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Hochschulmedizin Zürich

Who is Who in Medical Research

A compendium of Hochschulmedizin Zurich

1st edition (2017)

Foreword

“The world is too complicated to understand all at once, and we make progress by discovering which complications to ignore” (Geoffrey T. Evans, 1988).

One of the complications is the very dense network that can only be searched on individual webpages. Do you know that there are more than 400 professors performing research in the medical field in Zurich? Have you ever been looking for a local research partner with a very specific expertise? Despite all the information available on the web, it is sometimes still difficult to find the ideal research partner who is not only an expert in a specific field, but also willing for collaboration. In many discussions and workshops, we realized that collaboration is limited because one does not know the colleagues in Zurich well enough, especially across disciplines.

This first edition of a “Who-is-who Compendium” of Hochschulmedizin Zürich (University Medicine Zurich) compiles all the information of nearly 200 research groups at the level of professorships relevant for collaboration in the medical field. The spectrum ranges from basic natural scientists and engineers up to physicians performing clinical research. We hope that this compendium will help you identifying the right contact persons for your current and future research questions.

We would like to thank all groups included in this first edition of the compendium for their contribution. If you are not yet part, we are looking forward to include you in the second edition upon your request. It will be our goal to extend the first edition to a comprehensive Who-is-who Compendium including all groups relevant for medical research in near future.

Prof. Detlef Günther

Chair HMZ
Vice President Research and Corporate Relations
ETH Zurich

Prof. Christoph Hock

Vice Chair HMZ
Vice President for Medicine
University of Zurich

«Hochschulmedizin Zürich» at a Glance

The academic and clinical setting in Zurich offers expertise in a wide range of (bio-)medical and technical disciplines and therefore embraces a unique potential of innovative, interdisciplinary, translational research. «Hochschulmedizin Zürich» (HMZ, in English «University Medicine Zurich») thereby serves as a platform to promote collaboration between its partner institutions, the University of Zurich, ETH Zurich, and the associated University's hospitals. The partner institutions strive to reach highest scientific quality in the field of university medicine and within the scope of this collaboration aim to ensure and extend the internationally well-known reputation as medical hub.

HMZ is the umbrella of several joint centers and networks (Neuroscience Center Zurich, EXCITE Zurich, Competence Center for Personalized Medicine, Cancer Network Zurich, Node Infection & Immunity Zurich, Network Regenerative Medicine, Drug Discovery Network Zurich).

HMZ serves as a platform to kick-off new projects, to enhance existing collaborations and to define and develop new strategic focus projects at the intersection of basic medical research, life sciences, engineering, clinical research, and medical care. To specifically promote large interdisciplinary projects with national and international lighthouse character and break-through potential, HMZ supports so-called flagship projects with substantial seed money and further assistance. Our innovative research projects are of high medical importance and strategic relevance. By 2017, HMZ has four flagship projects (Zurich Heart, Zurich Exhalomics, SKINTEGRITY, SleepLoop).

HMZ has a broad network and is an effective point of contact for researchers looking for a certain expertise or research partner. It supports researchers in developing their ideas by organizing workshops, brainstorming meetings and pitching events. All these activities aim at bringing the over 400 research groups closer together and bundling the scientific excellence in Zurich.

Research Groups

Aebersold, Rudolf
Aguzzi, Adriano
Altmeyer, Matthias F.
Basler, Konrad
Baudis, Michael
Baumann, Christian
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Bollwein, Heinrich
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Buhmann, Joachim
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Distler, Oliver
Dittrich, Petra
Dommann, Alex
Dressel, Holger
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Eliades, Theodore
Ewald, Collin
Farshad, Mazda
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Fontana, Adriano
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Gämperli, Oliver
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Gassert, Roger
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Günthard, Huldrych
Halin Winter, Cornelia
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Hämmerle, Christoph H.F.
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Hierold, Christofer
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Huang, Qiuting
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Mansuy, Isabelle
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Rudin, Markus
Rühli, Frank J.
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Schertler, Gebhard
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Sennhauser, Felix Hans
Senti, Gabriela
Snedeker, Jess Gerrit
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Tuncay, Baubec

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von Eckardstein, Arnold
von Rechenberg, Brigitte

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Wenderoth, Nicole
Werner, Sabine
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Impressum

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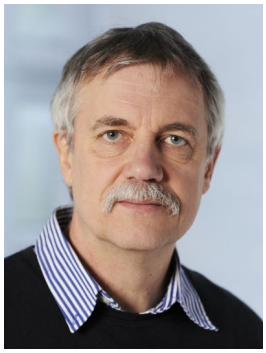
Prof. Dr. Rudolf Aebersold



Professorship: Molecular Systems Biology

Academic affiliation: ETH Zurich / University of Zurich

Department/faculty: Department of Biology

Clinical affiliation: none

Area of research

Biochemistry; Chemistry/Analytics; Diagnostics; Oncology; Personalized Medicine; Proteomics/Transcriptomics, ...-omics; Statistics; Systems Biology

Description of research

The work in our group is focused on the proteome, the ensemble of proteins expressed by a cell or tissue. We view the proteome as kind of a Rosetta stone that connects the effects of genotypic variation and environmental effects to (disease) phenotypes.

The efforts of the group are directed at the development of fast, accurate and quantitative mass spectrometric methods to determine the composition and organization of the proteome and the application of these methods to basic biology and clinical research.

Platforms and associated services / shareable equipment & infrastructure / databases

- Mass spectrometers
- Unique software suites for the analysis of protoemic data
- A range of protein separation tools

Special expertise

- Mass spectrometry
- Proteome profiling, PTM profiling
- Protein-protein cross linking; protein-RNA cross linking
- Computational trans omics data integration
- Computational/statistical methods for large-scale data analysis

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Cancer maps

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Prof. Dr. med. Dr. sc. h.c. Adriano Aguzzi

Professorship: Neuropathology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Aging; Biotechnology; Diagnostics; Imaging; Immunology; Molecular Biology; Neuro Sciences; Pathology; Personalized Medicine

Description of research

Prof. Adriano Aguzzi has devoted the past 23 years to studying the immunological and molecular basis of prion pathogenesis. Combining transgenetics with molecular and immunological techniques, he has aimed to identify cells and molecules involved in prion neuroinvasion.

His discovery of pervasive colonization of the immune system by prions has convinced most of the world's governments to undertake efforts to limit the exposure of humans to prions derived from farm animals.

Furthermore, Prof. Aguzzi's discovery that chronic inflammation controls the organ tropism of prion diseases has crucially contributed to clarifying how scrapie transmits horizontally within sheep flocks.

The realization that prion excretion results from coincident inflammation and prion infection is paving the way to the eradication of prion diseases from ruminants.

Prof. Aguzzi's discovery that the removal of microglia accelerates prion disease has a fundamental impact on therapeutic strategies against aggregation proteinopathies such as Alzheimer's disease and Parkinson's disease.

Prof. Aguzzi's most recent work, published in Science Translational Medicine in 2015, has established the feasibility of structure-based drug design against prions. We predict that the latter work will find rapid and successful translation into clinical applications.

Platforms and associated services / shareable equipment & infrastructure / databases

- PCR Genotyping Service

Special expertise

- Prions

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- KFSP Small RNAs
- KFSP Human Hemato-Lymphatic Diseases (HHLD)

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Prof. Dr. Matthias F. Altmeyer

Professorship: SNF Professor of Genome Stability

Academic affiliation: University of Zurich

Department/faculty: Vetsuisse Faculty

Clinical affiliation: none

Area of research

Aging; Biochemistry; Epigenetics; Genetics; Imaging; Molecular Biology; Oncology; Pharmacology/Toxicology; Systems Biology

Description of research

Damage to our genetic material can lead to dysfunctional gene products, which in turn can greatly affect cell function and cause disease. Cancer is most prominently associated with increased mutational loads and many tumors show signs of genome instability. To reduce the risk of mutations, our cells have developed sophisticated mechanisms to minimize DNA damage and repair genetic lesions efficiently when they occur. Many of these mechanisms are subverted in cancer, indicating that they provide a natural barrier for cancer development. On the other hand, the deregulation of cellular genome caretaker functions in cancer may constitute cancer-specific vulnerabilities that can be exploited by precision medicine. Our research aims at elucidating cellular mechanisms of genome integrity maintenance. Specifically, we investigate how different chromatin states affect DNA repair reactions, and how the DNA repair machinery itself uses spatially and temporally confined chromatin modifications to safeguard genome integrity. To achieve our aims we employ advanced cell imaging techniques, in particular time-resolved microscopy of chromatin dynamics in response to DNA breakage, and multivariate automated high-content imaging of cell populations exposed to irradiation and chemotherapeutics. By combining our tailored cell imaging setup with targeted perturbations of cell functions through chemical and reverse genetics we aim at identifying and characterizing hitherto unknown genome caretakers.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Cell cycle resolved high-content fluorescence microscopy
- RNAi screening
- Immunofluorescence

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Prof. Dr. Konrad Basler

Professorship: Molecular Biology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Science
Clinical affiliation: none

Area of research

Development/Developmental Biology; Genetics; Molecular Biology

Description of research

My lab has a long-standing interest in signalling pathways (e.g. Wnt signalling) and we would like to apply new concepts and reagents in clinically relevant tumor models.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

• URPP Translational Cancer Reserach

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Prof. Dr. med. Michael Baudis

Professorship: Bioinformatics

Academic affiliation: University of Zurich

Department/faculty: Faculty of Science

Clinical affiliation: none

Area of research

(Bio-)Informatics; Diagnostics; Genetics; Hematology; Modelling/Computation; Molecular Biology; Neuro Sciences; Oncology; Pediatrics; Personalized Medicine; Systems Biology

Description of research

My main research interests are connected to mutation patterns in cancer. The work of my group focusses on the mining of genomic variation data in cancer, and the development of data structures, resources and utilities for the exchange and analysis of genome data for research and medical applications.
Part of our work is in the curation of cancer genome reference resources, with emphasis on structural variations. Our Progenetix and arrayMap online repositories are internationally among the largest, freely accessible cancer genome profiling databases. Our annotated cancer publication database facilitates access to original data, but also aides in the design of future studies by highlighting gaps and biases in the research landscape.
Through the expertise in data curation, genome analyses and data visualisation, my group is involved in a variety of disease-specific collaborative studies, for instance in aggressive childhood brain tumors, neuroblastomas and hematologic neoplasias.
As a member of the Global Alliance for Genomics and Health (GA4GH), I am involved in guiding the development of future standards for genome data storage, annotation and exchange, and in implementing federated access to genome resources through the "Beacon" protocol.
In a Swiss context, I am interested in shaping research in bioinformatics (e.g. through SIB) and personalised medicine (e.g. through SPHN), as well as the public discourse about risks and opportunities of genome data sharing (e.g. DSI).

Platforms and associated services / shareable equipment & infrastructure / databases

- arraymap.org
- progenetix.org
- github.com/progenetix/

Special expertise

- Genome variation
- Cancer genome profiling
- Copy number variation
- Bioinformatics

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Prof. Dr. med. Christian Baumann

Professorship: Neurology

Academic affiliation: University of Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: University Hospital Zurich

Area of research

Movement Sciences; Neuro Sciences; Personalized Medicine; Sleep; Systems Biology

Description of research

Examining the role of sleep and other electrophysiological signaling patterns in the pathophysiology of disorders and vice versa, and modeling sleep for therapeutic and preventive purposes. More specifically, we (1) aim at modulating sleep both pharmacologically and non-pharmacologically for preventing and treating acute and chronic brain disorders, for enhancing performance, and for improving quality of life. In addition, we (2) record intracerebral brain activity and correlate signaling patterns to specific behaviors, for future implementation of adaptive closed-loop brain activity modulation strategies.

Platforms and associated services / shareable equipment & infrastructure / databases

- Clinical department.
- Animal facility (rodents).
- Systems biology lab.

Special expertise

- Clinical studies along GCP guidelines.
- Basic human behavioral and electrophysiological studies.
- Sleep intervention studies (animals/humans).
- Histological and imaging studies (animals).

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- SleepLoop (Chair)
- Neuroscience Center Zurich (ZNZ)

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URL:

Prof. Dr. med. Matthias Baumgartner

Professorship: Metabolic diseases
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Children's Hospital Zurich

Area of research

Biochemistry; Diagnostics; Genetics; Metabolism; Pediatrics; Personalized Medicine

Description of research

Matthias Baumgartner is a physician-scientist with a recognized expertise in inborn errors of metabolism. Research focus on disorders of intracellular cobalamin (vitamin B12) metabolism including the methylmalonic acidurias, homocystinurias and remethylation disorders. Together with his team, identification of several of the genes involved in these pathways and elucidation of intracellular trafficking of cobalamin.
Main techniques in the lab include enzymology, molecular genetics, bacterial and eukaryotic expression systems, cellular and animal models of disease (primary cultures from patients, genetically modified cell lines, mouse models), mass spectrometry based metabolite detection & metabolomics.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Largest metabolic centre in Switzerland providing care to patients with inborn errors of metabolism
- Research focus on urea cycle disorders and organic acidurias (intoxication type metabolic diseases)
- Research Focus on homocystinurias and remethylation disorders
- Long lasting experience with gene therapy of inborn errors in animal models (Prof. Thöny)

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Founding and steering committee member of the European networks and registries for Homocystinurias and remethylation disorders (E-HOD, www.e-hod.org) and Intoxication type Metabolic Diseases (E-IMD, www.e-imd.org)

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Prof. Dr. Burkhard Becher

Professorship: Experimental Immunology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: none

Area of research

Aging; Hematology; Immunology; Neuro Sciences; Oncology; Pathology

Description of research

Inflammation Research: From an evolutionary perspective, the complex mammalian immune system developed to combat microbial threats. The flip side of this protective system is however that aberrant and deregulated immune responses can lead to immune-mediated pathologies as seen in chronic inflammatory or autoimmune diseases.

Fundamentally, deregulated communication between immune cells is the reason for unwanted immune responses. For the complex immune system to work, the individual cell types have not only specialized functions, but also a complex communication network. Cytokines are soluble factors with the capacity to serve as signals for the communication (or words in the complex language) between immune cells. Our goal is to uncover this communication network and to translate the language of the immune system.
Our research aims to understand the development of tissue-specific inflammation in particular in the context of interactions of the nervous system with the immune system.
Related to our studies of autoimmunity (an undesired process) we expanded our interest to apply our tool-set and expertise to study the impact of immunity to combat cancer (a desired process).

Our main research interests can be categorized as such:

Cytokine networks in chronic inflammatory disease with a focus on in vivo modeling of multiple sclerosis, psoriasis, graft-versus host disease
Immune tolerance and lymphoid development
Cancer-immunotherapy

Platforms and associated services / shareable equipment & infrastructure / databases

- Flow Cytometry Core Facility
- Mass Cytometry Core Facility

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- URPP: Translational Cancer Research

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Prof. Dr. med. Beatrice Beck Schimmer

Professorship: Anesthesiology

Academic affiliation: University of Zurich / ETH Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: University Hospital Zurich

Area of research

Anesthesiology/ Intensive Care; Immunology; Molecular Biology; Nanotechnology; Physiology; Respiratory Tract; Surgery; Tissue Engineering/Biointerfaces

Description of research

Immunmodulation with volatile anesthetics (basic, translational and clinical studies): Exploration of the anti-inflammatory role of such anesthetics in various injuries (ischemia-reperfusion, severe inflammation such as sepsis, etc.).

Nanomedicine: Use of magnetic nanoparticles to target blood substances to remove them (naturally occurring proteins or metals, drugs, toxins, etc.) as well as blood cells (lymphocytes, circulating tumor cells)

Hypoxia and liver regeneration: After discovering hypoxia as a trigger for rapid liver regeneration detailed elucidation of oxygen-sensing pathways.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Prof. Dr. Niko Beerenwinkel

Professorship:	Computational Biology
Academic affiliation:	ETH Zurich
Department/faculty:	Department of Biosystems Science and Engineering
Clinical affiliation:	none

Area of research

(Bio-)Informatics; Microbiology/Infectiology; Modelling/Computation; Oncology; Personalized Medicine; Statistics; Systems Biology

Description of research

We develop statistical models and computational methods for the analysis and design of biosystems. Our goal is to support the rational design of medical interventions based on large-scale molecular profiling data. To achieve this goal, we develop models and algorithms for the statistical analysis of high-throughput sequencing data, we analyze biological networks and predict the effect of perturbations, and we design evolutionary models of rapidly adapting disease-causing agents. We are engaged in several personalized medicine efforts, particularly in oncology and virology. A recent major focus in both application domains is the analysis of single-cell data. In computational oncology, we develop methods for the reconstruction of the evolutionary history of tumors from single-cell sequencing data. In computational virology, we analyze single-cell transcriptomes of infected cells to understand viral latency and reactivation, and to optimize antiviral treatment

Platforms and associated services / shareable equipment & infrastructure / databases

- Cancer NGS data analysis pipeline (https://github.com/cbg-ethz/NGS-pipe)
- Viral NGS data analysis pipeline (https://github.com/cbg-ethz/V-pipe)

Special expertise

- Statistical modeling
- Evolutionary modeling
- Networks and perturbations

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Competence Center Personalized Medicine
- M3C3.CH

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Prof. Dr. Wolfgang Berger

Professorship:	Medical Molecular Genetics and Gene Diagnostics
Academic affiliation:	University of Zurich
Department/faculty:	Faculty of Medicine
Clinical affiliation:	none

Area of research

(Bio-)Informatics; Cardiovascular Sciences; Development/Developmental Biology; Diagnostics; Gene/Cell therapy; Genetics; Molecular Biology; Neuro Sciences; Personalized Medicine; Physiology

Description of research

Goals:
Identification of new genes and mutations in human diseases
Characterization of gene function in normal physiology and disease
Functional analyses of mutations at the molecular level
Development of therapeutic treatment approaches for genetic diseases

Platforms and associated services / shareable equipment & infrastructure / databases

- Next Generation Sequencing (Illumina, MiSeq & NextSeq 500)

Special expertise

- Genetic basis of human diseases (monogenic and complex)

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Neuroscience Center Zurich (ZNZ)
- Zurich Center for Integrative Human Physiology (ZIHP)

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Prof. Dr. med. DrPH Heike A. Bischoff-Ferrari

Professorship: Geriatrics and Aging Research

Academic affiliation: University of Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: USZ and Stadtspital Waid

Area of research

Aging; Behavioral science/Mental Health; Cardiovascular Sciences; Digestive System/ Nutrition; Endocrinology; Movement Sciences; Multimorbidity; Musculoskeletal Sciences; Neuro Sciences; Personalized Medicine; Rehabilitation; Statistics

Description of research

At the Centre on Aging and Mobility, we design, implement and analyze large-scale clinical trials on strategies that help senior adults stay healthy and active longer. One focus is DO-HEALTH, the largest European Study on Healthy Aging.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Healthy Aging
- Frailty Sarcopenia
- Osteoporosis
- Public Health
- Nutrition

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Coordinator and PI DO-HEALTH
- Centre on Aging and Mobility

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Prof. Dr. med. Stephan Bodis

Professorship: Molecular Radiation Oncology

Academic affiliation: University of Zurich / ETH Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: University Hospital Zurich

Area of research

Design/Construction; Electrical Engineering; Genitourinary System; Mechanical Engineering; Modelling/Computation; Molecular Biology; Oncology; Pain

Description of research

Radiation Oncology
Radiation Biology
Radiation Oncology and Hyperthermia (in cooperation with ETH, Zurich / IT'IS Zurich)

Platforms and associated services / shareable equipment & infrastructure / databases

- Oncologic Hyperthermia clinical studies
- Oncologic Hyperthermia Equipment Research (in cooperation with ETH, Zurich / IT'IS Zurich)

Special expertise

- Oncologic Hyperthermia
- Interdisciplinary Oncology

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Swiss Hyperthermia Network
- Swiss Hyperthermia Research Network

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Prof. Dr. Heinrich Bollwein

Professorship:	Reproductive Medicine
Academic affiliation:	University of Zurich
Department/faculty:	Vetsuisse Faculty
Clinical affiliation:	Clinic of Reproductive Medicine/Departement for Farm Animals/Vetsuisse Faculty Zurich

Area of research

Veterinary Medicine

Description of research

Reproductive medicine in domestic animals
Effect of stress on gametes and embryos with special regard on epigenetics
Embryo-maternal communication during early pergnancy
Biomarkers for male and female subfertility

Platforms and associated services / shareable equipment & infrastructure / databases

- Sperm Lab
- IVF Lab
- Lab for chromosome analysis
- Transcriptomics

Special expertise

- Flow cytometry/CASA of sperm
- IVF/ICSI/Ovum pickup
- Doppler sonography of the genital tract
- 3D/4D sonography of the fetus and the genital tract

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Prof. Dr. med. vet. Nicole Borel

Professorship: Assistant Professor for Infection Pathology

Academic affiliation: University of Zurich

Department/faculty: Vetsuisse Faculty

Clinical affiliation: Department of Pathobiology, Vetsuisse Faculty

Area of research

Diagnostics; Microbiology/Infectiology; Pathology; Veterinary Medicine

Description of research

The main research focus of my group is on chlamydial diseases in humans and animals. We investigate host-pathogen interactions, pathogenesis, mixed infection models and potential therapeutic strategies. In addition, we provide pathology for clinical studies.

Platforms and associated services / shareable equipment & infrastructure / databases

- Arraymate Microarray
- Tissue Microarray

Special expertise

- Infectious Diseases
- Animal models
- Pathology

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Institute of Veterinary Pathology
Winterthurertrasse 268
8057 Zürich

E-mail: n.borel@access.uzh.ch

URL: http://www.vetpathology.uzh.ch/de.html

Prof. Dr. med. Onur Boyman

Professorship: Clinical Immunology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Immunology; Oncology; Personalized Medicine; Skin

Description of research

We are interested in the function of cytokines in the immune system during health and disease. We study how cytokines coordinate immune homeostasis and responses, and how they stimulate various immune cells in vitro and in different models of cancer, inflammatory and autoimmune disease, as well as allograft rejection. To this end, we generate and characterize natural versus modified cytokine formulations, including cytokine-antibody complexes, in order to better understand cytokine biology and improve cytokine-directed immunotherapy.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Cytokine biology
- Immunotherapy
- Tumor models
- Inflammation models
- Transplantation models

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- SleepLoop
- Network Infection and Immunity Zurich
- HSM-2 Immunology

Address: University Hospital Zurich
Department of Immunology
Gloriastrasse 23
8091 Zürich
E-mail: onur.boyman@usz.ch
URL: http://www.boymanlab.com/

Prof. Dr. Steven A. Brown

Professorship: Chronobiology and Sleep Research
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: none

Area of research

Biochemistry; Epigenetics; Genetics; Metabolism; Molecular Biology; Neuro Sciences; Proteomics/Transcriptomics, ...-omics; Sleep; Systems Biology

Description of research

We sleep because it is nighttime, and because we are tired. Traces of these two mechanisms, one circadian and one homeostatic, can be found in most cells of the brain and body. Our laboratory takes various approaches to understanding this problem, including biochemical techniques such as synaptic transcriptomics, as well as circuit-based methods like optogenetics and unit activity recordings in mouse models. Together with our colleagues at HMZ, we have also pioneered the application of metabolomics to the study of chronobiology.

Platforms and associated services / shareable equipment & infrastructure / databases

- High-throughput cellular circadian function platform
- Rodent and human sleep facility

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Zurich Exhalomics

Address: University of Zurich
Institute of Pharmacology and Toxicology
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8057 Zürich
E-mail: steven.brown@pharma.uzh.ch
URL: www.sbrownlab.com

Prof. Dr. Thorsten Buch

Professorship: Laboratory Animal Science
Academic affiliation: University of Zurich
Department/faculty: Vetsuisse Faculty
Clinical affiliation: none

Area of research

Bioengineering; Diagnostics; Ethics; Genetics; Immunology; Microbiology/Infectiology; Modelling/Computation; Molecular Biology; Neuro Sciences; Oncology; Veterinary Medicine

Description of research

We investigate the multi-layered tolerance system that prohibits autoimmunity and allergy. We study how thymic tolerance is achieved and how tolerance is broken in the periphery. We also investigate how the latter can be used to treat cancer. While the general concept of thymic tolerance is clear, it is not understood what gives autoreactive thymocytes the ability to commit suicide. We have generated a mouse model in which we can follow a cohort of cells through development. This allows direct comparison of cells in different selecting and non-selecting environments. In another approach we use the CRISPR/Cas9 technology to screen for and identify relevant genes. The same technology is applied to confirm the in vitro results in vivo by rapid generation of gene-modified animals in our facility. To study the underlying causes of tolerance breakdown we use mouse models of multiple sclerosis and allergic asthma. Currently we investigate the role of pattern recognition receptors such as the TLR system and specific alarmins by breeding together multiple deficiencies or even create them through CRISPR/Cas9 when the genes are clustered on one chromosome. While in autoimmunity and allergy the breakdown of tolerance constitutes a pathological process, such a breakdown can be hijacked for the use in cancer therapy (cancer vaccination, checkpoint inhibitors). We investigate improved biologicals for glioma therapy.

Platforms and associated services / shareable equipment & infrastructure / databases

- Transgenic technologies for the mouse
- Reproductive technologies for the mouse
- Protocols in animal experimentation
- swiss3Rnetwork.org
- Animatch

Special expertise

- Gene modification in the mouse
- Animal experiments and experimental design
- T cell tolerance
- Multiple Sclerosis and Experimental Autoimmune Encephalomyelitis
- Animal Ethics

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University of Zurich
Institute of Laboratory Animal Science
Wagistrasse 12
8952 Schlieren
E-mail: thorsten.buch@uzh.ch
URL: www.ltk.uzh.ch

Prof. Dr. Joachim Buhmann

Professorship: Information Science and Engineering
Academic affiliation: ETH Zurich
Department/faculty: Department of Computer Science
Clinical affiliation: ETH Zürich

Area of research

(Bio-)Informatics; Ethics; Imaging; Law; Modelling/Computation; Statistics

Description of research

Joachim Buhmann's research interests range from statistical learning theory to applications of machine learning and artificial intelligence in the life sciences. Research projects are focused on topics in neuroscience, biology and medical sciences, as well as signal processing and computer vision.
The group currently collaborates with clinicians in computational cardiology and computational neurology, e.g., cortex parcellation and fMRI data analysis.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Zurich Exhalomics
- SignalX

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8092 Zürich
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URL: http://www.ise.inf.ethz.ch/

Prof. Dr. Amedeo Caflisch

Professorship: Computational Structural Biology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: none

Area of research

Biochemistry; Epigenetics; Modelling/Computation; Structural Biology

Description of research

Computer-aided drug design, computational structural biology. In-house software and simulation protocols have been established for drug-design, in particular for fragment-based high- and medium-throughput docking and de-novo design, as well as for the decomposition and identification of molecules. Major related scientific achievements include the design and characterization of small molecules that inhibit aggregation of the Alzheimer's A-beta peptide, and the discovery and validation of potent and selective human tyrosine kinase inhibitors, which are now investigated in animal models as potential anti-cancer drugs. On the experimental side, the group has deposited in the Protein Data Bank the X-ray crystal structures of the EphA3 kinase in complex with nine different inhibitors, and nearly 100 structures of bromodomains with fragments and inhibitors identified by the in house developed docking tools.

