



**Institute for Medical Engineering
and Medical Informatics**

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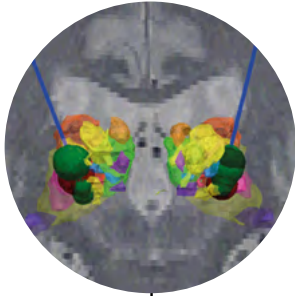


Industry and academic researchers working together to create innovative solutions for medicine and technology

The Institute for Medical Engineering and Medical Informatics does advanced R&D in therapeutic systems and diagnostics. We focus on patient-centred solutions such as devices, implants and treatment methods, as well as medical data processing, analysis and communication. We collaborate with a wide range of industrial, medical, and research organisations to solve problems in the medical sector and develop cutting edge solutions, from concept through to functional model.

The Institute is an expert R&D partner. Our employees own experience from industrial and clinical environment, which they integrate not only into research, but also into teaching.

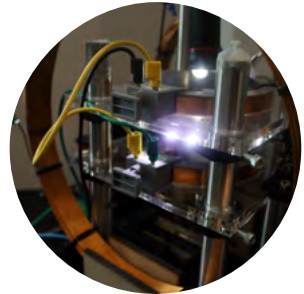
Interdisciplinary fields



Methods and Systems for Optimising Neuroclinical Care

Sensing, data analysis and decision support and surgical assistance systems for brain and nerve stimulation in neuroclinical care including objective evaluations within observational and clinical studies.

Prof. Dr. Simone Hemm-Ode



Sensor Systems for Diagnosis and Therapy

Design, implementation and testing of autocalibrated, networkable, miniaturised sensor systems for diagnosis and therapy.

Prof. Dr. Joris Pascal



Signal Analysis and Digital Biomarkers

Digital analysis of biosignals and sensor data for diagnostic systems. Development of signal processing algorithms for new medical devices and for extracting new digital biomarkers.

Prof. Dr. Dr. med. Reto Wildhaber



Minimally Invasive Systems

Patient-friendly treatment via new, improved minimally invasive instruments and support systems.

Prof. Dr. David Hradetzky



Computer Aided Surgery

Supporting surgical procedures with computer-based planning, simulation, navigation and instruments.

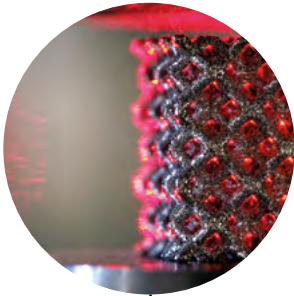
Prof. Dr. Erik Schkommodau



Artificial Intelligence in Health

Artificial intelligence methods, high-throughput sequencing technologies, and software development for precision diagnostics and antibody discovery.

Prof. Dr. Enkelejda Miho



Functional Materials and Surfaces

Investigation and optimization of materials and surfaces for biomedical applications.

Prof. Dr. Michael de Wild



Implant Design and Production with Additive Manufacturing

Development and modelling of anatomical structures for the creation of intelligent implants through additive manufacturing.

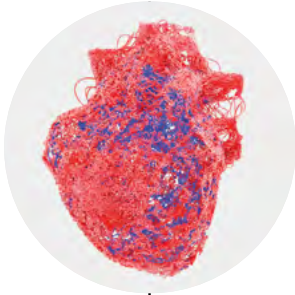
Daniel Seiler



Clinical Information Systems

Design and development of integrated clinical data processing and management systems.

Prof. Markus Degen



Biofabrication

3D biofabrication of cell tissue and biohybrid micro systems for biology, medicine and pharmaceuticals.

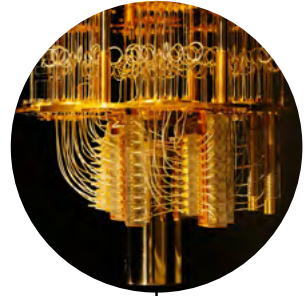
Dr. Maurizio Gullo



Medical Image Processing

Image enhancement, extraction of imaging biomarkers, segmentation, registration and visualization, generation and quality control of synthetic medical images.

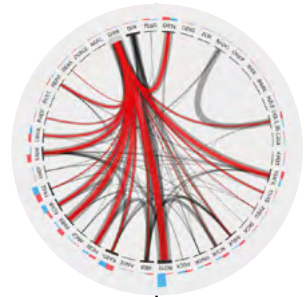
Prof. Dr. Antje-Christin Knopf



Applied Quantum Computing

Quantum and AI hybrid algorithms for near-term applications in the life sciences. Quantum (bio)sensing and communications for healthcare applications.

