



UNIVERSITÀ  
DEGLI STUDI  
FIRENZE

## DOCTORAL PROGRAMME IN INFORMATION ENGINEERING

*Coordinator prof. Luigi Chisci*

|  |   |
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| <b>TECHNOLOGICAL AREA</b>  |   |
| <b>ADMINISTRATIVE OFFICE</b>   | Department of Information Engineering   |
| <b>CURRICULA</b>   | <ol style="list-style-type: none"><li>1. Control, Optimization and Complex Systems</li><li>2. Electronics, Electromagnetics and Electrical Systems</li><li>3. Computer Engineering</li><li>4. Telecommunications and Telematics</li></ol>   |
| <b>POSITIONS AVAILABLE: 8</b><br>Positions with Scholarship: 6<br>Positions without Scholarship: 2 |   |
| <b>Ranking List for STANDARD POSITIONS Scholarships available: 6</b>                               | University of Florence  |
| <b>RESERVED POSITIONS</b>  | NO  |
| <b>STUDY/RESEARCH PERIODS ABROAD</b>   | NO  |
| <b>DOCUMENTS TO BE ENCLOSED WITH THE APPLICATION</b>   | <b>MANDATORY DOCUMENTS</b> <ul style="list-style-type: none"><li>• Copy of the Identification Document</li><li>• <a href="#">Replacement Declaration Form</a></li><li>• Curriculum vitae including a list of publications and of the other qualification documents (if any)</li><li>• Title and grades of Bachelor and Master Theses</li><li>• Abstract of the Master Thesis</li><li>• List of exams of Bachelor and Master Degrees with grades (documents should be either in Italian or in English)</li><li>• Research proposal</li></ul> <b>OPTIONAL DOCUMENTS</b> <ul style="list-style-type: none"><li>• Copy of the Master Thesis</li></ul> |
| <b>RESEARCH PROJECT</b>  | The proposal must be in .pdf format, written either in Italian or in English. The proposal should describe a three-years project having a high potential for novel scientific contributions in the broad field of Information Engineering, but also in other fields provided that methodologies and/or technologies of Information Engineering are exploited. The proposal must include the specific reference to the curriculum and the chosen area of study listed in the below section <b>“Thematics”</b>  |
| <b>MODALITY OF EVALUATION</b>  | <ul style="list-style-type: none"><li>• <b>Evaluation of curriculum vitae, research project</b>, publications and other qualification documents</li><li>• <b>Interview as detailed in the section below “Evaluation Marks”</b></li></ul>  |
| <b>OTHER LANGUAGE FOR THE EXAMINATION</b>  | English   |

| <b>SKYPE INTERVIEW</b>   | <b>YES</b> – possible for foreign residents only   |               |               |               |   |        |        |                   |        |        |  |  |  |  |        |        |   |  |  |
|--|--|---------------|---------------|---------------|---|--------|--------|-------------------|--------|--------|--|--|--|--|--------|--------|---|--|--|
| <b>FURTHER INFORMATION ABOUT EXAMINATION</b>   | The interview will primarily concern a discussion on the research proposal presented by the candidate.   |               |               |               |   |        |        |                   |        |        |  |  |  |  |        |        |   |  |  |
| <b>EVALUATION MARKS</b>  | <table border="1" data-bbox="533 360 1409 748"> <thead> <tr> <th data-bbox="533 360 979 450">Parameter</th> <th data-bbox="979 360 1193 450">minimum score</th> <th data-bbox="1193 360 1409 450">maximum score</th> </tr> </thead> <tbody> <tr> <td data-bbox="533 450 979 524">Curriculum vitae, publications, qualification documents</td> <td data-bbox="979 450 1193 524">27/120</td> <td data-bbox="1193 450 1409 524">40/120</td> </tr> <tr> <td data-bbox="533 524 979 562">Research proposal</td> <td data-bbox="979 524 1193 562">27/120</td> <td data-bbox="1193 524 1409 562">40/120</td> </tr> <tr> <td colspan="3" data-bbox="533 562 1409 636"><b>Applicants who obtain at least 27/120 marks in the evaluation of the two above parameters will be admitted to the interview</b></td> </tr> <tr> <td data-bbox="533 636 979 710">Interview: (including a discussion of the research proposal)</td> <td data-bbox="979 636 1193 710">26/120</td> <td data-bbox="1193 636 1409 710">40/120</td> </tr> <tr> <td colspan="3" data-bbox="533 710 1409 748"><b>Eligibility is achieved with a minimum score of 80/120</b></td> </tr> </tbody> </table>   | Parameter     | minimum score | maximum score | Curriculum vitae, publications, qualification documents | 27/120 | 40/120 | Research proposal | 27/120 | 40/120 | <b>Applicants who obtain at least 27/120 marks in the evaluation of the two above parameters will be admitted to the interview</b> |  |  | Interview: (including a discussion of the research proposal) | 26/120 | 40/120 | <b>Eligibility is achieved with a minimum score of 80/120</b> |  |  |
| Parameter  | minimum score  | maximum score |               |               |   |        |        |                   |        |        |  |  |  |  |        |        |   |  |  |
| Curriculum vitae, publications, qualification documents  | 27/120   | 40/120        |               |               |   |        |        |                   |        |        |  |  |  |  |        |        |   |  |  |
| Research proposal  | 27/120   | 40/120        |               |               |   |        |        |                   |        |        |  |  |  |  |        |        |   |  |  |
| <b>Applicants who obtain at least 27/120 marks in the evaluation of the two above parameters will be admitted to the interview</b> |  |               |               |               |   |        |        |                   |        |        |  |  |  |  |        |        |   |  |  |
| Interview: (including a discussion of the research proposal)   | 26/120   | 40/120        |               |               |   |        |        |                   |        |        |  |  |  |  |        |        |   |  |  |
| <b>Eligibility is achieved with a minimum score of 80/120</b>  |  |               |               |               |   |        |        |                   |        |        |  |  |  |  |        |        |   |  |  |
| <b>THEMATICS</b>   | <p><b>Control, Optimization and Complex Systems</b></p> <p>AREA 1 – CONTROL SYSTEMS: concerns analysis, modelling and synthesis of high-performance (possibly networked and hence subject to cyber attacks) automatic control, supervision and monitoring systems for processes that are only partially known, possibly distributed in space and subject to constraints, such as those encountered in industrial applications, robotics, bio-engineering, aerospace, electrical systems, etc.</p> <p>AREA 2 – OPTIMIZATION: concerns the study of Operations Research models and their applications, as well as the development and the analysis of efficient optimization algorithms for the solution of complex problems. The optimization applications are found both in the field of automation systems as well as in the productive world, from logistics to transportation, to the supply-chain, in the networks of electrical energy management (“smart grids”) even in stochastic contexts and with multiple decision-makers (game theory).</p> <p>AREA 3 – COMPLEX SYSTEMS: this research area is suitable for applicants with a strong background in Physics, Chemistry, Mathematics or Engineering who are willing to carry out research work of cross-disciplinary type. Training aims to deepen the more formal aspects of the analysis of complex systems. The research topic can concern methodological aspects, from dynamical systems to stochastic processes, including complex networks and their applications, from computer engineering to life science.</p> <p><b>Electronics, Electromagnetics and Electrical Systems</b></p> <p>AREA 1 – HIGH-FREQUENCY ELECTRONICS: concerns the analysis and design of electronic devices and systems at high frequency (from radio frequency to millimeter waves).</p> <p>AREA 2 – DIGITAL ELECTRONIC SYSTEMS: concerns the analysis and design of electronic systems based on advanced digital components, with applications from biomedical to radar fields.</p> <p>AREA 3 – ELECTROMAGNETICS: concerns the use and development of numerical techniques for the analysis and design of radiant systems and passive devices at high frequency, from some GHz up to optical frequencies.</p> <p>AREA 4 – ELECTRICAL SYSTEMS: concerns the critical and comparative analysis of control techniques for electrical drives with the development of innovative algorithms, the automation of power systems, with particular reference to the “power quality” in distribution networks, to the “smart-</p> |               |               |               |   |        |        |                   |        |        |  |  |  |  |        |        |   |  |  |

