

BioTechMed[®]
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BioTechMed-Graz



Biomedical Basics-Technological Developments-Medical Implementation

Research for Health

Representative

- Prof.Dr. Franz Fazekas, MUG and team
 - stroke, small vessel diseases of the brain, multiple sclerosis, aging of the brain, neurorehabilitation

Representative

- Prof. Dr. Anja Ischebeck, KF UNI & colleagues
 - cognitive and affective neurosciences, number and language processing, learning, emotion, research using functional imaging and brain stimulation

Representative

- Prof. Dr. Gernot Müller-Putz, TUG
 - Brain-Computer Interfacing for communication (e.g., disorders of consciousness), control (neuroprosthetics), functional brain mapping, motor system, neurorehabilitation

Current Situation

- **Existing, quite successful collaboration** between the three universities in the neurosciences
 - Research on **neuronal plasticity** and **functional compensation** of the brain during development and aging and in the context of neurologic diseases
 - Research into **cognitive and affective neurosciences** with functional imaging and brain stimulation
 - Development of a new method for communication and control (**Brain-Computer Interface, BCI**) for individuals with severe motor disabilities, including neurofeedback and neurorehabilitation

Current Situation

- **Broad spectrum of methods and devices**
 - Morphological and functional magnetic resonance imaging (**two 3T MRT**)
 - Electrophysiological methods (EEG, EP)
 - Non-invasive brain stimulation (TMS, tACS, tDCS)
 - Functional near-infrared spectroscopy (fNIRS)

Current Situation

- **High regional, national and international visibility**
 - Initiative Gehirnforschung Steiermark (INGE St)
 - Publications in high and very high ranked *peer-reviewed* journals
 - Third party funding (e.g., FP7/H2020 EU Projects, FWF Projects)

Goals

- Structural and functional MRI studies (fMRI) for **neuronal plasticity** and **functional repair/compensation** and broadening of the topics of **learning** and **competence preservation** in **aging**
- **Development** and **evaluation of new rehabilitation techniques** based on EEG, functional near-infrared spectroscopy, fMRI and non-invasive brain stimulation
- Development of a **Brain-Data-Bank** (focus: *quantitative morphometry, functional cerebral networks*) in healthy individuals and neurological disease

Goals

- Clinical and epidemiological, genetic and biochemical investigations of **molecular fundamentals** of neurologic and psychiatric diseases with respect to new treatment strategies
- **Translational Research in the animal model** (genetic, neurophysiological, behavioral, imaging methods)

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