

Guide2006

National Centres of Competence in Research

The NCCR brochure «Guide» will be updated every year. A complementary brochure («The National Centres of Competence in Research NCCR - Cutting the Edge Research Made in Switzerland - Strategic Priorities in Research») informs about the visions, the research topics and the activities of the 20 NCCRs. It is addressed to a broad public and written in an easily understandable way. Both brochures can be ordered at the Swiss National Science Foundation (see address below).

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NCCR Office
Wildhainweg 3
CH-3001 Berne
phone: +41 (0)31 308 23 52
nccr@snf.ch
www.snf.ch

Production

Stefan Bachmann
Urs Christ
Rita Pinezich
Matthias Wenker

Design, layout, typesetting

Beat Schenk, Werbeatelier, Berne

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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 20 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 are 8 to 15 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 institution - and third parties. The 20 existing NCCRs receive a total of CHF 250 million in SNSF funding for 2005 - 2008.

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.

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. Wanner Heinz	University of Berne	www.nccr-climate.unibe.ch
CO-ME	Prof. Székely Gábor	ETH Zurich	co-me.ch
FINRISK	Prof. Gibson Rajna	University of Zurich	www.nccr-finrisk.unizh.ch
Genetics	Prof. Duboule Denis	University of Geneva	www.frontiers-in-genetics.org
IM2	Prof. Bourlard Hervé	IDIAP 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	ISREC Epalinges	www.nccr-oncology.ch
Nanoscale Science	Prof. Güntherodt Hans-Joachim	University of Basel	www.nccr-nano.org
Neuro	Prof. Schwab Martin	University of Zurich	www.nccr-neuro.unizh.ch
North-South	Prof. Hurni Hans	University of Berne	www.nccr-north-south.unibe.ch
Plant Survival	Prof. Rahier Martine	University of Neuchâtel	www.unine.ch/plantsurvival
Quantum Photonics	Prof. Devaud-Plédran Benoit	EPF Lausanne	nccr-qp.epfl.ch
Structural Biology	Prof. Grütter Markus	University of Zurich	www.structuralbiology.unizh.ch

2nd Call of NCCRs

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

Output in 2001 - 2004

(1st Call of NCCRs)

Type	Number
Scientific papers	7600
Presentations at congresses and fairs	6700
Patents/licences	138
Start up companies ¹	18
Prototypes, demonstrators, processes	81
Cooperations with private and public sector	338
CTI projects ²	28 ³

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.

Total of funds in 2001 - 2004

(1st Call of NCCRs)

Funding source (CHF)	2001	2002	2003	2004	Total	%
SNSF funding	51 087 538	54 951 874	57 842 346	60 176 900	224 058 658	36
Self-funding from home institutions ¹	16 909 173	16 603 705	18 493 160	19 891 787	71 897 825	12
Self-funding from project participants	37 713 948	55 711 090	61 975 666	82 687 636	238 088 340	39
Third-party funding ²	8 648 950	16 692 540	27 986 868	28 719 777	82 048 135	13
Total	114 359 609	143 959 209	166 298 040	191 476 100	616 092 958	100

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

² Not included in CTI funding (of page 6)

Total of persons involved in 2001 - 2004

(1st Call of NCCRs)

Personnel	Total of Persons	Female	%	Male	%	Swiss	Other Nations
Management ¹	50	21	42	29	58	36	14
Master students	152	75	49	77	51	71	81
Doctoral students	1296	360	28	936	72	511	785
Postdoctoral students	644	161	25	483	75	152	492
Research associates	53	21	40	32	60	25	28
Senior researchers ²	1165	195	17	970	83	519	646
Other staff	722	377	52	345	48	459	263
Total	4 082	1 210	30	2 872	70	1 773	2 309

¹ Fulltime equivalent, including all NCCR-Directors, 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

Total of funds in 2005 - 2008

(1st and 2nd call of NCCRs)

Funding source	2005	2006	2007	2008	Total	%
SNSF funding	62 000 000	62 500 000	62 500 000	63 000 000	250 000 000	38
Self-funding from Home Institution ¹	26 379 595	22 712 806	22 666 015	21 104 508	92 862 924	14
Self-funding from other institutions ²	7 159 825	2 720 000	2 720 000	2 720 000	15 319 825	2
Self-funding from project participants	59 203 876	61 308 257	58 158 760	56 955 251	235 626 144	35
Third-party funding ³	20 002 113	16 712 256	17 179 876	18 775 293	72 669 538	11
Total	174 745 409	165 953 319	163 224 651	162 555 052	666 478 431	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 persons involved in the NCCRs in the last reporting period (12 months)

(1st Call of NCCRs)

Personnel	Total of Persons	Female	%	Male	%	Swiss	Other Nations
Management ¹	52.12	23.10	44	29.02	56	108	58
Master students	126	63	50	63	50	56	71
Doctoral students	1 031	282	27	749	73	383	641
Postdoctoral students	459	109	24	350	76	98	347
Senior researchers ²	965	153	16	812	84	436	542
Other staff	539	284	53	255	47	329	196
Total	3 219.12	934.10	30	2 287.02	70	1 434	1 872

¹ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training (applies not for the country analysis)

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

Home Institution

ISREC Epalinges

Start of the NCCR

May 1, 2001

NCCR Management

Director

Aguet Michel, Prof.

Associate Director

Deka Jürgen, Dr.
phone: +41 (0)21 692 58 41
juergen.deka@isrec.ch

Office

Rossier Geneviève, Mrs.
phone: +41 (0)21 692 58 40
genevieve.rossier@isrec.ch

Public Relations

Deka Jürgen, Dr.

Knowledge and Technology Transfer

Aguet Michel, Prof.

Education and Training

Cerottini Jean-Charles, Prof.

Advancement of Women

Brisken Cathrin, Dr.

Address

NCCR Molecular Oncology
ISREC
Chemin des Boveresses 155
Case postale
1066 Epalinges sur Lausanne
phone: + 41 (0)21 692 58 58
nccr.oncology@isrec.ch

Web Address

www.nccr-oncology.ch

Public Relations

- Newsletter NCCR

Research

Tumor Host Interactions

Cell Signaling in Tumor Development and Metastasis
Signaling pathways important in breast cancer and breast development

Head: Brisken C.

Mechanisms controlling tissue homeostasis and their role in cancerogenesis

H: Hülsken J.

The role of the tumor stroma

H: Stamenkovic I.

Apoptosis-inducing MegaFasL as novel anti-tumor agent

H: Tschopp J.

Study of gene networks implied in cancer biology

H: Naef F.

Gene Expression Signatures in Tumors

Gene expression signatures in human glioblastoma and their implications for tumor biology and treatment of cancer

H: Hegi M.

Gene expression profiling of microdissected pigmented skin lesions and primary melanoma

H: Piguet V.

Microarray analysis of breast cancer

H: Iggo R.

Tumor Angiogenesis

Role of COX-2 and inflammatory cells in tumor angiogenesis and tumor progression

H: Rüegg C.

Unraveling the molecular regulation of tumor lymphangiogenesis and lymph node metastasis

H: Christofori G.

Tumor Immunity and Cancer Immunotherapy

Coordinator H: Romero P.

Antigen discovery and validation

H: Lévy F.

T cell vaccination of cancer patients and cellular analysis of T cell responses

H: Speiser D.

Combining T cell vaccination with adoptive-cell-transfer (ACT) immunotherapy

H: Leyvraz S.

Molecular analysis of T cell immune responses

H: Rufer N.

Structural design of peptide/MHC and T cell receptor interactions

H: Michielin O.

Evaluation of TNF-related co-stimulatory ligands as molecularly defined adjuvants for cancer vaccines

H: Schneider P.

Novel anti-tumor vaccine strategies

H: Kraehenbuhl J.-P.

Technology Development and Support

Bioinformatics core facility

H: Delorenzi M.

Mouse facility

H: Beermann F.

Microscopy, imaging & morphology facility

H: Garin N.

Clinical tumor proteome analysis facility

H: Servis C.

Education

Oncology Online:

Development of a web-based oncology teaching program

H: Kraehenbuhl J.-P.

Heads of Individual Research Projects

Aguet Michel, Prof.
Beermann Friedrich, Dr.
Brisken Cathrin, Prof.
Christofori Gerhard, Prof.
Delorenzi Mauro, Dr.
Garin Nathalie, Dr.
Hegi Monika, Dr.
Hülsken Jörg, Prof.
Iggo Richard, Prof.
Kraehenbuhl Jean-Pierre, Prof.
Lévy Frédéric, Prof.
Leyvraz Serge, Prof.
Michielin Olivier, Prof.
Naef Felix, Prof.
Piguet Vincent, Prof.
Romero Pedro, Prof.

ISREC, Epalinges
ISREC, Epalinges
ISREC/EPF Lausanne, Epalinges
Dept. of Clinical-Biological Sciences, University of Basel
ISREC, Epalinges
ISREC, Epalinges
Centre Hospitalier Universitaire Vaudois, CHUV, Lausanne
ISREC/EPF Lausanne, Epalinges
University of St Andrews, Scotland
ISREC, Epalinges
Ludwig Institut de Recherches sur le Cancer, Epalinges
Centre pluridisciplinaire d'oncologie, Lausanne
Swiss Institute of Bioinformatics, Lausanne
ISREC/EPF Lausanne, Epalinges
Hôpitaux Universitaires de Genève, HUG
Ludwig Institut de Recherches sur le Cancer, Epalinges

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) forms together with several partner institutes (Ludwig Institute for Cancer Research, Department of Biochemistry of the University of Lausanne, Swiss Institute of Bioinformatics) part of a biomedical research center in Epalinges near 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, using genetic approaches in unicellular and multicellular organisms. A major project at the Department of Biochemistry of the University of Lausanne investigates the ways that permit tumor cells to evade programmed cell death. Other groups in the ISREC and the Ludwig Institute for Cancer Research elucidate the mechanisms that control immune responses to cancer. Research projects in external institutes and clinics, also in other parts of Switzerland, complement

the research portfolio of this cancer research program.

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

Third Party Cooperation

(in progress)

Programmes

- EORTC European Organisation for Research and Treatment of Cancer
- EuroVacc Foundation
- VITAL - IT (SIB)

Research Institutions

- Cancer Research Institute, New York, US
- Centre Medical Universitaire de Genève, CH
- Computational Physics and Bioinformatics Group, Weizmann Institute of Science, Rehovot, IL
- Department of Clinical Pharmacology, University of Oxford, GB
- Department of Immunohematology and Blood Transfusion, Leiden University Medical Center, NL
- Department of Surgical Oncology, Erasmus University Hospital, Rotterdam, NL
- Department Diagnostic Radiology, Centre Hospitalier Universitaire Vaudois (CHUV), Lausanne, CH
- Department Neurosurgery, Anderson Cancer Center, University of Texas, Houston, US
- Department of Biochemistry, University of North Carolina, US
- Department of Clinical Research, University of Bern, CH
- Department of Immunology and Oncology, University of Madrid, ES
- Department Growth Control, Friedrich Mischer Institute, Basel, CH
- Department Signal Processing, EPF Lausanne, CH
- Faculty of Medicine & Science, Garvan Institute of Medical Research, Sydney, AU
- Functional Genomics Unit, Institute Gustave Roussy, Villejuif, FR
- Institute of Infectious Diseases, Free University of Berlin, DE
- Microarray and Expression Genomics Laboratory, Genome Institute of Singapore, SG
- Molecular Cancer Biology Laboratory, University of Helsinki, FI

Rüegg Curzio, Prof.
Rufier Nathalie, Dr.
Schneider Pascal, Prof.
Servis Catherine, Dr.
Speiser Daniel, Prof.
Stamenkovic Ivan, Prof.
Tschopp Jürg, Prof.

Centre pluridisciplinaire d'oncologie, Lausanne
ISREC, Epalinges
Department of Biochemistry, University of Lausanne
Department of Biochemistry, University of Lausanne
Ludwig Institut de Recherches sur le Cancer, Epalinges
Centre Hospitalier Universitaire Vaudois, CHUV, Lausanne
Department of Biochemistry, University of Lausanne

Partner Institutions

Ludwig Institute for Cancer Research LICR, Lausanne Branch
Department of Biochemistry of the University of Lausanne DB, UNIL
Swiss Institute of Bioinformatics SIB, Lausanne Branch
Centre Pluridisciplinaire d'Oncologie CePO
Centre Hospitalier Universitaire Vaudois CHUV
Hôpitaux Universitaires de Genève HUG

Members of the Advisory Board

Tumor-Host Interaction and Apoptosis

Ashkenazi Avi, Prof. Genentech Inc., San Francisco, US
Carmeliet Peter, Prof. Catholic University of Leuven, BE
Rommelaere Jean, Prof. Deutsches Krebsforschungszentrum DKFZ, Heidelberg, DE

DNA-Microarrays, Bioinformatics and Tumor Specific Gene Expression

Ansorge Wilhelm, Prof. European Molecular Biology Laboratory EMBL, Heidelberg, DE
Collins Peter, Prof. University of Cambridge, GB
Guha Abhijit, Prof. University of Toronto, CA
Liu Edison, Prof. Genome Institute of Singapore, SG
Van't Veer Laura, Dr. Netherlands Cancer Institute NKI, Amsterdam, NL

Immunotherapy

Greenberg Philip, Prof. University of Seattle & Fred Hutchinson Cancer Research Center, US
Lanzavecchia Antonio, Prof. Istituto di Ricerca in Biomedicina IRB, Bellinzona, CH
Lazaridis Emmanuel, Dr. International Agency for Research on Cancer IARC, Lyon, FR
Melief Cees J. M., Prof. Leiden University, NL

Molecular Oncology – From Basic Research to Therapeutic Approaches

NCCR Molecular Oncology

- National Health Institute, Frederick, Maryland, US
- Service de dermatologie et vénéréologie, Centre Hospitalier Universitaire Vaudois (CHUV), Lausanne, CH
- Stiftung Tumorbank Basel STB, CH

Economy / Industry

- Agilent Technologies, Palo Alto California, US
- Apotech Biochemicals, Epalinges, CH
- Artus GmbH, Hamburg, DE
- Bracco Research SA, Geneva, CH
- BTG International Ltd., London, GB
- Merck KGaA, Darmstadt, DE
- Novartis AG, Basel, CH
- OncoScore AG, Basel, CH
- Pfizer AG, Zurich, CH
- Pharmacia-Pfizer, Zurich, CH
- Smart Nose Ltd., Neuchâtel, CH
- Tecan, Salzburg, AT
- Transgene, Strasbourg, FR
- Zeptosens, Witterswil, CH

Other

- Andersen Switzerland Foundation, Zurich, CH
- Fond' Action contre le cancer, Lausanne, CH
- Fondation Widmer c/o Dept. Medecine Interne, Hopital Universitaire de Genève, CH
- Gabriella Giorgi-Cavaglieri Foundation, Geneva, CH
- Leenaard's Foundation, Lausanne, CH
- Ligue Suisse contre le Cancer, Bern, CH
- Medic Foundation, Geneva, CH
- OncoSuisse, Bern, CH
- RATP Recherche à Axe Thématique Prioritaire, Geneva, CH
- Recherche Suisse contre le Cancer, Bern, CH
- WHO Vaccines & Biologicals, Geneva, CH

Achievements

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 now under-

way to assess the efficacy of anti-angiogenic therapy in patients with head and neck tumours.

Novel strategies have been developed to direct the patient's immune system against the tumour. Immunisation of melanoma patients with tumour derived antigens proved to be successful in eliciting a strong tumour specific immune response.

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

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

New research groups

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

New technologies

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

Training

The NCCR Molecular Oncology provides education and training in cancer research at several levels. It participates and strengthens the ISREC International PhD Programme and the MD/PhD programme of the University of Lausanne, providing medical doctors with an opportunity to carry out a PhD thesis in molecular oncology. The NCCR presently supports the training of approximately 20 PhD students and 20 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 5	Year 6	Year 7	Year 8	Total	%
SNSF funding	3 750 000	3 750 000	3 750 000	3 750 000	15 000 000	35
Self-funding from home institution ¹	1 412 449	1 543 909	1 553 978	1 564 202	6 074 538	14
Self-funding from EPF Lausanne	550 000	670 000	670 000	670 000	2 560 000	6
Self-funding from project participants	3 434 846	3 360 100	3 132 041	3 068 571	12 995 558	31
Third-party funding	1 508 998	1 544 952	1 519 209	1 378 469	5 951 628	14
Total	10 656 293	10 868 961	10 625 228	10 431 242	42 581 724	100

Personnel ²	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							FR	IT	BE	DE	US	
Management ³	2.88	0.80	28	2.08	72	8	1	0	2	1	1	0
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	31	17	55	14	45	12	2	2	1	2	0	12
Postdoctoral students	23	7	30	16	70	6	2	4	0	1	1	8
Research associates	0	0	0	0	0	0	0	0	0	0	0	0
Senior researchers ⁴	65	19	29	46	71	40	6	3	4	4	2	12
Other staff	32	27	84	5	16	24	3	2	1	0	1	2
Total	153.88	70.80	44	83.08	56	90	14	11	8	8	5	34

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 (applies not for the country analysis)

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

Meier Jürg, Dr. (Chair)	Swiss National Science Foundation, Berne, CH
Ben-Ze'ev Avri, Prof.	Department of Molecular Cell Biology, The Weizmann Institute of Science, IL
Cavalli Franco, Prof.	Oncology Institute of Southern Switzerland, Ospedale San Giovanni, Bellinzona, CH
Dalla-Favera Riccardo, Prof.	Institute of Cancer Genetics, Columbia University, New York, US
Huber Christoph, Prof.	Department of Hematology and Oncology, Johannes-Gutenberg-University Medical School, Mainz, DE
Kléber André, Prof.	Swiss National Science Foundation, Berne, CH
Müller Hans-Joachim, Prof.	Pharma Research Penzberg, Roche Diagnostics GmbH, Penzberg, DE
Polyak Kornelia, Prof.	Department of Medical Oncology, Dana-Farber Cancer Institute, Harvard Medical School, Boston, US
Stevenson Freda K., Prof.	Tenous Laboratory, Southampton University, GB
Werner Sabine, Prof.	Swiss National Science Foundation, Berne, CH
Yaniv Moshe, Prof.	Institut Pasteur, Unité des Virus Oncogènes, Paris, FR

NCCR Office SNSF

Christ Urs, Dr.
Schweiz. Nationalfonds, Wildhainweg 3, 3001 Bern
phone: + 41 (0)31 308 23 50, fax: + 41 (0)31 305 29 71
uchrist@snf.ch

Frontiers in Genetics – Genes, Chromosomes and Development

NCCR Genetics

Home Institution

University of Geneva

Start of the NCCR

July 1, 2001

NCCR Management

Director

Duboule Denis, Prof.
phone: + 41 (0)22 379 67 71
denis.duboule@frontiers-in-genetics.org

Deputy Director

Trono Didier, Prof.
phone: + 41 (0)21 693 17 51
didier.trono@frontiers-in-genetics.org

NCCR Executive Officer

Laemmler Caroline, Dr.
phone: + 41 (0)22 379 67 82
caroline.laemmler@frontiers-in-genetics.org

Office Secretary

Krebs Bérénice, Mrs.

Knowledge and Technology Transfer

Hartmann Reto, Dr.

Education and Training

Rodriguez Ivan, Prof.

Advancement of Women

Gasser Susanne, Prof.

Communication

Frei Pierre-Yves, Mr.

Webmaster

Thièvent Alain, Dr.

Address

NCCR Frontiers in Genetics
Sciences III
Université de Genève
Quai Ernest-Ansermet, 30
1211 Genève 4
phone: + 41 (0)22 379 67 82
fax: + 41 (0)22 379 61 50
management@frontiers-in-genetics.org

Web Address

www.frontiers-in-genetics.org

Public Relations

- Pole Position Newsletter
- Brochure 2004
- Leaflets (English, French or German)
- Press releases, news and adverts on website
- Public events (open doors, teaching, training, exhibitions)
- Meetings

Research

Work Packages

Novel approaches to study mammalian genetics and develop animal models of human diseases

Coordinator: Trono D.

Members: Antonarakis S., Duboule D., Rodriguez I., Schibler U., Trono D., Vassalli J-D., Wahli W., Herrera P., Ruiz I Altaba A.

Functional genomics based on PhiC31 integrase; Integrase-mediated germ-line transformation of drosophila and design of shuttle systems in the mouse

Coordinator: Basler K.

Members: Basler K., Hafen E., Karch F., Spierer P.

Chromosome structure, chromatin function/dynamics, and nuclear-cytoplasmic interactions

Coordinator: Shore D.

Members: Gasser S., Laemmler U., Lingner J., Shore D., Stutz F.

Genetic and viral mapping of neural circuits

Coordinators:

Arber S., Rodriguez I.

Members: Arber S., Gasser S., Rodriguez I., Gomez M., Roska B.

Energy homeostasis and size control: from physiology to pathology

Coordinator: Wahli W.

Members: Duboule D., Hafen E., Schibler U., Wahli W., Herrera P., Nef S., Thorens B.

Technological Platforms, Programs etc.

Genomics platform (Genotyping and transcriptome profiling)

H: Antonarakis S.E., Schibler U.
Manager: Descombes P.

Proteomics platform (Protein chemistry)

H: Shore D.

Bioimaging platform (Image analysis)

H: Gasser S., Laemmler U.
Manager: Bauer C.

Mammalian genetics platform

H: Duboule D.

Doctoral School

Supervisors: Laemmler C., Rodriguez I.

Topics

The general goal of the NCCR Frontiers in Genetics – Genes, Chromosomes and Development is to understand the function and regulation of genes during cellular and organismal development. 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 scientists, which work together on common projects (organized as Work-Packages, WP). These WPs provide an ideal forum for the in-depth discussion of scientific issues by all interested persons (including post-doctoral fellows and students).

In addition, some projects are directly related to technological development and

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

We must think of the future. To keep competing among the best, we need to “make” the best scientist. Our goal is to offer the best graduate school in genetics, in order to attract the best students (worldwide).

Third Party Cooperation

(in progress)

Programmes

- Concert European Program
- ESF European Collaborative Research (EUROCORES) Program on «Dynamic Nuclear Architecture and Chromatin Function» (euroDYNA).
- EU 5th framework; «lentiviral vectors for the gene therapy of the hematopoietic system: development from bench to bedside»
- EU research Network RTN-2001-00276, Checkpoints, DNA Damage Response and Cancer
- EU RTN: Modulation of Signaling (coordinator: Matthias Gaestel)
- European Union Mouse Research for Public Health and Industrial Applications)
- FP6 EU network CELLS INTO ORGANS
- FP6 EU network CRESCENDO
- Human Frontiers Science Program. Project: «Growth regulation of ribosomal protein gene transcription in yeast»
- International group for the Construction of a new Drosophila Deletion
- Programme communautaire LIFE-GENERIC. Projet Eumorphia: Understanding human molecular physiology and pathology through integrated functional genomics in the mouse model

Research Institutions

- Center of Genome Regulation, Barcelona, ES
- Department of Biochemistry and Molecular Biophysics, Columbia University, New York, US
- Department of Biochemistry, University of Fribourg, CH
- Department of Cell Biology - Albert Einstein College of Medicine, Jack and Pearl Resnick Campus, Bronx, NY, US
- Department of Cell Biology and Genetics, Erasmus University, Rotterdam, NL

Heads of Individual Research Projects

Antonarakis Stylianos E., Prof.
Arber Silvia, Prof.
Basler Konrad, Prof.
Duboule Denis, Prof.

Gasser Susan M., Prof.
Gomez Marie, Dr.

Hafen Ernst, Prof.
Herrera Pedro, Dr.
Karch François, Dr.

Laemmli Ulrich K., Prof.

Lingner Joachim, Dr.
Nef Serge, Dr.
Rodriguez Ivan, Prof.

Roska Botond, Dr.
Ruiz i Altaba Ariel, Prof.
Schibler Ueli, Prof.
Shore David M., Prof.
Spierer Pierre, Prof.

Stutz Françoise, Dr.
Thorens Bernard, Prof.
Trono Didier, Prof.
Vassalli Jean-Dominique, Prof.
Wahli Walter, Prof.

Division de Génétique Médicale, Université de Genève
Departement für Zellbiologie, Universität Basel
Institut für Molekularbiologie, Universität Zürich
Département de Zoologie et Biologie Animale,
Université de Genève

Friedrich Miescher Institute for Biomedical Research, Basel
Département de Zoologie et Biologie Animale,
Université de Genève

Institut für Zoologie, Universität Zürich
Département de Morphologie, Université de Genève
Département de Zoologie et Biologie Animale,
Université de Genève

Départements de Biologie Moléculaire et Biochimie,
Université de Genève

ISREC, Epalinges
Département de Morphologie, Université de Genève
Département de Zoologie et Biologie Animale,
Université de Genève

Friedrich Miescher Institute for Biomedical Research, Basel
Département de Génétique Médicale, Université de Genève
Département de Biologie Moléculaire, Université de Genève
Département de Biologie Moléculaire, Université de Genève
Département de Zoologie et Biologie Animale,
Université de Genève

Département de Biologie Cellulaire, Université de Genève
Centre Intégréatif de Génomique, Université de Lausanne
Ecole Polytechnique Fédérale de Lausanne
Département de Morphologie, Université de Genève
Centre Intégréatif de Génomique, Université de Lausanne

- Department of Computer Science, Washington University, St-Louis, US
- Department of Genetic Medicine and Development, University of Geneva Medical School (CMU), CH
- Department of Neurobiology, Friedrich Miescher Institute, Basel, CH
- Department of Psychiatry, Geneva Medical School, Belle-Idée HUG, CH
- Faculty of Applied Biological Science, Hiroshima University, JP
- Genome Sequencing Center, Washington University, St-Louis, US
- INSERM, Development Biology Institute, Marseille, FR
- Institut Suisse de Recherche Experimentale sur le Cancer ISREC, Epalinges, CH
- Institute of Molecular Cancer Research, University of Zürich, CH
- Instituto de Bioquímica Vegetal y Fotosíntesis – Universidad de Sevilla, CSIC, ES
- Ludwig Institute for Cancer Research, Lausanne, CH
- Max Planck Institute for Molecular Biology, Munich, DE
- Max Planck Institute of Experimental Endocrinology, Hannover, DE
- Nutrition, Metabolism and Genomics group, Wageningen University, NL
- Telethon Institute of Genetics and Medicine, Naples, IT
- Walter and Eliza Hall Institute for Research, Melbourne, AU
- Whitehead Institute, MIT Center for Genome Research, Boston, US
- Zentrum für Molekulare Biologie Heidelberg ZMBH, DE
- Zoological laboratory, Department of Animal Behavior, Chronobiology, University of Groningen, Haren, NL

Achievements

Research and technology

The various individual research projects are now conducted under the auspices of “Work-Packages” (WPs). Currently, the 23 different laboratories are organized in five WPs. The WPs have been developed with the goal of creating an ideal forum for in-depth discussion of scientific issues and collaborations. Some projects directly related to technological developments are pursued in the context of our three technological platforms (genomics, bioimaging and proteomics). These platforms are very well attended by members of the NCCR as well as by other regional scientists in search of excellent expertise and a low “cost/quality” ratio. The attractiveness of the platforms is directly visible by the positive income, this is mainly due to the top quality of the technologies, the excellent expertise and the constant development to keep up with the scientists needs. Furthermore, the courses proposed by the platforms are very well attended and

receive good feedback from the participants. Furthermore, a new officer, which is responsible of promoting knowledge and technology transfer, has been hired. His main job is to promote KTT activities within the NCCR Genetics and identify technologies and competences with commercial potential.

Education

The International Doctoral School developed by the NCCR Genetics has been a success. To date, 29 students of various nationalities have been hired. 2006 will mark a milestone since the first four students will graduate. The different professors are all very fond of their NCCR students, which proves the attractiveness of the program for excellent and motivated students and the high standard of the recruitment procedure. With regard to the future of research, an excellent training program is in our opinion of major importance. Therefore, a dominant goal for the NCCR Genetics is to develop tomorrow’s top

scientists. We keep our eyes and ears open to students/professors opinions and wishes, in order to find out which features are appreciated and which need to be altered. In this way, the school stays dynamic and fulfills the top needs.

Public relations

The NCCR Genetics continues to be concerned by the need to make science accessible to the public. We therefore organize activities such as lab visits, debates, information booklets. With respect to the young public, we organise more specific events (Journée des filles, Journée d’information aux collégiens, visits of the platforms for schoolchildren, and laboratory weeks). We also organise courses for elementary and high school teachers, and more than a dozen visits for political national and foreign delegations.

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

Economy/Industry

- Bitplane AG, Zurich, CH
- Cenix BioScience GmbH, Dresden, DE
- Nestlé Research Center, Vevey, CH
- NovImmune SA, Geneva, CH
- Serono International SA, Genève, CH
- The Genetics Company Inc., Schlieren, CH
- Zydus Cadila, Ahmedabad, IN

Statistical Input – Output Data

Funding source (CHF)	Year 5	Year 6	Year 7	Year 8	Total	%
SNSF funding	4 100 000	4 100 000	4 000 000	3 800 000	16 000 000	30
Self-funding from home institution ¹	500 000	500 000	500 000	500 000	2 000 000	4
Self-funding from project participants	6 727 393	7 574 542	7 564 075	8 141 554	30 007 564	56
Third-party funding	1 373 998	1 387 550	1 411 550	1 434 045	5 607 143	10
Total	12 701 391	13 562 092	13 475 625	13 875 599	53 614 707	100

Personnel ²	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							FR	IT	RU	GR	JP	
Management ³	1.78	0.50	28	1.28	72	4	3	0	0	0	0	0
Master students	1	0	0	1	100	0	0	0	0	0	0	0
Doctoral students	55	21	38	34	62	21	5	10	4	3	1	19
Postdoctoral students	44	18	41	26	59	4	13	1	4	0	5	16
Research associates	0	0	0	0	0	0	0	0	0	0	0	0
Senior researchers ⁴	42	13	31	29	69	22	8	3	0	5	1	11
Other staff	59	40	68	19	32	39	11	2	1	0	1	6
Total	202.78	92.50	44	110.28	56	90	40	16	9	8	8	52

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 (applies not for the country analysis)

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

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

Members of the Review Panel

Kléber André, Prof. (Chair)
Hoeijmakers Jan H.J., Prof.

Swiss National Science Foundation, Berne, CH
Dept. of Cell Biology and Genetics, Erasmus University, Rotterdam, NL

Jovin Thomas M., Prof.

Department of Molecular Biology, Max Planck Institute for Biophysical Chemistry, Göttingen, DE

Lindpaintner Klaus, Prof.

Roche Genetics and Roche Center for Medical Genomics, F. Hoffmann-La Roche, Basel, CH

McMahon Andrew, Prof.

Dept. of Molecular and Cellular Biology, Harvard University, Cambridge, US

Meier Jürg, Dr.

Swiss National Science Foundation, Berne, CH

Paro Renato, Prof.

Center for Molecular Biology (ZMBH), University of Heidelberg, DE

Rosbash Michael, Prof.

Howard Hughes Medical Institute, Brandeis University, Waltham, US

Schaffner Walter, Prof.

Swiss National Science Foundation, Berne, CH

NCCR Office SNSF

Christ Urs, Dr.

Schweiz. Nationalfonds, Wildhainweg 3, 3001 Bern
phone: + 41 (0)31 308 23 50, fax: + 41 (0)31 305 29 71
uchrist@snf.ch

Molecular Life Sciences – Three Dimensional Structure, Folding and Interactions

NCCR Structural Biology

Home Institution

University of Zurich

Start of the NCCR

May 1, 2001

NCCR Management

Director

Grütter Markus Gerhard, Prof.
phone: + 41 (0)1 635 55 80
gruetter@bioc.unizh.ch

Deputy Director

Wüthrich Kurt, Prof.
phone: + 41 (0)1 633 24 73
Fax: + 41 (0)1 633 11 51

Coordinator

Sticher Patrick, Dr.
phone: + 41 (0)1 635 54 84
sticher@bioc.unizh.ch

Administrative Assistant

Schmid Brigitte, Mrs.
phone: + 41 (0)1 635 55 82
brigitte.schmid@bioc.unizh.ch

Knowledge and

Technology Transfer
Plückthun Andreas, Prof.

Education and Training

Glockshuber Rudolf, Prof.

Advancement of Women

van Gunsteren Wilfred, Prof.

Address

NCCR Bureau
Structural Biology
Patrick Sticher
Institute of Biochemistry
University of Zurich
Winterthurerstrasse 190
8057 Zurich

phone: + 41 (0)1 635 54 84
fax: + 41 (0)1 635 68 34
sticher@bioc.unizh.ch

Web Address

www.structuralbiology.unizh.ch

Public Relations

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

Research

Areas

Structural biology of membrane proteins

Coordinator: Engel A.

Supramolecular assemblies/molecular interactions

Coordinator: Richmond T. J.

Technologies

Coordinator: Plückthun A.

Projects

Folding and function of supramolecular systems and membrane proteins

Head: Glockshuber R.

Synthetic protein libraries

H: Plückthun A.

Assessing the structure and dynamics of membrane proteins by electron and atomic force microscopy

H: Engel A.

X-ray crystallography of supramolecular systems and membrane transporters

H: Grütter M.

Supramolecular assemblies: structures of chromatin and associated multiprotein complexes

H: Richmond T. J.

Signalling and transport through biological membranes

H: Winkler F.

Solution NMR with soluble and membrane proteins, including supramolecular structures

H: Wüthrich K.

Computer simulation of membrane proteins, supramolecular complexes and macromolecular folding

H: van Gunsteren W. F.

X-ray crystallography and electron microscopy of supramolecular systems

H: Ban N.

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

H: Allain F.

Mechanisms of ion transport across membranes: The structural biology of ion channels and ion transporters

H: Dutzler R.

Structure and mechanism of bacterial drug and antibiotic transporters

H: Locher K.

Associated Groups

Automation of protein crystallography beamlines for challenging projects at the swiss light source

H: Schulze-Briese C.

New isotope labeling strategies of protein and RNA for NMR spectroscopy investigations

H: Wüthrich K.

Calorimetric and biophysical analysis of protein-ligand binding and protein folding

H: Jelezarov I.

Synthesis of modified RNA-sequences for structural investigations

H: Pitsch S.

Programmes

Postgraduate program

Supervisor: Glockshuber R.

Annual practical course in structural biology

Supervisor: Glockshuber R.

Topics

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

products, a quantitative understanding of the 3D-structure of proteins, their folding, and their interactions with other molecules is required. Such understanding is the key to develop innovative medicines, such as new antibiotics and vaccines, as well as drugs against cancer and diseases of the central nervous, immune, and cardiovascular systems. In this NCCR

specialists in experimental structure determination by X-ray crystallography, NMR spectroscopy and electron microscopy / crystallography, in protein biophysical chemistry, modern molecular biology, and computational biology will meet the challenge to link the ever increasing biological data generated in the genomics field with related structural and functional information.

