Digitalizing life at the interface

Regenerative medicine holds the promise to cure many of what are now chronic patients, restoring health rather than protracting decline, bettering the lives of millions and at the same time preventing lifelong, expensive care processes: cure instead of care. The scientific community has made large steps in this direction over the past decade, however our understanding of the fundamentals of cell, tissue and organ regeneration and of how to stimulate and guide this with intelligent biomaterials in the human body is still in its infancy.

In order to tackle these challenges, the "Materials-driven regeneration (MDR)-consortium" (see www.mdrresearch.nl for more information) brings together an interdisciplinary team of excellent scientists at three leading institutes (ICMS at Eindhoven University of Technology, RMU at Utrecht University and MERLN at Maastricht University). The central goal of MDR's research program is to investigate, design and use intelligent biomaterials that drive the functional regeneration of living tissues and organs under complex (patho)physiological conditions.

Within the MDR consortium you will work on a project that combines state-of-the-art experimental techniques with computational approaches at the laboratory for Cell Biology-inspired Tissue Engineering (cBITE). The research program of cBITE is characterized by a holistic approach to both discovery and application, aimed at merging high throughput technologies, computational modeling and experimental cell biology to streamline the wealth of biological knowledge to real clinical applications. cBITE is a department of the MERLN Institute for Technology-inspired Regenerative Medicine, which is focused on developing novel and challenging technologies to advance the field of tissue and organ repair and regeneration.

Background

Cell functions, tissue homeostasis and regeneration are controlled at different length scales, e.g. from single proteins that act as chemo-attractants, to macrophages migrating into a scaffold, up to collagen fibers guiding the migration process and tissue formation. Currently, however, biomaterial properties are mainly manipulated at a single level of hierarchy.

This research project aims at transforming the way we engineer biomaterials by adding functionality analogous to the natural evolutionary process of mutation and natural selection. At the core of this research project lies high throughput screening and transcriptomics, as well as computational modelling to drive the evolutionary design process that will bring novel multi-functional biomaterials to interact with the dynamic and multi-scale processes of tissues. You will work on material platforms developed within the consortium with a hierarchy in length scales (nanometer molecular imprints to micrometer range topographies). You will parameterize the biomaterial properties using high throughput analysis, expose the materials to cells, and record the response through high content imaging and large-scale transcriptomics (RNA-sequencing). Next, you will use machine learning and genetic network modelling to characterize and/or quantify the relations between biomaterial parameters and cell behavior. This knowledge will be used to optimize material and time parameters for different material approaches and to generate novel biomaterials that produce the desired biological response at all length scales.

Applying

MERLN invites applications for this full-time PhD position. The candidate will use her/his knowledge at the exciting crossroads of cell biology, imaging and computational modeling. The candidate should have a Master's degree in biomedical engineering, bioinformatics, mathematics, computer science or similar

fields and have an affinity with regenerative medicine. Outstanding knowledge of scientific English both in speaking and in reading is required.

The full-time position is offered for four years (1+3), with a yearly evaluation. The salary will be set in PhD salary scale of the Collective Labor Agreement of the Dutch Universities (€2083 gross per month in first year to €2664 last year). On top of this, there is an 8% holiday and an 8.3% year-end allowance. The terms of employment of Maastricht University are set out in the Collective Labor Agreement of Dutch Universities (CAO). Furthermore, local UM provisions also apply. For more information look at the website www.maastrichtuniversity.nl, employees, A-Z.

Maastricht University (UM) is renowned for its unique and innovative problem based learning (PBL), characterized by a small scale and student oriented approach. With 16,000 students and 4,000 staff, UM offers a wide choice of academic programs. UM is the most international university in the Netherlands, with 45% of the students and more than 30% of its staff from abroad.

For more detailed information you can contact dr. A. Carlier: a.carlier@maastrichtuniversity.nl.
Interested candidates are invited to apply through this website by sending an application letter and resume before the vacancy deadline.