PhD in Engineering in Computer Science

PhD Program at Sapienza University of Rome

Sapienza University of Rome is a leading European Academic institution on basic and applied research in Computer Science and Engineering. The PhD program in Engineering in Computer Science is at the forefront of academic research and offers students unique opportunities for dissertations through interdisciplinary cutting-edge research projects covering important theoretical and practical issues. PhD students have access to state-of-the-art research laboratories and the opportunity to study under the guidance of world-wide leading academics. The program provides exceptional career enhancement opportunities by offering: Highly specialized PhD courses on hot research topics; Research training on vital, innovative issues and challenging industry sponsored projects; Moderate tuition fees, possibly waived in case of exceptional performance. Scholarships for EU students are available and research contracts for non-EU students can be issued; A warm and stimulating research environment aligned with the highest international standards and located in middle of ancient Rome. All activities related to the PhD program (courses, exams, reports, defense, etc.) are in English. Applicants should be highly motivated and have a minimum of an upper second-class honors degree or equivalent in either an appropriate engineering discipline, or in computer science, math, physics or biology. PhD candidates are expected to make a substantial original contribution to their field in the form of new knowledge or significant and original adaptation, application and interpretation of existing knowledge. These outcomes may be based on a comprehensive review of the literature, testing and experimentation, creative exegesis or other systematic approaches, or critical analysis of professional theory and practice.

DESCRIPTION

The PhD in Engineering in Computer Science (Dottorato in Ingegneria Informatica) aims at training: expert computer scientists able to develop new technologies and methodologies both in the academia and in public and private research institutions; specialists of very high professional level with engineering skills able to transfer technological and methodological advances into leading application sectors such as industry, services, and public administration.

Areas of Interest

Areas of interest of the PhD in Engineering in Computer Science include, but are not limited to: Algorithm Engineering and Complexity Analysis; Artificial Intelligence; Artificial Intelligence in Robotics; Bioinformatics; Computer Architectures and Networks; Computer Vision and Computer Graphics; Cyber Security and Intelligence; Databases; Distributed Systems; Human-Computer Interaction; Information Systems; Knowledge Representation; Multi-agent Systems; Multi-robot Systems; Software Engineering; Software Oriented Computing; Web and Social Networks.

Expected Activity

The PhD curriculum last three years. An extension to a forth year can be granted in special cases. The overall activity of PhD students during these years of the PhD program can be quantified in 180 ECTS credits (ECTS), 30 of which (corresponding to 50% of work load of one year) are devoted to studying, and 150 of which (corresponding to one year and a half of work) are devoted to carrying on research and writing the thesis. The 30 ECTS devoted to the studying activity can be divided into: a) 10 ECTS for attending PhD courses and schools, typically assuming 2.5 ECTS for a 20-hours course; b) 12 ECTS for completing the basic curriculum of studies by attending a 12-ECTS course (or two 6-ECTS courses) either of the M.Sc. in Engineering in Computer Science or delivered by a foreign university; c) 8 ECTS for attending department seminars, assuming 0.5 ECTS per seminar. The goal of this activity is to foster students to form close links with the department and to broaden their views by exposing them to multidisciplinary areas of Computer Science/Engineering. The PhD rules prescribe that, in presence of a particularly good curriculum (due to previous work experience, studies and (pre-PhD) research activities, or due to a large number of undergraduate computer science courses attended), the ECTS in b) can be automatically assigned to a student without the need to attend any additional course and pass any exam. Conversely, if the student curriculum is particularly poor in computer science, the studying activity may be increased by taking M.Sc. courses for additional 12 ECTS. The organization of the PhD in Engineering in Computer Science includes, besides the PhD Board, a Teaching Committee, which is in charge of planning the individual and collective educational activities for students. In addition, a Thesis Committee is assigned to each student, formed by a supervisor, chosen by the student and by an additional advisor appointed by the PhD Board. If the scholarship is granted by an external institution, the Thesis Committee includes a representative of that institution as well.