Third Party Cooperation

(in progress)

Research Institution

(selection of international cooperations only)

- Astbury Centre for Structural Mol. Biology, School of Biochemistry and Mol. Biology, University of Leeds, GB
- Biochemie-Zentrum Heidelberg BZH, University of Heidelberg, DE
- BIOTECH, Technical University Dresden, DE
- BIOXHIT, Biocrystallography on a Highly Integrated Technology Platform, EMBL, Hamburg, DE
- Cell Physiology, University Medical Center St Radboud, University of Nijmegen, NL
- Center for Biomolecular Magnetic Resonance, University of Frankfurt, DE
- Chemistry Research Laboratory, University of Oxford, GB
- Cent. nat. de la Recherche Scientifique, Architecture et Fonction de Macromolécules Biologique, Marseille, FR
- Department Biology, Mikrobiologie, Ludwig Maximilians-Universität, Munich, DE
- Department of Biochemistry and Molecular Biology, Colorado State University, Fort Collins, US
- Department of Biochemistry and Molecular Biology, University of Barcelona, ES
- Depart. of Biochemistry, Tel-Aviv University, Tel Aviv, IL
- Department of Biochemistry, University of Rome "La Sapienza", IT
- Department of Biology, University of Konstanz, DE
- Department of Biophysics and Biochemistry, University of Tokyo, JP
- Department of Biophysics, Kyoto University, JP
- Dep. of Cell and Molecular Biology/Microbiology, Göteborg University, SE
- Department of Cell Biology, Aarhus University, DK

Heads of Individual Research Projects and Associated Groups

Allain Frédéric, Prof.

Ban Nenad, Prof.

Dutzler Raimund, Prof.

Engel Andreas, Prof.

Glockshuber Rudolf, Prof.

Grütter Markus, Prof.

Jelezarov Ilian, Dr.

Locher Kaspar, Prof.

Pitsch Stefan, Prof.

Plückthun Andreas, Prof.

Richmond Timothy J., Prof.

Schulze-Briese Clemens, Dr.

van Gunsteren Wilfred F., Prof.

Winkler Fritz, Prof.

Wüthrich Kurt, Prof.

Institut für Molekularbiologie und Biophysik, ETH Zürich

Institut für Molekularbiologie und Biophysik, ETH Zürich

Institut für Biochemie, Universität Zürich

M.E. Müller Institut, Biozentrum, Universität Basel

Institut für Molekularbiologie und Biophysik, ETH Zürich

Institut für Biochemie, Universität Zürich

Institut für Molekularbiologie und Biophysik, ETH Zürich

Institute of Chemical Science and Engineering, EPF Lausanne

Institut für Biochemie, Universität Zürich

Institut für Molekularbiologie und Biophysik, ETH Zürich

Paul Scherrer Institut, Villigen PSI

Laboratorium für physikalische Chemie, ETH Zürich

Paul Scherrer Institut, Villigen PSI

Institut für Molekularbiologie und Biophysik, ETH Zürich

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

- Department of Chemistry, University of Leiden, NL
- Department of Medical Biochemistry and Biophysics MBB, Karolinska Institute Stockholm, SE
- Dep. of Mol. Biophysics and Biochemistry, Yale University, New Haven, CT, US
- Department of NMR Spectroscopy, University of Utrecht, NL
- Department of Ophthalmology, University of Washington, Seattle, WA, US
- Dep. of Plant Biochemistry, Lund University, SE
- Division of Clinical Sciences, Medicine, Imperial College London, GB
- Fachhochschule beider Basel FHBB/Swiss Biotechnet, CH
- FB9 Mikrobiologie, Univ. Duisburg-Essen, DE
- Biomolecular Sciences and Biotechnology Institute, University of Groningen, Haren, NL
- HHMI/Microbio & Mol Genet, University of California, Los Angeles, CA, US
- Howard Hughes Medical Institute, Brandeis University, Waltham, MA, US
- Howard Hughes Medical Institute, University of California, Los Angeles, US
- IGBMC, Institut de Génétique et de Biologie Moléculaire et Cellulaire, Illkirch, FR
- Institute Curie, Physical chemistry, Paris, FR
- Institute of Biotechnology and Biomedicine, University of Barcelona, ES
- Inst. of Mol. Biol. and Biotechnology, Univ. of Crete, Heraklion, GR
- Inst. of Mol. Biol., Slovak Academy of Sciences, Bratislava, SK
- Johns Hopkins School of Medicine, Department of Biological Chemistry, Baltimore, MD, US
- Krebs Institute, University of Sheffield, GB
- Laboratory of Molecular Biology, NIH, National Institutes of Health, Bethesda, US
- Laboratory of Viral Diseases, NIH, National Institutes of Health, Bethesda, US
- MPI für Kohlenforschung, Mülheim, DE

Achievements

Key biology areas

This NCCR focuses on the structural biology of membrane proteins and supramolecular complexes and interactions. In both areas, major advances could be reported over the first phase of the project. Methods for cloning, expression, purification, crystallisation and analysis of membrane proteins could be advanced and first successes in the structure determination of membrane proteins were achieved. The structures of several supramolecular complexes were determined. An important research field within this area is the structure and compaction of the chromatin fibre, where new insights were gained.

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 three 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 in many applications. The business idea for this spin-off was awarded with several awards.

Education

A post-graduate program in structural biology was established and embedded in the PhD Program Molecular Life Sciences Zurich. 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.unizh.ch

Statistical Input – Output Data

Funding source (CHF)	Year 5	Year 6	Year 7	Year 8	Total	%
SNSF funding	3 900 000	3 800 000	3 400 000	3 300 000	14 400 000	42
Self-funding from home institution ¹	2 066 620	1 754 830	1 730 000	1 570 000	7 121 450	21
Self-funding from ETH Zurich	1 000 000	1 000 000	1 000 000	1 000 000	4 000 000	12
Self-funding from project participants	2 338 840	2 338 850	2 028 155	1 928 155	8 634 000	25
Third-party funding	50 000	50 000	50 000	50 000	200 000	1
Total	9 355 460	8 943 680	8 208 155	7 848 155	34 355 450	100

Personnel ²	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	IT	FR	US	NL	
Management ³	2.54	1.14	45	1.40	55	4	2	0	0	0	0	0
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	96	30	31	66	69	39	21	6	2	1	2	21
Postdoctoral students	52	12	23	40	77	9	15	5	4	2	3	12
Research associates	0	0	0	0	0	0	0	0	0	0	0	0
Senior researchers ⁴	40	7	17	33	83	13	8	2	3	3	1	12
Other staff	32	20	62	12	38	16	3	2	1	3	0	7
Total	222.54	70.14	32	152.40	68	81	49	15	10	9	6	52

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 (applies not for the country analysis)

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

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

Members of the Review Panel

Kléber André, Prof. (Chair)

Eisenberg David, Prof.

Iwata So, Prof.

Michel Hartmut, Prof.

Riezmann Howard, Prof.

Roditi Isabel, Prof.

Schmid Franz Xaver, Prof.

Widmer Hans, Dr.

Wright Ernest M., Prof.

Wright Peter E., Prof.

Swiss National Science Foundation, Berne, CH

UCLA-DOE Institute for Genomics and Proteomics, US

Department of Biological Sciences, Imperial College London, GB

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

Swiss National Science Foundation, Berne, CH

Swiss National Science Foundation, Berne, CH

Laboratorium für Biochemie, Universität Bayreuth, DE

Novartis Pharma AG, Basel, CH

UCLA School of Medicine, Los Angeles, US

Department of Molecular Biology, The Scripps Research Institute, La Jolla, US

NCCR Office SNSF

Christ Urs, Dr.

Schweiz. Nationalfonds, Wildhainweg 3, 3001 Bern

phone: + 41 (0)31 308 23 50, fax: + 41 (0)31 305 29 71

uchrist@snf.ch

- MPI for Biochemistry, Martinsried, DE
- MPI for Biophysical Chemistry, Göttingen, DE
- MAX-INF, European Macromolecular Crystallography Infrastructure Cooperation Network, Daresbury, Warrington, GB
- Molecular and Structural Biochemistry, University of Rennes, FR
- National Institute of Chemistry Slovenia, Ljubljana, SI
- NMI, Naturwissenschaftliches und Medizinisches Institut, University of Tübingen, DE
- Pharmacology Department, Vanderbilt University, Nashville, Tennessee, US
- Physiology and Biophysics, University of Texas Medical Branch, Galveston, US
- San Diego Joint Center for Structural Genomics, US
- School of Biosciences, Cardiff University, GB
- The Scripps Research Institute, La Jolla, CA, US
- Unité de Génétique moléculaire, Centre National de la Recherche Scientifique Institut Pasteur, Paris, FR
- ZMBH, Zentrum für Molekulare Biologie, University of Heidelberg, DE

Economy/Industry

- Actelion Pharmaceuticals Ltd., Allschwil, CH
- Apotech Corporation, Lausen, CH
- Cambridge Antibody Technology, GB
- Discovery Partners International, Allschwil, CH
- Discovery Partners International, San Diego, CA, US
- ESBATech AG, Schlieren, CH
- Molecular Partners AG, Zurich, CH
- Novartis Pharma AG, Basel, CH
- Novartis Pharma Molecular Modelling Group, Basel, CH
- Novo Nordisk A/S, Bagsvaerd, DK
- Polyphor Ltd., Allschwil, CH
- Speedel Experimenta AG, Allschwil, CH
- Syngenta Crop Protection AG, Basel, CH
- Wacker-Chemie AG, Munich, DE

Neural Plasticity and Repair

NCCR Neuro

Home Institution

University of Zurich

Start of the NCCR

June 1, 2001

NCCR Management

Director

Schwab Martin E., Prof.
phone: + 41 (0)44 635 33 31
schwab@hifo.unizh.ch

Deputy Directors

Möhler Hanns, Prof.
phone: + 41 (0)44 635 59 11
mohler@pharma.unizh.ch

Nitsch Roger M., Prof.
phone: + 41 (0)44 634 88 71
nitsch@bli.unizh.ch

Knecht Wolfgang, Dr.
phone: + 41 (0)44 635 33 81
wknecht@neuroscience.unizh.ch

Coordinator

Vranesic Tamara, Mrs.
phone: + 41 (0)44 635 33 84
vransic@neuroscience.unizh.ch

*Knowledge and
Technology Transfer*
Colombo Gery, Dr.

Education and Training
Knecht Wolfgang, Dr.

Advancement of Women
Mansuy Isabelle, Prof.

Address

NCCR Neural Plasticity
and Repair
Winterthurerstrasse 190
8057 Zürich
vransic@neuroscience.unizh.ch

Web Address

www.nccr-neuro.unizh.ch

Public Relations

- Neurotransmitter Newsletter
- Video clips on the research projects
- BrainFair 2006

Research

Neural stem cells: An integrated approach to basic knowledge and thera- peutic applications

Head: Suter U.
Lipp H.-P., Relvas J.,
Sommer L., Thallmair M.

Alzheimer's disease

H: Nitsch R.
Caflish A., Glockshuber R.,
Heizmann C., Hock Ch.,
Konietzko U., Molinari M.,
Schmidt M., Sonderegger P.

Functional recovery after stroke

H: Bassetti C.
Gerber U., Hermann D.,
Kollias S., Mansuy I., Streit P.

Epilepsy: New models and therapeutic strategies

H: Fritschy J.-M.
Frei K., Jeanmonod D.,
Leppert D., Wieser H. G.

Cortical plasticity

H: Martin K.
Boesiger P., Ishai A., Jäncke L.,
Kiper D., Scherberger H.

Infection and immunity of the central nervous system

H: Fontana A.
Aguzzi A., Becher B.,
DeLamarter J., Glatzel M.,
Goebels N., Kappos L., Reith W.,
Suter T.

Spinal cord repair

H: Schwab M., Dietz V.
Curt A., Keller T., Kollias S.,
Mir A., Riener R., Rouiller E.,
Schurch B., Stoeckli E., Zurn A.

Rehabilitation technology matrix

H: Riener R.
Bassetti C., Hock Ch., Keller T.,
Kollias S., Schwab M.,
Verschure P.

Technological Platforms, Programmes etc.

Center of transgenesis expertise

H: Mansuy I.
Becher B., Bürki K.,
Sonderegger P., Suter U.,
Trono D.

Center for advanced assessment of animal behavior

H: Lipp H.-P.
Feldon J., Verschure P.,
Wolfer D.

Center for proteomics

H: Wollscheid B.
N.N.

Center for animal imaging

H: Rudin M.
Boesiger P., Helmchen F.,
Rausch M.

International Ph. D. Program in Neuroscience

Administered by the
Neuroscience Center Zurich
Coordinator: Knecht W.

Topics

Today there is still little that can be done to help the victims of brain damage or other kinds of diseases that afflict the brain or spinal cord. Only since the beginning of the 1980's research has been devoted to repairing brain trauma or disease. But at the same time, great strides have been made in the understanding of disease mechanisms and the possibilities of restoring neural functions. It is said that neuroscience made

more progress in the last ten years than in the whole of last century.

The fundamental goal of the NCCR on "Neural Plasticity and Repair" is the restoration of function after damage or disease of the nervous system. The NCCR will elucidate the basic cellular and molecular mechanisms of regeneration, plasticity and functional repair of the damaged nervous system. The synergies between experimental

and clinical sciences in conjunction with engineering sciences and neuroinformatics will generate new knowledge on brain functions in epilepsy, multiple sclerosis, prion disease, immune surveillance, neuronal regeneration and rehabilitation after stroke and spinal cord injury. Indeed, the stage of the first clinical trials has been reached with the immunotherapy of Alzheimer disease and spinal cord injury.

Third Party Cooperation

(in progress)

Programmes

- Christopher Reeve Paralysis Foundation (CRPF) US
- DIADEM (EU FP 5)
- SCOPES SNF

Research Institutions

(selection of international cooperations only)

- Alzheimer Research Center, Karolinska Institute, Stockholm, SE
- Bioinorganic Research Group, University of Konstanz, DE
- Center for Neurologic Diseases, Harvard Medical School, Boston, MA, US
- Center for Structural Biology, Vanderbilt University, Nashville, TN, US
- Clinic of Medicine, University of Heidelberg, DE
- Clinical Neurology, University of Würzburg, DE
- Cuban Neuroscience Center, Havana, CU
- Department for Molecular Medicine and Gene Therapy, Lund University, Malmö, SE
- Department of Anatomical & Cellular Pathology, The Chinese University of Hong Kong, Shatin, NT, CN
- Department of Biochemistry and Molecular Biology, University of Massachusetts, Amherst, MA, US
- Department of Biochemistry, Ludwig-Maximilian-University Munich, DE
- Department of Biology, University of Konstanz, DE
- Department of Child and Adolescent Psychiatry and Psychotherapy, University of Frankfurt, DE
- Department of Genetics, University of Pennsylvania, Philadelphia, PA, US
- Department of Geriatric Medicine, Karolinska Institute, Stockholm, SE
- Department of Immunology, Weizmann Institute of Science, Rehovot, IL
- Department of Molecular and Cellular Neurobiology, Nencki Institute of Experimental Biology, Warsaw, PL
- Department of Neurobiology, University of Chicago, IL, US
- Department of Neurology, Massachusetts General Hospital, Boston, MA, US

Heads of Individual Research Projects and Subprojects

Aguzzi Adriano, Prof.
Bassetti Claudio, Prof.
Becher Burkhard, Prof.
Boesiger Peter, Prof.
Bürki Kurt, Prof.
Caflich Amedeo, Prof.
Curt Armin, PD Dr.
DeLamarer John, Dr.
Dietz Volker, Prof.
Feldon Joram, Prof.
Fontana Adriano, Prof.
Frei Karl, Prof.
Fritschy Jean-Marc, Prof.
Gerber Urs, Prof.
Glatzel Markus, Dr.
Glockshuber Rudolf, Prof.

Goebels Norbert, Prof.
Heizmann Claus W., Prof.
Helmchen Fritjof, Prof.
Hermann Dirk, PD Dr.
Hock Christoph, Prof.
Ishai Alunit, Prof.
Jäncke Lutz, Prof.
Jeanmonod Daniel, Prof.
Kappos Ludwig, Prof.
Keller Thierry, Dr.

Institut für Neuropathologie, Universitätsspital Zürich
Neurologische Poliklinik, Universitätsspital Zürich
Neurologische Klinik, Universitätsspital Zürich
Institut für Biomedizinische Technik, Universität und ETH Zürich
Institut für Labortierkunde, Universität Zürich
Biochemisches Institut, Universität Zürich
Paraplegikerzentrum, Universitätsklinik Balgrist, Zürich
Serono International S.A., Geneva
Paraplegikerzentrum, Universitätsklinik Balgrist, Zürich
Labor für Verhaltensbiologie, ETH Zürich, Schwerzenbach
Klinische Immunologie, Universitätsspital Zürich
Neurochirurgische Klinik, Universitätsspital Zürich
Institut für Pharmakologie und Toxikologie, Universität Zürich
Institut für Hirnforschung, Universität Zürich
Institut für Neuropathologie, Universitätsspital Zürich
Institut für Molekularbiologie und Biophysik, ETH Zürich
Hönggerberg
Neurologische Klinik, Universitätsspital Zürich
Klinische Chemie und Biochemie, Kinderspital Zürich
Institut für Hirnforschung, Universität Zürich
Neurologische Klinik, Universitätsspital Zürich
Abteilung für Psychiatrische Forschung, Universität Zürich
Institut für Neuroradiologie, Universitätsspital Zürich
Psychologisches Institut, Universität Zürich
Neurochirurgische Klinik, Universitätsspital Zürich
Abteilung Neurologie, Universitätsspital Basel
Paraplegikerzentrum, Universitätsklinik Balgrist, Zürich und
Institut für Automatik, ETH Zürich

- Department of Neuropharmacology, University of Michigan, Ann Arbor, MI, US
- Department of Neuroscience, University of Pennsylvania, Philadelphia, PA, US
- Dept. of Neurosciences, Mayo Clinic, Jacksonville, FL, US
- Department of Pathology, Harvard Medical School, Boston, MA, US
- Department of Pharmacology, Graduate School of Medicine, Kyoto University, JP
- Dept. of Pharmacology, University of Michigan, MI, US
- Department of Physical Therapy, School of Medicine, University of Miami, FL, US
- Department of Psychiatry and Psychotherapy, University of Frankfurt, DE
- Department of Psychological and Brain Sciences, Duke University, Durham, US
- Developmental Neurobiology, Burnham Institute, La Jolla, CA, US
- Division of Biology, California Institute of Technology, Pasadena, US
- Division of Biomedical Sciences, University of Edinburgh, GB
- Division of Molecular Neurobiology, National Institute of Medical Research, London, GB
- Div. of Neurophysiology, National Institute for Medical Research, Mill Hill, London, GB
- Division of Physical Therapy, Ohio State University, Columbus, OH, US
- Faculty of Rehabilitation Medicine, University of Alberta, Edmonton, CA
- Forschungsinstitut für Molekulare Pharmakologie, Max-Delbrück-Centrum für Molekulare Medizin (MDC), Berlin-Buch, DE
- Genetics Division, Biochemistry and Biophysics, University of California, San Francisco, CA, US
- INSERM U495, Université Pierre et Marie Curie, Paris, FR
- Institut de Génétique et de Biologie Moléculaire et Cellulaire (IGBMC), Strasbourg, FR
- Institut für Biochemie, Universität Erlangen-Nürnberg, DE

Achievements

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 and engineering sciences.

Therapeutic advances

Immunotherapy has reached the clinical stage in the treatment of Alzheimer's disease and NCCR groups will be participating in first clinical trials. Similarly, the stage is set for first clinical trials of immunotherapy for spinal cord injury.

Basic science

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

Recognition

The achievements of the NCCR were recognized by

a large number of internationally and nationally prestigious prizes awarded to members of the NCCR Neuro.

New professorships

To advance the NCCR, five new professorships were created in Phase I: in clinical and experimental analysis of multiple sclerosis, rehabilitation engineering, neuroimaging and brain imaging of animals.

Central facilities

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

Education

The Neuroscience Center Zurich (ZNZ) offers the International Ph.D. Program in Neuroscience. Since the beginning of the NCCR, 46 Ph.D. students have successfully completed their doctoral thesis. About 60 Ph.D. students are currently enrolled.

Spin offs

Major efforts have been made to extend joint projects with major pharma companies. In addition, two spin off companies arose from the NCCR and provide new positions for young scientists: NewBehavior AG in Zurich ("Intellicage") and Evotec Neuroscience AG in Zurich. Ten patents have been issued.

Dialogue with society

The dialogue between the NCCR and society at large is an important aspect. Regular press contacts are organized, video clips on the research projects are available on the homepage and 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.unizh.ch

Kiper Daniel, PD Dr.
Knecht Wolfgang, Dr.

Kollias Spyros, PD Dr.
Konietzko Uwe, Dr.
Leppert David, Dr.
Lipp Hans-Peter, Prof.
Mansuy Isabelle, Prof.
Martin Kevan, Prof.
Mir Anis, Dr.
Möhler Hanns, Prof.

Molinari Maurizio, Dr.
Nitsch Roger M., Prof.
Rausch Martin, Dr.
Reith Walter, PD Dr.
Relvas João, Dr.
Riener Robert, Prof.

Rouiller Eric, Prof.
Rudin Markus, Prof.

Scherberger Hans, Dr.
Schmidt Markus, Dr.
Schurch Brigitte, PD Dr.
Schwab Martin E., Prof.

Sommer Lukas, Prof.
Sonderregger Peter, Prof.
Stoeckli Esther, Prof.
Streit Peter, Prof.
Suter Tobias, Dr.
Suter Ulrich, Prof.
Thallmair Michaela, Dr.
Trono Didier, Prof.
Verschure Paul, Dr.
Wieser Heinz-Gregor, Prof.
Wolfer David, PD Dr.
Wollscheid Bernd, Dr.
Zurn Anne, Dr.

Delegates

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

Institut für Neuroinformatik, Universität und ETH Zürich
Zentrum für Neurowissenschaften Zürich, Universität
und ETH Zürich

Institut für Neuroradiologie, Universitätsspital Zürich
Abteilung für Psychiatrische Forschung, Universität Zürich
GlaxoSmithKline, London, GB

Anatomisches Institut, Universität Zürich
Institut für Hirnforschung, Universität Zürich
Institut für Neuroinformatik, Universität und ETH Zürich
Novartis Pharma AG, Basel

Institut für Pharmakologie und Toxikologie, Universität Zürich
und Departement für Angewandte Biowissenschaften, ETH Zürich
Institute for Research in Biomedicine, Bellinzona
Abteilung für Psychiatrische Forschung, Universität Zürich
Novartis Pharma AG, Basel

Département de Pathologie et Immunologie, Université de Genève
Institut für Zellbiologie, ETH Zürich Hönggerberg
Institut für Automatik, ETH Zürich und Paraplegikerzentrum,
Universitätsklinik Balgrist, Zürich

Institut de Physiologie, Université de Fribourg
Institut für Pharmakologie und Toxikologie, Universität
und ETH Zürich und Institut für Biomedizinische Technik,
Universität und ETH Zürich

Institut für Neuroinformatik, Universität und ETH Zürich
Novartis Pharma AG, Basel

Paraplegikerzentrum, Universitätsklinik Balgrist, Zürich
Institut für Hirnforschung, Universität Zürich und
Departement für Biologie, ETH Zürich

Institut für Zellbiologie, ETH Zürich Hönggerberg
Biochemisches Institut, Universität Zürich

Zoologisches Institut, Universität Zürich
Institut für Hirnforschung, Universität Zürich

Klinische Immunologie, Universitätsspital Zürich
Institut für Zellbiologie, ETH Zürich Hönggerberg

Institut für Hirnforschung, Universität Zürich
School of Life Sciences, EPF Lausanne

Institut für Neuroinformatik, Universität und ETH Zürich
Neurologische Klinik, Universitätsspital Zürich

Anatomisches Institut, Universität Zürich
Institut für Molekulare Systembiologie, ETH Zürich Hönggerberg
Service de Chirurgie Expérimentale, CHUV, Lausanne

Paraplegikerzentrum, Universitätsklinik Balgrist, Zürich
Institut für Hirnforschung, Universität Zürich
Zentrum für Neurowissenschaften Zürich, Universität
und ETH Zürich

- Institut für Klinische Chemie, Universität Regensburg, DE
- Institut für klinische Neuroimmunologie, Ludwig-Maximilians-Universität München, DE
- Institut für Mediz. Immunologie, Charité Berlin, DE
- Institute for Clinical Pharmacology and Toxicology, Freie Universität Berlin, DE
- Institute of Genetics, University of Cologne, DE
- Institute of Human Genetics, University of Würzburg, DE
- Institute of Physiology, University of Tübingen, DE
- Laboratoire d'Ethologie et Cognition Animale, University of Toulouse, FR
- Laboratory for Behavioral Genetics, Riken Brain Science Institute, Saitama, JP
- Laboratory of Histopathology, University of Bruxelles, BE
- Laboratory of Neurobiology and Genetics, Rockefeller University, New York, NY, US
- Laboratory of Veterinary Medicine, Istituto Superiore di Sanita, Rome, IT
- Max Planck Institute for Brain Research, Frankfurt, GE
- Max Planck Station Seewiesen München, DE
- Merck, Sharp & Dohme Neuroscience Research Centre, Harlow, Essex, GB
- Molecular Neurobiology, Freie Universität Berlin, DE
- Netherlands Inst. for Brain Research, Amsterdam, NL
- Retinal Electrophysiology Research Group, University of Tübingen, DE
- Samuel Lunenfeld Institute, Mt. Sinai Hospital, Toronto, CA
- School of Biological Sciences, University of Manchester, GB
- School of Medicine, Keio University, Tokyo, JP
- School of Medicine, Wayne State University, Detroit, Michigan, US
- The Rudbeck Laboratory, Uppsala Univ. Hospital, SE
- Veterinär-Physiologie, University of Giessen, DE
- Whitehead Institute for Biomedical Research (MIT), Cambridge, MA, US
- Zentrum für Molekulare Biologie der Universität Heidelberg (ZMBH), DE

Neural Plasticity and Repair NCCR Neuro

Economy / Industry

- Alcon Laboratories Inc., Fort Worth, TX, US
- Alea Solutions GmbH, Zurich, CH
- AstraZeneca, Macclesfield, GB
- Brain Products GmbH, MES MEDIZINELEKTRONIK, Munich, DE
- Evotec AG, Hamburg, DE
- F. Hoffmann-La Roche AG, Genomics, Basel, CH
- GlaxoSmithKline GmbH & Co., Verona, IT
- Hocoma AG, Volketswil, CH
- NewBehavior AG, Zurich, CH
- Novartis Inst. for Biomedical Research, Basel, CH
- Novartis Pharma Schweiz AG, Basel, CH
- Philips Medical Systems, Zurich, CH
- Prionics AG, Zurich, CH
- Warren Pharmaceuticals Inc., Ossining, NY, US

Others

- Hartmann Müller-Stiftung, Zurich, CH
- International Spinal Research Trust (ISRT), Surrey, GB
- Olga-Mayenfisch Stiftung, Zurich, CH
- Swiss Heart Foundation, Berne, CH

Statistical Input – Output Data

Funding source (CHF)	Year 5	Year 6	Year 7	Year 8	Total	%
SNSF funding	4 100 000	4 100 000	4 100 000	4 100 000	16 400 000	22
Self-funding from home institution ¹	3 579 544	1 500 000	1 500 000	1 500 000	8 079 544	11
Self-funding from ETH Zurich	5 609 825	1 050 000	1 050 000	1 050 000	8 759 825	12
Self-funding from project participants	9 533 212	9 533 212	9 533 212	9 533 212	38 132 848	51
Third-party funding ²	2 812 227	1 000 000	0	0	3 812 227	5
Total	25 634 808	17 183 212	16 183 212	16 183 212	75 184 444	100

Personnel ³	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	FR	IT	US	AT	
Management ⁴	2.38	1.58	66	0.80	34	5	2	1	0	0	0	1
Master students	7	5	71	2	29	6	0	0	1	0	0	1
Doctoral students	113	52	46	61	54	44	27	6	4	3	3	20
Postdoctoral students	37	13	35	24	65	7	11	3	0	2	1	13
Research associates	0	0	0	0	0	0	0	0	0	0	0	0
Senior researchers ⁵	126	33	26	93	74	58	30	8	2	2	2	27
Other staff	60	38	63	22	37	29	5	2	2	1	1	8
Total	345.38	142.58	43	202.80	57	149	75	20	9	8	7	70

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

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

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

⁴ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training (applies not for the country analysis)

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

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

Members of the Review Panel

Meier Jürg, Dr. (Chair)
Bonhoeffer Tobias, Prof.
Compston Alastair, Prof.
Ghisalba Oreste, Prof.
Götz Magdalena, Prof.

Herrling Paul, Dr.
Lindvall Olle, Prof.
Lüscher Hans-Rudolf, Prof.
Thier Hans-Peter, Prof.
Wiestler Otmar, Prof.

NCCR Office SNSF

Bachmann Stefan, Dr.

Swiss National Science Foundation, Berne, CH
Max-Planck Institut für Neurobiologie, München-Martinsried, DE
Neurology Unit, University of Cambridge, GB
Swiss National Science Foundation, Berne, CH
Institute of Stem Cell Research GSF, National Research Center for Environment and Health, Neuherberg, DE
Novartis Pharma AG, Basel, CH
Wallenberg Neuroscience Center, University Hospital of Lund, SE
Swiss National Science Foundation, Berne, CH
Neurologische Universitätsklinik, Universität Tübingen, DE
Deutsches Krebsforschungszentrum, Heidelberg, DE

Schweiz. Nationalfonds, Wildhainweg 3, 3001 Bern,
phone: + 41 (0)31 308 23 49, fax: + 41 (0)31 305 29 71,
sbachmann@snf.ch

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

NCCR North-South

Home Institution

University of Berne

Start of the NCCR

July 1, 2001

NCCR Management

Director

Hurni Hans, Prof.
phone: + 41 (0)31 631 88 76
hans.hurni@cde.unibe.ch

Deputy Director

Wiesmann Urs, Prof.
phone: + 41 (0)31 631 88 69
urs.wiesmann@cde.unibe.ch

Coordinator

Breu Thomas, Mr.
phone: + 41 (0)31 631 30 58
thomas.breu@cde.unibe.ch

Deputy Coordinator /

Knowledge and Technology Transfer
Pfister Franziska, Dr.

Education and Training

Herweg Karl, Dr.

Advancement of Women /

Career Building
Zimmermann Anne, Dr.

Financial Management

Balsiger Urs, Mr.

Address

NCCR North-South
University of Bern
Steigerhubelstrasse 3
3008 Bern
phone: + 41 (0)31 631 52 72
fax: + 41 (0)31 631 85 44
nccr-north-south@cde.unibe.ch

Web Address

www.nccr-north-south.unibe.ch

Public Relations

- Research Partnerships for Mitigating Syndromes of Global Change, 2002 (in English, French, German, Russian and Spanish)
- Research Partnerships for Mitigating Syndromes of Global Change, 2004, Flyer (English)
- Overview of Research, Research Partnerships in International Cooperation, 2004 (English)
- News on website

Research

Work Package “Governance and Conflict”

Head: Goetschel L.
Deputy Head: Carton M.

- Statehood and economy
- Governance
- Conflict transformation

Work Package “Livelihood Options and Globalisation”

Head: Müller-Böker U.
Deputy Head: Rabinovich A.

- Livelihoods, institutions and political space
- Livelihood strategies and poverty
- Livelihoods and territory

Work Package “Health and Environmental Sanitation”

Head: Tanner M.
Deputy Head: Schertenleib R.

- Vulnerability and resilience
- Health interventions
- Environmental sanitation

Work Package “Natural Resources in Sustainable Development”

Head: Wiesmann U.
Deputy Head: Hurni H.

- Syndromes and potentials
- Resources and approaches
- Information and participation

Transversal Package “Syndrome Mitigation and its Scientific Foundations”

Head: Hurni H.
Coordinator: Rist S.

Transversal extensive production systems in semi-arid regions – Options for sustainable future livelihoods

Leader: Bonfoh B.

The political economy of coffee: Global markets, local production and options for sustainable development.

Leader: Ludi E.

The impact of development disparities on natural resource management; Negotiation and decision-making in trans-contextual settings

Leader: Messerli P.

From vulnerability to resilience: Assessing the potential and limitation of a new conceptual approach for pathways to sustainable development

Leader: Obrist B.

Innovations in decision-making processes for sustainable urban projects

Leader: Rabinovich A.

Operationalising human security for livelihood protection: Analysis, monitoring and mitigation of existential threats by and for local communities

Leader: Schnabel A.

Sustaining livelihoods in trans-local and trans-national settings

Leader: Thieme S.

Knowledge, power and politics: Evaluating institutional and social practices in sustainable development and syndrome mitigation research

Leader: Zingerli C.

Platforms, Programmes etc.

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

Head: Lys J.-A.

Graduate Programme

Coordinator: Herweg K.

Joint Areas of Case Studies (JACS)

The NCCR North-South carries out integrated, context-specific, problem- and mitigation-oriented research in the following regions:

East Africa (EAF)

Coordinator: Kiteme B. (Kenya)

Horn of Africa (HoA)

Coordinator: Debele B.

(Ethiopia)

West Africa (WAF)

Coordinator: Cissé G.

(Ivory Coast)

South-East Asia (SEA)

Coordinator: Koottatep T.

(Thailand)

South Asia (SAS)

Coordinator: Upreti B. (Nepal)

Central Asia (CAS)

Coordinator: Kasymov U.

(Kyrgyzstan)

Central America

and Caribbean (CCA)

Coordinator: Perez Gutierrez

M.A. (Costa Rica)

South America (SAM)

Coordinator: De la Fuente M.

(Bolivia)

Swiss Alps (ALP)

Coordinator: Wallner A.

(Switzerland)

Partnership Actions for Mitigating Syndromes of Global Change (PAMS)

The NCCR North-South is implementing a series of mitigation experiments and pilot activities. These are proposed by partners and associated institutions through programme calls, selected by the Board, and executed in partnership with the WPs in JACS regions.

Third Party Cooperation

(in progress)

Programmes

- Aga Khan Development Network
- CAMP: Central Asia Mountain Partnership Programme
- CONICET: Centro de Estudios e Investigaciones Laborales CEIL PIETTE
- ESAPP: Eastern and Southern Africa Partnership Programme
- European Observatory for Health Systems
- Intermediate Technology Development Group, East Africa
- International Human Dimensions Programme on Global Environmental Change
- International Work Group for Indigenous Affairs
- Kerala Research Programme on Local Level Development
- Municipal Council of Nakuru
- Network-Association of European Researchers on Urbanisation in the South
- Programa de Gestión Urbana, Coordinación Regional para América Latina y el Caribe
- Programa de las Naciones Unidas para el Desarrollo
- WOCAT: World Overview of Conservation Approaches and Technologies

Research Institutions

- Agrarian Institute, Bishkek, KG
- Agricultural Information Resource Centre, Nairobi, KE
- Asian Institute of Technology Center in Vietnam AITCV, Hanoi, VN
- ASR, Rural Sociology, University Guadalajara, MX
- Centre de Coopération Internationale en Recherche Agronomique pour le Développement CIRAD-Forêts, Paris, FR
- Centre d'Economie et d'Ethique pour l'Environnement et le Développement C3ED, Laboratoire de recherche de l'Université de Versailles, Saint-Quentin-en-Yvelines, FR
- Centre for Environmental Engineering in Towns and Industrial Areas CEETIA, Hanoi University of Civil Engineering HUCE, VN
- Centre IRD d'Orléans, Institut de recherche pour le développement, FR
- Centro de Planificación y Gestión CEPLAG, Universidad Mayor de San Simon UMSS, Cochabamba, BO
- Department for Environmental Science and Engineering, Kunming University of Technology, CN

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

Heads of Individual Research Projects

Bonfoh Bassirou, Dr.
Carton Michel, Prof.
Goetschel Laurent, Prof.
Hurni Hans, Prof.