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|   | <p>metering” and fault diagnosis in electrical systems.</p> <p><b>Computer Engineering</b></p> <p>AREA 1 – METHODS AND TECHNOLOGIES OF SOFTWARE: concerns methods of design, examination and evaluation of complex software systems, with further details on formal methods and advanced software architectures.</p> <p>AREA 2 – PATTERN RECOGNITION AND COMPUTER VISION: concerns multimedia processing, classification and media search from databases and Internet, solutions for human-machine interaction, smart environments.</p> <p>AREA 3 – ARTIFICIAL INTELLIGENCE AND BIOINFORMATICS: is mainly focused on machine learning and its applications to bioinformatics.</p> <p>AREA 4 – DISTRIBUTED SYSTEMS AND DATA ENGINEERING: it concerns the study of distributed, parallel and complex processing systems wherein distributed architecture, performance and data complexity issues are integral part of the problem, such as for instance in applications for big data, smart cities, smart clouds, internet-of-things, smart manufacturing, etc..</p> <p><b>Telecommunications and Telematics</b></p> <p>AREA 1 – ALGORITHMS AND TECHNOLOGIES FOR SIGNAL PROCESSING: concerns processing methods and techniques of mono/multidimensional signals for the extraction of information and the efficiency of their representation in transmission and storage.</p> <p>AREA 2 – TRANSMISSION SYSTEMS: concerns methods and techniques for efficient generation, transmission and disclosure of information through future terrestrial and satellite transmission channels.</p> <p>AREA 3 – TELECOMMUNICATION NETWORKS: concerns methods and techniques for efficient transfer of information from source to destination through complex and advanced communication networks and related communication network applications.</p> <p>AREA 4 – TELEMATICS AND INFORMATION SOCIETY: this cross-disciplinary area involves the applications of ICT technologies considered as key-enabling in different scientific and application domains. It requires a multi-disciplinary background in order to cope with the large variety of services and applications of telematics. The domains of interest include: telecommunications, communication, political and socio-economic sciences including all areas of the “Societal Challenges” of the European programme H2020.</p> |
| <p>Further information is available at the following web page:<br/> <a href="http://informationengineering.dinfo.unifi.it/">http://informationengineering.dinfo.unifi.it/</a></p> |  |

| <b>EXAMINATION SCHEDULE</b>   |                  |             |  |
|---|------------------|-------------|--|
|   | <b>DATE</b>      | <b>TIME</b> | <b>PLACE</b>   |
| <b>INTERVIEW</b>  | 7 September 2018 | 8:30 a.m.   | Department of Information Engineering<br>Via di S. Marta, 3 – Florence<br>Meeting room |
| <p>The list of the candidates admitted to the interview and the final ranking will be published online at the following web page: <a href="https://www.unifi.it/p11361.html">https://www.unifi.it/p11361.html</a></p> |                  |             |  |