



PhD in INGEGNERIA DELL'INFORMAZIONE / INFORMATION TECHNOLOGY - 40th cycle

Research Area n. 1 - Computer Science and Engineering

THEMATIC Research Field: DESIGNING MULTIMODAL MODELS FOR DECISION-MAKING IN IMMUNOTHERAPY TREATMENTS

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>Lung cancer is among the leading cause of cancer-related deaths globally. Non-Small Cell Lung Cancer (NSCLC) accounts for approximately 85% of all lung cancers. Despite recent advances in treatment, such as immunotherapy (IO), the survival rate for NSCLC patients remains low, and identifying the most effective treatment for individual patients remains challenging. This PhD program aims to design a cutting-edge, multimodal machine learning and deep learning framework that will provide novel methodologies for integrating data coming from multiple modalities (clinical, radiomics, digital pathology) for the design of decision-making methods that are able to provide suggestions to physicians about the most suitable treatment for NSCLC treatment. The PhD student will have the opportunity to collaborate closely with clinicians and researchers from diverse disciplines, fostering interdisciplinary research that combines computer science expertise with oncological insights to achieve comprehensive and practical solutions.</p>
Methods and techniques that will be developed and used to carry out the research	<p>This research centers on the design of cutting-edge Multimodal AI algorithms specially crafted to tackle the unique challenges of medical data coming from multiple sources. A significant emphasis will be placed on developing methods able to integrate fruitfully the different</p>



	<p>data sources.</p> <p>The study will also take into account the case in which some of the modalities are missing. The final method should be able to provide different types of predictions depending on the amount of information present for a patient.</p>
Educational objectives	<p>The PhD program in Information Technology offers advanced scientific training that enhances the research and problem-solving skills of doctoral candidates. The program focuses on both theoretical and experimental skills to foster high-level scientific competence. Upon completion, graduates will possess the ability to independently develop and execute original research, either by leading a research group or working collaboratively within a team.</p>
Job opportunities	<p>Being a joint work in the intersection of computer science and the medical field, the PhD will outcome in career opportunities in academia or the medical field, as the research program involves interdisciplinary knowledge in AI and health.</p> <p>Potential job opportunities include positions as a data scientist, AI engineer, or medical researcher, collaborating with medical centers to apply and refine the techniques developed during the PhD. The candidate may also consider pursuing a postdoctoral fellowship to continue research in the field or start their own research program.</p>
Composition of the research group	<p>1 Full Professors 1 Associated Professors 16 Assistant Professors 20 PhD Students</p>
Name of the research directors	<p>Francesco Trovò</p>

Contacts
<p>francesco1.trovo@polimi.it, 0223994101, https://trovo.faculty.polimi.it/index.html</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: Fondazione IRCCS Istituto Nazionale Tumori di Milano

EDUCATIONAL ACTIVITIES (purchase of study books and material, including computers, funding for participation in courses, summer schools, workshops and conferences): financial aid per PhD student 5707,20 Euro

TEACHING ASSISTANTSHIP: (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: individual use

DESK AVAILABILITY: individual use

The PhD is in the context of an HE project, I3Lung (<https://i3lung.eu/>), whose goal is to develop a platform able to support physicians regarding the most suitable immunotherapeutic treatment for non-small cell lung cancer. The project started collecting data from real-world patients, which will be made available for processing in the PhD.