Ludi Eva, Dr.
Messerli Peter, Dr.
Müller-Böker Ulrike, Prof.
Obrist Brigit, PD Dr.
Rabinovich Adriana, Dr.
Schertenleib Roland, Dipl. Ing.
Schnabel Albrecht, Dr.
Tanner Marcel, Prof.
Thieme Susan, Dr.
Wiesmann Urs, Prof.

Zingerli Claudia, Dr.

Swiss Tropical Institute STI, Bamako, ML
Institut Universitaire d'Etudes du Développement IUED, Genève, CH
swisspeace, Bern, CH
Centre for Development and Environment, GIUB, University of Bern, CH
Overseas Development Institute ODI, London, GB
Centre for Development and Environment, Vientiane, LA
Development Study Group, GIUZ, University of Zurich, CH
Swiss Tropical Institute STI, University of Basel, CH
Laboratoire de Sociologie Urbaine LaSUR, INTER, EPF Lausanne, CH
SANDEC, EAWAG-ETHZ, Dübendorf, CH
swisspeace, Bern, CH
Swiss Tropical Institute STI, University of Basel, CH
Division of Human Geography, GIUZ, University of Zurich, CH
Centre for Development and Environment, GIUB, University of Bern, CH
Institute for Human-Environment Systems, ETH Zurich, CH

Regional JACS Coordinators

Cissé Guéladio, Dr.
Debele Berhanu
De la Fuente Manuel
Kasymov Ulan
Kiteme Boniface

Kootatop Thammarat, Dr.
Perez Gutierrez Maria Angelina

Upreti Bishnu Raj, Dr.
Wallner Astrid, Dr.

Centre Suisse de Recherches Scientifiques, Abidjan, CI
Regional Coordination Office Horn of Africa, Addis Abeba, ET
Regional Coordination Office South America, Cochabamba, BO
Regional Coordination Office Central Asia, Bishkek, KG
Centre for Training and Integrated Research in Arid and Semi-arid Lands Development CETRAD, Nanyuki, KE
Asian Institute of Technology (AIT), Pathumthani, TH
Facultad Latinoamericana en Ciencias Sociales FLACSO-CR San José, CR
Regional Coordination Office South Asia, Kathmandu, NP
Centre for Development and Environment, GIUB, University of Bern, CH

North-South Partnership Institutions

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

Topics

The present-day world is threatened by increasing insecurity, which is caused by processes of global change, globalisation, and global disparities. There are regions where a number of core problems form clusters, which eventually lead to syndromes, the mitigation of which is a global challenge and a precondition for achieving sustainable development. The NCCR North-South will contribute, through high-quality, disciplinary, interdisciplinary and trans-disciplinary research, to an improved understanding of the status of different

syndromes of global change, the pressures these syndromes and their causes exert on different resources (human, natural, economic), and the responses of different social groups and society as a whole. By identifying the potentials of social systems for mitigating syndromes, by considering their dynamics, and by adhering to existing innovative solutions, the NCCR will also contribute to designing ways of mitigating syndromes. The NCCR North-South will enable Swiss research institutions to enhance partnerships

with institutions in developing and transition countries, thereby building competence and capacity in order to develop socially robust knowledge for mitigation action. Through its activities and partnerships, the NCCR North-South will contribute to developing the capabilities of partner institutions and societies at large in developing and transition countries, thereby eventually helping these institutions to find sustainable solutions with the means available in their own local contexts.

- Department of Agricultural Extension, University of Agriculture UoAF, Faisalabad, PK
- Department of Geography, University of Ho Chi Minh City, VN
- Department of Geography, University of Nairobi, KE
- Department of Political Science and International Relations DPSIR, Addis Ababa University, ET
- Department of Sociology, Delhi School of Economics, University of Delhi, IN
- Department of Sociology, North Eastern Hill University, Shillong, IN
- Department of Sociology, University of Dhaka, BD
- Department of Sociology, University of Lille, FR
- Department of Sociology, University of Nairobi, KE
- Department of Sociology, University of Pennsylvania UPENN, Philadelphia, US
- Department of Urban and Regional Planning, University of Nairobi, KE
- East Africa Wildlife Society, Nairobi, KE
- Ecole Africaine des Métiers de l'Architecture et de l'Urbanisme EAMAU, Lomé, TG
- Ecole Inter-Etats d'Ingénieurs de l'Équipement Rural EIER & World Health Organisation - Organisation Mondiale de la Santé, Ouagadougou OMS, BF
- 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
- European Association of Development Research and Training Institutes EADI, Bonn, DE
- Faculté des Sciences et Techniques, Université de Nouakchott, MR
- Faculty of Environmental Studies and Natural Resources, Egerton University, Njoro, KE
- French Institute for African Research IFRA, Nairobi, KE
- Groupement d'Intérêt Scientifique pour l'Étude de la Mondialisation et du Développement GEMDEV, Paris Cedex, FR
- Institute for Environmental Technology, University of Innsbruck, AT
- Institute of Environmental Sciences CML, Leiden University, NL

Directorship of the Sierra de Manantlán Biosphere Reserve DRBSM, Autlán, MX
[Ecole Inter-Etats d'Ingénieurs de l'Équipement Rural EIER, Ouagadougou, BF](#)
Ecole Supérieure des Sciences Agronomiques ESSA, University of Antananarivo, MG
[Ethiopian Amhara Region Agricultural Research Institute ARARI, Bahr Dar, ET](#)
Facultad de Agronomía, Agroecología, Universidad Cochabamba AGRUCO, 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, México City, MX](#)
Inter-Municipal Initiative IMI, Autlán, MX
[Journalists for Democracy and Human Rights JDHR, Islamabad, PK](#)
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](#)

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

NCCR North-South

- Institute of Geography, Ministry of Science and Education, Almaty, KZ
- Instituto Tecnológico y de Estudios Superiores de Occidente ITESO, Guadalajara, MX
- International Atomic Energy Agency IAEA, Wien, AT
- International Centre for Agricultural Research in Dry Areas ICARDA, Aleppo, SY
- International Centre for Research in Agroforestry ICRAF, Nairobi, KE
- International Network of Field Sites with Continuous Demographic Evaluation of Populations and their Health in Developing Countries INDEPTH Network, Accra, GH
- International Water Management Institute IWMI, Accra, GH
- Kenya Agricultural Research Institute, Makindu, KE
- Kenya Forest Working Group KFWG, Nairobi, KE
- Liverpool School of Tropical Medicine, Vulnerability and Health Alliance, GB
- London School of Hygiene and Tropical Medicine LSHTM, GB
- National Centre for Soil and Fertiliser NISE, Hanoi, VN
- Observatoire de l'Écopolitique Internationale OEI, Université du Québec, Montreal, CA
- Office of Population Research, Princeton University, US
- Soil Physics and Environmental Resources Conservation, Institute of Land Use, University of Rostock, DE
- Soil Science Research Institute SSRI, Agrarian Academy of Science, Dushanbe, TJ
- Sokoine University of Agriculture, Morogoro, TZ
- United Nations Habitat Programme UN-Habitat, Nairobi, KE

Industry/Economy

- Alter Ego, Lausanne, CH
- Nestlé, Abidjan, CI

Others

- Bread for All / Brot für Alle BFA, Berne, CH
- Central Asia Mountain Information Network CAMIN, Bishkek, KG
- Centro de Investigación, Promoción y Desarrollo de la Ciudad CIPRODEC, Cochabamba, BO

Achievements

The second phase of the NCCR North-South (2005–2009) can build on the scientific, institutional and action-oriented achievements of the first phase. It maintains its general research directions, which are in line with other international research programmes, and builds on the partnership approach promoted by the Swiss Commission for Research Partnerships with Developing Countries (KFPE). The core focus thus remains: Research partnerships for mitigating syndromes of global change.

Adjustment of structure

A major element of further integration within the NCCR North-South programme is the shift from eight Individual Projects in Phase 1 to four Work Packages (WPs) in Phase 2. This organisational and structural step made it possible for the new WPs to amalgamate two major research topics into a joint research package with three themes each. The four WPs pursue research

on the following four main themes (1) 'Governance and conflict'; (2) 'Livelihood options and globalisation'; (3) 'Health and environmental sanitation', and (4) 'Natural resources in sustainable development'.

Transversal Package

Integrative and transversal research was initiated in Phase 1 through a series of small projects funded through the reserve funds. In Phase 2, this component is strongly enhanced through the creation of a Transversal Package (TP). The TP focuses on 'Syndrome mitigation and its scientific foundations', and works with eight TP projects that connect the WP themes thematically. This highly integrative, innovative and challenging research of the TP has in part been entrusted to research teams under the leadership of promising post-doctoral researchers from the North and the South who aspire to university or research careers. Each TP Project will explicitly relate its

research activities to the two overall themes of the Transversal Package: (a) syndrome mitigation and (b) its scientific foundations. The eight projects were selected in a competitive process, which included internal and external reviews.

Partnership Actions for Mitigation Syndromes of Global Change (PAMS)

The specific programme component "Partnership Actions for Mitigating Syndromes of Global Change" (PAMS) consists of small and timely limited activities that foster the transdisciplinary collaboration between research and society for mutual learning. 55 projects were carried out in Phase 1. Currently, a capitalization of the PAMS program component is ongoing. A final report will be elaborated until the end of 2005, based on which the PAMS guidelines will be refined for Phase 2.

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

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

Statistical Input – Output Data

Funding source (CHF)	Year 5	Year 6	Year 7	Year 8	Total	%
SNSF funding	3 500 000	3 500 000	3 500 000	3 500 000	14 000 000	40
Self-funding from home institution ¹	471 171	487 588	493 063	504 179	1 956 001	6
Self-funding from project participants	1 220 553	1 244 690	1 298 716	1 318 913	5 082 872	14
Third-party funding from SDC	754 124	2 698 940	4 346 379	6 467 682	14 267 125	40
Total	5 945 848	7 931 218	9 638 158	11 790 774	35 305 998	100

Personnel ²	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							IN	ET	KE	KG	DE	
Management ³	5.64	2.70	48	2.94	52	16	0	0	0	0	2	7
Master students	108	50	46	58	54	44	0	10	4	6	1	43
Doctoral students	99	37	37	62	63	28	5	5	4	4	6	44
Postdoctoral students	7	2	29	5	71	3	1	0	0	0	0	3
Research associates	47	20	43	27	57	24	4	1	3	0	1	11
Senior researchers ⁴	126	24	19	102	81	34	7	4	5	4	9	68
Other staff	93	53	57	40	43	24	8	2	5	7	1	46
Total	405.00	188.70	39	296.94	61	173	25	22	21	21	20	222

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 (applies not for the country analysis)

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

Levy René, Prof. (Chair)
Bradley David, Prof.

Brock Lothar, Prof.

Flury Manuel, Dr.
Hasler Martin, Prof.
Jeffery Roger, Prof.
Narasimha Reddy D., Prof.

Shisana Olive, Dr.
Stocking Michael, Prof.

Wehrli Bernhard, Prof.

Swiss National Science Foundation, Berne, CH
Department of Infectious and Tropical Diseases, London School of Hygiene and Tropical Medicine, London, GB
Fachbereich Gesellschaftswissenschaften, Johann Wolfgang Goethe-Universität, Frankfurt am Main, DE
Swiss Agency for Development and Cooperation SDC, Berne, CH
Swiss National Science Foundation, Berne, CH
Department of Sociology, University of Edinburgh, Edinburgh, GB
Department of Economics, University of Hyderabad, Hyderabad, IN
Human Sciences Research Council, Cape Town, ZA
School of Development Studies, University of East Anglia, Norwich, GB
Swiss National Science Foundation, Berne, CH

NCCR Office SNSF

Christ Urs, Dr.

Schweiz. Nationalfonds, Wildhainweg 3, 3001 Bern
phone: + 41 (0)31 308 23 50, fax: + 41 (0)31 305 29 71
uchrist@snf.ch

- City Medical Office of Health and Dar es Salaam City Council, TZ
- Comisión Ambiental Regional Cusco CAR, PE
- Conflict Prevention and Conflict Transformation COPRET, SDC, Berne, CH
- ENDA-Third World, Relay for Participatory Urban Development RUP, Dakar, SN
- Federación Nativa del Río Madre de Dios FENAMAD, PE
- Fundación La Paz, BO
- Gerling Foundation for Sustainable Development, Tenna, CH
- German Advisory Council on Global Change WBGU, Berlin, DE
- Institute Dayakologi, Kalimantan Barat, ID
- Intercooperation, Peshawar, PK
- Municipality of Nueva San Salvador, SV
- Municipality of San Salvador, SV
- PROclim, Forum for Climate and Global Change, Swiss Academy of Sciences, Berne, CH
- Programme „21“, Bildung für eine Nachhaltige Entwicklung, Freie Universität, Berlin, DE
- Racimos de Ungurahui, Lima, PE
- SAMPARK, Bangalore, IN
- Swiss Information and Data Archive for the Social Sciences (SIDOS), Neuchâtel, CH
- Syngenta Foundation for Sustainable Agriculture, Basel, CH
- UNICEF, Education, N'Djaména, TD
- Vétérinaires sans Frontières, Lyon, FR
- Virtual Academy, Bishkek, KG
- World Conservation Union Cameroon IUCN, Yaoundé, CM
- World Conservation Union Tanzania (UCN, Tanga, TZ)
- World Health Organisation WHO, Nouakchott, MR
- WWF, Kathmandu, NP
- Ogiek Welfare Council
- United Nations Center for Human Settlements
- United Nations International Strategy for Disaster Reduction

Home Institution
University of Neuchâtel

Start of the NCCR
April 1, 2001

NCCR Management

Director

Rahier Martine, Prof.
phone: + 41 (0)32 718 31 37
martine.rahier@uni.ne.ch

Deputy Directors

Neuhaus Jean-Marc, Prof.
phone: + 41 (0)32 718 22 07
jean-marc.neuhaus@unine.ch

Kuhlemeier Cris, Prof.
phone: + 41 (0)31 631 49 13
cris.kuhlemeier@ips.unibe.ch

Müller-Schärer Heinz, Prof.
phone: + 41 (0)26 300 88 35
heinz.mueller@unifr.ch

Coordinator

Arnold Claire, Dr.
phone: + 41 (0)32 718 25 03
claire.arnold@unine.ch

Office Secretary

Jauslin Carol, Mrs.
phone: + 41 (0)32 718 25 00
plant.survival@unine.ch

Communication

Chlebny Igor, Mr.
phone: + 41 (0)32 718 25 07
igor.chlebny@unine.ch

Knowledge and Technology Transfer

El Kadiri-Jan Tourya, Dr.
phone: + 41 (0)32 718 25 06
tourya.elkadiri-jan@unine.ch
Grant Jason, Dr.
phone: + 41 (0)32 718 25 22
jason.grant@unine.ch

Education and Training

Ted Turlings, Dr.
phone: + 41 (0)32 718 31 58/
ted.turlings@unine.ch
Bobillier Christiane, Dr.
phone: + 41 (0)32 718 25 02
christiane.bobillier@unine.ch

Equal Opportunity Officer

El Kadiri-Jan Tourya, Dr.
phone: + 41 (0)32 718 25 06
tourya.elkadiri-jan@unine.ch

Address

NCCR Plant Survival
Rue Emile Argand 11
2007 Neuchâtel
phone: + 41 (0)32 718 25 00
fax: + 41 (0)32 718 25 01
plant.survival@unine.ch

Web Address

www.unine.ch/plantsurvival

Public Relations

- Plant Survival News (trilingual English, French and German)
- Press releases
- New layout of the website

Plant Survival in Natural and Agricultural Ecosystems

NCCR Plant Survival

Research

Module “Natural and Agro-Ecosystems”

Multitrophic interactions

Head: Turlings T.
Bacher S., Benrey B., Bshary R., Farmer T., Kuhlemeier C., Rahier M.

Genetic introgression and ecological consequences

H: Bigler F.
Felber F., Kuepfer P., Nentwig W., Romeis J.

Evolution and spread of potentially invasive plants

H: Guisan A.
Buttler A., Gillet F., Müller-Schärer H., Schaffner U., Steinger T., Wagner H.

Module “Disease Resistance and Pest Control”

Grapevine diseases and resistance mechanisms

H: Neuhaus J.-M.
Amrhein N., Métraux J.-P., Gindro K., Mauch-Mani B., Pezet R., Tabacchi/successor, Tamm L., Viret O.

Heads of Individual Research Projects and Subprojects

Amrhein Nikolaus, Prof.
Aragno Michel, Prof.
Bacher Sven, Prof.
Benrey Betty, Dr.
Bersier Louis-Félix, Dr.
Bigler Franz, Dr.
Bshary Redouan, Prof.
Bucher Marcel, Prof.
Buttler Alexandre, Prof.

Charmillot Pierre-Joseph, Dr.
Davison Anthony C., Prof.
Fankhauser Christian, Prof.
Farmer Edward E., Prof.

Felber François, Dr.
Föllmi Karl, Prof.
Gillet François, Dr.
Gindro Katia, Dr.
Gobat Jean-Michel, Prof.

Development of novel control methods for grape moths based on their sex pheromones and host plant attractants

H: Guerin P.
Charmillot P.-J.

Module “Energy-Resources”

Plastid function and plant survival

H: Kessler F.
Hörtensteiner S., Fankhauser C., Rentsch D., Rochaix D., Zeeman S.

Mycorrhiza development and functioning, and its effect on soil structure

H: Martinoia E.
Bucher M., Föllmi K., Gobat J.-G., Reinhardt D.

Plant - fungi - bacterial interaction in the Ca - oxalate cycle: Relationship with calcite biomineralisation and its consequences on soil properties

H: Verrecchia E.
Aragno M., Gobat J.-M., Job D.

Module “Modelling and Statistics”

Statistical and dynamical modelling

H: Davison A.
Gillet F., Goldstein D., Bersier L.-F.

Technological Platforms, Programmes etc.

Sequencing and microarrays

H: Neuhaus J.-P.

Chemical analysis

H: Abou-Mansour E.

ICP-MS analysis

H: Föllmi K.

Greenhouse facilities

H: Felber F.

Data analysis

H: Davison A.

Graduate School

H: Turlings T.

GIS facilities (ECOSPAT lab)

H: Guisan A.

Institut für Pflanzenwissenschaften, ETH-Zentrum, Zürich
Institut de Botanique, Université de Neuchâtel
Zoologisches Institut, Universität Bern
Institut de Zoologie, Université de Neuchâtel
Département de Biologie, Université de Fribourg
Eidg. Forschungsanstalt für Agrarökologie und Landbau, Zürich
Institut de Zoologie, Université de Neuchâtel
Institute of Plant Sciences, Experimental Station, ETH Zürich
Institut fédéral de recherches sur la forêt, la neige et le paysage,
Antenne romande c/o EPF Lausanne
Agroscope RAC Changins, Nyon
Département de Mathématiques, EPF Lausanne
Center for Integrative Genomics, University of Lausanne
Département de biologie Moléculaire Végétale,
Université de Lausanne
Institut de Botanique, Université de Neuchâtel
Institut de Géologie, Université de Neuchâtel
Laboratoire des Systèmes Ecologiques, EPF Lausanne
Agroscope RAC Changins, Nyon
Institut de Botanique, Université de Neuchâtel

Topics

Plants are the primary producers of organic matter on land and central to almost all ecosystems. The survival and performance of plants is therefore of fundamental importance to both the preservation of biodiversity and sustainable agriculture. Plant survival in natural and agricultural systems is determined by a multitude of interactions with the biotic and abiotic environment, thus, to warrant biodiver-

sity and sustainability, it is essential to increase our knowledge of these interactions.

We explore interactions among plants, and between plants, insects and pathogens from the molecule to the ecosystem and landscape level. We gather basic knowledge on resistance mechanisms in grapevine and apply this knowledge to develop new strategies to improve the health of the grapevine and the quality

of its products, while minimising the impact on the environment. Other projects explore the mechanisms of resource exploitation and energy generation at the leaf-air and root-soil interfaces. To support these research efforts, novel statistics and modelling methods are being developed, thereby providing an impetus for such interdisciplinary collaboration in Switzerland.

Third Party Cooperation

(in progress)

Programmes

- ANGE: Analysis of gene flow from crop to wild forms in lettuce and chicory and its populations-ecological consequences in the context of GM-crop biosafety
- Arabidopsis Starch Metabolism Network
- Biodiversity Assessment Tools EU
- Carbon storage in European grasslands COST 627
- ECO-SAFE: Ecological and Environmental Biosafety Assessment of Novel Plant and Microbial Biotechnology Products
- French-Swiss International Project, Impact des inocula bactériens (*Azospirillum* naturels et génétiquement modifiés)
- HybTech: Development of an environment friendly F1 hybrid breeding technology
- Indo-Swiss Collaboration in Biotechnology
- International Grapevine Genome Initiative
- Réseau Septentrional de la Vigne et du Vin, France
- Sustainable control of the horse chestnut leaf-miner *Cameraria ohridella*
- TLinks: Trophic Linkages

Research Institutions

(selection of international cooperations only)

- Amt für Landwirtschaft, Landschafts- und Bodenkultur Offenburg, Bundesland Baden-Württemberg, DE
- Botanica e Patologia vegetale, Facoltà di Agraria, Università di Napoli "Federico II", IT
- Center for Microbial Ecology, Michigan State University, US
- Centre de coopération internationale en recherche agronomique pour le développement CIRAD, Montpellier, FR
- Centre de géochimie de la surface, Université Louis Pasteur Strasbourg, FR
- Centre for Agri-Environmental Research, University of Reading, GB
- Centre interprofessionnel de la vigne et du vin, Nîmes, FR

Goldstein Darlene, Dr.
Guerin Patrick, Dr.
Guisan Antoine, Prof.
Hörtensteiner Stefan, Dr.
Job Daniel, Prof.
Kessler Felix, Prof.
Kuhlemeier Cris, Prof.
Kuepfer Philippe, Prof.
Martinoia Enrico, Prof.
Mauch-Mani Brigitte, Dr.
Métraux Jean-Pierre, Prof.
Müller-Schärer Heinz, Prof.
Nentwig Wolfgang, Prof.
Neuhaas Jean-Marc, Prof.

Pezet Roger, Dr.
Rahier Martine, Prof.

Reinhardt Didier, Dr.
Rentsch Doris, Prof.
Rochaix Jean-David, Prof.
Romeis Jörg, Prof.
Schaffner Urs, Prof.
Steinger Thomas, Prof.

Tabacchi Raffaele, Prof.
Tamm Lucius, Dr.

Turlings Ted, Dr.

Verrecchia Eric, Prof.

Viret Olivier, Dr.
Wagner Helene, Dr.
Zeeman Samuel C., Dr.

Département de Mathématiques, EPF Lausanne
Laboratoire de Physiologie sensorielle, Université de Neuchâtel
Laboratoire de Biologie de la Conservation, Université de Lausanne
Pflanzenbiologisches Institut, Universität Bern
Institut de Botanique, Université de Neuchâtel
Laboratoire de Physiologie Végétale, Université de Neuchâtel
Pflanzenbiologisches Institut, Universität Bern
Institut de Botanique, Université de Neuchâtel
Labor für Molekulare Pflanzenphysiologie, Universität Zürich
Institut de Botanique, Université de Neuchâtel
Institut de Biologie Végétale, Université de Fribourg
Département de Biologie, Université de Fribourg
Zoologisches Institut, Universität Bern
Laboratoire de Biologie Moléculaire et Cellulaire, Université de Neuchâtel

Agroscope RAC Changins, Nyon
Laboratoire d'Entomologie et Ecologie animale, Université de Neuchâtel
Département de Biologie et Zoologie, Université de Fribourg
Pflanzenbiologisches Institut, Universität Bern
Département de Biologie Moléculaire, Université de Genève
Agroscope FAL Reckenholz, Zürich
CABI Bioscience Swiss Centre, Delémont
Département de Biologie, Ecologie et Evolution, Université de Fribourg
Institut de Chimie, Université de Neuchâtel
Pflanzenschutz "Pflanzenkrankheiten", Forschungsinstitut für biologischen Landbau FiBL, Frick
Laboratoire d'Entomologie et Ecologie Animale, Université de Neuchâtel
Laboratoire de Géodynamique de la Biosphère, Université de Neuchâtel
Agroscope RAC Changins, Nyon
Swiss Federal Research Institute WSL, Birmensdorf
Institut für Pflanzenwissenschaften, ETH-Zentrum, Zürich

- Chemistry and molecular Biology Dept., Michigan State University, Nevada, US
- Commissariat à l'énergie atomique CEA, Caradache, FR
- Consejo de la Facultad de Agronomía, University of Montevideo, UY
- Department of Agricultural and Environmental Sciences, University of Newcastle, GB
- Department of Biochemistry and Molecular Biology, University of Massachusetts, Amherst, US
- Department of Botany, University of South Bohemia, Ceske Budejovice, CZ
- Department of Environmental Horticulture, University of Florida, Gainesville, US
- Department of Genetics, Katholieke Universiteit Nijmegen, NL
- Dept. of Life Science, University Pohang, Postech, KR
- Department of Metabolic Biology and Cell and Dev. Biology, John Innes Center, Norwich, GB
- Developmental Genetics and Genetics of Plants, Vrije Universiteit Amsterdam, NL
- Dipartimento di Biologia Vegetale, Università La Sapienza, Roma, IT
- Division of Molecular And Cellular Biology, Nagoya University, JP
- Ecologie microbienne, UMR CNRS, Université Claude-Bernard, Lyon, FR
- Geochemistry Division, Geological Survey of Israel GSI, Jerusalem, IL
- Institut de Recerca i Tecnologia, Centre Universitat de Lleida, ES
- Institut de recherche pour l'ingénierie de l'agriculture et de l'environnement Cemagref, Grenoble, FR
- Institut für Mineralogie und Geochemie, Universität Karlsruhe, DE
- Institut für Pflanzeernährung, University Hohenheim, DE
- Institut für Pharmazeutische Biologie, Technische Universität Braunschweig, DE
- Institut für Rebenzüchtung Geilweilerhof, Siebeldingen, DE
- Institute for Plant Nutrition, University Hohenheim, DE
- Institute of Arable Crops Research ACR, Rothamsted, Division of Biological Chemistry Harpenden, Hertfordshire, GB
- Institute of Cell and Molecular Biology, University of Edinburgh, GB
- Institute of Grassland and Environmental Research, IGER Wales, Aberystwith, GB

Plant Survival in Natural and Agricultural Ecosystems

NCCR Plant Survival

Achievements

Interdisciplinary research

Scientists from various research fields put their efforts together to achieve higher integrative results. The results of the first phase were presented in Leysin at the NCCR Plant Survival International Conference 2005. Use of grapevine as a model has strengthened interdisciplinary research, allowing phytopathologists, plant physiologists and biochemists to work together. In another area, studying the mechanisms of nutrient transfer between rocks, soil and plants has required competences in soil science, geochemistry and plant biology. The research on energy and resources emphasised the key role played by soil and light on plant growth, nutrition and resistance.

Technology transfer

Our partner institutions oriented towards applied research (Agroscope RAC Changins, Agroscope FAL

Reckenholz, CABI, FIBL) were closely involved in the NCCR. Two KTI projects on the control of pests in vineyards and on the Western Corn Rootworm *Diabrotica v. virgifera* directly address problems of end-users. Additionally, three applied projects subsidised directly by industries or private foundations started.

Public relations

The newsletter Plant Survival News has a new layout and appears in a unique tri-lingual version (English, French and German) in order to enhance our visibility in German-speaking Switzerland. The press releases are systematically translated in German. The NCCR Plant Survival researchers participated in the Faculty of Science open days in Neuchâtel. All these measures make the general public, end-users, school students and policy makers aware of our scientific progress.

Graduate School

During the previous academic year, eight courses in communication, research tools and scientific topics were organised, two of which in collaboration with other institutions. The courses were followed by more than 240 participants, of which a quarter from the University of Neuchâtel and three quarters from the other universities. Mobility grants were awarded to allow Ph. D. students to work in other laboratories and to present their research at international congresses.

Equal opportunities

Two workshops were organised in collaboration with the graduate school to encourage the advancement of women. Some measures have also been taken in order to support young parents involved in the NCCR.

Further information see www.unine.ch/nccr/

Members of the Advisory Board

Appel Klaus, Prof.
Baldwin Ian T., Prof.
Edwards Peter, Prof.
Hartmann Thomas, Prof.

Töpfer Reinhard, Prof.

Institut für Pflanzenwissenschaften ETH Zentrum Zürich, CH
Max Planck Institute of Chemical Ecology, DE
Geobotanisches Institut, ETH Zentrum Zürich, CH
Institut für pharmazeutische Biologie, Technische Universität Braunschweig, DE
Institut für Rebenzüchtung, BA Züchtungsforschung, DE

- Institute of Organic Chemistry, University of Innsbruck, AT
- International Maize and Wheat Improvement Center CIMMYT, Mexico, MO
- Laboratoire de biochimie métabolique, Institut national de la recherche agronomique INRA et technologies, Montpellier, FR
- Laboratoire de microbiologie des sols, INRA, Dijon, FR
- MPI für chemische Ökologie, Jena, DE
- MPI Molekulare Pflanzenphysiologie, Potsdam, DE
- National Research Center for Environment and Health, GSF-Forschungszentrum, Munich, DE
- Netherlands Institute of Ecology, NIOO-CTO, Heteren, NL
- NIOO - Netherlands Institute of Ecology, NL
- Northern Plains Agricultural Research Lab, United States Department of Agriculture USDA, Montana, US
- Pflanzenphysiologie ZMBP, University of Tübingen, DE
- School of Biological Sciences, Washington State University, Pullman, US
- Sciences de la vie et de l'environnement ECOBIO, Université de Rennes, FR
- Staatliches Weinbauinstitut, Freiburg, DE

Economy / Industrie

- BIOREBA AG, Reinach, CH
- Didier Schaller SARL, Moutier, CH
- Diethelm Keller SiberHegner DKSH Ltd Switzerland, Zurich, CH
- ECOGENICS GmbH, Molecular Marker Services, Zurich, CH
- ExoSect Limited, Southampton, GB
- Fenaco UFA Samen, Winterthur, CH
- IPM Tech, Inc., Portland, US
- MONSANTO Company, Ecological Technology Center, St-Louis, US
- SMart Nose Ltd., Marin, CH
- Syngenta, Basel, CH
- Torrey Mesa Research Institute TMRI, Syngenta, La Jolla, California, US

Others

- Bundesamt für Umwelt BAFU, Bern, CH
- Bundesamt für Landwirtschaft BLW, Bern, CH
- Center for Applied Biosciences CABI, Delémont, CH
- INFORAMA "Rütli", Zollikofen, CH
- Microbial Genomics and Bioprocessing Unit, United States Department of Agriculture USDA, Peoria IL, US
- Station Viticole, Auvernier, CH

Statistical Input – Output Data

Funding source (CHF)	Year 5	Year 6	Year 7	Year 8	Total	%
SNSF funding	3 250 000	3 250 000	3 250 000	3 250 000	13 000 000	44
Self-funding from home institution ¹	600 000	600 000	600 000	600 000	2 400 000	8
Self-funding from project participants	3 332 051	3 419 938	3 500 768	3 507 582	13 760 339	46
Third-party funding ²	173 237	173 237	173 237	0	519 711	
Total	7 355 288	7 443 175	7 524 005	7 357 582	29 680 050	100

Personnel ³	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							FR	DE	NL	GB	AT	
Management ⁴	6.12	3.47	57	2.65	43	7	1	0	1	0	1	2
Master students	1	0	0	1	100	0	0	0	1	0	0	0
Doctoral students	54	26	48	28	52	29	11	2	2	0	0	12
Postdoctoral students	33	15	45	18	55	9	8	4	1	1	1	8
Research associates	0	0	0	0	0	0	0	0	0	0	0	0
Senior researchers ⁵	49	9	18	40	82	35	2	3	3	3	0	3
Other staff	38	27	71	11	29	32	1	3	0	0	1	1
Total	181.12	80.47	45	100.65	55	112	23	12	8	4	3	26

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

² Not included is CTI funding (cf. page 6). Since the start of the NCCR 2 projects have been funded by CTI at a total amount of 2.67 mio. CHF

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

⁴ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training (applies not for the country analysis)

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

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

Members of the Review Panel

Ghisalba Oreste, Prof. (Chair)

Boller Thomas, Prof.

Godfray Charles, Prof.

Gullino Maria Ludovica, Prof.

Harr Jost, Dr.

Lambers Hans, Prof.

Pickett John, Prof.

Scheel Dierk, Prof.

Schwarzenbach René, Prof.

Swiss National Science Foundation, Berne, CH

Swiss National Science Foundation, Berne, CH

NERC Centre for Population Biology, Imperial College of Science, Technology and Medicine, Ascot, GB

Università degli Studi, Facoltà Agraria, Torino, IT

Landwirtschaftlicher Forschungsrat, Erfindungsverwertungs AG, Basel, CH

Faculty of Natural and Agricultural Sciences, University of Western Australia, AU

Biological and Ecological Chemistry Department, Institute of Arable Crops Research, Harpenden, GB

Department of Stress and Development Biology, Halle, DE

Swiss National Science Foundation, Berne, CH

NCCR Office SNSF

Christ Urs, Dr.

Schweiz. Nationalfonds, Wildhainweg 3, 3001 Bern

phone: + 41 (0)31 308 23 50, fax: + 41 (0)31 305 29 71

uchrist@snf.ch

Climate Variability, Predictability and Climate Risks

NCCR Climate

Home Institution

University of Bern

Start of the NCCR

April 1, 2001

NCCR Management

Director

Wanner Heinz, Prof.
wanner@giub.unibe.ch

Deputy Director

Ammann Brigitta, Prof.
ammann@ips.unibe.ch

NCCR Executive Director

Grosjean Martin, Prof.
phone: + 41 (0)31 631 31 47
grosjean@giub.unibe.ch

Science Officer

Xoplaki Elena, Dr.
phone: + 41 (0)31 631 31 48
xoplaki@giub.unibe.ch

Communication

Meuli Kaspar, Mr.
phone: + 41 (0)31 631 31 49
meuli@giub.unibe.ch

Event Manager

Wälti Monika, Mrs.
phone: + 41 (0)31 631 31 45
waelti@giub.unibe.ch

Administrative Manager

Möhl Margret, Mrs.
phone: + 41 (0)31 631 31 45
moehl@giub.unibe.ch

IT-Experts

Martin Lorenz, Dr.
phone: + 41 (0)31 631 31 46
martin@giub.unibe.ch

Ferrante Basilio, Mr.
phone: + 41 (0)31 631 31 46
basil@giub.unibe.ch

Knowledge and Technology Transfer

Meuli Kaspar, Mr.