Platforms and associated services / shareable equipment & infrastructure / databases

- Compute cluster

Special expertise

- Docking
- Molecular dynamics
- Protein X-ray crystallography
- Medicinal chemistry

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Department of Biochemistry
Winterthurerstrasse 190
8057 Zürich
E-mail: caflisch@bioc.uzh.ch
URL: http://www.biochem-caflisch.uzh.ch/

Prof. Dr. Manfred Claassen

Professorship: Computational Biology

Academic affiliation: ETH Zurich

Department/faculty: Department of Biology

Clinical affiliation: none

Area of research

(Bio-)Informatics; Immunology; Modelling/Computation; Personalized Medicine; Proteomics/Transcriptomics, ...-omics; Statistics; Systems Biology

Description of research

Our research aims at elucidating the composition of heterogeneous cell populations and how these implement function in the context of cancer and immune biology by jointly evaluating single cell and genome wide measurements. The Claassen group builds on concepts from statistics, machine learning and mathematical optimization to develop probabilistic approaches to describe biological systems, learn these descriptions from data and to design experiments to validate hypotheses following from computational analyses.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: ETH Zurich
Institute of Molecular Systems Biology
Auguste-Piccard-Hof 1
8093 Zürich

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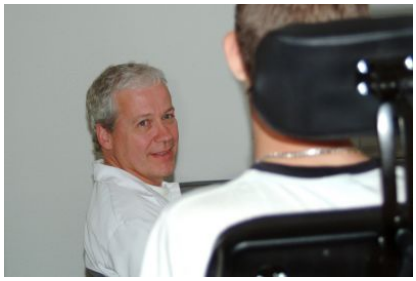
URL: http://www.imsb.ethz.ch/research/claassen/people/manfredclaassen.html

Prof. Dr. med. Armin Curt



Professorship: Paraplegiology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: Balgrist University Hospital

Area of research

Movement Sciences; Neuro Sciences; Rehabilitation

Description of research

The fesearch focus is about human spinal cord injury, rehabilitation and exploitation of neural plasticity, clinical trials, translational research.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Neurology
- Clinical neurophysiology

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Spinal Cord Injury Center
Forchstrasse 340
8008 Zürich
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URL: https://www.balgrist.ch/ueber-uns/klinik/curt-armin/

Prof. Dr. med. Michael Detmar

Professorship: Pharmacogenomics

Academic affiliation: ETH Zurich

Department/faculty: Department of Chemistry and Applied Biosciences

Clinical affiliation: none

Area of research

Epigenetics; Imaging; Lymphatic System; Oncology; Skin

Description of research

We investigate the role of the vascular system in chronic inflammatory diseases and in cancer progression. In particular, we develop new therapeutic approaches to activate the lymphatic vascular system for the treatment of chronic wounds and chronic inflammatory diseases, and we aim to understand how expansion of lymphatic vessels contributes to cancer progression, using a number of disease models. A further focus regards the quantitative in vivo imaging of vascular functions, including vascular permeability, fluid clearance from tissues including the skin and the brain, and pumping activity of peripheral lymphatic vessels. Recent studies address the epigenetic stromal cell memory in chronic inflammatory diseases including psoriasis.

Platforms and associated services / shareable equipment & infrastructure / databases

- Light sheet microscopy
- Laser capture microdissection

Special expertise

- In vivo imaging of vascular functions
- Models of cancer metastasis
- Inflammatory disease models (skin, gut)

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- SKINTEGRITY

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Vladimir-Prelog-Weg 3
8093 Zürich

E-mail: michael.detmar@pharma.ethz.ch

URL: http://www.pharmacogenomics.ethz.ch

Prof. Dr. med. Olivier Devuyst

Professorship: Physiology and Medicine

Academic affiliation: University of Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: Consultant in Nephrology, InselSpital Bern and CHUV Lausanne

Area of research

Biochemistry; Diagnostics; Gene/Cell therapy; Genetics; Genitourinary System; Molecular Biology; Personalized Medicine; Physiology; Proteomics/Transcriptomics, ...-omics

Description of research

Regulation of body fluid homeostasis is of vital importance for all terrestrial organisms. In most mammals, the maintenance of the hydration status and normal plasma electrolytes levels critically depends on the appropriate handling of water and ions by the kidneys. This essential function involves specific transport systems operating in the epithelial cells lining kidney tubules. In the past two decades, our understanding of the transport mechanisms across biological membranes has substantially improved with the molecular identification and structural characterization of key proteins (channels, transporters, or their regulators) that are expressed in the nephron. The discovery of these molecules, initiated by classical biochemical approaches, has benefited from the molecular genetics analysis of rare genetic diseases. The analysis of such diseases has provided essential informations about the mechanisms of water and solute handling by the nephron. In turn, these insights improved the diagnosis, follow-up and treatment of renal diseases and associated conditions such as dehydration, electrolyte disorders, hypertension, growth retardation, nephrolithiasis, and progressive renal failure.

Platforms and associated services / shareable equipment & infrastructure / databases

- Humanized mouse models of rare kidney diseases
- zebrafih models of renal tubular diseases
- Highly differentiated cell culture systems
- Human cohorts and biobanking: rare disorders, normal populations
- Platform for high-throughput biochemical analyses

Special expertise

- Investigations of renal function parameters
- Deep phenotyping of kidney disorders
- Microdisssection and primary epithelial cell culture systems
- Rare kidney disorders
- Population genetics

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Institute of Physiology, Mechanims of Inherited Kidney Disorders Group
Winterthurerstrasse 190
8057 Zürich

E-mail: olivier.devuyst@uzh.ch

URL: http://www.physiol.uzh.ch/research/institutegroups/grdevuyst.html

Prof. Dr. med. Oliver Distler

Professorship: Inflammatory Rheumatology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Bioengineering; Epigenetics; Imaging; Immunology; Molecular Biology; Musculoskeletal Sciences; Personalized Medicine; Respiratory Tract; Skin; Tissue Engineering/Biointerfaces

Description of research

Our clinical research focuses on the analysis of quality standards in clinical care, biomarkers for disease activity and the development of novel therapeutic strategies for the treatment of rheumatic diseases. Thereby, promising targeted therapies and innovative diagnostic approaches are critically evaluated including large-scale approaches in international consortia. We also contribute to optimized clinical trial design by taking advantage of international registries and initiatives. Examples for your clinical research include precision medicine to predict responses to therapeutic interventions in inflammatory rheumatic diseases, and proof of concept studies with novel targets therapies in rare diseases such as systemic sclerosis.
Our preclinical, translational research focuses on molecular biology and epigenetics in arthritis and systemic sclerosis. The research is conducted by six groups with the following foci: Epigenetics and fibroblasts, epigenetics and inflammation, skin tissue engineering and pain, inflammation, heart and systemic sclerosis, microbiome and systemic sclerosis. In this context, we have a variety of animal models for remolding and fibrosis available. Specific interests are, for example, molecular imaging, site specific regulation of epigenetic factors, trained immunity, role of Fra2 in Tregs and autoimmunity, long non-coding RNAs in systemic sclerosis, the role of bromodomain proteins in arthritis susceptibility and synovial biology.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Epigenetics
- Animal models
- Monocyte biology

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- SKINTEGRITY
- Sinergia molecular imaging

Address: University Hospital Zurich
Department of Rheumatology
Gloriastrasse 25
8091 Zürich
E-mail: oliver.distler@usz.ch
URL:

Prof. Dr. Petra Dittrich

Professorship: Bioanalytics

Academic affiliation: ETH Zurich

Department/faculty: Department of Biosystems Science and Engineering

Clinical affiliation: none

Area of research

(Bio-)Fluidics/Fluiddynamics; Biotechnology; Chemistry/Analytics; Control/Sensors/Actuators; Diagnostics; Imaging; Pharmacology/Toxicology

Description of research

We are developing a new generation of analytical instruments and methods for cell and membrane analysis using microsystems technology. We are designing, fabricating and optimizing microfluidic devices for diagnostic applications, e.g., detection of pathogens, isolation of exosomes, and for single-cell analysis.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Microfluidics
- Lab-on-Chip technology
- Fluorescence spectroscopy and related techniques

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: ETH Zurich
Department of Biosystems Science and Engineering
Mattenstrasse 26
4058 Basel

E-mail: petra.dittrich@bsse.ethz.ch

URL: www.dittrich.ethz.ch

Prof. Dr. Alex Dommann

Professorship: Adjunct Professor

Academic affiliation: Empa and University of Bern

Department/faculty: Materials meet Life and Institute for Surgical Technology and Biomechanics

Clinical affiliation: none

Area of research

Bioengineering; Biomechanics/Mechanobiology; Control/Sensors/Actuators; Imaging; Materials Sciences; Mechanical Engineering; Nanotechnology; Personalized Medicine; Rehabilitation; Tissue Engineering/Biointerfaces

Description of research

Development of new X-ray imaging techniques
Development of Small Angle X-ray techniques to characterize nanoparticles and self-assembled liposome structures
Development of thin films to control the surface functionalization
Studies on the calcification process for cardio vascular diseases
Studies on the interactions between nanofibers and cells
Studies on the interactions between nanoparticles and cells

Platforms and associated services / shareable equipment & infrastructure / databases

- X-ray center equipped with all tools to characterize thin films
- X-ray tomography facilities supporting imaging developments
- Small angle equipment's to study surface reactions and liposomes
- Computer node to support new imaging developments

Special expertise

- X-ray Imaging developments
- X-ray diffraction and scattering techniques to study surface interactions

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Zurich Heart

Address: Empa
Materials meet Life
Lerchenfeldstrasse 5
9014 St. Gallen

E-mail: alex.dommann@empa.ch

URL: https://www.empa.ch/web/empa/materials-meet-life

Prof. Dr. med. Holger Dressel

Professorship: Occupational and Environmental Medicine

Academic affiliation: University of Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: University Hospital Zurich

Area of research

Diagnostics; Respiratory Tract

Description of research

Research Focus:
Methodological and clinical questions in respiratory diagnostics, e.g. nitric oxide diffusing capacity or breath analysis with innovative methods.
Respiratory diseases and allergy in occupational and environmental medicine.
Secondary data analysis of insurance related data.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Epidemiology, Biostatistics and Prevention Institute
Hirschengraben 84
8001 Zürich

E-mail: holger.dressel@usz.ch

URL: https://www.ebpi.uzh.ch/en/services/occupational.html

Prof. Dr. med. Reinhard Dummer

Professorship: Dermatology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Molecular Biology; Oncology; Pathology; Skin

Description of research

Professor Dummer's principal research interests are molecular biology, immunology and immunotherapy of cutaneous malignancies, including cutaneous lymphomas and melanoma

Prof. Dummer and his team has intensively studied the immune biology of cutaneous lymphomas, cutaneous melanoma and epithelial skin cancers. Based on the microenvironment of these tumors, we have established immune interventions in cell cultures and animal models. Translational research applies this new knowledge to our patients in order to provide effective treatment with best quality of life.

We have training opportunities for PhD students and candidates of the Postgraduate Course of Medicine at the University of Zurich interested in the research topics mentioned above.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- SKINTEGRITY

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Gloriastrasse 31
8091 Zürich
E-mail: reinhard.dummer@usz.ch
URL:

Prof. Dr. Leo Eberl

Professorship: Microbiology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Science
Clinical affiliation: none

Area of research

Microbiology/Infectiology; Molecular Biology; Proteomics/Transcriptomics, ...-omics

Description of research

We are interested in two areas:
1) The role of biofilms in infections; the main focus in this line of research is on the identification of the molecular mechanisms underlying biofilm development, the role of cell signalling (quorum sensing and c-di-GMP) and the development of anti-biofilm strategies.
2) Mode of action of antibiotics, particularly peptidomimetics (this is done in collaboration with Prof. J. Robinson, Department of Chemistry, UZH).

Platforms and associated services / shareable equipment & infrastructure / databases

- Biofilm settings
- Confocal laser scanning microscopy
- Colony picker robot

Special expertise

- RNA sequencing (RNA-Seq)
- Proteomics
- Transposon sequencing (Tn-Seq)

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University of Zurich
Department of Plant and Microbial Biology (IPMB)
Zollikerstrasse 107
8008 Zürich
E-mail: leberl@botinst.uzh.ch
URL: http://www.botinst.uzh.ch/en.html

Prof. Dr. Theodore Eliades

Professorship: Orthodontics and Pediatric Dentistry
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: Center of Dental Medicine, UZH

Area of research

Biomechanics/Mechanobiology; Chemistry/Analytics; Dentistry; Materials Sciences; Mechanical Engineering; Tissue Engineering/Biointerfaces

Description of research

Enamel-adhesive interfacial phenomena and alterations during orthodontic treatment (structure, roughness, color, gloss).
In vivo-ageing of orthodontic materials by means of surface analysis (Auger and ESCA, EDX and SEM) as well as mechanical properties of used dental and biomedical materials with associated clinical implications in bonding and mechanotherapy.
Clinical trials assessing the efficiency of orthodontic materials.
Development and testing of new adhesives based on non-Bis-GMA containing monomer systems (degree of conversion, bond strength monomer leaching).
Corrosion potential and ionic release of alloys and leaching of polymeric materials in the oral environment.
BPA release and estrogenicity of polymers.
Mechanics of materials (strength, fatigue, bond strength) and tissues with reference to PDL properties in health, disease and developmental/ageing status.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Surface analysis of biomaterials
- Enamel-restorative material interface
- Xeno-estrogenicity of polymers
- Intraoral release of susbstances from metals and alloys

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Prof. Dr. Collin Ewald

Professorship: Extracellular Matrix Regeneration

Academic affiliation: ETH Zurich

Department/faculty: Department of Health Sciences and Technology

Clinical affiliation: none

Area of research

Aging; Genetics; Molecular Biology; Neuro Sciences

Description of research

We are interested in determining the molecular mechanism(s) that prolong health during aging, using a multifaceted approach consisting of C. elegans and mammalian systems, in order to develop novel therapeutic/clinical strategies to treat age-related pathologies.

Platforms and associated services / shareable equipment & infrastructure / databases

- Automated C. elegans lifespan machine
- Microinjection system

Special expertise

- High-throughput screening with genetic manipulations and chemical compounds for aging research
- Neuronal plasticity (learning) assays

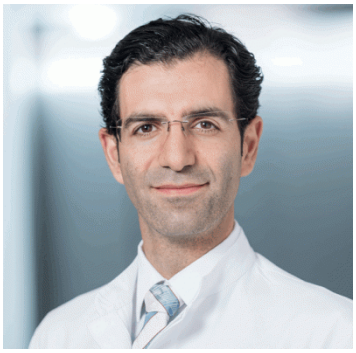
Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: ETH Zurich
Institute of Translational Medicine
Schorenstrasse 16
8603 Schwerzenbach

E-mail: collin-ewald@ethz.ch

URL: www.ewaldlab.com

Prof. Dr. med. Mazda Farshad



Professorship: Orthopaedic Surgery
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: Balgrist University Hospital

Area of research

(Bio-)Informatics; Bioengineering; Diagnostics; Epidemiology; Imaging; Implants; Musculoskeletal Sciences; Pain; Personalized Medicine; Statistics

Description of research

Translational and clinical Research in Orthopaedic and Spinal Surgery with particular interest in innovation and development of scientific applications towards personalized diagnosis and treatment of disorders of the musculoskeletal system.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Orthopaedic Surgery
- Spine Surgery
- Patient specific diagnosis, analysis and treatment of MSK disorders
- Epidemiology

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- HSM Projekt "Patientensicherheit und Ergebnisquslität durch computergestützte, patientenspezifische 3D-Planung, Simulation und Durchführung von Operationen" (http://www.uzh.ch/de/research/medicine/hsm.html#12)

Address: Balgrist University Hospital
Orthopaedic Surgery
Forchstrasse 340
8008 Zürich
E-mail: mazda.farshad@balgrist.ch
URL: https://www.balgrist.ch/forschung-lehre/forschung-orthopaedie/

Prof. Dr. Stephen John Ferguson

Professorship:	Biomechanics
Academic affiliation:	ETH Zurich
Department/faculty:	Department of Health Sciences and Technology
Clinical affiliation:	Schulthess Klinik

Area of research

Bioengineering; Biomechanics/Mechanobiology; Cardiovascular Sciences; Imaging; Implants; Materials Sciences; Mechanical Engineering; Modelling/Computation; Movement Sciences; Musculoskeletal Sciences; Tissue Engineering/Biointerfaces

Description of research

Our research in the area of Musculoskeletal Biomechanics is focused on the evaluation of musculoskeletal pathologies, injuries and treatments through the use of imaging, computer simulations and laboratory experiments at the scale of the whole body down to the organ level. A central theme is the definition of healthy and abnormal motion and loading of the musculoskeletal system, considering especially unique non-linear behaviour due to fluid-structure interactions, high-frequency loading and large tissue deformations.

A central theme in our work on Bone Pathologies and Treatment is the investigation of osteoporosis related fractures in the spine and the hip. Understanding what predisposes a bone to fracture helps us to identify patients at high risk and design early interventional treatment strategies. Using the state of the art in simulation techniques we predict the flow of biomaterials augmented into cancellous bone which allows us to compare the calculated risk of fracture for a given patient before and after treatment.

Our research in Tissue Mechanobiology is focused on the application of novel methods for the design and production of tissue engineering scaffolds, to develop materials which are mechanically biomimetic and which support the rapid growth of new tissue. Applications include fibrous electrospun membranes for blood compatible cardiovascular implant surfaces and for the reconstruction of three-dimensional cartilaginous tissues.

Platforms and associated services / shareable equipment & infrastructure / databases

- MicroCT imaging
- Dynamic testing machines
- Electrospinning

Special expertise

- Soft tissue biomechanics
- Computer simulation
- Tribology
- Organ culture methods

Member of large scale research projects / HMZ Flagship Projects / centers & networks

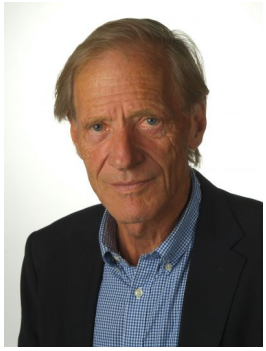
- Zurich Heart
- SKINTEGRITY

Address: ETH Zurich
Institute for Biomechanics
Hönggerbergring 64
8093 Zürich

E-mail: sferguson@ethz.ch

URL: http://www.orthotech.ethz.ch

Prof. Dr. med. Adriano Fontana



Professorship: Professor emeritus

Academic affiliation: University of Zurich / ETH Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: University Hospital Zurich

Area of research

Immunology

Description of research

Neuroimmunology:
1. Tumorimmunology: production of TGFb by glioma cells
2. Macrophage mediated neurotoxicity: involvment of glutamate and Xc antiporter system
3. Antigen presentation, expression of MHC molecules and production of cytokines in the nervous system
4. Autoimmunity in the brain: effector signals involved in experimental autoimmune encephalitis
5. Fatigue and clock genes in infectious - and autoimmune diseases

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Institute of Experimental Immunology
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8057 Zürich

E-mail: fontana.adriano7@gmail.com

URL:

Prof. Dr. med. Lars E. French

Professorship: Dermatology and Venerology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Immunology; Oncology; Skin

Description of research

Our team is engaged in competitive research and development in the field of inflammatory skin disease and tumor immunology with a particular focus on innate immunity.

Current projects include:
1. Investigating the molecular mechanism of neutrophil recruitment to the skin in the adverse cutaneous drug eruption AGEP (Acute Generalized Exanthematous Pustulosis)
2. Investigating the molecular pathogenesis of inflammation in the severe adverse cutaneous drug eruption TEN (Toxic Epidermal Necrolysis)
3. Investigating the role of IL-1 family members in the pathogenesis of the acne-like skin eruption caused by EGF-R antagonists.
4. Analyzing the role of CARD14 and its signaling partners in the pathogenesis of psoriasis and pityriasis rubra pilaris.
5. Developing inhibitors to cytotoxic molecules involved in the pathogenesis of Toxic Epidermal Necrolysis.
6. Analyzing the role of IL-1 beta and innate immune cells in the tumor microenvironment of melanoma.
7. Analyzing the molecular mechanism of lichenoid cutaneous side effects of immune check-point inhibitors.

Platforms and associated services / shareable equipment & infrastructure / databases

- URPP Translational Cancer Research Biobank (www.cancer.uzh.ch)

Special expertise

- Skin biology
- Cutaneous immunobiology

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- SKINTEGRITY (Co-Chair)

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URL:

Prof. Dr. Jean-Marc Fritschy

Professorship: Neuropharmacology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: none

Area of research

Anatomy; Imaging; Neuro Sciences; Pharmacology/Toxicology

Description of research

Our studies focus on the molecular, cellular, and functional organization of the GABAergic system. As the main inhibitory neurotransmitter in the CNS, γ-aminobutyric acid plays an essential role in governing and coordinating the activity of neuronal networks and in regulating neuronal development.
A major feature of the GABAergic system is the heterogeneity of their constituents, notably postsynaptic receptors that are assembled from large subunit gene families. A precise knowledge of the cellular and subcellular localization of these proteins in adult and developing brain provides useful cues for designing studies of the functional organization of inhibitory neurotransmission.
Much of our current work is devoted to understanding the molecular organization of GABAergic synapses and on the mechanisms of GABAergic synaptic plasticity. We focus on the striatum, the main input nucleus of the basal ganglia, and investigate whether different neuronal subtypes and neuronal circuits in the striatum can be identified based on their pattern of GABAA-receptor expression. Further, using dopaminergic denervation as a model of Parkinsons's disease, we investigate whether changes in GABAergic circuits in the striatum, caused by the absence of dopamine, contribute to the pathophysiology of Parkinson's disease.
Another focus of interest lies in the mechanisms of epileptogenesis and a possible contribution of altered GABAergic transmission in a mouse model of temporal lobe epileps

Platforms and associated services / shareable equipment & infrastructure / databases

- Confocal laser scanning microscopy
- Primary neuronal cultures
- Patch clamp recording
- Stereotaxic brain surgery

Special expertise

- Immunohistochemistry
- Image analysis
- Neuroanatomy

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Neuroscience Center Zurich (ZNZ)

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Institute of Pharmacology and Toxicology
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8057 Zürich
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URL: http://www.pharma.uzh.ch/en/research/neuromorphology/researchareas/neuromorphology.html

Prof. Dr. med. Oliver Gämperli

Professorship: Cardiac Imaging and Intervention
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Cardiovascular Sciences; Imaging; Personalized Medicine; Radiology/Nuclear Medicine

Description of research

Cardiovascular noninvasive Imaging
Hybrid Imaging
CT imaging
Interventional Cardiology

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University Hospital Zurich
Cardiovascular Center
Rämistrasse 100
8091 Zürich
E-mail: oliver.gaemperli@usz.ch
URL:

Prof. Dr. Kerstin Gari

Professorship: SNSF Assistant Professor
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: none

Area of research

Biochemistry; Molecular Biology; Proteomics/Transcriptomics, ...-omics

Description of research

Cells are constantly exposed to factors that damage DNA, either from exogenous sources, such as UV light, or endogenous sources, such as oxidative stress. Moreover, DNA replication itself poses a problem to genome integrity. Not surprisingly, a huge number of proteins work together to faithfully replicate DNA and to detect, signal and repair DNA damage. Failure to do so results in genome instability, one of the hallmarks of cancer. Over the last years, a considerable number of proteins involved in DNA metabolism have been identified to bind to an iron-sulphur (FeS) cluster as a cofactor. Considering that – upon FeS cluster oxidation – free iron atoms can generate reactive oxygen species and damage DNA, the abundance of FeS proteins in DNA replication and repair has come as a surprise, and the function of FeS clusters in these processes has remained largely elusive to date. At the same time, their redox sensitivity makes FeS clusters particularly interesting and versatile cofactors that would be uniquely suited e.g. to sense oxidative stress conditions and allow adaption to suboptimal conditions of DNA replication.
We exploit a combination of complementary experimental approaches and systems, such as molecular and cellular biology, proteomics, and biochemistry, in order to gain insight into the role of FeS clusters in DNA replication and repair.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Institute of Molecular Cancer Research
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8057 Zürich
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URL: http://www.imcr.uzh.ch/en/research/Gari.html

Prof. Dr. Roger Gassert

Professorship: Rehabilitation Engineering

Academic affiliation: ETH Zurich

Department/faculty: Department of Health Sciences and Technology

Clinical affiliation: none

Area of research

Bioengineering; Control/Sensors/Actuators; Design/Construction; Electrical Engineering; Imaging; Movement Sciences; Neuro Sciences; Rehabilitation; Robotics

Description of research

We apply robotics, wearable sensor technologies and non-invasive neuroimaging to the exploration (sensorimotor control and neuromechanics), assessment (tools and objective metrics for motor and somatosensory function) and restoration (therapy and long-term assistance) of sensorimotor function following neuromuscular injury.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Mechatronics design and system integration
- Wearable sensors and algorithms for clinical assessments
- (f)MRI-compatible robotics
- Robot-assisted rehabilitation (therapy and assistance)
- Assessment of somatosensory function

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- SleepLoop
- ZurichMOVE (www.zurichmove.com)
- NCCR Robotics (www.nccr-robotics.ch)

Address: ETH Zurich
Institute of Robotics and Intelligent Systems
Lengghalde 5
8092 Zürich

E-mail: roger.gassert@hest.ethz.ch

URL: www.relab.ethz.ch

Prof. Dr. med. vet. Max Gassmann

Professorship: Veterinary Physiology
Academic affiliation: University of Zurich
Department/faculty: Vetsuisse Faculty
Clinical affiliation: University Hospital Zurich

Area of research

Behavioral science/Mental Health; Cardiovascular Sciences; Development/Developmental Biology; Endocrinology; Hematology; Metabolism; Movement Sciences; Musculoskeletal Sciences; Neuro Sciences; Oncology; Pediatrics; Physiology; Respiratory Tract

Description of research

Max Gassmann is a trained Swiss veterinarian who is specialized in animal and human physiology. He is well known for his work on hypoxia and erythropoietin (Epo). Since over a decade he is full professor of Veterinary Physiology and director of the corresponding institute, as well as chairman of the Zurich Center of Integrative Human Physiology (ZIHP), both institutions being located at the University of Zurich.
As early as 1992 he became interested in the physiological responses to oxygen deprivation, with a special focus on the impact of Epo and its receptor. He showed that Epo's action is not restricted to erythropoiesis but has a widespread influence on different cellular responses to hypoxia. As such, he demonstrated that Epo protects the retina from light-induced degeneration. His scientific work starts at the molecular and cellular level and leads to patients and adapted Andean highlanders. These integrative and translational efforts have provided new insights in the adaptive mechanisms that allow coping with acute and chronic hypoxia.

Platforms and associated services / shareable equipment & infrastructure / databases

- Hypoxia equipment

Special expertise

- High altitude
- Low oxygen
- Red blood cells
- Erythropoietin

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Zurich Center of Integrative Human Physiology (ZIHP)

Address: University of Zurich
Inst. of Veterinary Physiology
Winterthurerstrasse 260
8057 Zürich
E-mail: maxg@access.uzh.ch
URL: http://www.vetphys.uzh.ch/en.html

Prof. Dr. med. Michele Genoni

Professorship: Cardiac Surgery

Academic affiliation: University of Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: University Hospital Zurich and Stadtspital Triemli

Area of research

Cardiovascular Sciences

Description of research

Myocardial Revascularisation
Clinical outcome
Cardiovascular Imaging in cardiac surgery
Quality control in cardiac surgery

Platforms and associated services / shareable equipment & infrastructure / databases

- Foundation Stadtspital Triemli Zürich
- USZ - Departement of research for cardiac
- National registry of cardiac surgery

Special expertise

- Myocardial revascularization

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Departement of cardiac surgery
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URL:

Prof. Dr. Orcun Göksel

Professorship: Computer-assisted Applications in Medicine

Academic affiliation: ETH Zurich

Department/faculty: Department of Information Technology and Electrical Engineering

Clinical affiliation: none

Area of research

Aging; Biomechanics/Mechanobiology; Diagnostics; Electrical Engineering; Imaging; Modelling/Computation; Musculoskeletal Sciences; Oncology; Personalized Medicine; Radiology/Nuclear Medicine

Description of research

My research interests focus around medical image analysis, in particular novel approaches in ultrasound imaging and processing.

