National and Kapodistrian University of Athens

Presentation and relations with INRIA

Executive summary

Ioannis Z. Emiris, March 8, 2010

This is a description of National and Kapodistrian University of Athens (NKUA) and, more specifically, the Department of Informatics and Telecommunications (DIT), and its collaborations with INRIA Sophia-Antipolis. The report concludes with ideas towards a formal relationship between the two Institutions.

NKUA is the largest University in Greece, with about 70,000 students, 2,500 faculty, and 32 Departments, which cover all scientific domains. It is is organized in 5 Schools. The School of Sciences includes 6 Departments: DIT, Mathematics, Physics, Biology, Chemistry, Geology and Geoenvironment.

DIT expects to have 43 full-time faculty members at the end of 2009. There are about 2000 enrolled undergraduates (4-year curriculum), about 700 Masters students, and about 250 PhD candidates. It offers a general Master's program, and coordinates or participates in another 6 programs jointly with other Departments. DIT is organized in 3 sectors: Computer Science; Computer Systems and Applications; Communications and Signal Processing. It is very active in terms of European and national research and industrial projects, with an average of 22 new projects yearly, in the past 5 years. Total funding in the past 20 years is about 200 Million Euro, in current prices. The Department has established itself as the leading Greek department in its field and appears in the top 100 departments of the 2009 Shanghai list.

NKUA, and DIT in particular, wish to expand their research collaborations, as well as offer challenging prospects for their students and faculty. DIT maintains strong links with INRIA Sophia-Antipolis, and mainly with: GALAAD (European projects, ex-Associated team), GEOMETRICA (European projects and ARC), MASCOTTE and MAESTRO (European projects), COPRIN (bilateral projects), REVES (student exchange).

The main exchanges with Sophia-Antipolis are: I. Emiris, now Professor at DIT, was an INRIA Researcher in 1995-2002; two Postdocs since 2003 (GALAAD, GEOMETRICA, MASCOTTE). There is also a Postdoc at Loria (VEGAS). NKUA participates in the Internships program, with the following exchanges: 1 in 2008 (now PhD at GALAAD), 3 in 2009 (now 1 PhD at GRAAL, 1 Postdoc at CEPAGE). There is an ERASMUS agreement between DIT and the University of Nice since 2004.

We propose to consider an agreement with INRIA Sophia-Antipolis with the following main objectives:

- Strengthening the education activities between the two Institutions, including participation in thesis supervision (cotutelle) and committees, mini-courses offered by visitors or remotely, and joint organization of thematic Schools or conferences. Strengthening the exchanges of students, including internships, participation in Master's programs and PhD / Postdoc fellowships.

- Enhancing the reseach collaborations and exchanges for researchers and faculty: beyond the existing actions, specific actions can be designed such as extending the program COLOR to include NKUA, and extending 3+3 Méditerrannée to include Greece. Enhancing the technology transfer via common software development; the agreement may explicitly mention the most relevant axes of research (e.g. Computer algebra, or Geometric modeling). Also, examining the possibility and modalities for creating joint research teams.

- Considering the association of NKUA with the Sophia-Antipolis Research Parc, since contacts exist with other institutions of the Parc, such as Eurecom. Also, considering the setup of research networks (e.g. with other Mediterrenean regions) on specific themes.

The agreement could be signed for a certain number (e.g. 4 or 5) of years, and also outline organizational matters, such as regular meetings (e.g. annual), and coordinating persons.

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National and Kapodistrian University of Athens

Presentation and relations with INRIA

Detailed Presentation

Ioannis Z. Emiris, March 8, 2010

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Contents

1 Setting and Goals

National and Kapodistrian University of Athens (NKUA) is the largest University in Greece, with about 70,000 students, 2,500 faculty, and 32 Departments, which cover all scientific domains. The Department of Informatics and Telecommunications (DIT) has rapidly grown in the past 5 years by more than 20% in terms of faculty and total number of students. It has a strong research record in the scientific areas relevant to INRIA, has established itself as the leading Greek department in its field, and appears in the top 100 departments of the 2009 Shanghai list.

NKUA, and DIT in particular, wish to expand their research activities, as well as offer challenging prospects for their students. NKUA has signed bilateral agreements with several Institutions from Europe and beyond, aiming at "enlarging the horizons of its members, fulfill its duties towards society, and support its three main objectives, namely knowledge dissemination, academic excellence, and leadership in higher education".

In particular DIT, in the preamble of its 5-year Self-evaluation and Planning report, dated February 2009, notes that one of the pilars of academic activity is the "encouragement of collaborations between Univerities and Research centers", whereas one of the existing dangers in the Department's activities is the "persistence of a low degree of validation, by the industrial sector, of the educational and research activities in the University".

On the other hand, INRIA is currently in an expansion phase. One form of this expansion is to extend its activities at the European level. This has recently led INRIA, or specific Research Units of INRIA, to undertake formal collaborations with European partners.