Education and Training

Grosjean Martin, Prof.

Advancement of Women
Xoplakig Elena, Dr.

Address

NCCR Climate
Universität Bern
Erlachstrasse 9a
3012 Bern
phone: + 41 (0)31 631 31 45
fax: + 41 (0)31 631 43 38
nccr-climate@giub.unibe.ch

Web Address

www.nccr-climate.unibe.ch

Research

Work Package 'Past Climate Variability'

Leader: Stocker T.

MONALISA Modelling and reconstruction of North Atlantic atmosphere-ocean variability (P 1.1)

Head: Stocker T.
Raible C.

PALVAREX Paleoclimate variability and extreme events

H: Wanner H.
Luterbacher J.

VIVALDI Variability in Ice, Vegetation and Lake Deposits- Integrated

H: Ammann B.
Gäggeler H., Beer J., Boesch R.,
Bugmann H., Grosjean M.,
Leuenberger M., Lischke H.,
Schwikowski M., Sugita S.,
Sturm M.

EXTRACT Extended Thousand-year Reconstruction of Alpine Climate from Tree-rings

H: Esper J.
Frank D.

Work Package 'Climate Dynamics and the Future'

Leader: Davies H.

GLOBCLIM Global Climate Processes and Scenarios

H: Wild M.
Ohmura A., Lohmann U.

REGCLIM Regional Climate Processes and Scenarios

H: Schär C.
Seneviratne S.

VARCLIM Intra-seasonal and Inter-annual Climate Variability

H: Davies H.C.
Martius O., Croci-Maspoli M.

STARTWAVE Acquisition and Analysis of Critical Observations

H: Mätzler C.
Philipona R., Kämpfer N.,
Morland J., Schmutz W.,
Vuilleumier L.

PRECLIM Operational Climate Prediction and Risk Analysis

H: Appenzeller C.
Liniger M.

Work Package 'Ecosystems impacts and management'

Leader: Fuhrer J.

PLANT/SOIL How Do Extreme Climate Events Affect Plant/Soil Interactions in Agroecosystems?

H: Feller U.
Buchmann N., Schmidt M.

GRASS Climate Change and Food Production

H: Fuhrer J.
Calanca P L., Lehmann B.

CANOPY Hydrological Implications of Atmospheric CO2 Enrichment in Forests

H: Körner C.
Leuzinger S.

ECOHYDRO Projecting the Impacts of Changes in Climate and Land Use on the Ecology and Hydrology of Mountain Catchments

H: Bugmann H.
Fahse L.

FORFUNGS The Long-term Evolution of the Forest Functions Biodiversity and C-sequestration in a Variable and Changing Climate

H: Fischlin A.
Gyalistras D.

Work Package 'Climate Risks'

Leader: Stephan G.

ETS Assessment of Energy Technology Strategies

H: Wokaun A.
Barreto L., Kypreos S.

CVR Climate Vulnerability and Risk in a Post-Kyoto World

H: Gunter S.
Müller-Fürstenberger G.

MIADAC Modelling Sectoral Climate Change Policies: Mitigation, Adaptation, and Acceptability

H: Thalman P.
Viguier L.

CAPRICORN Climate Anom- alies and Coping Strategies of Societies in Central Europe: the Historical Dimension

H: Pfister Ch.
Poliwoda G.

IEM International Economic Mechanisms: Implications for Domestic Policies

H: Bürgenmeier B.

DIFI Design and Implementa- tion of Financial Instruments

H: Haurie A.

Integrated Projects and Fast Track Studies

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

H: Beniston M.
Viguier L.

Programmes

Yearly Summer School

H: Grosjean M.

PhD student meetings

H: Xoplaki E.

Workshops co-organized with ProClim

H: Grosjean M.
Xoplaki E.

Topics

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

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

Climate is a research network of institutions within Switzerland with ONE common scientific vision and collaborates with national and international programmes (ProClim, WCRP-CLIVAR, IGBP, UN-FCCC, IPCC, ERA). The NCCR Climate commits itself to a firm effort in education, to knowledge transfer and interaction with key-persons in administration, politics, the private sector and the public.

Third Party Cooperation

Programmes

- ALP-IMP: Multi-centennial climate variability in the Alps based on instrumental data, model simulations and proxy data
- Atmospheric Model Inter-comparison Project
- Consortium for Small-scale MOdelling
- Cost 627: Carbon storage in European grasslands
- Cost 717: Use of radar observation in hydrological and NWP models
- Cost 719: The use of geographic information systems in Climatology and Meteorology
- Cost 723: Data exploitation and modeling for the upper troposphere and lower stratosphere
- EU / IEA project Assessing Climate Response Options: Policy Simulations
- EU FP 6: Association of Consulting Management Engineers
- EU project: Ensembles based prediction of climate changes and their impacts
- EU project: CarboEurope
- EU project: European and North Atlantic Daily to Multi-decadal Climate Variability
- EU project: Geographical Extension of the GEM-E3 General Equilibrium Model Database
- EU project: Patterns of North Atlantic Climate Variability
- EU project: Prediction of Regional scenarios and Uncertainties for Defining European Climate change risks and Effects
- EU project: Simulations Observations and Paleoclimate Data
- EU project: Sources and Sinks of Greenhouse Gases from Managed Grasslands and Mitigation Strategies
- EU project: Spurenstofftransport in der Tropopausenregion
- EU project: Statistical and Regional Dynamical Downscaling of Extremes for European Regions
- EU project: Stratosphere-Troposphere Exchange

Heads of Individual Research Projects and Subprojects

Ammann Brigitta, Prof.
Appenzeller Christof, PD Dr.
Barreto Leonardo, Dr.
Beer Jürg, Prof.
Beniston Martin, Prof.
Boesch Ruedi, Dr.
Buchmann Nina, Prof.
Bugmann Harald, Prof.
Bürgenmeier Beat, Prof.
Calanca Pierluigi, Dr.
Crochi-Maspoli Mischa, Dr.
Davies Huw C., Prof.
Esper Jan, PD Dr.
Fahse Lorenz, Dr.
Feller Urs, Prof.
Fischlin Andreas, Dr.
Frank David, Dr.
Fuhrer Jürg, Prof.

Gäggeler Heinz, Prof.
Grosjean Martin, Prof.
Gunter Stephan, Prof.
Gyalistras Dimitrios, Dr.
Haurie Alain, Prof.
Kämpfer Niklaus, Prof.
Körner Christian, Prof.
Kypreos Sokrates, Dr.
Lehmann Bernhard, Prof.
Leuenberger Markus, Dr.
Liniger Mark, Dr.
Lischke Heike, Dr.
Lohmann Ulrike, Prof.
Luterbacher Jürg, PD Dr.
Martius Olivia
Mätzler Christian, Prof.

Institut für Pflanzenforschung, Universität Bern
MeteoSchweiz, Zürich
Paul Scherrer Institut, Villigen
EAWAG, Dübendorf
Institut de Géographie, Université de Fribourg
WSL, Birmensdorf
Institut für Pflanzenwissenschaften, ETH Zürich
Waldökologie, ETH Zürich
Département d'Economie Politique, Université de Genève
FAL, Reckenholz
Institut für Atmosphäre und Klima, ETH Zürich
Institut für Atmosphäre und Klima, ETH Zürich
WSL, Birmensdorf
Waldökologie, ETH Zürich
Institut für Pflanzenwissenschaften, Universität Bern
Terrestrische Systemökologie, ETH Zürich
WSL, Birmensdorf
Eidg. Forschungsanstalt für Agrarökologie und Landbau, Reckenholz
Departement für Chemie und Biochemie, Universität Bern
Geographisches Institut, Universität Bern
Volkswirtschaftliches Institut, Universität Bern
Terrestrische Systemökologie, ETH Zürich
Management Studies SES, Université de Genève
Institut für Angewandte Physik, Universität Bern
Botanisches Institut, Universität Basel
Paul Scherrer Institut, Villigen
Institut für Agrarwirtschaft, ETH Zürich
Abt. Klima- und Umweltp Physik, Universität Bern
Meteo Schweiz, Zürich
WSL, Birmensdorf
Institut für Atmosphäre und Klima, ETH Zürich
Geographisches Institut, Universität Bern
Institut für Atmosphäre und Klima, ETH Zürich
Institut für Angewandte Physik, Universität Bern

- EU project: Systems Analysis for Progress and Innovation in Energy Technologies
- EU project: The Dynamics of Innovation and Investment and its Impact on Policy Design in Energy and Environment for a Sustainable Growth in Europe.
- Exploitation of ground-based GPS for operational numerical weather prediction and climate applications
- GICC Gestion et impact du changement climatique
- IGBP-WCRP-IHDP START
- Integrated ground-based remote sensing stations for atmospheric profiling
- Intergovernmental Panel on Climate Change
- International Geosphere-Biosphere Program - Past Global Changes
- International Greenland Environment Monitoring Programme
- Mesoscale Alpine Programme of the World Weather Research Program
- Network for the Detection of Stratospheric Change
- New Austrian Climate Research Program
- United Nations Environmental Programme
- World Climate Research Programme – Baseline Surface Radiation Network
- World Climate Research Programme – CLimate VARIability
- World Meteorological Organisation – Long-Range Forecasting

Research Institutions

- ARPA, Agenzia Regionale Prevenzione e Ambiente dell'Emilia Romagna, Bologna, IT
- Canadian Institute for Climate Sciences, University of Quebec, Montreal, CA
- Climate Research Unit, University of East Anglia, Norwich, GB
- Danish Meteorological Institute, Copenhagen, DK
- Department of Atmospheric Sciences, University of Washington, Seattle, US
- Department of Geosciences, University of Massachusetts, Amherst, US
- Department of Meteorology, University of Reading, GB
- Department of Plant Biology, University of Illinois, Urbana, US
- Division for Atmospheric Research, CSIRO, Victoria, AU

Climate Variability, Predictability and Climate Risks

NCCR Climate

Achievements

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 Science" (S-EN ETH) will open in 2006/2007 and offers high-level interdisciplinary studies on climate in a wide range of fields with the support of world-leading researchers.

Science

The NCCR Climate shaped the profile of Swiss climate research through collaborative novel and timely scientific contributions

with a high impact. Examples are the reconstruction of temporally highly-resolved European temperature and precipitation fields back to 1500 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. As a flexible network with pooled expertise and infrastructure, the NCCR Climate makes full use of this comparative advantage.

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.

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

Morland June, Dr.
 Müller-Fürstenberger Georg, PD Dr.
 Ohmura Atsumu, Prof.
 Pfister Christian, Prof.
 Philipona Rolf, PD Dr.
 Poliwoda Guido, Dr.
 Raible Christoph, Dr.
 Schär Christoph, Prof.
 Schmidt Michael W.I., Prof.
 Schmutz Werner, Prof.
 Schwikowski Margit, PD Dr.
 Seneviratne Sonia, Dr.
 Stocker Thomas, Prof.
 Sturm Michael, Dr.
 Sugita Shynia, Prof.
 Thalmann Philippe, Prof.
 Viguier Laurent, Dr.
 Vuilleumier Laurent, Dr.
 Wanner Heinz, Prof.
 Wild Martin, Dr.
 Wokaun Alexander, Prof.

Institut für Angewandte Physik, Universität Bern
 Volkswirtschaftliches Institut, Universität Bern
 Institut für Atmosphäre und Klima, ETH Zürich
 Historisches Institut, Universität Bern
 MeteoSwiss, Payerne
 Historisches Institut, Universität Bern
 Abt. Klima und Umweltphysik, Universität Bern
 Institut für Atmosphäre und Klima, ETH Zürich
 Geographisches Institut, Universität Zürich
 Physikalisch-Meteorologisches Observatorium Davos
 Paul Scherrer Institut, Villigen
 Institut für Atmosphäre und Klima, ETH Zürich
 Abt. Klima- und Umweltphysik, Universität Bern
 EAWAG, Dübendorf
 Institut für Pflanzenforschung, Universität Bern
 Lab. de recherches en économie et management de l'environnement, EPF Lausanne
 Lab. de recherches en économie et management de l'environnement, EPF Lausanne
 MeteoSwiss, Payerne
 Geographisches Institut, Universität Bern
 Institut für Atmosphäre und Klima, ETH Zürich
 Paul Scherrer Institut, Villigen

- European Centre for Medium Range Weather Forecasts, Reading, GB
- European Phenology Network, Wageningen, NL
- Fondazione Eni Enrico Mattei, Milano, IT
- GKSS Research Centre Geesthacht, DE
- Groupe d'Études et de Recherche en Analyse des Décisions, GERARD, Montréal, CA
- Hadley Centre for Climate Prediction and Research, Bracknell, GB
- Institut d'Economie et de Politique de l'Énergie IEPE-CNRS, Grenoble, FR
- Institut National sur la Recherche Agronomique INRA, Clermont-Ferrand, FR
- Institute of Geography, University of Würzburg, DE
- Joint Research Centre, Ispra, IT
- Laboratory of Paleobotany and Palynology, University of Utrecht, NL
- Massachusetts Institute of Technology, Cambridge, US
- Max Planck Institute for Meteorology, Hamburg, DE
- NCAR, National Centre for Atmospheric Research, Boulder, US
- NOAA Climate Diagnostics Centre, Boulder, Colorado, US
- Potsdam Institute for Climate Impact Research PIK, DE
- Signal and Information Processing Laboratory, ISI-ETH Zürich, CH
- Swiss Center for Scientific Computing, Manno, CH
- VAW Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie, ETH Zürich, CH

Statistical Input – Output Data

Funding source (CHF)	Year 5	Year 6	Year 7	Year 8	Total	%
SNSF funding	2 900 000	2 612 000	2 466 000	2 022 000	10 000 000	27
Self-funding from home institution ¹	612 500	612 500	612 500	612 500	2 450 000	7
Self-funding from project participants	3 189 438	2 917 436	2 944 150	2 581 365	11 632 389	30
Third-party funding	3 350 000	3 350 000	3 350 000	3 350 000	13 400 000	36
Total	10 051 938	9 491 936	9 372 650	8 565 865	37 482 389	100

Personnel ²	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	FR	GB	AT	IT	
Management ³	4.53	1.70	38	2.83	62	12	0	0	0	0	2	0
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	45	11	24	34	76	26	7	3	0	0	0	10
Postdoctoral students	37	10	27	27	73	18	6	1	3	2	1	7
Research associates	0	0	0	0	0	0	0	0	0	0	0	0
Senior researchers ⁴	49	4	8	45	92	30	3	4	3	3	1	4
Other staff	21	11	52	10	48	18	3	0	0	0	0	0
Total	156.59	37.70	26	118.83	74	104	19	8	6	5	4	22

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 (applies not for the country analysis)

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

Schwarzenbach René, Prof. (Chair)	Swiss National Science Foundation, Berne, CH
Bradley Raymond, Prof.	Department of Geoscience, University of Massachusetts, US
Cramer Wolfgang, Prof.	Potsdam Institute for Climate Impact Research, Potsdam, DE
Endres Alfred, Prof.	Fernuniversität Hagen, Hagen, DE
Gregory Peter, Prof.	Department of Soil Science, University of Reading, GB
Hartmann Dennis, Prof.	Department of Atmospheric Sciences, University of Washington, US
Höppe Peter, Prof.	Fachbereich GeoRisikoForschung/Umweltmanagement, Münchener Rückversicherungs-Gesellschaft, DE
Levy René, Prof.	Swiss National Science Foundation, Berne, CH
Rotmans Jan, Prof.	Dutch Research Institute for Transitions, Erasmus University, Rotterdam, NL
Van den Bergh Hubert, Prof.	Swiss National Science Foundation, Berne, CH

NCCR Office SNSF

Christ Urs, Dr.
Schweiz. Nationalfonds, Wildhainweg 3, 3001 Bern
phone: + 41 (0)31 308 23 50, fax: + 41 (0)31 305 29 71
uchrist@snf.ch

Economy/Industry

- SwissRe, Swiss Reinsurance Company, Zürich, CH

Others

- Bundesamt für Umwelt BAFU, Bern, CH
- European Science Foundation
- French Ministry of equipment, transportation, and housing, Paris, FR
- IAEA, International Atomic Energy Agency, Wien, AT
- MeteoFrance, Toulouse, FR
- MeteoSwiss, Zürich, CH
- OcCC: Beratendes Organ für Fragen der Klimaänderung, Bern, CH
- PAGES: Past Global Changes of IGBP, Bern, CH
- ProClim Forum for Climate, Bern, CH
- Swisstopo, Bundesamt für Landestopographie, Wabern, CH

Materials with Novel Electronic Properties – Basic Science and Applications

NCCR MaNEP

Home Institution

University of Geneva

Start of the NCCR

July 1, 2001

NCCR Management

Director

Fischer Øystein, Prof.
phone: +41 (0)22 379 62 70
Oystein.fischer@physics.unige.ch

Deputy Director

Triscone Jean-Marc, Prof.
phone: +41 (0)22 379 68 27
Jean-marc.triscone@physics.unige.ch

Scientific Managers

Decroux Michel, Dr.
phone: +41 (0)22 379 63 24
Michel.decroux@physics.unige.ch

Manuel Alfred, Dr.
phone: +41 (0)22 379 62 93
Alfred.manuel@physics.unige.ch

Administrative Manager

Bretton Isabelle, Mrs.
phone: +41 (0)22 379 62 18
Isabelle.bretton@physics.unige.ch

Knowledge and Technology Transfer

Kuhn Matthias, Mr.
phone: +41 (0)22 379 34 87
Matthias.kuhn@physics.unige.ch

Kuffer Olivier, Dr.
phone: +41 (0)22 379 6699
Olivier.kuffer@physics.unige.ch

Education and Training

Decroux Michel, Dr.

Advancement of Women

Decroux Michel, Dr.

Computer

and Internet Resources
Maggio-Aprile Ivan, Dr.
phone: +41 (0)22 379 61 13
Ivan.maggio-aprile@physics.unige.ch

Communication

Anne Rougemont, Mrs.
phone: +41 (0)22 379 64 99
Anne.rougemont@physics.unige.ch

Address

NCCR MaNEP
Section de physique
Université de Genève
24, quai E.- Ansermet
1211 Genève 4
phone: +41 (0)22 379 30 13
fax: +41 (0)22 379 68 69
manep@physics.unige.ch

Web Address

www.manep.ch

Research

Strongly interacting electrons, low-dimensional and quantum fluctuation dominated systems

Head: Sigrist M.

Participating members:
Blatter G., Büttiker M.,
Degiorgi L., Fischer Ø., Forró L.,
Giamarchi T., Grioni M.,
Van Der Marel D.,
Margaritondo G., Mesot J.,
Mila F., Nesper R., Ott H.R.,
Rice T.M., Schlapbach L.,
Seo M., Troyer M.

Superconductivity, unconventional mechanism and novel materials

H: Van Der Marel D.
Participating members:
Baeriswyl D., Blatter G.,
Büttiker M., Fischer Ø.,
Forró L., Giamarchi T.,
Grioni M., Karpinski J.,
Keller H., Mesot J., Sigrist M.,
Triscone J.-M.

Members participating to the Research Projects

Abplanalp Markus, Dr.
Aebi Philipp, Prof.
Baeriswyl Dionys, Prof.
Blatter Gianni, Prof.
Böni Peter, Prof.
Büttiker Markus, Prof.
Degiorgi Leonardo, Prof.
Eckert Daniel, Dr.
Fischer Øystein, Prof.

Flükiger René, Prof.

Forró László, Prof.
Giamarchi Thierry, Prof.

Grioni Marco, Prof.
Hasler Martin, Prof.
Hofer Willy, Prof.
Hulliger Jürg, Prof.
Karpinski Janusz, Dr.

Crystal growth

H: Forró L.

Participating members: Aebi P.,
Degiorgi L., Fischer Ø.,
Flükiger R., Grioni M.,
Hulliger J., Karpinski J.,
Keller H., Margaritondo G.,
Martinoli P., Mesot J., Mila F.,
Ott H.R., Rice T.M., Schilling A.,
Triscone J.-M.,
Van Der Marel D.

Novel materials

H: Hulliger J.
Participating members:
Karpinski J., Nesper R.,
Schilling A., Schlapbach L.,
Seo J.W.

Thin films, artificial materials and novel devices

H: Triscone J.-M.
Participating members: Aebi P.,
Blatter G., Fischer Ø., Forró L.,
Giamarchi T., Keller H.,
Margaritondo G., Martinoli P.,
Rice T.M., Schilling A.,
Van Der Marel D.

Industrial applications and pre-application development

H: Fischer Ø.

Participating members:
Abplanalp M., Böni P.,
Eckert D., Flükiger R., Forró L.,
Hasler M., Hofer W., Mesot J.,
Nesper R., Sommer P.,
Triscone J.-M.

Platforms, Programmes etc.

Industry Network

Workshop MaNEP «Les Diablerets»

Summer School MaNEP «Saas-Fee»

MaNEP Mobile Post-Doc Program

Advancement of Women MaNEP Summer Internships

Topics

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

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

for instance magnetic and superconducting, which makes them very sensitive to many external parameters, leading to interesting functionalities. In MaNEP, the main goals of our NCCR are to develop a basic understanding of these new materials, to prepare for their applications, and to train young scientists in this important field for future electronic applications.

Keller Hugo, Prof.
Margaritondo Giorgio, Prof.
Martinoli Piero, Prof.
Mesot Joel, Dr.
Mila Frédéric, Prof.
Nesper Reinhard, Prof.
Ott Hans-Rudolf, Prof.
Rice T. Maurice, Prof.
Schilling Andreas, Prof.
Schlapbach Louis, Prof
Seo Jin Won

Sigrist Manfred, Prof.
Sommer Pascal
Triscone Jean-Marc, Prof.

Troyer Matthias, Prof.
Van Der Marel Dirk, Prof.

Institut für Physik, Universität Zürich
Laboratoire de Physique des Matériaux Electroniques, EPF Lausanne
Institut de Physique, Université de Neuchâtel
Labor für Neutronenstreuung, ETHZ/PSI
Institut de Physique Théorique, BSP, EPF Lausanne
Laboratorium für Anorganische Chemie, ETH-Hönggerberg
Laboratorium für Festkörperphysik, ETH-Hönggerberg
Institut für Theoretische Physik, ETH-Hönggerberg
Institut für Physik, Universität Zürich
Materialprüfungs- und Forschungsanstalt, EMPA Dübendorf
Laboratoire de nanostructures et nouveaux matériaux électroniques, EPF Lausanne
Institut für Theoretische Physik, ETH-Hönggerberg
Metrolab Instruments SA, Genève
Département de Physique de la Matière Condensée, Université de Genève
Institut für Theoretische Physik, ETH-Hönggerberg
Département de Physique de la Matière Condensée, Université de Genève

Members of the Scientific Committee

Fischer Øystein, Prof.
Forró László, Prof.
Hulliger Jürg, Prof.
Sigrist Manfred, Prof.
Triscone Jean-Marc, Prof.
Van Der Marel Dirk, Prof.

Département de Physique de la Matière Condensée, Université de Genève
Institut de Génie Atomique, EPF Lausanne
Chemistry & Biochemistry, Universität Bern
Institut für Theoretische Physik, ETH-Hönggerberg
Département de Physique de la Matière Condensée, Université de Genève
Département de Physique de la Matière Condensée, Université de Genève

Public Relations

- MaNEP activity report 2001–2004
- MaNEP Annual Report years 1,2,3,4
- MaNEP facilities catalog
- MaNEP Inauguration and Open Days
- MaNEP Movie “voyage en classe perovskite”
- Open Doors and promotions toward schools
- MaNEP Newsletter and electronic newsletter
- MaNEP Website
- Participations at various radio programs
- Nuit de la Science
- CERN-50 celebrations

Third Party Cooperation

(in progress)

Programmes

- CANVAD, EU FP 5
- ESF Program on Vortex Matter
- ESF Program Pishift
- FUNCARS, EU FP 5
- NEDO Project, Tokyo, Japan

Research Institutions

- Academia Sinica, Taipei, TW
- Applied Physics and Physics, Yale University, New Haven, US
- Atom Institute, Low Temperature Physics Department, Vienna, AT
- Atominstitut der Österreichischen Universitäten, Vienna, AT
- Centre de Micro Nano Technologie, EPF Lausanne, CH
- Centre pour l'Elaboration de Matériaux et d'Etudes Structurales, Toulouse, FR
- Chimie du Solide et Inorganique Moléculaire, Université de Rennes, FR
- CNRS, Centre de Recherches sur Très Basses Températures, Grenoble, FR
- Département de Physique Théorique des Matériaux, Université de Liège, BE
- Department of Applied Physics, Osaka University, JP
- Department of Physics and Astronomy, Rutgers University, Piscataway, NJ, US
- Department of Physics and Astronomy, University College London, GB
- Department of Physics and Astronomy, University of British Columbia, Vancouver, CA
- Department of Physics Solid State Theory, Lund University, SE
- Department of Physics, Hokkaido University, Sapporo, JP

- Department of Physics, University of California, Davis, US
- Department of Physics, University of Wisconsin, Milwaukee, US
- Department of Superconductivity, University of Tokyo, JP
- Deutsches Zentrum für Luft und Raumfahrt, Berlin, DE
- Ecole Normale Supérieure, Paris, FR
- Ecole Polytechnique, Palaiseau, FR
- Ecole Supérieure de Physique et Chimie Industrielle, Paris, FR
- Ecole Supérieure d'Ingénieurs d'Annecy, Université de Savoie, Annecy, FR
- EIG-HES, Ecole d'Ingénieurs de Genève, CH
- Ellettra, Trieste, IT
- European Synchrotron Radiation Facility, Grenoble, FR
- Faculté des Sciences d'Orsay, Laboratoire de Physique des Solides, Paris, FR
- Faculty of Mathematics and Natural Sciences, University of Leiden, NL
- Forschungszentrum Karlsruhe, Karlsruhe, DE
- GAP Optique, Université de Genève, CH
- Hahn-Meitner-Institut, Berlin, DE
- Institut Laue-Langevin, Grenoble, FR
- Institut National Polytechnique de Grenoble, FR
- Institute for Material Sciences, Tsukuba, JP
- Institute for Problems of Materials Science, Academy of Sciences of Ukraine, Kiev, UA
- Institute for Solid State Physics, Tokyo, JP
- Institute for Theoretical Physics, University of Regensburg, DE
- Institute of Metals, Ekaterinburg, RU
- Institute of Physics PAS, Warsaw, PL
- Institute of Physics, Budapest University of Technology and Economics, HU
- Institute of Physics, Zagreb, HR
- International Physics Center, Donostia University, ES
- Istituto dei Materiali per Elettronica e Magnetismo, Parma-Fontanini, IT
- Istituto di Struttura della Materia ISM, CNR, Rome, IT
- Istituto Nazionale di Fisica della Materia INFN, Trieste, IT
- Laboratoire de Physique des Solides, Université Paris-Sud, Orsay, FR
- Laboratoire de Physique et de Métrologie des Oscillateurs LPMO, Besançon, FR

Materials with Novel Electronic Properties – Basic Science and Applications

NCCR MaNEP

Achievements

Science

In MaNEP phase II, the scientific activities are organized around five projects. The main idea which led to this structure was to center our efforts around the key questions in the area of MaNEP. Project I, “Strongly interacting electrons, low-dimensional and quantum fluctuation dominated systems”, aims to make further progress in the understanding and description of the complex properties of systems where electron correlations play a dominant role for the low-energy physics. Effects of correlation and quantum fluctuations are most pronounced in systems of low effective dimensionality and when other aspects such as frustration or competing interactions suppress classical order of itinerant and localized electrons. Project II, “Superconductivity, unconventional mechanisms and novel materials”, focuses on unconventional and new superconductors. Investigations of bulk materials and phase diagrams

of novel superconducting materials and detailed investigation and theoretical understanding of the electronic properties and of the mechanism of superconductivity will be pursued. Project III, “Crystal growth”, will focus on the growth of the highest quality crystals which is a key to allow the electronic properties of complex systems to be probed. Project IV, “Novel Materials”, aims at using chemistry for finding unknown compounds which might show novel physical properties. By definition this is a risky endeavour, however, an indispensable necessity to continue the line of success represented by many materials which have found real world applications. In project V, “Thin Films, Artificial Materials, and Novel Devices”, thin films, heterostructures, and superlattices of correlated oxides will be realized and studied. One of the goals is to realize high quality materials in thin film form which are essential for some applications and useful for specific studies

and novel devices. Another goal is to use advanced deposition techniques to fabricate heterostructures and novel oxide superlattices that will be used to create new materials with designed properties. Finally, Project VI, “Industrial applications and pre-application development”, has three main themes: Applied Superconductivity, Sensors and Thin Film Development and Applications. Each of these themes is composed of several applied projects involving a total of 5 industrial companies, one start-up, the technical university HES-Genève and four member institutions of MaNEP.

Besides the Scientific projects briefly described above, the important efforts in the area of Knowledge and technology transfer, Education and Promotion of women started in Phase I will further develop in Phase II. We only mention here the creation of a MaNEP doctoral school.

Further information see www.manep.ch

Members of the Advisory Board

Fischer Øystein, Prof.

Martinoli Piero, Prof.

Ott Hans-Rudolf, Prof.

Rice T. Maurice, Prof.

Triscone Jean-Marc, Prof.

Département de Physique de la Matière Condensée, Université de Genève

Institut de Physique, Université de Neuchâtel

Laboratorium für Festkörperphysik, ETH-Hönggerberg

Institut für Theoretische Physik, ETH-Hönggerberg

Département de Physique de la Matière Condensée, Université de Genève

- Laboratoire de Physique Théorique des Liquides, University Paris, FR
- Laboratoire de Physique Théorique et Hautes Energies (LPTHE) Université Paris, FR
- Laboratoire des Matériaux Physiques de Grenoble, FR
- Laboratoire pour l'Utilisation du Rayonnement Electro-magnétique LURE, Paris, FR
- Laboratory of Applied and Solid State Physics, University of Groningen, NL
- Landau Institute for Theoretical Physics, Moscow, RU
- Leibniz Institute for Solid State and Materials Research IFW, Dresden, DE
- Los Alamos National Laboratory, US
- Max Plank Institute for Solid State Research, Stuttgart, DE
- National Institute of Advanced Industrial Science and Technology, Tsukuba, JP
- National Synchrotron Light Source, Upton, US
- Oak Ridge National Laboratory, Solid State Division, US
- Physics and Astronomy Department, John Hopkins University, Baltimore, US
- Physikalisches Institut, Universität Karlsruhe, DE
- Politecnico di Milano, IT
- Politecnico di Torino, IT
- POSTECH, Pohang, KP
- Research Institute for Solid State, Budapest, HU
- School of Physics and Astronomy, University of Birmingham, GB
- SUNY, Department of Physics and Astronomy, Stony Brook, US
- Tokyo Institute of Technology, JP
- Université Paul Sabatier, Toulouse, FR
- Walther-Meissner Institut, Garching, DE

Economy/Industry

- ABB Switzerland Ltd., Corporate, Baden-Dättwil, CH
- BRUKER AG, Fällanden, CH
- IBM Research Laboratory, Rüschlikon, CH
- IBM, T.Y. Watson Research Center, Yorktown Heights, NY, US
- Mec Sens SA, Genève, CH
- METROLAB Instruments SA, Genève, CH
- Phasis Sarl, Genève, CH
- Swiss Neutronics, Klingnau, CH

Statistical Input – Output Data

Funding source (CHF)	Year 5	Year 6	Year 7	Year 8	Total	%
SNSF funding	4 750 000	4 750 000	4 750 000	4 750 000	19 000 000	35
Self-funding from home institution ¹	993 244	1 125 060	1 125 060	1 125 060	4 368 424	8
Self-funding from project participants	7 285 650	6 720 535	6 510 651	5 633 136	26 149 972	48
Third-party funding	1 510 436	1 148 362	1 155 189	981 185	4 795 172	9
Total	14 539 330	13 743 957	13 540 900	12 489 381	54 313 568	100

Personnel ²	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							FR	IT	RU	RU	GB	
Management ³	6.32	2.07	33	4.25	67	8	2	1	1	0	0	2
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	87	7	8	80	92	31	11	12	6	0	2	22
Postdoctoral students	58	8	14	50	86	6	7	7	9	3	2	22
Research associates	0	0	0	0	0	0	0	0	0	0	0	0
Senior researchers ⁴	87	7	8	80	92	38	4	2	9	7	2	23
Other staff	24	4	17	20	83	16	2	4	0	0	0	1
Total	256.10	28.07	14	234.25	86	99	26	26	25	10	6	70

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 (applies not for the country analysis)

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

Leiderer Paul, Prof. (Chair)
Claeson Tord, Prof.

Swiss National Science Foundation, Berne, CH
Department of Nanotechnology and Nanoscience,
Chalmers /Göteborg Universities, Göteborg, SE

Geballe Theodor, Prof.

Department of Applied Physics, Stanford University,
Stanford, US

Greuter Felix, Dr.

Swiss National Science Foundation, Berne, CH

Hallberg Karen, Prof.

Centro Atomico Bariloche, Bariloche, AR

Larbalestier David, Prof.

Department of Physics, University of Wisconsin, Madison, US

Mannhart Jochen, Prof.

Institut für Physik, Universität Augsburg, Augsburg, DE

Pannetier Bernard, Dr.

CNRS Centre de Recherche sur les Très Basses Températures,
Grenoble, FR

Röthlisberger Ursula, Prof.

Swiss National Science Foundation, Berne, CH

Vollhardt Dieter, Prof.

Center for Electronic Correlations and Magnetism,
University of Augsburg, Augsburg, DE

NCCR Office SNSF

Bachmann Stefan, Dr.

Schweiz. Nationalfonds, Wildhainweg 3, 3001 Bern,
phone: + 41 (0)31 308 23 49, fax: + 41 (0)31 305 29 71,
sbachmann@snf.ch

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

NCCR Nanoscale Science

Home Institution

University of Basel

Start of the NCCR

June 1, 2001

NCCR Management

Director

Güntherodt Hans-Joachim, Prof.

phone: + 41 (0)61 267 37 68/67
hans-joachim.guentherodt@unibas.ch

Director

from June 1, 2006

Schönenberger Christian, Prof.
phone: + 41 (0)61 267 36 90
christian.schonenberger@unibas.ch

Deputy Director

from June 1, 2006

Loss Daniel, Prof.
phone: + 41 (0)61 267 37 49
daniel.loss@unibas.ch

Director of Scientific Communication

Gerber Christoph, Prof.
phone: + 41 (0)61 267 07 60
christoph.gerber@unibas.ch

Administrative Director

Fischer Audrey, Mrs.
phone: + 41 (0)61 267 12 38
audrey.fischer@unibas.ch

Communications

Möller Christel, Dr.
phone: + 41 (0)61 267 37 63
c.moeller@unibas.ch

Knowledge and Technology Transfer

Cerletti Verónica, Dr.
phone: + 41 (0)61 267 37 66
veronica.cerletti@unibas.ch

Education and Training

Bruder Christoph, Prof.
phone: + 41 (0)61 267 36 92
christoph.bruder@unibas.ch

Advancement of Women

Cerletti Verónica, Dr.

