisse, Wissenschaft und Technologie W + T, Thun, CH
- Centre Suisse d'Électronique et de Microtechnique, Alpnach, CH
- Département de l'instruction Publique, Genève, CH
- ETH Research Grant, Zurich, CH
- Independent Investigators' Research Awards, Zurich, CH
- Mobsya Association, Lausanne, CH

Statistical Input – Output Data

Funding source (CHF)	Year 1	Year 2	Year 3	Year 4	Total	%
SNSF funding	2 375 000	3 705 000	3 705 000	3 515 000	13 300 000	47
Self-funding from home institution ¹	641 416	537 257	1 104 246	730 671	3 013 590	11
Self-funding from project participants	2 436 720	2 184 708	3 619 282	3 470 582	11 711 291	42
Third-party funding ²	0	45 575	71 250	71 250	188 075	1
Total	5 453 136	6 472 540	8 499 778	7 787 503	28 212 956	100

Personnel ³	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	FR	US	IT	CN	
Management	2.5 ⁴	3	60	2	40	2	0	2	0	1	0	1
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	40	5	13	35	88	11	4	2	2	3	3	19
Postdoctoral students	13	1	8	12	92	1	2	1	2	0	0	7
Research associates	9	2	22	7	78	4	1	1	0	1	0	3
Senior researchers ⁵	25	2	8	23	92	8	2	1	3	3	1	7
Other staff	20	12	60	8	40	15	2	0	1	0	0	3
Total	109.50	25	22	87	78	41	11	7	8	8	4	40

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

² Not included is CTI funding. Since the start of the NCCR 2 projects have been funded by CTI at a total amount of 2.5 million CHF (cf. third table).

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)

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Quantum Science and Technology

NCCR QSIT

Research

Section 1 Spectroscopy of single and few quantum systems

Sub-section 1A: Quantum optomechanics

H: Bruder C., Degen C., Esslinger T., Kippenberg T., Maletinsky P., Poggio M., Treutlein P., Wallraff A.

Sub-section 1B: Quantum Spintronics

H: Ihn T., Blatter J., Büttiker M., Ensslin K., Faist J., Fontcuberta i Morral A., Fuhrer A., Imamoglu A., Loss D., Morpurgo A., Salis G., Schönenberger C., Warburton R., 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: Esslinger T., Blatter J., Bruder C., Home J., Merkt F., Troyer M., Willitsch S.

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

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

Section 3 Hybrid quantum systems

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

H: Wallraff A., Degen C., Ensslin K., Ihn T., Imamoglu A., Loss D., Merkt F., Treutlein P., Wood V.

Sub-section 3B: Quantum repeaters for quantum communications

H: Gisin N., Bölcskei H., Christandl M., Renner R., Wolf S., Zbinden H.

Transfer projects (strong Swiss franc package)

Cryptographic Randomness Extractor (CREx)

H: Renner R., Gisin N., Troyer M.

Heads of Individual Research Projects and Subprojects

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Institut des Matériaux, EPF Lausanne

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January 1, 2011

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Third Party Cooperation

Programmes

- Composing Quantum Channels (CQC / CHIST-ERA EU)
- Device Independent Quantum Information Processing (DIQIP / CHIST-ERA EU)
- Efficient and Reliable Superconducting Single Photon Detectors (SCOPES / Swiss-Russian Cooperation)
- ERC grants (several starting and advanced grants)
- EU-Marie Curie Actions (participation in several Initial Training Networks / Intra-European Fellowships)
- MAQUIS (HP2C initiative / CRUS)
- Optical Lattice Emulators (OLE / DARPA)
- Optical Radiation Cooling and Heating in Integrated Devices (ORCHID / DARPA)
- Quantum Entanglement Science and Technology (QUEST / DARPA)
- Quantum Interfaces, SENSors, and Communication based on Entanglement (Q-ESSENCE / EU)
- Quantum repeaters for long distance fibre-based quantum communication (QuReP / EU)
- Quantum Information Entanglement-Enabled Technologies (QUIE2T / EU)
- Nanodesigning of Atomic and Molecular QUantum Matter (NAMEQUAM – STREP/ EU)
- SOLID (Solid State QI processing)

Research Institutions

- Austrian Institute of Technology, Vienna, AT
- Consejo Superior de Investigaciones Científicas, Madrid, ES
- Institut Néel, Grenoble, FR

Economy / Industry

- ID Quantique, Geneva, CH
- IBM Research Laboratory, Rüschlikon, CH

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 applications are primarily focused in the area of computer science and sensors. The NCCR QSIT takes a 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 information processing and to investigate new paradigms in physical basic research such as the order and states of material.

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Ihn Thomas, Prof.
Imamoglu Atac, Prof.
Kippenberg Tobias, Prof.
Loss Daniel, Prof.
Maletinsky Patrick, Prof.
Merkt Frédéric, Prof.
Morpurgo Alberto, Prof.

Poggio Martino, Prof.
Renner Renato, Prof.
Salis Gian, Dr.
Schönenberger Christian, Prof.
Treutlein Philipp, Prof.
Troyer Matthias, Prof.
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Statistical Input – Output Data

Funding source (CHF)	Year 1	Year 2	Year 3	Year 4	Total	%
SNSF funding ¹	3 600 000	4 500 000	4 700 000	4 500 000	17 300 000	30
Self-funding from home institution ²	4 005 000	3 505 000	3 505 000	2 505 000	13 520 000	24
Self-funding from University of Basel	1 255 000	1 255 000	1 255 000	1 255 000	5 020 000	9
Self-funding from project participants	5 000 417	5 993 833	4 996 950	4 818 350	20 809 550	37
Third-party funding	0	0	120 050	51 400	171 450	0
Total	13 860 417	15 253 833	14 577 000	13 129 750	56 821 000	100

Personnel ³	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	IT	AT	CN	FR	
Management	2.9 ⁴	5	45	6	55	3	6	0	1	0	0	3
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	36	8	22	28	78	11	13	5	1	1	0	5
Postdoctoral students	25	2	8	23	92	2	7	1	1	2	4	9
Research associates	1	0	0	1	100	0	0	0	0	0	0	1
Senior researchers ⁵	34	2	6	32	94	15	9	3	2	0	0	6
Other staff	6	1	17	5	83	2	1	0	0	1	0	2
Total	104.90	18	16	95	84	33	36	9	5	4	4	26

¹ Included funding of transfer projects (strong Swiss franc package)

² Personnel costs, equipment and consumables, not included infrastructure and basic equipment

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

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Interactive Multimodal Information Management

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- Festival "Science et Cité" 2005
- Brochure IM2
- Public Day at the "Foire du Valais"
- "Let's talk about your future"

Research

Integrated Multimodal Processing

H: Billard A.

Human Centered Design and Evaluation

H: Lalanne D.

Social Signal Processing

H: Vinciarelli A.

Transfer projects (strong Swiss franc package)

Automated Analysis of Visual Exploration from Wearable Videos

H: Noris B.

Low Complexity Binary Features for Robust-to-Noise Speaker Recognition

H: Marcel S.

Automatic Recommendation of Lectures and Snippets (ARoLeS)

H: Popescu- Belis A.

Diarizing Massive Amounts of Heterogeneous Audio (DIMHA)

H: Valente F.

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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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, re-

quiring 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.

