



# PhD in FISICA / PHYSICS - 40th cycle

## THEMATIC Research Field: IN-VITRO NEUROLOGY TECHNOLOGIES

### 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

In the context of an aging society, technologies for healthy living that can monitor personal health and even in future dispense therapeutics without requiring constant hospitalization are in high demand to provide effective health services at sustainable costs.

This PhD scholarship focuses on advanced in-vitro devices for brain health, and aims at developing smart nanoparticles for neuroprotection, neuromodulation and neurostimulation mediated by various external stimuli (mechanical, optical, thermal).

At the same time, the stimulated neuronal activities will be monitored by advanced transducers of cells action potentials, in the form of printed electrolyte-gate organic transistors arrays.

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

The scholarship is offered within the “Technologies for Healthy Living” of the Istituto Italiano di Tecnologia (<https://www.iit.it/en/web/guest/our-research>). The project will comprise the development a new generation of in-vitro technologies for the prediction and prevention of neurological diseases. It will include the development of smart nanoparticles targeting brain diseases, to be performed at the Center for Materials Interfaces of IIT in Pontedera. Nanoparticles interaction with neurons will be probed thanks novel transducers based on printed electrolyte-gated organic transistors, realized at the Center for Nano Science and Technology of IIT in Milan.

#### Educational objectives

The student will develop a strong insight in the emerging field of bioelectronics and in particular in nanoparticles-



	neuronal cells interaction. At the same time, the student will conduct cutting-edge research on advanced in-vitro cells signals transducers, which may be the base for future in-vivo devices. The scholarship will grant exposition to several different environments, from academia to industry, including connection with clinics and opportunities for technology transfer.
<b>Job opportunities</b>	New technologies for remote health assistance are in high demand. Obtaining a multidisciplinary PhD in advanced technologies for brain health will therefore open many opportunities in a continuously expanding job market at global as well as at national level, including careers in academia, in industry, industrial R&D and consulting.
<b>Composition of the research group</b>	1 Full Professors 2 Associated Professors 7 Assistant Professors 6 PhD Students
<b>Name of the research directors</b>	Mario Caironi, Gianni Ciofani

<b>Contacts</b>
PI of Smart Bio-Interfaces: Gianni Ciofani - gianni.ciofani@iit.it PI of Printed and Molecular Electronics: Mario Caironi - mario.caironi@iit.it

<b>Additional support - Financial aid per PhD student per year (gross amount)</b>			
<b>Housing - Foreign Students</b>	<b>1st year</b>	<b>2nd year</b>	<b>3rd year</b>
	1000.0 € per student	1000.0 € per student	1000.0 € per student
	max number of financial aid available: 1, given in order of merit (only for students with scholarship)..		
<b>Housing - Out-of-town residents (more than 80Km out of Milano)</b>	<b>1st year</b>	<b>2nd year</b>	<b>3rd year</b>
	500.0 € per student	500.0 € per student	500.0 € per student
	max number of financial aid available: 1, given in order of merit (only for students with scholarship)..		

<b>Scholarship Increase for a period abroad</b>	
<b>Amount monthly</b>	700.0 €
<b>By number of months</b>	6

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



**Educational activities:** Educational activities (purchase of study books and material, funding for participation to courses, summer schools, workshops and conferences). Financial aid per PhD student per 3 years: 5707,20 Euros.

**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.

**Computer and desk availability:** individual use computer and desk.