Other major research interests include patient-specific modelling, image-guided therapy, tissue biomechanical characterization, and medical simulation for surgical planning and virtual-reality.

Platforms and associated services / shareable equipment & infrastructure / databases

- Ultrasound research and development equipment and expertise
- Computational resources and know-how for image analysis

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- SKINTEGRITY

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Computer Vision Lab
Sternwartstrasse 7
8092 Zürich

E-mail: ogoksel@ethz.ch

URL: http://www.caim.ee.ethz.ch/~ogoksel

Prof. Dr. Urs Greber

Professorship: Molecular Cell Biology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Science
Clinical affiliation: none

Area of research

Biochemistry; Gene/Cell therapy; Imaging; Immunology; Microbiology/Infectiology; Modelling/Computation; Molecular Biology; Personalized Medicine; Respiratory Tract; Systems Biology

Description of research

Viruses carry genetic information between cells and individuals, and cause disease, sometimes with worldwide impact. They emerge unpredictably, and take control of susceptible cells. Viruses are restricted by innate and adaptive immunity against their molecular footprints. By studying viruses, scientists have gained fundamental insights into the inner workings or cells and organisms. This has provided a strong basis for anti-viral therapies, and clinical gene therapy, the latter largely in the context of viral vectors. Elucidating how viruses change the infected cell is key to better treatments against viral disease in normal and immune-compromised individuals. Our group analyzes the molecular mechanisms of virus entry, replication, egress, and more recently molecular evolution. We use advanced microscopy, biochemical and cell biological assays, systems profiling and numerical models in cell cultures, primary cells and micro-tissue. Our deep mechanistic studies lead to a better understanding of how human disease causing viruses - adenovirus, rhinovirus, influenza virus - use protein, lipid, DNA or RNA-based host factors for infection. They give new insights on how viruses adapt to a dynamic host environment and to therapeutic pressure, and how viruses break the defense barriers of the host and cause disease.

Platforms and associated services / shareable equipment & infrastructure / databases

- ImageXpress Micro Confocal (IXM--C) Molecular Devices

Special expertise

- Image-based high content screening of infection phenotypes

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Network Infection and Immunity Zurich
- SystemsX MRD VirX

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Department of Molecular Life Sciences
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E-mail: urs.greber@imls.uzh.ch
URL: http://www.imls.uzh.ch/en/research/Greber.html

Prof. Dr. Christian Grimm

Professorship: Experimental Ophthalmology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Aging; Gene/Cell therapy; Imaging; Molecular Biology; Neuro Sciences

Description of research

Retinal degeneration focusing on photoreceptor cells and the retinal pigment epithelium.

Main areas within the field:
Cytokine signalling in the retina with special focus on leukemia inhibitory factor (LIF)
Consequences of acute and chronic hypoxia for survival and function of retinal cells
Cone pathophysiology
Lipid metabolism in the RPE

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Test of visual function in mice: fundus imaging, OCT, ERG, OMR
- Intravitreal and subretinal injections in mice

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Dept. Ophthalmology
Wagistrasse 14
8952 Schlieren
E-mail: cgrimm@opht.uzh.ch
URL: http://home.ggaweb.ch/LabForRetinalCellBiology/index.html

Prof. Dr. Hansjörg Grützmacher

Professorship:	Inorganic Chemistry
Academic affiliation:	ETH Zurich
Department/faculty:	Department of Chemistry and Applied Biosciences
Clinical affiliation:	none

Area of research

Chemistry/Analytics; Nanotechnology

Description of research

Development of photoinitiators for dental repair and micro-surgery (in collaboration with EPFL Lausanne).

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

• Synthesis of main group element compounds (especially silicon and phosphorus)

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Inorganic Chemistry
Valdemir-Prelog-Weg 1
8093 Zürich

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URL: www.gruetzmacher.ethz.ch

Prof. Dr. med. Matthias Guckenberger

Professorship: Radiation Oncology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Imaging; Modelling/Computation; Oncology; Personalized Medicine

Description of research

Matthias Guckenberger is the Chairman of the Department for Radiation Oncology, University Hospital Zurich (USZ). Development, translation and clinical evaluation of advanced imaging and radiotherapy planning and delivery technologies into cancer treatment is his major research focus. Research is clinically focused on early and locally advanced stage lung cancer, prostate cancer and in particular oligo-metastatic disease. Recent projects established Radiomics, a methodology using advanced mathematical quantification of radiological images, as a potential prognostic and predictive biomarker. Mathematical modelling of tumor and normal tissue response to radiotherapy was extended for the use of advanced statistical methodologies such as support-vector machine learning and cure rate models. Retrospective register studies as well as prospective clinical trials have been conducted for evaluation of advanced radiotherapy technologies.

Platforms and associated services / shareable equipment & infrastructure / databases

- Radiomics
- Small animal high precision radiotherapy

Special expertise

- Radiomics
- Outcome Modelling
- Lung Cancer
- Oligo-metastasis

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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URL: http://www.radio-onkologie.usz.ch/

Prof. Dr. med. Huldrych Günthard

Professorship: Clinical Infectiology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Immunology; Microbiology/Infectiology

Description of research

Prof. Huldrych F. Günthard is board certified in internal medicine and infectious diseases, is the deputy head of the Division of Infectious Diseases and Hospital Epidemiology, University Hospital Zurich, head of it's HIV research laboratory, the president and Principle Investigator of the Swiss HIV Cohort Study, a member of the IAS-USA Antiretroviral Guidelines and Drug Resistance Mutation panel and a member of the research council of the Swiss National Science Foundation.

He is a physician-scientist and Professor at the University of Zurich in Switzerland, working as senior consultant in general infectious diseases and HIV-medicine, performing clinical, translational and basic research. His HIV-research focuses mainly on 1) emergence and transmission of drug resistance, 2) antiretroviral therapy, 3) the latent reservoir and residual replication, 4) broadly anti-HIV neutralizing antibodies, 5) transmission/primary HIV-infection, 6) pathogenesis and viral evolution. 7) Co- and sexually transmitted infections. He is interested in all aspects of infectious diseases and HIV-medicine in general. His major aim is to perform multidisciplinary research, bringing together, e.g. basic scientists, clinicians, epidemiologists/statisticians and bioinformatics researchers and strongly fosters international studies. He has authored > 300 peer reviewed scientific articles.

Platforms and associated services / shareable equipment & infrastructure / databases

- Zurich Primary HIV Infection Study
- The Swiss HIV Cohort Study

Special expertise

- HIV (Virology / Immunology / Transmission / Treatment / Resistance
- Clinical Trials
- Epidemioloy / Phylogenetics

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Division of Infectious Diseases and Hospital Epidemiology
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8091 Zürich
E-mail: huldrych.guenthard@usz.ch
URL:

Prof. Dr. Cornelia Halin Winter

Professorship: Pahrmaceutical Immunology

Academic affiliation: ETH Zurich

Department/faculty: Department of Chemistry and Applied Biosciences

Clinical affiliation: none

Area of research

Cardiovascular Sciences; Imaging; Immunology; Lymphatic System; Skin

Description of research

Our laboratory performs research at the crossroads of immunology and vascular biology. A major focus lies in investigating inflammation-induced changes of the vasculature and their impact on leukocyte migration and on immune function. The murine skin is our preferred tissue to study vascular morphology and function and for performing confocal/multiphoton-based intravital microscopy and to study leukocyte migration in the interstitium and within lymphatic vessels.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Pharmaceutical Sciences
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8093 Zürich

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URL:

Prof. Dr. Andrew Hall

Professorship:	Assistant Professor of Structural and Functional Imaging
Academic affiliation:	University of Zurich
Department/faculty:	Faculty of Medicine
Clinical affiliation:	University Hospital Zurich

Area of research

Genitourinary System; Imaging; Physiology

Description of research

We use live imaging techniques, including intravital microscopy, and computational analysis to investigate unknown cellular mechanisms of kidney diseases relevant to humans.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Intravital microscopy

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- NCCR Kidney.ch
- KFSP Molecular Imaging Network Zurich (MINZ)

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Anatomy
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Prof. Dr. med. dent. Christoph H.F. Hämmerle

Professorship:	Fixed and Removable Prosthodontics and Dental Material Science
Academic affiliation:	University of Zurich
Department/faculty:	Faculty of Medicine
Clinical affiliation:	Center of Dental Medicine, UZH

Area of research

Biomechanics/Mechanobiology; Dentistry; Implants; Materials Sciences; Tissue Engineering/Biointerfaces

Description of research

In vitro development and testing as well as clinical application of materials used for the rehabilitation of dental and oral structures including polymers, ceramics and hybrid materials.
Preclinical testing and clinical application of biological materials like active factors and tissue replacement grafts for the regeneration of bone and mucosa.
Development of computer technologies for capturing of patient data, planning and execution of therapeutic interventions and additive/subtractive manufacturing of dental reconstructive materials.

Platforms and associated services / shareable equipment & infrastructure / databases

- Laboratory for dental biomaterial sciences
- Laboratory for hard and soft tissue histology
- Facilities, personel and expertise for clinical trials

Special expertise

- International network for the execution of multi-center clinical trials

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Clinic of Prosthodontics, Dental Material Science, Division of Implantology
Plattenstrasse 11
8032 Zürich

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URL: https://www.zzm.uzh.ch/en/research/staff/haemmerle-christoph.html

Prof. Dr. Wolf-Dietrich Hardt

Professorship: Microbiology
Academic affiliation: ETH Zurich
Department/faculty: Department of Biology
Clinical affiliation: none

Area of research

Microbiology/Infectiology

Description of research

The Hardt lab studies Salmonella diarrhea. This is a very common disease caused by contaminated food or water. We are interested in the molecular and cellular mechanisms that explain how the food-borne pathogen colonizes the gut, infects the gut tissue and causes disease.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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URL: http://www.micro.biol.ethz.ch/research/hardt.html

Prof. Dr. Leonhard Held

Professorship: Biostatistics
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: none

Area of research

Epidemiology; Modelling/Computation; Statistics

Description of research

As the chair of Biostatistics at UZH, I ahve been involved in numerous clinical studies at the University and beyond. My expertise is in all methodological aspects of clinical studies from design to analysis and reporting. I have specific expertise in the analysis of survival and longitudinal data.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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8001 Zürich
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URL: http://www.ebpi.uzh.ch/en/aboutus/departments/biostatistics/teambiostats/held.html

Prof. Dr. Fritjof Helmchen

Professorship: Professor of Neuroscience
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: none

Area of research

Anatomy; Behavioral science/Mental Health; Imaging; Modelling/Computation; Neuro Sciences; Neuroinformatics; Pathology; Physiology

Description of research

As an experimental neuroscientist with physics background my general research interest is to reveal principles of neural computation on the cellular and network level using electrophysiology and particularly optical methods. My lab has contributed to advances in the field of in vivo two-photon microscopy for the study of neuronal and glial function in vivo. Most recently we have applied genetically-encoded calcium indicators for longitudinal imaging studies as well as for imaging neocortical dynamics in awake, behaving mice. Currently, my lab is further expanding studies of behaviour-related neural dynamics in various brain regions, including hippocampus, using new microscopy concepts, genetically encoded sensors, and optogenetic and chemogenetic tools to monitor and manipulate specific neuronal populations. Our goal is to gain a mechanistic understanding of signal flow on the mesoscale, between local microcircuit operation and large-scale brain dynamics, under healthy conditions as well as in brain dieseases.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Neuroscience Center Zurich (ZNZ)
- EXCITE Zurich

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Brain Research Institute
Winterthurerstrasse 190
8057 Zürich
E-mail: helmchen@hifo.uzh.ch
URL: http://www.hifo.uzh.ch/en/research/helmchen.html

Prof. Dr. Manfred Heuberger

Professorship: Adjunct Professor

Academic affiliation: ETH Zurich

Department/faculty: Department of Materials

Clinical affiliation: none

Area of research

(Bio-)Fluidics/Fluiddynamics; Control/Sensors/Actuators; Materials Sciences; Nanotechnology

Description of research

As head of the Empa laboratory of Advanced Fibers, I conduct fundamental and applied research in the area of synthetic (thermoplastic) fiber development. We cover expertise in the fields of fiber spinning, polymer and additive chemistry as well as surface functionalization via plasma (gas) processing.
We have experience with different types of fibers and polymer surfaces that can be relevant medtech applications; examples include antibacterial fibers, liquid-filled fibers, antifouling polymer surfaces, high-binding surfaces (protein & cell adsorption), optical detection of protein adsorption, polymer op-tical fibers, conductive fibers for textile electrodes.
As Titularprofessor of the Department of Materials, ETH Zurich, I conduct fundamental research on aqueous interfaces, which involves electrical double layers in salt solutions as well as antifouling and protein-surface interactions. The fundamental study of surface forces using the surface forces apparatus can be used to address fundamental questions of molecule-surface and surface-surface intereacitions under well-controlled conditions.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Synthetic fibers
- Surface functionalization
- Protein adsorption
- Confined fluids

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Prof. Dr. Andreas Hierlemann

Professorship: Biosystems Engineering

Academic affiliation: ETH Zurich

Department/faculty: Department of Biosystems Science and Engineering

Clinical affiliation: none

Area of research

(Bio-)Fluidics/Fluiddynamics; Bioengineering; Electrical Engineering; Neuro Sciences; Personalized Medicine; Tissue Engineering/Biointerfaces

Description of research

Detailed in-vitro characterization of iPSC-derived electrogenic or neuronal cells (also from patients)
Detailed in-vitro characterization of the effects of compounds on electrogenic cells
Detailed and comprehensive characterization of compounds in 3D microtissue systems (spheroids) comprising of single or several tissue types ("body on chip")

Platforms and associated services / shareable equipment & infrastructure / databases

- Microtechnological cleanroom (Department BSSE)
- Deep sequencing (Department BSSE)
- Lab automation facility (Department BSSE)

Special expertise

- Bioelectronics, extracellular electrophysiology, high-density microelectrode arrays
- Electronic interfacing with neurons and neuronal preparations
- 3D microtissues and microfluidics, "body on a chip"

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: ETH Zurich
Department of Biosystems Science and Engineering
Mattenstrasse 26
4058 Basel

E-mail: andreas.hierlemann@bsse.ethz.ch

URL: https://www.bsse.ethz.ch/bel/people/person-detail.html?persid=89956

Prof. Dr. Christofer Hierold

Professorship: Micro and Nanosystems

Academic affiliation: ETH Zurich

Department/faculty: Department of Mechanical and Process Engineering

Clinical affiliation: none

Area of research

Control/Sensors/Actuators; Electrical Engineering; Implants; Materials Sciences; Mechanical Engineering; Nanotechnology

Description of research

We pursue research on advanced microsystems in general and for medical applications in particular.Research topics include the development of new low-cost polymer-based biocompatible and biodegradable (strain) sensors, magnetic polymer microsystems for biomedical applications, and the integration of sensors in implants with a focus on the fabrication of biocompatible interfaces and bioaffine surfaces.
The objectives of our research on nanotransducers and nanosytems are the exploration of single-walled carbon nanotubes as active elements in sensors. In combination with our research on energy harvesters, this leads to zero power sensor systems enabling the Internet of Humans and thus connecting medical / physiological data with environmental data for prevention and treatment.

Platforms and associated services / shareable equipment & infrastructure / databases

- BRNC
- FIRST, FIRST-CLA

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Zurich Heart

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Prof. Dr. med. Christoph Hock

Professorship: Biological Psychiatry

Academic affiliation: University of Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: University Hospital of Psychiatry Zurich

Area of research

Aging; Diagnostics; Gene/Cell therapy; Imaging; Immunology; Neuro Sciences; Personalized Medicine; Tissue Engineering/Biointerfaces

Description of research

Next generation bio-inspired therapies at the interface of degeneration and regeneration with a major focus on dementias and other neurodegenerative conditions as well as protein aggregation disorders.
Biomarker and imaging readouts for clinical sutdies and precision medicine.
Multimodal combination of structural, functional and molecular imaging to support the development of preventive and regenerative therapies under quantitative and qualitative control.

Platforms and associated services / shareable equipment & infrastructure / databases

- Center for Prevention and Dementia Therapy

Special expertise

- Translational Medicine
- Clinical Trial Design

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Neuroscience Center Zurich (ZNZ)

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Institute for Regenerative Medicine - IREM
Wagistrasse 12
8952 Schlieren

E-mail: christoph.hock@irem.uzh.ch

URL: http://www.irem.uzh.ch/en.html

Prof. Dr. med. Jürg Hodler

Professorship: Radiology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Imaging; Musculoskeletal Sciences; Radiology/Nuclear Medicine

Description of research

Imaging of the musculoskeletal system, with an emphasis on MR imaging.
Image guided injections and biopsies (CT, fluoroscopy and ultrasound).
Diagnostic performance of imaging methods, with an emphasis on MR imaging.
Translation of new technological developments into clinical practice, mainly CT and MR Imaging.
MR anatomical correlation.

Platforms and associated services / shareable equipment & infrastructure / databases

- Small animal CT
- Stakeholder in small animal MR Hönggerberg
- Clinical MR/CT/sonography/fluoroscopy

Special expertise

- Imaging of joints
- Diagnostic performance
- Translation in imaging technology

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- HMZ Multi-parametric Ultrasound Imaging
- KFSP Molecular Imaging Network Zurich (MINZ)

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Radiology
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URL:

Prof. Dr. med. vet. Regina Hofmann-Lehmann

Professorship: Laboratory Medicine
Academic affiliation: University of Zurich
Department/faculty: Vetsuisse Faculty
Clinical affiliation: Tierspital Zürich

Area of research

Hematology; Microbiology/Infectiology; Veterinary Medicine

Description of research

We investigate scientific questions of clinical relevance in the field of clinical infectiology and laboratory medicine. A primary focus of our research is on retroviral infections. We have developed methods to investigate the host-virus interaction, pathogenesis and immunoprophylaxis for infectious diseases in the cat. These studies are financially supported by the Swiss National Science Foundation. We are concentrating on the role of provirus carriers in the biology and epidemiology of retroviral infections and the analysis of progeny viruses that develop over time under the pressure of the immune system within a host. We further aim to develop antiretroviral strategies to reduce virus loads and destroy FeLV provirus reservoirs. Secondly, we focus on hemotropic Mycoplasma infections, which induce infectious anemia in various mammalian species. We have discovered a novel feline hemotropic Mycoplasma species ("Candidatus Mycoplasma turicensis"). Moreover, we study other infectious diseases of cats and dogs including the feline calicivirus, vector-borne infections in general and infectious diseases in many wild animal species.
As a multivalent routine diagnostic laboratory we offer further hematological, cytological, clinical chemistry, serological and molecular analyses of samples from domestic animals, laboratory animals including rats and mice and wild and exotic animals. The laboratory is accredited by the European College of Veterinary Clinical Pathology.

Platforms and associated services / shareable equipment & infrastructure / databases

- Multivalent diagnostic laboratory for domestic, laboratory and exotic animals (www.vetlabor.uzh.ch)
- Hematological, cytological, clinical chemistry, urine, serological and molecular analyses
- Center for Clinical Studies (ZKS; www.zks.uzh.ch)

Special expertise

- Laboratory accredited by the European College of Veterinary Clinical Pathology
- Board Member of the European Advisory Board on Cat Diseases
- President of the Swiss Association of Veterinary Laboratory Diagnosticians (SVVLD)

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University of Zurich
Clinical Laboratory, Vetsuisse Faculty
Winterthurerstrasse 260
8057 Zürich
E-mail: rhofmann@vetclinics.uzh.ch
URL: http://www.vetlabor.uzh.ch/de.html

Prof. Dr. Thorsten Hothorn

Professorship: Computational Biostatistics
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: none

Area of research

Modelling/Computation; Oncology; Personalized Medicine; Statistics

Description of research

Statistical Learning for Personalized Medicine, Computational Biostatistics, Analysis of Survival Endpoints

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Statistical Modelling
- Open-source Statistical Computing
- Machine Learning
- Survival Analysis

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University of Zurich
Epidemiology, Biostatistics and Prevention Institute
Hirschengraben 84
8001 Zürich
E-mail: torsten.hothorn@uzh.ch
URL: http://user.math.uzh.ch/hothorn/

Prof. Dr. Dr. med. vet. Michael Hottiger

Professorship: Biochemistry and Molecular Biology

Academic affiliation: University of Zurich

Department/faculty: Vetsuisse and Science Faculty

Clinical affiliation: none

Area of research

Aging; Biochemistry; Cardiovascular Sciences; Epigenetics; Immunology; Metabolism; Molecular Biology; Musculoskeletal Sciences; Oncology; Personalized Medicine; Proteomics/Transcriptomics, ...-omics; Stem Cell Biology

Description of research

My laboratory is interested to understand the molecular regulatory mechanisms of inflammation. While inflammation at large is a beneficial event for the organism, excessive activation or inappropriate regulation of immune and inflammation cascades cause tissue and cellular damage, which may lead to cellular dysfunction and cell death.

We investigate inflammatory signaling (e.g. oxidative stress) with special focus on the role of post-translations modifications (PTM) such as ADP-ribosylation in the regulation of inflammation. PTMs of proteins are thought to contribute to the observed complexity of cellular processes in animal and man. PTMs may help to explain the differences between e.g. worm and man, considering that the number and the nucleotide sequences of genes is rather comparable among animal species.

We and others identified protein ADP-ribosylation as a crucial process in the cellular response to detrimental stimuli, be it through genotoxicity, oxidative or metabolic stress, or excessive inflammation. We study the patterns of ADP-ribosylation using cutting-edge systems biology approaches such as ADP-ribosyl-specific high-resolution and quantitative mass spectrometry that we developed in house or in collaboration with various colleagues worldwide. Furthermore, we investigate the players involved, such as writers, readers and eraser of ADP-ribosylation, as well as their target proteins that carry this PTM using state-of-the-art proteomics methods.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Inflammation
- NF-kappaB gene expresssion
- Chromatin
- Protein ADP-ribosylation
- Histone modification

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University of Zurich
Department of Molecular Mechanisms of Disease
Winterthurerstrasse 190
8057 Zürich

E-mail: michael.hottiger@dmmd.uzh.ch

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Prof. Dr. Qiuting Huang

Professorship: Electronics

Academic affiliation: ETH Zurich

Department/faculty: Department of Information Technology and Electrical Engineering

Clinical affiliation: none

Area of research

Control/Sensors/Actuators; E-Health; Electrical Engineering; Imaging; Implants; Personalized Medicine; Sleep

Description of research

Miniaturised electronic platforms for wearable and implantable medical monitoring devices; neural interfaces, wearable and implantable device for pulse oximetry, blood pressure, etc.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

• Integrated Circuit Design for Miniaturised Medical Devices

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: ETH Zurich
Integrated Systems Laboratory
Gloriastrasse 35
8092 Zürich

E-mail: huang@iis.ee.ethz.ch

URL: iis.ee.ethz.ch

Prof. Dr. med. Alexander Huber

Professorship: Otorhinolaryngology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Bioengineering; Biomechanics/Mechanobiology; Biotechnology; Implants; Physiology

Description of research

In our laboratory for biomechanics of hearing we develop a comprehensive understanding and a detailed theoretical model of the physiological and pathological processes of the peripheral auditory system (from the pinna to the auditory nerve).
The objectives are 1) Experimental studies of physiological and pathological processes of hearing, 2) The development of a detailed mathematical model of hearing, and 3) The optimization and development of hearing aids and hearing prostheses in collaboration with the industry. We are an interdisciplinary research team of graduates from different specialties, with competence in investigation techniques of acoustics, vibro-mechanics, fluid dynamics, electrophysiology and behavioral audiometry by taking into account the latest measurement technology.

Platforms and associated services / shareable equipment & infrastructure / databases

- Audiology
- Acoustics
- Laser Doppler
- Electrophysiology

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Neuroscience Center Zurich (ZNZ)

Address: University Hospital Zurich
Otorhinolaryngology, Head and Neck Surgery
Frauenklinikstrasse 24
8091 Zürich
E-mail: alex.huber@usz.ch
URL: http://www.orl.usz.ch

Prof. Dr. Reto Huber

Professorship: Developmental Neurobiology of childhood and adolescence

Academic affiliation: University of Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: University Children's Hospital Zurich

Area of research

Neuro Sciences; Sleep

Description of research

Investigate the mutual interplay between sleep and brain maturation in health and disease.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- High-density EEG
- Electrophysiology during sleep
- Anatomical and behavioural markers of maturation
- Closed-loop accoustic stimulation

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- SleepLoop

Address: University Children's Hospital Zurich
Child Development Center
Steinwiesstrasse 75
8032 Zürich

E-mail: reto.huber@kispi.uzh.ch

URL:

Prof. Dr. Dagmar Iber

Professorship: Computational Biology

Academic affiliation: ETH Zurich

Department/faculty: Department of Biosystems Science and Engineering

Clinical affiliation: none

Area of research

(Bio-)Fluidics/Fluiddynamics; (Bio-)Informatics; Biomechanics/Mechanobiology; Development/Developmental Biology; Genetics; Genitourinary System; Imaging; Immunology; Modelling/Computation; Molecular Biology; Personalized Medicine; Respiratory Tract; Stem Cell Biology; Systems Biology; Tissue Engineering/Biointerfaces

Description of research

From Networks to Function: Computational Models of Morphogenesis

We use computational approaches to delineate basic mechanisms and to integrate biological knowledge into a framework that permits the efficient generation of testable hypotheses and that enables an integrative understanding of signalling networks in a tissue and organ context.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Computational Modelling
- Image Processing & Image-Based Modelling

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: ETH Zurich
D-BSSE
Mattenstrasse 26
4058 Basel

E-mail: dagmar.iber@bsse.ethz.ch

URL: www.cobi.bsse.ethz.ch

Prof. Dr. Giacomo Indiveri

Professorship: Neuroinformatics
Academic affiliation: University of Zurich
Department/faculty: Faculty of Science
Clinical affiliation: none

Area of research

Bioengineering; Control/Sensors/Actuators; Electrical Engineering; Modelling/Computation; Nanotechnology; Neuroinformatics; Robotics

Description of research

Study of computational models of neural processing and development of neuromorphic electronic circuits to build brain-like computing systems that can interact with the environment in real-time and in an intelligent way.

