



**University of
Zurich^{UZH}**

ZENTRUM FÜR
paraplegie
balgrist

Open PhD position

Project

MRI investigation of trauma induced structural changes across the neuroaxis following acute spinal cord injury

Keywords

Spinal cord injury; MRI; rehabilitation

Short Description

Extensive upstream (e.g. remote) volumetric and microstructural changes of corticospinal axons and sensorimotor cortical areas occur along the neuro-axis (ranging from the cord to the brainstem and brain) in the first months after spinal cord injury, with faster degenerative changes relating to poorer recovery. However, the spatial and temporal patterns of these changes and their relation to the clinical course of SCI are still uncertain. To better reveal the interaction between spinal cord and brain changes a more defined analysis of changes along the whole spinal cord, i.e. within but also below and above the cord lesion, and characterization of the spinal patterns of changes affecting the myelin and axonal architecture will be required. This will help to disentangle effects attributable to the immediate damage of the cord from secondary remote (above and below) spinal cord changes.

The specific aim of the project is to apply novel, cutting edge MRI acquisition methods to assess the time course of (micro-) structural changes in vivo below, at and above the lesion using high resolution MRI to distinguishing lesion dependent changes from secondary changes in animal and human spinal cord injury.

The successful candidate will a) incorporate cutting edge technology into the current state of the art methods for multiparametric mapping sequences and high resolution diffusion MRI acquisition, b) test and optimize the so developed acquisition and post-processing pipeline, & c) be involved with the acquisition and processing of the MRI data in acute traumatic spinal cord injury patients and animal models of spinal cord injury.

Environment

The student will be integrated in our world-leading lab at University of Zürich, primarily supervised by Dr Freund. The student will have the opportunity to attend UZH courses in relevant subject areas, as well as to interact with students and postdoctoral researchers from other departments. The project will be tightly linked to two world-renowned institutions: the Institute for Biomedical Engineering (IBT), which belongs to both the University of Zurich and ETH in Zurich and the Department of Systems Neuroscience, University Medical Center Hamburg-Eppendorf Hamburg, Germany.

Necessary skills

- Master's degree in neuroscience (Biology, Medicine, Pharmacy), engineering or an equivalent field
- Experience in experimental research and/or MR knowledge
- Strong analytical/mathematical skills
- An interest in medical image processing, and a desire to learn more.
- Good communication skills - especially in written English.

A strong work ethic, with the ability to think creatively and work independently

Duties and Responsibilities

- Implement and maintain the software arising from the PhD work.
- Work in collaboration with clinical researchers and MR physicists, who will help guide the project and who may need some training in making use of the PhD work.
- Prepare progress reports on research as required.
- Prepare manuscripts for submission to peer-reviewed journals.
- Prepare presentations, including text and images, for delivery by self and others.
- Travel for training, collaboration and other meetings or conferences.
- Contribute to the overall activities of the research team and department as required.

Time of the studentship

The studentship is funded for 3 years (1st May 2015– 28st Feb, 2018) under the guidelines of the UZH policy. The anticipated start date is 1st May, 2015.

For further questions please contact

Dr. Patrick Freund (email: pfreund@paralab.balgrist.ch)

Application procedures

Application is by CV and covering letter (including motivation for applying) emailed to pfreund@paralab.balgrist.ch. Candidates short-listed for interview will be required to give a short research presentation. Please put "Balgrist Spine Studentship" in the subject line.