Address

NCCR Nanoscale Science
Universität Basel
Klingelbergstrasse 82
4056 Basel

phone: + 41 (0)61 267 12 38
fax: + 41 (0)61 267 34 08
audrey.fischer@unibas.ch

Web Address

www.nccr-nano.org

Research

Module “Nanobiology”

Head: Engel A., Aebi U.

Exploring the biomechanical properties of articular cartilage by SFM

H: Staufer U., Friedrich N., Daniels A. U., Aebi U.

High-resolution imaging and nanomanipulation with the AFM

H: Engel A., Aebi U., Lüthi A.

Nanomechanics in biology

H: Gerber Ch., Hegner M., Plückthun A.

Nanocontainer targeting for medicine: Feasibility and toxicity

H: Hunziker P.

Real-time single-particle tracking in living cells

H: Hecht B.

Single cell proteomics

H: Vettiger P., Plückthun A., Engel A.

Studies of cytoskeletal filaments by photonic force microscopy

H: Aebi U., Forro L.

Module “Quantum Computing and Quantum Coherence”

H: Loss D., Ensslin K.

Qubit and spintronics (theory)

H: Loss D.

Quantum coherence and quantum computing in superconducting nanostructures (theory)

H: Bruder C.

Experimental manipulation of quantum systems

H: Ensslin K.

Quantum dot nuclear spins

H: Imamoglu A.

Entanglement and coherence in nanostructures

H: Schönenberger C.

Module “Atomic and Molecular Nanosystems”

H: Meyer E., Hug H. J.

Magnetic nanosystems and single spin experiments

H: Hug H.

Mechanics on the nanometer-scale

H: Meyer E.

Direct stencil type lithography

H: Meyer G.

Atomistic simulations of nanosystems

H: Goedecker S.

Molecular conformations on surfaces

H: Fasel R.

Module “Molecular Electronics”

H: Schönenberger C., Jung T.

Molecular wires

H: Kontos T., Forro L.

Transport properties of molecular junctions

H: Schönenberger Ch., Calame M.

Networks of molecular junctions

H: Calame M., Oelhafen P.

Electron spectroscopy of single molecules

H: Jung T.

Optical properties of single molecules

H: Hecht B.

Chemical synthesis of functional molecules for optoelectronics

H: Diederich F., Mayor M.

Theory

H: Bruder C., Belzig W.

Module “Functional Materials by Hierarchical Self-Assembly”

H: Diederich F., Meier W.

Functional biomimetic dendrimers

H: Diederich F.

Functional nanosystems

H: Jung T.

Self-assembling (bio-) polymers

H: Meier W., Textor M.

Molecular structures

H: Constable E., Giese B.

Functional surface structures

H: Fromm K., Pfalz A.

Nanocrystals

H: Eisler H. – J., Forro L., Setter N.

Module “Supplementary Research Activities”

H: NCCR Board of Directors

NanoEthics - Deliberating the vision of an emergent nano-science

H: Rehmann-Sutter C., Maasen S

Ethics of Science: A course for scientists provided by the NCCR Nanoscale Science

H: Reiter-Theil S.

Platforms

Education Platform

Supervisor: Bruder C.

Nanocurriculum

Bachelor and Master Degree in Nanoscience at University of Basel

H: Engel Andreas
Contact: Spieler Katrein, Ms.
phone: +41 (0) 61 267 16 05
Katrein.Spieler@unibas.ch

Topics

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

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

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

Public Relations

- News on website
- Information Brochure, 2005 (in German/English)
- Electronic Newsletter nanonews

Third Party Cooperation

(in progress)

Programmes

- Frontiers Joint Program FP6 NoE (EC), Brussels, BE

Research Institutions

- Applied and Environmental Chemistry Department, University of Szeged, HU
- CEMES-CNRS, Groupe Electronique Moléculaire, Toulouse, FR
- College of Engineering, University of Oklahoma, US
- Department of Biology, University of Lausanne, CH
- Department of Biophysical and Electronic Engineering, University of Genoa, IT
- Department of Chemistry and Biochemistry, University of Bern, CH
- Department of Chemistry, Clemson University, US
- Department of Electronic Materials Engineering Research, School of Physical Sciences and Engineering, The Australian National University, Canberra, AU
- Department of Organic and Industrial Chemistry, University of Parma, IT
- Department of Physics and Astronomy (IFA), Interdisciplinary Nanoscience Center (iNANO), University of Aarhus, DK
- Department of Physics, Harvard University, Cambridge, MA, US
- Department of Physics, McGill University, Montreal, CA
- Department of Physics, Princeton University, NJ, US
- Department of Solid State Physics, University of Ulm, DE
- Divisions of Chemistry & Medicine, University College of London, GB
- German Cancer Research Center, Heidelberg, DE

Heads of Individual Research Projects and Subprojects

Aebi Ueli, Prof.
Belzig Wolfgang, Dr.
Bruder Christoph, Prof.
Calame Michel, Dr.
Constable Edwin, Prof.
Daniels Alma U., Prof.
Diederich François, Prof.
Eisler Hans-Jürgen, Dr.
Engel Andreas, Prof.
Ensslin Klaus, Prof.
Fasel Roman, Dr.
Forro Laszlo, Prof.
Friederich Niklaus, Prof.

Fromm Katharina, Prof.
Gerber Christoph, Prof.
Giese Bernd, Prof.
Goedecker Stefan, Prof.
Güntherodt Hans-Joachim, Prof.
Hecht Bert, Prof.
Hegner Martin, PD Dr.
Hug Hans Josef, Prof.
Hunziker Patrick, PD Dr.

Imamoglu Atac, Prof.
Jung Thomas, Dr.

Klok Harm-Anton, Prof.
Kontos Takis, Dr.
Loss Daniel, Prof.
Lüthi Anita, PD Dr.
Maasen Sabine, Prof.

Mayor Marcel, Prof.
Meier Wolfgang, Prof.
Meyer Ernst, Prof.
Meyer Gerhard, Dr.
Oelhafen Peter, Prof.
Pfaltz Andreas, Prof.
Plückthun Andreas, Prof.
Rehmann-Sutter Christoph, Prof.

M. E. Müller-Institut für Strukturbiologie, Universität Basel
Institut für Physik, Universität Basel
Institut für Physik, Universität Basel
Institut für Physik, Universität Basel
Departement Chemie, Universität Basel
Labor für Orthopädische Biomechanik, Felix Platter Spital, Basel
Laboratorium für Organische Chemie, ETH Zürich
Institut für Physik, Universität Basel
M. E. Müller-Institut für Strukturbiologie, Universität Basel
Laboratorium für Festkörperphysik, ETH Zürich
Abteilung Oberflächen, Beschichtungen, Magnetismus, EMPA
Institute de Genie Atomique, EPF Lausanne
Klinik für Orthopädische Chirurgie und Traumatologie des Bewegungsapparates, Kantonsspital Bruderholz, Basel
Departement Chemie, Universität Basel
Institut für Physik, Universität Basel
Institute for Organic Chemistry, Universität Basel
Institut für Physik, Universität Basel
Institut für Physik, Universität Basel
Institut für Physik, Universität Basel
Institut für Physik, Universität Basel
Nanoscale Materials Science, EMPA
Department of internal medicine, Cardiology, University Hospital Basel
Institute of Quantum Photonics, ETH Zürich
Lab for Micro- and Nanostructures, Paul Scherrer Institut, Villigen PSI
Laboratoire des Polymères, EPF Lausanne
Institut für Physik, Universität Basel
Institut für Physik, Universität Basel
Abteilung Pharmakologie/Neurobiologie, Universität Basel
Wissenschaftsforschung / Wissenschaftssoziologie, Universität Basel
Departement Chemie, Universität Basel
Departement Chemie, Universität Basel
Institut für Physik, Universität Basel
IBM Research Laboratory, Rüschlikon
Institut für Physik, Universität Basel
Institut für Organische Chemie, Universität Basel
Institute of Biochemistry, Universität Zürich
Institut für Geschichte und Epistemologie der Medizin, Universität Basel

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

NCCR Nanoscale Science

- Institut de Physique et Chimie des Matériaux IPCMS, University of Strasbourg, Strasbourg, FR
- Institut für Physikalische Chemie, University of Karlsruhe, DE
- Institute Jozef Stefan, Ljubljana, SI
- IRC in Nanotechnology, University of Cambridge, GB
- Istituto di Chimica dei Composti Organometallici, Università di Firenze, Polo Scientifico, IT
- Kavli Institute of Nanoscience, Delft University of Technology, NL
- Laboratoire de Chimie Macromoléculaire, Ecole Nationale Supérieure de Chimie de Mulhouse, University Haute Alsace, FR
- Laboratory for Micro- & Nanotechnology, Paul Scherrer Institute, Villigen, CH
- Physics Department, University of Regensburg, DE
- Physikalische Chemie, University of Siegen, DE
- Skirball Institute, New York University Medical Center, US

Economy/Industry

- Concentris GmbH, Basel, CH
- CSEM, Alpnach Dorf, CH
- Glatt GmbH, Binzen, DE
- IBM Research Laboratory, Zürich, CH
- IBM, TJ Watson Research Center, Yorktown Heights, NY, US
- Meristem Therapeutics, Clermont-Ferrand, FR
- Nanonis GmbH, Zürich, CH
- NTT Basic Research Laboratories, Atsugi-shi, JP and Dübendorf, CH
- Sony Deutschland GmbH, Material Science Laboratories, Stuttgart, DE
- SwissProbe Ltd., Basel, CH

Achievements

Science

In the beginning of its second phase, the NCCR Nanoscale Science has been very successful and productive, having already produced important results, built upon an enhanced collaboration and interaction between the groups, supported by the new structure of the NCCR Nanoscale Science. As examples for the very fruitful work carried out in this period, the following papers, which had great impact, can be mentioned: The gate-field-controlled magnetoresistance of carbon nanotubes connected by ferromagnetic leads has been demonstrated, opening the route to multifunctional spintronic devices.

Protocol and physical implementation for partial Bell-state measurements of Fermionic qubits. This measurement-based qubit scheme greatly simplifies the experimental realization of scalable quantum computers in electronic nanostructures.

The first nanometer-scale gold dipole antennas, de-

signed to be resonant at optical frequencies, have been constructed. They should find applications in optical characterization, manipulation of nanostructures, and optical information processing. The interaction of a single quantum dot with a bowtie antenna is demonstrated for visible light. The observations demonstrate that the relaxation channels of a single quantum emitter can be controlled by coupling to an efficiently radiating metallic nano-antenna. A sensitivity of 1nM using cantilever arrays as biosensors was achieved.

Know-how and technology transfer

The NCCR Nanoscale Science continued as in the past stimulating the know-how and technology transfer, by starting new collaborations with the industry, participating in public events like the fair NanoEurope in St. Gallen, or allowing for the internal flow of know-how within the NCCR in the biannual Meeting of the Center taking place October 2005 in

Gwatt. Also, international delegations visited our Center, and more visits are planned in the near future.

Education

The interdisciplinary program leading to a Bachelor/Master of Nanoscience continued to be a success story of the NCCR Nanoscale Science. Currently over 100 students are registered, and the first students finished their Bachelor October 2005.

Communication

The NCCR Nanoscale Science continues to put effort on communication and had presented recently its new brochure for the second phase of the NCCR. The web site has the latest news and updated information on research, structure, events, and news coming from our center. The presence in different public events, where its research can be presented, and information can be delivered on a personal basis, is also part of the communication strategy of the NCCR Nanoscale Science.

Further information see www.nccr-nano.org.

Reiter-Theil Stella, Prof.

Schönenberger Christian, Prof.

Setter Nava, Prof.

Staufe Urs, Prof.

Textor Marcus, Prof.

Vettiger Peter, Dr.

Institut für Angewandte Ethik und Medizinethik, Universität Basel

Institut für Physik, Universität Basel

Laboratoire de céramique, EPF Lausanne

Institute of Microtechnology, Universität Neuenburg

Oberflächentechnik, ETH Zürich

Universität Neuchâtel

Members of the Scientific Advisory Board

Baumeister Wolfgang, Prof.

Binnig Gerd, Prof.

Eigler Don, Dr.

Kroto Sir Harry, Prof.

Lindelof Poul Erik, Prof.

Melchers Fritz, Prof.

Quate Calvin, Prof.

Rohrer Heinrich, Dr.

Max Planck Institute, Martinsried, DE

Definiens AG, Munich, DE

IBM Almaden, US

University of Sussex, GB

University of Copenhagen, DK

University of Basel, CH

Stanford University, US

Wollerau, CH

Statistical Input – Output Data

Funding source (CHF)	Year 5	Year 6	Year 7	Year 8	Total	%
SNSF funding	4 750 000	4 750 000	4 750 000	4 750 000	19 000 000	32
Self-funding from home institution ¹	750 000	750 000	750 000	750 000	3 000 000	5
Self-funding from project participants	6 399 651	6 399 651	6 399 651	6 399 651	25 598 604	43
Third-party funding	2 875 662	2 875 662	2 875 662	2 875 662	11 502 648	19
Total	14 775 313	14 775 313	14 775 313	14 775 313	59 101 252	100

Personnel ²	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	FR	RU	IT	IN	
Management ³	3.30	2.20	67	1.10	33	8	3	0	0	0	0	0
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	74	10	14	64	86	35	6	5	2	4	3	18
Postdoctoral students	71	12	17	59	83	15	14	11	6	3	2	19
Research associates	0	0	0	0	0	0	0	0	0	0	0	0
Senior researchers ⁴	54	7	13	47	87	28	13	2	0	0	0	9
Other staff	41	14	34	27	66	37	1	2	0	0	0	2
Total	245.87	45.20	20	198.10	80	123	37	20	8	7	5	48

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 (applies not for the country analysis)

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

Folkers Gerd, Prof. (Chair)

Altshuler Boris, Prof.

Awschalom David D., Prof.

Gaub Hermann, Prof.

Hüfner Stefan, Prof.

Leiderer Paul, Prof.

Ott Hans Rudolf, Prof.

Reinhoudt David, Prof.

von Löhneysen Hilbert, Prof.

Welland Mark, Prof.

Swiss National Science Foundation, Berne, CH

Physics Department, Princeton University, US

Center for Spintronics and Quantum Computation

University of California, US

Lehrstuhl für Angewandte Physik, Universität München, DE

Fachbereich Physik, University of the Saarland, DE

Swiss National Science Foundation, Berne, CH

Swiss National Science Foundation, Berne, CH

Faculty of Chemical Technology, University of Twente, NL

Physikalisches Institut, Universität Karlsruhe, DE

Department of Engineering, University of Cambridge, GB

NCCR Office SNSF

Bachmann Stefan, Dr.

Schweiz. Nationalfonds, Wildhainweg 3, 3001 Bern,

phone: + 41 (0)31 308 23 49, fax: + 41 (0)31 305 29 71,

sbachmann@snf.ch

Quantum Photonics

NCCR Quantum Photonics

Home Institution

Swiss Federal Institute of
Technology, Lausanne

Start of the NCCR

July 1, 2001

NCCR Management

Director

Deveaud-Plédran Benoît, Prof.
phone: + 41 (0)21 693 54 96
benoit.deveaud-pledbran@epfl.ch

Deputy Director

Faist Jérôme, Prof.
phone: + 41 (0)32 718 29 22
jerome.faist@unine.ch

Administration and Secretariat

Varrin Heidi, Mrs.
phone: + 41 (0)21 693 54 15
heidi.varrin@epfl.ch

Knowledge and

Technology Transfer
Cochet François, Dr.
phone: + 41 (0)21 693 54 12
francois.cochet@epfl.ch

Education and Training

Fiore Andrea, Prof.
phone: + 41 (0)21 693 44 28

Advancement of Women

Fabian Montabert Andrea, Dr.
phone: + 41 (0)21 693 54 12
andrea.fabian@epfl.ch

Address

NCCR Quantum Photonics
Post Office Box 123
1015 Lausanne

phone: + 41 (0)21 693 54 15
fax: + 41 (0)21 693 54 10
nccr-qp@epfl.ch

Web Address

<http://nccr-qp.epfl.ch>

Research

Quantum communication

Head: Gisin N.

Single photon detectors

H: Zbinden H., Fiore A.

Cavity-QED and spin based quantum information processing

H: Imamoglu A.

Ordered pyramidal quantum dots for quantum photonics applications

H: Kapon E.

Quantum coherence in semiconductor nano-structures

H: Deveaud-Plédran B.

Time resolved cathodoluminescence

H: Ganière J.D.

Nitrides based light emitters

H: Grandjean N., Hofstetter D.

Long-wavelength dilute nitride VECSELS and SESAMs

H: Schoen S.

Advanced photonic crystal structures

H: Houdré R.

MEMS photonic crystals and gratings

H: Stanley R.

Coherent control of matter in photonic crystal fibers

H: Feurer T.

Quantum cascade interlevel sources

H: Faist J.

Application of quantum cascade lasers in atmosphere monitoring

H: van den Bergh H.

Ultrafast sources from near infrared to X-rays

H: Keller U.

Technology Platforms, Programmes etc.

Doctoral programme in quantum photonics

Martin O.

Workshop “Leysin”

Workshop “Monte Verita”

Heads of Individual Research Projects and Subprojects

Deveaud-Plédran Benoît, Prof.

Faist Jérôme, Prof.

Feurer Thomas, Prof.

Fiore Andrea, Prof.

Ganière Jean-Daniel, Dr.

Gisin Nicolas, Prof.

Grandjean Nicolas, Prof.

Hofstetter Daniel, Prof.

Houdré Romuald, Dr.

Imamoglu Atac, Prof.

Kapon Eli, Prof.

Keller Ursula, Prof.

Schoen Silke, Dr.

Stanley Ross, Dr.

van den Bergh Hubert, Prof.

Zbinden Hugo, Dr.

Institut de Photonique et d'Electronique Quantiques, EPF Lausanne

Institut de Physique, Université de Neuchâtel

Institut für Angewandte Physik, Universität Bern

Institut de Photonique et d'Electronique Quantiques, EPF Lausanne

Institut de Photonique et d'Electronique Quantiques, EPF Lausanne

Groupe de Physique Appliquée, Université de Genève

Institut de Photonique et d'Electronique Quantiques, EPF Lausanne

Institut de Physique, Université de Neuchâtel

Institut de Photonique et d'Electronique Quantiques, EPF Lausanne

Institut für Quantenelektronik, ETH Zürich

Institut für Quantenelektronik, ETH Zürich

Institut für Quantenelektronik, ETH Zürich

Institut für Quantenelektronik, ETH Zürich

CSEM Neuchâtel

Laboratoire de Pollution Atmosphérique et du Sol, EPF Lausanne

Groupe de Physique Appliquée, Université de Genève

Members of the Advisory Board

Cuomo Andrea, Dr.

Erman Marko, Dr.

Forchel Alfred, Prof.

Harder Christoph, Dr.

Heffernan Jon, Dr.

Kraus Thomas, Prof.

Levinson Frank, Dr.

Ostrowsky Dan, Prof.

Rarity John, Prof.

Rosencher Emmanuel, Prof.

ST Microelectronics, Grenoble, FR

Thales Communication, Orsay, FR

Wuerzburg University, DE

Bookham Switzerland AG, Zurich, CH

Sharp Laboratories, Oxford, GB

University of St. Andrews, GB

Finisar, Sunnyvale, US

University of Nice, FR

University of Bristol, GB

ONERA, Université Paris-Sud, FR

Topics

The field of Quantum Photonics extends from basic physical concepts regarding the quantum description of light, matter, and light-matter interaction to the implications and applications of these concepts in future information and communication technologies. This field will have tremendous impact on science and society in the coming decades, because of the deeper physical understanding it brings into fundamental aspects of modern physics, the

opening of interdisciplinary links to molecular chemistry and biochemistry, and the perspectives it offers for the invention and implementation of new devices and systems in the rapidly moving and expanding field of information management, going from sensors to advanced light sources, from data handling and transmission systems, to more advanced subjects such as quantum computing and coherent control of matter. During the first phase, the

NCCR was organized in to 10 projects, classified in four main areas: Quantum communications, Nano-scale optics, Advanced light sources and Photonic systems. For the second phase 2005-2008, the organization of the consortium is slightly modified so as to reflect the changes that occurred among the different projects. We now have 14 projects within 4 main domains: Quantum optics, material science, photonic structures and advanced photon sources.

Achievements

Research results

The Quantum Photonics Programme has strengthened the position of Switzerland in the field of photonics, with outstanding scientific achievements: Long distance teleportation of time bin qubits, conversion of entangled photons to plasmons (UniGE/ETHZ); Time Resolved Cathodoluminescence of nanostructures in tetrahedral pyramids (EPFL); Photonic Crystal based THz lasers (UniNE/EPFL); Nitride intersubband detector at 1.55 micron (UniNE/EPFL/Cornell University); attosecond pulses in the extreme UV (2 cycle pulses, 1015 W/cm², (ETHZ) Scientific impact Phase One (2001-2005) has led to close to 300 refereed publications and about 400 conference presentations directly resulting from the research carried out in this NCCR. International con-

tacts were fostered by the organisation with NCCR support of the Monte Verita summer schools on Photonic Crystals (2002) and Quantum Dot Photonics (2004), the organisation of a Photonics Day at EPF Lausanne, and the organisation of the 2004 Latsis Symposium on Quantum Communications and Computing in Lausanne.

European collaborations

NCCR research groups are participating in over ten research projects or networks sponsored by the European community, providing strong links with European industries and promoting the image of Switzerland as a leading research centre in photonics in Europe.

Spin-offs

Several spin-offs have been created by NCCR scientists (idQuantique, AlpesLaser, BeamExpress) and are exploiting the

research results developed in the programme and benefiting from the favourable conditions created by the NCCR research environment.

Education and Knowledge transfer

The recently established Doctoral School in Photonics at EPF Lausanne and the new Photonics curriculum in the department of Information Technology and Electrical Engineering at ETH Zurich are reinforcing the impact of the NCCR Quantum Photonics research on the education and training of young scientists. The internal collaborations within the NCCR have been promoted by the organisation of yearly ex-muros meetings (Chexbres, Chaumont, Leysin) and the encouragement of joint research efforts.

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

Third Party Cooperation

(in progress)

Programmes

- COST 288: European Cooperation in the Field of Scientific and Technical Research
- COST P11: Physics of linear, nonlinear and active photonic crystals
- COST P5: Mesoscopic electronics
- EU Network of Excellence Plasmo-Nano-Devices
- EU-ANSWER
- EU-ePIXnet
- EU-EURONIM
- EU-FUNFOX
- EU-IST-VISTA
- EU-NITWAVE
- EU-QAP
- EU-QUIPROCONEII
- EU-RAMBOQ
- EU-RESQ
- EU-RTN (Marie Curie Research Training Networks)
- EU-SECOQC
- EU-STIMSCAT
- EU-STREP
- EU-ULTRAGAN
- EU-WANTED

Research Institutions

- Centre de recherches sur l'hétéroépitaxie et ses applications (CRHEA), CERN, Valbonne, FR
- Department of applied physics, COBRA, Eindhoven University of Technology, NL
- Department of Electrical and Electronical Engineering, University of Bristol, GB
- Department of physics – condensed matter theory, Universidad Autonoma de Madrid, ES
- Department of physics and astronomy, Louisiana State University, Baton Rouge, US
- Hahn-Meitner Institut, Berlin, DE
- Institut für Kernphysik, University of Frankfurt, DE
- Institute of Photonics and Nanotechnology, Italian National Research Council CNR-IFN, Roma, IT
- Institute of Theoretical Physics, Innsbruck University, AT
- Laboratoire de physique de la matière condensée, Ecole Polytechnique, Paris-Palaiseau, FR

- Laboratoire d'optique appliquée, Ecole Polytechnique, Paris-Palaiseau, FR
- Laboratoire Physique de Nanostructures, CNRS, Marcoussis, FR
- Lund Laser Center, Lund University, SE
- Microphotonics and photonic crystals research group, St. Andrews University, GB
- Nano Optics Group, Ludwig-Maximilians-Universität, München, DE
- Nano-Optics Group, ETH Zurich, CH
- National Microelectronics Research Center NMRC Cork, IE
- National Research Group, University of Lecce, IT
- Theoretical and quantum computing (LITQ), Montreal University, CA

Economy/Industry

- Agilent Technologies, Colorado Springs, US
- Alpes Lasers SA, Neuchâtel, CH
- ALPS AG, Wiedlisbach, CH
- Avalon Photonics, Zürich, CH
- BeamExpress SA, Lausanne, CH
- Bystronic Laser AG, Niederönz, CH
- Crystal Fibres A/S, Birkerød, DK
- CSEM, Neuchâtel, CH
- Dätwyler Fiber Optics SA, Boudry, CH
- Exalos AG, Zürich, CH
- GAP-Optique SA, Geneva, CH
- GigaTera Inc., Zürich, CH
- HP International, Geneva, CH
- IBM Research, Rüschlikon, CH
- Id Quantique SA, Geneva, CH
- Lasag AG, Thun, CH
- Lombard Odier Darier Hentsch, Geneva, CH
- OSRAM AG, Regensburg, CH
- PPC Electronic AG, Cham, CH
- RAITH GmbH, Dortmund, DE
- Schmid & Partner Engineering AG, Zurich, CH
- SolSens Ltd., Bern, CH
- Time-Bandwidth Products Inc., Zürich, CH

Others

- Air Force Office of Scientific Research, Arlington, Virginia, US
- Bundesamt für Metrologie und Akkreditierung METAS, Bern, CH
- ESA, Noordwijk, NL
- IT'IS Foundation for Research on Information Technologies in Society, ETH Zurich, CH

Statistical Input – Output Data

Funding source (CHF)	Year 5	Year 6	Year 7	Year 8	Total	%
SNSF funding	5 200 000	4 000 000	3 600 000	3 200 000	16 000 000	45
Self-funding from home institution ¹	2 350 000	1 100 000	850 000	800 000	5 100 000	14
Self-funding from project participants	2 411 860	3 758 700	2 633 700	2 533 700	11 337 960	32
Third-party funding ²	3 040 000	0	0	0	3 040 000	9
Total	13 001 860	8 858 700	7 083 700	6 533 700	35 477 960	100

Personnel ³	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							FR	IT	DE	AT	RU	
Management ⁴	2.18	0.84	39	1.34	61	5	2	0	0	0	0	1
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	54	12	22	42	78	25	2	7	7	0	1	10
Postdoctoral students	29	3	10	26	90	4	7	6	3	1	1	7
Research associates	0	0	0	0	0	0	0	0	0	0	0	0
Senior researchers ⁵	70	4	6	66	94	28	10	7	6	3	2	14
Other staff	22	3	14	19	86	20	0	1	0	0	0	2
Total	177.18	22.84	14	154.34	86	82	21	21	16	4	4	34

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

² Not included is CTI funding (cf. page 6). Since the start of the NCCR 1 projects have been funded by CTI at a total amount of 1.6 mio. CHF.

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

⁴ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training (applies not for the country analysis)

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

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

Members of the Review Panel

Leiderer Paul, Prof. (Chair)

Baets Roel, Prof.

Ebeling Karl Joachim, Prof.

Folkers Gerd, Prof.

Knop Karl, Dr.

Ott Hans Rudolf, Prof.

Stubkjaer Kristian, Prof.

Svelto Orazio, Prof.

Weisbuch Claude, Prof.

Swiss National Science Foundation, Berne, CH

Department of Information Technology, Universiteit Gent, BE

Rektor der Universität Ulm, DE

Swiss National Science Foundation, Berne, CH

CSEM Zurich, CH

Swiss National Science Foundation, Berne, CH

Technical University of Denmark, Lyngby, DK

Politecnico di Milano, Dipartimento de Fisica, Milano, IT

Laboratoire de Physique de la Matière Condensée,

Ecole Polytechnique, Palaiseau, FR

NCCR Office SNSF

Bachmann Stefan, Dr.

Schweiz. Nationalfonds, Wildhainweg 3, 3001 Bern,
phone: + 41 (0)31 308 23 49, fax: + 41 (0)31 305 29 71,
sbachmann@snf.ch

Interactive Multimodal Information Management NCCR IM2

Research

Audio processing

Head: Dines J.

Database management and meeting analysis

H: Popescu-Belis A.

Visual/video processing

H: Thiran J.P.

Multimodal processing and recognition

H: Bengio S.

Multimodal context abstraction

H: Marchand-Maillet S.

Human-machine integration

H: Wellner P.

Integration software and research demonstration

H: Flynn M.

Brain machine interaction

H: Millán J. del R.

Platforms, Programmes etc.

Doctoral School

Supervisor: Bourlard H.
Co-Supervisor: Siegwart R.
Female Fellowship: Bourlard H.

Visitor exchange program with ICSI, Berkeley, US

Supervisor: Bourlard H.

Smart Meeting Room

Supervisor: Bourlard H.

Multimedia File Server

Supervisor: Wellner P.

Heads of Individual Research Projects

Bengio Samy, Dr.

Bourlard Hervé, Prof.

Dines John, Dr.

Flynn Mike

Marchand-Maillet Stefane, Dr.

Millán J. del R., Prof.

Popescu-Belis Andrei, Dr.

Thiran Jean-Philippe, Prof.

Wellner Pierre, Dr.

IDIAP, Martigny

IDIAP, Martigny

IDIAP, Martigny

IDIAP, Martigny

Centre Universitaire d'Informatique, Université de Genève

IDIAP, Martigny

ISSCO, Université de Genève

Signal Processing Institute, EPF Lausanne

IDIAP, Martigny

Members of the Scientific Advisory Board

Bellanger Maurice, Prof.

Delp Edward, Prof.

De Mori Renato, Prof.

Hirschberg Julia, Prof.

Huang Thomas, Prof.

Jelinek Fred, Prof.

Kittler Joseph, Prof.

C.N.A.M., FR

Purdue University, US

University of Avignon, FR

Columbia University, US

University of Illinois, US

Johns Hopkins University, US

University of Surrey, GB

Members of the Industrial Advisory Board

Bussien Aldo, Dr.

Cohen Jordan, Dr.

Emmott Stephen, Prof.

Estola Kari-Pekka, Dr.

Malzbender Tom, Dr.

Meier Christophe, Dr.

Sobel Irwin, Dr.

VP of Engineering, Logitech SA, CH

CTO VoiceSignal Technologies Inc, US

Director Microsoft Research Cambridge, GB

Nokia Research Center, FI

HP Laboratories, Palo Alto, US

Director, CCSO, CH

HP Laboratories, Palo Alto, US

Home Institution

IDIAP, Martigny

Start of the NCCR

January 1, 2002

NCCR Management

Director

Bourlard Hervé, Prof.
phone: + 41 (0)27 721 77 20
bourlard@idiap.ch

Deputy Director

Siegwart Roland, Prof.
phone: + 41 (0)21 693 38 50
roland.siegwart@epfl.ch

Officer

Foglia Francois, Dr.
phone: + 41 (0)27 721 77 50
foglia@idiap.ch

Roby Nancy-Lara, MBA
phone: + 41 (0)27 721 77 18
nancy-lara.robey@idiap.ch

Knowledge and

Technology Transfer

Crittin Frank, Dr.
phone: + 41 (0)27 721 77 17

Bagnoud Frédéric, Mr.

Education and Training

Roland Siegwart, Prof.
phone: + 41 (0)21 693 38

Advancement of Women

Roby Nancy-Lara, MBA
phone: + 41 (0)27 721 77 18

Address

NCCR IM2
IDIAP
P.O. Box 592
1920 Martigny

phone: + 41 (0)27 721 77 11
fax: + 41 (0)27 721 77 12
im2@idiap.ch

Web Address

www.im2.ch

Public Relations

- Newsletter IM2, www.im2.ch
- IM2 Flyer
- Festival "Science et Cité" 2005
- Brochure IM2
- Public Day at the "Foire du Valais"

Third Party Cooperation

(in progress)

Programmes

- Bio Secure: Network of Excellence: Biometrics for Secure Authentication
- BIOMET: Multimodal Biometric Identity Verification
- CNRS ANANAS: Annotation Anaphorique pour l'Analyse Sémantique
- COST 275: Biometrics-Based Recognition of People over the Internet
- COST 276: Information and Knowledge Management for Integrated Media Communication
- COST 277: Non-Linear Speech Processing
- COST 278: Spoken Language Interaction in Telecommunication
- CTI: CRYstal Marking based Encryption and Document Authentication Security Architecture for brand protection
- DARPA: Effective and Affordable Reusable Speech recognition
- DOCMINING
- eCoLoRe: E-Content Localisation Resources
- EU FP6: Network of Excellence on Virtual Reality and Virtual Environments Applications for Future Workspaces
- EU-FP5: IST Cognitive Vision Systems project
- EU-FP6: Augmented Multiparty Interaction
- EU-FP6: European Network of Excellence in Cryptology
- EU-FP6: European Robotics Network
- EU-FP6: Excellence in the Processing of Open Cultural Heritage
- EU-FP6: Marie-Curie Action (EST): Cultural Heritage Informatics Research Oriented Network
- EU-FP6: Non-Invasive Brain Interaction with Robots-Mental Augmentation through Determination of Intended Action
- EU-FP6: Pattern analysis, statistical modeling and computational learning
- EU-FP6: Seamless Integrated Multimodal Interfaces for Learning and Augmenting Communication in the Real-World
- EU-FP6: The CyberCarpet-enabling Omni-directional Walking in Virtual World
- EU-IST: INfotainment management with SPeech Interaction via Remote-microphones and tElephone interfaces
- EU-IST: Intuitive Physical Interfaces to the WWW

Interactive Multimodal Information Management NCCR IM2

Topics

The National Center of Competence in Research (NCCR) on Interactive Multimodal Information Management, in brief IM2, is aimed at the advancement of research, and the development of prototypes, in the field of man-machine interaction. The NCCR is particularly concerned with technologies coordinating natural input modes (such as speech, image, pen, touch, hand gestures, head and/or body movements, and even physiological sensors) with multimedia system outputs, such as speech, sounds, images, 3D graphics and animation. The field of multimodal interaction covers a wide range of activities and applications, including the recognition and interpretation of spoken, written and gestured languages,

computer vision, and the automatic indexation and management of multimedia documents. Other important related themes are information content protection, data access control, and the structuring, retrieval and presentation of multimedia information.

Multimodal interfaces represent a new, highly strategic direction for information technologies of the future. Thanks to such interfaces, man-machine interactions will become simpler and, by consequence, more productive. In the near future, multimedia systems equipped with such interfaces will be flexible enough to accommodate a wide variety of users, tasks and environments for which current interaction modalities (such as keyboard,

mouse and screen) are insufficient. In first instance, ideal interfaces would be capable of manipulating more complex and realistic data, including the combination of different forms of data, such as audio and video.

The IM2 NCCR, headed by the Dalle Molle Institute of Perceptual Artificial Intelligence (IDIAP) in Martigny, combines many partners from a number of university institutions (EPFL, University of Geneva, University of Fribourg, University of Bern, ETHZ), as well as HES (Sion), CSEM (Neuchâtel) and a range of commercial companies. The NCCR also has numerous international contacts, including an agreement for the exchange of young researchers with ICSI in Berkeley, California.

