

Master Thesis Work

at the Institute for Molecular Systems Engineering and Advanced Materials (IMSEAM)

Topic: Light manipulation of 3D printed photoswitchable scaffold for mechanical stimulation

Motivation: Photoswitchable scaffolds are promising platforms for a biophysical understanding of mechanotransduction which allow photomechanical stimulation of cellular proteins in molecular lever, thus to control mechanosensing in cells and control cellular functions (e.g. cell adhesion and cell differentiation) in a user-defined manner. Reported examples mainly deal with the response of cell adhesion to forces on the azobenzene-functionalized surface. Therefore, in this work, we here apply an azobenzene which perform a high frequency oscillation upon illumination with visible light in 3D matrix. Moreover, the light-based 3D printing is selected as a strategy to print scaffolds and open possibilities for the fabrication of complex multifunctional structures, eventually allow for the quantitative probing of mechanical interactions between cellular proteins and photoswitchable azobenzene in 3D.

Requirements:

- The candidate should have previous synthesis experience.
- A basic knowledge of chemistry and material science is required.

Supervisor: Prof. Dr. Christine Selhuber-Unkel, Dr. Qiyang Jiang

Starting date: As soon as possible

Submission until: six-months Thesis

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HiWi position

at the Institute for Molecular Systems Engineering and Advanced Materials (IMSEAM)

We are hiring a student assistant (HiWi) for 3 months (40 hrs/month) for the following project: "Photoswitchable azobenzene-based platform for mechanotransduction"; from June 2023 to August 2023.

The student (background: chemistry) will work on the following tasks:

- Synthesis of azobenzene
- Surface silanization and further modification with azobenzene and biomimetic peptide

Starting date: As soon as possible

Contact: qiyang.jiang@uni-heidelberg.de