



# PhD in INGEGNERIA DELL'INFORMAZIONE / INFORMATION TECHNOLOGY - 39th cycle

Research Area n. 1 - Computer Science and Engineering

THEMATIC Research Field: DISTRIBUTED AI FOR HEALTHCARE DATA

**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**

In recent years, data-driven medicine has gained increasing importance in terms of diagnosis, treatment, and research due to the exponential growth of healthcare data. The linkage of health data from various sources, including genomics, and analysis via innovative approaches based on artificial intelligence (AI) advanced the understanding of risk factors, causes, and development of optimal treatment in different disease areas. Furthermore, it contributed to the development of a high-quality accessible health care system. Nevertheless, the use of patient data for medical research is often limited to data sets available at a single medical centre as data protection regulations prohibit data centralisation for analysis purposes. The goal of this PhD is to explore this context, focusing on a real use case on pediatric rare diseases, where data are available from three different institutions.

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

The student will research on development of distributed tools leveraging artificial intelligence capabilities. The objective is to design, develop and evaluate distributed algorithms that iteratively analyse separate databases in order to learn without patient data being centralised. Furthermore, the student will actively work on topics such as federated and incremental learning modalities, data and model parallelism, and ensembling techniques.



<b>Educational objectives</b>	The student will learn how to develop, deploy and evaluate distributed artificial intelligence analyses. The student will also learn how to master data and conduct computational researches in the context of biomedical applications.
<b>Job opportunities</b>	Artificial Intelligence and Distributed Artificial Intelligence are attractive research fields and professional areas. Graduates with expertise in this area can easily find jobs both in academia and in private organizations.
<b>Composition of the research group</b>	1 Full Professors 1 Associated Professors 3 Assistant Professors 2 PhD Students
<b>Name of the research directors</b>	Prof. Pietro Pinoli

Contacts
Pietro.pinoli@polimi.it

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
<p>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.</p> <p>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.</p> <p>COMPUTER AVAILABILITY: individual use</p>



DESK AVAILABILITY: individual use