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NEUROZENTRUM
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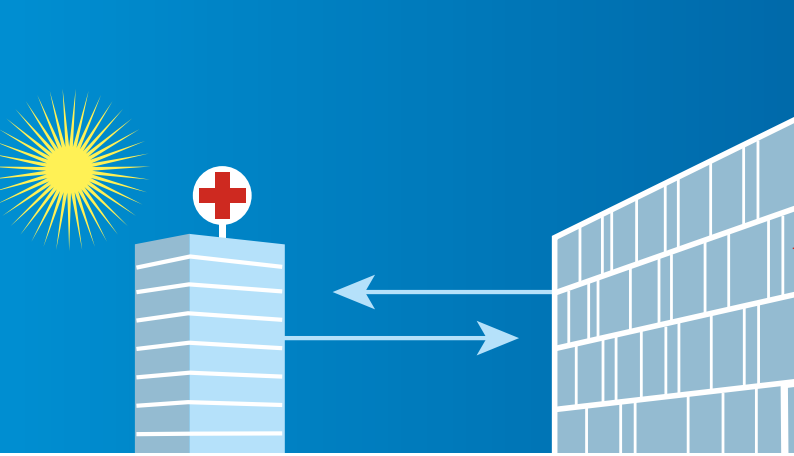
sitem-insel Neuro

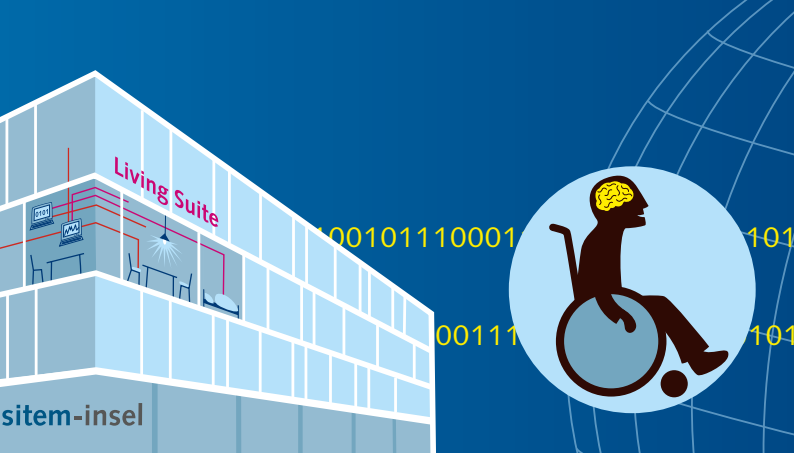


Threat of Neurologic Disorders

Neurologic disorders such as Alzheimer's or Parkinson's Disease, Stroke, Epilepsies, Sleep-Wake-Disorders or Multiple Sclerosis cause direful individual suffering and they impose a tremendous economic burden on our progressively overaged society. One important reason for the devastating effects of most neurologic disorders is their chronic time course. On one hand, once a neurologic disorder manifests, it may persist for many years or even the rest of the patient's life. On the other hand, a seemingly sudden manifestation may emerge from pathophysiologic processes that have been evolving for a long time period and which might have been averted or even prevented by early treatment.

Need for New Technology

To better understand the dynamics of neurologic disorders, how they develop, how they manifest and how they evolve under different treatments, we urgently need new technology. Innovation and optimization of neurological diagnostics and therapies will depend decisively on the development, testing and, in particular, translation of modern technology.

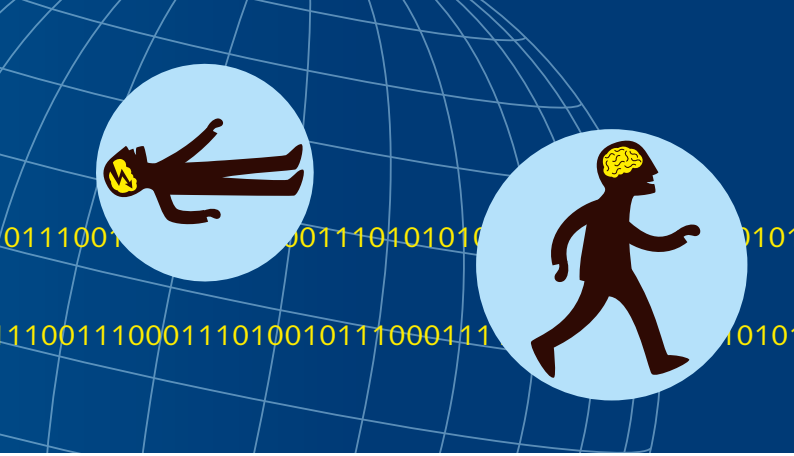


Translational Future of Neurology

Translation indicates the passage of results from basic research and industrial development into practical clinical applications. The future of neurology will depend on successful translational research. New biomedical devices have to be developed that record and analyse biomarkers enabling early diagnosis, swift treatment and accurate monitoring of the interventional effects. These devices have to be tested in model systems and in controlled environments, before they are applied under real-world conditions. At sitem-insel Neuro we strive for enabling this translation of new neuro-medical devices from the lab to the patients living environment.