Third Party Cooperation

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)
- GUIDE
- HAPQNET
- HISDOC
- HOARSE
- Humanitics
- Humanitics II
- Humavips
- inEvent (149909)
- IURO
- MAIA (EU-FP6)
- MASH (EU-FP7)
- METISS
- MOBIO (EU-FP7)
- MUMIA (ICT COST Action)
- NeuroMath (COST)
- PASCAL (EU-FP6)
- PASCAL2
- PetaMedia (NoE EU-FP7)
- Qualinet
- RADHAR
- SCOVIS (EU-FP7-ICT)
- SIMILAR (EU-FP6)
- SSPNET (NoE)
- TACT (EU-FP6)
- TANGO
- TIVIPOL
- TOBI (EU-FP7)
- URUS (EU-FP6)
- Vanaheim
- VISMMASTER (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 Procession, Guildford, GB
- Center for Image Science, Johns Hopkins University, Baltimore, US
- Civil and Environmental Engineering, Massachusetts Institute of Technology, Boston, US
- Communication and Remote Sensing Laboratory, Université catholique de Louvain, BE
- CVLab, Ecole Polytechnique Federale de Lausanne, CH
- 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
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- Department of Psychology, University of Fribourg, CH
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- 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 Multimediali (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
- Media Lab, Massachusetts Institute of Technology, Cambridge, US
- Natural Language Processing Laboratory, Faculty of Informatics, Brno, CZ
- Speech, Audio, Brisbane, AU
- Transportation Centre, EPFL, Lausanne, CH
- Unité de Physique Mathématique, Université catholique de Louvain, BE

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- 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

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

Statistical Input – Output Data

Funding source (CHF)	Year 9	Year 10	Year 11	Year 12	Total	%
SNSF funding ¹	1 860 000	1 100 000	1 000 000	1 810 000	5 770 000	39
Self-funding from home institution ²	591 481	1 183 817	894 472	698 000	3 367 770	23
Self-funding from project participants	1 040 913	512 303	607 016	627 000	2 787 232	19
Third-party funding ³	1 271 766	450 116	276 205	745 000	2 743 087	19
Total	4 764 160	3 246 236	2 777 693	3 880 000	14 668 089	100

Personnel ⁴	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							FR	IT	IR	BE	CN	
Management	3.0 ⁵	5	33	10	67	11	0	0	0	2	0	2
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	19	5	26	14	74	2	0	4	3	0	2	8
Postdoctoral students	8	1	13	7	88	2	1	1	1	0	0	3
Research associates	1	0	0	1	100	0	0	0	0	0	0	1
Senior researchers ⁶	19	2	11	17	89	5	6	3	0	3	0	4
Other staff	9	1	11	8	89	7	2	0	0	0	0	2
Total	59.00	14	20	57	80	27	9	8	4	5	2	20

Type of output ⁷	Totals
Publications > 2011 Peer-reviewed 7 Not peer-reviewed 1 Anthology articles 70 Books 650 Reports	2739
Presentations at congresses >	298
Cooperations > 92 Programmes 58 Research institutions 87 Private sector 12 Other	249
Transfer activities > 11 Patents 14 Licenses 20 Start-ups ⁸ 98 Prototypes/processes 26 CTI-projects ⁹	169

¹ Included funding of economic stimulus package and transfer projects (strong Swiss franc package)

² Personnel costs, equipment and consumables, not included infrastructure and basic equipment

³ Not included is CTI funding. Since the start of the NCCR 23 projects have been funded by CTI at a total amount of 12.4 million CHF (cf. third table).

⁴ Persons involved in the NCCR in the last reporting period (12 months)

⁵ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁶ Including leaders of the individual projects and other organisational units of the NCCR

⁷ This table displays the major indicators in knowledge and technology transfer; other data is available as well (see text on "achievements"). The output data of NCCRs differ considerably according to disciplinary cultures.

⁸ Start-up companies that have been built up or were considerably supported by NCCRs.

⁹ Projects funded by the Commission for Technology and Innovation (CTI) that have been initiated by members of NCCRs and are thematically linked to NCCR projects.

- Intel Corp., Santa Clara, US
- Invacare International Sàrl, Gland, CH
- KeyLemon SA, Martigny, 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
- SMARTDATA SA, Martigny, CH
- Sowoon Technologies Sàrl, St-Imier, CH
- Spiderphone SA, Martigny, CH
- SVOX AG, Zürich, CH
- Swisscom SA, Berne, CH
- TATA Infotech, Bombay, IN
- TBS Holding AG, Pfäffikon, CH
- Telecontrol AG, Bern, CH
- Toyota: Charibot, 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

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Computer Aided and Image Guided Medical Interventions

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Kroschewski R., Kurtcuoglu V.,
Kuster N., Martin E.,
Poulikakos D., Rudin M.,
Werner B.

Ophthalmology

Head: Nelson B.
Buechler P., Kowal J.,
von Rechenberg B.

Patient Specific Intervention Planning in CMF Surgery

Head: Zeilhofer H.F.
Baur C., Cattin P., Gross M.,
Juergens P., Kowal J.,
Mazza E., Reyes Aguirre M.,
Scheffler K., Vetter T.,
von Rechenberg B.

Oto-Rhino-Laryngology

Head: Caversaccio M.
Baur C., Ferguson S.,
Weber S., Zheng G.

The Virtual Skeleton Database

Head: Büchler P., Nolte L.-P.,
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Székely G., Tannast M.,
Thali M., Vetter T., Weber S.

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Transfer projects (strong Swiss franc package)

Application of Statistical Shape Modelling to Robot Assisted Spine Surgery

H: Baur C.

A Statistical Shape Modeling Platform for Medical Applications

H: Lüthi M., Zheng G.

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.

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Third Party Cooperation

Programmes

- BOTMED
- FP7-PEOPLE-2012-ITN (EU-FP7)
- HEAR-EU
- NANOMA
- SpineFX

Research Institutions

- AO Research Institute, Davos, CH
- Asclepios group, INRIA, Sophia Antipolis, FR
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- Stanford School of Medicine, Radiological Sciences Unit, Stanford University, US
- Sunnybrook Health Sciences Centre, Toronto, CA
- Swiss Eye Research Foundation, Reinach, CH
- University of Silesia, Katowice, PL

Economy / Industry

- Advanced Osteotomy Tools - AOT AG, Basel, CH
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- ANSYS Inc. France, Lyon, FR
- Atracsys SARL, Bottens, CH
- Axios, Oldenburg, DE
- Baur SA, St-Aubin-Sauges, CH
- Bayrisches Laserzentrum, Erlangen, DE
- Bien-Air Surgery SA, Le Noirmont, CH
- Bracco Research Laboratory, Geneva, CH
- Cadfem GmbH, Grafing b. München, DE
- Camlog Holding AG, Basel, CH
- CAScination AG, Bern, CH
- Crisalix Sarl, Lausanne, CH
- CSM Instruments SA, Peseaux, CH
- Disney Research Zurich, Zurich, CH
- EnHatch, Lindhurst NJ, US
- Force Dimension, Lausanne, CH
- GE Global Research Center, Munich, DE

Achievements of the previous years

Co-Me has achieved an international reputation and visibility which is also represented by the performance figures for research (950 publications with a field impact index significantly above world average: 1.8), for knowledge and technology transfer (90 industrial partners, 31 patents and 11 start-up companies) as well as for education and career building.

Research

During the past eleven 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 Symbionix 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 AR-TORG 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 post-doctoral 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.

Structural Impact

In September 2011 the Swiss Institute for Computer Assisted Surgery (SICAS) was launched. SICAS will carry out a step-by-step take over and extend the activities of the NCCR Co-Me which will come to an end by mid 2013.

SICAS was created to continue the success story of the Co-Me research network as a platform for cutting-edge science in medical technologies, translational medicine, knowledge transfer, clinical usage and enterprises. It will steer follow-up projects and exploit achievements and competence.

