POLITECNICO DI MILANO

PhD in FISICA / PHYSICS - 39th cycle

PNRR 118 PNRR Research Field: ADVANCED BIOPHOTONIC TECHNIQUES FOR NON-INVASIVE MONITORING OF TISSUE METABOLISM

Monthly net income of PhDscholarship (max 36 months)
€ 1195.5 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 program aims at developing novel photonic techniques for biomedical optics. In particular, the program focuses on near infrared diffuse spectroscopy techniques (e.g., time resolved reflectance spectroscopy and diffuse correlation spectroscopy) for estimating tissue optical properties (e.g., absorption coefficient, reduced scattering coefficient, diffusion coefficient), and for the assessment of tissue physiological parameters (e.g., hemoglobin content and blood flow). Main targets will be the skeletal muscle and the brain for applications in Rehabilitation and Neuroscience.
Methods and techniques that will be developed and used to carry out the research	The research activities will focus on: i) modelling and simulations with both analytical (e.g. photon diffusion theory) and numerical (e.g. Monte Carlo method) tools; ii) design and assembling of advanced instrumentation; iii) performance assessment of instruments and techniques following standardized protocols; iv) clinical applications in collaboration with hospitals. The PhD Student will experience a multidisciplinary environment in which Physics and Engineering meet Neuroscience and Physiology.
Educational objectives	The main educational objectives are to: i) consolidate the student’s background in Physics of matter and Photonics; ii) develop experimental know-how on Photonics devices and Biomedical Optics; iii) mature advanced data analysis methods; iv) achieve soft skills, in particular in the communication of experimental research activities.

Job opportunities	Job opportunities, in Italy or abroad, will be in companies (e.g., start-up, SME or large companies) that develop advance photonics system for health, environment, and material science, or in research centres, or also in academic institutions.
Composition of the research group	1 Full Professors 2 Associated Professors 1 Assistant Professors 5 PhD Students
Name of the research directors	Alessandro Torricelli

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	597.75 €
By number of months	6

National Operational Program for Research and Innovation	
Company where the candidate will attend the stage (name and brief description)	NA
By number of months at the company	0
Institution or company where the candidate will spend the period abroad (name and brief description)	Universities and research centres the research team collaborates with (e.g., ICFO Barcelona, UCL London, Boston University, IBIB Warsaw)
By number of months abroad	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: max **4.872,90** euros per student. ***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 availability: *individual use*
Desk availability: *share use*