Achievements

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 recognised 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 is 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 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

IM2 is among the creators of the series of international Multimodal Interaction and Related Machine Learning Algorithms (MLMI) work-shops. IM2 fostered the creation of several start-up companies, such as Spiderphone.ch, Anteleon Imaging,... Thanks to IM2, IDIAP and its subsidiary IdeArk S.A. are a core component 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 supports a new Female Fellowship programme aimed specifically at boosting the careers of female researchers.

Structural Impact

IM2 has an excellent integration in the ERA (European Research Area) through several key FP6 projects, especially AMI. So far, the most impressive structural impact of IM2 is also at the level of the Leading House IDIAP, turning a local research institute into a large, worldwide recognised, research institution, often quoted for its work, publications, or simply as an example of dynamism and international integration.

Further information see www.im2.ch

- EU-IST: MultiModal Meeting Manager
- EU-IST: The Parmenides Project
- Face and Gesture Recognition Working Group
- HASSIP: RTN, Harmonic Analysis and Statistics in Signal and Image Processing
- HOARSE: Hearing, Organization and Recognition of Speech in Europe
- LAVA: Learning for Adaptable Visual Assistants
- Med Tag: Free-text medical document retrieval via extraction of complex terms
- MEDSLT: Automatic Spoken Language Translation for Medical Applications
- MeLLANGE: Multilingual e-Learning in Language Engineering
- METISS: Modélisation et expérimentation pour le traitement des informations et des signaux sonores

Research Institutions

- Applied and Computational Mathematics Department, California Institute of Technology, Pasadena, US
- Center for Vision, Speech and Signal Processing, University of Surrey, Guildford, GB
- Centre for Speech Technology Research, School of Informatics, University of Edinburgh, GB
- CERN, Geneva, CH
- Civil and Environmental Engineering, Massachusetts Institute of Technology MIT, Boston, US
- Communication and Remote Sensing Laboratory, Université catholique de Louvain, BE
- Department of Computer Science, University of Sheffield, GB
- Department of Computer Science, University of Szeged, HU
- Department of Computing, Hong Kong Polytechnic University, HK
- DFKI, Research Center for Artificial Intelligence, Kaiserslautern, DE
- Dipartimento di Ingegneria Elettrica ed Elettronica, Università degli Studi di Cagliari, IT
- ESA, Paris, FR
- Eurecom, Sophia Antipolis, Nice, FR
- German Research Center for AI- Deutsche Forschungszentrum für Künstliche Intelligenz DFKI, Saarbrücken, DE
- Haute Ecole Valaisanne HEVs, Sion, CH
- Hautes Ecoles Spécialisées de Suisse Occidentale HES-SO, Fribourg, CH

- Hautes Ecoles Spécialisées de Suisse Occidentale HES-SO, Lausanne, CH
- HEC-INFORGE, University of Lausanne UNIL, CH
- Hôpitaux Universitaires de Genève, CH
- International Computer Science Institute ICSL, Berkley, California, US
- Istituto per le Tecnologie Informatiche Multimediali ITIM, CNR, Milano, IT
- Laboratoire TELE, Université Catholique de Louvain, BE
- Natural Language Processing Laboratory, Faculty of Informatics, Masaryk University, Brno, CZ
- Speech, Audio, Image & Video Technology SAIVT, Queensland University of Technology, Brisbane, AU
- Zürcher Hochschule Winterthur, Winterthur, CH

Economy/Industry

- Anteleon Imaging SARL, Geneva, CH
- Atonce Capital Management AG, Bätterkinden, CH
- Canon (Schweiz) AG, CH
- Centre Suisse d'Electronique et de Microtechnique SA CSEM, Neuchâtel, CH
- Fastcom Technology SA, Lausanne, CH
- France Telecom R&D, Lanion, FR
- Ibermatica, Madrid, ES
- IBM Watson Reseach Center, Yorktown Heights, New York, US
- Imasys SA, Lausanne, CH
- Infonoia SA, Genève, CH
- Intel Corp, Santa Clara, California, US
- Logitech Inc. – Corporate Business Development, Morges, CH
- Mentor Graphics Inc., Wilsonville, US
- Nestlé Research, Consumer Science Department, Vevey, CH
- Siemens Corperate Research, New Jersey, US
- SMARTDATA SA, Martigny, CH
- Sowoon Technologies, Lausanne, CH
- Spiderphone SA, Martigny, CH
- Sun Microsystems (Schweiz) AG, Zurich, CH
- Swisscom AG, Bern, CH
- TATA Infotech, Bombay, IN
- Toyota Motor Engineering & Manufacturing Europe, Zaventem, BE
- Vision Objects SA, Saint Luce s/Loire, FR
- VisioWave SA, Ecublens, CH
- VoxAccess SA, Martigny, CH

Others

- Banque Cantonale Vaudoise BCV Foundation, Lausanne, CH
- CimArk, Sion, CH

Interactive Multimodal Information Management NCCR IM2

Statistical Input – Output Data

Funding source (CHF)	Year 5	Year 6	Year 7	Year 8	Total	%
SNSF funding	3 500 000	3 500 000	3 500 000	3 500 000	14 000 000	50
Self-funding from home institution ¹	572 148	594 088	620 000	620 000	2 406 236	9
Self-funding from project participants	1 704 291	1 739 465	1 890 000	1 890 000	7 223 756	26
Third-party funding ²	1 105 281	1 220 403	1 080 000	1 080 000	4 485 684	16
Total	6 881 720	7 053 956	7 090 000	7 090 000	28 115 676	100

Personnel ³	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							FR	US	BE	IT	CZ	
Management ⁴	4.96	1.64	33	3.32	67	9	0	0	2	0	0	1
Master students	10	8	80	2	20	6	0	1	0	0	0	3
Doctoral students	109	20	18	89	82	26	13	4	1	6	6	54
Postdoctoral students	17	2	12	15	88	2	4	0	0	2	0	9
Research associates	0	0	0	0	0							
Senior researchers ⁵	57	9	16	48	84	14	8	9	7	2	1	19
Other staff	32	2	6	30	94	18	5	2	0	0	1	5
Total	229.96	42.64	19	187.32	81	75	30	16	10	10	8	91

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

² Not included is CTI funding (cf. page 6). Since the start of the NCCR 10 projects have been funded by CTI at a total amount of 4.7 mio. CHF

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

⁴ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training (applies not for the country analysis)

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

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

Members of the Review Panel

Steger Angelika, Prof. (Chair)
Beretta Giordano Bruno, Dr.
Byrne Bill, Dr.
Chang Shih-Fu, Prof.

Hirsbrunner Béat, Prof.
Jain Ramesh, Prof.
Opitz-Belakhal Claudia, Prof.
Ostendorf Mari, Prof.

Renals Steve, Prof.
Rigoll Gerhard, Prof.

NCCR Office SNSF

Bachmann Stefan, Dr.

Swiss National Science Foundation, Berne, CH

Hewlett Packard Laboratories, Palo Alto, US

Machine Intelligence Laboratory, Cambridge University, GB

Department of Electrical Engineering, Columbia University, New York, US

Swiss National Science Foundation, Berne, CH

School of ECE and College of Computing, Georgia Tech, US

Swiss National Science Foundation, Berne, CH

Department of Electrical Engineering, University of Washington, Seattle, US

School of Informatics, University of Edinburgh, GB

Lehrstuhl für Mensch-Maschine-Kommunikation, Technische Universität München, DE

Schweiz. Nationalfonds, Wildhainweg 3, 3001 Bern,
phone: + 41 (0)31 308 23 49, fax: + 41 (0)31 305 29 71,
sbachmann@snf.ch

Computer Aided and Image Guided Medical Interventions

NCCR CO-ME

Research

Real-time sensor fusion and 3D model update for minimally invasive surgery

Head: Baur C.
Helmer P., Székely G., Zheng G.

Magnet-resonance image- guided radio-frequency liver tumour ablation

H: Becker C.
Cattin P., Kuster N., Székely G.,
Terraz S.

Computer-aided surgery around the head

H: Caversaccio M.
Langlotz F.

Virtual-reality based training of medical procedures

H: Harders M.
Bajka M., Bleuler H.,
Gantert W., Gross M.,
Thaler M.

Image-guided neurosurgery – neurosurgical treatment of functional brain disorders

H: Jeanmonod D.
Martin E., Morel A., Székely G.,
Verschure P., Werner B.

Load sensing surgical instruments and implants

H: Ryser P.
Burger J., Hierold C., Jacq C.,
Kowal J., Maeder T.,
Neuenschwander J.,
Sennhauser U., Wendlandt, M.

Interactive clinical visuali- sation for joint examination

H: Magnenat-Thalmann N.
Ferguson S., Hoffmeyer P.,
Moccozet L., Siebenrock K.,
Thalmann D.

Advanced image guided surgical interventions in ophthalmology

H: Nelson B.
Abbott J., Burger J., Cattin P.,
Kowal J., Nolte L.-P.

Soft-tissue modelling: from mechano-biology to real-time simulation

H: Olsen B.
Baur C., Gross M.,
Koumoutsakos P., Mazza E.,
Otaduy M.

Computer assistance in orthopaedic surgery

H: Gonzalez Ballester M. A.
Chopard B., Rüfenacht D.,
Székely G.

Diagnosis patient-specific flow simulation and advanced wessel wall analysis

H: Alkadhi H.
Boomsma K., Cattin P.,
Hoyer K., Poulikakos D.

Systems face: Computer aided treatment of facial diseases

H: Zeilhofer H.-F.
Caversaccio M., Gross M.,
Kuttenberger J., Sader R.,
Schwenzer Zimmerer K.,
Vetter T., von Rechenberg B.

Semiautomatic coronary anastomosis using cobra and helical needle concept

H: Zünd G.
Brom C., Grünenfelder J.,
Hora P., Van de Venn H.

Heads of Individual Projects and Key Researchers

Abbot Jake, Dr.
Alkadhi Hatem, Dr.
Bajka Michael, Dr.
Baur Charles, Dr.
Becker Christoph, Prof.

Bleuler Hannes, Prof.
Boomsma Kevin, Dr.
Brom Charles, Prof.

Burger Jürgen, Prof.
Cattin Philippe, Dr.
Caversaccio Marco, PD Dr.

Chopard Bastien, Prof.

Ferguson Stephen, Dr.

Institut für Robotik und Intelligente Systeme, ETH Zürich
Institut für Diagnostische Radiologie, Universitätsspital Zürich
Klinik für Gynäkologie, Universitätsspital Zürich
Institut de Systèmes Robotiques, EPF Lausanne
Division de Radiodiagnostic et Radiologie Interventionnelle,
Hôpitaux Universitaires, Genève
Institut de Systèmes Robotiques, EPF Lausanne
Energietechnik, ETH Zürich
Inst. für Mechatronische Systeme, Zürcher Hochschule,
Winterthur
Hochschule für Technik und Informatik, Biel
Institut für Bildverarbeitung, ETH Zürich
Klinik für Hals-, Nasen-, Ohrenkrankheiten,
Kopf- und Halschirurgie, Inselspital Bern
Scientific and Parallel Computing Group, CUI,
University of Geneva
M.E. Müller Forschungsinstitut für Orthopädische Chirurgie,
Universität Bern

Home Institution

Swiss Federal Institute of
Technology Zurich

Start of the NCCR

July 1, 2001

NCCR Management

Director
Székely Gábor, Prof.
phone: + 41 (0)44 632 52 88
szekely@vision.ee.ethz.ch

Deputy Director
Nolte Lutz-Peter, Prof.
phone: + 41 (0)31 631 59 34
lutz.nolte@memcenter.unibe.ch

General Manager
Müller Bert, PD Dr.
phone: + 41 (0)44 633 61 90
bmueller@vision.ee.ethz.ch

Public Relations
Nolte Lutz-Peter, Prof.
phone: + 41 (0)31 631 59 34
lutz.nolte@memcenter.unibe.ch

Officers
Vogt Vreni, Mrs.
phone: + 41 (0)44 632 04 72
vogt@vision.ee.ethz.ch

Steinmann Ruth, Mrs.
phone: + 41 (0)44 632 51 63
steinmann@vision.ee.ethz.ch

Neuenschwander Annelies, Mrs.
phone: + 41 (0)31 631 59 58
annelies.neuenschwander@
memcenter.unibe.ch

*Knowledge and
Technology Transfer*
Nolte Lutz-Peter, Prof.
phone: + 41 (0)31 631 59 34
lutz.nolte@memcenter.unibe.ch

Education and Training
Müller Bert, PD Dr.

Advancement of Women
Hüppi Petra, Dr.
Dept. of Pediatrics, HUG,
Genève

Address

NCCR CO-ME
ETHZ - Bildverarbeitung
Sternwartstr. 7
8092 Zürich

phone: + 41 (0)44 632 04 72
fax: + 41 (0)44 632 11 99
vogt@vision.ee.ethz.ch

Web Address

<http://co-me.ch>

Computer Aided and Image Guided Medical Interventions NCCR CO-ME

Third Party Cooperation

(in progress)

Programmes

- KTI MedTech-Initiative

Research Institutions

- Advanced Telecommunications Research Institute, Kyoto, JPBG-Unfallklinik, Frankfurt a.M., DE
- BG-Unfallklinik, Ludwigshafen, DE
- Biox and Artificial Intelligence Lab, Stanford University, San Francisco, US
- Brigham and Women's Hospital, Harvard Medical School, Boston, US
- Cardiff School of Computer Science, Cardiff University, GB
- Catharina Hospital, Eindhoven, NL
- CIMIT Consortium, Boston, US
- Clinic of Visceral & Transplant Surgery Research, University Hospital Zurich, CH
- Computational Biomechanics Group, TU Graz, AT
- Département de Neurochirurgie, CHUV, Lausanne, CH
- Department of Bio-engineering, Imperial College, London, GB
- Department of Computer Science, University of North Carolina, Chapel Hill, US
- Department of Orthopaedic Surgery, Inselspital, Bern, CH
- Duke University Medical Center, Durham, US
- EMPA, Dübendorf, CH
- Faculty of Electrical Engineering, Dept. of Measurement, Czech Technical University, Prague, CZ
- Faculty of Mathematics & Computer Science, Weizmann Institute of Science, Rehovot, IL
- Faculty of Mechanical Engineering of Technion Haifa, IL
- Girardet Klinik, Essen, DE

[Gantert Walter, Dr.](#)
[Gonzalez Ballester Miguel, Dr.](#)

[Gross Markus, Prof.](#)
[Grünenfelder Jürg, Dr.](#)
[Harders Matthias, Dr.](#)
[Helmer Patrick, Prof.](#)
[Hierold Christopher, Prof.](#)
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[Ryser Werner, Prof.](#)
[Sader Robert, PD Dr.](#)
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[Sennhauser Urs, Dr.](#)
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[Van de Venn, Hans Wernher, Prof.](#)

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[Zeilhofer Hans-Florian, Prof.](#)
[Zheng Guoyan, Dr.](#)
[Zünd Gregor, Prof.](#)

[Klink St. Anna, Luzern](#)

[M.E. Müller Forschungsinstitut für Orthopädische Chirurgie, Universität Bern](#)

[Computer Graphics Group, ETH Zürich](#)

[Klinik für Herz- und Gefässchirurgie, Universitätsspital Zürich](#)

[Institut für Bildverarbeitung, ETH Zürich](#)

[Institut de Systèmes Robotiques, EPF Lausanne](#)

[Micro- und Nanosysteme, ETH Zürich](#)

[Département d'Orthopédie, Hôpital Cantonal,](#)

[Université de Genève](#)

[Institut für Virtuelle Produktion, ETH Zürich](#)

[Institut für Hydromechanik und Wasserwirtschaft, ETH Zürich](#)

[Laboratoire de production microtechnique, EPF Lausanne](#)

[Neurochirurgische Klinik, Universitätsspital Zürich](#)

[Computational Sciences, ETH Zürich](#)

[M.E. Müller Forschungsinstitut für Orthopädische Chirurgie,](#)

[Universität Bern](#)

[IT'IS Foundation, ETH Zürich](#)

[Klinik für Mund-, Kiefer- und Gesichtschirurgie,](#)

[Kantonsspital Luzern](#)

[M.E. Müller Forschungsinstitut für Orthopädische Chirurgie,](#)

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[Electronics/Metrology, EMPA Dübendorf](#)

[M.E. Müller Forschungsinstitut für Orthopädische Chirurgie,](#)

[Universität Bern](#)

[M.E. Müller Forschungsinstitut für Orthopädische Chirurgie,](#)

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[Klinik für Kiefer- und Gesichtschirurgie, Kantonsspital Basel](#)

[Klinik für Kiefer- und Gesichtschirurgie, Kantonsspital Basel](#)

[Electronics/Metrology, EMPA Dübendorf](#)

[Orthopädische Chirurgie, Inselspital, Bern](#)

[Institut für Bildverarbeitung, ETH Zürich](#)

[Département de Radiologie, Hôpital Cantonal,](#)

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[Laboratoire d'Infographie, EPF Lausanne](#)

[Inst. für Mechatronische Systeme, Zürcher Hochschule,](#)

[Winterthur](#)

[Institut für Neuroinformatik, ETH Zürich](#)

[Departement Informatik, Universität Basel](#)

[Pferdeklinik, Tierspital, Universität Zürich](#)

[Micro- und Nanosysteme, ETH Zürich](#)

[MR Center, University Children's Hospital, Zurich](#)

[Klinik für Kiefer- und Gesichtschirurgie, Kantonsspital Basel](#)

[MEMCenter, Universität Bern](#)

[Klinik für Herz- und Gefässchirurgie, Universitätsspital Zürich](#)

Topics

The fundamental target of this NCCR is to understand, realise, and demonstrate the potential, which information technology offers for the optimisation of medical interventions in order to improve the treatment of individual patients and overall health care

for society as a whole. The focus of the NCCR is on the development, integration and validation of enabling technologies towards advanced computer aided, image guided systems for medical interventions that support the complete treatment process

from therapeutic planning and simulation via intra-operative action to post-operative care, monitoring and documentation. In addition, the utility of the underlying strategies and concepts for novel forms of medical education and training is being explored.

Achievements

Basic and applied research

Major advances achieved in biomedical simulation allow modelling the complex behaviour of living human tissue. Numerous applications have been developed for the optimal support of a variety of medical interventions by functional pre-operative planning, as well as for offering realistic skill training environments for surgical residents using high-fidelity training simulators. For surgical navigation, different devices have been realised including a small, cost-saving optical tracking system marketed by our spin-off Atracsys. Another highlight for the integration of advanced sensor technology into surgical environment is the intra-operative force-measuring

device supporting balancing the ligaments during total knee arthroplasty. A recent initiative on sensor integration into orthopaedic instruments and implants is further advancing precise intra-operative support and post-operative follow-up. Force feedback for improving medical diagnosis, therapy, and education belongs to the main areas of competence.

Technology transfer

The close cooperation between research labs and clinical sites guarantees the effective transfer of scientific results to patient care, demonstrated by numerous patent applications and spin-offs as well as collaborations with global market leaders in computer-aided surgery including BrainLAB.

Advancement of women

The scientific career of female clinicians is supported every year by a targeted research grant. The organisation of the annual research-networking workshop is headed by female PhD-students.

Education and Training

The members of the NCCR play a decisive role in creating new Master Curricula: Master of Science in Biomedical Engineering (University of Berne) – with the focus areas Musculoskeletal System and Microsensor and Actuator Technology – and inter-departmental Master of Biomedical Engineering (ETH Zurich).

Further information see vogt@vision.ee.ethz.ch

- Group of Applied Physics, University of Geneva, CH
- Hopital Louis Pradel, Lyon, FR
- INRIA, Sophia-Antipolis, France, FR
- Institut de génie biomédical, EPF Lausanne, CH
- Institute for Computer Science and Applied Mathematics, University of Bern, CH
- Institute for Orthopaedic Research and Biomechanics, University of Ulm, DE
- Institute for Rapid Product Development, University of Applied Science, St. Gallen, CH
- Kantonsspital Bruderholz, Basel, CH
- Kantonsspital Chur, CH
- Kantonsspital Luzern, CH
- Klinik am Ring, Koeln, DE
- Klinik Sanssouci Potsdam, DE
- Labor für Unfallchirurgie, Hand- und Wiederherstellungschirurgie, Universitätsklinikum, Ulm, DE
- Laboratoire de Modélisation et Calcul, Université Joseph-Fourier, Grenoble, FR
- MeVis, Zentrum für Medizin. Diagnosesysteme u. Visualisierung, Bremen, DE
- Nakao Lab, Tokyo University, JP
- National Biocomputation Center, Stanford, US
- Orthopädische Klinik der Ruhr-Universität, Bochum, DE
- Orthopädische Universitätsklinik, Hamburg-Eppendorf, DE
- Polyclinique de Chirurgie, University Hospital Geneva, CH
- Robotics Lab, Stanford University, US
- School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, US
- Sint Maartenskliniek, Nijmegen, NL
- Surgery Dept., University of Sherbrooke, CA
- TIMC – Imaging, Modelling and Vision, Grenoble, FR
- Unfallchirurgische Klinik, Medizinische Hochschule, Hannover, DE
- UPMC Health System, Carnegie Mellon University, Pittsburgh, US

Computer Aided and Image Guided Medical Interventions

NCCR CO-ME

Economy / Industry

- Amersham Health AG, Wädenswil, CH
- Atracsys SARL, Bottens, CH
- BrainLAB AG, Heimstetten, DE
- Celon AG, Teltow/Berlin, DE
- Computive Surgery LLC, Ecublens, CH
- Force Dimension, Lausanne, CH
- Hansen Medical, Palo Alto, CA, US
- Image Guided Therapy SA, Pessac, FR
- Institut Straumann AG, Waldenburg, CH
- Kontron Medical AG, Basel, CH
- Leica Microsystems AG, Glattbrugg, CH
- med3D GmbH, Heidelberg, DE
- Medical Intelligence GmbH, Schwabmünchen, DE
- Midland Medical Technologies, Univ. of Birmingham, Research Park, GB
- Nucletron B. V., Veenendaal, NL
- Philips Medical Systems, Zürich, CH
- Praxim Medivision AG, Bern, CH
- Proform AG, Marly, CH
- Richard Wolf GmbH, Knittlingen, DE
- Siemens AG Medizinaltechnik, Dietlikon-Fahrweid, CH
- Siemens Medical Solutions, Erlangen, DE
- Sinus-Point AG, Welschenrohr, CH
- Sun Microsystems (Schweiz) AG, Volketswil, CH
- Synthes, Oberdorf, CH
- Treier Endoscopy AG, Beromünster, CH
- Tyco Healthcare Switzerland Ltd., Wollerau, CH
- Wild Wetzikon AG, Wetzikon, CH
- xitact SA, Morges, CH

Others

- AO-ASIF-Stiftung, Davos-Platz, CH
- Fondation de la recherche contre le cancer, Geneva, CH
- Foundation C. + E. de Reuter, Geneva, CH
- KTI, Bern, CH
- M.E. Müller-Stiftung, Bern, CH

Members of the Scientific Advisory Board

Buess Gerhard, Prof.
Caramella Davide, Prof.
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Metaxas Dimitris, Prof.

Schlenzka Dietrich, Prof.
Taylor Chris, Prof.

Thorpe Chuck, Prof.
Troccaz Jocelyne, Dr.

Eberhard-Karls-Universität, Tübingen, DE
Pisa University, Diagnostic and Interventional Radiology, Pisa, IT
Imperial College London, Mechanical Engineering, London, GB
Universitätsklinik für Hals-, Nasen- und Ohrenheilkunde, Innsbruck, AT
Harvard Medical School, Brigham and Women's Hospital, Boston, US
University of Pennsylvania, Computer and Information Science, Philadelphia, US
Orton Hospital, The Invalid Foundation, Helsinki, FI
University of Manchester, Division of Imaging Science & Biomedical Engineering, Manchester, GB
Carnegie Mellon University, Pittsburgh, US
Laboratoire TIMC/IMAG, Université Joseph Fourier, La Tronche, FR

Members of the Women Advisory Board

D'Arcy Susanne, Mrs.
Hüppi Petra, PD Dr.
Kunz Manuela, Dr.
Landmann-Suter Regine, Prof.
Müller Bert, PD Dr.
Vogt Vreni, Mrs.

Dept. Informationstechnologie und Elektrotechnik, ETH Zürich, CH
Dept. of Pediatrics, Children's Hospital, HUG, Geneva, CH
Syl&Molly Apps. Research Center, General Hospital, Kingston, CA
Departement Forschung, Kantonsspital/Universität Basel, Basel, CH
General Manager NCCR CO-ME, ETH Zürich, CH
Project Office NCCR CO-ME, ETH Zürich, CH

Members of the Technical Advisory Board

Responsible: Nolte Lutz-Peter, Prof. M.E. Müller Forschungsinstitut für Orthopädische Chirurgie, Universität Bern, CH

Statistical Input – Output Data

Funding source (CHF)	Year 5	Year 6	Year 7	Year 8	Total	%
SNSF funding	4 000 000	4 000 000	4 000 000	4 000 000	16 000 000	40
Self-funding from home institution ¹	2 000 000	2 000 000	2 000 000	2 000 000	8 000 000	20
Self-funding from project participants	3 307 500	4 475 200	3 039 500	3 026 800	13 849 000	34
Third-party funding ²	652 150	607 150	607 650	692 250	2 559 200	6
Total	9 959 650	11 082 350	9 647 150	9 719 050	40 408 200	100

Personnel ³	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	FR	IT	US	DZ	
Management ⁴	3.88	2.25	58	1.63	42	8	2	0	0	0	0	0
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	58	11	19	47	81	18	8	7	3	0	2	18
Postdoctoral students	24	1	4	23	96	7	5	2	1	2	1	6
Research associates	0	0	0	0	0	0	0	0	0	0	0	0
Senior researchers ⁵	103	8	8	95	92	59	24	5	2	2	0	11
Other staff	32	12	38	20	62	27	2	1	1	0	0	1
Total	220.88	34.25	17	186.63	83	119	41	15	7	4	3	36

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

² Not included is CTI funding (cf. page 6). Since the start of the NCCR 10 projects have been funded by CTI at a total amount of 12.1 mio. CHF

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

⁴ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training (applies not for the country analysis)

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

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

Members of the Review Panel

Hasler Martin, Prof. (Chair)
Bucholz Richard, Prof.

Swiss National Science Foundation, Berne, CH
Division of Neurosurgery, St. Louis University
School of Medicine, US

Duncan James, Prof.

Department of Diagnostic Radiology, Yale University School
of Medicine, New Haven, US

Frey Felix, Prof.

Swiss National Science Foundation, Berne, CH

Friskens Sarah F., Prof.

Department of Computer Science, Tufts University, US

Hirsbrunner Béat, Prof.

Swiss National Science Foundation, Berne, CH

Hirzinger Gerd, Prof.

Institut für Robotik und Mechatronik, DLR Oberpfaffenhofen, DE

Jolesz Ferenc A., Prof.

Harvard University, Brigham & Women's Hospital, Boston, US

Lorensen Bill

General Electric Corporate R&D, Niskayuna NY, US

NCCR Office SNSF

Bachmann Stefan, Dr.

Schweiz. Nationalfonds, Wildhainweg 3, 3001 Bern,
phone: + 41 (0)31 308 23 49, fax: + 41 (0)31 305 29 71,
sbachmann@snf.ch

Mobile Information and Communication Systems

NCCR MICS

Home Institution

Swiss Federal Institute of
Technology, Lausanne

Start of the NCCR

November 1, 2001

NCCR Management

Director

Aberer Karl, Prof.
phone: + 41 (0)21 693 46 79
karl.aberer@epfl.ch

Deputy Director

Thiele Lothar, Prof.
phone: + 41 (0)1 632 70 31
thiele@tik.ee.ethz.ch

Coordinator

Bovay Jacques, Mr.
phone: + 41 (0)21 693 56 38
jacques.bovay@epfl.ch

Finances & Administration

Bernau Heidi, Mrs.
phone: + 41 (0)21 693 81 06
heidi.bernau@epfl.ch

Industrial Liaison Officer

Monti Max, Dr.
phone: + 41 (0)21 693 69 77
max.monti@epfl.ch

Education and Training

Bovay Jacques, Mr.
phone: + 41 (0)21 693 56 38
jacques.bovay@epfl.ch

Equal Opportunity Officer

Gugler Anne-Christine, Mrs.
phone: + 41 (0)21 693 75 79
anne-christine.gugler@epfl.ch

Communication Officer

Florence Luy, Mrs.
phone: + 41 (0)21 693 21 05
florence.luy@epfl.ch

Knowledge and Technology

Transfer
N.N.

Advancement of Women

N.N.

Address

EPFL IC PRN MICS
Station 14
1015 Lausanne

phone: + 41 (0)21 693 56 38
fax: + 41 (0)21 693 81 40
nccr-mics@epfl.ch

Web Address

www.mics.org

Public Relations

- Web site
- Bimonthly newsletter

Research

Cluster “Theory of Self-Organized, Distributed Communication and Information”

Head: Urbanke R.

Information and coding theory for wireless multi-hop networks

Diggavi S., Telatar E.,
Urbanke R.

Network theory for wireless multi-hop networks

Diggavi S., Grossglauser M.,
Telatar E., Thiran P.

Distributed signal processing and communication in sensor networks

Vetterli M.

Algorithmic foundations of ad hoc and sensor networks

Wattenhofer R., Widmayer P.

Sensorscope and its application to environmental monitoring

Parlange M., Vetterli M.

Cluster “Mobile Communication and Processing Platforms”

H: Le Boudec J.-Y.

Very low radiated power UWB communication

Le Boudec J.-Y.,
Decotignie J.-D., Knopp R.,
Robert S., Skrivervik A.,
Wittneben A.

Deployment of sensor networks

Mattern F., Thiele L.

Modular and composable platform for sensor and actuator networks

Henzinger T., Thiele L.

Application: Distributed odour source localization using a miniature multi-robot system

Martinoli A.

Application: Real-time avalanche and landslide analysis through sensor networks

Ancey C., Charbon E.

Cluster “Networked Software Systems”

H: Gross T.

Checking properties of flexible programs in the presence of modularity

Gross T.

VerSePro: Verification of security and privacy protocols for wireless networks

Basin D., Hubaux J.-P.

Secure stream ciphers

Meier W.

Spam detection based on self-organization

Le Boudec J.-Y.

Permasense

Tschudin C.

WaterSense

Hubaux J.-P.

Cluster “In-Network Information Management”

H: Alonso G.

XTream

Alonso G., Kossmann D.

Mobile publish-subscribe

Aberer K.

Distributed event detection and localization architecture for wireless sensor networks

Braun T.

Data dissemination in mobile ad hoc sensor environments

Murphy A., Pedone F.

Sensor awareness

Aberer K., Henzinger M.,
Süsstrunk S.

Serious building games

Gross T., Hovestadt L.,
Morari M., Thiele L.

Idea futures market for MICS technology foresight

Pigneur Y.

Programmes

Doctoral Program in Computer, Communication and Information Sciences

Direction: Telatar E., Bovay J.

Undergrad Research Opportunity Program

Direction: Bovay J.

Internship Program for Female Undergraduate Students

Direction: Gugler A.-C.

Industrial Liaison Program

Direction: Monti M.

Heads of Clusters and Participants to the Research Projects

Aberer Klaus, Prof.
Alonso Gustavo, Prof.
Ancey Christophe, Prof.

Basin David, Prof.
Braun Torsten, Prof.

Charbon Edoardo, Prof.
Decotignie Jean-D., Prof.
Diggavi Suhas, Prof.
Gross Thomas, Prof.

Faculté Informatique et Communications, EPF Lausanne
Departement Informatik, ETH-Zentrum, Zürich
Faculté Environnement naturel, architectural et construit,
EPF Lausanne

Departement Informatik, ETH-Zentrum, Zürich
Institut für Rechnernetze und Verteilte Systeme,
Universität Bern

Faculté Informatique et Communications, EPF Lausanne
CSEM, Faculté Informatique et Communications, EPF Lausanne
Faculté Informatique et Communications, EPF Lausanne
Departement Informatik, ETH-Zentrum, Zürich

Third Party Cooperation

(in progress)

Programmes

- Coordination Action "Embedded Wisents"
- Dynamic Communication Networks
- End-to-End Quality of Service in the Internet
- EU IP project: Evergrowing global scale-free networks, their provisioning, repair and unique functions
- EU IP project: Building resources for integrated cultural knowledge services
- EU IP project: Data, Information and process integration with semantic web services
- EU Network of Excellence Interop
- EU NoE: Exstence
- EU NoE: Knowledge Web: realizing the Semantic Web
- EU NoE: MB-Net
- EU Project: Superpeer Semantic Search Engine
- EU Project: MEMPHIS
- European FP 6 Project Palcom
- European project mCast
- Security of Vehicular Communications
- Service Oriented Development in a Unified framework

Research Institutions

- Centre d'études et de recherches en informatique appliquée (CERIA), University of Paris, FR
- Centre for Electronics Design and Technology CEDT, Indian Institute of Science, Bangalore, IN
- College of Business Administration, University of Manoa, US
- Communication and Signal Processing Group, Imperial College, London, GB
- Communication Sciences Institute, University of South Carolina, Los Angeles, US
- Computer Laboratory, University of Cambridge, Cambridge, GB
- Computer Networks Laboratory, University of Massachusetts, Amherst, US
- CUBIN, University of Melbourne, AU
- Cylab, Carnegie Mellon University, Pittsburg, US
- Département de mathématiques, Ecole Nationale Supérieure, Paris, FR
- Department of Architecture, ETH Zurich, CH
- Department of Computer Science, University of Lisbon, PT
- Department of Computer Science, Purdue University, US
- Department of EE, Indian Institute of Technology, Kanpur, IN
- Department of EE, University of California, Los Angeles, US

Topics

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

ized IT systems will not be able to scale up. Decentralized approaches, based on self-organization principles, need to be studied and developed in order to master the complexity of the resulting systems.

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

(wireless sensor technology, ad-hoc networks, in-network information processing, verification) and testing technologies in applications, as well as looking at economic implications. A particularly interesting class of applications, from a Swiss perspective, will be the environmental monitoring of the behaviour of landslide, permafrost and glaciers.

The NCCR MICS strongly believes that this mutual exchange between theoretical work and systems/applications will lead to real progress and to fruitful technology transfer.

Grossglauer Matthias, Prof.
Henzinger Monika, Prof.
Henzinger Thomas, Prof.
Hovestadt Ludger, Prof.
Hubaux Jean-Pierre, Prof.
Knopp Raymond, Prof.
Kossmann Donald, Prof.
Le Boudec Jean-Yves, Prof.
Martinoli Alcherio, Prof.
Mattern Friedemann, Prof.
Meier Willi, Prof.
Morari Manfred, Prof.

Murphy Amy, Prof.

Parlange Marc, Prof.
Pedone Fernando, Prof.

Pigneur Yves, Prof.
Robert Stephan, Prof.

Skrivervik Anja, Prof.
Süssstrunk Sabine, Prof.
Telatar Emre, Prof.
Thiele Lothar, Prof.

Thiran Patrick, Prof.
Tschudin Christian, Prof.
Urbanke Rüdiger, Prof.
Vetterli Martin, Prof.
Wattenhofer Roger, Prof.
Widmayer Peter, Prof.
Wittneben Armin, Prof.