- General Electric Health Care, Milwaukee, US
- InSightec - Image Guided Treatment Ltd., Tirat Carmel, IL
- Intellect Medical, Cleveland, US
- IntroMedic, Seoul, KR
- KUKA Roboter GmbH, Neuenhof, CH
- Materialise GmbH, Pfaffenhofen, DE
- MED-EL, Starnberg, DE
- Mentor Corporation, Santa Barbara, CA, US
- Minolta GmbH, Langenhagen, DE
- Miracor Medical Systems GmbH/ Miracor Sales & Marketing GmbH, Baar, CH
- Naviswiss AG, Laufen, CH
- Oertli Instrumente AG, Berneck, CH
- Orangedental GmbH&Co. KG, Biberach, DE
- Pantec Biosolutions AG, Glattbrugg, CH
- Polymed Medical Center, Glattbrugg, CH
- pSivida Inc., Watertown MA, US
- Sensoptic SA, Losone, CH
- SPEAG, Zürich, CH
- Steinbichler Optotechnik GmbH, Neubeuern, DE
- Straumann AG, Basel, CH
- Synthes AG, Oberdorf, CH
- Virtamed AG, Zürich, CH
- Zurich MedTech (ZMT), Zurich, CH

Others

- Focused Ultrasound Surgery Foundation, Charlottesville, US
- openFOAM development group, Womersley, GB

Statistical Input – Output Data

Funding source (CHF)	Year 9	Year 10	Year 11	Year 12	Total	%
SNSF funding ¹	4 575 000	2 000 000	1 500 000	1 760 000	9 835 000	34
Self-funding from home institution ²	1 363 114	1 249 805	1 250 925	1 360 600	5 224 444	18
Self-funding from project participants	2 757 609	2 795 537	3 106 159	2 909 989	11 569 294	40
Third-party funding ³	363 858	767 156	1 095 068	347 130	2 573 212	9
Total	9 059 581	6 812 498	6 952 152	6 377 719	29 201 950	100

Personnel ⁴	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	GR	PL	US	IN	
Management	3.5 ⁵	4	57	3	43	5	1	0	0	0	0	1
Master students	1	1	100	0	0	0	0	0	0	0	0	1
Doctoral students	35	9	26	26	74	7	5	4	1	0	2	16
Postdoctoral students	21	2	10	19	90	6	3	2	0	2	1	7
Research associates	27	2	7	25	93	13	3	0	3	0	1	7
Senior researchers ⁶	58	5	9	53	91	31	14	1	2	4	0	7
Other staff	14	6	43	8	57	13	1	0	0	0	0	0
Total	159.50	29	18	134	82	75	27	7	6	6	4	39

Type of output ⁷	Totals
Publications > 869 Peer-reviewed 318 Not peer-reviewed 4 Anthology articles 76 Books 10 Reports	1277
Presentations at congresses >	777
Cooperations > 37 Programmes 128 Research institutions 133 Private sector 22 Other	320
Transfer activities > 32 Patents 1 Licenses 11 Start-ups ⁸ 46 Prototypes/processes 29 CTI-projects ⁹	119

¹ Included funding of economic stimulus package and transfer projects (strong Swiss franc package)

² Personnel costs, equipment and consumables, not included infrastructure and basic equipment

³ Not included is CTI funding. Since the start of the NCCR 29 projects have been funded by CTI at a total amount of 30.0 million CHF (cf. third table).

⁴ Persons involved in the NCCR in the last reporting period (12 months)

⁵ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training

⁶ Including leaders of the individual projects and other organisational units of the NCCR

⁷ This table displays the major indicators in knowledge and technology transfer; other data is available as well (see text on "achievements"). The output data of NCCRs differ considerably according to disciplinary cultures.

⁸ Start-up companies that have been built up or were considerably supported by NCCRs.

⁹ Projects funded by the Commission for Technology and Innovation (CTI) that have been initiated by members of NCCRs and are thematically linked to NCCR projects.

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- 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.

Transfer projects (strong Swiss franc package)

Capital adequacy, valuation, and portfolio selection for in- surance companies

H: Farkas E. W.

Programme

Swiss Doctoral School in Finance

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

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DeGeorge François, Prof.

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Filipovic Damir, Prof.
Gibson Brandon Rajna, Prof.
Habib Michel, Prof.
Hens Thorsten, Prof.
Kuebler Felix, Prof.
Mancini Loriano, Prof.
Morellec Erwan, Prof.
Paoletta Marc, Prof.
Rochet Jean-Charles, Prof.
Scaillet Olivier, Prof.
Schweizer Martin, Prof.
Trojani Fabio, Prof.

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Facoltà di Scienze Economiche, Università
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Universität Wien, AT
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Research Institutions

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- Finance Department, Columbia Business School, New York, US
- Finance Department, School of Business, Madison, US
- Finance Department, The London Business School, GB
- Fisher College of Business, Ohio State University, US
- Graduate School of Business, Stanford University, US
- Graduate School of Business, University of Chicago, 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 eleven 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 800 working papers and 500 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

- 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
- Institute of Mathematics, Fudan University, Shanghai, CN
- Institut de Finance, Université Paris-Dauphine, FR
- Institut für Mathematik, Technische Universität Berlin, DE
- Kellogg School of Management, Northwestern University, Evanston, US
- Kennedy School, Harvard University, Cambridge, US
- Laboratoire de Mathématiques, Université Blaise Pascal, Clermont-Ferrand, FR
- Laboratoire Finance-Assurance, CREST, Paris, FR
- LMU Mathematics Institute, LMU München, DE
- Mathematisch-Naturwissenschaftliche Fakultät, Christian-Albrechts-Universität zu Kiel, DE
- Manchester School of Accounting and Finance, University of Manchester, GB
- Paris School of Economics, FR
- Research Department, European Central Bank, Frankfurt, DE
- Risk Management and Insurance, Vienna University of Economics and Business, AT
- School of Mathematics, University of Leeds, GB
- School of Management, Boston University, US
- School of Management, HEC Paris, FR
- Sciences Po, Paris, FR
- Simon School of Business, University of Rochester, New York, US
- The Robert Day School of Economics and Finance, Claremont McKenna College, California, US
- Toulouse School of Economics, University of Toulouse, FR
- Vienna Graduate School of Finance, Vienna University of Economics and Business, AT
- Warwick Business School, Warwick University, Coventry, GB

Economy / Industry

- Associazione Bancaria Ticinese, Lugano, CH
- Banque Nationale de Paris (BNP) Paribas, London, GB
- Caisse des Dépôts et Consignations (CDC) Ixis Capital Markets, Paris, FR
- Cédric Bancaire Privée, Geneva, CH
- Cortal Consors S.A., Paris, FR
- Credit Suisse Group, Zurich, CH
- CSS Krankenversicherungen, Luzern, CH
- LGT Capital Management AG, Zürich, CH
- Standard and Poors, London, GB
- Swiss Life, Zurich, CH
- Swissquote Bank SA, Gland, CH
- UBS AG, Zurich, CH
- Wilshire Associates, Los Angeles, US
- Zurich Financial Services, Zürich, CH

Others

- Ausbildungszentrum für Experten der Kapitalanlage (AZEK), Bülach, CH
- Banque de France, Paris, FR
- Banca della Svizzera Italiana (BSI) Gamma Foundation, Lugano, CH
- Deutsche Bundesbank, Frankfurt a. Main, DE
- Federal Reserve Bank of Chicago, US
- Federal Reserve Bank of New York, US
- International Monetary Fund, Washington, US
- P&K Stiftung, Vitznau, CH
- Swiss National Bank, Bern, CH

Financial Valuation and Risk Management NCCR FINRISK

Statistical Input – Output Data

Funding source (CHF)	Year 9	Year 10	Year 11	Year 12	Total	%
SNSF funding ¹	2 300 000	2 100 000	2 100 000	70 000	6 570 000	38
Self-funding from home institution ²	969 361	1 069 293	1 574 761	859 508	4 472 923	26
Self-funding from project participants	1 020 500	1 314 501	1 327 593	30 000	3 692 594	22
Third-party funding	546 527	345 652	486 888	956 400	2 335 467	14
Total	4 836 388	4 829 446	5 489 242	1 915 908	17 070 984	100

Personnel ³	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	IT	FR	CN	US	
Management	3.2 ⁴	6	43	8	57	5	2	2	2	0	1	2
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	59	15	25	44	75	19	8	10	2	3	0	19
Postdoctoral students	23	5	22	18	78	0	6	4	2	3	3	5
Research associates	2	1	50	1	50	0	0	1	0	0	0	1
Senior researchers ⁵	68	7	10	61	90	16	11	9	13	0	1	21
Other staff	5	4	80	1	20	4	0	0	0	0	0	1
Total	160.20	38	22	133	78	44	27	26	19	6	5	49

Type of output ⁶	Totals
Publications > 543 Peer-reviewed 814 Not peer-reviewed 41 Anthology articles 3 Books 0 Reports	1401
Presentations at congresses >	2728
Cooperations > 0 Programmes 193 Research institutions 33 Private sector 24 Other	250
Transfer activities > 0 Patents 0 Licenses 3 Start-ups ⁷ 0 Prototypes/processes 0 CTI-projects ⁸	3

¹ Included funding of transfer projects (strong Swiss franc package)

² Personnel costs, equipment and consumables, not included infrastructure and basic equipment

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 This table displays the major indicators in knowledge and technology transfer; other data is available as well (see text on "achievements"). The output data of NCCRs differ considerably according to disciplinary cultures.

