PhotonIQ: Highly-integrated micro-optics for advanced endoscopic imaging

PhD project in the Laboratory for Micro-optics

This project will take place within a consortium of industrial, medical and academic partners, dedicated to conceiving and developing an advanced new form of endoscopic imager for use in gastroenterology. Most diagnostic procedures in this branch of medicine rely on finding and characterising polyps in intestinal tissue. *PhotonIQ* aims to revolutionize the field by demonstrating an imager which not only yields microscope images of these polyps, but will simultaneously determine their size; detailed surface shape; blood perfusion; color; roughness; and level of infiltration into surrounding tissue. With the *PhotonIQ* imager, the clinician will possess a diagnostic toolbox with unparalleled capabilities.

The goals of this PhD project are to develop some of the core technologies of *PhotonIQ* by conceiving, designing, fabricating and characterizing five optical sensors using a miniaturized 2D imaging chip. The required functionalities include optical imaging at two different resolutions; measurements of scattering and absorption in tissue; and determination of form using stripe projection. In each case, optical design is followed by fabrication of multi-element micro-optical components, using 3D-micro-structured glass or polymers, and concluded by demonstration measurements proving that the concepts can yield the required characteristics. Through close collaboration with the industrial partners who will ultimately fabricate and integrate your designs at scale, these technologies will ultimately be transferred to clinical use within the project.

We are looking for a talented, highly-motivated and creative engineer with a solid background in optical, mechanical, microsystems or electrical engineering to undertake this challenge. Experience in optical design and/or microfabrication is a plus. The candidate should have completed her or his MSc degree in a relevant field; be fluent in English and German; and have demonstrated clear ability to work both independently and as part of a highly interdisciplinary team.

The position is scheduled to start November 1, 2023.

Intrigued? Send email to `zappe@imtek.uni-freiburg.de`.