Platforms and associated services / shareable equipment & infrastructure / databases

- Oscilloscopes
- Robotic platforms
- Neuromorphic Processing Systems

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Institute of Neurorinformatics
Winterthurerstrasse 190
8057 Zürich
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URL: http://www.ini.uzh.ch

Prof. Dr. med. Sebastian Jessberger

Professorship: Neural Plasticity
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: none

Area of research

Neuro Sciences; Stem Cell Biology

Description of research

Neural stem cells (NSCs) generate new neurons throughout life in two distinct areas of the mammalian brain, the subventricular zone lining the lateral ventricles and the hippocampal dentate gyrus. Adult neurogenesis has been implicated in tissue homeostasis, physiologic brain function, and is also associated with a number of neuro-psychiatric diseases, such as cognitive aging and depression. Understanding the mechanisms underlying adult neurogenesis represents a prerequisite for future therapeutic targeting of adult NSCs for endogenous brain repair. Our previous work has identified several pathways/genes that are critically involved in certain steps, from the dividing NSC to the integrating newborn neuron, during the developmental course of adult neurogenesis. Further, we have participated in efforts to characterize the functional role of adult neurogenesis on a behavioral level. Currently, we use gene expression profiling together with analyses of the metabolic state of NSCs and their progeny to study the molecular framework of NSC diversity in the adult brain and to identify novel regulators of the neurogenic process. In addition, our laboratory aims to understand how physiologic and disease-associated alterations of the neurogenic niche are translated into stem cell-associated plastic changes of the adult brain on a cellular but also behavioral level.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Brain Research Institute
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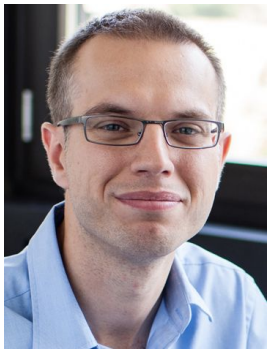
E-mail: jessberger@hifo.uzh.ch
URL: http://www.hifo.uzh.ch/en/research/jessberger.html

Prof. Dr. Martin Jinek



Professorship: Assistant Professor for Biochemistry

Academic affiliation: University of Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: none

Area of research

Biochemistry; Gene/Cell therapy; Structural Biology

Description of research

My research combines structural and biochemical approaches and focuses on two main topics – (i) RNA biology and (ii) CRISPR-Cas systems and their application as a genome editing technology. Since starting my research group at the UZH in 2013, I have studied the molecular mechanisms of CRISPR-Cas genome editing tools in atomic detail. Our work has revealed the atomic structures of Cas9 and more recently also Cpf1/Cas12a, providing fundamental insights into their mechanisms of RNA-guided DNA targeting. These studies have established a mechanistic framework for rational, structure-guided engineering of CRISPR-Cas genome editing tools to address current limitations of the technology in terms of specificity, targeting potential and efficiency.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Genome editing
- X-ray crystallography
- Protein and nucleic acid biochemistry

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Institute of Biochemistry
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Prof. Dr. Josef Jiricny

Professorship: Molecular Cancer Research
Academic affiliation: University of Zurich / ETH Zurich
Department/faculty: Faculty of Science
Clinical affiliation: none

Area of research

Biochemistry; Epigenetics; Molecular Biology; Oncology; Proteomics/Transcriptomics, ...-omics

Description of research

My group studies the mechanisms of DNA repair, with particular emphasis on the malfunctions of repair pathways that lead to genomic instability and thus to cancer and ageing.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

• Cancer Network Zurich (CNZ)

Address: ETH Zurich
Institute of Biochemistry
Otto-Stern-Weg 3
8093 Zürich
E-mail: jiricny@ethz.ch
URL:

Prof. Dr. Nicole Joller

Professorship: SNSF/ERC Assistant Professor

Academic affiliation: University of Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: none

Area of research

Genetics; Imaging; Immunology; Lymphatic System; Microbiology/Infectiology; Neuro Sciences; Oncology; Pathology; Proteomics/Transcriptomics, ...-omics; Respiratory Tract

Description of research

We study the regulation of the immune response using a broad range of infectious models and to a certain degree also neuroinflammatory models and cancer. Our focus is on regulatory T cells and co-stimulatory/co-inhibitory molecules.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Regulatory T cells
- Checkpoint inhibitors

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Network Infection and Immunity Zürich

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Experimental Immunology
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Prof. Dr. Dr. med. dent. Ronald E. Jung

Professorship: Professor for Implantology

Academic affiliation: University of Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: Center of Dental Medicine, UZH

Area of research

Bioengineering; Biomechanics/Mechanobiology; Dentistry; Implants; Materials Sciences; Tissue Engineering/Biointerfaces

Description of research

The research area include hard- and soft-tissue regeneration in oral rehabilitations and implant dentistry. It includes the development of substitute materials and the use of bioactive molecules like growth factors for the regeneration of missing oral tissues. In addition, research takes place in the field of digital technologies and computer assisted planning and surgery. Further research focuses are on modern technologies for the reconstruction of missing teeth by means of tooth and implant supported reconstructions.
The entire research activity encompasses in vitro, preclinical and clinical study set ups.

Platforms and associated services / shareable equipment & infrastructure / databases

- Histological lab for hard and soft tissue
- Dental technician lab and material science lab
- Center for Implant research for interdisciplinary clinical research

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Center of Dental Medicine/Clinic for Fixed and Removable Prosthodontics
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8032 Zürich

E-mail: ronald.jung@zzm.uzh.ch

URL:

Prof. Dr. Dr. med. Wolfgang Jungraithmayr

Professorship: Thoracic surgery
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Immunology; Oncology; Surgery

Description of research

The main interest of my research group is experimental as well as clinical transplant- and tumor immunology. In These Projects, a major role plays the model of mouse lung transplantation which we invented 9 years ago as the first group worldwide. We try to find out how Antigens interact with the host, wether transplantation, tumor or allergy. Through this model, new therapeutics and diagnostics will be developed, such as measures against ischemia-reperfusion injury, acute or chronic transplant rejection. For example, in a longstanding cooperation with the University of Antwerp, clinical biochemistry, or the Perelman University, Pennsylvania, we could show that by inhibition of the molecule CD26/DPP4, transplant survival was improved, and through diminishing the co-stimulation of CD26-bearing T cells, allograft rejection was dampened. Clinical studies focus on early detection acute and chronic rejection by specific cytokine patterns and MR-imaging.
With regard to tumor research, we try to find new therapeutics against lung cancer. When inhibiting CD26/DPP4, we found in vitro as well as in vivo a significant reduction of lung cancer in different representative mouse lung tumor models. Currently, we are testing if human lung cancer is inhibitable when targeting CD26/DPP4.
One more research concerns tissue engineering. We test stem-cell – seeded new materials for chest wall and tracheal replacement, such as PLGA.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Transplant Immunology
- Tumor Immunology
- Tissue engineering

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Department of Thoracic Surgery
Rämistrasse 100
8091 Zürich
E-mail: wolfgang.jungraithmayr@usz.ch
URL:

Prof. Dr. Theofanis Karayannis

Professorship: Neuroscience

Academic affiliation: University of Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: none

Area of research

Anatomy; Behavioral science/Mental Health; Development/Developmental Biology; Genetics; Molecular Biology; Neuro Sciences; Physiology

Description of research

The brain begins to form during embryogenesis, but undergoes a protracted period of development that lasts into adulthood. Our work is aimed at understanding how the environment moulds the construction and reconfiguration of neuronal circuits to allow them to effectively process and respond to external stimuli throughout development. The goal is to unravel how the interplay between electrical activity and genetic programs controls the assembly and plasticity of cortical circuits that are involved in processing and gating sensory information. To achieve this, we utilize a multi-dimensional approach that includes molecular, genetic and functional methods. It is our hope that this research will not only provide insights into the making of the healthy brain, but also into neurodevelopmental brain pathologies resulting from aberrant circuit wiring.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Brain Research Institute
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URL: http://www.hifo.uzh.ch/en/research/karayannis.html

Prof. Dr. Walter Karlen

Professorship: Mobile Health Systems

Academic affiliation: ETH Zurich

Department/faculty: Department of Health Sciences and Technology

Clinical affiliation: none

Area of research

Anesthesiology/ Intensive Care; Control/Sensors/Actuators; Diagnostics; E-Health; Electrical Engineering; Implants; Modelling/Computation; Personalized Medicine; Respiratory Tract; Robotics; Sleep

Description of research

Research in the area of medical automation with the goal to improve digital health technologies and services. We develop personalized and efficient methods, devices and systems that can be used by anyone at the point-of-care. Our current focus is novel sensors and systems, intelligent diagnostics, and digital health reliability and quality.

Platforms and associated services / shareable equipment & infrastructure / databases

- Open access actimeters
- Numerous wearables
- Algortithms for real-time vital sign processing

Special expertise

- Low resource settings
- mHealth
- Engineering for development
- Medical device design

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- SKINTEGRITY
- SleepLoop

Address: ETH Zurich
Mobile Health Systems Laboratory
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8092 Zürich

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URL: www.mhsl.hest.ethz.ch

Prof. Dr. med. Philipp A. Kaufmann

Professorship: Nuclear Medicine
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Cardiovascular Sciences; Imaging; Personalized Medicine; Radiology/Nuclear Medicine

Description of research

Non-invasive multimodality Cardiac Imaging

Platforms and associated services / shareable equipment & infrastructure / databases

- PET center at University Hospital Zurich and WAGI
- Cyclotron Unit at Unviersity Hospital and WAGI

Special expertise

- Cardiac Imaging
- Hybrid Imaging
- Nuclear Cardiology
- Cardiac CT
- Cardiac Magnetic Resonance Imaging

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Department of Nuclear Medicine
Rämistrasse 100
8091 Zürich
E-mail: pak@usz.ch
URL: http://www.nuk.usz.ch/Seiten/default.aspx

Prof. Dr. med. Emanuela Keller

Professorship: Associate Professor, Neurocritical Care Unit

Academic affiliation: University of Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: University Hospital Zurich

Area of research

Anesthesiology/ Intensive Care; E-Health; Personalized Medicine; Physiology

Description of research

-Development of new methods to estimate brain perfusion and oxygenation
-Optical spectroscopy: Theoretical examinations, in vitro examinations, development of new medical devices for clinical applications
-Examination of the cerebral and systemic inflammatory response after stroke
-New treatment strategies against secondary injuries after stroke and traumatic brain injury
-Data mining, artificial intelligence and self-learning systems in intensive care medicine

Platforms and associated services / shareable equipment & infrastructure / databases

- Database from neurocritical care patients
- Data from biosignals with high time resolution

Special expertise

- Neurocritical care
- Emergency Medicine
- Biomedical Engineering

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University Hospital Zurich
Dept. of Neurosurgery
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8091 Zürich

E-mail: emanuela.keller@usz.ch

URL:

Prof. Dr. Mustafa Khammash

Professorship: Control Theory and Systems Biology

Academic affiliation: ETH Zurich

Department/faculty: Department of Biosystems Science and Engineering

Clinical affiliation: none

Area of research

(Bio-)Informatics; Bioengineering; Control/Sensors/Actuators; Modelling/Computation; Systems Biology

Description of research

Developing optogenetic feedback control devices with computer/cell interface. Engineering synthetic feedback control devices in living cells. Dynamic modeling and computation of physiological systems.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Zurich GeneQR

Address: ETH Zurich
Department of Biosystems Science and Engineering
Mattenstrasse 26
4058 Basel

E-mail: mustafa.khammash@bsse.ethz.ch

URL: https://www.bsse.ethz.ch/ctsb

Prof. Dr. Jan Klohs

Professorship: Assistant professor for preclinical imaging

Academic affiliation: University of Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: none

Area of research

Aging; Bioengineering; Diagnostics; Imaging; Neuro Sciences

Description of research

Our group conducts interdisciplinary research in the field of preclinical optical imaging and magnetic resonance imaging. We apply our extensive methodological expertise in data acquisition and post-processing to investigate models of brain diseases, with a focus on cerebral ischemia and Alzheimer`s disease. To this end, we use experimental and genetic animal models of human disease, pharmacology, biochemical and immunohistochemical techniques are employed for validation of these approaches.

The main lines of research in our group are:
1. MRI signatures of cerebrovascular function e.g. vascular density and morphology, and hemodynamic function.
2. Molecular imaging of inflammatory processes using cell labeling strategies and a variety of target-specific imaging probes.
3. Imaging approaches to reliably characterize and quantify changes in brain structure and function using novel sequences and biophysical models.

Platforms and associated services / shareable equipment & infrastructure / databases

- Small animal magnetic resonance imaging systems (4.7, 7 and 9.4T)
- Multispectral optoaccoustic tomography
- Planar near-infrared fluorescence imaging and tomography

Special expertise

- Animal models of cerebral ischemia
- Transgenic models of Alzheimer`s disease

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- EXCITE Zurich
- HMZ seed project 2015

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Biomedical Engineering
Vladimir-Prelog-Weg 4
8093 Zürich

E-mail: klohs@biomed.ee.ethz.ch

URL: http://www.pi.ethz.ch/

Prof. Dr. med. Malcolm Kohler

Professorship: Respiratory Medicine
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Cardiovascular Sciences; Chemistry/Analytics; Diagnostics; Metabolism; Personalized Medicine; Physiology; Proteomics/Transcriptomics, ...-omics; Respiratory Tract; Sleep

Description of research

Exhaled breath analysis (Exhalomics)
This has a focus on (but is not restricted to) the diagnosis and metabolic pathway identification of lung and airway diseases. Applied techniques are mainly based on SESI-MS and sensors. Currently investigated diseases include e.g. obstructive sleep apnoea, chronic obstructive pulmonary disease, lung fibrosis, asthma, cystic fibrosis, and lung cancer a.o.

Sleep disordered breathing
This is mainly focused on randomised controlled trials investigating the pathophysiological effects of obstructive sleep apnoea (OSA) and novel treatments for OSA.

Chronic obstructive pulmonary disease
In this area we are interested in the effects of COPD on the cardiovascular system. We are also looking at the effects of therapeutic interventions on various patient-centered outcomes in COPD.

Platforms and associated services / shareable equipment & infrastructure / databases

- Exhalomics via mass spectral analysis
- Sleep disordered breathing

Special expertise

- All areas of pulmonary medicine
- Sleep
- Sleep-disordered breathing (OSA)
- COPD

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Zurich Exhalomics (Co-Director)
- PhD Program Clinical Science UZH (Director)
- CRPP Sleep and Health (UZH; steering committee member)

Address: University Hospital Zurich
Department of Pulmonology
Rämistrasse 100
8091 Zürich
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URL: www.pneumologie.usz.ch

Prof. Dr. Johann Walter Kolar

Professorship: Power Electronic Systems

Academic affiliation: ETH Zurich

Department/faculty: Department of Information Technology and Electrical Engineering

Clinical affiliation: none

Area of research

Control/Sensors/Actuators; Design/Construction; Electrical Engineering

Description of research

The research of the ETHZ Power Electronic Systems Laboratory targets fundamental scientific problems in the area of Power Electronics and Mechatronics, e.g. for fulfilling extreme requirements concerning efficiency, power density, control dynamics or power quality. In the context of medical applications this includes the generation of high voltages for CTs, of defined current profiles for MRI systems, of ultra-high power pulses for cancer treatment, and recently the development of a wireless power transfer system which allows for a non-invasive energy supply of a LVAD implanted in the human body.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Zurich Heart

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Power Electronic Systems Laboratory
Physikstrasse 3
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URL: www.pes.ee.ethz.ch

Prof. Dr. Dr. med. Daniel Konrad

Professorship: Paediatric Endocrinology and Diabetology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Children's Hospital Zurich

Area of research
Endocrinology; Pediatrics; Physiology

Description of research
Our research focuses on the pathogenesis of obesity-associated insulin resistance.

Platforms and associated services / shareable equipment & infrastructure / databases
• Hyperinsulinaemic-euglycaemic clamp studies in mice

Special expertise
• Assessment of glucose metabolism in mice

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University Children's Hospital Zurich
Division Paediatric Endocrinolgy and Diabetology
Steinwiesstrasse 75
8032 Zürich
E-mail: daniel.konrad@kispi.uzh.ch
URL:

Prof. Dr. Ender Konukoglu

Professorship: Biomedical Image Computing

Academic affiliation: ETH Zurich

Department/faculty: Department of Information Technology and Electrical Engineering

Clinical affiliation: none

Area of research

Cardiovascular Sciences; Diagnostics; Electrical Engineering; Imaging; Modelling/Computation; Neuro Sciences; Neuroinformatics; Statistics

Description of research

I am interested in developing computational methods for analyzing medical data and in particular medical images. I develop machine learning algorithms, statistical methods and biophysical models for analyzing images and extract clinically relevant information.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Machine Learning
- Image Analysis

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Computer Vision Laboratory
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8092 Zürich

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URL:

Prof. Dr. Benoît Kornmann

Professorship: Organelle Biology
Academic affiliation: ETH Zurich
Department/faculty: Department of Biology
Clinical affiliation: none

Area of research

Biochemistry; Genetics; Molecular Biology; Systems Biology

Description of research

In the Kornmann laboratory, we are interested in the ultrastructural organization of the cell and the communications between its different compartments. We focus our research on the connection between the ER and the mitochondria.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Prof. Dr. Sebastian Kozerke

Professorship:	Biomedical Imaging
Academic affiliation:	ETH Zurich / University of Zurich
Department/faculty:	Department of Information Technology and Electrical Engineering
Clinical affiliation:	University Hospital Zurich

Area of research

(Bio-)Fluidics/Fluiddynamics; Cardiovascular Sciences; Diagnostics; Electrical Engineering; Imaging; Modelling/Computation; Pathology; Personalized Medicine; Physiology

Description of research

The Cardiovascular Magnetic Resonance Group at the Institute for Biomedical Engineering develops Magnetic Resonance technology and methods to assess the cardiovascular system. We devise the next generation of diagnostic tools for quantification of blood flow, organ perfusion, metabolism and function, tissue composition, microstructure and mechanics. The group exploits principles from physics, electrical engineering and computer science to design highly efficient and sensitive imaging and spectroscopy approaches to help guide diagnosis and treatment.

Platforms and associated services / shareable equipment & infrastructure / databases

- MRI User Lab (www.biomed.ee.ethz.ch/infrastructure/mri-user-lab.html)

Special expertise

- MR pulse sequence design
- MR image reconstruction and processing

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- EXCITE Zurich (www.excite.ethz.ch)
- KFSP Molecular Imaging Network Zurich (MINZ, www.minz.uzh.ch)

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Institute for Biomedical Engineering
Gloristrasse 35
8092 Zürich

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URL: www.cmr.ethz.ch

Prof. Dr. med. Gerd Kullak-Ublick

Professorship: Clinical Pharmacology and Toxicology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Diagnostics; Epidemiology; Epigenetics; Genetics; Metabolism; Molecular Biology; Personalized Medicine; Pharmacology/Toxicology; Proteomics/Transcriptomics, ...-omics

Description of research

Our group is focussed on all aspects of drug safety, both from a clinical-epidemiological as well as from a preclinical, translational perspective. We cloned several hepatocellular transport proteins from the OATP family (organic anion transporting polypeptides) as well as the bile salt export pump (BSEP), and have characterized the function and regulation of these transporters extensively, notably the role of nuclear receptors such as the farnesoid X receptor (FXR). We showed that FXR is also highly expressed in the kidney, where it exerts a protective effect against renal fibrosis induced by obesity and against other causes of kidney injury. The role of transporters in the onset of drug-induced liver injury (DILI) and drug-induced kidney injury (DIKI) is an ongoing area of research, as well as the validation of novel safety biomarkers for the clinical assessment of DILI and DIKI.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Pharmacogenetics and pharmacogenomics
- Pharmacoepidemiology
- Primary renal tubular cells
- Primary mouse and human hepatocytes

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Competence Center Personalized Medicine (CCPM)
- Drug Discovery Network Zurich (DDNZ)

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Department of Clinical Pharmacology and Toxicology
Rämistrasse 100
8091 Zürich
E-mail: gerd.kullak@usz.ch
URL: www.pharma.usz.ch

Prof. Dr. Vartan Kurtcuoglu

Professorship: Computational and Experimental Physiology

Academic affiliation: University of Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: none

Area of research

(Bio-)Fluidics/Fluiddynamics; Bioengineering; Biomechanics/Mechanobiology; Cardiovascular Sciences; Modelling/Computation; Neuro Sciences; Personalized Medicine; Physiology; Systems Biology

Description of research

My research group's vision is to answer fundamental questions of physiology and address clinical needs through the convergence of engineering, biological and medical research. We combine computational techniques with experimental methods to establish comprehensive models of investigated systems. Our focus is on fluid flow and mass transport processes in the cardiovascular system, the brain and the kidneys.

Platforms and associated services / shareable equipment & infrastructure / databases

- High performance computing
- Virtual reality

Special expertise

- Computational fluid dynamics
- Computational physiology

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Zurich Heart

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Institute of Physiology
Winterthurerstrasse 190
8057 Zürich

E-mail: vartan.kurtcuoglu@uzh.ch

URL: http://interfacegroup.ch

Prof. Dr. Christophe Lacroix

Professorship: Food Biotechnology

Academic affiliation: ETH Zurich

Department/faculty: Department of Health Sciences and Technology

Clinical affiliation: none

Area of research

Bioengineering; Biotechnology; Digestive System/ Nutrition; Microbiology/Infectiology; Pathology; Pediatrics; Physiology

Description of research

Our Research aims to gain fundamental and application knowledge on food and gut microbes with high potential metabolic activities. This includes ecosystem study, microbe screening and characterization, functional studies and mechanisms, microbial technology, and intestinal research. Lacroix's group works on the cultivation and stabilization of strict anaerobes, in pure, mixed and consortium cultures and of complete intestinal microbiota. Innovative technological platforms combining continuous in vitro gut fermentation models inoculated with immobilized microbiota (PolyFermS), and cellular models are developed for different hosts and diseases to investigate the effects and mechanisms of biotic and abiotic factors on the gut microbiota composition, activity and functions. In vivo animal and human studies are carried out in collaboration with different groups at the University of Zurich and elsewhere.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Functional microbes
- Gut microbiota and transplantation
- Fermentation and downstream processing
- Probiotics
- Dietary components

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- SNF-Sinergia 154488: The Microbe-Host Interface

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Schmelzbergstrasse 7
8092 Zürich

E-mail: christophe.lacroix@hest.ethz.ch

URL: http://www.fbt.ethz.ch/

Prof. Dr. Salomé LeibundGut-Landmann

Professorship: Immunology
Academic affiliation: University of Zurich
Department/faculty: Vetsuisse Faculty
Clinical affiliation: none

Area of research

Immunology; Lymphatic System; Microbiology/Infectiology; Skin; Veterinary Medicine

Description of research

The LeibundGut laboratory investigates innate and adaptive defense strategies against human and animal pathogens with a special interest in fungal pathogens.
Of the approximately 1.5 million different species of fungi on earth, only a few hundred are known to be pathogenic for humans and animals. These comprise organisms that are found in the normal microbiota of mammalian hosts. Disease symptoms occur when host defense barriers are breached and reach from mild infections that can be cured by available antifungal drugs to severe and life threatening diseases such as fungal meningitis and sepsis, which are associated with a high mortality rate.
Understanding the basic mechanisms of fungal pathogenicity and antifungal defense is key for improving diagnostic, therapeutic and preventive measures against these clinically important opportunistic infections. The research in our laboratory is based on animal models to investigate the immune mechanisms that protect the host from mucosal and systemic infections with Candida albicans and Malassezia spp.. Our particular interest is on the role of interleukin-17 and neutrophil-mediated antifungal defense. Our lab further investigates the natural diversity within a fungal species and how the dramatic variations in pathogenicity determine the balance between commensalism and pathogenicity.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Mouse models (mucosal, cutaneous and systemic infection models)
- Fungal infections (C. albicans, Malassezia)
- T cell immunology, neutrophil biology, IL-17 biology

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Sinergia project with partners at UniL, EPFL and Institut Pasteur

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Section of Immunology
Winterthurerstrasse 266a
8057 Zürich
E-mail: Salome.leibundgut-landmann@uzh.ch
URL: www.vetvir.uzh/en/Research/Immunology.html

Prof. Dr. Jean-Christophe Leroux

Professorship: Drug Formulation and Delivery

Academic affiliation: ETH Zurich

Department/faculty: Department of Chemistry and Applied Biosciences

Clinical affiliation: none

Area of research

Bioengineering; Materials Sciences

Description of research

Design of innovative delivery systems for drugs and diagnostic agents. Our laboratory is developing dosage forms (liposomes, gels, implants, microneedles) for the controlled and targeted delivery of therapeutic compounds. We have expertise in the fabrication of tailor made formulations with complex architectures and release patterns. We are also interested in biodetoxification and are testing novel lipid and polymer-based systems to remove or inactivate toxic compounds in the body.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- 3D-printing
- Liposomes / exosomes
- Functional polymers

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- SKINTEGRITY
- Drug Discovery Network Zurich (DDNZ)

Address: ETH Zurich
Institute of Pharmaceutical Sciences
Vladimir-Prelog-Weg 3
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Prof. Dr. med. Nicole Lindenblatt

Professorship: Plastic and Hand Surgery
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Other (please specify under remarks); Skin; Surgery; Tissue Engineering/Biointerfaces

Description of research

Microcirculation, microvascular thrombus formation, skin graft vascularisation, angiogenesis, vascular integration of biomaterials, autologuos fat grafting, regeneratove properties of nanofat, lymphedema models and lymphatic surgery, wound healing.

Platforms and associated services / shareable equipment & infrastructure / databases

- Intravital microscopy

Special expertise

- Reconstructive surgery
- Lymphatic surgery
- Scar treatment with nanofat

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- SKINTEGRITY

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Plastic and Hand Surgery
Rämistrasse 100
8091 Zürich
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URL: http://www.plastische-chirurgie.usz.ch/Seiten/default.aspx

Prof. Dr. med. Johannes Loffing

Professorship: Anatomy
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: none

Area of research

Anatomy; Cardiovascular Sciences; Genitourinary System; Physiology

Description of research

The general goal of our research is to understand how the kidneys maintain ion balance and how deranged underlying mechanism lead to human diseases including arterial hypertension. Current projects focus on the identification and characterization of novel candidate genes that control glomerular filtration, adaptive renal cell growth and epithelial sodium transport. Moreover, we elucidate regulatory mechanisms by which the kidney and other organs cooperate to control potassium homeostasis and blood pressure.

Platforms and associated services / shareable equipment & infrastructure / databases

- Large-scale isolation of renal tubules
- Ex vivo kidney slice culture / experiments
- Rodent tail-cuff blood pressure recordings

Special expertise

- Kidney histology (LM and EM)

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Institute of Anatomy
Winterthurerstrasse 190
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Prof. Dr. Jörg Löffler

Professorship: Metal Physics and Technology
Academic affiliation: ETH Zurich
Department/faculty: Department of Materials
Clinical affiliation: none

Area of research

Materials Sciences

Description of research

We focus on bioabsorbable metallic alloys which degrade in the body after they have performed their task, thus making implant removal surgery unnecessary. In the past, we have developed fine-grained Mg-alloys, Mg-based metallic glasses, and fine-grained Fe-alloys for such applications, and investigated in detail their mechanical characteristics, biomedical properties, and in-vitro / in-vivo degradation performance. Focusing on alloys without any biologically harmful alloying elements (e.g. MgZnCa), we have various projects and collaborations in the areas of vascular intervention, osteosynthesis, and the CMF region. We also work on bioabsorbable 3D-printed scaffolds and are involved in the project Zurich Heart with our experience in materials science.

Platforms and associated services / shareable equipment & infrastructure / databases

- Equipment for new materials production
- Equipment for materials characterization (microscopy, etc.)

Special expertise

- Bioabsorbable metallic alloys
- Materials science
- New materials development for medical applications
- Electron microscopy

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Zurich Heart

Address: ETH Zurich
Metal Physics and Technology
Vladimir-Prelog-Weg 4
8093 Zürich
E-mail: joerg.loeffler@mat.ethz.ch
URL: www.metphys.mat.ethz.ch

Prof. Dr. med. Andreas Luft

Professorship: Vascular Neurology and Rehabilitation

Academic affiliation: University of Zurich / ETH Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: University Hospital Zurich

Area of research

Neuro Sciences; Rehabilitation

Description of research

Basic and clinical research on the influence of dopaminergic reward system on motor system plasticity and motor recovery after stroke.