Faculté Informatique et Communications, EPF Lausanne
Faculté informatique et communications, EPF Lausanne
Faculté Informatique et Communications, EPF Lausanne
Departement Architektur, ETH Zürich
Faculté Informatique et Communications, EPF Lausanne
Faculté Informatique et Communications, EPF Lausanne
Departement Informatik, ETH-Zentrum, Zürich
Faculté Informatique et Communications, EPF Lausanne
Faculté Informatique et Communications, EPF Lausanne
Departement Informatik, ETH-Zentrum, Zürich
Fachhochschule Aargau, Brugg

Departement Informationstechnologie und Elektrotechnik, ETH-Zentrum, Zürich

Facoltà di scienze informatiche, Università della Svizzera Italiana, Lugano

Faculté Environnement naturel, architectural et construit, EPF Lausanne
Facoltà di scienze informatiche, Università della Svizzera Italiana, Lugano

Université de Lausanne, Ecole des HEC, Lausanne
Institut des télécommunications, Ecole d'Ingénieurs du Canton de Vaud, Yverdon-les-Bains

Faculté Sciences et techniques de l'ingénieur, EPF Lausanne
Faculté Informatique et Communications, EPF Lausanne
Faculté Informatique et Communications, EPF Lausanne
Departement Informationstechnologie und Elektrotechnik, ETH-Zentrum, Zürich

Faculté Informatique et Communications, EPF Lausanne
Departement Informatik, Universität Basel

Faculté Informatique et Communications, EPF Lausanne
Faculté Informatique et Communications, EPF Lausanne
Departement Informatik, ETH-Zentrum, Zürich
Departement Informatik, ETH-Zentrum, Zürich
Departement Informationstechnologie und Elektrotechnik, ETH-Zentrum, Zürich

- Department of EECS, University of California, Berkeley, US
- Department of Information Technology, University of Uppsala, SE
- Department of Social Informatics, University of Kyoto, JP
- Electronic Commerce Competence Center (EC3), University Vienna, AT
- Eurecom Institute, Sophia Antipolis, FR
- Fachhochschule Aargau, Brugg (AG), CH
- Fakultät für Informatik, Universität Karlsruhe, DE
- Fraunhofer Institute IPSI, Darmstadt, DE
- HYDRAM Laboratoire d'hydrologie et aménagements, EPF Lausanne, CH
- INRIA-ENS Institut National de recherche en informatique et automatique, Ecole Nationale Supérieure, Paris, FR
- Inst. de Matematics, Universidad Nacional Autonoma, Mexico, MX
- Institut d'informatique, FUNDP, University of Namur, BE
- Institut National de recherche en Informatique et Automatique (INRIA), Rocquencourt, FR
- Institut of Theoretical Physics, EPF Lausanne, CH
- Institute for Information Transmission Problems (IPPI), Moscow, RU
- Institute of Industrial Science, University of Tokyo, JP
- Laboratoire de physique théorique, Ecole Supérieure Nationale, Paris, FR
- Laboratoire d'électronique informatique et image (LE2I), University of Burgundy, Dijon, FR
- Laboratory for Computer Science, MIT, Boston, US
- Laboratory for Dependable Distributed Systems RWTH, University Aachen, DE
- Laboratory for Information and Decision Systems, MIT, Boston, US
- Laboratory of Multimedia Information Technology, East China Normal University, Shanghai, CN
- Lehrstuhl für Rechnernetze, Heinrich Heine University, Düsseldorf, DE
- Networks Group, Rice University, US
- Planete Group, Institut National de Recherche en Informatique et Automatique, Sophia Antipolis, FR
- School of Informatics and Engineering, Flinders University of South Australia, Adelaide, AU
- STI, EPF Lausanne, CH

Mobile Information and Communication Systems NCCR MICS

Achievements

Theory for wireless sensor networks

The NCCR MICS invested a substantial effort in understanding fundamental limits in wireless networks. The added value of MICS is its ability to tackle fundamental questions, such as capacity, using different methodological approaches. Applying percolation theory to random wireless networks, we could improve the existing upper bounds on transport capacity of ad hoc networks. For data gathering tasks, we proposed distributed approximation algorithms that perform these tasks efficiently beyond capacity limits.

Routing in wireless networks

One of the most active and successful research areas was on routing in wireless networks. We showed that mobility can be beneficial for routing efficiency and we provided competitive worst and average case algorithms for geometric routing. For sensor networks, it has been shown that cooperative communication allows to improve

the performance of broadcasts and routing.

Security in wireless networks

Wireless networks create a number of novel security challenges. An important effort is the identification of new and unexpected types of attacks on wireless communication systems and propose solutions to counter such security challenges. Examples are a protocol against MAC-level attacks in WiFi networks, reputation-based WiFi deployment, and a method for securing location verification in wireless networks.

Peer-to-peer computing

Peer-to-peer computing is one of the most visible applications of principles of self-organization in distributed systems. MICS research advanced the state-of-the-art on algorithmic aspects of peer-to-peer computing such as overlay network maintenance, load balancing, trust and security, and data management, and resulted in system implementations that are evaluated in global-scale testbeds.

Mobile execution platforms

For the implementation of wireless sensor network systems, the NCCR MICS followed two directions: we developed testbeds using commercially available platforms and continued to invest into the proprietary BTNodes platform, which is now being manufactured and commercialized. The software radio has been successfully completed and was used to test advanced wireless communication techniques. For the low-power WiseNet platform we developed the WiseMAC protocol.

General

Within 4 years, the NCCR MICS has reached a high international visibility, with over 520 peer-reviewed publications in journals and conferences and 23 MICS graduates, of which 5 have been hired as assistant professors. The NCCR MICS Industrial Liaison Program now includes 9 companies.

Further information see www.mics.org

Members of the Advisory Board

Badoux Jean-Claude, Prof.

Beerli Christine, Dir.

Baechtold Werner, Prof.

Caccia Fulvio, Dr.

Schloter Carsten

Former President, EPF Lausanne, CH

HTI, University of Applied Sciences Berne, CH

ETH Zürich, CH

Former President, Federal Communication Commission, CH

CEO, Swisscom Mobile, CH

Members of the Scientific Board

Chevillat Pierre, Dr.

Feldmann Anja, Prof.

Franklin Michael, Prof.

Kumar P.R., Prof.

Kurose Jim, Prof.

Landrock Peter, Prof.

Massey James L., Prof.

Perkins Charles E., Dr.

Rabaey Jan M., Prof.

Weikum Gerhard, Prof.

IBM Zurich Research Laboratory, CH

TU Munich, DE

UC Berkeley, US

University of Illinois, Urbana-Champaign, US

University of Massachusetts, US

Cryptomathic Inc. and Aarhus University, Aarhus, DK

ETH Zürich, CH

Nokia Research Center, Mountain View, US

UC Berkeley, US

Saarland University, DE

Statistical Input – Output Data

Funding source (CHF)	Year 5	Year 6	Year 7	Year 8	Total	%
SNSF funding	3 800 000	3 800 000	3 800 000	3 800 000	15 200 000	43
Self-funding from home institution ¹	3 215 360	3 014 090	2 946 830	2 231 650	11 407 930	32
Self-funding from project participants	2 410 830	2 004 997	1 931 350	1 768 540	8 115 717	23
Third-party funding ²	350 000	350 000	150 000	150 000	1 000 000	3
Total	9 776 190	9 169 087	8 828 180	7 950 190	35 723 647	100

Personnel ³	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	FR	AT	CN	ES	
Management ⁴	2.88	1.16	40	1.72	60	8	0	0	1	0	1	1
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	87	14	16	73	84	28	7	2	5	6	2	36
Postdoctoral students	5	1	20	4	80	0	0	1	0	0	1	3
Research associates	1	0	0	1	100	0	0	0	0	0	0	0
Senior researchers ⁵	48	5	10	43	90	20	7	4	3	0	1	13
Other staff	49	29	59	20	41	26	0	3	0	1	2	15
Total	192.88	50.16	26	142.72	74	82	14	10	9	7	7	68

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

² Not included is CTI funding (cf. page 6). Since the start of the NCCR 5 projects have been funded by CTI at a total amount of 6.4 mio. CHF

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

⁴ Full-time equivalent, including NCCR-Director and persons in charge of knowledge and technology transfer, and education and training (applies not for the country analysis)

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

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

Members of the Review Panel

Steger Angelika, Prof. (Chair)

Effros Michelle, Prof.

Folkers Gerd, Prof.

Gray Robert, Prof.

Swiss National Science Foundation, Berne, CH

California Institute of Technology, Caltech, Pasadena, US

Swiss National Science Foundation, Berne, CH

Department of Electrical Engineering, Stanford University, Stanford, US

Jäger Placidus, Dr.

McAuley Derek, Prof.

Odlyzko Andrew, Prof.

Swiss National Science Foundation, Berne, CH

Intel Research, Cambridge, GB

Digital Technology Centre, University of Minnesota, Minneapolis, US

Pottie Greg, Prof.

Electrical Engineering Department, University of California, Berkeley, US

Steenkiste Peter, Prof.

School of Computer Science and Department of Electrical and

Computer Engineering, Carnegie Mellon University, Pittsburgh, US

Department of EECS, University of California, Berkeley, US

Walrand Jean, Prof.

NCCR Office SNSF

Christ Urs, Dr.

Schweiz. Nationalfonds, Wildhainweg 3, 3001 Bern,
phone: + 41 (0)31 308 23 50, fax: + 41 (0)31 305 29 71,
uchrist@snf.ch

- Swedish Institute of Computer Science (SICS), Stockholm, SE
- TC Department, Michigan State University, Lansing, US
- Telecommunications and Networks Kab., University of Crete, GR
- VTT Information Technology, Research Center of Finland, Espoo, FI
- Wireless Intelligent Systems Laboratory, Cornell University, US

Economy / Industry

- A4M applied formal methods AG, Zürich
- Art of Technology AG, Zürich, CH
- Augurion AG, Zürich
- bridgeCo AG, Duebendorf, CH
- Compaq Cambridge Research Lab., GB
- Daimler- Chrysler, Ulm, DE
- Dartfish, Fribourg, CH
- Development Laboratory, Hitachi Systems, Rüschlikon, CH
- Development Laboratory, Hitachi Systems, Yokohama, JP
- DoCoMo Euro-Labs, Munich, DE
- Flarion Technologies Inc., Bedminster New Jersey, US
- IBM Zurich, CH
- Intel Corp. WCGG Group, Santa Clara, US
- Intel Research, Cambridge, GB
- Intel Research, Santa Clara, US
- IP01 SA, Neuchâtel, CH
- Microsoft Research, Cambridge, GB
- Microsoft, Beijing, CN
- NetModule AG, Niederwangen, CH
- Nokia Research Center, Tampere, FI
- RSA Security Inc., Bedford, US
- Samsung Advanced Institute of Technology, Suwon, KR
- Sensoria Corp., San Diego, US
- Shockfish SA, Lausanne, CH
- Siemens AG, München, DE
- STMicroelectronics, Geneva, CH
- Swisscom AG, Berne, CH
- Trialog AG, Paris, FR
- TriReme International Ltd., Stockport, GB
- Whitestem Technologies AG, Zurich, CH

Others

- European Science Foundation, Strasbourg, FR
- Hasler Foundation, Berne, CH
- International Consortium, Lausanne, CH

Financial Valuation and Risk Management

NCCR FINRISK

Home Institution

University of Zurich

Start of the NCCR

November 1, 2001

NCCR Management

Director

Gibson Rajna, Prof.
phone: + 41 (0)44 634 29 69
rgibson@isb.unizh.ch

Deputy Director

Danthine Jean-Pierre, Prof.
phone: + 41 (0)21 692 34 85
jdanthin@hec.unil.ch

Administrative Director

Jaeger Eckart, Mr.
phone: + 41 (0)44 634 39 55
jaeger@nccr-finrisk.ch

Research

Hens Thorsten, Prof.

Knowledge and

Technology Transfer

Vanini Paolo, Prof.

Education and Training

Morellec Erwan, Prof.

Paolella Marc, Prof.

Advancement of Women

Chavez-Demoulin Valerie, Dr.

International Scientific Council

Loubergé Henri, Prof.

Address

NCCR FINRISK
Plattenstrasse 14
8032 Zurich

phone: + 41 (0)44 634 29 69

fax: + 41 (0)44 634 43 45

rgibson@isb.unizh.ch

Web Address

www.nccr-finrisk.unizh.ch

Public Relations

- Folder «NCCR FINRISK»
- "FINRISK Letter"
- Booklet "Risk and Risky Management"
- Booklet "Challenges to Executive Compensation"

Research

Module "Asset Pricing and Portfolio Management"

Coordinator: Trojani F.

Behavioural and evolutionary finance

Head: Hens T.

Macro Risk, systemic risks and international finance

H: Imbs J.

New methods in theoretical and empirical asset pricing

H: Trojani F.

Module "Corporate Finance"

Coordinator: Degeorge F.

Corporate finance, market structure and the theory of the firm

H: Habib M.

Dynamic corporate finance and financial innovation

H: Morellec E.

Module "Risk Management"

Coordinator: Leippold M.

Credit risk and non-standard sources of risk in finance

H: Gibson R.

Interest rate and volatility risk

H: Barone-Adesi G.

Module "Quantitative Methods in Finance"

Coordinator: Scaillet O.

Mathematical methods in financial risk management

H: Delbaen F.

Financial econometrics for risk management

H: Scaillet O.

Programme

Swiss Doctoral School in Finance

Supervisor: Morellec, E.
and Paolella, M.

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

Barone-Adesi Giovanni, Prof.

Degeorge François, Prof.

Delbaen Freddy, Prof.

Genberg Hans, Prof.

Gibson Rajna, Prof.

Habib Michel, Prof.

Hens Thorsten, Prof.

Imbs Jean, Prof.

Leippold Markus, Prof.

Morellec Erwan, Prof.

Padella Marc, Prof.

Scaillet Olivier, Prof.

Trojani Fabio, Prof.

Facoltà di Scienze Economiche, Università

della Svizzera Italiana, Lugano

Facoltà di Scienze Economiche, Università

della Svizzera Italiana, Lugano

Departement Mathematik, ETH Zürich

Institut Univ. des Hautes Etudes Internationales, Genève

Institut für schweizerisches Bankwesen, Universität Zürich

Institut für schweizerisches Bankwesen, Universität Zürich

Institut für empirische Wirtschaftsforschung, Universität Zürich

Ecole des HEC, Université de Lausanne

Institut für schweizerisches Bankwesen, Universität Zürich

Ecole des HEC, Université de Lausanne

Institut für schweizerisches Bankwesen, Universität Zürich

Ecole des HEC, Université de Genève

Schweizerisches Institut für Banken und Finanzen,

Universität St. Gallen

Members of the Advisory Board

Brennan Michael, Prof.

Duffie Darrell, Prof.

Gourieroux Christian, Prof.

Pagano Marco, Prof.

Stulz René, Prof.

University of California, Los Angeles, US

Stanford University, California, US

University Paris IX, FR

University of Napoli, IT

Ohio State University, Columbus, US

Third Party Cooperation

(in progress)

Research Institutions

- Center for Finance, WHU Koblenz, DE
- Centre de Mathématiques Appliquées, University Paris VI, FR
- Centre de Recherche en Économie et Statistique (CREST), Paris, FR
- CERMSEM, University Paris I, FR
- Departamento de Fundamentos del Analisis Economico, University of Alicante, ES
- Département Finance, ESSEC, Paris, FR
- Département Finance, IDEI, Toulouse, FR
- Département Finance, University of Cergy Pontoise, FR
- Department of Business and Economics, University of Chicago, US
- Department of Economics, Harvard University, Cambridge, US
- Department of Economics, London School of Economics and Political Science, GB
- Department of Economics, MIT, Cambridge, US
- Department of Economics, University of Calgary, CA
- Department of Economics, University of California, San Diego, US
- Department of Economics, University of Toronto, CA
- Department of Economics, University of Virginia, Charlottesville, US
- Department of Finance and Management Science, University of Alberta, Edmonton, CA
- Department of Finance, City University of New York, US
- Department of Finance, Concordia University, Montreal, US
- Department of Finance, Georgia State University, Atlanta, US
- Department of Finance, Kellogg School of Management, Northwestern University, Illinois, US
- Department of Finance, Stanford University, California, US
- Department of Statistical and Actuarial Sciences, University of Western Ontario, Ontario, CA
- Department of Statistics, University of Leipzig, DE
- Dipartimento di Scienze Economiche, GRETA, Venice, IT
- Dipartimento di Teoria Economica e Metodi Quantitativi per le Scelte Politiche, University of Rome "La Sapienza", IT

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 the second phase (2005-09) relate to the analysis and the modelling of

risks. They are examined in four 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 and statistical tools that are necessary to provide meaningful answers to the above cited research questions?

Achievements

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

Research

By now our research efforts have reached a phase of maturation. Within the first four years FINRISK has produced about 300 working papers. Furthermore our research work has generated more than 150 publications in internationally renowned academic journals. Please check our website for more detailed information on our research output.

Knowledge transfer

Starting with the dissemination of the booklet "Risk and Risky Management", and following up with two conference series on applied research topics, we have attempted to popularise our research activities within the Swiss

financial services industry. The constant interactions with practitioners at conferences, workshops and seminars contribute to install a mutually beneficial dialogue with the Swiss finance community. In addition, the "FINRISK Letter" informs a broad public twice yearly about current events and news from our research network.

Education

We have pursued the consolidation of our doctoral network activities. The co-operation between the FAME program (Geneva and Lausanne) and the doctoral programmes in Lugano, Sankt Gallen and Zurich has been strengthened over the past year. We now offer a large variety of specialised doctoral courses to the 150 doctoral students from the Swiss Doctoral Network in Finance. The annual

Swiss Doctoral Workshop in Finance allows the students to present their research to a mix of local and international faculty.

Structural Effects

The activities of FINRISK have contributed to the fact that both the Universities of Zurich and Lausanne have recently declared Finance to be one of their top priority research areas for the next four years. Furthermore the Swiss Bankers Association, recognising the importance of research and high level education in finance for the reputation of the Financial Centre Switzerland, has recently launched the Swiss Finance Institute that aims to secure and extend the research and educational efforts of FINRISK in the long-term.

Further information see www.nccr-finrisk.unizh.ch

- Faculty of Commerce, University of British Columbia, Vancouver, CA
- Finance & Economics Division, University of Columbia, New York, US
- Finance Department, The Wharton School, University of Pennsylvania, Philadelphia, US
- Finance Department, University of California, Los Angeles, US
- HEC, Paris, FR
- Institut für Finanzmanagement, University of Bern, CH
- Institute for Financial Management, University of Amsterdam, NL
- Institute of Finance, Ohio State University, Columbus, US
- Institute of Mathematical Economics, University of Bielefeld, DE
- Judge Institute of Management Studies, University of Cambridge, GB
- Lehrstuhl Wirtschaftswissenschaften, Universität Giessen, DE
- Manchester School of Accounting and Finance, University of Manchester, GB
- OMEGA Project, INRIA, Sophia-Antipolis, FR
- School of Economic Studies, University of Manchester, GB
- University of Applied Science SUPSI, Lugano, CH

Economy / Industry

- Banca della Svizzera Italiana, Lugano, CH
- BNP Paribas, London, GB
- Cédric Bancaire Privée, Geneva, CH
- Cortal Consors, Paris, CH
- Credit Suisse Group, Zurich, CH
- CSS Versicherung, Luzern, CH
- EMS Chemie AG, Zurich, CH
- F. Hoffmann – La Roche AG, Zurich, CH
- IFB Consulting AG, Zurich, CH
- Insightful, Zurich, CH
- Ixis Capital Markets, Paris, FR
- Mc Kinsey & Company, Zurich, CH
- Price Waterhouse Coopers, Zurich, CH
- Standard and Poors, London, GB
- Zürcher Kantonalbank (ZKB), Zurich, CH

Others

- AZEK / CFPI, Bülach, CH
- Banque de France, Paris, FR
- BSI Gamma Foundation, Lugano, CH
- Dacco Foundation, Lugano, CH
- European Central Bank, Frankfurt, DE
- European Corporate Governance Institute, Brussels, BE
- Swiss National Bank, Bern, CH

Financial Valuation and Risk Management NCCR FINRISK

Statistical Input – Output Data

Funding source (CHF)	Year 5	Year 6	Year 7	Year 8	Total	%
SNSF funding	3 000 000	3 000 000	2 500 000	2 500 000	11 000 000	68
Self-funding from home institution ¹	1 275 000	825 000	825 000	825 000	3 750 000	23
Self-funding from project participants	120 000	120 000	120 000	120 000	480 000	3
Third-party funding	376 000	206 000	206 000	206 000	994 000	6
Total	4 771 000	4 151 000	3 651 000	3 651 000	16 224 000	100

Personnel ²	Total of Persons	Female	%	Male	%	CH	Most Represented Nations					Other Nations
							DE	FR	IT	BE	RU	
Management ³	2.73	1.05	38	1.68	62	6	3	3	0	1	0	1
Master students	0	0	0	0	0	0	0	0	0	0	0	0
Doctoral students	69	14	20	55	80	21	11	5	6	0	5	24
Postdoctoral students	22	5	23	17	77	8	4	2	7	0	0	3
Research associates	0	0	0	0	0	0	0	0	0	0	0	0
Senior researchers ⁴	49	4	8	45	92	17	7	9	4	5	0	10
Other staff	4	4	100	0	0	3	0	1	0	0	0	0
Total	146.73	28.05	20	118.68	80	55	25	20	17	6	5	38

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 (applies not for the country analysis)

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

Linder Wolf, Prof. (Chair)
 Antille Gaillard Gabrielle, Prof.
 Errunza Vihang R., Prof.
 Flückiger Yves, Prof.
 Geman Hélyette, Prof.
 Kalay Avner, Prof.
 Leland Hayne E., Prof.
 Polemarchakis Herakles, Prof.
 Sørensen Michael, Prof.

Swiss National Science Foundation, Berne, CH
 Swiss National Science Foundation, Berne, CH
 Faculty of Management, McGill University, Montreal, CA
 Swiss National Science Foundation, Berne, CH
 Département Finance, Université Paris IX, Dauphine et ESSEC, FR
 Dept. of Finance, University of Utah, Salt Lake City, US
 Haas School of Business, University of California, Berkeley, US
 Department of Economics, Brown University, Providence, US
 Department of Statistics and Operations Research, University of Copenhagen, DK

NCCR Office SNSF

Bachmann Stefan, Dr.

Schweiz. Nationalfonds, Wildhainweg 3, 3001 Bern,
 phone: + 41 (0)31 308 23 49, fax: + 41 (0)31 305 29 71,
 sbachmann@snf.ch

The Power and Meaning of Images

NCCR Iconic Criticism

Research

The power of images: image politics

Heads: Boehm G., Beyer A.,
Loprieno A., Renner M.,
Simon R., Vischer Th.

Image, architecture and word

H: Beyer A.

Time in the image

H: Boehm G., Brandstetter G.

The image of writing

H: Loprieno A.

The literary text as iconic criticism

H: Simon R.

The epistemic image – Visualization in science, technology and humanities

H: Bernold T., Hagner M.,
Renner M., Vetter T.

Graduate School „Image and Knowledge“

1.10.05 – 30.9.08

Supervisor: G. Boehm / N.N.

Heads of Individual Research Projects

Bernold Thomas, Dr.
Beyer Andreas, Prof.
Boehm, Gottfried, Prof.
Brandstetter Gabriele, Prof.
Hagner Michael, Prof.
Loprieno Antonio, Prof.
Renner Michael, Prof.

Simon Ralf, Prof.
Vetter Thomas, Prof.
Vischer Theodora, Dr.

eikones, NCCR Iconic Criticism, University of Basel
Department of the History of Art, University of Basel
Department of the History of Art, University of Basel
Institut für Theaterwissenschaften, Freie Universität Berlin
Chair for Science Studies, ETH Zürich
Institute of Egyptology, University of Basel
Department Visual Communication, University of Art and Design,
Basel
Institute of German Studies, University of Basel
Computer Science Department, University of Basel
Schaulager, Münchenstein/Basel

Members of the Advisory Board

N.N.

Home Institution

University of Basel

Start of the NCCR

October 1, 2005

NCCR Management

Director

Boehm Gottfried, Prof.

Managing Director

Bernold Thomas, Dr.
phone: + 41 (0)61 267 1802

Administrative Manager

Dunkel Helen, Mrs.
phone: + 41 (0)61 267 18 03

Management Support

Piccinato Samanta, Mrs.
phone: + 41 (0)61 267 18 10

Communications

Bernold Thomas, Dr.

Advancement of Women

Dunkel Helen, Mrs.

Knowledge

and Technology Transfer
N.N.

Education and Training

N.N.

Address

eikones/NCCR Iconic Criticism
University of Basel
Rheinsprung 11
4051 Basel

phone: + 41 (0)61 267 18 10

fax: + 41 (0)61 267 18 11

e-mail: Bildkritik@unibas

Web Address

www.eikones.ch

Public Relations

- Homepage

The Power and Meaning of Images

NCCR Iconic Criticism

Third Party Cooperation

(Data will be published in Guide2007)

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 mo-

ments 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.

Statistical Input – Output Data

Funding source (CHF)	Year 1	Year 2	Year 3	Year 4	Total	%
SNSF funding	1 775 000	1 775 000	1 775 000	1 775 000	7 100 000	39
Self-funding from home institution ¹	1 228 950	1 372 950	1 352 950	1 370 150	5 325 000	29
Self-funding from project participants	1 260 100	1 282 850	1 305 350	1 305 350	5 153 650	29
Third-party funding	70 000	90 000	240 000	90 000	490 000	3
Total	4 334 050	4 520 800	4 673 300	4 540 500	18 068 650	100

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

Personnel

(Data will be published in Guide2007)

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

Members of the Review Panel

Levy René, Prof. (Chair)
Bätschmann Oskar, Prof.
Belting Hans, Prof.

Cohn Danièle, Prof.

Daston Lorraine, Prof.
Elins James, Prof.
Jäger Ludwig, Prof.
Krämer Sybille, Prof.
Schwarzenbach René, Prof.
Wellbery David E., Prof.

Swiss National Science Foundation, Berne, CH
Swiss National Science Foundation, Berne, CH
IFK Internationales Forschungszentrum Kulturwissenschaften,
Wien, AT

Ecole des Hautes Etudes en Sciences Sociales, Centre de Sociologie
du Travail et des Arts CESTA, Paris, FR

Max-Planck-Institut für Wissenschaftsgeschichte, Berlin, DE
Department of Art History, School of the Art Institute, Chicago, US
Lehrstuhl für Deutsche Philologie, RWTH Aachen, DE
Institut für Philosophie, Freie Universität Berlin, DE
Swiss National Science Foundation, Berne, CH
Department of Germanic Studies, University of Chicago, US

NCCR Office SNSF

Bachmann Stefan, Dr.

Schweiz. Nationalfonds, Wildhainweg 3, 3001 Bern
phone: + 41 (0)31 308 23 49, fax: + 41 (0)31 305 29 71
sbachmann@snf.ch

International Trade Regulation: From Fragmentation to Coherence

NCCR Trade Regulation

Research

Research Cluster A Constitutional Topics

Coordinator:
Breining-Kaufmann C.
Alternate: Ziegler A.

Constitutionalism and multilayered governance

Head: Peters A.
Alternate Leader: Stürchler N.

Decision-making in the WTO and in other international organizations

H: Dupont C., Ziegler A.
AL: Elsig M.

Special and differential treatment and variable geometry and regionalism

H: Baldwin R.
AL: Germann C.

The role of human rights in trade regulation

H: Breining-Kaufmann C.
AL: Schefer K.

Research Cluster B Unresolved Regulatory Issues

Coordinator: Baldwin R.
Alternate: Graber C.

Regulation sustainable agriculture in WTO law and policy

H: Lehman B.
AL: Aerni P.

Energy in WTO law and policy

H: Wälde T.
AL: Rechsteiner S.

Legal protection of cultural diversity in a digital networked environment

H: Graber C.
AL: Nenova M.

Developing trade rules for services: Prudential standards, trade remedies, competition and migration

H: Sauvé P.
AL: Panizzon M.

Genetic engineering in international trade regulation and policy:

Intellectual property, technical regulation and the impact of human rights

H: Cottier T.
AL: Wüger D.

Research Cluster C Establishing Regulatory Linkages in International Trade, Investment and Finance

Coordinator: Baltensperger E.
Alternate: Gugler P.

International trade and finance

H: Baltensperger E.
AL: Hodler R.

Multilateral rules on trade and investment

H: Gugler P.
AL: Tomsik V.

Trade in primary commodities: Financial sustainability and market structures

H: Nissanke M.
AL: Ferrari B.

Platforms, Programmes etc.

Annual NCCR conference

Biannual IP workshops and symposia

Home Institution

University of Bern

Start of the NCCR

September 1, 2005

NCCR Management

Director

Cottier Thomas, Prof.
thomas.cottier@wti.org

Alternate Director

Baldwin Richard, Prof.
baldwin@hei.unige.ch

Deputy Director

Ziegler Andreas, Prof.
andreas.ziegler@unil.ch

Breining-Kaufmann
Christine, Mrs.

christine.breining@rwi.unizh.ch

Scientific Coordinator

Brown Susan, Mrs.
susan.brown@wti.org

Administrative Coordinator

Vetter Margrit, Mrs.
margrit.vetter@wti.org

Administrative Assistant

Deutsch Stephan, Mr.
stephan.deutsch@wti.org

IT Administrator

Steiger Christian, Mr.
christian.steiger@wti.org

Science Editor

Kaplan Susan, Mrs.
susan.kaplan@wti.org

Knowledge and

Technology Transfer
N.N.

Education and Training

N.N.

Advancement of Women

N.N.

Address

NCCR Trade Regulation
World Trade Institute
Hallerstrasse 6
3012 Bern

phone: + 41 (0)31 631 30 80

fax: + 41 (0)31 631 36 30

<http://www.nccr-trade.ch/>

International Trade Regulation: From Fragmentation to Coherence NCCR Trade Regulation

Third Party Cooperation

(Data will be published in
Guide2007)

Topics

The focus of this NCCR, "International Trade Regulation: From Fragmentation To Coherence", stems mainly from the observation that under the GATT, and still today under the WTO, international trade regulation has been undertaken as a specialised field of international law and economic policy. However, current and future WTO rules increasingly impinge upon other areas of law, such as environmental protection,

welfare, regional policies, labour standards, human rights, finance, investment, education and culture. All these areas tend to be addressed by distinct instruments targeting different subject matters, and are insufficiently interlinked. The resulting tensions are difficult to overcome under the current system of international and national law and policies. The project attempts to pursue answers to these questions

through 12 separate but closely linked research projects.

The NCCR employs a large number of doctoral and post-doctoral students and organises a series of seminars and educational events, with the aim to create a whole generation of specialists in the field of international trade regulation and to maximise the transfer of acquired knowledge to society at large.

Heads of Individual Research Projects and Subprojects

Aerni Philipp, Dr.	c/o World Trade Institute, Bern
Armingeon Klaus, Prof.	Institute of Political Science, Universität Bern
Baldwin Richard, Prof.	Graduate Institute of International Studies, Genève
Baltensperger Ernst, Prof.	Institute of Economics, Universität Bern
Breining-Kaufmann Christine, Prof.	Rechtswissenschaftliches Institut, Universität Zürich
Cottier Thomas, Prof.	c/o World Trade Institute, Bern
Dupont Cédric, Prof.	Graduate Institute of International Studies, Genève
Elsig Manfred, Dr.	c/o World Trade Institute, Bern
Ferrarini Benno	c/o World Trade Institute, Bern
Germann Christophe, Dr.	c/o World Trade Institute, Bern
Graber Christoph, Prof.	Rechtswirtschaftliche Fakultät, Universität Luzern
Gugler Philippe, Prof.	Département d'Économie Politique, Université de Fribourg
Hodler Roland, Dr.	c/o World Trade Institute, Bern
Lehman Bernard, Prof.	Institut für Agrarwissenschaft, ETH Zürich
Nenova Mira	c/o World Trade Institute, Bern
Nissanke Machiko, Prof.	SOAS, University of London, GB
Panizzon Marion, Dr.	c/o World Trade Institute, Bern
Peters Anne, Prof.	Juristische Fakultät, Universität Basel
Rechsteiner Stefan, Dr.	c/o World Trade Institute, Bern
Sauvé Pierre, Prof.	c/o World Trade Institute, Bern
Schefer Krista, Dr.	c/o World Trade Institute, Bern
Stürchler Nikolas, Dr.	c/o World Trade Institute, Bern
Tomsik Vladimir, Dr.	c/o World Trade Institute, Bern
Wälde Thomas, Prof.	Center for Energy, Petroleum and Mineral Law and Policy, University of Dundee
Wüger Daniel, Dr.	c/o World Trade Institute, Bern
Ziegler Andreas, Prof.	Droit International Public Centre, Université de Lausanne

Members of the NCCR International Scientific Advisory Board

Ehlermann Claus Dieter, Prof.	Wilmer Cutler Pickering LLP, Brussels, BE
Hufbauer Gay, Dr.	Institute of International Economics IIE, Washington D.C., US
Jackson John H., Prof.	Georgetown University Law Center, Washington D.C., US
Müller Jörg Paul, Prof.	University of Berne, CH
Ostry Sylvia, Prof.	University of Toronto, CA

Statistical Input – Output Data

Funding source (CHF)	Year 1	Year 2	Year 3	Year 4	Total	%
SNSF funding	2 600 000	2 600 000	2 600 000	2 600 000	10 400 000	39
Self-funding from home institution ¹	577 200	577 200	577 200	577 200	2 308 800	29
Self-funding from project participants ²	0	0	0	0	0	29
Third-party funding	0	0	0	0	0	3
Total	3 177 200	3 177 200	3 177 200	3 177 200	12 708 800	100

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

² Amounts will be published in Guide2007

Personnel

(Data will be published in Guide2007)

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

Members of the Review Panel

Opitz-Belakhil Claudia, Prof. (Chair)	Swiss National Science Foundation, Berne, CH
Flückiger Yves, Prof.	Swiss National Science Foundation, Berne, CH
McGrew Anthony, Prof.	School of Social Sciences, University of Southampton, GB
Probst Thomas, Prof.	Swiss National Science Foundation, Berne, CH
Odell John S., Prof.	School of International Relations, University of Southern California, US
Ruiz-Fabri Hélène, Prof.	Unité Mixte de Recherche de Droit Comparé, Université de Paris I, FR
Steger Debra, Prof.	Faculty of Law, University of Ottawa, CA
Tietje Christian, Prof.	Institut für Wirtschaftsrecht, Universität Halle Wittenberg, DE
Van Overwalle Geertrui, Prof.	Centre for Intellectual Property Rights, Catholic University Leuven, BE

NCCR Office SNSF

Griessen Thomas
Schweiz. Nationalfonds, Wildhainweg 3, 3001 Bern
phone: + 41 (0)31 308 23 51, fax: + 41 (0)31 305 29 71
tgriessen@snf.ch

Mediality – Historical Perspectives

NCCR Mediality

Home Institution

University of Zurich

Start of the NCCR

October 1, 2005

NCCR Management

Director

Kiening Christian, Prof.
phone: + 41 (0)44 634 25 53
ckiening@access.unizh.ch

Deputy Director

Glessgen, Martin-D., Prof.
phone: + 41 (0)44 634 36 20
glessgen@rom.unizh.ch

Research Manager

Stercken Martina, PD Dr.
phone: + 41 (0)44 634 28 55
stercken@hist.unizh.ch

Knowledge and

Technology Transfer

Thier Andreas, Prof.

