



PhD in DATA ANALYTICS AND DECISION SCIENCES - 40th cycle

Number of scholarship offered	1
Department	DIPARTIMENTO DI ELETTRONICA, INFORMAZIONE E BIOINGEGNERIA

Description of the PhD Programme
<p>The Ph.D. program in Data Analytics and Decision Sciences (DADS) aims at training highly qualified senior data analysts and data managers capable of carrying out research at universities, international institutions, tech and financial companies, regulatory authorities, and other public bodies. The program stems from the cooperation between three departments: Dipartimento di Elettronica, Informazione e Bioingegneria (DEIB), Dipartimento di Ingegneria Gestionale (DIG), Dipartimento di Matematica (DMAT), and the center for Health Data Science Center of Human Technopole. It allows the enrolled students to work in a highly interdisciplinary environment with strong connections to international research centers and private companies. The program provides successful candidates with the opportunity to acquire a high degree of professional expertise in specific scientific and technological fields.</p> <p>The program lasts three years: upon its successful completion and final exam, candidates will be awarded the title of PhD in Data Analytics and Decision Sciences. The first year is devoted to the courses that build the broad competence and the strong interdisciplinary set of skills required by data analytics.</p> <p>The next two years focus on the development of the Doctoral thesis. Students are required to spend at least one semester in a research institution abroad, taking advantage of the network of international collaborations of the three departments involved in the program. All the students enrolled in the DADS Doctoral Program are supported by scholarships from public institutions and private companies.</p>



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THEMATIC Research Field: STATISTICAL LEARNING FOR HEALTH BIG DATA PROJECT

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	<p>The ten-year HBD project, funded by the MEF and coordinated by the Ministry of Health, involves 51 IRCCS belonging to the Networks Alliance Against Cancer (ACC), Neuroscience and Neurorehabilitation (RIN), Cardiology and Pediatrics (IDEA). HBD provides for the creation or enhancement of: i) a set of local IT platforms in each participating IRCCS to ensure extraction, integration and interoperability of clinical and scientific data; ii) a centralized IT platform, ensuring connectivity between IRCCS and advanced analysis of shared data. The type of data that will be collected and shared is heterogeneous and includes omics data (genomics, transcriptomics, proteomics, metabolomics), clinical data (electronic medical record and patient follow-up data), clinical imaging and radionics data; and data provided by the patient. Data from biosensors, environmental, social, and economic data will also be included in the medium term. The project will ensure connectivity between the IRCCS participants in the project to develop predictive and prescriptive analysis capabilities based on the integration of omics and clinical data and the study of aggregate patient subgroups for various biological and clinical parameters, with the possibility of access and sharing by individual operators of each IRCCS.</p>
Methods and techniques that will be developed and used to carry out the research	<p>The research will focus on the development of novel and federated methods for the analysis of complex data coming from the HBD project. Specific methodologies will</p>



	<p>include:</p> <ul style="list-style-type: none"> - Multilevel and mixture models for multicenter registries. - Voxel-based ComBat methods for image-based harmonization settings. - Deep Learning/Machine learning risk prediction models. - Multi-modal learning and latent space representation of complex data.
Educational objectives	To be able to critically analyse, model, ask and answer pertinent biological questions from data. To develop skills in statistical data analysis, machine learning, and their application to complex and diversified clinical data.
Job opportunities	The profile proposed here are broadly relevant for a range of employers including (but not limited to): public and private healthcare institutions, hospitals, clinical and pharmaceutical companies, technology and biotech companies, as well as Research institutes in healthcare domain.
Composition of the research group	1 Full Professors 1 Associated Professors 2 Assistant Professors 5 PhD Students
Name of the research directors	Francesca Ieva (DMAT), Lara Cavinato (DMAT)

Contacts	
<p>Prof. Francesca Ieva (DMAT) mail: francesca.ieva@polimi.it https://sites.google.com/view/francesca-ieva/home</p>	

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	700.0 €
By number of months	6

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

List of Universities, Companies, Agencies and/or National or International Institutions that are cooperating in the research:

Networks of IRCCS (Neurological - RIN, Cardiological - CARDIO, Oncological - ACC, Pediatrics - IDEA)

Additional support:

Educational activities (purchase of study books and material, funding for participation in courses, summer schools, workshops and conferences), financial aid per PhD student per year:

1st year: max 1902,37 euro per student

2nd year: max 1902,37 euro per student

3rd year: max 1902,37 euro per student

Teaching assistanship: availability of funding in recognition of supporting teaching activities by the PhD student:

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:

1st year: *individual use*

2nd year: *individual use*

3rd year: *individual use*

Desk availability:

1st year: *individual use*

2nd year: *individual use*

3rd year: *individual use*