

# The Autonomous Eyeball: How optically controlled optics can use light to steer light

PhD project  
in the  
Laboratory for Micro-optics

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The goal of the *Autonomous Eyeball* project is to engineer and demonstrate an eyeball-like optical system which autonomously adapts its optical behavior to the environment. Key to the realization of such a system are two families of developments previously demonstrated at the Laboratory for Micro-optics: 1) the design and fabrication of soft-matter-based optics using controllably-deformable polymers; and 2) implementation of liquid-crystal elastomer-based films which can be controllably actuated in response to light stimulation.

Based on this prior work, your challenge now will be to engineer an optical imager based on a highly compliant deformable lens whose focal length can be modified by radial and circumferential compression and tension applied by light-actuated liquid-crystal elastomers (LCEs) in combination with an LCE-based iris whose aperture varies in response to ambient light levels. The system should be tunable in focus and aperture with only light as an external control stimulus and power source. Combined with a solid-state sensor, this complete “eyeball” would represent a micro-imaging system which both responds autonomously to ambient conditions and is remotely controllable by light.

To undertake this ambitious project, we are looking for a highly-motivated scientist or engineer with a solid background in optical, mechanical, microsystems or electrical engineering. Experience in numerical modeling of mechanical systems; chemical synthesis; 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 have demonstrated ability to work both independently and as part of an interdisciplinary team.

The position is open for an immediate start.

Intrigued? Send email to [zappe@imtek.uni-freiburg.de](mailto:zappe@imtek.uni-freiburg.de).

Interested in applying? Please see [www.livmats.uni-freiburg.de/en/career](http://www.livmats.uni-freiburg.de/en/career)