Education and Training

Glauser Jürg, Prof.

Advancement of Women

Naumann Barbara, Prof.

Address

NCCR Mediality
University of Zurich
Rämistr. 69

8006 Zürich
phone: + 41 (0)44 634 51 19
sekretariat@mediality.ch

Web Address

www.mediality.ch

Research

Institutionalization

Techniques and methods of medieval continental Germanic literacy

Head: Glaser E., Rübekel L.

From spoken to written word: The scripting of the Germanic languages from a comparative perspective

H: Fischer A.

The transition from papyrus to paper as reflected in Arabic papyri and papers

H: Kaplony A.

Communication with images of glass, light, and color: The media character and significance of glass painting in Switzerland until the end of the Middle Ages

H: Kurmann-Schwarz B.

Interference

The staging of writing: Translation, vocality, and intentionality of writing in Scandinavian literature of the middle ages

H: Glauser J.

Texts and images – Education and conversation. Media circumstances and functional interferences

H: Lutz E. C.

Orality – visuality – writing / oralité – visualité – écriture

H: Wetzel R.

Display

Complex medialities of the late middle ages: The example of vernacular religious plays

H: Kiening C.

Mediality of the pilgrimage: “Advertising” between magic imagining and calculated cult propaganda

H: Rendtel C., Wittmer-Butsch M.

Media display of relics in medieval Rome

H: Claussen P.C.

Violence and morality: Discourses, images, and media flux around 1500

H: Burghartz S.

Instrumentalization

The image of ruling power and its relationship to law in the transition from the middle ages to the early modern period

H: Thier A.

Media of order: Practices for handling legal records and changes in political culture (1200–1500)

H: Teuscher S.

Cartography of power

H: Stercken M.

Documentary sources and language elaboration in the late French middle ages

H: Gleßgen M.

Functions of Latin versification in the middle ages

H: Stotz P.

Transference

“Transference” as a basic concept of mediality (literature and visual culture)

H: Naumann B.

“Crossmapping” – Transference in philosophy, literature, and visual culture

H: Bronfen E.

Rhetoric of transference in the late 18th and early 19th centuries

H: Müller Nielaba D.

Transference of knowledge: Media-related and disciplinary constellations in Stifter and Musil

H: Wagner K.

A history of the representation of flesh in Western art

H: Stoichita V.

Topics

Media both enable and influence communication. This can be clearly seen from modern communication technologies which have brought about a fundamental change in our societies. However, the phenomenon can also be observed in earlier eras which possess their own form of mediality. The National Centre of Competence in Research (NCCR) "Mediality. Historical perspectives" looks into the link between the forming of cultural meaning and media forms and how this has changed over the passage of time.

Its 20 individual projects are purposely not devoted primarily to the present day, its mass media and diverse media theories. The study instead looks mainly at the Middle Ages and the Early Modern Period, in other words the very era

which saw the emergence of the conditions leading to modern mediality.

In the Middle Ages and Early Modern Period writing was by no means a customary skill but was surrounded by an aura. There were no mass media at that time. Communication was a face to face interchange. However, wide-ranging changes also took place in these times. Communication networks developed, the use of paper increased, new types and combinations of texts and images emerged and the printing press broadened communication.

This development can be best observed where there is an interface between or transformation of media forms, where they become the subject of discussion and reflection. The aim of the NCCR "Mediality. Historical perspectives" is

to plumb the historical dimensions of mediality, to provide an insight into the various forms, phenomena and processes, categories, models and metaphors in which communication appears. The objective is also to combine historical and systematic perspectives and to present the situation today in a more focused light.

Leading house is the Competence Centre for Medieval Studies at Zurich University. The Universities of Basel, Freiburg and Geneva are also participating in the project which encompasses historical and linguistic sciences, cultural and art sciences. It provides a broad network for experts on the Middle Ages as well as for media historians and offers a framework for concentrated and innovative training for young scientists.

Third Party Cooperation

(Data will be published in Guide2007)

Heads of Individual Research Projects

Bronfen Elisabeth, Prof.

Burghartz Susanna, Prof.

Claussen Cornelius, Prof.

Fischer Andreas, Prof.

Glaser Elvira, Prof.

Glauser Jürg, Prof.

Glessgen Martin-Dietrich, Prof.

Kaplony Andreas, Prof.

Kiening Christian, Prof.

Kurmann-Schwarz Brigitte, PD Dr.

Lutz Eckart Conrad, Prof.

Müller-Nielaba Daniel, Prof.

Naumann Barbara, Prof.

Rendtel Constanze, Dr.

Rübekeil, Ludwig, PD Dr.

Stercken Martina, PD Dr.

Stoichita Viktor, Prof.

Stotz Peter, Prof.

Teuscher Simon, Dr.

Thier Andreas, Prof.

Wagner Karl, Prof.

Wetzel René, Prof.

Wittmer-Butsch Maria, Dr.

Englisches Seminar, Universität Zürich

Historisches Seminar, Universität Basel

Kunsthistorisches Seminar, Universität Zürich

Englisches Seminar, Universität Zürich

Deutsches Seminar, Universität Zürich

Deutsches Seminar, Universität Zürich

Romanisches Seminar, Universität Zürich

Orientalisches Seminar, Universität Zürich

Deutsches Seminar, Universität Zürich

Kunsthistorisches Seminar, Universität Zürich

Département für Germanistik, Université de Fribourg

Deutsches Seminar, Universität Zürich

Deutsches Seminar, Universität Zürich

Historisches Seminar, Universität Zürich

Deutsches Seminar, Universität Zürich

Historisches Seminar, Universität Zürich

Département d'Histoire de l'Art et Musicologie,

Université de Fribourg

Mittelateinisches Seminar, Universität Zürich

Department of History, University of California, Los Angeles, CA /

Historisches Seminar, Universität Zürich

Rechtswissenschaftliches Institut, Universität Zürich

Deutsches Seminar, Universität Zürich

Département de Langue et Littérature Allemands,

Université de Genève

Historisches Seminar, Universität Zürich

Mediality – Historical Perspectives NCCR Mediality

Statistical Input – Output Data

Funding source (CHF)	Year 1	Year 2	Year 3	Year 4	Total	%
SNSF funding	1 425 000	1 425 000	1 425 000	1 425 000	5 700 000	66
Self-funding from home institution ¹	567 500	567 500	567 500	567 500	2 270 000	26
Self-funding from project participants ²	152 709	152 709	152 709	152 709	610 836	7
Third-party funding	0	0	0	0	0	0
Total	2 145 209	2 145 209	2 145 209	2 145 209	8 580 836	100

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

² Amounts will be published in Guide2007

Personnel

(Data will be published in Guide2007)

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

Members of the Review Panel

Opitz-Belakhal Claudia, Prof. (Chair)	Swiss National Science Foundation, Berne, CH
Coleman Janet, Prof.	Department of Government, London School of Economics, GB
Geary Patrick J., Prof.	Department of History, University of California, Los Angeles, US
Hasler Martin, Prof.	Swiss National Science Foundation, Berne, CH
Kasten Ingrid, Prof.	Institut für Deutsche und Niederländische Philologie, Freie Universität Berlin, DE
Krüger Klaus, Prof.	Kunsthistorisches Institut, Freie Universität Berlin, DE
Landfester Ulrike, Prof.	Swiss National Science Foundation, Berne, CH
Ruhe Doris, Prof.	Institut für Romanistik, Ernst Moritz Arndt Universität, Greifswald, DE
Strohschneider Peter, Prof.	Institut für Deutsche Philologie, Universität München, DE
Voskamp Wilhelm, Prof.	Institut für deutsche Sprache und Literatur, Universität Köln, DE

NCCR Office SNSF

Bachmann Stefan, Dr. Schweiz. Nationalfonds, Wildhainweg 3, 3001 Bern,
phone: + 41 (0)31 308 23 49, fax: + 41 (0)31 305 29 71,
sbachmann@snf.ch

Challenges to Democracy in the 21st Century

NCCR Democracy

Home Institution

University of Zurich

Start of the NCCR

October 1, 2005

NCCR Management

Director

Kriesi Hanspeter, Prof.
phone: + 41 (0)44 634 40 10
hanspeter.kriesi@pwi.unizh.ch

Deputy Director

Jarren Otfried, Prof.
phone: + 41 (0)44 634 46 60
o.jarren@ipmz.unizh.ch

Administrative Director

Rosteck Yvonne, Mrs.
phone: + 41 (0)44 634 52 02
rosteck@nccr-democracy.unizh.ch

Administration

Cavegn Barbara, Mrs.

Communication

Rosteck Yvonne, Mrs.

Knowledge and Technology Transfer

Ladner Andreas, Prof.

Education and Training

Papadopoulos Ioannis, Prof.

Advancement of Women

N.N.

Address

NCCR Democracy
University of Zurich
Stampfenbachstr. 63
8001 Zürich

phone: + 41 (0)44 634 52 01

fax: + 41 (0)44 634 52 00

info@nccr-democracy.unizh.ch

Web Address

www.nccr-democracy.unizh.ch

Public Relations

- Newsletter
- Public events
- Website

Research

Module “Expanding Democratic Governance in the International Realm”

Leader: Cederman L.-E.

Democratizing global institutions: the WTO as an emerging polity

Head: Dupont C.

Promoting democracy in the EU and its near abroad

H: Lavenex S., Schimmelfennig F.

Democratizing divided societies in bad neighborhoods

H: Cederman L.-E.

Module “Changing Relations between Input, Throughput, and Output in Public Governance”

Leaders: Papadopoulos I., Klöti U.

The impact of internationalization on Swiss policy processes in comparative perspective

H: Papadopoulos I.

Assessing the trend towards new regionalism in Swiss metropolitan areas

H: Kübler D.

Heads of Individual Research Projects

Bernauer Thomas, Prof.

Bonfadelli Heinz, Prof.

Cederman Lars-Erik, Prof.

Dupont Cédric, Prof.

Hardmeier Sibylle, Prof.

Imhof Kurt, Prof.

Jarren Otfried, Prof.

Koubi Vally, Prof.

Kriesi Hanspeter, Prof.

Kübler Daniel, Prof.

Ladner Andreas, Prof.

Information on public performance – Creation, diffusion and utilization

H: Widmer T., Bonfadelli H.

Democratic structures and processes and the provision of public goods

H: Bernauer T., Koubi V.

Module “Changing Structures and Actors of Political Communication”

Leader: Marcinkowski F.

Democracy in the media society – Theoretical support and empirical validation of a societal term

H: Imhof K.

Mediatization and structural change within political actors and organizations

H: Jarren O.

The dynamics of political institutions in mediated democracies:

Political bargaining and the transformation of the public sphere

H: Marcinkowski F.

Module “Changing Processes and Strategies of Political Participation and Representation – Audience Democracy”

Leader: Siegert G.

The strategies of political actors: Process and message

H: Kriesi H.

The strategies and processes of issue selection and construction

H: Siegert G.

The strategies and processes of attitude formation and public participation

H: Bonfadelli H., Wirth W.

Knowledge Transfer Module “The Quality of Democracy”

Leader: Ladner A.

Democracy barometer

H: Hardmeier S., Merkel W.

Civic education

H: Ziegler B., Ladner A.

Smart-voting as a tool for electronic campaigning

H: Ladner A., Trechsel A., Leuthold H.

Quality of journalism

H: Wyss V.

Programmes

Doctoral programme

Supervisor: Papadopoulos I.

Research colloquium

Supervisor: Kriesi H.

Peer mentoring programme

Supervisor: N.N.

Center for Comparative and International Studies (CIS), ETH Zürich

SwissGIS / Institut für Publizistik- und Kommunikationswissenschaft, Universität Zürich

Center for Comparative and International Studies (CIS), ETH Zürich

Institut Universitaire de Hautes Etudes Internationales, Genève

Wissenschaftszentrum Berlin für Sozialforschung

SwissGIS / Institut für Publizistik- und Kommunikationswissenschaft, Universität Zürich

SwissGIS / Institut für Publizistik- und Kommunikationswissenschaft, Universität Zürich

Volkswirtschaftliches Institut, Universität Bern

CIS / Institut für Politikwissenschaft, Universität Zürich

CIS / Institut für Politikwissenschaft, Universität Zürich

Kompetenzzentrum für Public Management, Universität Bern

Challenges to Democracy in the 21st Century

NCCR Democracy

Third Party Cooperation

(Data will be published in
Guide2007)

Topics

Well-functioning democratic processes and institutions constitute the backbone of political legitimacy, social stability, economic growth, and prosperity. However, a realistic assessment of the state of democracy today must acknowledge that democratic regimes are faced with serious challenges that threaten to undermine their legitimacy. Citizens in Western democracies are increasingly disillusioned with their political leaders and institutions. Beyond established liberal democracies, the process of democratization has proven to be more difficult than expected.

The NCCR Democracy wants to show why and explain what can be done about it. It examines two key challenges to democracy in the 21st century: On the one hand, nation-states are suffering from a severe loss of problem-solving capacity in the wake of globalization. On the other hand, the "mediatization of politics," i.e. the intrusion of the media into the political process, constitutes a serious threat to traditional models of representative democracy and profoundly alters the character of public debate. While both developments are real threats to the democratic process, they also represent opportu-

nities for new forms of political participation and representation, as well as for political legitimation. The main goals of the NCCR Democracy are to propose designs for new political decision-making processes and to devise strategies to improve the quality of democracy. The NCCR is based on four basic research modules and a fifth applied research module charged with finding practical applications that implement the research results. The NCCR will also provide an interdisciplinary doctoral program in its two core disciplines – political science and media and communication science.

Lavenex Sandra, Prof.

Leuthold Heiri

Marcinkowski Frank, Prof.

Merkel Wolfgang, Prof.

Papadopoulos Ioannis, Prof.

Schimmelfennig Frank, Prof.

Siegert Gabriele, Prof.

Trechsel Alexander, Prof.

Widmer Thomas, Dr.

Wirth Werner, Prof.

Wyss Vinzenz, Prof.

Ziegler Béatrice, PD Dr.

Institut für Politikwissenschaft, Universität Bern

Geographisches Institut, Universität Zürich

SwissGIS / Institut für Publizistik- und Kommunikationswissenschaft, Universität Zürich

Wissenschaftszentrum Berlin für Sozialforschung

Institut d'Etudes Politiques et Internationales,

Université de Lausanne

Center for Comparative and International Studies

(CIS), ETH Zürich

SwissGIS / Institut für Publizistik- und Kommunikationswissenschaft, Universität Zürich

European University Institute, Florence

CIS / Institut für Politikwissenschaft, Universität Zürich

SwissGIS / Institut für Publizistik- und Kommunikationswissenschaft, Universität Zürich

Zürcher Hochschule Winterthur

Pädagogische Hochschule Aargau

Partner Institutions

Deutsches Seminar, Universität Zürich

Institut für Völkerrecht, Universität Zürich

Laboratoire de Sociologie Urbaine, Ecole Polytechnique Fédérale de Lausanne

Philosophisches Seminar, Universität Zürich

Rechtswissenschaftliches Institut, Universität Zürich

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

SIDOS, Universität Neuchâtel

Soziologisches Institut, Universität Zürich

Università della Svizzera Italiana, Lugano

Members of the Scientific Advisory Board

de Bens Els, Prof.

Humphreys Peter, Prof.

Kitschelt Herbert, Prof.

N.N.

N.N.

Universiteit Gent, BE

University of Manchester, GB

Duke University, Durham, US

Statistical Input – Output Data

Funding source (CHF)	Year 1	Year 2	Year 3	Year 4	Total	%
SNSF funding	1 775 000	1 775 000	1 775 000	1 775 000	7 100 000	48
Self-funding from home institution ¹	835 103	862 483	1 104 399	568 016	3 370 001	23
Self-funding from project participants	1 184 168	1 085 775	1 004 601	890 722	4 165 266	28
Third-party funding	0	10 000	15 000	20 000	45 000	0
Total	3 794 271	3 733 258	3 899 000	3 253 738	14 680 267	100

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

Personnel

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

Members of the Review Panel

Linder Wolf, Prof. (Chair)

Benz Arthur, Prof.

Braun Dietmar, Prof.

Entman Robert, Prof.

Héritier Adrienne, Prof.

Kaase Max, Prof.

Leftwich Adrian, Prof.

Mazzoleni Gianpietro, Prof.

Mény Yves, Prof.

Messerli Paul, Prof.

Swiss National Science Foundation, Berne, CH

Institut für Politikwissenschaft, FernUniversität Hagen, DE

Swiss National Science Foundation, Berne, CH

School of Media and Public Affairs,

The George Washington University, Washington, US

European University Institute, San Domenico di Fiesole, IT

International University Bremen, DE

Department of Politics, University of York, GB

Department of Social and Political Studies, University of Milan, IT

European University Institute, San Domenico di Fiesole, IT

Swiss National Science Foundation, Berne, CH

NCCR Office SNSF

Grissens Thomas

Schweiz. Nationalfonds, Wildhainweg 3, 3001 Bern,
phone: + 41 (0)31 308 23 51, fax: + 41 (0)31 305 29 71,
tgrissens@snf.ch

Swiss Etiological Study of Adjustment and Mental Health NCCR SESAM

Home Institution

University of Basel

Start of the NCCR

October 1, 2005

NCCR Management

Director

Margraf Jürgen, Prof.
juergen.margraf@unibas.ch

Deputy Director

Grob Alexander, Prof.
alexander.grob@unibas.ch

NCCR CEO

Lieb Roselind, Prof.
roselind.lieb@unibas.ch

Deputy CEO

Meinlschmidt Gunther, Dr.
gunther.meinlschmidt@unibas.ch

Office

Coste Catherine, Ms.
phone: + 41 (0)61 276 02 78
catherine.coste@unibas.ch

Communication

Glättli-Dolanc Barbara, Mrs.
phone: + 41 (0)61 276 02 73
barbara.glaettli@unibas.ch

Database Manager

Glavic Boris, Mr.
boris.glavic@unibas.ch

Knowledge and

Technology Transfer

Habegger Daniel, Mr.
phone: + 41 (0)61 276 02 72
daniel.habegger@unibas.ch

Education and Training

N.N.

Advancement of Women

N.N.

Address

NCCR SESAM
Birmannsgasse 8
P.O. Box
4009 Basel
sesam@unibas.ch

Web Address:

www.sesamswiss.ch

Public Relations

• in preparation

Research

**An experimental variation
of individual and systemic
risk factors:
Their significance for
etiology and prevention**

Head: Bodenmann G.
Perrez M.

**Psychobiological program-
ming of the stress response,
behavioral self-regulation
and parental bonding in
infants**

H: Hellhammer D. H.
Meinlschmidt G., Rieger M.,
Holzgreve W.

**The impact of grand-
parental investment on the
health and well-being of
children and grandchildren**

H: Hertwig R.
Wänke M.

**Psychobiological
consequences of mental
health during pregnancy**

H: Holzgreve W.
Alder J., Bitzer J., Hösli I.

Heads of Individual Research Projects and Subprojects

Alder Judith, Dr.
Bitzer Johannes, Prof.
Blumenthal Terry D., Prof.
Bodenmann José-Guy, Prof.

Bürgin Dieter, Prof.
Dammann Gerhard, Dr.
Favez Nicolas, Dr.
Grob Alexander, Prof.
Grossman Paul

Hellhammer Dirk, Prof.
Hertwig Ralph, Prof.
Holzgreve Wolfgang, Prof.
Hösli Irene, Dr.
Knüsel Irene, Dr.
Margraf Jürgen, Prof.
Meinlschmidt Gunther, Dr.

**A transgenerational
perspective on risk factors
related to neuroticism,
affective and substance
use disorders**

H: Mueller-Spahn F.
Dammann G., Seifritz E.,
Wilhelm F.

**The genetic basis of major
psychopathological pheno-
types**

H: Papassotiropoulos A.
Meyer U.A.

**Primate and rodent models
of stress-related disorders:
Neurobehavioral studies of
interactions between stress
in early life and adulthood**

H: Pryce C.
Knüsel I.

**Postnatal programming
of human mesolimbic
dopaminergic function**

H: Schaechinger H.
Wilhelm F., Blumenthal T.

**Prospective and retro-
spective parental memory:
The accuracy of autobiogra-
phical memories of birth and
infancy behavior problems**

H: Schneider S.
Opwis K., Steinhausen H.-C.

**Social determinants of
family environments and
children's health**

H: Siegrist J.
Grob A.

**Triadic family functioning
in pregnancy and the first
3 months postpartum:
An integrated psychosomatic
approach to obstetrics and
infant development**

H: Stadlmayr W.
Bürgin D., Grob A., Favez N.,
Surbek D.

**Autonomic nervous system
activity assessed by spectral
analysis of fetal and infant
heart rate variability and its
relationship to psychosocial
development**

H: Wilhelm F.
Grossman P., Schächinger H.

Core Study

H: Margraf J.

Third Party Cooperation

(Data will be published in Guide2007)

Topics

Mental health is one of the society's most precious commodities. The rapid rise in emotional disorders (such as anxiety, depression, addiction or youth violence) is a growing cause for concern. According to WHO estimates, depression will be the second most important cause of premature death and health impairment by 2020.

sesam aims to uncover the complex factors that influence the development of

mental health and mental disorders over a person's lifetime. It will identify psychological, social, biological and genetic factors by means of behavioral observations, surveys, interviews and biological analyses. 3000 children will be studied, together with their parents and grandparents, beginning with pregnancy and ending in early adulthood. By integrating the research findings into prevention and treatment efforts, sesam will directly

contribute to better mental health promotion.

sesam deals with a highly sensitive area in terms of data protection and ethics. It will comply at all times with the strictest ethical and legal requirements. It will also request the necessary authorisation or approval from the authorities prior to embarking on any work. Like all other research projects, participation is voluntary and those involved may withdraw from the study at any time.

Meyer Urs, Prof.

Müller-Spahn Franz, Prof.

Opwis Klaus, Prof.

Papassotiropoulos Andreas, Prof.

Perrez Meinrad, Dr.

Pryce Christopher, Prof.

Rieger Margarethe, Dr.

Schächinger Hartmut, Prof.

Schneider Silvia, Prof.

Seifritz Erich, Prof.

Siegrist Johannes, Prof.

Stadlmayr Werner, Dr.

Steinhausen Hans-Christoph, Prof.

Surbek Daniel, Dr.

Wänke Michaela, Prof.

Wilhelm Frank, Dr.

Abteilung für Psychiatrische Forschung, Universität Zürich

Psychiatrische Universitätsklinik Basel

Institut für Psychologie, Universität Basel

Abteilung für Psychiatrische Forschung, Universität Zürich

Departement für Psychologie, Universität Fribourg

Verhaltensneurobiologie, ETH Zürich

Institut für Psychologie, Universität Basel

FBI – Psychobiologie, Universität Trier

Institut für Psychologie, Universität Basel

Universitätsklinik für Klinische Psychiatrie, Universität Bern

Institut für medizinische Soziologie, Heinrich Heine Universität

Düsseldorf, DE

Klinik und Poliklinik für Frauenheilkunde, Inselspital Bern

Zentrum für Kinder- und Jugendpsychiatrie, Universität Zürich

Frauenklinik Inselspital Bern

Institut für Psychologie, Universität Basel

Institut für Psychologie, Universität Basel

Members of the Advisory Board

Barr Ronald G., Prof.

B.C. Research Institute for Children's & Women's Health,

Centre for Community Child Health Research, Vancouver, CA

Diener Ed, Prof.

University of Illinois, US

Kraemer Helena C., Prof.

Department of Psychiatry and Behavioral Sciences,

Stanford University, US

Marmot Michel, Prof.

International Centre for Health and Society, Department of

Epidemiology and Public Health, University College London, GB

Meaney Michael, Prof.

Douglas Hospital Research Centre Montreal, Quebec, CA

Moffitt Terrie, Prof.

Institute of Psychiatry, Social, Genetic & Developmental

Research Center, London, GB

Rapee Ronald M., Prof.

Department of Psychology, Macquarie University, Sydney, AU

Wadhwa Pathik D., Prof.

Departments of Psychiatry and Human Behavior and Obstetrics &

Gynecology, University of California, Irvine, College of Medicine, US

Swiss Etiological Study of Adjustment and Mental Health NCCR SESAM

Statistical Input – Output Data

Funding source (CHF)	Year 1	Year 2	Year 3	Year 4	Total	%
SNSF funding	2 480 000	2 480 000	2 600 000	2 640 000	10 200 000	43
Self-funding from home institution ¹	2 210 306	2 363 108	2 395 035	2 256 551	9 225 000	39
Self-funding from project participants	950 647	946 397	1 136 496	1 136 497	4 170 037	18
Third-party funding	0	0	0	0	0	0
Total	5 640 953	5 789 505	6 131 531	6 033 048	23 595 037	100

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

Personnel

(Data will be published in Guide2007)

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

Members of the Review Panel

Levy René, Prof. (Chair)
Blane David, Prof.

Swiss National Science Foundation, Berne, CH
Department of Primary Care and Social Medicine,
Imperial College London, GB

DeLoache Judy S., Prof.
Eisenberg Nancy, Prof.
Esser Günter, Prof.

Department of Psychology, University of Virginia, US
Department of Psychology, Arizona State University, US
Institut für Psychologie, Universität Potsdam, DE

Kléber André, Prof.
Maier Wolfgang, Prof.

Swiss National Science Foundation, Berne, CH
Klinik und Poliklinik für Psychiatrie und Psychotherapie,
Universitätsklinikum Bonn, DE

Merkiangas Kathleen, Prof.

Section on Developmental Genetic Epidemiology,
National Institute of Mental Health, Bethesda, US
Institut für Psychologie, Universität Würzburg, DE

Pauli Paul, Prof.
Perrig-Chiello Pasqualina, Prof.
Rutter Michael Sir, Prof.

Swiss National Science Foundation, Berne, CH
Social, Genetic and Developmental Psychiatry Centre,
Institute of Psychology, London, GB

Visser Gerard H.A., Prof.

Department of Perinatology, University Medical Centre,
Utrecht, NL

NCCR Office SNSF

Christ Urs, Dr.

Schweiz. Nationalfonds, Wildhainweg 3, 3001 Bern,
phone: + 41 (0)31 308 23 50, fax: + 41 (0)31 305 29 71,
uchrist@snf.ch

Affective Sciences: Emotion in Individual Behaviour and Social Processes

NCCR Affective Sciences

Home Institution

University of Geneva

Start of the NCCR

September 1, 2005

NCCR Management

Director

Scherer Klaus R., Prof.
phone: + 41 (0)22 379 92 11
Klaus.Scherer@pse.unige.ch

Deputy Directors

van der Linden Martial, Prof.
phone: + 41 (0)22 379 93 41
Martial.VanDerLinden@pse.unige.ch

Mulligan Kevin, Prof.
phone: + 41 (0)22 379 70 51
Kevin.Mulligan@lettres.unige.ch

Scientific Coordinator

Sander David, Dr.
phone: + 41 (0)22 379 92 12
David.Sander@pse.unige.ch

Administrative Manager

Mouron Blandine, Mrs.
phone: + 41 (0)22 379 98 04
Blandine.Mouron@pse.unige.ch

Administrative Assistants

Martorell Patricia, Mrs.
phone: + 41 (0)22 379 98 01

Patricia.Martorell@pse.unige.ch
Staepli Sylvie, Ms.
phone: + 41 (0)22 379 98 01
Sylvie.Staepli@pse.unige.ch

Education and Training

Sander David, Dr.
phone: + 41 (0)22 379 92 12
David.Sander@pse.unige.ch

Advancement of Women

Kaiser Susanne, Prof.
phone: + 41 (0)22 379 92 16
Susanne.Kaiser@pse.unige.ch

Schmid Mast Marianne, Prof.
phone: + 41 (0) 26 300 76 20
m.schmidmast@psychologie.unizh.ch

Computer and Internet Resources

Grandjean Didier, Dr.
phone: + 41 (0)22 379 92 13
Didier.Grandjean@pse.unige.ch

Sanchez Yvan, Mr.
Yvan.Sanchez@pse.unige.ch

Communications Officer

N.N.
*Knowledge and
Technology Transfer*
N.N.

Research

Area “Emotion Elicitation and Perception”

Appraisal and motivational processes in the elicitation of emotion

Heads: Scherer K.R., Gendolla G.

Response patterning

H: Scherer K.R., Kaiser S.

Neural architecture of emotion perception and affect-related cognition

H: Vuilleumier P., Landis T.

Area “Emotion Regulation”

Individual and social regulation of emotions in the family

H: Perrez M., Reicherts M.

Work and emotions: issues of stress and social interactions and their relationship to well-being, health, and productivity

H: Semmer N.K., Tschan F.

Emotion regulation, impulsivity, and executive functions

H: van der Linden M.

Area “Social Functions of Emotion”

Emotional foundations of norm compliance and norm enforcement

H: Fehr E.

Emotions, values, and norms

H: Mulligan K.

The importance of emotions in social and legal regulation

H: Flückiger A., Robert C.-N., Roth R.

Myths and rites as cultural expression of emotion

H: Borgeaud P.

Transversal Modules

Pro- and Antisocial Affect and Behaviour

H: Fehr E., Perrez M., Killias M.

Life Span Development and Transitions

H: Labouvie-Vief G.

The Nature and Consequences of Gender Differences

H: Kaiser S., Schmid Mast M.

Methodological Development

H: Eid M., Renaud O.

Programmes

Graduate School

Post-Doc Program

Workshops

Colloquium

Summer/Autumn Academies

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Lab Rotation

Invited Professorships

Heads of Individual Research Projects

Borgeaud Philippe, Prof.
Eid Michael, Prof.

Fehr Ernst, Prof.
Flückiger Alexandre, Prof.
Gendolla Guido, Prof.
Kaiser Susanne, Prof.
Killias Martin, Prof.
Labouvie-Vief Gisela, Prof.
Landis Theodor, Prof.

Mulligan Kevin, Prof.

Nils-Robert Christian, Prof.
Perrez Meinrad, Prof.
Reicherts Michael, Prof.
Renaud Olivier, Dr.
Roth Robert, Prof.
Scherer Klaus, Prof.
Schmid Mast Marianne, Prof.
Semmer Norbert, Prof.
Tschan Franziska, Prof.

van der Linden Martial, Prof.
Vuilleumier Patrik, Prof.

Faculté des Lettres, Université de Genève
Faculté de Psychologie et des Sciences de l'Education (FPSE),
Université de Genève
Institut für Empirische Wirtschaftsforschung, Universität Zürich
Faculté de Droit/Cetel, Université de Genève
FPSE, Université de Genève
FPSE, Université de Genève
Faculté de Droit, Université de Lausanne
FPSE, Université de Genève
Département des Neurosciences Cliniques et Dermatologie,
Hôpitaux Universitaires de Genève
Faculté des Lettres/Département de Philosophie,
Université de Genève
Département de Droit Pénal, Université de Genève
Departement für Psychologie, Universität Freiburg
Departement für Psychologie, Universität Freiburg
FPSE, Université de Genève
Faculté de Droit, Université de Genève
FPSE, Université de Genève
Département de Psychologie, Université de Fribourg
Institut für Psychologie, Universität Bern
Institut de Psychologie du Travail et des Organisations,
Université de Neuchâtel
FPSE, Université de Genève
Faculté de Médecine, Centre Médical Universitaire, Genève

Affective Sciences: Emotion in Individual Behaviour and Social Processes NCCR Affective Sciences

Address

NCCR Affective Sciences
CISA Centre Interfacultaire en
Sciences Affectives
Université de Genève
7, rue des Batoirs
1205 Genève

phone: + 41 (0)22 379 98 00
fax: + 41 (0)22 379 98 44

Web Address

www.affective-sciences.org
www.sciences-affectives.ch

Public Relations

- Newsletter
- Inauguration
- Presentation at the Reopening of the Swiss Institute in Rome
- Presentation Swiss House
- Newsletter
- Website
- Participation in radio and TV programs
- Newspaper and magazine interviews

Third Party Cooperation

(Data will be published in Guide2007)

Topics

In the context of the ongoing "affective revolution" in many different disciplines, this inter-disciplinary centre studies emotions from many different perspectives and on several levels of analysis. Research topics include 1) Emotion elicitation and response patterning (e.g., the role of brain structures, individual predispositions, cognitive appraisal, and situational factors; patterning of emotional responses; and action tendencies; communica-

tion of emotion); 2) Emotion regulation (e.g., control of bodily reactions and feelings by social norms and interpersonal expectations; ability to cope with emotions to avoid stress and burn-out; loss of control as risk factors for affective disorders such as pathological anxiety and depression); 3) Emotion in social processes (e.g., affective processes in family, workplace, and society as a whole; the role of social norms and values in

shaping the nature of the emotional response and its control; the role of religion and myths in ethnic conflicts; the socializing function of shame; the effect of economic and socio-political changes on affective experiences and well-being). Special emphasis is placed on the use of scientific findings to address social problems related to violence and health, as well as training the first generation of Affective Scientists.

Members of the Advisory Board

Nominations in progress

Statistical Input – Output Data

Funding source (CHF)	Year 1	Year 2	Year 3	Year 4	Total	%
SNSF funding	2 400 000	2 600 000	2 500 000	2 500 000	10 000 000	48
Self-funding from home institution ¹	562 500	562 500	562 500	562 500	2 250 000	11
Self-funding from project participants	2 240 137	2 233 210	2 033 635	2 018 794	8 525 776	41
Third-party funding	0	0	0	0	0	0
Total	5 202 637	5 395 710	5 096 135	5 081 294	20 775 776	100

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

Personnel

(Data will be published in Guide2007)

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

Members of the Review Panel

Linder Wolf, Prof. (Chair)

Clark Margaret, Prof.

Ellsworth Phoebe, Prof.

Lerner Jennifer, Prof.

Levy René, Prof.

Lyons William, Prof.

Phelps Elisabeth A., Prof.

Reusser Kurt, Prof.

Ricci Bitti Pio Enrico, Prof.

Rüpke Jörg, Prof.

Thoits Peggy A., Prof.

Swiss National Science Foundation, Berne, CH

Department of Psychology, Yale University, US

Department of Psychology, University of Michigan, US

Department of Psychology, Carnegie Mellon University, US

Swiss National Science Foundation, Berne, CH

Department of Philosophy, Trinity College, IR

Department of Psychology, New York University, US

Swiss National Science Foundation, Berne, CH

Dipartimento di Psicologia, Università di Bologna, IT

Professur für Vergleichende Religionswissenschaft, Universität Erfurt, DE

Department of Sociology, University of North Carolina, US

NCCR Office SNSF

Griessen Thomas

Schweiz. Nationalfonds, Wildhainweg 3, 3001 Bern,
phone: + 41 (0)31 308 23 51, fax: + 41 (0)31 305 29 71,
tgriessen@snf.ch