Prof. Dr. Clément Javerzac



Medical Decision Support Systems

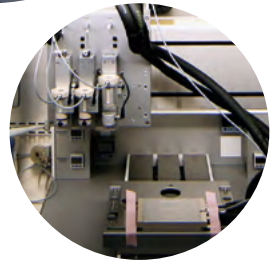
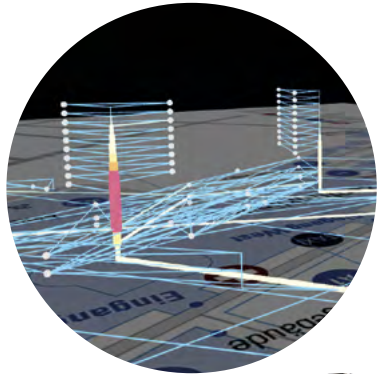
Acquisition, processing and analysis of medical and health care data; development of applications to make this data useable for patients and health care professionals.

Prof. Dr. Dominique Brodbeck

Expertise and infrastructure

Medical Additive Manufacturing

- Micro selective laser melting (μ SLM) of metals
- Binder jetting of bone replacement ceramics
- Selective laser sintering (SLS) and fused deposition modeling (FDM) of thermoplastics
- Digital light processing (DLP) / stereolithography (SLA) of photopolymers
- Patient-specific anatomical models / cutting templates / implants
- Process qualification and validation in accordance with ISO 13485
- 3D Bioprinting
- 2-photon polymerization (Photonic Professional GT2)



Surface Treatments

- Electropolishing
- Anodising
- Hydrophilisation / plasma treatment
- Sterilisation
- Ultrasonic cleaning
- Sandblasting

Medical IT

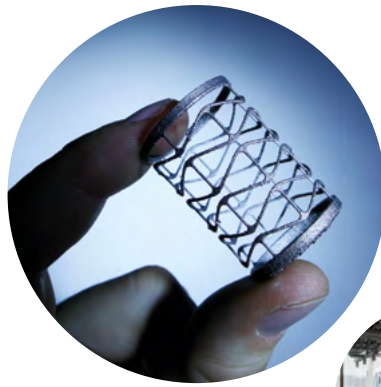
- Surgical navigation systems
- Augmented and Virtual Reality
- 3D Graphics
- Data Visualization
- Medical protocols (DICOM, HL7 etc.)
- Development of highly interactive visual user interfaces (web & desktop)
- Large Language Models (LLMs)
- Clinical Decision Support Systems

Analytical Instruments (Developed In-House and Commercial Systems)

- Microcomputer tomography
- SEM / EDX incl. sample preparation by ion-milling
- Universal tribometer
- Static and dynamic biomechanical analyses
- Removal Torque System
- 3D measurement and tracking
- Ultrasound imaging
- Infrared acquisition systems
- DVT/CBCT, O-Arm
- Motion analysis with force plates, insoles, IMUs, cameras and mobile sensors
- X-ray diffraction
- High-speed image acquisition
- EMG / EEG / ECG-platforms
- Digital endoscopy
- Quantum magnetic field sensors
- Magnetic field probes from 100 pT to 4T
- Benchtop MRI spectrometer
- Calibrated Helmholtz coil
- Zero Gauss chamber
- Magnetic field cameras
- Gene sequencing

Software Platforms for Surgical Planning and Implant Design

- DICOM handling
- Image processing (including segmentation, registration & vectorisation)
- Surgical planning and navigation
- CAD and FEM, freeform design



Laboratories

- OR/Robotics Lab
- Metallography / Materialography
- Medical microsystems
- Biomechanical test Lab
- Implant surface Lab
- Imaging Lab
- Bioprinting Lab
- Mechanical workshops
- Magnetic detection Lab
- Electronic and sensor Lab
- Biofabrication and Biohybrid Systems Lab
- 3D Nanofabrication Lab
- Quantum Lab
- aiHealth Lab

Study Programs

- BSc in Life Sciences in Medical Engineering
- BSc in Life Sciences in Medical Informatics
- MSc in Biomedical Engineering
- MSc in Medical Informatics
- CAS Applied Quantum Computing
- CAS CARAQA: Clinical, Regulatory and Quality Affairs for Medical Devices and In-Vitro Diagnostics

FHNW School of Life Sciences



At the new FHNW Campus in the heart of Europe's largest life sciences region, the School of Life Sciences does cutting-edge research for a better future. State-of-the-art infrastructure and equipment, including a new Process Technology Centre, enable our researchers and industry partners to work together to develop new technologies and products from concept to market.

The campus has an ideal location close to public transport links and with a view over Basel. In addition to the School of Life Sciences, the new FHNW Campus Muttenz houses the Schools of Architecture, Civil Engineering and Geomatics, Education, Social Work and Engineering, where around 4500 people study and work.

Contacts



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For further information
about our research fields:
www.fhnw.ch/im2-en

The FHNW incorporates nine facilities:

- FHNW School of Applied Psychology
- FHNW School of Architecture, Civil Engineering and Geomatics
- FHNW Academy of Art and Design
- **FHNW School of Life Sciences**
- FHNW Academy of Music
- FHNW School of Education
- FHNW School of Social Work
- FHNW School of Engineering
- FHNW School of Business

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