Curriculum

The student three year curriculum is organized as follows: First year: During the first year, students start their educational program and their research activity. The teaching program consists of a series of PhD courses held especially for students by teachers from the department, or invited from other Italian or foreign institutions. Courses cover the main areas...
of interest of the PhD program and the activity of students can be quantified in 80 hours spent attending classes and preparing exams and short dissertations. Alternatively, or as a complement to the PhD educational program, students may be asked to take courses from M.Sc. or national or international PhD schools. The research activity for the PhD thesis starts in the first year of the PhD program, and continues in the second and in the third year. The research is conducted under the supervision of the Thesis Committee. At the end of the first year, PhD students present to the PhD Board a brief overview of the state of the art of their area of interest, and sketch the main lines of the research goals they intend to pursue. Admission to the second year is subject to fulfillment of the expected educational objectives and to the preliminary research results obtained during the first year.

Second year: During the second year, students typically spend some months (usually six) abroad in prestigious universities or other research institutions. At the end of the second year, each student prepares a 20-page report on her or his research activity. Admission to the third year is subject to completion of their educational program and to the scientific quality of the research results obtained during the first two years.

Third year: The third year is dedicated to the completion of the thesis. At the end of the third year, the PhD Board appoints, for each student, two external reviewers from prominent national or international research institutions, which are asked to evaluate the quality of the thesis. Then, the thesis is defended in front of the PhD Board, which produces a final evaluation of the student’s thesis and overall activity carried out during the three years, taking into account the reports of both the Thesis Committee and the external reviewers. Most of the results contained in the thesis are expected to be published in high quality journals and conferences.

Alumni

The majority of the PhD’s are currently engaged as researchers in industry, academia, or other research institutions. Among those who finished in recent years (61 from the 13th through the 22nd cycle), 23 have faculty positions (12 in Italy and 11 abroad), 20 have postdoc positions (11 in Italy and 9 abroad), and 15 have high-level industry positions (12 in Italy and 3 abroad).

PhD Board

PhD Board members are listed in Fig. 1. They have an excellent scientific record both in numerical and qualitative terms. According to a study based on h-indexes computed through Google Scholar available at http://via-academy.org/, 2 of the top 3 scientists (including the 1st) in Computer Science/Engineering working in Italy are member of the PhD Board. Moreover several other members are listed among the top scientists with h-index greater than 30 in the area. According to a recent ranking by Microsoft Academic, Sapienza has excellent positions in several areas of Computer Science/Engineering. In particular Sapienza is the 1st center of excellence in Italy in Artificial Intelligence, and it is among the top 3 in several other areas including Databases, Algorithms & Theory, Data Mining, Security & Privacy. Many members of the PhD Board, which includes several AAAI Fellows, ACM Fellows, ECCAI Fellows, received awards by several institutions, including 2 Laurea Honoris Causa, 4 IBM Faculty Awards, 1 Global Cyber Security Center (GCSEC) Award, 1 Google Award, and many others. All members of the PhD Board have an active leading role in the international scientific community. For instance, in 2012, besides participating to the PC of the most prestigious conferences and events in CS, they have had, among others, the following roles: IEEE Technical Committee on Dependable and Fault Tolerant Systems; Member of Advanced Visual Interfaces (AVI); Member of IFIP Data Semantics of a Networked World; Member of European Symposium on Algorithms; Member of the Steering Committee of the Graph Theoretic Concepts in Computer Science Workshop series; Member of the Steering Committee of Dependable Systems and Network (DSN) Conference series; Member of the Cognitive Robotics Workshop Series Steering Committee; Trustee of the Robocup Federation; Trustee of the International Joint Conference on Artificial Intelligence (IJCAI); President of the Robocup; Local Organizers of the 13th International Conference on Principles of Knowledge Representation and Reasoning (KR’12); Area Chair of the 26th Conference on Artificial Intelligence (AAAI’12); General Chair of ACM SIGMOD-SIGACT-SIGART Symposium on Principles of Database Systems (PODS’12); Chair of ACM Web Search and Data Mining 2013 (WSDM’13); Program chair of the 14th International Conference on Principles of Knowledge Representation and Reasoning (KR’14); General Chair of 24th International World Wide Web Conference (WWW’15).

Environment

The Department of Computer, Control, and Management Engineering Antonio Ruberti (Dipartimento di Ingegneria in-
formatica automatica e gestionale - DIAG) is a center for research and education at the undergraduate and graduate levels. Formerly known as Department of Computer and System Sciences (Dipartimento di Informatica e sistemistica-DIS), it was established in 1983. In 2001 it was named after Antonio Ruberti, the eminent scholar who founded it.

