



PhD in BIOINGEGNERIA / BIOENGINEERING - 39th cycle

THEMATIC Research Field: DEVELOPMENT OF ADVANCED ORGAN-ON-CHIP TOOLS FOR CARDIAC RESEARCH

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

Organ-on-Chip (OoC) technology combines the use of microfluidics, biomaterials, and advanced cell cultures in order to generate and monitor miniaturized replicas of human tissues and organs in vitro. It is an enabling technology involving interdisciplinary expertise from the fields of engineering, physics, and cell/molecular biology. Application areas include environmental assessment, toxicological evaluation of chemical agents, drug screening and disease modeling, among others. The aim of the project is to develop novel readout tools to extract patho-physiological parameters from cardiac tissue models. The tools will be integrated into organ-on-chip platforms, purposely designed.

CUP Master del progetto: E53D23003950006

CUP del progetto: D53D23004360006

Decreto direttoriale di ammissione a finanziamento prot. n. 961 del 30 giugno 2023

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

The design and the development of new advanced microscale in vitro platforms will consider state-of-the-art technologies, micro- and nano-fabrication, including organ models previously developed by Prof. Rasponi group at Politecnico di Milano. Computational modeling will be used to optimize geometrical parameters. The proposed research plan is divided into 3 Actions.
A1: Development of a new organ-on-chip platform able to



	<p>A1: Development of a new organ-on-chip platform able to host advanced cardiac models, and definition of a protocol for mimicking healthy and pathological conditions</p> <p>A2: Development of new technologies to sense patho-physiological parameters from cardiac microtissues</p> <p>A3: Integration of the sensing technologies into the organ-on-chip platform and their exploitation The research will be implemented at the MiMic and EvOoC Laboratories, Department of Electronics, Information and Bioengineering of Politecnico di Milano, while secondment periods may be considered.</p>
Educational objectives	<p>To train the PhD student in organs-on-chip technology, microfluidics, microfabrication, soft-lithography, cell culture applications, micro-bioreactors. http://www.biomech.polimi.it/mimiclab https://www.polifab.polimi.it/</p>
Job opportunities	<p>The research will be carried out in cooperation with BiomimX Srl, spinoff of Politecnico di Milano, developing organ-on-chip models.</p>
Composition of the research group	<p>0 Full Professors 1 Associated Professors 2 Assistant Professors 6 PhD Students</p>
Name of the research directors	PROFF. MARCO RASPONI - PAOLA OCCHETTA

Contacts	
<p><i>Prof. Marco Rasponi</i> <i>marco.rasponi@polimi.it,</i></p> <p><i>Prof. Paola Occhetta</i> <i>paola.occhetta@polimi.it</i></p> <p>+39-02-2399-3377</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

- 1. Educational activity:** The student will be encouraged to attend to courses with subjects in tissue engineering, cell and tissue culture, micro and nanofabrication either at POLIMI or abroad in International Schools.
- 2. Teaching assistantship:** There are various forms of financial aid for activities of support to the teaching practice. The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations.
- 3. Computer and desk availability:** the student will be allowed to access facilities of both MiMic Lab and EvOoC Lab of the DEIB.

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