

ESR 7 Information Sheet

Project title: Multimodal nonlinear imaging for clinical diagnosis in combination with laser tissue ablation for selective tissue removal

Host institution/company: Leibniz-Institute of Photonic Technology Jena (Germany).

Supervisors

- *Academic:* Prof. Dr. Juergen Popp, Scientific director Leibniz-Institute of Photonic Technology (Leibniz-IPHT) and head of research department Spectroscopy / Imaging at Leibniz-IPHT.
- *Industrial:* Dr. Bernhard Messerschmidt, Grintech GmbH (Germany)

Type of contract: 36-months full-time research grant within the PHAST-ETN project.

Brief description of the project: The spectroscopy and imaging group at the Leibniz-Institute of Photonic Technology focuses on researching innovative optical/photonic methods for multiscale spectroscopy and multimodal imaging for clinical diagnostics and therapy. The ESR project will work on the development of specially tailored analysis routines for a timely evaluation of the multimodal images together with the adjustment of an existing multimodal microscope combining the modalities CARS (coherent anti-Stokes Raman scattering), TPEF (two-photon excited autofluorescence) and SHG (second harmonic generation) towards a multimodal surgery microscope. In this context the development of a miniaturized rigid free-beam optical probe, which can be attached to the aforementioned existing multimodal microscope (in cooperation with ESR8) takes center stage. Furthermore, the design and development of innovative fibre optical probes for multimodal endoscopy allowing for the simultaneous implementation of several spectroscopic modalities (e.g. CARS, SHG and TPEF) will be a further objective of the ESR. Finally, it is planned to combine multimodal imaging and laser tissue ablation. Achieving these objectives will provide the basis for using multimodal imaging as intraoperative approach to detect tumour surgical margins and the selective removal of tumour by laser tissue ablation. Planned secondments at **Grintech GmbH Jena** (Germany), **Medical University Vienna** (Austria), **Carl Zeiss Meditec AG Jena** (Germany) and **Jena University Hospital (Germany)**.

Qualifications

Essential

- Applicants should hold or expect to attain, as a minimum an MSc in Physics, Chemistry, Optics/Photonics or related area.

Knowledge and Experience

Essential

- A demonstrated knowledge of at least two of the following: optical spectroscopy / microscopy and their application in biomedicine, photonics / optics, laser physics, optical design, nonlinear optics, electronics, technical programming language (Labview, or R), image analysis.

Desirable

- Research project carried out in at least one of the above disciplines.

Skills and Competencies

Essential

- Applicants whose first language is not English must submit evidence of competency in English,
- Evidence of interest, aptitude and research experience in the above disciplines.

Further information

For any informal queries, please contact Prof. Juergen Popp by email at juergen.popp@leibniz-ipht.de.