



Internship Masters Student

In Biofabrication and Bio-instructive Materials research group

Topic: Melt electrowriting of hierarchical structures for regeneration of hard-soft tissue interfaces

Project description

Interfacial tissues, such as bone to muscle connections, are structurally and compositionally heterogeneous, consisting of gradients of materials, cell phenotypes, and biochemical factors. The gradient structure is essential in transmitting load between the distinct orthopedic tissues and preventing damage during body movement. In Biofabrication group we are using the high-resolution additive manufacturing method to develop interfacial tissue - the melt electrowriting (MEW) technique. It works by combining 3D printing and electrospinning principles, allowing to print thermoplastic polymers with unrepresented precision, which enables the creation of similar structures to the native collagen fibers architecture present in tendons and ligaments.

Using MEW, we are creating scaffolds with different, very precisely controlled architectures, which influences final material properties. By the design, we tune the mechanical and biological performance of the scaffolds. We focus on detailed cell-material interaction studies by performing quantitative and qualitative cell-based assays on different MEW substrate designs. Additionally, we perform mechanical analysis on MEW scaffolds with uni-axial tensile, cyclic-tensile, and compression tests.

Internship

We are looking for highly motivated Master's students with knowledge in chemistry or polymer chemistry, who can enjoy shaping the field of biofabrication in an interdisciplinary path in a large and successful team. The student will learn biofabrication and material mechanical and biological characterization methods. We will work together to understand material structure-property relation.

Group: The biofabrication and bio-instructive materials group is a new, international team working at the Biotechnology Center. Only **highly motivated, creative students, with fluency in English**, will be considered for the project.

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