⁷ Start-up companies that have been built up or were considerably supported by NCCRs.

⁸ Projects funded by the Commission for Technology and Innovation (CTI) that have been initiated by members of NCCRs and are thematically linked to NCCR projects.

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

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The Power and Meaning of Images

NCCR Iconic Criticism

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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

The Visuality of Baroque Opera

Head: N. Gess

Fields and Frequencies in Cinematic Perception

Head: U. Holl

„Graduate School - Image as Artifact“

1.1.2012 - 31.12.2014

Supervisor: A. Schubbach

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Schaulager, Münchenstein/Basel

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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
- Central Institute of History Art, Munich, DE
- Centre for Architecture, Canadian Centre for Architecture, Montreal, CA
- 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
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- 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

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 institu-

tions 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 interest 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	839 987	1 174 054	1 309 870	1 109 184	4 433 095	25
Self-funding from project participants	1 029 102	1 144 952	1 166 000	1 093 000	4 433 054	25
Third-party funding	413 887	439 490	134 500	339 000	1 326 877	7
Total	4 157 976	4 633 496	4 485 370	4 416 184	17 693 026	100

Personnel ²	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	AT	IT	AR	BE	
Management	5.0 ³	4	36	7	64	5	4	1	1	0	0	1
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	36	20	56	16	44	13	18	2	1	1	1	2
Postdoctoral students	19	10	53	9	47	1	11	3	2	0	0	4
Research associates	0	0	0	0	0	0	0	0	0	0	0	0
Senior researchers ⁴	18	7	39	11	61	1	15	1	2	0	0	0
Other staff	2	1	50	1	50	1	0	0	0	0	0	1
Total	80.00	42	49	44	51	21	48	7	6	1	1	8

Type of output ⁵	Totals
Publications > 103 Peer-reviewed 274 Not peer-reviewed 741 Anthology articles 170 Books 2 Reports	1290
Presentations at congresses >	955
Cooperations > 12 Programmes 106 Research institutions 0 Private sector 8 Other	126
Transfer activities > 0 Patents 0 Licenses 0 Start-ups ⁶ 0 Prototypes/processes 0 CTI-projects ⁷	0

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

⁵ This table displays the major indicators in knowledge and technology transfer; other data is available as well (see text on "achievements"). The output data of NCCRs differ considerably according to disciplinary cultures.

⁶ Start-up companies that have been built up or were considerably supported by NCCRs.

⁷ Projects funded by the Commission for Technology and Innovation (CTI) that have been initiated by members of NCCRs and are thematically linked to NCCR projects.

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

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- 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
- Society of Fellows, Princeton University, US
- 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

Others

- IG Tanz - Tanzbüro Basel, CH
- Mediathek tanz.ch, Zürich, CH
- Schaulager, Basel, Münchenstein, CH
- Stiftung Bibliothek Werner Oechslin, Einsiedeln, CH

International Trade Regulation: From Fragmentation to Coherence

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Research

Work Package 1 Trade Governance

H: Kaufmann C.

Cluster 1.1 Judicial Governance: Pushing the Research Frontier

H: Elsig M.

Cluster 1.2 Attitudes towards Trade Liberalization

H: Spilker G.

Cluster 1.3 Corporate Trade Governance: Exploring the Interfaces

Kaufmann C.

Work Package 2 Preferential Trade and Investment

H: Elsig M.

Cluster 2.1 Preferential Trade

H: Sauvé P.

Cluster 2.2 New Challenges in Investment Law and Policy

H: Nadakavukaren K.

Work Package 3 Innovation and Creativity in International Trade

H: Cottier Th.

Cluster 3.1 Product Innovation

H: Aerni Ph.

Cluster 3.2 Revisiting Patent Law and Policy

H: Temmerman M.

Cluster 3.3 New Technologies and Trade Governance

H: Burri M.

Work Package 4 Trade, Development and Migration

H: Panizzon M.

Cluster 4.1 Food Security

H: Häberli Ch.

Cluster 4.2 Multilevel Migration Governance: Norm Sequenc- ing and Duplication

H: Lavenex S.

Work Package 5 Trade and Climate Change

H: Cottier Th.

Cluster 5.1 Towards a Principle of Common Concern in Inter- national Economic Law

H: Karapinar B.

Cluster 5.2 Towards Effective Architecture and Trade Linkage of the International Climate Regime

H: de Sépibus J.

Cluster 5.3 Towards a Framework Energy Agreement

H: Nartova O.

Work Package 6 Impact Assessment

H: Cadot O.

Cluster 6.1 Impact of Trade Liberalization on Economic and Political Institutions

H: Oechslin M.

Cluster 6.2 Economic Impact Evaluation of Trade Policy Measures

H: Shingal A.

Cluster 6.3 Impact of International Trade on Intra-National Economic Geography

H: Brülhart M.

Horizontal Issue Multilayered Governance

H: Oesch M.

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

transcends 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 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.

Third Party Cooperation

(international cooperations only)

Programmes

- NRP 64

Research Institutions

- Centre d'Etudes Politiques de l'Europe Latine, Université de Montpellier, FR
- Centre for Development and Environment, Institute of Geography, Bern, CH
- Centre for Trade Policy and Law, Carleton University, Ottawa, CA
- Chemicals and Waste Management Programme, United Nations Institute for Training and Research, Geneva, CH
- Climate and Energy Program, World Resources Institute, Washington D.C., US
- Climate Change Impacts, Adaption and Vulnerability, Intergovernmental Panel on Climate Change, Geneva, CH
- Common Law Section/ Faculty of Law, University of Ottawa, Ottawa, CA
- Development Strategy and Governance Division, International Food Policy Research Institute, Washington, US
- Ecologic Institute, Washington D.C., US
- Faculty of Law, Cambridge University, Cambridge, GB
- Faculty of Law, University of Ottawa, Ottawa, CA
- Fraunhofer Institut for Media Communications, University of St. Gallen, St. Gallen, CH
- Hardware & Timing Section Mandate, CERN European Organization for Nuclear Research, Geneva, CH
- International Center for Agricultural Research in Dry Areas, Aleppo, SY
- Institute for Human Rights, German Institute for Human Rights, Berlin, DE
- Institute of Mass Communication and Media Research, University of Zurich, Zurich, CH
- Lehrstuhl für Privat- Wirtschafts- und Europarecht, University of Zurich, Zurich, CH
- NCCR North-South, University of Bern, CH
- Regional Coordination Office Horn of Africa, NCCR North-South, Addis Abeba, ET

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Cottier Thomas, Prof.

de Sépibus Joëlle, Dr.

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Häberli Christian, Dr.

Karapinar Baris, Dr.

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Nadakavukaren Schefer Krista, Prof.

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Oechslin Manuel, Prof.

Oesch Matthias, Prof.

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Politikwissenschaftliches Seminar der Universität Luzern

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Drexler Josef, Prof.

Dupont Cédric, Prof.

Fink Carsten, Prof.

Hillman Jennifer, Prof.

Hoekman Bernard, Prof.

Hufbauer Gary, Prof.

Jackson John H., Prof. em.

Marceau Gabrielle, Prof.