Platforms and associated services / shareable equipment & infrastructure / databases

- Microscopy

Special expertise

- Stroke (recovery) animal models
- fMRI
- Rehabilitation assessment technology

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University Hospital Zurich
Neurology
Frauenklinikstrasse 26
8091 Zürich

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URL:

Prof. Dr. med. Jan Lünemann

Professorship: Assistant Professor
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Biochemistry; Immunology; Molecular Biology; Neuro Sciences

Description of research

Genetic and environmental factors jointly determine the susceptibility to develop autoimmune diseases such as multiple sclerosis (MS). Allelic variants within the major histocompatibility complex (MHC) class II region are strongly associated with MS susceptibility and we are investigating mechanisms by which antigen presentation permits CD4+ T cell-mediated CNS tissue injury in animal models of MS. In addition, we aim at identifying mechanisms how environmental insults interact with genetic risk factors and are currently investigating immune responses to viral pathogens associated with MS, such as Epstein Barr Virus (EBV) to develop therapeutic strategies aiming at preventing EBV-associated MS risk. As an important immune effector mechanism in neuroinflammatory diseases, we study glycan-dependent antibody responses and whether immune recognition of glycans contributes to the development of and can be harnessed to limit tissue inflammation. Combining clinical with basic research and to increase the efficacy of current immunotherapies, we are exploring mechanisms of approved therapeutic strategies in patients with immune-mediated neurological diseases.

Platforms and associated services / shareable equipment & infrastructure / databases

- Standard protocols in immunology (cell culture techniques, flow cytometry, cell sorting)
- Standard protocols in protein biochemistry (expression, purification)
- Lentiviral techniques
- Experimental autoimmune encephalomyelitis models (active immunization and T cell transfer)

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Institute of Experimental Immunology
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URL: http://www.immunology.uzh.ch/en/researchunit/neuroinflammation.html

Prof. Dr. med. Thomas F. Lüscher

Professorship: Cardiology and Cardiovascular Physiology

Academic affiliation: University of Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: University Hospital Zurich

Area of research

Aging; Cardiovascular Sciences; Diagnostics; Epigenetics; Gene/Cell therapy; Imaging; Personalized Medicine; Physiology; Stem Cell Biology

Description of research

Basic Research in vascular biology (aging, endothelial dysfunction, progenitor cells, lipids, hypertension)

Clinical Research in cardiovascular disease (lipids, hypertension, acute coronary syndromes, stenting, heart failure)

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Center for Molecular Cardiology
Wagistreet 12
8952 Schlieren

E-mail: cardio@tomluescher.ch

URL:

Prof. Dr. med. vet. Thomas Lutz

Professorship: Veterinary Physiology
Academic affiliation: University of Zurich
Department/faculty: Vetsuisse Faculty
Clinical affiliation: none

Area of research

Cardiovascular Sciences; Digestive System/ Nutrition; Endocrinology; Metabolism; Neuro Sciences; Physiology; Veterinary Medicine

Description of research

My main interests are:
Amylinergic control of eating
Mechanisms underlying the effects of Roux-en-Y gastric bypass surgery (RYGB)
Pathophysiology of diabetes mellitus in cats

The gut brain axis is one of the major physiological systems to control energy balance and in particular energy intake. One of these signals is the pancreatic hormone amylin. Amylin analogues are in clinical use for the treatment of type 1 and type 2 diabetes, and some of these and newly developed analogues are currently being tested as anti-obesity medications by several pharmaceutical companies in Europe and North America.

Our laboratory has an established rodent model of RYGB. Our research focusses on RYGB effects on eating, energy expenditure, taste reactivity, bone metabolism, lipid metabolism and the cardiovascular system.

Diabetes mellitus in cats has a pathophysiology very similar to human type 2 diabetes. Cats are the only species apart from primates that develop a type 2 diabetes like syndrome spontaneously. Our research focussed on the characterization of changes in the exocrine and in the endocrine pancreas of diabetic cats. Further, we provided evidence for the usefulness of incretin-based therapy (in particular with GLP-1 analogues) in treating diabetic cats.

Platforms and associated services / shareable equipment & infrastructure / databases

- Indirect calorimetry
- Rodent CT scan
- Automated feeding systems for rodents

Special expertise

- Bariatric surgery in rodents

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Institute of Veterinary Physiology
Winterthurerstrasse 260
8057 Zürich
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URL:

Prof. Dr. Marloes Maathuis

Professorship: Statistics

Academic affiliation: ETH Zurich

Department/faculty: Department of Mathematics

Clinical affiliation: none

Area of research

(Bio-)Informatics; Modelling/Computation; Neuroinformatics; Personalized Medicine; Statistics; Systems Biology

Description of research

Methodology development and applications of statistics, in particular related to high-dimensional models and classification problems, graphical models, and the estimation of causal effects.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

• Zurich Exhalomics

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Seminar for Statistics
Rämistrasse 101
8092 Zürich

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URL: http://stat.ethz.ch/~maathuis/

Prof. Dr. med. Francesco Maisano

Professorship: Cardiac Surgery
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Anatomy; Bioengineering; Cardiovascular Sciences; Implants; Pathology; Physiology; Tissue Engineering/Biointerfaces

Description of research

Cardiovascular structural interventions, minimally invasive cardiac surgery and interventional cardiology, percutaneous treatment of valve disease, Heart failure therapies
Simulation for R&D and for education

Platforms and associated services / shareable equipment & infrastructure / databases

- Hybrid operating room
- Hybrid preclinical room
- Simulation lab

Special expertise

- Cardiovascular innovation

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Cardiovascular Surgery
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URL:

Prof. Dr. Isabelle Mansuy

Professorship: Neuroepigenetics

Academic affiliation: University of Zurich / ETH Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: none

Area of research

Behavioral science/Mental Health; Epigenetics; Genetics; Molecular Biology; Neuro Sciences; Personalized Medicine; Proteomics/Transcriptomics, ...-omics; Systems Biology

Description of research

Study of the mechanisms underlying the inheritance of the effects of trauma across generations in mice and humans.
Research on the molecular mechanisms underlying the transmission of environmentally-induced traits across generations. Particular interest on traits resulting from trauma in early life and that involve the germline.

Platforms and associated services / shareable equipment & infrastructure / databases

- Functional Genomics Center Zurich (FGCZ)

Special expertise

- Epigenetics
- Molecular biology
- Mouse behavior
- Omics

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University of Zurich
Brain Research Institute
Winterthurerstrasse 190
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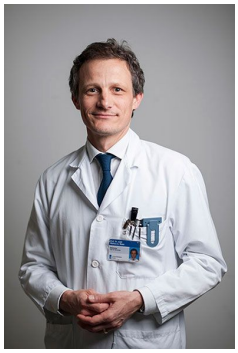
URL: http://www.hifo.uzh.ch/en/research/mansuy.html

Prof. Dr. med. Markus Manz



Professorship: Hematology

Academic affiliation: University of Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: University Hospital Zurich

Area of research

Aging; Bioengineering; Gene/Cell therapy; Hematology; Immunology; Lymphatic System; Oncology; Personalized Medicine; Stem Cell Biology; Tissue Engineering/Biointerfaces

Description of research

Our research is focused on haematopoietic and immune system development, homeostasis and function, as well as on hemato-lymphoid disease. We aim to gain basic knowledge and to provoke practical new strategies for clinical intervention in states of infection, immunodeficiency, autoimmunity, malignancy, and transplantation of hematopoietic cells.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Cancer Network Zurich

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Prof. Dr. med. Roland Martin

Professorship: Neurology and neuroimmunology

Academic affiliation: University of Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: University Hospital Zurich

Area of research

Immunology; Neuro Sciences

Description of research

Neuroimmunology and multiple sclerosis research
Basic immunology
Experimental therapies and treatment development
Drug discovery
Vaccine research
Disease mechanisms in autoimmune diseases
Infectious diseases of the nervous system

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Neurology, neuroimmunology
- Human immunology, T cell immunology, antigen recognition, HLA
- Treatment development to proof-of-concept clinical trials

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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8091 Zürich

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URL:

Prof. Dr. Alexander Mathys

Professorship: Sustainable Food Processing

Academic affiliation: ETH Zurich

Department/faculty: Department of Health Sciences and Technology

Clinical affiliation: none

Area of research

(Bio-)Fluidics/Fluiddynamics; Biochemistry; Bioengineering; Biotechnology; Chemistry/Analytics; Digestive System/ Nutrition; Electrical Engineering; Materials Sciences; Mechanical Engineering; Microbiology/Infectiology; Modelling/Computation; Molecular Biology; Statistics; Structural Biology

Description of research

The Sustainable Food Processing group focuses on a system oriented approach in food production via the consideration of the total value chain including emerging needs in society and their environmental, economic and social impact. Sustainable Food Processing is part of the global bioeconomy. Life cycle sustainability assessment LCSA as guidance tool is the foundation of our emerging food process development. Selected mechanical, biotechnological, thermal and non-thermal techniques to realize several objectives such as i) biomass and (ii) energy use efficiency, (iii) significant waste reduction along the food value chain and (iv) healthy and high quality food production are evaluated. Innovative raw materials from algae and insects are utilized within urban farming and processing concepts to enable new ways of sustainable food supply.

Platforms and associated services / shareable equipment & infrastructure / databases

- Microalgae cultivation
- Insect cultivation
- Isostatic ultra high pressure processing
- Low energy electron beam processing
- Pulsed elctrical field processing

Special expertise

- Emerging prerservation technologies
- Novel proteins from algae and insects
- Sustainability assessment

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- World Food System Center Flagship: Novel proteins (PI)

Address: ETH Zurich
Institute of Food, Nutrition and Health IFNH
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8092 Zürich

E-mail: alexander.mathys@hest.ethz.ch

URL: http://www.sfp.ethz.ch

Prof. Dr. Edoardo Mazza

Professorship: Mechanics

Academic affiliation: ETH Zurich

Department/faculty: Department of Mechanical and Process Engineering

Clinical affiliation: none

Area of research

Biomechanics/Mechanobiology; Materials Sciences; Mechanical Engineering; Modelling/Computation

Description of research

The group investigates the mechanics of biological and biomedical materials, i.e. man-made materials designed to interact with the body tissues in medical devices, implants or scaffolds for tissue engineering. We study these material systems from sub-cellular to organ level towards a better understanding of complex interactions at different length scales. One important aspect is the evaluation of the so called “mechanical biocompatibility” of implants and prosthetics.

Platforms and associated services / shareable equipment & infrastructure / databases

- Wet and dry biomechanics lab (uniaxial, multiaxial)
- In-situ testing devices
- Image based deformation analysis
- Dedicated suction devices
- Bioreactors

Special expertise

- Continuum mechanics
- Material modeling (continuum, multi-phase, discrete models)
- Mechanical biocompatibility
- In-vivo mechanical measurements
- Deformation and fracture of soft biological tissues

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Zurich Heart (Co-Chair)
- SKINTEGRITY

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IMES - Institute for Mechanical Systems
Leonhardstrasse 21
8092 Zürich

E-mail: mazza@imes.mavt.ethz.ch

URL:

Prof. Dr. Mirko Meboldt

Professorship: Product Development and Engineering Design

Academic affiliation: ETH Zurich

Department/faculty: Department of Mechanical and Process Engineering

Clinical affiliation: none

Area of research

(Bio-)Fluidics/Fluiddynamics; Behavioral science/Mental Health; Bioengineering; Cardiovascular Sciences; Control/Sensors/Actuators; Design/Construction; Diagnostics; Mechanical Engineering; Skin; Tissue Engineering/Biointerfaces

Description of research

Medical device development and validation:
The research goals are modelling and reproduction of physiological and pathological conditions as well as of medical hardware applications to address clinical needs. With Hardware-in-the-Loop approach or the real hardware system numerical models, new developed devices and control algorithms are investigated and tested under realistic conditions.

Usability and user centered design:
A central aspect of our research is related to user centered designed focusing on medical applications. Innovative products are strongly connected to the cognitive and behavioral processes of humans. We develop methods for novel measurement technologies to investigate user behavior during product application. For example with mobile Eye Tracking we are able to recorded behavioral data in real application environments and this allows us to effectively reveal latent user needs and thus to considerably improve user-focused product design.

Additive Manufacturing AM (3D-Printing):
New technologies like additive manufacturing (3D-Printing) offer great opportunities for new products and applications. With AM it is possible to create devices that were previously impossible to make or personalized components can be easily manufactured based on digital process chain. We are focusing on the design tools and process for a broad range of different additive manufacturing technologies, in order to accelerate the translation in clinical applications.

Platforms and associated services / shareable equipment & infrastructure / databases

- 3D Printing / Additive Manufacuring with meta e.g. titanium (ConceptLaser MLab)
- Mobile Eye Tracking glasses (SMI)

Special expertise

- Development and design of medical devices
- Development of test benches inkl simualtions
- Additive Manufactruing and 3D-Printing
- Prototyping of novel medical devices
- Usability studies in real world applications

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- SKINTEGTITY
- Zurich Heart

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Prof. Dr. Thimios A. Mitsiadis

Professorship: Oral Biology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: Center of Dental Medicine, UZH

Area of research

Bioengineering; Dentistry; Development/Developmental Biology; Genetics; Imaging; Molecular Biology; Stem Cell Biology; Tissue Engineering/Biointerfaces

Description of research

The research activities are focused on tooth development, pathology and regeneration. Research includes studies on key regulators of tooth development such as Notch and Wnt signalling. Transgenic analyses in Notch, Wnt and FAM20A mice, which exhibit enamel defects, are under investigation. Taking advance of the knowledge on the molecular and cellular mechanisms that govern tooth development, pathology and regeneration, and in combination with unique experimental biology skills applied in transgenic animal models, we have developed model systems for dental pathologies that are frequent in humans. Experimental procedures include organotypic cultures, tissue recombinations, stem cell cultures, in vitro tissue electroporation, in situ hybridisation and immunohistochemistry, whole-mount imaging, CAM essays and microfluidics.
Several of our studies focus on key molecules involved in the function and fate of specific dental stem cell populations. For this reason, we have developed a new research area in the dental field towards regenerative dentistry/personalised dentistry that combines various disciplines from stem cell biology, genetics, nanotechnology and mathematical modelling. Consequently, it is obvious that our research orientations are of importance and might benefit to both patients and clinicians working on dental tissue regeneration, thus having a big societal impact.

Platforms and associated services / shareable equipment & infrastructure / databases

- Functional Genomics Centre Zurich (FGCZ)
- Imaging Centre Zurich

Special expertise

- Dental cells and tissues
- Dental stem cells (culture, analysis, in vivo tracing etc)
- Microfluidics
- Organ on a chip

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Institute of Oral Biology
Plattenstrasse 11
8032 Zürich
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URL:

Prof. Dr. med. Holger Moch

Professorship: Pathology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Genitourinary System; Molecular Biology; Oncology; Pathology; Personalized Medicine

Description of research

The research program is devoted to the identification of clinically significant biomarkers in cancer, to the development of diagnostic tests for targeted therapeutics as well as the evaluation of novel molecular technologies in pathology. Dr. Moch's understanding of the relevant clinical issues in oncology and urology led to development a translational research program to understand the molecular underpinnings of renal cancer. One of the most important objectives is to develop a histological and molecular classification for renal cancers.

Platforms and associated services / shareable equipment & infrastructure / databases

- Histology and Immunohistochemistry
- FISH
- Biobanking
- Tissue Microarrays

Special expertise

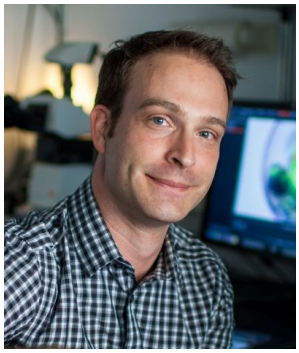
- Molecular Pathology
- Uropathology

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Cancer Network Zurich (CNZ)

Address: University Hospital Zurich
Department of Pathology and Molecular Pathology
Schmelzbergstrasse 12
8091 Zürich
E-mail: holger.moch@usz.ch
URL: http://www.pathologie.usz.ch

Prof. Dr. Christian Mosimann



Professorship: SNF Assistant Professor

Academic affiliation: University of Zurich

Department/faculty: Faculty of Science

Clinical affiliation: none

Area of research

Cardiovascular Sciences; Development/Developmental Biology; Genetics; Hematology; Imaging; Molecular Biology; Personalized Medicine; Stem Cell Biology

Description of research

The aim of our lab's research is to understand how cells acquire their fates during development. As principal model, we use the zebrafish (Danio rerio) to investigate the cell fate control of mesodermal lineages. The key topics of the lab are:

a) Lateral plate mesoderm (LPM) origins, emergence, and formation of its descendant organs, with key focus on cardiac, endothelial, and hematopoietic lineages.

b) Mechanisms of mesodermal tumor formation, with key focus on chordoma and chondrosarcoma modeling.

Our work combines transgenics, genome editing, analysis of cis-regulatory elements, and latest imaging techniques. Using our developmental readouts, we further apply CRISPR-Cas9-based genome editing for rapid genotype-phenotype testing of disease candidate genes and human microdeletion loci.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Disease modeling
- Transgenesis
- Genome Engineering
- Chemical Screening
- Live Imaging

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University of Zurich
Institute of Molecular Life Sciences
Winterthurerstrasse 190
8057 Zürich

E-mail: christian.mosimann@imls.uzh.ch

URL:

Prof. Dr. Ralph Müller

Professorship: Biomechanics

Academic affiliation: ETH Zurich

Department/faculty: Department of Health Sciences and Technology

Clinical affiliation: none

Area of research

Aging; Anatomy; Bioengineering; Biomechanics/Mechanobiology; Diagnostics; Electrical Engineering; Genetics; Imaging; Mechanical Engineering; Modelling/Computation; Molecular Biology; Musculoskeletal Sciences; Pathology; Personalized Medicine; Physiology; Proteomics/Transcriptomics, ...-omics; Systems Biology; Tissue Engineering/Biointerfaces

Description of research

The Müller Group is pursuing state-of-the-art biomechanical testing and simulation techniques as well as novel bioimaging and visualization strategies for musculoskeletal tissues. Today, these techniques are successfully employed for the quantitative assessment and monitoring of structure function relationships in tissue regeneration, growth and adaptation. These approaches are now often used for precise phenotypic characterization of tissue response in mammalian genetics, mechanobiology as well as tissue engineering and regenerative medicine.

Platforms and associated services / shareable equipment & infrastructure / databases

- Micro-computed tomography
- Biomechanical testing

Special expertise

- Biomechanics
- Bioimaging
- Computational modeling

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: ETH Zurich
Institute for Biomechanics
Leopold-Ruzicka-Weg 4
8093 Zürich

E-mail: ram@ethz.ch

URL: http://www.bone.ethz.ch/

Prof. Dr. Christian Münz

Professorship: Experimental Immunology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: none

Area of research

Immunology; Microbiology/Infectiology; Oncology

Description of research

Infection, oncogenesis and immune control of human gamma-herpesviruses.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Autophagy
- Epstein Barr virus
- Kaposi sarcoma associated herpesvirus
- Natural killer cells
- Humanized mice

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Network Infection and Immunity Zurich

Address: University of Zurich
Institute of Experimental Immunology
Winterthurerstrasse 190
8057 Zürich
E-mail: christian.muenz@uzh.ch
URL: http://www.immunology.uzh.ch/en/researchunit/immunobiology.html

Prof. Dr. Michael Nash

Professorship: Molecular engineering of synthetic systems

Academic affiliation: University of Basel / ETH

Department/faculty: Department of Biosystems Science and Engineering

Clinical affiliation: none

Area of research

Biochemistry; Bioengineering; Biomechanics/Mechanobiology; Biotechnology; Chemistry/Analytics; Nanotechnology; Structural Biology; Systems Biology; Tissue Engineering/Biointerfaces

Description of research

The Nash Lab is interested in molecular biomechanics, studying the response of proteins to applied forces using single-molecule biophysical techniques including single-molecule atomic force microscopy (i.e., force spectroscopy). We are also interested in developing enzymatic reaction cascades that encapsulate individual cells in synthetic hydrogels. Such systems have applications in directed evolution of biocatalysts as well as for the cross-linking of artificial extracellular matrix.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

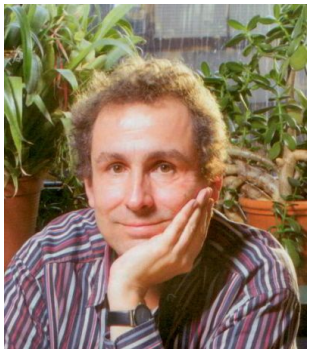
Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: ETH Zurich
Department of Biosystems Science and Engineering
Mattenstrasse 26
4058 Basel

E-mail: michael.nash@bsse.ethz.ch

URL: www.chemie.unibas.ch/~nashm

Prof. Dr. Stephan Neuhauss



Professorship: Neurobiology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Science
Clinical affiliation: none

Area of research

Behavioral science/Mental Health; Development/Developmental Biology; Molecular Biology; Neuro Sciences

Description of research

We use the zebrafish to generate models of human diseases, with a focus on ophthalmic disorders. We have developed a number of physiological (electroretinogram, electrophysiology, calcium imaging) and behavioral (3D tracking, parallel movement tracking, choice discrimination) assays for phenotype analyses.

Platforms and associated services / shareable equipment & infrastructure / databases

- Electroretinogram
- Fish breeding facility (incl. Transgenesis)

Special expertise

- Zebrafish Genetics

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University of Zurich
Institute of Molecular Life Sciences
Winterthurerstrasse 190
8057 Zürich
E-mail: stephan.neuhauss@imls.uzh.ch
URL: http://www.imls.uzh.ch/en/research/Neuhauss.html

Prof. Dr. med. vet. Karl Nuss

Professorship:	Ruminant Surgery
Academic affiliation:	University of Zurich
Department/faculty:	Vetsuisse Faculty
Clinical affiliation:	Animal Hospital, Vetsuisse Faculty University of Zurich

Area of research

Anatomy; Imaging; Movement Sciences; Musculoskeletal Sciences; Pathology; Radiology/Nuclear Medicine; Surgery; Veterinary Medicine

Description of research

Lameness in Ruminants, force plate, pressure plate, kinematography

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Welfare Aspects of Lameness in Ruminants

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University of Zurich
Farm Animal Department
Winterthurerstrasse 260
8057 Zürich

E-mail: karl.nuss@uzh.ch

URL:

Prof. Dr. Annette Oxenius

Professorship: Immunology

Academic affiliation: ETH Zurich

Department/faculty: Department of Biology

Clinical affiliation: none

Area of research

Immunology

Description of research

Annette Oxenius is Chair of Immunology at the Institute of Microbiology at ETH Zurich. Her research focuses on infection immunology, mainly in the context of acute and chronic viral infections. Using two experimental infection models, chronic infection with Lymphocytic Choriomeningitis virus (LCMV) and latent / reactivating infection with murine cytomegalovirus (MCMV) allows to study how adaptive immunity is regulated in face of overt or repetitive low level antigen exposure.
Chronic LCMV infection is associated with numerical and functional decimation of virus-specific CD8 T cell responses, collectively termed T cell exhaustion. Recently, emphasis has moved to virus-specific T helper cells, as they are markedly skewed towards a specific subtype, follicular T helper cells (TFH), during chronic viral infection. We could show that the generation of virus-neutralizing antibodies that eventually control the infection critically depends on sustained TFH activity. These findings have initiated a new priority area: to study molecular evolution of virus-specific antibody responses during chronic viral infections and the specific role of TFH cells in this process.
A second area focuses on the impact of chronic infections on the phenotype and function of bystander non virus-specific T cells.
A third area of investigation is the regulation of antiviral T cell immunity by NK cells.
A forth area is to understand regulation of T cell immunity in the context of latent CMV infection.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Mouse models of acute and chronic viral infefctions

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Network Infection and Immunity Zurich

Address: ETH Zurich
Institute of Microbiology
Vladimir-Prelog-Weg 1-5/10, HCI G401
8093 Zürich

E-mail: annette.oxenius@micro.biol.ethz.ch

URL: http://www.micro.biol.ethz.ch/research/oxenius.html

Prof. Dr. Monique Pfaltz

Professorship: Clinical and Experimental Psychophysiology

Academic affiliation: University of Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: University Hospital Zurich

Area of research

Behavioral science/Mental Health

Description of research

Our research focuses on emotion regulation and emotional processing in healthy and in clinical populations (e.g. posttraumatic stress disorder, borderline personality disorder). We are currently conducting experimental, psychophysiological laboratory studies and using ambulatory assessment strategies to assess facial mimicry and emotion recognition as well as effects of child maltreatment, neglect and other traumatic experiences on cognitive and emotional functioning.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Clinical Psychology
- Trauma/Posttraumatic Stress
- Emotion Regulation
- Emotion Recognition
- Psychophysiology

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University Hospital Zurich
Department of Psychiatry and Psychotherapy
Haldenbachstrasse 18
8006 Zürich

E-mail: Monique.Pfaltz@usz.ch

URL: https://www.researchgate.net/profile/Monique_Pfaltz

Prof. Dr. Jörn Piel

Professorship: Microbiology
Academic affiliation: ETH Zurich
Department/faculty: Department of Biology
Clinical affiliation: none

Area of research

Biochemistry; Biotechnology; Chemistry/Analytics; Genetics; Molecular Biology

Description of research

Bacterial bioactive natural products: identification of new bioactives and bacterial producers, genome mining for natural product discovery, metabolic engineering.

Platforms and associated services / shareable equipment & infrastructure / databases

- MS analytical platform including MALDI imaging MS

Special expertise

- Natural product isolation and characterization
- Metabolic enzymology
- Metagenomics

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: ETH Zurich
Institute of Microbiology
Vladimir-Prelog-Weg 4
8096 Zürich
E-mail: jpiel@ethz.ch
URL: http://www.micro.biol.ethz.ch/research/piel.html

Prof. Dr. Randall Platt

Professorship: Assistant Professor of Biological Engineering

Academic affiliation: ETH / Unibas

Department/faculty: Department of Biosystems Science and Engineering

Clinical affiliation: none

Area of research

Bioengineering; Biotechnology; Gene/Cell therapy; Genetics; Molecular Biology; Neuro Sciences; Personalized Medicine

Description of research

Developing CRISPR-based genome editing technologies for identifying, modeling, and correcting disease-associated genetic variants.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: ETH Zurich
Department of Biosystems Science and Engineering
Mattenstrasse 26
4058 Basel

E-mail: randall.platt@bsse.ethz.ch

URL: platt.ethz.ch

Prof. Dr. Andreas Plückthun

Professorship: Biochemistry

Academic affiliation: University of Zurich

Department/faculty: Faculty of Science and Faculty of Medicine

Clinical affiliation: none

Area of research

Biochemistry; Bioengineering; Biotechnology; Oncology; Structural Biology

Description of research

We study the creation of new proteins and protein variants. The purpose of this work is to use such engineered proteins to enable research and biomedical applications which have been very difficult or even impossible so far. Examples have been the creation of synthetic antibody libraries, the DARPin technology as new synthetic binding proteins, and the creation of stable GPCR variants as drug targets. From several endeavors, molecules have advanced to phase III clinical studies. Our laboratory combines biophysical and structural studies, directed evolution, cell culture and animal experimentation.

