



PhD in DATA ANALYTICS AND DECISION SCIENCES - 39th cycle

**THEMATIC Research Field: LARGE-SCALE HISTOLOGY FOR THE UNDERSTANDING OF
INFLAMMATORY BOWEL DISEASE (IBD)**

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

Inflammatory Bowel Disease (IBD) is commonly diagnosed through histological assessment of multiple GI biopsies. Additionally, disease progression and response to treatment are also monitored via biopsy and histology throughout the patient's life. In this project, we would like to design, develop, and apply machine learning models to aid in the diagnosis, prognosis and disease understanding of IBD using histology, prospective clinical data as well as genetics (genotyping). In addition, understanding the molecular basis of IBD histopathological characteristics will be determined via the use of large-scale spatial transcriptomics, for novel subtype discovery and biomarker identification.

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

- Supervised and unsupervised machine learning method development (multiple instance learning, segmentation, cell classification, detection, and localisation).
- Digital pathology/Whole Slide Image analysis.
- Spatial Transcriptomics.

Educational objectives

To be able to critically analyse, model, ask and answer pertinent biological questions from data. To develop one's skills in statistical data analysis, machine learning and the application of computation to human genetics research.

Job opportunities



	The profile of machine learning researcher and the applications 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.
Composition of the research group	1 Full Professors 1 Associated Professors 1 Assistant Professors 1 PhD Students
Name of the research directors	Dr C.A. Glastonbury and Prof. P. Lanzi

Contacts	
•Dr C.A. Glastonbury craig.glastonbury@fht.org https://humantechnopole.it/en/people/craig-glastonbury/ +393662532728	
•Prof. P. Lanzi pierluca.lanzi@polimi.it +390223993472 DEIB - Politecnico di Milano	

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
List of Universities, Companies, and Institutions cooperating in the research •Population & Medical Genomics, Human Technopole



Further support is available for students who engage in activities of teaching or additional lab duties coherent with their academic mission and doctoral training. The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations.