DOCTORAL PROGRAMME
IN
MATHEMATICS, COMPUTER SCIENCE, STATISTICS

Director prof. Matteo Focardi

XXXVIII cycle – academic year 2022/2023

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: 14 Positions with Scholarship: 12 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: 1	**1** - Department of Statistics, Computer Science, Applications "G. Parenti" – Progetto Ministeriale "Dipartimenti di Eccellenza 2018-2022" **Thematic:** "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.
"VINCI PROGRAM" CALL 2022 – Université FRANCO ITALIENNE	In the frame of Vinci Program 2022 one project has been submitted by the PhD course for the funding of one scholarship. The results of the selection will be known by the end of June. For those candidates who wish to apply for that scholarship, the knowledge of French language is required. More information on the Vinci Program Call 2022 here. **Thematic:** "State constrained optimal control problems. Sufficient conditions for strong local optimality" University of Florence/Université de Toulon

	This project is aimed at the application of Hamiltonian methods to the study of sufficient conditions for strong local optimality of Pontryagin extremals in optimal control problems. Hamiltonian methods have proved to be a powerful tool for obtaining sufficient conditions for optimality, and have been successfully applied to many interesting cases (Mayer's and minimum time problems with a control-affine dynamics). Furthermore, they are a valuable tool for proving the structural stability of optimal controls. Recently the use of such methods has been extended to problems with integral cost with a generalized L^1 growth, that is, in which the cost to be minimized contains the L^1 norm of the control. The project is aimed at extending these methods to the study of control problems with state constraints.
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 31/10/2022*
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
REFERENCE LETTERS	A section is provided in the online application to specify the e-mail addresses of two professors/researchers willing to provide information about candidates training path and activities performed within a scientific field related to the Ph.D. course.
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.
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; in addition, for Vinci Program 2022 scholarships, the

<table>
<tr><td></td><td>knowledge of French language will be assessed.</td></tr>
<tr><td>EVALUATION MARKS</td><td>
<table>
<tr><th>parameter</th><th>minimum score</th><th>maximum score</th></tr>
<tr><td>Curriculum vitae, academic career, research project, publications and other scientific qualification documents.</td><td>40/120</td><td>60/120</td></tr>
<tr><td colspan="3">Applicants who obtain a mark of at least 40/120 in the evaluation of the above parameters will be admitted to the interview</td></tr>
<tr><td>Interview</td><td>40/120</td><td>60/120</td></tr>
<tr><td colspan="3">Eligibility is achieved with a minimum score of 80/120</td></tr>
</table>
</td></tr>
<tr><td colspan="2">Further information available at the following web page:
https://www.phdmatinfstat.unifi.it/</td></tr>
</table>

<table>
<tr><th colspan="4">EXAMINATION SCHEDULE</th></tr>
<tr><th></th><th>DATE</th><th>TIME</th><th>PLACE</th></tr>
<tr><td>INTERVIEW</td><td>August 31st-September 1st-2nd 2022</td><td>9:00 a.m.</td><td>Dipartimento di Matematica e Informatica “Ulisse Dini”
Viale Morgani, 67/A - Firenze</td></tr>
<tr><td colspan="4">The list of candidates admitted to the interview and the final ranking will be published at the following web page: https://www.unifi.it/p12202.html</td></tr>
</table>