

BSc/MSc project for students in Biomedical Engineering and/or Quantitative Biology and Disease Modelling, DTU/KU

Project Title: 3D printing of photo-crosslinkable biopolymers for biomedical applications

Description: Inspired by nature, this project is aimed at developing a biopolymer-based resin/bio-ink for 3D printing of native-like hydrogel scaffolds to accelerate the mending of tissue disorders. Owing to their intrinsic soft 3D structure and tunable physical and chemical properties, hydrogels have recently found widespread applications in various biomedical applications. They exhibit similar properties to that of the native extracellular matrix of many tissues and can often be processed under relatively mild conditions. These biomaterial-based temporary scaffolds support cells growth and promote their maturation toward functional tissues. Therefore, they can also serve as cell carriers, which are capable of molding themselves into the defect site and cause minimal inflammatory responses. The effective organization of cells into a functional tissue, however, requires a highly controlled native-like 3D microenvironment, which mimics the physiological and mechanical properties of the natural extracellular matrix. This can be achieved by employing the state-of-the-art 3D printing techniques where microstructures can be precisely designed and fabricated through a highly automated process. This project provides the opportunity to expand your knowledge and skills within the area of biomaterials and tissue engineering, specifically in synthesis and characterization of biopolymers, 3D printing and cell studies.

Required qualifications: Basic knowledge in chemistry and some experience of working in chemistry lab

Responsible institution/department: Department of Health Technology, DTU

Contact information: Fatemeh Ajalloueian, faaj@dtu.dk

Allowed no of students per report (1-4): 2 students

KU and/or DTU supervisor: Anja Boisen (DTU), Fatemeh Ajalloueian (DTU), Nayere Taebnia (DTU)