Platforms and associated services / shareable equipment & infrastructure / databases

- High-throughput binder selection facility

Special expertise

- Protein Design
- Protein Engineering
- Directed Evolution
- Translating basic research to commercial products for the clinic

Member of large scale research projects / HMZ Flagship Projects / centers & networks

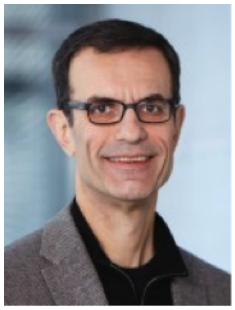
- Sinergia Project coordinator
- FET-Open EU Project coordinator

Address: University of Zurich
Dept. of Biochemistry
Winterthurerstrasse 190
8057 Zürich

E-mail: plueckthun@bioc.uzh.ch

URL: www.bioc.uzh.ch/plueckthun

Prof. Dr. Dimos Poulikakos



Professorship: Thermodynamics

Academic affiliation: ETH Zurich

Department/faculty: Department of Mechanical and Process Engineering

Clinical affiliation: none

Area of research

Bioengineering; Biomechanics/Mechanobiology; Cardiovascular Sciences; Diagnostics; Imaging; Materials Sciences; Mechanical Engineering; Modelling/Computation; Molecular Biology; Nanotechnology; Personalized Medicine; Tissue Engineering/Biointerfaces

Description of research

Prof. Poulikakos works in the area of micro- and nanofluidic technologies and rational (science-based) biomedical surface texturing under realistic fluidic environments. Specific examples of his research to this end are the accelerated and guided cell adhesion on surfaces, the endothelialization of a broad range of engineered surfaces and the development of anti-fibrotic, implantable surface textures and materials. Applications directly related to his work are cardiac implants (Ventricular Assist Devices), accelerated wound closing materials and biocellulose-based anti-fibrotic enveloping materials for implants, ranging from cosmetic to pacemakers. His work covers the entire range from fundamentals to (in cooperation with medical experts) animal experiments.

In addition to this, he develops nanofluidic technology platforms for the transport, trapping, investigation and valving of living micro- nano organisms (from cells to bacteria and down to nanoscale size viruses) controllably attaining even single virus resolution.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

• Zurich Heart (Co-Chair)

Address: ETH Zurich
Laboratory of Thermodynamics in Emerging Technologies
Sonneggstrasse 3
8092 Zürich

E-mail: dpoulikakos@ethz.ch

URL: http://www.ltnt.ethz.ch/

Prof. Dr. Sotiris E. Pratsinis

Professorship: Process Engineering

Academic affiliation: ETH Zurich

Department/faculty: Department of Mechanical and Process Engineering

Clinical affiliation: none

Area of research

Chemistry/Analytics; Control/Sensors/Actuators; E-Health; Materials Sciences; Mechanical Engineering; Modelling/Computation; Nanotechnology; Personalized Medicine; Statistics

Description of research

Highly selective chemoresistive WO3 sensors have been developed for breath acetone at the ppb level and high relative humidity (80-90%). This led to creation of a portable breath sensor that was benchmarked with standard glucose tests & successfully tested with humans leading to an industry prototype for clinical testing and very recently for monitoring fat burn during excersizing. MoO3 sensors are developed for detection of breath NH3 to monitor kidney diseases or ZnO sensors for breath isoprene to monitor cholesterol levels & even sensor arrays for monitoring breath formaldehyde at ppb in gas mixtures to screen potential lung cancer patients or indoor air pollution.
Silica-Coated Nonstoichiometric Nano Zn-Ferrites for Magnetic Resonance Imaging and Hyperthermia Treatment. Deep Tissue Imaging with Highly Fluorescent Near-Infrared Nanocrystals after Systematic Host Screening. Nanogenerators made of thin films containing BaTiO3 nanoparticles exhibiting stable output for 45 000+ cycles, each corresponding to a heartbeat of 60 bpm. Janus-like silica-coated Ag/Fe2O3 & Au/Fe2O3 nanoparticles were developed for bioimaging of Raji/HeLa cells & hyperthermia treatment of human breast cancer cells, respectively. Toxicity of silver nanoparticles in macrophages. Flexible multifunctional magnetically-actuated nanocomposite films. Synthesis of uniformly-coated superparamagnetic nanoparticles for triggered drug release. The effect of settling on cytotoxicity evaluation of n-particles.

Platforms and associated services / shareable equipment & infrastructure / databases

- X-ray Diffraction
- Raman Microscopy
- Gas adsorption
- Particle size measurement
- UV, TGA, MS etc.

Special expertise

- Particle synthesis
- Aerosol Dynamics
- Population Balances
- Mass Transfer
- Diffusion

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Zurich Exhalomics

Address: ETH Zurich
Particle Technology Laboratory/Institute of Process Engineering
Sonneggstrasse 3
8092 Zürich

E-mail: sotiris.pratsinis@ptl.mavt.ethz.ch

URL: http://www.ptl.ethz.ch/

Prof. Dr. Martin Pruschy

Professorship: Molecular Radiobiology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Imaging; Oncology; Personalized Medicine; Proteomics/Transcriptomics, ...-omics

Description of research

Translational Research in Radiation Oncology.
Mechanistic and efficacy-oriented research in the field of combined treatment modalities of ionizing radiation with targeted agents of clinical relevance.

Platforms and associated services / shareable equipment & infrastructure / databases

- Small animal image guided radiotherapy platform
- IVIS bioimaging facility

Special expertise

- Radiobiology
- Tumor biology
- Combined Anticancer Treatment Modalities

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- RADIATE EU Horizon2020 Marie Curie ITN

Address: University Hospital Zurich
Radiation Oncology
Rämistrasse 100
8091 Zürich
E-mail: martin.pruschy@usz.ch
URL:

Prof. Dr. Boris Quednow

Professorship:	Experimental and Clinical Pharmacopsychology
Academic affiliation:	University of Zurich
Department/faculty:	Faculty of Medicine
Clinical affiliation:	University Hospital of Psychiatry Zurich

Area of research

Behavioral science/Mental Health; Genetics; Imaging; Neuro Sciences; Pharmacology/Toxicology

Description of research

Substance use disorders are associated with a high burden for affected individuals, their families, and the entire society. Our main research interests are, therefore, an enhanced understanding of the behavioural neurotoxicology and neuroplasticity of illegal substance use (e.g., cocaine, MDMA [“ecstasy”], cannabis, methylphenidate, prescription opioids, GHB, hallucinogens). Employing a multi-method approach (functional and molecular imaging, EEG and electrophysiology, neuropsychology, neuroendocrinology, genetics, pharmacological challenges), we aim to explain how drugs of abuse impact human brain function, chemistry, and structure as well as associated emotions, cognitions, and behaviours. Moreover, consequences of chronic substance use can only be understood if the predispositions and risks for addictive disorders are elucidated concurrently. Accordingly, we also investigate predisposed alterations in neurobiology and information processing in order to better predict, prevent, and treat substance use disorders.

Platforms and associated services / shareable equipment & infrastructure / databases

- Neuropsychological test batteries
- Eye-Tracking
- EEG

Special expertise

- Behavioral toxicology
- Social cognition and interaction
- Illegal drugs
- Addiction
- Neuropsychology

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Zurich Cocaine Cognition Study
- Z-proso

Address: University Hospital of Psychiatry Zurich
Experimental and Clinical Pharmacopsychology
Lenggstrasse 31
8032 Zürich

E-mail: quednow@bli.uzh.ch

URL: http://www.dppp.uzh.ch/en/research/psychiatric/substance/experimental.html

Prof. Dr. Ursula Quitterer

Professorship: Molecular Pharmacology

Academic affiliation: ETH Zurich / University of Zurich

Department/faculty: Department of Chemistry and Applied Biosciences

Clinical affiliation: none

Area of research

Aging; Cardiovascular Sciences; Molecular Biology; Neuro Sciences; Personalized Medicine; Pharmacology/Toxicology; Physiology

Description of research

From heart to brain - the impact of cardiovascular diseases on neurodegeneration. We generate transgenic disease models for target identification and target validation in the fields of cardiovascular diseases and neurodegeneration. Our focus lies on the pathophysiological relevance of dysfunctional GPCR signaling and GPCR aggregation.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Pathophysiological relevance of GPCR aggregation
- From heart to brain - the impact of cardiovascular diseases on neurodegeneration
- Development of GRK2 inhibitors
- Generation of transgenic disease models

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: ETH Zurich
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Winterthurerstrasse 190
8057 Zürich

E-mail: ursula.quitterer@pharma.ethz.ch

URL: www.molecular-pharmacology.ethz.ch

Prof. Dr. Lawrence Rajendran

Professorship: System- and Cellbiology of Neurodegeneration

Academic affiliation: University of Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: University Hospital of Psychiatry Zurich

Area of research

Aging; Behavioral science/Mental Health; Biochemistry; Ethics; Gene/Cell therapy; Genetics; Metabolism; Molecular Biology; Neuro Sciences; Pathology; Personalized Medicine; Pharmacology/Toxicology; Systems Biology

Description of research

Rajendran lab works on understanding the cellular and molecular process underlying Alzheimer's disease. In particular, we study the membrane and subcellular compartmentalization involved in the amyloid production (Rajendran et al PNAS, 2006; Science, 2008) using systems biological tools (Udayar et al, Cell Reports, 2013; Siegel et al, Cell Reports, 2017) and also study how these processes could be translated for therapy (Ben Halima et al, Cell reports, 2016; Science, 2008; Nature Reviews Drug Discovery, 2009) and amyloid clearance in neurons and microglia (Paolicelli et al, Neuron, 2017).

Platforms and associated services / shareable equipment & infrastructure / databases

- High-throughput screening platform
- Electrochemiluminescence assay platform

Special expertise

- Cell Biology
- Systems Biology
- Lysosome biogenesis
- Endocytosis

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University of Zurich
Systems and Cell Biology of Neurodegeneration, IREM
Wagistrasse 12
8952 Schlieren

E-mail: lawrence.rajendran@irem.uzh.ch

URL:

Prof. Dr. Gunnar Rätsch

Professorship: Biomedical Informatics

Academic affiliation: ETH Zurich

Department/faculty: Department of Computer Science

Clinical affiliation: University Hospital Zurich

Area of research

(Bio-)Informatics; E-Health; Genetics; Modelling/Computation; Oncology; Personalized Medicine; Proteomics/Transcriptomics, ...-omics; Statistics

Description of research

His group develops and applies new approaches for data sharing, machine learning, and genomics in interdisciplinary collaborations. He and his group are actively contributing to the analyses in large cancer genomics consortia (TCGA and ICGC), in particular, the analysis of alternative splicing in cancer. Recent work includes an early warning system for intensive care units based on novel methods for longitudinal data analysis and modeling. Within an SNF NRP 75 “Big Data” project his group develops novel graph data structures and analysis methods for metagenomic and whole genome sequence data. He is leading multiple international working groups, including the RNA analysis group of the International Cancer Genome Consortium. He is an active contributor to the Global Alliance of Genomics and Health (GA4GH), an international organization that promotes and technically supports data sharing across institutional and country boundaries. He leads the data group of the BRCA Challenge project, a driver project of GA4GH.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Machine Learning
- Cancer genomics/transcriptomics
- Electronic Health Records
- Medical Informatics
- Deep sequencing Data

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Competence Center Personalized Medicine (CCPM)

Address: ETH Zurich
Department of Computer Science
Universitätsstrasse 6
8092 Zürich

E-mail: raetsch@inf.ethz.ch

URL: http://bmi.inf.ethz.ch

Prof. Dr. med. Janine Reichenbach

Professorship: Assistant Professor Paediatric Immunology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Children's Hospital Zurich

Area of research

Gene/Cell therapy; Genetics; Immunology; Pediatrics; Personalized Medicine

Description of research

Our translational research is focused on inborn errors of the immune system, spanning from analysis of molecular pathophysiology to development of new therapeutic concepts and therapeutic correction by clinical gene therapy.

In the field of gene therapy our group has been involved in the large collaborative EU-FP7 project CELL-PID, focused on development of next-generation lentiviral gene therapy vectors for immunodeficiencies, and is currently involved in a collaborative EU-FP7 project NET4CGD, an EU-based three-center clinical phase I/II gene therapy study for the treatment of the immunodeficiency chronic granulomatous disease (CGD).

Technical expertise: gene therapy vector development and vector testing in cell lines, iPSCs and animal models, gene therapy monitoring (functional assays for CGD include neutrophil extracellular trap (NET)-formation and pathogen killing) and monitoring of vector insertion and clonal evolution (analysis of clonality, vector copy number analysis)

Platforms and associated services / shareable equipment & infrastructure / databases

- FPLC (ÄCTApure (GE Health Care))
- Luminometer (Mithras (Berthold))
- FACS (Gallios (3 lasers, 10 colors + FSC, SSC), Beckman Coulter)

Special expertise

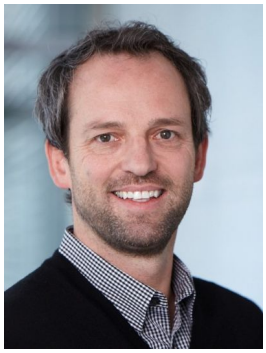
- Gene therapy (preclinical animal models, clinical phase I/II gene therapy studies)
- Retroviral vector design (tissue specific transgene expression, silencing resistant transgene expression)
- Targeted genome editing (CRISPR/Cas9, TALEN)
- Immunodeficiencies
- Pediatrics

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Planned HMZ Flagship on Gene Therapy: GeneQR
- EU-FP7 Project NET4CGD (Gene Therapy for CGD)
- HSM-2 Immunology
- KFSP Virome

Address: University Children's Hospital Zurich
Division of Immunology
Steinwiesstrasse 75
8032 Zürich
E-mail: janine.reichenbach@kispi.uzh.ch
URL:

Prof. Dr. Robert Riener



Professorship:	Sensory-motor Systems
Academic affiliation:	ETH Zurich / University of Zurich
Department/faculty:	Department of Health Sciences and Technology
Clinical affiliation:	Balgrist University Hospital

Area of research

Bioengineering; Biomechanics/Mechanobiology; Control/Sensors/Actuators; Electrical Engineering; Mechanical Engineering; Modelling/Computation; Movement Sciences; Musculoskeletal Sciences; Rehabilitation; Robotics; Sleep

Description of research

The research focuses on the study of human sensory-motor control, the design of novel mechatronic devices, and the investigation and optimisation of human-machine interaction. The main application area is the field of rehabilitation. Further applications are within sports, fitness, and medical education.Example projects include the arm therapy robot, ARMin, and the M3 Lab.

Platforms and associated services / shareable equipment & infrastructure / databases

- Machine shop shared with other professors
- M3 movement synthesis lab
- Movment analysis measurement equipment

Special expertise

- Rehabilitation robotics
- Man-machine interaction
- Virtual reality, augmented reality
- Biomechanics
- Muman motor learning

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: ETH Zurich
Sensory-Motor Systems Lab/ Dept. of Health Sciences and Technology
Tannenstrasse 1
8092 Zürich

E-mail: robert.riener@hest.ethz.ch

URL: http://www.sms.hest.ethz.ch/

Prof. Dr. med. Michael Ristow

Professorship: Energy Metabolism

Academic affiliation: ETH Zurich

Department/faculty: Department of Health Sciences and Technology

Clinical affiliation: none

Area of research

Aging; Biochemistry; Endocrinology; Epigenetics; Genetics; Metabolism; Musculoskeletal Sciences; Personalized Medicine; Pharmacology/Toxicology; Physiology; Systems Biology

Description of research

We are pursuing research on the biochemical and molecular basis of longevity regulation to provide novel therapeutic options to prevent and cure age-related diseases like obesity, diabetes, neurodegeneration and cancer.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: ETH Zurich
Institute of Translational Medicine
Schorenstrasse 16
8603 Schwerzenbach

E-mail: michael-ristow@ethz.ch

URL: http://www.energymetab.ethz.ch/

Prof. Dr. Mark D. Robinson

Professorship: Statistical Genomics
Academic affiliation: University of Zurich
Department/faculty: Faculty of Science
Clinical affiliation: none

Area of research

(Bio-)Informatics; Immunology; Modelling/Computation; Molecular Biology; Proteomics/Transcriptomics, ...-omics; Statistics

Description of research

Statistical methods for discovery in large-scale datasets (genomics, transcriptomics, multiplex cytometry, epigenomics).

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Statistics
- Bioinformatics

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University of Zurich
Institute of Molecular Life Sciences
Winterthurerstrasse 190
8057 Zürich
E-mail: mark.robinson@imls.uzh.ch
URL: http://goo.gl/d9V7ci

Dr. René Rossi

Professorship: none

Academic affiliation: Empa

Department/faculty: Materials meet Life

Clinical affiliation: none

Area of research

Biomechanics/Mechanobiology; Chemistry/Analytics; Control/Sensors/Actuators; E-Health; Materials Sciences; Metabolism; Modelling/Computation; Personalized Medicine; Physiology; Skin; Tissue Engineering/Biointerfaces

Description of research

Development of smart textiles for body monitoring and drug delivery purposes
Development of nanofibrous scaffolds for tissue engineering applications
Studies on the interactions between materials and the human body, especially the skin
Development of body and skin models to simulate human thermophysiology as well as mechanical properties of the skin.

Platforms and associated services / shareable equipment & infrastructure / databases

- Electrospinning plant for the fabrication of nanofibrous meshes
- Wet and melt spinning of fiber-based sensors and drug delivery fibers
- Numerical and physical models of human thermoregulation
- Sweating skin models for the simulation of contact mechanics
- Skin analytics devices

Special expertise

- Human thermoregulation

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Zurich Heart

Address: Empa
Biomimetic Membranes and Textiles
Lerchenfeldstrasse 5
9014 St.Gallen

E-mail: rene.rossi@empa.ch

URL: https://www.empa.ch/web/s401

Prof. Dr. Markus Rudin

Professorship: Molecular Imaging and Functional Pharmacology

Academic affiliation: University of Zurich / ETH Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: none

Area of research

Imaging; Neuro Sciences; Oncology

Description of research

Research group at the animal imaging center of UZH and ETH located at ETH Hönggerberg focused on MRI, in particular functional MRI (fMRI), and optical imaging methods (fluorescence tomography). His research focus is the development of non-invasive imaging techniques for studying structure, physiology, and metabolism of tissue as well as cellular and molecular events in the intact organism. Biomedical applications are studying the brain functional architecture under normal and pathologic conditions as well as structure-function relationships. In addition, the group is investigating aspects of hypoxia signaling in tumor models.

Platforms and associated services / shareable equipment & infrastructure / databases

- MRI Imaging platform at Animal Imaging Center UZH/ETH

Special expertise

- MRI and fMRI
- Fluorescence based optical imaging/tomography
- Hybrid fluorescence/MRI imaging
- Neurovascular coupling

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- EXCITE Zurich

Address: University of Zurich
Institute for Biomedical Engineering
Wolfgang-Pauli-Strasse 27
8093 Zürich

E-mail: rudin@biomed.ee.ethz.ch

URL:

Prof. Dr. Dr. med. Frank J. Rühli

Professorship: Anatomy
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: none

Area of research

Anatomy

Description of research

„Learning from the past for the present and the future."

-What are evolutionary origins of diseases, ultimate etiological causes?
-How do evolutionary vulnerabilities of human anatomy/physiology contribute to disease susceptibility and progression?
-How effectively do ancient samples, such as skeletal and mummified remains, act as a major source for the study of the evolution of disease?

We analyse ancient biological material and associated data to better understand modern human health issues and diseases; we are able to work on various interdisciplinary research questions in the context of the field of Evolutionary Medicine.

Our core competencies include:
-In the area of morphology: Clinical Anatomy; Variability and adaptation of body morphology as a function of time (Microevolution), sex, robustness, socio-economic factors etc.; Macroevolution of joint morphology and -pathologies.
-In the area of imaging: application of modern imaging techniques (MRI, terahertz) on historical tissues; Radiological diagnosis of pathologies.
-In the area of ancient DNA: Co-evolution of diseases and the human genome (evolution of human pathogens, microbiome analyses etc.); Service for Archaeology/Historical Anthropology (paternity testing, sex

Maintain a medical history object collection for the scientific community
Ethical considerations for the research on historical human tissues.

Platforms and associated services / shareable equipment & infrastructure / databases

- Ancient DNA
- Anthropometry Lab (e.g. Full body scanner)
- Mobile X-ray unit, 3d scanner
- Medico-historical collection
- Historic human bone and soft tissue samples

Special expertise

- Human Morphology
- Mummy Studies

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- URPP Evolution in Action
- EXCITE Zurich

Address: University of Zurich
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8057 Zürich
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URL: www.iem.uzh.ch

Prof. Dr. med. Frank Ruschitzka

Professorship: Cardiology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Cardiovascular Sciences

Description of research

Translational research from the development of novel drugs and devices to randomized clinical trials, in coronary artery disease and heart failure in particular.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Heart failure

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University of Zurich
Department of Cardiology
Rämistrasse 100
8091 Zürich
E-mail: frank.ruschitzka@usz.ch
URL:

Prof. Dr. Federica Sallusto

Professorship: Medical Immunology

Academic affiliation: ETH / USI (dual professorship, lead ETH)

Department/faculty: Department of Biology

Clinical affiliation: none

Area of research

Epigenetics; Immunology; Microbiology/Infectiology; Personalized Medicine; Proteomics/Transcriptomics, ...-omics; Skin; Sleep

Description of research

We study the human system to address fundamental questions in the context of the immune response to different classes of antigens, such as microbial pathogens, allergens or self-antigens, to gain insights into mechanisms that induce host protection or immune-mediated pathology. We are conducting studies to understand why in patients with chronic or disseminated infections, including patients with rare primary immunodeficiencies caused by genetic disorders, the immune system fails to protect the host. We also perform studies to understand how some individuals mount immune responses against not harmful environmental antigens or self-antigens, which cause allergy and autoimmunity. In this context, we are conducting studies in patients suffering from neurological disorders, including multiple sclerosis and narcolepsy, in collaboration with clinicians at university and cantonal hospitals in Zurich, Bern, Lugano and Genoa. Finally, we are developing new tools to advance the highly active and exciting field of cancer immunotherapy.

Platforms and associated services / shareable equipment & infrastructure / databases

- HT cell based screenings

Special expertise

- Human immunology
- Cell cultures
- Human T and B lymphocyte biology
- Human dendritic cell biology

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: ETH Zurich
Institute of Microbiology
Vladimir-Prelog-Weg 1-5/10
8093 Zürich

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URL: http://www.micro.biol.ethz.ch/research/sallusto.html

Prof. Dr. Alessandro Sartori

Professorship: Molecular Cancer Research
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: none

Area of research

Biochemistry; Genetics; Molecular Biology; Oncology; Personalized Medicine

Description of research

Targeting DNA damage repair pathways in cancer

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- DNA damage
- DNA repair
- Homologous Recombination
- Cell cycle
- Post-translational modifications

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University of Zurich
Institute of Molecular Cancer Research
Winterthurerstrasse 190
8057 Zürich
E-mail: sartori@imcr.uzh.ch
URL: http://www.imcr.uzh.ch/en/research/Sartori.html

Prof. Dr. Frank Scharnowski

Professorship: Neurofeedback

Academic affiliation: University of Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: University Hospital of Psychiatry Zurich

Area of research

Behavioral science/Mental Health; Imaging; Neuro Sciences; Neuroinformatics; Personalized Medicine

Description of research

Our approach to understanding the human brain is to manipulate brain activity and to subsequently determine how such manipulations affect perception and behavior. In order to manipulate brain activity without surgery and without drugs, we use non-invasive techniques such as neurofeedback and transcranial magnetic stimulation (TMS). These approaches allow to manipulate regionally specific brain activity, thus enabling us to establish a causal link between brain activity and behavior. We showed, for example, that neurofeedback-based 'brain training' of visual cortex improves visual sensitivity. We also showed that voluntary control over the motor cortex affects motor reaction times, and that control over the parahippocampal complex affects memory performance. We not only want to understand how the human brain works, but to also make use of this knowledge to the benefit of patients suffering from neurological and psychiatric conditions. We therefore work with clinicians to use these techniques in order to 'normalize' abnormal patterns of brain activity that are associated with, for example, neglect, blindsight, depression, PTSD, or addiction.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- (real-time) fMRI
- Neurofeedback
- Brain-computer-interfaces
- Functional brain imaging

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University Hospital of Psychiatry Zurich
Department of Psychiatry, Psychotherapy and Psychosomatics
Lenggstrasse 31
8032 Zürich

E-mail: frank.scharnowski@bli.uzh.ch

URL: www.neurofeedback-research.org

Prof. Dr. Gebhard Schertler

Professorship: Structural Biology

Academic affiliation: PSI/ETH

Department/faculty: Department of Biology

Clinical affiliation: none

Area of research

Biochemistry; Bioengineering; Biotechnology; Imaging; Modelling/Computation; Molecular Biology; Personalized Medicine; Pharmacology/Toxicology; Structural Biology

Description of research

Gebhard Schertler is a world leading expert in the structural studies of G-Protein Coupled receptor (GPCRs) and light-activated proteins, with a particular expertise in rhodopsin. He has a industry collaboration on structural analysis of rhodopsin mutants with medical relevance and the development of lead compounds. He is also obtaining structural information of the complexes between GPCRs and their cytoplasmic partners, G proteins and arrestins, the centerpieces that connect extracellular stimuli to intracellular signals. Schertler plans to compare the profile of activated signaling molecules with their dynamic intracellular localization pattern to learn how receptor activation translates into specific pathways of cellular signaling. Combination of the data resulting from the analysis of different Class A GPCRs will enable him to obtain a global picture of GPCR signaling and he will use this knowledge among things for assay development in collaboration with partners from biotech companies. His goal is to link receptor structure, cellular biological data and pharmacological results to physiological function.

Platforms and associated services / shareable equipment & infrastructure / databases

- 3D X-ray imaging of tissues
- Large scale expression systems for biophysical and structural studies

Special expertise

- Structural Analysis of membrane proteins
- Protein crystallography at synchrotrons and free electron lasers
- Structure based drug development
- Structural and functional analysis of visual pigments
- Receptor signaling and assay development

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Division of Biology and Chemistry
OFLC109
5232 Villigen

E-mail: gebhard.schertler@psi.ch

URL: https://www.psi.ch/bio/schertler-group-research

Prof. Dr. med. Isabelle Schmitt-Opitz

Professorship: Assistant Professor

Academic affiliation: University of Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: University Hospital Zurich

Area of research

Personalized Medicine; Respiratory Tract; Surgery

Description of research

The research focus of the working group led by Prof. Dr. Isabelle Schmitt-Opitz is the improvement of malignant pleural mesothelioma treatment.
One main focus of experimental research is the investigation of new therapeutic approaches using cell culture and small animal models of malignant pleural mesothelioma. With the help of a preclinical animal model a new therapy strategy was found to reduce recurrence rates by adding intracavitary local cisplatin bound to fibrin after tumor resection. After promising results a clinical phase I study proofed, that intracavitary local use of cisplatin/fibrin in human can be used safely. In this INFLuenCe Meso phase I study, 12 patients were successfully treated without limiting side effects. A clinical phase II study (INFLuenCe Meso II), was started to obtain first results about the efficacy of the treatment.
In further experimental studies, the possibility to use intracavitary chemotherapy to sensitize patients for a subsequent radiotherapy is examined. This would allow the use of a lower radiation dose and thus this therapy would be available to a larger amount of patients. In a second project, new medication for the treatment of mesothelioma is searched for. For this purpose, cells isolated from the tumour tissue are treated with various new active substances and the effect on cell growth is examined. Further focus is the identification of new molecular markers, which are traceable in the tumour tissue or blood of patients.

