



PhD in DATA ANALYTICS AND DECISION SCIENCES - 40th cycle

THEMATIC Research Field: USING OMICS IN HEALTH DATA SCIENCE AND EPIDEMIOLOGICAL RESEARCH

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

This project aims to gain aetiological insights into a range of yet unresolved exposure-outcome associations and their mediation, related to maternal and child health or women's health across their lifecourse, such as: descriptive trends in contemporary populations, investigation of biological and behavioural predictors and determinants, deconvolution of mediating and moderating effects, and determination of (causal) long-term effects and their mechanisms, combining different and complementary data sources and analytical methods in an evidence triangulation framework. To this scope, the student will bring together, enrich and analyse data from world-leading prospective studies from multiple settings including Italy, UK, Bangladesh, through causal inference approaches based on genetic and other omics data. It is anticipated that the project will require extended research visits abroad to collaborating Research Centres. The combination of advanced analytical methods, robust and powerful datasets, and impactful research questions make this a flagship project for the whole Health Data Science Centre at Human Technopole.

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

This research will approach applied aetiological questions from different angles, studying different populations and contexts with different cultural norms, genetic diversity, and environmental factors, and at different levels from individuals to populations. This improves our ability to



	<p>individuals to populations. This improves our ability to draw robust causal conclusions from largely observational or real-world data, in a framework known as “triangulation”. For example, the student will use negative and positive controls, genetic instrumental variables and other forms of natural or quasi experiments to improve causality of the association findings. Omics measurements will be at the centre of these analyses, and new methods for triangulation in mediation analyses will be developed and applied to cutting-edge large-scale data collections, specifically to discern the extent to which molecular markers can explain or mitigate the effects of known causes of maternal and child health.</p>
Educational objectives	<p>The successful candidate will collect, analyse and manage molecular, environmental and health data available in the projects developed in the joint Centre for Health Data Science of Human Technopole and international collaborating Research Centres. Moreover, the candidate will support the definition of potential and limitations of the data as well as develop knowledge and evidence from the real world data, through the use of advanced data analytics techniques including causal inference approaches.</p>
Job opportunities	<p>The profile of data scientist and the applications proposed in this project are of interest to a broad range of actors, including (but not limited to): public and private institutions dealing with healthcare, hospitals, clinical and pharmaceutical companies, public health charities, policymakers, as well as international institutions and research centres working in health and healthcare research.</p>
Composition of the research group	<p>3 Full Professors 3 Associated Professors 3 Assistant Professors 15 PhD Students</p>
Name of the research directors	Piercesare Secchi, Francesca Ieva



Contacts
<p>Piercesare Secchi mail: piercesare.secchi@polimi.it</p> <p>https://mox.polimi.it/research-areas/statistics/</p> <p>Luisa Zuccolo mail: luisa.zuccolo@fht.org</p> <p>https://humantechnopole.it/en/people/luisa-zuccolo/</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	12

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
<p>List of Universities, Companies, Agencies and/or National or International Institutions that are cooperating in the research: Fondazione Human Technopole (Italy), University of Bristol (UK), University of Cambridge (UK).</p> <p>Additional support</p> <p><i>Educational activities</i> (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 1.902,38 euro per student 2nd year: max 1.902,38 euro per student 3rd year: max 1.902,38 euro per student</p> <p><i>Teaching and lab assistantship</i>: availability of funding in recognition of supporting teaching and lab activities by the PhD student.</p> <p>Further support is available for students who engage in activities of teaching or additional lab duties coherent with their academic mission and doctoral training.</p> <p>The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations.</p>



regulations.

Computer availability:

1 st year: individual use

2 nd year: individual use

3 rd year: individual use

Desk availability:

1 st year: individual use

2 nd year: individual use

3 rd year: individual use