

Helmholtz Call for Chinese Applicants Interested in Running for CSC 2021 Fellowship

- Helmholtz Centre:** Forschungszentrum Jülich GmbH – www.fz-juelich.de
- Department/Institute:** Institute of Biological Information Processing, Bioelectronic (IBI-3),
https://www.fz-juelich.de/ibi/ibi-3//EN/Home/_node.html
- Supervising scientist:** Prof. Dr. Andreas Offenhäusser, Dr. Dirk Mayer
- University for registration or for a future degree:** University of Aachen (RWTH)
- Research Field:** Biomedical research / Bioelectronics / Biomaterials
- Position open for:** **PhD Student X**
- Title of the research:** Organic electrochemical transistor for the detection of chemical and electrophysiological cell signals

Recording of chemical and electrophysiological cell signals from nervous systems is crucial not only to study and understand the information processing in the brain but also to diagnose neuron related diseases such as Alzheimer's or Parkinson's disease. The early detection of these illnesses is decisive for the success of the treatment. The aim of this project is to develop novel neuroelectronic devices based on conductive polymer materials that are able to record both biochemical and electrophysiological signals from cells. The electrophysiological signals report on the activity and thus on the viability of the investigated neurons while Alzheimer biomarkers and neurotransmitter release directly report on the disease status. Therefore, organic electrochemical transistors (OECTs) with same or smaller dimensions as neurons will be first fabricated in our cleanroom and later be used for in vitro cell culture experiments. These flexible PEDOT:PSS-based device are well suited for electrophysiological sensing due to their minimally invasive nature to soft tissue and their ion sensitive conductivity. After successful device fabrication and biocompatibility evaluation, neurons from the rat brain will be grown on the polymer chips to investigate detailed effects of neurotoxic amyloid beta (A β) peptides on synaptogenesis, synaptic function, and intersynaptic cell-cell-communication. This, in turn, might allow a more detailed, faster and quantitative investigation of toxic effects of A β and/or an effective screening of neuroprotective and therapeutically active substances.

Specific requirements:

The candidate should have been trained either in physics, chemistry, material sciences, biophysics, electrical engineering or similar. Interest in interdisciplinary research is requested for the successful development of the project. Instruction and guidance will be provided for all experimental techniques by the supervising team including physicists, chemists, and biologists.

Working Place: Forschungszentrum Jülich, Germany (near Cologne)

Earliest Start: September 2021

Language Requirement: Very good knowledge of English language, written and spoken. German language courses are organised in the context of our in-house training program and are free of charge.

Name and Address of the Supervisor: Forschungszentrum Jülich, Dr. Dirk Mayer, Institute of Biological Information Processing (IBI-3), 52425 Jülich, Germany; dirk.mayer@fz-juelich.de