



# PhD in BIOINGEGNERIA / BIOENGINEERING - 38th cycle

## PARTENARIATO PNRR Research Field: IN-VITRO DYNAMIC 3D VASCULARIZED DISEASE MODELLING FOR DRUG SCREENING

### Monthly net income of PhDscholarship (max 36 months)

**€ 1325.0**

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

Over the last years, there has been a constant increase in the in-vitro modelling research that allowed the study of human pathologies, overcoming the limitations related to animal models and promoting the compliance to the 3Rs principles. This led to the development of organoids and tissue-based models to study human development, diseases and drug effects. However, several limitations still exist in the field, as highlighted by the literature. In particular, great efforts are being made for the development of dynamic and vascularised models which would allow cultures over longer timeframes as well as a better mimicking of the organs studied. The proposed PhD project is set in this context, aiming at the development of dynamic and vascularised in-vitro organ models via the development of innovative methodologies and dynamic culture devices. The host research group (<https://www.cmic.polimi.it/ricerca/elenco-gruppi-di-ricerca/labs-mufluid/>) is based in the Department of Chemistry, Materials and Chemical Engineering 'Giulio Natta' and its research focuses on the development of micro-models and devices for drug screening as well as computational modelling.

This project research is in the framework  
 "ANTHEM: AdvANced Technologies for Human-centrEd Medicine"  
 Codice PNC0000003 CUP B53C22006720001  
 PIANO NAZIONALE COMPLEMENTARE (PNC) –



	Decreto Direttoriale n. 931 del 6 giugno 2022 – “AVVISO PER LA CONCESSIONE DI FINANZIAMENTI DESTINATI AD INIZIATIVE DI RICERCA PER TECNOLOGIE E PERCORSI INNOVATIVI IN AMBITO SANITARIO E ASSISTENZIALE” da finanziare nell’ambito del PNC
<b>Methods and techniques that will be developed and used to carry out the research</b>	The candidate will develop a three-dimensional, in-vitro model of vascularized organs. The model will be developed at both the micro and the mini scale using either organoids or tissues co-cultured with endothelial cells. The candidate will design a dynamic mid-throughput culture setup that will be used to perform drug screening and to perform imaging analysis on the models exposed to different compounds. Result images will be shared with collaborators in the Anthem consortium to derive AI-based routines that will retrospectively predict the drug effect in the model as validation. Expected results are: (i) the development of the methodology for a vascularized model at both the micro and mini scale; (ii) the development of a mid-throughput dynamic culture model; (iii) the generation of an image-based analysis of the developed system.
<b>Educational objectives</b>	During the PhD project, the candidate will have to attend educational courses provided by the PhD Programme in Bioengineering and the PhD School of Politecnico di Milano. Participation in national and international conferences is also foreseen.
<b>Job opportunities</b>	The candidate will develop interdisciplinary knowledge and skills ranging from tissue engineering to cellular biology, besides working on cutting-edge methodologies and research. This will make the PhD candidate a highly attractive individual on the job market.
<b>Composition of the research group</b>	1 Full Professors 0 Associated Professors 2 Assistant Professors 1 PhD Students
<b>Name of the research directors</b>	PROF. GABRIELE DUBINI - DR ALESSANDRO PELLEGGATA

#### Contacts

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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	662.5 €
By number of months	6

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

A shared desk and computer will be provided to the candidate during the PhD work. The candidate will be also involved in teaching assistantship within the courses lectured by group members.

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