Platforms and associated services / shareable equipment & infrastructure / databases

- Infrastructure of Research Surgery at USZ

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Department of Thoracic Surgery
Rämistrasse 100
8091 Zürich

E-mail: isabelle.schmitt-opitz@usz.ch

URL:

Prof. Dr. med. Ulrich Schnyder

Professorship: Polyclinical Psychiatry and Psychotherapy
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Behavioral science/Mental Health; Epidemiology

Description of research

Our research activities are currently focused on different aspects of traumatic stress research, such as epidemiology, risk factors, psychotherapy and pharmacotherapy for PTSD, as well as neurobiologic issues including resilience and fear conditioning in traumatized populations. We are currently looking into emotion regulation in severely traumatized (tortured) refugees, hoping to develop tailored therapeutic mini-interventions aimed at enhancing refugees' self-efficacy. In another study, we are investigating the neural processing of high intensity sounds in patients suffering from posttraumatic stress disorder (PTSD). Furthermore, in a currently ongoing project, we are studying the role of dissociation in emotion recognition and regulation in PTSD. We are also preparing for a study of the reward system under stress, looking into the psychobiological mechanisms of resilience to stress in survivors of physical violence. A study of epigenetic alterations in young adults who had been exposed to neglect during childhood will start in 2017. Furthermore, we are participating in a multisite implementation study of PM+ (Problem Management Plus) as a low-threshold intervention for Syrian refugees, funded by a large EU (Horizon 2020) grant.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Culmannstrasse 8
8091 Zürich
E-mail: ulrich.schnyder@access.uzh.ch
URL: www.psychiatrie.usz.ch

Prof. Dr. Timm Schroeder

Professorship: Cell Systems Dynamics

Academic affiliation: ETH Zurich

Department/faculty: Department of Biosystems Science and Engineering

Clinical affiliation: none

Area of research

(Bio-)Fluidics/Fluiddynamics; (Bio-)Informatics; Bioengineering; Control/Sensors/Actuators; Development/Developmental Biology; Hematology; Imaging; Modelling/Computation; Molecular Biology; Personalized Medicine; Proteomics/Transcriptomics, ...-omics; Stem Cell Biology; Systems Biology; Tissue Engineering/Biointerfaces

Description of research

Timm Schroeder investigates the molecular control of mammalian stem cell fate decisions at the interface of molecular cell biology, stem cell research, medicine and informatics. He has pioneered bioimaging approaches for long-term single cell observations, enabling answers to long-standing questions in stem cell research. His work combines cell and molecular biology, genetics, imaging, engineering, software development, statistics and computational mathematical modelling.

Platforms and associated services / shareable equipment & infrastructure / databases

- Widefield time-lapse microscopes

Special expertise

- Single-cell analysis
- Single-cell imaging and tracking
- Stem cell biology
- Software development
- Microfluidics design

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Department of Biosystems Science and Engineering
Mattenstrasse 26
4058 Basel

E-mail: timm.schroeder@bsse.ethz.ch

URL: www.bsse.ethz.ch/csd

Prof. Dr. Martin E. Schwab

Professorship: Neuroscience

Academic affiliation: University of Zurich / ETH Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: none

Area of research

Anatomy; Development/Developmental Biology; Imaging; Molecular Biology; Movement Sciences; Neuro Sciences; Pharmacology/Toxicology; Rehabilitation

Description of research

Mechanisms of regeneration and repair after brain and spinal cord injuries. Animal models for spinal cord injury, stroke and multiple sclerosis (EAE). Immunotherapies (antibodies against Nogo-A). Clinical trials in collaboration with Spinal Cord Injury Center at Balgrist University Hospital, and with Dept. of Neurology and Dept. of Neurosurgery, USZ.

Platforms and associated services / shareable equipment & infrastructure / databases

- Animal behavior: Locomotion, skilled grasping; natural habitat cage
- Immunohistochemistry for rare antigens
- Electron microscopy
- Fiber tract tracing

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University of Zurich
Brain Research Institute
Winterthurerstrasse 190
8057 Zürich

E-mail: schwab@hifo.uzh.ch

URL: http://www.hifo.uzh.ch/en/research/schwab.html

Prof. Dr. Gerald Schwank

Professorship: Stem cells and disease modeling

Academic affiliation: ETH Zurich

Department/faculty: Department of Biology

Clinical affiliation: none

Area of research

Gene/Cell therapy; Genetics; Molecular Biology; Oncology; Personalized Medicine; Tissue Engineering/Biointerfaces

Description of research

We work on CRISPR/Cas approaches for in vivo gene editing in the liver. The goal is to cure patients with monogenetic liver diseases. In addition we use CRISPR/Cas9 in pancreatic organoids to study pancreatic cancer development and progression.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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IMHS
Otto-Stern-Weg 7
8093 Zürich

E-mail: gerald.schwank@biol.ethz.ch

URL: http://www.mhs.biol.ethz.ch/research/schwank.html

Prof. Dr. med. vet. Colin Schwarzwald

Professorship: Equine Internal Medicine

Academic affiliation: University of Zurich

Department/faculty: Vetsuisse Faculty

Clinical affiliation: Clinic for Equine Internal Medicine

Area of research

Cardiovascular Sciences; Veterinary Medicine

Description of research

General fields of expertise:
Comparative cardiology, cardiovascular medicine, echocardiography, electrocardiography, cardiac electrophysiology, hemodynamics and hemodynamic monitoring, cardiovascular pharmacology, cardiac biomarkers, critical care medicine in large animal species.

Platforms and associated services / shareable equipment & infrastructure / databases

- Center for Applied Biotechnology and Molecular Medicine (CABMM)
- Zurich Center for Integrative Human Physiology (ZIHP) Vetsuisse Faculty, University of Zurich

Special expertise

- Large Animal Cardiology
- Echocardiography in large animals
- Electrocardiography in large animals
- Hemodynamic monitoring in large animals

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University of Zurich
Clinic for Equine Internal Medicine, Equine Department, Vetsuisse Faculty
Winterthurerstrasse 260
8057 Zürich

E-mail: cschwarzwald@vetclinics.uzh.ch

URL: http://www.tierspital.uzh.ch/de/Pferde/Pferdemedizin.html

Prof. Dr. med. Oliver Senn

Professorship: Assistant Professor
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Multimorbidity

Description of research

Health Services Research (HSR) focusing on primary care. The impact of integrated health care on patients suffering from multiple chronic diseases. Testing new health care models such as team-based approaches (skill-mix), patient-centred care and the role of shared decision making for medication deescalation, screening and treatment decisions.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Institute of Primary Care
Pestalozzistrasse 24
8091 Zürich
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URL:

Prof. Dr. med. Felix Hans Sennhauser

Professorship: Pediatrics
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Children's Hospital Zurich

Area of research

Behavioral science/Mental Health; Diagnostics; Epidemiology; Ethics; Immunology; Pediatrics; Respiratory Tract

Description of research

Respiratory medicine: Bronchial Asthma, Cystic Fibrosis, Allergy, Mucosal Immunity, Malformations

Epidemiology of respiratory and allegic diseases

Coping strategy and posttraumatic stress syndrome in pediatric diseases

Concepts of pediatric care

Platforms and associated services / shareable equipment & infrastructure / databases

- Children's Research center CRC
- Commitee of clinical ethics
- Palliative Care

Special expertise

- Research in outcome
- Quality of life research
- Academic career development, Coping strategies
- Competence Center for Mental Health (CCMH)

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University Children's Hospital Zurich
Medical Director
Steinwiesstrasse 75
8032 Zürich
E-mail: felsen@kispi.uzh.ch
URL: https://www.kispi.uzh.ch/de/zuweiser/fachbereiche/allgemeinepädiatrie/Seiten/default.aspx#a=akk1

Prof. Dr. med. Gabriela Senti

Professorship: Adjunct Professor
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Immunology; Skin

Description of research

Allergology:
Immunotherapy (Intralymphatic 'ILIT', Epicutaneous 'EPIT', novel approaches)

Novel approaches against allergies against cats and dogs:
Cat and dog allergies are important causes of rhinoconjunctivitis and asthma. Responsible for the allergy are proteins in the saliva which are transferred onto the fur. Our team has developed a a new approach for pet allergies by vaccinating cats and dogs against their own allergens. The concept is that vaccination will render them hypoallergenic by neutralizing their own allergens the humans are allergic to, allowing more pet owners to keep their beloved cat or dog at home. This research has resulted in the setup of a spin-off company, Hypo Pet AG, which is continuing research in collaboration with the UniversityHospital Zurich and is developing tradeable products (vaccines).
http://www.hypopet.ch/

Platforms and associated services / shareable equipment & infrastructure / databases

- Clinical Trials Center: GCP support in planning, setting up and conducting clinical research
- Research Data Service Center
- Biobank Research Service Center

Special expertise

- Clinical Research
- Good Clinical Practice
- Regulatory affairs
- Development and trial of novel allergen specific immunotherapy approaches (ILIT, EPIT)

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Directorate Research & Education, Clinical Trials Center
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Prof. Dr. Jess Gerrit Snedeker

Professorship: Orthopedic Biomechanics

Academic affiliation: University of Zurich / ETH Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: Balgrist University Hospital

Area of research

(Bio-)Informatics; Aging; Bioengineering; Biomechanics/Mechanobiology; Diagnostics; Implants; Mechanical Engineering; Modelling/Computation; Movement Sciences; Musculoskeletal Sciences; Personalized Medicine; Physiology; Rehabilitation; Stem Cell Biology; Structural Biology; Surgery; Systems Biology; Tissue Engineering/Biointerfaces

Description of research

The Snedeker laboratory focuses on three primary research areas: mechanical/biological based understanding of collagen tissue degeneration and regeneration; micro-mechanical cell-biomaterial interactions and their implications for tissue damage and regeneration; and clinical biomechanics for improving existing orthopedic implant design, for the development of novel implants, and for the development of improved quantitative radiological endpoints.

Platforms and associated services / shareable equipment & infrastructure / databases

- Balgrist Campus: MSK Tissue Biobank
- Balgrist Campus: Functional Imaging Center
- Imaging based, multi-scale biomechanical characterization

Special expertise

- Collagen Matrix Biology
- Multi-Scale Biomechanics
- Wound Healing

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Department of Orthopedics
Lengghalde 5
8008 Zürich

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URL: http://www.orthobiomech.ethz.ch/

Prof. Dr. Berend Snijder

Professorship: SNF Professor

Academic affiliation: ETH Zurich

Department/faculty: Department of Biology

Clinical affiliation: none

Area of research

(Bio-)Informatics; Hematology; Imaging; Immunology; Molecular Biology; Oncology; Personalized Medicine; Proteomics/Transcriptomics, ...-omics; Statistics; Systems Biology

Description of research

We are interested in deciphering how cells work from a top-down point of view, focusing on the molecular networks and organizational principles that drive cellular behavior in health and disease.

To pursue this question we apply high-throughput automated microscopy, computer vision and machine learning, and integrative genomics and metabolomics, to the systematic analysis of human blood cells and various patient biopsies.

Automated imaging of primary human tissues cells allows us to characterize the ex vivo response of individual donors to thousands of (potential) drug treatments or perturbations, over millions of cells, all with spatial and sub-cellular resolution. This leads to unprecedented functional insights with direct applications in personalized medicine, particularly relevant to oncology and immunology. Integration with OMICs such as genome-wide transcriptomics and quantitative lipidomics enables a top-down view on the molecular players regulating the observed cellular behavior.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Large-scale image analysis
- Integrative OMICs
- Machine learning
- High throughput automated confocal microscopy

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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8093 Zürich

E-mail: snijder@imsb.biol.ethz.ch

URL: www.snijderlab.org

Prof. Dr. med. Alex Soltermann

Professorship: Assistant Professor for Tumor Pathology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Oncology; Pathology; Personalized Medicine; Proteomics/Transcriptomics, ...-omics; Respiratory Tract

Description of research

In order to correlate the proteomics profile of lung squamous cell carcinoma with its histologic tumor microarchitecture (called morpho-proteomics), we have prepared protein extracts from formalin-fixed paraffin-embedded tumor blocks. After digestion and purification by the filter-aided sample preparation (FASP) column, tryptic peptides were analysed by shotgun proteomics (LC-MS/MS) at FGCZ (Functional Genomics Center Zurich). In parallel, computerized image analysis of pan-cytokeratin stained tumor whole sections has identified tumor fragmentation as prognostic parameter of tumor invasion in both the Zurich lung squamous cell cohort as well as in the TCGA database. TF also correlates with markers of epithelial-mesenchymal transition such as periostin. In order to create a 3D model of lung squamous cell carcinoma, we have investigated wet and fixed samples by X-ray microtomography at the TOMCAT beamline of the PSI (Paul Scherrer Institute, Prof. M. Stampanoni). Next, we will investigate the parameter of tumor fragmentation in chemo-naïve versus chemo-treated lung SCC and correlate it with metabolic and radiologic parameters of tumor regression obtained from PET-CT data. To detect prognostic and diagnostic morphologic features unrecognizable to the human eye, we have started a deep learning project for computerized classification of non-small cell lung carcinoma into squamous cell or adenocarcinoma, in collaboration with Prof. B. Sick, ZHAW Winterthur.

Platforms and associated services / shareable equipment & infrastructure / databases

- Laboratory for In situ Technologies

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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URL: www.pathologie.usz.ch

Prof. Dr. Lukas Sommer

Professorship: Anatomy
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: none

Area of research

Development/Developmental Biology; Oncology; Skin; Stem Cell Biology

Description of research

Our research focuses primarily on neural crest stem cells, an embryonic cell population associated with a broad range of congenital diseases in human. In addition, our studies elucidate the development of tumors originating from neural crest derivatives, like melanoma. Finally, we investigate the role of neural crest-derived stem cells in regeneration and repair of adult tissues, with a particular emphasis on skin wound healing.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Adult and fetal stem cells
- Human embryonic stem cells
- Genetic mouse models
- Tumor models
- Wound healing models

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- SKINTEGRITY
- URPP Translational Cancer Research

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Winterthurerstrasse 190
8057 Zürich
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URL:

Prof. Dr. Marco Stampanoni

Professorship: X-ray Imaging

Academic affiliation: ETH Zurich

Department/faculty: Department of Information Technology and Electrical Engineering

Clinical affiliation: none

Area of research

Diagnostics; Electrical Engineering; Imaging

Description of research

The team around Prof. Stampanoni focuses on the development of tools, both instrumentation and algorithms, for tomographic X-ray imaging, exploiting synchrotron and laboratory sources. The group is engaged in the design and construction of ultra-fast data acquisition systems (stroboscopic coherent X-ray radiology and tomography) to provide dynamic investigation of rapidly evolving systems. The group also intensively develops optimized applications for fast, concurrent post-processing of tomographic data starting from simple normalization corrections to ad-hoc reconstruction and artifact reductions algorithms. Finally, the group investigates, creates and optimizes novel imaging modalities based on the coherent properties of synchrotron radiation and works on the translation of such work to conventional x-ray sources, in particular for medical application.

Platforms and associated services / shareable equipment & infrastructure / databases

- TOMCAT beamline at the Swiss Light Source
- Phase-contrast imaging systems

Special expertise

- Tomographic imaging
- Mammography
- Phase contrast

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- ERC Awardee

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8092 Zürich

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URL:

Prof. Dr. Wendelin Stark

Professorship: Functional Materials Engineering

Academic affiliation: ETH Zurich

Department/faculty: Department of Chemistry and Applied Biosciences

Clinical affiliation: none

Area of research

Chemistry/Analytics; Dentistry; Hematology; Implants; Materials Sciences; Nanotechnology; Physiology; Tissue Engineering/Biointerfaces

Description of research

Functional implant development: Use of chemical and biochemical methods to make traditionally applied biomaterials more amenable to complex medical tasks.

Soft materials: We have developed 3D printing of molds to manufacture soft objects of virtually any shape, and contributed to pneumatic and combustion driven soft robotics components.

Analysis: We currently investigate biosensors based on living microorganisms to accelerate analysis of medically relevant samples.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Zurich Heart

Address: ETH Zurich
HCI E 107
Vladimir-Prelog-Weg 1
8093 Zürich

E-mail: wendelin.stark@chem.ethz.ch

URL: www.fml.ethz.ch

Prof. Dr. Dr. med. Klaas Enno Stephan

Professorship: Translational Neuromodeling

Academic affiliation: University of Zurich / ETH Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: none

Area of research

Behavioral science/Mental Health; Imaging; Modelling/Computation; Neuro Sciences; Neuroinformatics; Personalized Medicine

Description of research

My work is concerned with the development and validation of mathematical models that infer subject-specific disturbances of physiology and information processing in neuronal circuits from neuroimaging, electrophysiological and behavioural measures.

These computational assays are developed to address concrete clinical problems in psychiatry, neurology, and psychosomatics. The goal is to establish these computational assays as novel tools for differential diagnosis and individual treatment predictions in clinical practice.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- fMRI data analysis
- Neuromodeling (fMRI, EEG, behavioural data)
- Computational Psychiatry
- Computational Psychosomatics

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University of Zurich
Translational Neuromodeling Unit (TNU), Institute for Biomedical Engineering
Wilfriedstrasse 6
8032 Zürich

E-mail: stephan@biomed.ee.ethz.ch

URL: https://www.tnu.ethz.ch

Prof. Dr. Shinichi Sunagawa

Professorship: Microbiome Research

Academic affiliation: ETH Zurich

Department/faculty: Department of Biology

Clinical affiliation: none

Area of research

(Bio-)Informatics; Digestive System/ Nutrition; Genetics; Immunology; Microbiology/Infectiology; Modelling/Computation; Personalized Medicine; Proteomics/Transcriptomics, ...-omics; Systems Biology

Description of research

We are interested in studying ecological and evolutionary factors that determine the structure, function and diversity of microbial communities – with a focus on the gastrointestinal tract of animals and humans. To this end, we develop and combine bioinformatic and experimental approaches to integrate quantitative 'meta-omics' readouts with contextual information, with the goal to better understand and predict the role of environmental microorganisms and the underlying mechanisms of host-microbial homeostasis.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Metagenomics
- Metatranscriptomics
- Bioinformatics
- Microbial community ecology

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: ETH Zurich
Institute of Microbiology
Vladimir-Prelog-Weg 4
8093 Zürich

E-mail: ssunagawa@ethz.ch

URL: http://www.micro.biol.ethz.ch/research/sunagawa.html

Prof. Dr. Brigitte Tag

Professorship: Medical Law, Criminal Law, Criminal proceeding

Academic affiliation: University of Zurich

Department/faculty: Law Faculty

Clinical affiliation: none

Area of research

Anatomy; E-Health; Epigenetics; Ethics; Imaging; Law; Nanotechnology; Oncology; Personalized Medicine; Surgery; Veterinary Medicine

Description of research

Medical law, medical ethics; protection of the autonomy;
legal and ethical questions concerning the beginning and the end of life; handling of human bodies, parts of the body and substances of human origin; treatment of the corpse; medical treatment in general; therapeutic and diagnostic interventions; personalized medicine; nanotechnology; medical devices; human research; cost utility ratio of interventions covered by statutory health insurance.

Platforms and associated services / shareable equipment & infrastructure / databases

- Competence Center Medicine - Ethics - Rights (www.merh.uzh.ch)
- PhD Program 'Biomedical Ethics and Law' (www.bmel.uzh.ch)
- www.medlaw.uzh.ch

Special expertise

- see above (research)

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- National Research Programme 67, End of life, member of the Steering Committee
- National Advisory Commission on Biomedical Ethics (Switzerland)
- Swiss Medical Board, Member of the Appraisal Comitee

Address: University of Zurich
Competence Center Medicine - Ethics - Rights (MERH)
Freiestrasse 15
8032 Zürich

E-mail: Lst.tag@rwi.uzh.ch

URL:

Prof. Dr. med. Felix C. Tanner

Professorship: Cardiology, Echocardiography
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Cardiovascular Sciences; Imaging

Description of research

Pathophysiology of cardiovascular disease

Imaging of cardiovascular disease: focus on echocardiography, integration of echo with other imaging modalities

Platforms and associated services / shareable equipment & infrastructure / databases

- Clinical echocardiography laboratory
- Echocardiography core laboratory for clinical studies
- Echocardiography database
- Several clinical databases

Special expertise

- Echocardiography
- Cardiac disease
- Vascular biology

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University Hospital Zurich
Cardiology
Rämistrasse 100
8091 Zürich
E-mail: felix.tanner@usz.ch
URL:

Prof. Dr. William R. Taylor

Professorship: Movement Biomechanics

Academic affiliation: ETH Zurich

Department/faculty: Department of Health Sciences and Technology

Clinical affiliation: none

Area of research

Bioengineering; Implants; Movement Sciences; Musculoskeletal Sciences; Pathology; Rehabilitation

Description of research

The Laboratory for Movement Biomechanics (LMB) focuses on the study of whole-body and joint kinetics and kinematics during both activities of daily living and sport. By examining the quality of movement, we aim to extract key information on critical aspects of an individual's functional status, including muscle activation and fatigue, and thereby lay the foundations for understanding and monitoring the changes that occur within the musculoskeletal system, including the adaptation that results from training. The targeted application of key experimental and computational techniques, such as pressure and force sensors, motion capture, EMG, accelerometers (www.ZurichMOVE.com), and sophisticated musculoskeletal modelling techniques, thereby enables encompassing approaches to support a host of scientific approaches for supporting the translation of ideas and concepts into industry and clinical settings.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Moving Fluoroscopy
- Human movement analysis
- Kinematics and kinetics of the human body

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Zurich MOVE (www.ZurichMOVE.com)

Address: ETH Zurich
Institute for Biomechanics
Leopold-Ruzicka Weg 4
8093 Zürich

E-mail: taylorb@ethz.ch

URL: www.movement.ethz.ch

Prof. Dr. Alexandra Trkola

Professorship: Professor Medical Virology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: none

Area of research

Diagnostics; Immunology; Microbiology/Infectiology; Molecular Biology

Description of research

A main focus of our research is dedicated to unraveling the processes that steer broadly neutralizing antibody (bnAbs) development in natural HIV-1 infection to guide HIV vaccine development. In this context we analyze factors that contribute to bnAb development, explore the interplay of infecting virus and antibody develop over the course of the infection, study the mechanisms and determinants of neutralization efficacy, and investigate the fate of B cells in HIV-1 infection. In a second line of research we use the knowledge on natural occurring bnAbs and the viral Envelope that evoked them to develop Designed Ankyrin Repeat Protein (DARPin) based inhibitors of HIV-1 entry that mimic bnAbs and immunogens capable of inducing bnAb responses.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- HIV-1
- Neutralizing antibodies
- Humoral immune response
- Vaccine

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Network Infection and Immunity Zurich

Address: University of Zurich
Institute of Medical Virology
Winterthurerstrasse 190
8057 Zürich
E-mail: trkola.alexandra@virology.uzh.ch
URL: http://www.virology.uzh.ch/en.html

Prof. Dr. Baubec Tuncay

Professorship: SNF Professor

Academic affiliation: University of Zurich

Department/faculty: Vetsuisse Faculty

Clinical affiliation: none

Area of research

(Bio-)Informatics; Bioengineering; Epigenetics; Genetics; Modelling/Computation; Molecular Biology; Proteomics/Transcriptomics, ...-omics; Stem Cell Biology; Systems Biology

Description of research

We study mammalian epigenetic gene regulatory mechanisms.
We have a long standing interest in understanding regulation and function of DNA methylation in healthy tissues, and how mutations in key epigenetic factors lead to disease (e.g. MeCP2 in Rett Syndrome or DNMT3A/B in AML and ICF syndrome).
We utilise cellular engineering in stem and neuronal cells to screen how disease-related mutations influence genome-wide binding of regulatory proteins and how their aberrant localisation results in disturbed epigenetic patterns and transcription.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Functional genomics (ChIP-, bisulphite-, RNA-, ATAC-seq)
- Genome engineering (recombination, Cas9, TALE)
- Systems and synthetic biology
- Computational biology

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University of Zurich
Department of Molecular Mechanisms of Disease
Winterthurerstrasse 190
8057 Zürich

E-mail: tuncay.baubec@dmmd.uzh.ch

URL: www.baubeclab.org

Prof. Dr. Dr. med. Oliver Ullrich

Professorship: Anatomy

Academic affiliation: University of Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: none

Area of research

Aging; Anatomy; Biochemistry; Bioengineering; Biomechanics/Mechanobiology; Biotechnology; Design/Construction; Epigenetics; Genetics; Hematology; Imaging; Immunology; Lymphatic System; Microbiology/Infectiology; Molecular Biology; Musculoskeletal Sciences; Pharmacology/Toxicology; Proteomics/Transcriptomics, ...-omics; Systems Biology; Tissue Engineering/Biointerfaces

Description of research

The most essential characteristics of all biological systems are defined by the universal law of gravity. During the last centuries, research in Anatomy elucidated in detail, how the human body is constructed to withstand and to live under the gravity conditions of Earth. Our aim is to understand how the cellular architecture and function responds to gravity and to identify molecular mechanisms how gravity influences cell function and adaptation. Our research also contributes to an appropriate integrated risk assessment for human space flight. It is crucial to understand if and how homeostasis of the immune system's cellular machinery is maintained in altered gravity. Knowing the cellular and molecular mechanisms through which gravity influences immune cell regulation and their function in nervous, bone and vascular tissue, is an important prerequisite for understanding immune regulation in space at an integrated level and for risk assessment, systematic and validated medical monitoring and potential countermeasures during exploration class missions. In coordinated in vitro studies, combining modern aerospace technology and methods in cellular and molecular biology and multiple research platforms (parabolic flights, suborbital ballistic rockets and the International Space Station), we are working together with research institutions from the U.S., Germany, Italy, Sweden, Russia and China and with the German Aerospace Center (DLR), the European Space Agency (ESA), the Swedish

Platforms and associated services / shareable equipment & infrastructure / databases

- Parabolic Flights
- Suborbital Ballistic Rocket Experiments
- International Space Station Experiments
- Ground-Based Simulators (2D Clinostat, Hyper-G-Centrifuges)
- Research Hardware for flight and space experiments

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- European Space Agency (ESA)
- German Aerospace Center (DLR)
- National Aeronautics and Space Administration (NASA)

Address: University of Zurich
Institute of Anatomy
Winterthurerstrasse 190
8057 Zürich

E-mail: oliver.ullrich@uzh.ch

URL: http://www.anatomy.uzh.ch/en/research/ullrich.html

Prof. Dr. Maries van den Broek

Professorship: Experimental Immunology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: none

Area of research

Immunology; Oncology; Pathology; Personalized Medicine; Proteomics/Transcriptomics, ...-omics; Radiology/Nuclear Medicine; Respiratory Tract; Skin

Description of research

A considerable proportion of tumor tissue consists of recruited and resident cells – often referred to as tumor microenvironment (TME) or stroma – and in fact, tumor progression and response to therapies are strongly influenced by the TME.
Immunotherapies that mobilize tumor-specific, adaptive immunity show significant clinical efficacy and are considered a major breakthrough in cancer treatment. For example, treatment with antibodies that interfere with immune checkpoints such as anti-CTLA-4 and anti-PD-1 has shown objective clinical responses in patients with various cancer types and is just one example of how targeting the TME can translate into clinical benefit.

