DOCTORAL PROGRAMME
IN
MATHEMATICS, COMPUTER SCIENCE, STATISTICS

Director prof. Matteo Focardi

XXXIX cycle – academic year 2023/2024

SCIENTIFIC AREA	
ADMINISTRATIVE OFFICE	Department of Mathematics and Computer Science "U. Dini" (DiMaI)
PARTNERS INSTITUTIONS	- University of Perugia - Istituto Nazionale di Alta Matematica "F. Severi" (INdAM)
CURRICULA	1. Mathematics 2. Computer Science 3. Statistics
	POSITIONS AVAILABLE: 17 Positions with Scholarship: 15 Positions without Scholarship: 2* ** standard ranking only*
RANKING LIST FOR STANDARD POSITIONS SCHOLARSHIPS AVAILABLE: 11	**6** - University of Florence **3** - University of Perugia **2** - Istituto Nazionale di Alta Matematica "F. Severi" (INdAM)
RANKING LIST FOR SPECIFIC RESEARCH TOPICS SCHOLARSHIPS POSITION AVAILABLE: 4	**1** - Department of Statistics, Computer Science, Applications "G. Parenti" – Progetto Ministeriale "Dipartimenti di Eccellenza 2023-2027" **Thematic:** "Rethinking Data Science" The Ph.D. student will be involved in the development of innovative statistical models and learning methods, together with computationally efficient algorithms, for the analysis of high-dimensional data and data with complex structure, to support research in substantive fields and across disciplines. **1** - Daiichi Sankyo Europe GmbH (Agreement with Department of Statistics, Computer Science, Applications "G. Parenti") **Thematic:** "Biostatistics for Observational Research and Casual Inference" The Ph.D. project will focus on the development of novel statistical models for observational studies and causal inference, with a specific application for drug development in the health science industry. The candidate will be involved in the development of mathematical models for clinical study design, as well as relevant computer modelling for the analysis of Clinical Patient Level Data, with the goal of optimising the evidence suggested by clinical studies and providing

	clearer decision making processes for Healthcare Providers and Patients.
	1 - Department of Mathematics and Computer Science "U. Dini" **Thematic:** "Design and Assessment of Dependable and secure Cyber-Physical Systems" The PhD student will work in the area of resilient, safety-critical and secure cyber-physical systems, providing novel techniques, mechanisms and architectural solutions for the design of cyber-physical systems, ecosystems and critical infrastructures, and innovative experimental and model-based techniques for their dependability and security assessment. **1** - **NRRP** - European Union - NextGenerationEU **Thematic:** "Adaptive approximation methods and Graph Neural Networks for the analysis and fitting of unstructured data" Missione 4 "Istruzione e Ricerca" - Componente 2 "Dalla ricerca all'impresa" – "Rafforzamento delle strutture di ricerca per la creazione di "campioni nazionali di R&S" su alcune "Key Enabling Technologies" (Centri Nazionali) - Centro Nazionale di Ricerca HPC, Big data e Quantum Computing - CN1 - CUP: B83C22002830001 co-funded by Department of Mathematics and Computer Science "U. Dini" (DiMaI) The Ph.D. student will be involved in the development of models and methods to analyze and fit unstructured data, producing efficient algorithms of possible usage also for big data sets. Specific goals of the research consist in experimenting Graph Neural Networks applied to guide the refinement process of adaptive bivariate functional spaces of interest for spatial data fitting and in extending this idea also to approximate data belonging to higher dimensional spaces.
STUDY/RESEARCH PERIODS ABROAD	1-3 months
DOCUMENTS REQUIRED FOR THE ADMISSION (under penalty of exclusion)	• Copy of the Identification Document • Self-declaration for qualifications obtained in Italy (laurea triennale, specialistica o magistrale o ciclo unico) with a list of all exams taken and their marks, title of the thesis and graduation mark (download the form **here,** make sure you **fill in all the fields**) • Qualifications obtained abroad (Bachelor's and Master Degrees or combined cycle Degree) with a list of all exams taken and their marks, title of the thesis and graduation mark. *The same documentation except for the final mark must be submitted by those who will graduate within the 31/10/2023*
DOCUMENTS REQUIRED FOR THE EVALUATION	**MANDATORY** • Curriculum vitae et studiorum • List of completed examinations with marks and with the Weighted average of the exams both for Bachelor and Master Degrees (or equivalent) • Research Project **OPTIONAL** • Publications • Any other qualification document
RESEARCH PROJECT	The research project, consisting of 5,000 characters including references and notes, excluding spaces, may be discussed during the interview, possibly contributing to the evaluation of the aptness of the applicant for research.

	The candidate may present the same project for the standard scholarship and for any scholarship with specific research topic and separate ranking lists he/she intend to apply to, or alternatively may present different projects for each scholarship, indicating clearly to which scholarship each project refers.
INTERVIEW MODE	**In person** (In the application form candidates residing abroad may ask to conduct the interview remotely) The interview can be conducted in English language
FURTHER INFORMATION	The interview is aimed to evaluate the basic preparation and the research potential of the candidate and may include the discussion of the research project, Master's thesis, curriculum and other possible qualifications. For specific research topic scholarships part of the interview will be focused on the discussion of the topic.

EVALUATION MARKS	parameter	minimum score	maximum score
	Curriculum vitae, academic career, research project, publications and other scientific qualification documents.	40/120	60/120
	Applicants who obtain a mark of at least 40/120 in the evaluation of the above parameters will be admitted to the interview		
	Interview	40/120	60/120
	Eligibility is achieved with a minimum score of 80/120		

Further information available at the following web page:
https://www.phdmatinfstat.unifi.it/

EXAMINATION SCHEDULE			
	DATE	**TIME**	**PLACE**
INTERVIEW	13, 14 and 17 July 2023	9:00 a.m.	Dipartimento di Matematica e Informatica "Ulisse Dini" Viale Morgani, 67/A - Firenze

The list of candidates admitted to the interview and the final ranking will be published at the following web page: https://www.unifi.it/p12341.html