NKUA, and especially DIT, maintains strong links with INRIA Sophia-Antipolis. On the other hand, the two institutions have a lot of complementarities. In this setting, we plan to propose a formal relationship with INRIA Sophia-Antipolis. This report outlines the existing setting and concludes with concrete ideas about implementing the formal relationship.

2 INRIA

INRIA (`http://www.inria.fr/`), the French national institute for research in computer science and control, operating under the dual authority of the Ministry of Research and the Ministry of Industry, is dedicated to fundamental and applied research in information and communication science and technology (ICST). The Institute also plays a major role in technology transfer by fostering training through research, diffusion of scientific and technical information, development, as well as providing expert advice and participating in international programs.

By playing a leading role in the scientific community in the field and being in close contact with industry, INRIA is a major participant in the development of ICST in France. Throughout its 8 research centres in Rocquencourt, Rennes, Sophia-Antipolis, Grenoble, Nancy, Bordeaux, Lille and Saclay, INRIA has a workforce of 3800, 2800 of whom are scientists from INRIA and INRIA's partner organizations such as CNRS (the French National Center for Scientific Research), universities and leading engineering schools. They work in 150 joint research project-teams. Many INRIA researchers are also professors and approximately 1000 doctoral students work on theses as part of INRIA research project-teams.

INRIA maintains important international relations and exchanges. In Europe, INRIA is a member of ERCIM which brings together research institutes from 19 European countries. INRIA is a partner in about 120 FP6 actions and 40 FP7 actions, mainly in the ICST field. INRIA also collaborates with numerous scientific and academic institutions abroad (joint laboratories such as LIAMA, associated research teams, training and internship programs).

3 National and Kapodistrian University of Athens

National and Kapodistrian University of Athens (NKUA) (`http://www.uoa.gr`) is the largest and oldest University in Greece. Created in 1837, it hosts today about 70,000 students, 2,500 faculty, 1,000 administrative personnel. The University maintains today about 100 graduate programs.

The University is composed of 35 Departments, organized in 5 Schools, as well as some independent Departments. The Schools are: Sciences; Health Sciences; Law, Economics and Political Science; Philosophy and Humanities; Theology.

The School of Sciences includes 6 Departments: Informatics and Telecommunications, Mathematics, Physics, Biology, Chemistry, Geology and Geoenvironment.

3.1 Department of Informatics and Telecommunications

The Department of Informatics and Telecommunications (DIT) (`http://www.di.uoa.gr/`) was created in 1986, with the first graduates obtaining their Degrees in 1990. The Department expects to have 43 full-time faculty members at the end of 2009, up from 35 in 2002.

In 2009, there are about 2000 enrolled undergraduates (4-year curriculum), about 700 Masters students in all 7 programs administrated by the Department or where the Department participates (see below), and about 250 PhD candidates. The corresponding numbers in 2003 were 1200, 360, and 190 respectively. There are today about 20 technical and administrative employees.

The research and teaching activities of the Department cover most areas of Computer Science and Telecommunications. The Department is organized in 3 sectors:

- Theoretical Informatics: complexity theory, game theory, online algorithms, operations research, combinatorial optimization, computational geometry, computer algebra, theory of programming languages, graphics, visualization, scientific computing, cryptography, bioinformatics.

- Computer Systems and Applications: database systems, data mining, digital libraries, human-computer interaction, articifical intelligence, software engineering, operating systems, distributed systems, web computing and web applications, e-government, e-commerce, computer architecture, education and distance learning.

- Communications and Signal Processing: communication systems, optical communications, wireless and mobile communications, networks, queuing theory, telecommunication and network policy, digital telecommunications, VLSI design, signal and image processing, pattern recognition, coding and information theory, embedded systems, computational biology.

Undergraduate education has a nominal length of 4 years, leading to a Bachelor's degree. [1] The Department is very active in graduate-level education, and offers a Master's program with 6 academic directions: Computational Science; Advanced Information Systems; Computer System Technologies; Communication Systems and Networks; Signal Processing for Communications and Multimedia; New Information and Communication Technologies (for professionals).

Moreover, the Department coordinates the following Master's programs, which are joint with other Departments or Institutions:

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[1] Greek Universities award Bachelor's degrees after 4 years, with most Master's programs having a nominal length of 18-24 months.

- Information Technologies in Medicine and Biology (with the Biomedical Research Foundation of the Academy of Athens, Democritus Research Insitute, and the Department of Medical Devices of ATEI-Athens)
- Management and Economics of Telecommunication Networks (with the Department of Economics)
- Microelectronics (with the Department of Physics and Democritus Research Insitute)

Lastly, the Department participates in the following Master's programs:
- Logic and Theory of Algorithms and Computation (coordinated by the Department of Mathematics)
- Electronics, Radioelectronics, and Control (coordinated by the Department of Physics)
- Fundamental and Applied Cognitive science (coordinated by the Department of Philosophy and History of Sciences)

The Department is very active in terms of European and national research and industrial projects, with an average of 22 new projects yearly, in the past 5 years. Total funding in the past 20 years is estimated at 200 Million Euro, in current prices.