University of Bern and Study Center Gerzensee, CH

Director Max-Planck-Institute for Intellectual Property,

Competition and Tax Law, Munich, DE

Graduate Institute of International and Development

Studies (HEID), Geneva, CH

World Intellectual Property Organization (WIPO), Geneva, CH

World Trade Organization (WTO), Geneva CH and German

Marshall Fund, Washington DC, USA

International Trade Department of the World Bank, Washington DC, USA

Peterson Institute of International Economics (PIIE), Washington DC, USA

Georgetown University, Washington DC, USA

Institute for International Public Law, University of

Geneva & World Trade Organization (WTO), CH

International Trade Regulation: From Fragmentation to Coherence

NCCR Trade Regulation

Economy / Industry

- ABB, Zurich, CH
- Die Innovationsgesellschaft, St. Gallen, CH
- Swissgrid, Frick, CH
- UBS, Zurich, CH

Others

- Bundesamt für Energie, Bern, CH
- CEPII, Paris, FR
- Ecoscientia, Zug, CH
- International Centre For Trade And Sustainable Development, Geneva, CH
- International Institute for Sustainable Development, Geneva, CH
- Madariaga/College of Europe Foundation, Brussels, BE
- Swiss Federal Office for the Environment, Berne, CH
- Swiss Federal Office of Communication, Biel, CH
- United Nations Conference for Trade and Development, Geneva, CH
- World Intellectual Property Organisation, Geneva, CH

Achievements of the previous years

Until fairly recently, international trade regulation was seen as a specialized field of international law and economic policy. It has insufficient interlinkage with other areas of law and policy, which WTO rules increasingly affect, or with the institutions that generate these norms. NCCR Trade Regulation is a unique, multidisciplinary research network that seeks to bring greater coherence to the study of these fragmented interfaces, and looks at them from the angles of economics, international relations and law. The results of research undertaken and published during the first phase of NCCR Trade Regulation were published as *The Prospects of International Trade Regulation: From Fragmentation to Coherence* (Cambridge University Press 2011). The research under the second phase builds upon this achievement.

Research accomplishments

NCCR Trade Regulation is structured into six Work Packages (WPs), which have provided an effective framework for research and will continue to do so for the remainder of the second phase and during the third phase of the NCCR.

We have added numerous articles and book chapters to our impressive list of publications. The most recent addition is the article by Manfred Elsig (leader of WP2) and Mark A. Pollack (Temple University, USA) "Agents, trustees, and international courts: The politics of judicial appointment at the World Trade Organization", in the *European Journal of International Relations*.

The annual World Trade Forum (WTF) continues to showcase work done within the framework of the NCCR and in cooperation with third parties. This year's WTF on the Rule of Law in Monetary Affairs: Lessons from the Trade Field, will as usual, form the basis for an edited volume to be published by Cambridge University Press.

Knowledge transfer and affiliations

The WTI/NCCR is now midway through its four-year academic cooperation project with the Swiss State Secretariat for Economic Affairs (SECO) in collaboration with universities in Peru, South Africa and Vietnam, and has welcomed two new partners - the University of Chile and the Universitas Pelita Harapan (Indonesia). Research fellowships, joint research projects, conferences and workshops are integrating foreign researchers into the work of NCCR Trade Regulation. In the long-term goal, the intention is to establish the foundations for a sustainable and productive network of academic cooperation to provide the rigorously trained experts needed to address the challenges of international trade regulation.

A team of NCCR researchers has obtained a grant from the Swiss Network for International Studies (SNIS) to study power shifts in the international trade arena. The two-year project entitled "From rule-takers to rule-makers: emerging powers in the regulation of international trade" will investigate the conditions under which countries such as Brazil, China, India and Mexico increasingly convert their growing market

power into regulatory influence in the international arena.

The International Investment Initiative (I3) continues to study the relationship between trade and investment law and policy. Its focus is on research, training and advisory services, as well as establishing a forum for dialogue between stakeholders.

Doctoral School

Work is under way to set up NCCR Trade Regulation's interdisciplinary doctoral programme. Together with the MILE Programme, the Summer Academy and the Distance Learning Programme, the doctoral programme forms part of the Graduate School of Economic Globalisation and Integration. Individual learning agreements will be concluded between the doctoral thesis supervisor and the student. These agreements will offer each student the possibility to advance his or her expertise in the field of trade regulation and economic globalisation, for example, by participating in doctoral seminars, presenting work at international conferences and to the doctoral school. The school will also offer students the chance to augment their knowledge by attending courses of the MILE programme and Summer Academy. The in-house WTI doctoral students will be expected to cooperate on NCCR and other research activities of the WTI. It will attract students of law, economics and international relations, with a focus on international trade.

For 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	73
Self-funding from home institution ¹	664 370	754 884	667 082	677 224	2 763 560	20
Self-funding from project participants	337 329	221 300	17 009	17 042	592 680	5
Third-party funding	14 280	120 576	75 605	54 264	264 725	2
Total	3 360 980	3 334 567	3 255 837	2 951 150	12 902 534	100

Personnel ²	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	IT	CA	GB	US	
Management	6.1 ³	11	61	7	39	13	2	0	2	1	1	1
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	15	7	47	8	53	5	1	1	0	0	0	8
Postdoctoral students	4	3	75	1	25	0	1	1	0	0	0	2
Research associates	13	8	62	5	38	4	1	1	0	0	1	7
Senior researchers ⁴	32	10	31	22	69	13	2	2	1	2	1	11
Other staff	1	0	0	1	100	0	0	0	0	0	0	1
Total	71.10	39	47	44	53	35	7	5	3	3	3	30

Type of output ⁵	Totals
Publications > 198 Peer-reviewed 322 Not peer-reviewed 85 Anthology articles 115 Books 38 Reports	758
Presentations at congresses >	337
Cooperations > 9 Programmes 164 Research institutions 30 Private sector 102 Other	305
Transfer activities > 0 Patents 0 Licenses 0 Start-ups ⁶ 0 Prototypes/processes 0 CTI-projects ⁷	0

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

⁵ This table displays the major indicators in knowledge and technology transfer; other data is available as well (see text on "achievements"). The output data of NCCRs differ considerably according to disciplinary cultures.

⁶ Start-up companies that have been built up or were considerably supported by NCCRs.

⁷ Projects funded by the Commission for Technology and Innovation (CTI) that have been initiated by members of NCCRs and are thematically linked to NCCR projects.

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NCCR Mediality

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Mythological Interference

H: Glauser 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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Sandl M.

Senior Researchers

Beil U. J., Nievergelt A.

Permanent Cooperations

Mediated Origins

H: Aris M-A. (Munich)

Medialising death

H: Stoellger Ph. (Rostock)

Third Party Cooperation

Research Institutions

- Art History and Music, University of Birmingham, School of Languages, Cultures, GB
- Biblioteca Mario Gromo, Museo del Cinema di Torino, IT
- Capaciteitsgroep Duitse en Scandinavische talen en culturen, Universiteit van Amsterdam, NL
- Centre André Chastel, Corpus Vitrearum France, FR
- Cinémathèque Luxembourg, Filmarchiv, LU
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- Comparative Literature Department, Yale University, New Haven, US
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- Department of Language and Culture, Linköping University, SE
- Department of German, Princeton University, US
- Department of Germanic Studies, New York University, US
- Department of History, University of South Carolina, US
- Department of Media, University of Copenhagen, DK
- Department of Technology and Society Studies, University of Maastricht, NL
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- Deutsches Seminar I, Albert-Ludwigs-Universität Freiburg i.Br, DE
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- Department of Germanic Studies, University of Chicago, US
- Department of History, Cornell University, US
- Department of Literature, History of Ideas, and Religion, University of Gothenburg, SE
- Dipartimento delle Arti Visive, Università di Bologna, IT
- Dipartimento di letteratura moderne e scienze dei linguaggi, Università Siena, IT
- Dipartimento di Storia delle Arti, della Musica e dello Spettacolo, Università degli studi di Milano, IT
- Ecole des Hautes Etudes en Sciences Sociales, Paris, FR
- Emmy-Noether-Research Group "History of Listening", Max-Planck-Institut für Wissenschaftsgeschichte, Berlin, DE
- English Department, Vanderbilt University, Nashville, Tennessee, US
- Equipe d'accueil de Linguistique et Lexicographie Latine et Romane, Université de Paris, FR
- EYE Nederlands Filmmuseum, Filmarchiv, NL
- Fachbereich Geschichte und Soziologie, Universität Konstanz, DE
- Fach Germanistik, Universität Duisburg-Essen, DE
- Fakultät für Sprach- und Literaturwissenschaften, Griechische und lateinische Philologie, Universität München, DE
- Filmmuseum Wien, Filmarchiv, AT
- Forschungszentrum für mittelalterliche Glasmalerei, Corpus Vitrearum Deutschland, DE
- Friedrich-Alexander-Universität Erlangen-Nürnberg, DE

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 patterns

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 develop 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.

