



PhD in BIOINGEGNERIA / BIOENGINEERING - 38th cycle

PARTENARIATO PNRR Research Field: MULTIMODAL FUNCTIONAL BRAIN CONNECTIVITY: INNOVATIVE TOOLS AND PHYSIO-PATHOLOGICAL APPLICATIONS.

Monthly net income of PhDscholarship (max 36 months)

€ 1250.0

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 recent years, enormous technological advancements have been made to gain a better understanding of the functional connections among brain regions and of the underlying “wiring diagram” of the central nervous system. Significant improvements in structural and functional magnetic resonance imaging (sMRI/fMRI) and electroencephalographic (EEG) acquisitions have enabled the collection of huge amounts of data worldwide, which taken together can provide unprecedented knowledge of brain connectivity.

Within this context, there is the urgent need to develop sophisticated techniques for the extraction and analysis of brain connectivity features from multicenter and multisource datasets.

The PhD project aims to provide easy-to-use software tools for sophisticated brain connectivity analyses and identification of brain network markers of physiology and pathology that could be shared with the neuroscientific community through the EBRAINS platform.

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

The PhD project will be dedicated to the development and optimization of methods for brain connectivity analyses of EEG and MRI datasets collected across multiple centers from healthy controls and subjects with psychiatric and/or neurological disorders.

Different data processing phases will be managed, including multi-center data harmonization and pre-processing, extraction of unimodal and multimodal



	<p>processing, extraction of unimodal and multimodal connectivity features, and identification of brain network markers of mental health and illnesses via machine learning and AI tools.</p> <p>The newly developed methods will be integrated in a software facility, which will be made available to the scientific community for use in multidisciplinary research areas.</p>
Educational objectives	<p>Work in a multidisciplinary team; Develop capabilities in understanding clinical problems and provide engineering solutions;</p> <p>Research in clinics and in physiological modeling;</p> <p>Use of advanced research tools; capability in developing novel research tools.</p>
Job opportunities	<p>Research and development in research institutions or in enterprises; support to clinics; product manager; networking with the research centers on the same or related subjects.</p>
Composition of the research group	<p>4 Full Professors 3 Associated Professors 6 Assistant Professors 15 PhD Students</p>
Name of the research directors	<p>PROF. ANNA MARIA BIANCHI - PROF ELEONORA MAGGIONI</p>

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	625.0 €
By number of months	6

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

The PhD student will attend specific PhD courses at Politecnico di Milano according to his/her personal study plan;

He/she will be able to attend summer schools and will have the opportunity to disseminate his/her research results in international conferences;

The PhD student will assist in teaching by giving practical and lab lessons and by tutoring of BSc and MSc students developing their thesis work.

The PhD student will have personal desk in the Politecnico B3Lab and will be equipped with a personal computer.