Goal of Medical Neurotechnology

The ultimate goal is to use modern technology to transform Neurology from an appointment based reactive procedure in hospitals into an individualized, precise and preventive activity that interacts with the patient anytime and anywhere. This transformation will be made possible by the current convergence of unobtrusive sensors, wire-less communication, ubiquitious computing and cloud-based information networks.



The «Big Data» generated by these novel and pervasive technologies are then analysed by powerful statistical methods such as deep neural networks, which have recently emerged as a key method in modern artificial intelligence. sitem-insel Neuro will be a versatile hub, where physicians, engineers, basic and applied neuro- and data-scientists and legal experts from Universities and Industry will interact to make accessible the full potential of modern technology for personalized diagnostics and treatment.

Core Platforms: Living and Virtual Reality Suites

sitem-insel Neuro will in particular offer controlled environments to test new devices in both **healthy probands and in patients** before they are applied in ambulatory settings under real-world conditions. The crucial platform for these essential testings will be the **Living Suite,** which is part of the Brain Life Lab. The Living Suite will be densely equipped with modern sensor technology to **monitor human behavior during activities of daily living.** Main fields of interest include detection, monitoring and analysis of physiological and pathological body movements, visual exploration, cognitive perfor-

mance, and of sleep/wake patterns in health but also during neurorehabilitation, in neurodegenerative or neuroinflammatory disorders and in epileptic patients. The **Virtual Reality Suite** provides an immersive test environment for training and testing coordinated activities, for example during driving, social interactions and spatial orientation. Using state of the art virtual reality technology, computer-generated three-dimensional animations of real world settings will allow patients to engage in and train natural actions and to interact with the virtual environment as if they were in real life.

Public Private Partnership

The sitem-insel Neuro promotes both academic and commercial oriented technical developments and clinical evaluation studies. To this end, interested companies can become partners of sitem-insel Neuro. Commercial partners have access to the facilities for testing their own devices. The core team of sitem-insel Neuro will support companies with their clinical and technical expertise and help them to find study participants. These activities will be financed either by common research grants or directly by the company itself.

The core units of sitem-insel Neuro are:

Department of Neurology
Department of Neurosurgery
Institute for Diagnostic and Interventional Neuroradiology
ARTORG Center for Biomedical Engineering Research
Institute of Psychology

Representatives
Prof. Dr. Claudio Bassetti
Prof. Dr. Andreas Raabe
Prof. Dr. Jan Gralla
Prof. Dr. René Müri
Prof. Dr. Tobias Nef
Prof. Dr. Claudio Pollo
Prof. Dr. Fred Mast

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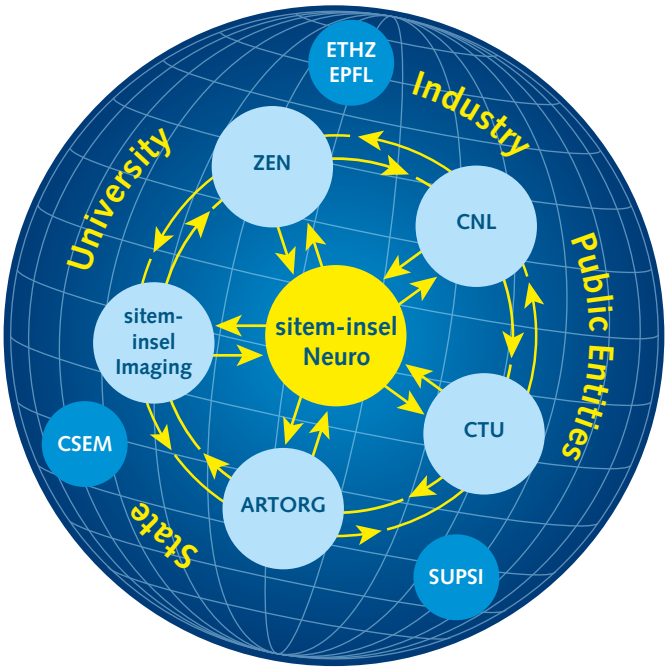

sitem-insel Neuro acts as a hub in a synergistic network of clinical and research teams across different disciplines.
ZEN = Zentrum Experimentelle Neurologie
CNL = Clinical Neurophysiological Labs
CTU = Clinical Trial Unit
ARTORG = Artificial Organ Center for Biomedical Engineering Research

External partners
ETHZ = Eidgenössisch Technische Hochschule Zürich
EPFL = Ecole Polytechnique Fédérale de Lausanne
SUPSI = Scuola Universitaria Professionale Della Svizzera Italiana
CSEM = Centre Suisse d'Electronique et de Microtechnique