Heads of Individual Research Projects

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Glaser Jürg, Prof.
Glessgen Martin-Dietrich, Prof.
Hinrichsen Hans-Joachim, Prof.
Kiening Christian, Prof.
Kurmann-Schwarz Brigitte, Prof.
Lutz Eckart Conrad, Prof.
Müller-Nielaba Daniel, Prof.
Naumann Barbara, Prof.
Nievergelt Andreas, PD

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- German Medieval and Linguistic Studies, University of Oxford, GB
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- Germanistik, Universität Saarbrücken, DE
- Germanistisches Seminar, Universität Salzburg, DE
- Geschichte und Ästhetik der Medien, Friedrich-Schiller-Universität Jena, DE
- Griechische und lateinische Philologie, LMU München, DE
- Historisches Institut, Universität Stuttgart, DE
- Historisches Seminar, Ludwig-Maximilians-Universität München, DE
- Historisches Seminar, Universität Essen/Duisburg, DE
- Historisches Seminar, Universität Freiburg, DE
- Historisches Seminar, Universität München, DE
- Historisches Seminar, Universität Münster, DE
- Historisches Seminar, Universität Strasbourg, FR
- History Department, Barnard College, Columbia University, New York, US
- Institut de Recherche en Cinéma et Audiovisuel (IRCAV), Université Sorbonne Nouvelle (Paris III), FR
- Institut des sciences humaines et sociales, Institut de recherche et d'histoire des textes (CNRS), Paris, FR
- Institut für Allgemeine und Vergleichende Literaturwissenschaft, Goethe-Universität Frankfurt/Main, DE
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- Institut de Linguistique Française, Université de Strasbourg, FR
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- Institut für deutsche Literatur, Humboldt-Universität zu Berlin, DE
- Institut für deutsche Philologie, Julius-Maximilians-Universität Würzburg, DE
- Institut für Germanistik, Universität Hamburg, DE
- Institut für Germanistik, Universität Wien, AT
- Institut für Germanistik, Vergleichende Literatur- und Kulturwissenschaft, Universität Bonn, DE
- Institut für Geschichte und ihre Didaktik, Universität Flensburg, DE
- Institut für Klassische Altertumskunde, Mittel- und Neulateinische Philologie, Christian-Albrechts-Universität zu Kiel, DE
- Institut für Linguistik / Romanistik, Universität Stuttgart, DE
- Institut für Musikwissenschaft und Medienwissenschaft, HU Berlin, DE
- Institut für vergleichende Städtegeschichte, Universität Münster, DE

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

Roeck Berndt, Prof.
Rübekeil, Ludwig, Prof.
Sandl Marcus, Prof.
Schneider Sabine Prof.
Schnyder Mireille, Prof.
Schweinitz Jörg, Prof.
Stercken Martina, Prof.
Stoichita Viktor, Prof.

Teuscher Simon, Prof.
Tröhler Margrit, Prof.
Thier Andreas, Prof.
Wagner Karl, Prof.
Weddigen Tristan, Prof.
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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	50
Self-funding from home institution ¹	447 936	869 479	897 046	445 875	2 660 336	22
Self-funding from project participants	1 167 512	1 122 503	1 042 503	63 400	3 395 918	28
Third-party funding	0	0	0	0	0	0
Total	3 115 448	3 491 982	3 439 549	2 009 275	12 056 254	100

Personnel ²	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	IT	AT	ES	FR	
Management	3.1 ³	6	67	3	33	4	5	1	0	0	0	0
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	24	13	54	11	46	16	6	1	0	1	0	3
Postdoctoral students	4	2	50	2	50	0	3	0	0	0	0	1
Research associates	0	0	0	0	0	0	0	0	0	0	0	0
Senior researchers ⁴	26	9	35	17	65	10	15	0	1	0	1	1
Other staff	5	2	40	3	60	5	0	0	0	0	0	0
Total	62.10	32	47	36	53	35	29	2	1	1	1	5

Type of output ⁵	Totals
Publications > 194 Peer-reviewed 23 Not peer-reviewed 366 Anthology articles 93 Books 12 Reports	688
Presentations at congresses >	668
Cooperations > 0 Programmes 194 Research institutions 0 Private sector 0 Other	194
Transfer activities > 0 Patents 0 Licenses 0 Start-ups ⁶ 0 Prototypes/processes 0 CTI-projects ⁶	0

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

⁵ This table displays the major indicators in knowledge and technology transfer; other data is available as well (see text on "achievements"). The output data of NCCRs differ considerably according to disciplinary cultures.

⁶ Start-up companies that have been built up or were considerably supported by NCCRs.

⁷ Projects funded by the Commission for Technology and Innovation (CTI) that have been initiated by members of NCCRs and are thematically linked to NCCR projects.

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

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- Mediävistisches Institut, Universität München, DE
- Medienwissenschaft, Universität Trier, DE
- Migros Kulturprozent, L'arc – Littérature et atelier de réflexion contemporaine, CH
- Monumenta Germaniae Historica, Munich, DE
- Museo del Cinema di Torino, Università degli Studi di Torino, IT
- Musikwissenschaftliches Seminar, Humboldt-Universität zu Berlin, DE
- Münster, Seminar für Lateinische Philologie des Mittelalters und der Neuzeit, Westfälische Wilhelms-Universität, DE
- National Fairground Archive, University of Sheffield, GB
- Neuere deutsche Literaturwissenschaft, Goethe-Universität Frankfurt a. M., DE
- Nordeuropa-Institut, Humboldt-Universität zu Berlin, DE
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- Thomas-Institut, Universität Köln, DE
- Nordistik Forschungsinstitut, Københavns Universitet, DK
- Panthéon Sorbonne, Paris, FR
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- Sammlung Malerei bis 1800 und Glasmalerei, Germanisches Nationalmuseum, DE
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- Seminar für Lateinische Philologie des Mittelalters und der Neuzeit, Westfälische Wilhelms-Universität Münster, DE
- Seminar für Neuere Geschichte, Universität Tübingen, DE
- Skaldic Poetry of the Scandinavian Middle Ages Project, University of Sydney, US
- Sprach- und Literaturwissenschaften, Universität Augsburg, DE
- Stofnun Árna Magnússonar í íslenskum fræum, Háskóli Íslands, Reykjavík, IS
- Technology, Innovation and Society, Eindhoven University of Technology, NL
- Universität Konstanz, DE
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Challenges to Democracy in the 21st Century

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Start of the NCCR

October 1, 2005

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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.

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.

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 mediatisation – A series of teaching units for level secondary I

H: Ziegler B.

Narrative space

H: Wyss V.

Transfer projects (strong Swiss franc package)

Visual Reader “The challenge of democracy”

H: Kriesi H.

Heads of Individual Research Projects

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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.

Third Party Cooperation

Programmes

- ASCN
- CAP
- CLIMPOL
- Demanc
- IMO
- NEWGOV
- RECON
- RRPP
- SFB 597

Research Institutions

- Amsterdam Institute for Advanced Labour, University of Amsterdam, NL
- Centre de Théorie Politique, Université Libre de Bruxelles, BE
- Centre for Deliberative Democracy, Australian National University, Canberra, AU
- Centrum voor Media Cultuur 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, University of Exeter, GB
- 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
- Faculty of the Social Sciences, Goethe University, Frankfurt / Main, DE
- Georgian Opinion Research Business International, Tbilisi, GE
- Graduate School, Chinese Academy of Social Sciences, Beijing, CN
- Institut für Kommunikationswissenschaft, Westfälische Wilhelms-Universität Münster, DE
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- Institute for European Integration Research, Austrian Academy of Science, Vienna, AT

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Jarren Otfried, Prof.

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

Merkel Wolfgang, Prof.
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- 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

Others

- Schweizer Jugend forscht, Bern, CH
- Tripartite Agglomerationskonferenz / Konferenz der Kantonsregierungen, Berne, CH

Achievements of the previous years

Multi-disciplinary research

The 24 research projects completed in Phase I show how the two challenges of globalization and media-tization jeopardize or re-inforce 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 mediatization 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 quality 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. The NCCR supports the training of 26 Ph.D. students in each research phase. The completion rate and professional perspectives of the students are very positive: Most of them completed their Ph.D. in time and continued their academic career. In Phase II, another focus is on promoting postdoctoral researchers. Furthermore, an NCCR assistant professorship in democratization was created in 2010 at the University of Zurich.

