

Gisela and Erwin Sick
Chair of Micro-Optics
Prof. Hans Zappe

Research Area

Endomicroscopy
Medical Imaging

Relevant Tasks

- Optical experiments
- Test setup development
- Device characterization
- Material characterization
- Optical simulations
- FEA simulations
- Clean room fabrication
- CAD/CAM
- Polymer fabrication
- Programming
- Analytical analysis / Theory
- Literature research
- Teaching

Eligible Departments

- Microsystems technology
- Mechanical engineering
- Process engineering
- Chemistry
- Physics
- Electronics and IT
- Computer science
- Industrial engineering

Requirements

Basic optics and FEA knowledge
CAD/CAM experience (Optional)
Good English skills

Starting Date

Immediately

Contact Person

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PhD Thesis Project

Integrated Adaptive Optical Microscope Objective

Adaptive Optics (AO) is an image correction technique based on real-time measurement and correction of optical aberrations in an imaging system. Originally developed for astronomical applications, AO has been adapted to life-science microscopy in the last decade with considerable success. Our laboratory has recently developed a new AO solution based on an optofluidic refractive phase modulator and associated control and image processing methods to radically miniaturize AO systems, which have hitherto been prohibitively complex and costly. We are looking for a talented and motivated doctoral candidate to take the next step in the evolution of this research direction, and develop a novel high- power microscope objective with integrated AO capability.

In the initial phase of the project, the prospective student is expected to explore high-end life science microscopy landscape to identify a set of specifications for the targeted optics. Then, detailed optical simulations will be performed to design a microscope objective optimized to accommodate the refractive adaptable element. Specific design question such as the location of the element in the optical train, the size and electrode count of its clear aperture, and its packaging strategy will need to be answered. In the last stage, the designed microscope objective will be manufactured and extensively characterized.

University of Freiburg offers a competitive and international research environment at the epicentre of the beautiful Black Forest region. Here you will find a friendly work environment with state-of-the-art infrastructure, and a rich social life of a traditional German university city. The duration of the position is 3 years with 100% employment.

Qualifications:

Candidates with a master's degree (or equivalent) in electrical or microsystems engineering, alternatively physics or mechanical engineering with a background in optics are welcome. Proven proficiency in written and spoken English is a must; German is a strong plus.

Application procedure:

The application should be sent by e/mail and be attached as pdf-files, as below:

- CV: (Please name the document: CV_Family name)
 - CV
 - Two references that we can contact.
- Cover letter: (Please name the document as: Cover letter_Family name)
 - 1-2 pages where you introduce yourself and present your qualifications.
 - Previous research fields and main research results.
 - Future goals and research focus.
- Other documents (if available):
 - Copies of bachelor and/or master's thesis.
 - Attested copies and transcripts of completed education, grades and other certificates, eg. TOEFL test results.