



PhD in CHIMICA INDUSTRIALE E INGEGNERIA

CHIMICA / INDUSTRIAL CHEMISTRY AND CHEMICAL ENGINEERING - 38th cycle

THEMATIC Research Field: 3D PRINTED CORTICAL ORGANIDS AS IN VITRO MODELS OF NEUROLOGICAL DISORDERS

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

The study of the molecular causes underlying neurological disorders is hampered by the difficulty in reproducing the complexity of the human cerebral cortex. In order to cover this gap, the aim of this project is the design, development and application of a 3D bioprinting process allowing the generation of vascularized cortical organoids. The ultimate goal is to exploit these systems as reliable *in vivo* models for studying the progression of neurological disorders at the molecular level.

The project is extremely multidisciplinary combining materials science, chemical engineering and biology. The latter expertise is covered by a partnership with Humanitas University, which will provide support on the cell processing and characterization of cell signals. The candidate is required to have a solid background in chemical engineering and in polymer materials.

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

The research will be mainly carried out in the chemical laboratories of the group at Politecnico di Milano, Piazza L. Da Vinci 32, Building 6. The multidisciplinary nature of the project implies a strong collaboration with Humanitas University.

The candidate will acquire knowledge on:

- Polymer reaction engineering



	<ul style="list-style-type: none"> • 3D bioprinting processes, including extrusion, stereolithography and 2-photon polymerization bioprinting • Computer-aided design • Practices allowing to work in sterile conditions
Educational objectives	The candidate will acquire the most recent competences in the framework of 3D bioprinting, covering all the aspects of the process, from the development of the bioink, to the realization and characterization of the model. In addition to these technical skills, the PhD program will allow the candidate to develop important soft skills, including writing scientific papers, presenting the results in front of an audience and working in a team.
Job opportunities	The candidate can develop his/her professional career in different sectors, from polymer manufacturing, to the development and distribution of bioprinting technologies. The combination of modeling and laboratory experience allows the candidates to be versatile and particularly suitable for R&D sectors.
Composition of the research group	2 Full Professors 0 Associated Professors 2 Assistant Professors 10 PhD Students
Name of the research directors	Prof. Mattia Sponchioni

Contacts	
Telephone: +39 02 2399 3197	
Email: mattia.sponchioni@polimi.it	
Web-pages of the research group: cfalab.chem.polimi.it	

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

Educational activities (funding for participation in courses, summer schools, workshops and conferences) - financial aid per PhD student per year: 1st year: around 1.800 euros per student 2nd year: around 1.800 euros per student 3rd year: around 1.800 euros per student

Teaching assistantship: availability of funding in recognition of supporting teaching activities by the PhD student: There are various forms of financial of 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 regulation.