The core of our efforts to promote female researchers is the peer mentoring program. Two peer groups have been established in order to advance the careers of their members in academia and beyond. The groups organize 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.

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

Partner Institutions

European University Institute (EUI), Florence
FORS, Université de Lausanne
Social Science Research Center Berlin (WZB), Berlin
Zentrum für Demokratie (ZDA), Aarau

Statistical Input – Output Data

Funding source (CHF)	Year 5	Year 6	Year 7	Year 8	Total	%
SNSF funding ¹	1 875 000	1 875 000	1 875 000	2 172 000	7 797 000	46
Self-funding from home institution ²	835 357	1 288 878	706 767	845 610	3 676 612	22
Self-funding from project participants	1 457 081	1 555 283	1 410 993	735 982	5 159 339	31
Third-party funding	4 720	14 328	81 803	148 313	249 164	1
Total	4 172 158	4 733 489	4 074 563	3 901 905	16 882 115	100

Personnel ³	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	FR	GR	NL	CA	
Management	4.3 ⁴	8	50	8	50	9	7	0	1	0	0	0
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	26	16	62	10	38	16	7	0	0	0	0	4
Postdoctoral students	6	1	17	5	83	3	3	1	0	0	0	0
Research associates	8	2	25	6	75	5	4	0	0	0	0	0
Senior researchers ⁵	36	7	19	29	81	20	13	1	2	1	1	3
Other staff	9	3	33	6	67	4	4	0	0	1	0	1
Total	89.30	37	37	64	63	57	38	2	3	2	1	8

Type of output ⁶	Totals
Publications > 137 Peer-reviewed 31 Not peer-reviewed 110 Anthology articles 26 Books 43 Reports	347
Presentations at congresses >	544
Cooperations > 16 Programmes 64 Research institutions 5 Private sector 4 Other	89
Transfer activities > 0 Patents 0 Licenses 0 Start-ups ⁷ 0 Prototypes/processes 0 CTI-projects ⁸	0

¹ Included funding of transfer projects (strong Swiss franc package)

² Personnel costs, equipment and consumables, not included infrastructure and basic equipment

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 This table displays the major indicators in knowledge and technology transfer; other data is available as well (see text on "achievements"). The output data of NCCRs differ considerably according to disciplinary cultures.

⁷ Start-up companies that have been built up or were considerably supported by NCCRs.

⁸ Projects funded by the Commission for Technology and Innovation (CTI) that have been initiated by members of NCCRs and are thematically linked to NCCR projects.

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Affective Sciences: Emotion in Individual Behaviour and Social Processes

NCCR Affective Sciences

Home Institution

University of Geneva

Start of the NCCR

September 1, 2005

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Research

Work Package Appraisal / Values / Norms

H: Sander D.

Affective relevance: nature, determinants and effects

H: Sander D.

The impact of emotional cues on prosocial behavior and norm compliance

H: Fehr E.

Emotion, feeling & value

H: Deonna J., Teroni F.

Myths & rites as cultural expression of emotion

H: Borgeaud P.

The translation of the emotions: from Greece to Rome

H: Nelis D.

Work Package Individual differences / Dispositions

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.

How the brain changes its mind: Roles of emotional relevance and sleep in learn- ing and decision making

H: Schwartz S.

When social appraisal meets social referencing. A develop- mental perspective on interest

H: Clement F.

Work Package Systems / Dynamics

H: Vuilleumier P.

Appraisal-driven patterning of emotional expression and experience

H: Scherer K.R.

Neural mechanisms of emo- tional response patterning and systems synchronisation

H: Grandjean D.

Cerebral bases of individual differences in affect perception and regulation

H: Vuilleumier P., Landis T.

Affective dynamics and aesthetic emotions

H: Lombardo P., Griener P.

Affective computing and emo- tion awareness in computer- mediated interaction

H: Betrancourt M., Pun T.

Research Foci

H: Steering Board

Applied affective sciences

Affective computing

Emotional basis of other-regarding behaviour: Empathy and fairness

The nature and consequences of gender differences

Emotion in language and culture

Moral emotions

Music & emotions

Development of methods

H: Grandjean D.

Transfer projects (strong Swiss franc package)

Emotions - An interactive ex- hibition

H: Grandjean D.

Measuring emotional intel- ligence in the workplace: De- velopment of a new test

H: Mortillaro M.

Combining brain stimula- tion with fMRI: Developing a standard setup for studying and modifying affective net- works in the human brain

H: Ruff Chr., Fehr E.

Applying affective sciences to virtual reality: The study of how scents can enhance emotional experiences in im- mersive virtual worlds

H: Sander D.

Programmes

Graduate School

Post-Doc Program

Summer School

Female Careers: Special
Stipends and Mentoring

Lab Rotation

Invited Professorships

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

factors; 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, myths but also fiction; the socializing function of moral emotions such as shame; effects of economic and socio-political 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".

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

- BridGE
- ENABLE
- FIGVRA
- ICCRA
- IFAPO/ UMR 7571 PROTASI
- IFAO/UMR 5140 (Ermant)
- 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
- Behavioural and Clinical Neuroscience Institute, Cambridge University, GB
- Brain Research Unit, Low Temperature Laboratory, Aalto University, FI
- Brain and Creativity Institute, University of Southern California, Los Angeles, 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
- Dept. Of Classics, University of Edinburgh, GB
- Department of Clinical Medicine - Center for Functionally Integrative Neuroscience, Aarhus University, DK
- Department of Comparative Literature, University of Bergen, NO
- Department of Economics, Ludwig-Maximilians-Universität, Munich, DE
- Department of Economics, University of Konstanz, DE
- Department of History and Archaeology, University of Crete, GR
- Department of Medical Sociology, Heinrich Heine Universität Düsseldorf, DE
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- Institut Communication Parlée, Université de Grenoble, FR
- Institut Dalcroze, Geneva, CH
- Institut de Biologia Evolutiva, Universitat Pompeu Fabra, Barcelona, ES
- Institut für Finanzwissenschaft, Universität Innsbruck, AT
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Affective Sciences: Emotion in Individual Behaviour and Social Processes NCCR Affective Sciences

Achievements of the previous years

Research

During its first two phases, 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 non-human 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 interdisciplinary Research Foci have been an outstanding success, in particular the foci on Music and Emotion 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 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 varied in-

terdisciplinary training for the graduate students at the NCCR. Similarly, 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 2012, the NCCR celebrated the fourth 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 newsletter.

Further information see www.affective-sciences.org

Statistical Input – Output Data

Funding source (CHF)	Year 5	Year 6	Year 7	Year 8	Total	%
SNSF funding ¹	2 500 000	2 500 000	2 500 000	3 613 000	11 113 000	32
Self-funding from home institution ²	666 454	1 066 702	1 647 276	1 568 305	4 948 737	14
Self-funding from project participants	3 863 189	3 245 582	4 080 257	2 300 158	13 489 186	39
Third-party funding	1 356 649	1 302 502	1 064 931	925 959	4 650 041	14
Total	8 386 292	8 114 786	9 292 464	8 407 422	34 200 964	100

Personnel ³	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							FR	DE	IT	GB	BE	
Management	4.8 ⁴	7	64	4	36	4	2	2	0	1	0	3
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	50	36	72	14	28	22	6	6	2	3	1	10
Postdoctoral students	42	20	48	22	52	7	10	6	7	1	1	12
Research associates	0	0	0	0	0	0	0	0	0	0	0	0
Senior researchers ⁵	40	15	38	25	63	16	6	7	4	2	3	5
Other staff	26	12	46	14	54	16	5	2	0	0	0	3
Total	162.80	90	53	79	47	65	29	23	13	7	5	33

Type of output ⁶	Totals
Publications > 515 Peer-reviewed 9 Not peer-reviewed 246 Anthology articles 27 Books 7 Reports	804
Presentations at congresses >	1022
Cooperations > 16 Programmes 220 Research institutions 9 Private sector 28 Other	273
Transfer activities > 0 Patents 0 Licenses 0 Start-ups ⁷ 13 Prototypes/processes 0 CTI-projects ⁸	13

¹ Included funding of transfer projects (strong Swiss franc package)

² Personnel costs, equipment and consumables, not included infrastructure and basic equipment

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

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

⁶ This table displays the major indicators in knowledge and technology transfer; other data is available as well

(see text on "achievements"). The output data of NCCRs differ considerably according to disciplinary cultures.

