Assistant Professor Daryl Yee (ALCHEMY)
Professor Christophe Moser (LAPD)
Institute of Electrical and Micro Engineering

Joint Master's Thesis position in ALCHEMY and LAPD

The Laboratory for the Chemistry of Materials and Manufacturing (ALCHEMY) and the Laboratory of Applied Photonics Devices (LAPD) has one joint Master's thesis position available for Spring 2025 on the volumetric additive manufacturing of stimuli-responsive biopolymers.

Thesis title: Volumetric additive manufacturing of stimuli-responsive biopolymers

Background: ALCHEMY has recently developed some photocurable biopolymers (Figure 1) which could potentially be utilized with additive manufacturing technology. Together, with LAPD, we are looking to explore how volumetric additive manufacturing (VAM, Figure 2) can be used with these biopolymers to fabricate complex 3D structures.

Figure 1. Photocured fluorescent biopolymer developed by ALCHEMY.

Tasks: The goal of this project will be to fabricate complex 3D stimuli-responsive structures out of natural biopolymers. With ALCHEMY, you will develop bio-sourced photoresins that can be used for VAM technology: this will entail studying the impact of resin formulation on printability and material properties; you will also investigate the stimuli-responsive behavior of these biopolymers. With LAPD, you will understand how to characterize the optical properties of these photoresins and understand how to fabricate complex 3D structures using VAM. The student will spend time in both ALCHEMY at EPFL Neuchâtel and in LAPD in EPFL Lausanne.

Figure 2. 3D structure printed in 30s with VAM at LAPD.

Learning outcomes: At the end of the thesis, the student will learn about photoresin formulation, polymer characterization methods, and volumetric additive manufacturing.

For more information and to discuss next steps, please contact Prof. Daryl Yee (daryl.yee@epfl.ch) and Prof. Christophe Moser (christophe.moser@epfl.ch)