The main goal of our laboratory is to better understand the mutual interaction between the immune system and cancer and how this interaction changes after therapeutic interventions. We think that this knowledge enables a better engagement of the immune system during standard or immune therapies, which will increase the clinical efficacy as well as the durability of such therapies.

Our laboratory uses a wealth of preclinical cancer models and samples from patients to address following topics:

- The impact of radiotherapy on immune activation
- Tertiary lymphoid structures and immune defense against cancer
- Beta-catenin/Wnt signaling in non-melanoma skin cancer
- The role of immune cells in metastasis
- Identification of and interference with local, cancer-associated im

Platforms and associated services / shareable equipment & infrastructure / databases

- Vectra 3.0 (Perkin-Elmer)

Special expertise

- Quantitative pathology
- Different mouse models for cancer
- Exosomes

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Cancer Network Zurich (CNZ)

Address: University of Zurich
Institute of Experimental Immunology
Winterthurerstrasse 190
8057 Zürich
E-mail: vandenbroek@immunology.uzh.ch
URL: www.immunology.uzh.ch, www.cancer.uzh.ch

Prof. Dr. med. François Verrey

Professorship: Physiology - Epithelial Transport
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: none

Area of research

Physiology

Description of research

Amino acid transport:
The role and control function of neutral amino acid transporters in cellular and systemic metabolism, function and homeostasis is studied using conditional knock-out rodent- and cellular models.

Dietary amino acids and kidney function:
In the context of the NCCR Kidney.CH, the impact of dietary amino acids and L-arginine on kidney function and chronic kidney disease progression is studied using rodent models.

Exocrine pancreatic amino acid transport in health and disease:
The group of Dr. Simone Camargo investigates exocrine pancreas transport of solutes, its metabolism following acute injury, and the composition and role of the pancreatic juice secreted into the lumen of the small intestine.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Physiology
- Amino acid transport and homeostasis
- Kidney and intestine physiology

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Institute of Physiology
Winterthurerstrasse 190
8057 Zürich
E-mail: verrey@access.uzh.ch
URL: http://www.physiol.uzh.ch/en/research/institutegroups/EpithelialTransports.html

Prof. Dr. med. Arnold von Eckardstein

Professorship: Clinical Chemistry
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Biochemistry; Cardiovascular Sciences; Chemistry/Analytics; Diagnostics; Genetics; Metabolism; Molecular Biology; Pathology; Personalized Medicine; Physiology; Proteomics/Transcriptomics, ...-omics

Description of research

Research at the Institute of Clinical Chemistry is translational and includes clinically oriented fundamental research, development of methodologies as well as clinical and epidemiological studies. The projects of the lipoprotein and sphingolipids research groups are aimed to gain better understanding of cardiometabolic diseases, in particular atherosclerosis, diabetes and peripheral neuropathies, and thereby to improve diagnosis, therapy and prevention. The biomarker research group searches and validates new candidate biomarkers for the diagnosis of cardiovascular diseases and metabolic disorders. The institute is also the central laboratory for several national and international cohort studies. Finally, the institute provides its broad spectrum of analytical tests and methods to many researchers, either as a service or as part of a collaboration (laboratory analysis for research projects).

Platforms and associated services / shareable equipment & infrastructure / databases

- Clinical laboratory tests
- Mass spectrometry of metabolites, lipids, drugs
- -omics data banks from previous RNAi screenings, RNAsequencing experiments, proteomics

Special expertise

- Biomarkers especially in the field of cardiovascular and metabolic diseases
- Lipoprotein metabolism
- Sphingolipids

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Zurich Exhalomics
- HMZ Seed Project on biomarkers of acute aortic dissection
- Systems X project (HDL-X)
- FP7 project (A systems biology approach to RESOLVE the molecular pathology of two hallmarks of patients with metabolic syndrome and its co-morbidities; hypertriglyceridemia and low HDL-cholesterol)

Address: University Hospital Zurich
Insititute of Clinical Chemistry
Rämistrase 100
8091 Zürich
E-mail: arnold.voneckardstein@usz.ch
URL: http://www.en.ikc.usz.ch

Prof. Dr. med. vet. Brigitte von Rechenberg

Professorship: Experimental surgery
Academic affiliation: University of Zurich
Department/faculty: Vetsuisse Faculty
Clinical affiliation: none

Area of research

Bioengineering; Implants; Materials Sciences; Musculoskeletal Sciences; Surgery; Tissue Engineering/Biointerfaces; Veterinary Medicine

Description of research

Experimental Veterinary Surgery

Platforms and associated services / shareable equipment & infrastructure / databases

- GLP accredited laboratory
- Histology laboratory
- Surgical facilities for large animal experiments

Special expertise

- Animal models experimental surgery
- Large animal surgery

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University of Zurich
Musculoskeletal Research Unit (MSRU), Department of Molecular Mechanisms of Disease (DMMD)
Winterthurerstrasse 260
8057 Zürich
E-mail: bvonrechenberg@vetclinics.uzh.ch
URL:

Prof. Dr. med. Carsten Wagner

Professorship: Human Physiology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: none

Area of research

Anatomy; Cardiovascular Sciences; Digestive System/ Nutrition; Endocrinology; Genetics; Genitourinary System; Imaging; Metabolism; Molecular Biology; Personalized Medicine; Pharmacology/Toxicology; Physiology; Proteomics/Transcriptomics, ...-omics; Respiratory Tract

Description of research

The research of the Wagner group focuses on mechanisms of inherited and acquired kidney disease with emphasis on processes relating to mineral homeostasis (phosphate, FGF23, PTH, vitamin D3) and acid-base balance.
In general, we aim to understand the genetic basis of normal kidney function as well as of kidney diseases using rodent models and patients (and healthy volunteers) combined with state-of-the art technologies.

For mineral homeostasis, we identified novel genes causing renal loss of phosphate and kidney disease, examine the role of various phosphate transport pathways in intestine and kidney, and the regulation and role of hormones controlling phosphate metabolism. Particularly, we interested in vitamin D3 and Fibroblast Growth Factor 23 (FGF23) and their associations with various diseases.

In the area of acid-base research, we have extensivley studied mechanisms by which the kidney controls acid-base balance and the dysregulation of these processes during kidney disease. More recently, we have been elucidating the role of acid-activated receptors in normal processes (regulation of breathing) and disease (inflammation, fibrosis). These receptors may present novel targets to modulate inflammation and fibrosis.

Platforms and associated services / shareable equipment & infrastructure / databases

- Rodent Phenotyping

Special expertise

- Analysis of mineral balance in rodents and humans, Analysis of endocrine factors
- Urine exosomes
- Analysis of renal and intestinal transport processes
- Kidney function and morphology
- Inherited and acquired kidney disease

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- NCCR Kidney.CH
- Swiss Kidney Stone Cohort

Address: University of Zurich
Institute of Physiology
Winterthurerstrasse 190
8057 Zürich
E-mail: wagnerca@access.uzh.ch
URL:

Prof. Dr. Bruno Weber

Professorship: Experimental Imaging
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: none

Area of research

Anatomy; Design/Construction; Imaging; Metabolism; Modelling/Computation; Neuro Sciences

Description of research

Our group uses a wide range of imaging tools to study the cell-to-cell communication pathways involved in energy metabolism and information processing in cerebral cortex. Furthermore, we are working on dissecting the interaction of neurons and astrocytes with the vascular system, which is responsible for maintaining adequate delivery of oxygen and energy substrates to the brain. As well as studying these systems, the development of imaging systems for in vivo research is an additional research focus of the group.

Platforms and associated services / shareable equipment & infrastructure / databases

- Two-photon microscopy
- Magnetic resonance imaging
- Positron Emission Tomography

Special expertise

- Imaging
- Metabolism
- Glial biology

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- EXCITE Zurich
- Neuroscience Center Zurich (ZNZ)

Address: University of Zurich
Institute of Pharmacology and Toxicology
Winterthurerstrasse 190
8057 Zürich
E-mail: bweber@pharma.uzh.ch
URL: www.pharma.uzh.ch

Prof. Dr. Franz E. Weber

Professorship: Oral Biotechnology & Bioengineering

Academic affiliation: University of Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: Center of Dental Medicine, UZH

Area of research

Biochemistry; Bioengineering; Dentistry; Design/Construction; Epigenetics; Implants; Materials Sciences; Musculoskeletal Sciences; Personalized Medicine; Pharmacology/Toxicology; Surgery; Tissue Engineering/Biointerfaces

Description of research

The main topic of our research is bone regeneration by bone substitutes, osteoinduction, osteoconduction and epigenetically active substances. Moreover, we also work on the regeneration of the pulp tissue to maintain living teeth.
At present we apply additive manufacturing to test and design osteoconductive bone substitutes from calcium phosphates and bioglasses. In combination with imaging data from the clinic, the final goal is to provide personalized bone substitutes to patients from dentisty, craniomaxillofacial surgery, and orthopaedy.

Platforms and associated services / shareable equipment & infrastructure / databases

- Lithography based additive manufacturing
- Hard tissue histology

Special expertise

- Bone regeneration
- Epigenetic
- Osteoinduction by bone morphogenetic proteins
- Hydrogels
- Bone substitutes

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University of Zurich
Center for Dentistry/MKG
Plattenstrasse 11
8032 Zürich

E-mail: franz.weber@zzm.uzh.ch

URL:

Prof. Dr. med. Rainer Weber

Professorship: Infectious Diseases
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Epidemiology; Microbiology/Infectiology

Description of research

Infectious Diseases.

Major research interests:
HIV infection: Epidemiology, clinical aspects, treatment, pathogenesis
Non-AIDS complications of HIV infection and treatment, specifically cardiovascular and hepatic complications of HIV infection
Microsporidiosis: microbiology and disease
Cryptosporidiosis: microbiology and disease
Opportunistic infections: diagnosis, clinical aspects, treatment
Tick-borne diseases
Antibiotic use, antibiotic policy, rational use of antimicrobials

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- SHCS (Swiss HIV Cohort Study)
- D.A.D. Cohort (Data Collection on Adverse Events of Anti-HIV Drugs)

Address: University Hospital Zurich
Division of Infectious Diseases and Hospital Epidemiology
Rämistrasse 100
CH-8091 Zürich
E-mail: rainer.weber@usz.ch
URL: http://www.infektiologie.usz.ch

MSc of Mech. Eng. Bernhard Weisse

Professorship: None

Academic affiliation: Empa

Department/faculty: Mechanical and Civil Engineering

Clinical affiliation: None

Area of research

Biomechanics/Mechanobiology; Design/Construction; Implants; Materials Sciences; Mechanical Engineering; Modelling/Computation; Musculoskeletal Sciences; Personalized Medicine; Tissue Engineering/Biointerfaces

Description of research

The Laboratory of Mechanical Systems Engineering (MSE) with the group Biomedical Engineering and Structural Mechanics has focused on the research of clinical related questions in the field of Biomechanics, Orthopedics, tissue engineering, regenerative medicine, diagnostics and rehabilitation / assistive devices. Various collaborations with Medtech companies have been carried out in the scope of product development, in particular load-bearing devices including their conceptual definition, design, manufacturing and testing as well as product certification processes.

Platforms and associated services / shareable equipment & infrastructure / databases

- Test facilities: static (uni- and biaxial), fatigue and wear test machines

Special expertise

- Modelling (dynamic rigid body, finite element)
- Failure Analysis

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: Empa
Mechanical Systems Engineering - Group Biomed. Eng. & Structural Mechanics
Überlandstrasse 129
8600 Dübendorf

E-mail: bernhard.weisse@empa.ch

URL: www.empa.ch/abt304

Prof. Dr. med. Michael Weller

Professorship: Neurology
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: University Hospital Zurich

Area of research

Immunology; Neuro Sciences; Oncology

Description of research

Our research group investigates the biology of malignant gliomas. These tumors, notably glioblastomas, are among the most lethal neoplasms. Gliomas are paradigmatic for their ability to deeply infiltrate the surrounding healthy tissue, precluding definitive surgical resection and limiting the efficacy of other local therapies. The results achieved with traditional cancer therapies are poor because of defects in the apoptotic machinery of glioma cells, accounting for their resistance to irradiation and chemotherapy. Recently, putative glioma-initiating (stem) cells have been identified. These glioma stem-like cells display stem cell characteristics with the capacity for self-renewal, multipotency and tumorigenicity, leading to a hierarchical model of gliomagenesis. They may also contribute to pathological angiogenesis and immune suppression in the local tumor environment.
The main interests of our laboratory include apoptosis research, tumor immunology as well as migration, invasion and angiogenesis, relating to malignant gliomas. We have established various techniques as well as different animal models to examine the key properties of glioblastoma cells in vitro and in vivo. We will continue to develop our major research platforms: (i) resistance to current standards of care including radiotherapy, chemotherapy and anti-angiogenesis, (ii) novel strategies of immunotherapy and (iii) the contribution of stem-like glioma cells to the biological properties of these tumors.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Cancer Network Zurich (CNZ)

Address: University Hospital Zurich
Department of Neurology
Frauenklinikstrasse 26
8091 Zürich
E-mail: michael.weller@usz.ch
URL: www.neurologie.usz.ch

Prof. Dr. Nicole Wenderoth

Professorship: Neural Control of Movement

Academic affiliation: ETH Zurich

Department/faculty: Department of Health Sciences and Technology

Clinical affiliation: none

Area of research

Behavioral science/Mental Health; Imaging; Movement Sciences; Neuro Sciences; Physiology; Rehabilitation

Description of research

The Neural Control of Movement Lab investigates how the human brain controls behaviour and flexibly adapts to cues, rewards and constraints in the environment. We use these insights to develop novel non-invasive interfaces for modulating neural processes in the healthy and disordered human brain. Even though our work is motivated by fundamental Systems Neuroscience research questions, we actively pursue translation of our findings to clinical applications with the goal to provide new biomarkers for diagnostics and treatment stratification. Furthermore, we aim to deliver evidence-based concepts and technology to improve rehabilitation training in special populations, such as children with developmental disorders or adult stroke sufferers.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- SleepLoop

Address: ETH Zurich
IBWS
Winterthurerstrasse 190
8057 Zürich

E-mail: nicole.wenderoth@hest.ethz.ch

URL: http://www.ncm.hest.ethz.ch/

Prof. Dr. Sabine Werner

Professorship: Cell Biology
Academic affiliation: ETH Zurich
Department/faculty: Department of Biology
Clinical affiliation: none

Area of research

Biochemistry; Immunology; Molecular Biology; Oncology; Proteomics/Transcriptomics, ...-omics; Skin

Description of research

Tissue injury initiates a series of events, which lead to at least partial reconstruction of the affected body site. Many conditions are associated with impaired tissue repair, including old age, steroid treatment and chronic diseases such as diabetes and cancer. A prerequisite for the improvement of impaired healing is a thorough understanding of the underlying cellular and molecular mechanisms. Our laboratory studies these mechanisms, focusing on the roles of growth factors and reactive oxygen species in the repair process. One of the most exciting aspects of our work is the analysis of the parallels between tissue repair and cancer. We use state-of-the art approaches, including functional genomics and proteomics, 2D and 3D primary cell culture systems, and genetically modified mice for our research. Through collaboration with clinical partners we determine the importance of our findings for the human situation (see also SKINTEGRITY – a flagship project of “Hochschulmedizin Zurich”, http://www.hochschulmedizin.uzh.ch/de/projekte/skintegrity.html).

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Wound healing
- Skin barrier function
- Liver regeneration

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- SKINTEGRITY (Co-Chair)

Address: ETH Zurich
Molecular Health Sciences
Otto-Stern-Weg 7
8093 Zürich
E-mail: sabine.werner@biol.ethz.ch
URL: http://www.mhs.biol.ethz.ch/research/werner.html

Dr. Peter Wick

Professorship: none

Academic affiliation: Empa

Department/faculty: Materials meet Life

Clinical affiliation: none

Area of research

Bioengineering; Biotechnology; Digestive System/ Nutrition; Immunology; Molecular Biology; Nanotechnology; Personalized Medicine; Pharmacology/Toxicology; Respiratory Tract; Tissue Engineering/Biointerfaces

Description of research

Our laboratory enables particle-based solutions for diagnostics and therapeutics driven by clinical needs. We are active in characterizing, understanding and steering the interaction of particulate materials with human cells or tissues and provide expertise in the interdisciplinary field of particulate materials safety and applications for industry or authorities.

We are a highly motivated team of biologists and chemists with core competences in cell- and molecular biology, material science and chemistry. We pioneered investigations on particle bio-functionalization, particles uptake, accumulation, translocation across biological barriers and their bio-responses. With this we provide key contributions to novel strategies of particles design for drug delivery, imaging or diagnosis.

Platforms and associated services / shareable equipment & infrastructure / databases

- Customized, advanced human in vitro models of soft tissue, GI, placenta etc
- Light- and electron mircoscopy
- Nanoparticle characterization facilities
- Assay cascade for cytotoxicological assessment of NPs

Special expertise

- Nanoparticles synthesis, characterization and functionalization
- Human in vitro models
- Nanosafety
- Nanobiomedicine

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Coordinator of the CCMX materials Challenge NanoScreen
- Coordinator of H2020 ProSafe joint force GoNanoBioMat
- Member of EU H2020 Graphene Flagship

Address: Empa
Particles-Biology Interactions
Lerchenfeldstrasse 5
9014 St. Gallen

E-mail: peter.wick@empa.ch

URL: https://www.empa.ch/web/empa/particles-biology-interactions

Prof. Dr. Erich Josef Windhab

Professorship: Food Process Engineering

Academic affiliation: ETH Zurich

Department/faculty: Department of Health Sciences and Technology

Clinical affiliation: none

Area of research

(Bio-)Fluidics/Fluiddynamics; Biomechanics/Mechanobiology; Design/Construction; Digestive System/ Nutrition; Materials Sciences; Mechanical Engineering; Modelling/Computation; Nanotechnology

Description of research

Oro-Gastro-Intestinal Engineering in the context of food perception/digestion and functional/medical food for personalised nutrition and food fortification.

Related material science topics treated are: bio-rheology, soft tissue tribology, pro-gastro-intestinal non-Newtonian flow simulation (CFD), functional component encapsulation

Biofilm and mucus research

Platforms and associated services / shareable equipment & infrastructure / databases

- Extrusion Platform
- Microfluidics Platform (design and production)
- Encapsulation technologies (from dispersion to powder or capsule)
- Shear- and elongational rheometers
- Static and dynamic interfacial tension measurements

Special expertise

- Process design, optimisation and scale up
- Fluid dynamics and rheology of complex fluids
- Magneto-responsive biomaterial design
- Oro-gastro-intestinal processing
- Additive manufacturing techniques

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- EIT Food
- CTI-Chocool
- CTI-FeIN
- SNF-NRP69
- EU ITN PowTech

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Prof. Dr. med. Claudia Witt

Professorship: Complementary and Integrative Medicine

Academic affiliation: University of Zurich

Department/faculty: Faculty of Medicine

Clinical affiliation: University Hospital Zurich

Area of research

E-Health; Epidemiology; Oncology; Pain

Description of research

Clinical studies and comparative effectiveness research in complementary and integrative medicine including effect modifying factors, safety and health economic evaluations, clinical research methodology.

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Clinical Epidemiology
- Comparative Effectiveness Research
- Health Services Research
- Health Economics
- mHealth Studies

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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Institute for Complementary and Integrative Medicine
Sonneggstrasse 6
8091 Zürich

E-mail: claudia.witt@uzh.ch

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Prof. Dr. Bernd Wollscheid

Professorship: Adjunct Professor

Academic affiliation: ETH Zurich

Department/faculty: Department of Health Sciences and Technology

Clinical affiliation: none

Area of research

Chemistry/Analytics; Personalized Medicine; Proteomics/Transcriptomics, ...-omics; Systems Biology

Description of research

The Wollscheid research group is focusing on biomedical research bridging the gap in understanding the genotype to phenotype transition via detailed analysis of the proteotype. In order to gain a systems biology understanding of the surfaceome as a cellular signaling gateway. We develop and apply chemoproteomic technologies which ultimately enable the quantitative assessment of dynamic protein-protein interactions towards the molecular understanding of signaling processes.
Prof. Wollscheid is the head of the D-HEST BioMedical Proteomics Platform (BMPP) (http://www.bmpp.ethz.ch/) and the ETH PHRT Mass spectrometric platform (https://www.sfa-phrt.ch/platforms).
- The general mission of the BMPP as a small and dedicated research-driven departmental technology platform is to provide D-HEST with the capacity to develop and tailor biomedical and chemoproteomic technologies at the interface to the clinic.
- The PHRT Mass Spectrometric Platform is a comprehensive and coordinated effort to accelerate the understanding of the molecular basis of disease/wellness, through the development and application of robust, quantitative, mass spectrometry-based strategies. Phase 1 of the platform development will focus on the generation of large scale high quality data on the protein level from tissues, biofluids and cells. Complementary data types on the genome and transcriptome level will be generated in collaboration and coordinated with the PHRT Genomics Platform.

Platforms and associated services / shareable equipment & infrastructure / databases

- Proteotype Analysis
- Cell Surface Protein Atlas server/ http://wlab.ethz.ch/cspa/
- PROTTER server/ Interactive Protein Feature Visualization / http://wlab.ethz.ch/protter/start/
- D-HEST BioMedical Proteomics Platform (BMPP)
- ETH PHRT Clinical Proteomics Platform

Special expertise

- Systems Biology
- Cell Signaling
- Chemical Biology

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: ETH Zurich
Institute of Molecular Systems Biology
Auguste-Piccard-Hof 1
8093 Zürich

E-mail: wbernd@ethz.ch

URL: http://www.imsb.ethz.ch/research/wollscheid/people/berndwollscheid.html

Prof. Dr. Wendy Wei-Lynn Wong

Professorship: Assistent Professor
Academic affiliation: University of Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: none

Area of research

Cardiovascular Sciences; Hematology; Immunology; Molecular Biology; Pathology

Description of research

Necroptosis is a programmed form of cell death, involving cell membrane rupture and release of cytoplasmic content into the extracellular milieu triggering an inflammatory response. In turn, unresolved inflammation can lead to further cell death and a persistent state of inflammation, driving diseases such as cancer, arthritis and cardiovascular disease. Tumor necrosis factor (TNF) is considered to be a master regulator of cytokines and at least three of the top 10 selling drugs block TNF activity. Over time, complications occur with consistent use of anti-TNF drugs. Therefore understanding the signaling networks that occur in normal physiological conditions and in disease states allow us to discover novel therapeutic targets. Inhibitors of apoptosis proteins (IAPs), particularly XIAP, are well known for their role in inhibiting apoptosis, whereas the cIAPs, regulate NF-kB and signaling from TNF superfamily receptors as well as regulating necroptosis versus apoptosis and immune signaling. My research now indicates both cIAPs and XIAP negatively regulate cytokine production in vivo in the myeloid lineage, the first physiological role requiring all of these related proteins. Meanwhile, receptor interacting protein kinases (RIPK) are positive regulators of cytokine production. Our goal is to understand how IAPs and RIPKs regulate cytokine production, cell death or other biological functions such as differentiation or vascular permeability.

Platforms and associated services / shareable equipment & infrastructure / databases

- Luminex 200

Special expertise

- Cell death: necroptosis and apoptosis
- TNF signaling
- Vascular permeability
- Myeloid differentiation

Member of large scale research projects / HMZ Flagship Projects / centers & networks

Address: University of Zurich
Institute of Experimental Immunology
Winterthurerstrasse 190 Y44J55
8057 Zürich
E-mail: wong@immunology.uzh.ch
URL: http://www.immunology.uzh.ch/en/researchunit/celldeath.html

Prof. Dr. Karin Würtz-Kozak

Professorship: Immunoengineering & Regenerative Medicine

Academic affiliation: ETH Zurich

Department/faculty: Department of Health Sciences and Technology

Clinical affiliation: none

Area of research

Aging; Bioengineering; Biomechanics/Mechanobiology; Cardiovascular Sciences; Digestive System/ Nutrition; Gene/Cell therapy; Immunology; Microbiology/Infectiology; Molecular Biology; Musculoskeletal Sciences; Nanotechnology; Pain; Pathology; Physiology; Skin; Stem Cell Biology; Tissue Engineering/Biointerfaces

Description of research

We aim to understand the cellular mechanisms underlying specific pathologies, with a focus on inflammation, and to utilize this knowledge for the development of novel treatment options that allow for tissue regeneration and pain reduction.

Platforms and associated services / shareable equipment & infrastructure / databases

- Electrospinning Device
- Flexstation
- Automated Patchclamp
- qPCR
- Hypoxia Incubator

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Zurich Heart

Address: ETH Zurich
Institute for Biomechanics
Hönggerbergring 64
8093 Zürich

E-mail: kwuertz@ethz.ch

URL: http://www.immunoreg.ethz.ch/

Prof. Dr. med. Hanns Ulrich Zeilhofer

Professorship: Pharmacology
Academic affiliation: University of Zurich / ETH Zurich
Department/faculty: Faculty of Medicine
Clinical affiliation: none

Area of research

Neuro Sciences; Pain; Pharmacology/Toxicology

Description of research

Function of sensory circuits in the spinal cord
Pain-related neuroplasticity
Modulators of GABA and glycine receptor function

Platforms and associated services / shareable equipment & infrastructure / databases

Special expertise

- Electrophysiology
- Optogenetics
- 2-photon microscopy
- Behavioral analysis of mice
- Murine and viral transgenesis

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Drug Discovery Network Zurich (DDNZ)

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8057 Zürich
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URL:

Prof. Dr. Renato Zenobi

Professorship: Analytical Chemistry

Academic affiliation: ETH Zurich

Department/faculty: Department of Chemistry and Applied Biosciences

Clinical affiliation: none

Area of research

Chemistry/Analytics

Description of research

Zenobi's group has developed new ambient ionization sources for mass spectrometry, specifically secondary electrospray ionization (SESI) that greatly simplify sample introduction and virtually eliminate sample preparation. Ambient ionization allows direct analysis of a wide range of samples in their native state, with practical analytical applications including forensic analysis, detection of counterfeited perfumes, food quality monitoring, and others. The current activity of the group in this area has a very important clinical component, namely the diagnosis of diseases, the measurement of pharmacokinetics, and following medication compliance via SESI-mass spectrometry based analysis of exhaled breath.

Platforms and associated services / shareable equipment & infrastructure / databases

- SESI-mass spectrometry

Special expertise

- Exhaled Breath Analysis

Member of large scale research projects / HMZ Flagship Projects / centers & networks

- Zurich Exhalomics (Co-Director)

Address: ETH Zurich
Laboratorium für Organische Chemie
HCI E 329
8093 Zürich

E-mail: zenobi@org.chem.ethz.ch

URL: www.zenobi.ethz.ch

Prof. Dr. Marcy Zenobi Wong

Professorship: Tissue Engineering and Biofabrication

Academic affiliation: ETH Zurich

Department/faculty: Department of Health Sciences and Technology

Clinical affiliation: none

Area of research

Bioengineering; Biomechanics/Mechanobiology; Materials Sciences; Musculoskeletal Sciences; Tissue Engineering/Biointerfaces

Description of research

The Zenobi-Wong research group is focused on the development of advanced biomaterials for cartilage regeneration using biofabrication technologies including electrospinning, two-photopolymerization and bioprinting. The research group is also developing injectable biopolymers which can be used to treat early stage osteoarthritis.

Platforms and associated services / shareable equipment & infrastructure / databases

- Bioprinter
- Biohydrogels
- Drug Delivery systems

Special expertise

Member of large scale research projects / HMZ Flagship Projects / centers & networks

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URL: www.biofabrication.ethz.ch