Currently, the department is composed by more then 70 faculty members (full, associate and assistant professors), with the addition of about 70 PhD students and a similar number of post-docs. Internationally renowned research groups in computer science, system science, and management science are active at DIAG. Basic research is its main goal, with a strong emphasis on interdisciplinary research, on applications that stimulate basic research, and on technology transfer and dissemination of results. Every year DIAG publishes hundreds of papers in the foremost international journals and conference proceedings, and its members appear in the program and steering committees of the most prestigious scientific events and institutions. Numerous prizes and awards have been assigned to its members for their scientific and educational activities.

Strong collaborations are maintained with researchers in other universities, research institutions and companies, in Italy and abroad. National and European research contracts and grants are routinely acquired by department, totaling about two million euros a year.

On the educational side, the mission of DIAG is to train engineers for professional, research and teaching careers either in universities or in industries and public administration. To this end, education is provided by DIAG within several undergraduate and graduate programs of the School of Engineering at Sapienza University, with main responsibility of the curricula in computer, control and management engineering. As an effort towards internationalization, the department offers two master programs that are entirely taught in English. Moreover, DIAG hosts two PhD programs, and cooperates with PhD programs offered by other departments.

DIAG has a number of laboratories that are devoted to education and research in the various areas of interest for the department. Through its library, it provides access to about 900 online/printed journals and to an outstanding collection of 11000 scientific volumes.

More information can be found in the yearly departmental research reports available at http://www.dis.uniroma1.it.

**ADMISSION**

An annual call is issued by Sapienza for all PhD program in June with deadline mid July at the Sapienza site (dox available both in Italian and in English): http://www.uniroma1.it/didattica/offerta-formativa/dottorati, with specific admission procedures for each PhD program.

The admission procedure for the PhD in Engineering in Computer Science consists of two phases: the evaluation of the qualifications of the candidate and an interview. Admission is evaluated by an Admission Committee, which is elected every year by the PhD Board.

**Evaluation of qualifications:** The Admission Committee assigns to each candidate a maximum score of 60 for the academic curriculum, qualifications, and publications. Scores are assigned in accordance with the assessment criteria defined by the PhD Board: academic curriculum (exams, thesis, and grades); publications; recommendation letters supporting the candidate, if any; professional/work/research experience and any other qualifications; a research proposal prepared by the candidate.

These documents must be submitted by end of August, of each year, through the online PhD in Engineering in Computer Science of page: http://www.uniroma1.it/~dottoratoii

Applicants obtaining a minimum score of 40/60 in the evaluation of qualifications are invited for an interview.

After the evaluation of qualifications has been completed, the Admission Committee compiles a list of applicants in order of merit, on the basis of assigned scores. The list is announced by in mid September on the web page: http://www.dis.uniroma1.it/~dottoratoii.

Notification is considered as delivered through the announcement of the list. The successful applicants will receive no personal communications of their results.

**Interview:** The interview is in English and is aimed to assessing knowledge, skills, and aptitude to carry on research in the scientific areas of the PhD program. The interview includes a discussion of the research proposal prepared by the candidate and of personal motivations for applying for a PhD position. The duration of the interview is at most 45 minutes, including a presentation of the research proposal by the candidate no longer than 15 minutes.

The calendar of the interviews will be published in mid September at the web page: http://www.dis.uniroma1.it/~dottoratoii. Interviews will start immediately after.

The Admission Committee assigns a score for the interview of at most 60. A score of at least 40 is required for admission.

Upon motivated requests sent to the PhD Coordinator, Prof. Giuseppe De Giacomo (email: degiacomo@dis.uniroma1.it), interviews may be done remotely using video-conferencing facilities.

After the completion of the interviews, by the end of September, the Admission Committee publishes the final ranking, the list of candidates admitted to the PhD program and the assignment of the PhD grants on the basis of assigned scores at the web page: http://www.dis.uniroma1.it/~dottoratoii.

Students with an Erasmus Mundus, Marie-Curie or similar scholarships, which cover the entire duration of the PhD, can apply in any period of the year. Please contact the coordinator for further information.

**FURTHER INFORMATION**

For further details, please visit the website of the PhD in Engineering in Computer Science:

http://www.dis.uniroma1.it/~dottoratoii

For specific questions, please contact the coordinator of the PhD in Engineering in Computer Science: professor Giuseppe De Giacomo (degiacomo@dis.uniroma1.it).