POLITECNICO DI MILANO

PhD in MODELLI E METODI MATEMATICI PER L'INGEGNERIA / MATHEMATICAL MODELS AND METHODS IN ENGINEERING - 38th cycle

THEMATIC Research Field: DATA-DRIVEN AND PHYSICS-BASED MODELING OF BIOSENSORS AND BIOPRINTING PROCESSES

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	This research develops in the context of bioprinting manufacturing processes, bio-intelligent systems, and biosensors. The research is developed in the framework of the *BioPros* project (HORIZON-CL4-2021-DIGITAL-EMERGING-01-27).Goals of this research are: •the development of numerical models and data-augmented simulations to predict the performances of bioprinted constructs and biosensor platforms; •the construction of digital twins for adaptation to data acquired in real-time; •the development of novel methods to combine big data streams from in-situ/in-line images aimed at preventing defects in bioprinting, performing process optimization, and reducing variability and failures through process monitoring; •the development of physics-based and data-driven models for multi-sensor data fusion for bioprinting monitoring. https://www.biopros.eu/
Methods and techniques that will be developed and used to carry out the research	The research activity aims at developing innovative methods that combine physics-based computational models, data-driven models, and learning algorithms to address problems in bioprinting technology. It will develop

	advanced physics-based and data-driven models, also exploiting machine learning algorithms. The project will feature software development implementing the innovative methods and models for bio-intelligent systems, bioprinting, and additive manufacturing.
Educational objectives	The research will be carried out in a researchers' team of experts in data analysis, scientific computing, software development, data-driven and physics-informed machine learning algorithms. The candidate will develop proficiency in software libraries for data analysis and scientific computing.
Job opportunities	The research addresses innovative and advanced topics in Applied Mathematics, Scientific Computing, Data Science, Machine Learning, and software development. Scientists at the interplay of these fields are very likely to find a highly qualified job in industrial and business sectors, wherein the demand of such profile is continuously growing both in EU and US. Specific areas of employment: data analysis, consulting, R&D, industry, healthcare, software development.
Composition of the research group	1 Full Professors 2 Associated Professors 2 Assistant Professors 2 PhD Students
Name of the research directors	Luca Dedè, Alessandra Menafoglio

Contacts
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Additional support - Financial aid per PhD student per year (gross amount)			
	1st year	**2nd year**	**3rd year**
Housing - Foreign Students	1500.0 € per student	0.0 € per student	0.0 € per student
	max number of financial aid available: 1, given in order of merit ..		
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 (purchase of study books and material, funding for participation to courses, summer schools, workshops and conferences): financial aid per PhD student per year1st year: max 1.800,47 euros 2nd year: max 1.800,47 euros 3rd year: max 1.800,47 euros The PhD students are encouraged to take part in activities related to teaching, within the limits allowed by the regulations.1 individual PC per student +several shared PC. Access to one cluster with 32 processors and 384 GB RAM, and to several multi-processor servers and 1 individual desk per student are granted.