⁷ Start-up companies that have been built up or were considerably supported by NCCRs.

⁸ Projects funded by the Commission for Technology and Innovation (CTI) that have been initiated by members of NCCRs and are thematically linked to NCCR projects.

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- Neurological Reeducation Centre, Hospital Raymond Poincaré, Paris, FR
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- 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

- Domo Safety, EPF Lausanne, CH
- Dynortis, Lucerne, CH
- Fehr Advice, Zurich, CH
- Firmenich SA, Genève, CH
- GfK Nürnberg e.V., Nürnberg, DE

Others

- Alliance, Genève, CH
- Foundation Montreux Jazz, CH
- Innovations for poverty action, Busia, KE
- Innovations for poverty action, New Haven, US
- Lake Innovation Geneva Society (LIGS), Genève, CH
- Musée d'Histoire des sciences, Geneva, CH
- Muséum d'Histoire Naturelle, Genève, CH
- Service de la Formation Continue, Université de Genève, CH
- Service Médico-Pédagogique, Genève, CH
- Société Suisse pour la Science des Religions, Genève, CH
- United Nations Children's Fund, Zurich, CH

Overcoming vulnerability: life course perspectives

NCCR LIVES

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January 1, 2011

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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.

**Economic inequalities:
Towards pathways out
of vulnerability**

H: Lalive R.

**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:
Impact of the 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.

Heads of Individual Research Projects

Spini Dario, Prof.

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Bonvin Jean-Michel, Prof.
Lalive Rafael, Prof.

Le Feuvre Nicky, Prof.
Rossier Jérôme, Prof.

Widmer Eric, Prof.

Staerklé Christian, Prof.
Burton-Jeangros Claudine, Prof.

Favez Nicolas, Prof.
Perrig-Chiello Pasqualina, Prof.
Oris Michel, Prof.

Ritschard Gilbert, Prof.

Joye Dominique, Prof.

Centre de recherche sur les parcours de vie et les inégalités,
Université de Lausanne
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Haute école de travail social et de la santé-Lausanne, HES-SO
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Laboratoire de sociologie, Université de Lausanne
Laboratoire de psychologie du développement, conseil et
Intervention, Université de Lausanne
Institut d'études démographiques et du parcours de vie,
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Section de psychologie, Université de Genève
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Centre interfacultaire de gérontologie et d'études des vulnérabilités
(CIGEV), Université de Genève
Institut d'études démographiques et du parcours de vie,
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Centre de recherche sur les parcours de vie et les inégalités,
Université de Lausanne

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 investigates 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 sociopolitical 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

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

The Universities of Lausanne and Geneva 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 Statistical Office (FSO) and with several renowned institutes and outstanding life course experts at international level.

Third Party Cooperation

Programmes

- Population Europe – Network of Europe’s leading demographic research centres

Research Institutions

- Birkbeck Institute for Social Research, Birkbeck College, University of London, GB
- Population Change and Lifecourse: Strategic Knowledge Cluster, University of Western Ontario, London, CA
- Center for Healthy Ageing Research, Oregon State University, Corvallis, US
- Center for Research on Inequalities and the Life Course, Yale University, New Haven, US
- Center on Ageing and the Life Course, Purdue University, West Lafayette, US
- Centre de Recherche et d’Etudes en Gestion, Université de Pau et des Pays de l’Adour, FR
- Centre d’étude de l’emploi, Ministère du travail, Noisy-le-Grand, FR
- Centre for Analysis of Social Exclusion, London School of Economics and Political Science, GB
- Centre of Gender Research, University of Oslo, NO
- Department of Sociology, Case Western Reserve University, Cleveland, US
- Department of Sociology, University of Western Ontario, London, CA
- Dipartimento Sanita, Scuola Universitaria Professionale della Svizzera Italiana, Manno, CH
- Etudes sur le Genre et la Diversité en Gestion, Université de Liège, BE
- Hallie Ford Center for Healthy Children and Families, Oregon State University, Corvallis, US
- Industrial Psychology & People Management, University of Johannesburg, ZA
- Institute of Longitudinal Studies in Education, University of Bamberg, DE
- Laboratoire d’Economie et de Sociologie du Travail, Centre national de la recherche scientifique, Aix-Marseille Université, FR
- Mobilité, logement et entourage, Institut National Etude Démographiques, Paris, FR
- Organizational Behaviour and Human Resources department, ESCP Europe, Paris, FR
- Service Psychiatrie de Liaison, Hôpitaux Universitaires de Lausanne, CH
- Social Policy Research Unit, University of York, GB
- Forum suisse pour l’étude des migrations et de la population, Université de Neuchâtel, CH

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Oregon State University, US
Stockholm University, SE and University of Wisconsin, US

Overcoming vulnerability: life course perspectives NCCR LIVES

- Swiss Household Panel, Swiss Foundation for Social Sciences, Lausanne, CH
- Department of Epidemiology and Public Health, International Centre for Lifecourse Studies in Society and Health, University College London, GB
- Leading House en économie de la formation professionnelle, Université de Genève, CH

Others

- Bureau de l'égalité de l'Université de Fribourg, CH
- Bureau de l'égalité des chances de l'Université de Lausanne, CH
- Bureau de l'égalité entre les femmes et les hommes du Canton de Vaud, Lausanne, CH
- Bureau fédéral de l'égalité entre femmes et hommes, Berne, CH
- Centre de Formation et d'Orientation Professionnelle, Lausanne, CH
- Département de la santé et de l'action sociale du Canton de Vaud, Lausanne, CH
- Département de la santé et des affaires sociales du Canton du Tessin, Bellinzona, CH
- Département de la sécurité, des affaires sociales et de l'intégrité de l'Etat du Valais, Sion, CH
- Département de la solidarité et de l'emploi du Canton de Genève, CH
- Département des affaires régionales, de l'économie et de la santé du Canton de Genève, CH
- Département des finances, des institutions et de la santé de l'Etat du Valais, Sion, CH
- Dicastère Relève académique et diversité, Université de Lausanne, CH
- Federation of Swiss Psychologists, Berne, CH
- Office de statistique du canton du Tessin, Bellinzona, CH
- Office fédéral de la statistique, Neuchâtel, CH
- Bundesamt für Sozialversicherungen, Bern, CH
- Pro Senectute Schweiz, Wallis und Basel, CH
- Service de l'Emploi, Lausanne, CH
- Staatssekretariat für Wirtschaft, Bern, CH

Public Relations

- Brochure
- Website
- Electronic Newsletter
- IP7 Newsletter
- Exhibition

Statistical Input – Output Data

Funding source (CHF)	Year 1	Year 2	Year 3	Year 4	Total	%
SNSF funding	2 470 000	3 610 000	4 465 000	3 990 000	14 535 000	44
Self-funding from home institution ¹	712 500	912 500	1 216 500	1 216 500	4 058 000	12
Self-funding from University of Geneva	451 000	458 000	569 000	669 000	2 147 000	7
Self-funding from project participants	3 709 377	3 194 862	2 725 767	1 928 000	11 558 006	35
Third-party funding	105 770	139 358	120 000	120 000	485 128	1
Total	7 448 647	8 314 720	9 096 267	7 923 500	32 783 134	100

Personnel ²	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							FR	DE	IT	AT	PT	
Management	6.1 ³	10	77	3	23	9	1	0	0	0	0	3
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	50	33	66	17	34	27	3	3	2	1	3	12
Postdoctoral students	14	6	43	8	57	4	3	1	3	1	0	2
Research associates	23	14	61	9	39	20	2	2	0	0	0	0
Senior researchers ⁴	58	20	34	38	66	47	3	3	0	1	0	7
Other staff	13	12	92	1	8	10	0	1	1	0	0	1
Total	164.10	95	56	76	44	117	12	10	6	3	3	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)

Members of the Review Panel

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