#### Position: PhD Student in Neuroimaging Technology Development

We are seeking a highly motivated and enthusiastic PhD student to join an exciting and innovative project aimed at advancing neuroimaging technology. The project focuses on the development of a holographic endo-microscope for in-vivo imaging of brain structure and neuronal activity in freely moving mice. This work has the potential to revolutionize how we study brain function, cognition, and disease progression.

## **Project Overview**

The project is part of the NEUROGATE initiative (<u>https://www.leibniz-ipht.de/en/illuminating-the-brain-new-imaging-technology-for-</u>

<u>neuroscience/</u>). It builds on innovations in holographic endoscope technology, a minimally invasive imaging tool that allows for real-time monitoring of neuronal signaling and structural changes at the subcellular level in live animals.

The current work focuses on technological advancements towards repeated imaging in freely moving animals through implementation of:

- **Bending-resilient optical fibers**, ensuring that the light flow remains calibrated despite movement.
- **Brain-scope interfaces** that allow for chronic monitoring of the brain's structural connectivity and activity, minimizing tissue damage during repeated imaging sessions.

The goal is to validate the methods under real-world conditions at the Institute of Scientific Instruments, Brno, and through a study of dopaminergic circuitry with one of the key partners at NERF (Leuven). DeepEn GmbH, a young startup company founded as a spin-off from IPHT, is a key project partner offering a direct route to technology transfer and future opportunities for the successful candidate.

## Key Responsibilities

- **Optical Setup Development**: Implement bending-resilient modules of the holographic endo-microscope system.
- **In-vivo Imaging**: Work with animal models to conduct in-vivo imaging experiments, including monitoring neuronal activity and structural connectivity in the brain.
- **Collaboration**: Work closely with academic and industrial partners to refine and optimize the holographic endoscope, helping to test the technology in real-world conditions.
- **Technology Transfer**: Support the transition of developed technologies into a commercial setting, collaborating with DeepEn GmbH and academic partners to further develop the system for broader use in neuroscience.

• **Data Analysis**: Analyze imaging data to assess system performance and biological insights gained from chronic monitoring of the brain's structural and functional connectivity.

# **Candidate Requirements**

- **Background in Optics**: MSc in optics, physics, engineering, or a related field with a focus on optical imaging, waveguides, holography or microscopy.
- **Experience or Interest in Optical Setup Design**: Some experience or a strong interest in designing and building optical systems for imaging applications.
- **In-vivo Imaging Knowledge**: Experience with imaging of biological samples and/or a strong desire to work with animal models in neuroscience research.
- **Technical Skills**: Familiarity with experimental techniques, including optical alignment, data acquisition, and image analysis (Matlab, Python). An advantage would be experience with automatic experiment control (LabView).
- **Motivation for Technology Transfer**: A strong interest in the commercialization of innovative technology and the ability to work in a startup environment with a potential transition to industry.

## What We Offer

- **Innovative Research**: Join a cutting-edge project at the forefront of neuroimaging technology with the opportunity to contribute to groundbreaking scientific discoveries.
- **Collaboration with Leading Institutions**: Work with a strong consortium of academic partners (Leibniz Institute of Photonic Technology, Czech Academy of Sciences, and Neuro-Electronics Research Flanders) and a young innovative startup (DeepEn GmbH).
- **Training and Development**: Extensive opportunities for skill development in optics, imaging, and data analysis, with mentorship and support from experts in the field.
- **Future Career Opportunities**: Experience at the intersection of academic research and commercial technology, applicable for future roles in academia, industry, or startups.
- **Dynamic and Supportive Environment**: Be part of a dynamic research environment that fosters creativity, interdisciplinary collaboration, and scientific excellence.
- Stipendium supported by a part-time employment at ISI Brno

# Application Process

Please submit your CV, a cover letter outlining your experience and motivation for the position, and contact details for at least two academic or professional references. Review of applications will begin immediately and continue until the position is filled.

#### Contact

For further information about the project and application process, please contact: Hana Uhlirova (huhlirova@isibrno.cz)

We look forward to receiving your application!