



PhD in BIOINGEGNERIA / BIOENGINEERING - 39th cycle

THEMATIC Research Field: BEACONSANDEGG. AN ORGANISM-ON-CHIP PLATFORM TO MODEL BREAST CANCER PROGRESSION. ENGINEERING AND MICROFABRICATION

Monthly net income of PhDscholarship (max 36 months)

€ 1400.0

In case of a change of the welfare rates during the three-year period, the amount could be modified.

Context of the research activity

Motivation and objectives of the research in this field

The overarching goal of this project is to create an innovative platform capable of modeling the fibrotic microenvironment of invasive breast cancer in order to better understand its progression and design better targeted cancer therapies. When this goal is met, it will be possible to validate the efficacy and specificity of therapeutic agents at various stages of tumor fibrosis. The long-term goal is to improve our understanding of incurable cancers and to provide a standardized testing platform for new therapeutic products.

Methods and techniques that will be developed and used to carry out the research

The goal of this project is to simulate breast tumor fibrosis progression by varying the geometrical features of 3D micro scaffolds. Their geometry will be a three-dimensional micro lattice with variable spatial arrangement into several repeated levels, each with variable inter-spacing, capable of conditioning adhesion and migration of individual cells that repopulate the microstructure. The scaffold geometry, when implanted in a living organism, will "physically" condition the infiltration of the host's vascular, fibroblast, and immune cells involved in the foreign-body reaction to the synthetic structure in the 3D scaffold spaces. To that end, the candidate will: a) Use two-photon laser polymerisation (2PP), a micro stereolithography technique, to create ultra-precise micro scaffolds in a biocompatible polymer. b) Develop a "medium-throughput" test array of 3D micro tumor environments with varying matrix stiffness and



	tumor environments with varying matrix stiffness and vascularity.c) Validate the platform by incorporating the micro scaffolds into a 3D-printed imaging window capable of directly contacting and imaging the avian chorioallantoic membrane in vivo.
Educational objectives	The program will be part of the international project ERC, acronym BEACONSANDEGG, G.A. 101053122 funded by the European Union. The candidate will take part to the research meetings and to the different phases of the project, working in the EU context. Besides acquiring specific expertise on research methodologies, and publishing the obtained results, the candidate will improve on team collaboration, deadline compliance, research reporting.
Job opportunities	The acquired expertise will lead to various job opportunities as a researcher and/or research manager in public research institutions, as well as pharmaceutical and instrumentation companies. Collaborations with a PhD with this level of experience will also benefit companies and institutions interested in applying Nanoscience and Nanoengineering to Regenerative Medicine.
Composition of the research group	1 Full Professors 1 Associated Professors 2 Assistant Professors 1 PhD Students
Name of the research directors	PROF. MANUELA RAIMONDI

Contacts	
<p><i>Prof. Manuela T. Raimondi</i> https://www.cmic.polimi.it/en/persona/docenti-e-ricercatori/raimondi-manuela-teresa <i>manuela.raimondi@polimi.it</i> , +39 02 2399 4306</p>	

Additional support - Financial aid per PhD student per year (gross amount)	
Housing - Foreign Students	--
Housing - Out-of-town residents (more than 80Km out of Milano)	--



Scholarship Increase for a period abroad	
Amount monthly	700.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information

The PhD student will be involved in educational activities along with teaching assistantship. A shared desk and computer will be given to the student for the time needed to carry out the research.