

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

**Project Title:** Microporous Nanostructures and nanofibrous microparticles for smart drug delivery and tissue engineering applications

**Description:** Nanofibrous structures (e.g. electrospun sheets) mimicking the ECM fibrous structure of native tissue play an important role in drug delivery and tissue engineering applications. On the other side, microparticles have demonstrated a profound role as carriers of drugs/bioactive agents in oral drug delivery systems (DDS). Both these systems, in their conventional form, suffer from deficiencies preventing them from efficient clinical applications. Whilst Nanofibers suffer from limited cell infiltration due to their small pore sizes (against their high total porosity), microparticles have appeared inferior to nanoparticles (in several studies) due to their incapability in passing through mucus barrier in order to deliver their drug. In this project, we use our fabrication knowledge to design and develop nanofibers with regular micro-pores for improved cell adhesion and infiltration, as well as fabricating nanostructured microparticles with possibility of delivering nanocarriers to pass through mucus barrier. In this project, you will work on either of these structures, and will learn how to fabricate them, and use them for cell culture studies or for drug loading and oral delivery. You will also learn several characterization techniques including imaging, drug release and cell-scaffold interactions.

**Required qualifications:** None

**Responsible institution/department:** Department of Health Technology, DTU

**Contact information:** Fatemeh Ajalloueian ([faaj@dtu.dk](mailto:faaj@dtu.dk))

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

**KU and/or DTU supervisor:** Anja Boisen, Fatemeh Ajalloueian