4 Existing collaborations

4.1 Research collaborations

Geometric and Algebraic Algorithms The Lab of Geometric and Algebraic Algorithms (ErGA) (`http://erga.di.uoa.` has several past and on-going collaborations with GALAAD. Prof. Ioannis Emiris is founder (2002) and head of ErGA: he has been an INRIA Tenured Researcher since 1995 and among the founders of the GALAAD team.

Joint research projects:
- ErGA has been an Associated Team of GALAAD: project CALAMATA (Calculs Algébriques, Matriciels et Applications), 2003-07.
- They have participated in the European STREP FET-Open project ACS (Algorithms for Complex Shapes, 2005-08), where ErGA coordinated the Software workpackage.
- They are participating in the Marie-Curie Initial Training Network SAGA (2008-12).

ErGA has also had the following collaborations with other INRIA groups:
- INRIA ARC ARCADIA (Arrangements de Quadriques, Algorithmes, Implémentation et Applications) with VEGAS (Loria) and GEOMETRICA, 2005-06. One workshop held in Athens, in 2006.
- Industrial Project PENED on "Algorithm design and software development for parallel robotic mechanisms and applications to physiotherapy", funded by the Ministry of Development, and greek company "Reflexion", 2005-09. Collaboration with COPRIN, including 2 visits of 10 days each by D. Daney (COPRIN) to NKUA.

Algorithms and complexity. The Theory group (`http://theory.di.uoa.gr/`) is headed by Professors E. Koutsoupias, V. Zissimopoulos, and D. Achlioptas (ERC Startup grant 2008). Prof. E. Koutsoupias has participated, along with MASCOTTE, to the European project FLAGS, and they are both participants of the successor project AEOLUS.

Assistant Professor D. Thilikos (Mathematics Department) has joint publications with MASCOTTE.

Networks. Prof. Ioannis Stavrakakis (http://cgi.di.uoa.gr/ istavrak/) heads the DIT team that participates, along with MAESTRO, in FP6 Integrated Project BIONETS.

Graphics and Image processing. Associate Prof. Theoharis Theoharis is the head of the Graphics Lab (`http://graphics.di.uoa.gr/`) and has collaborated with REVES on Soft Shadows, with the joint supervision of a BSc thesis. He is coordinating a national proposal that includes R. Deriche (ODYSSEE).

Databases. Yannis Ioannidis has been working with S. Abiteboul (WebDam, Paris).

4.2 Student exchanges

Exchanges between NKUA and INRIA have occured and continue at all levels. The list below is in inverse chronological order.

Postdoctoral researchers:
- George Tzoumas, PhD 2009, has a Postdoc with VEGAS (Loria) for 18 months, starting in Fall 2009.
- Elies Tsigaridas, PhD 2006, has been a Postdoc with GEOMETRICA in 2006-07, and with GALAAD in 2007-09.
- Evripides Markou, PhD 2003, National Technical University of Greece. During his Postdoc at NKUA, he was invited by MASCOTTE for 2 weeks in 2004.

In 2007, NKUA adhered to the International Internship Program.
- 2008-09: 4 applications, 3 accepted, 3 realized: 2 Master's and one PhD student.
  (i) G. Markomanolis (Master's) at GRAAL (Rhone-Alpes), he is now a PhD student at GRAAL;
  (ii) V. Fisikopoulos (Master's) at GEOMETRICA, he is now a PhD student at DIT, and M. Teillaud (GEOMETRICA) is in his advisory committee;
  (iii) E. Mpampas (PhD) at CEPAGE (Bordeaux), he has a Postdoc offer by CEPAGE.
- 2007-08: 4 applications, 2 accepted, 1 realized by A. Mantzaflaris (Master's) at GALAAD; he is now a PhD student at GALAAD.

Besides the International Internship program, or before our participation to it, there has been the following mobility:
- PhD student: S. Zoupanos, MSc from NKUA, is with GEMO.
- Visit of PhD students: E. Tsigaridas, 3 months in GALAAD during 2003-04, later a Postdoc at GALAAD. G. Tzoumas, 2 weeks in GALAAD during 2007; B. Mourrain (GALAAD) participated in his PhD examination committee. C. Syrseloudis, 2 weeks in COPRIN during 2007.
- MSc internships: A. Kakargias, Summer 2003, GALAAD. P. Souldatos, Summer 2006, COPRIN.
- BSc internships: G. Koulieris, 5 months in 2008-09, REVES.

DIT has an ERASMUS agreement with the University of Nice since 2004: With the Department of Mathematics until 2006; with the Department of Informatics, since 2006. Greek students to Nice: one in 2006-07, two in 2008-09. The demand is actually larger from both sides, but the coordinators have been slow in answering this demand.

5 Proposal for a formal relationship

NKUA, and especially the DIT, maintains strong links with INRIA Sophia-Antipolis, but there are also several complementarities. In this setting, we wish to propose a formal relationship with INRIA Sophia-Antipolis, based on an agreement signed by the two Institutions, possibly modeled after similar arrangements between INRIA centers and Universities, in particular Universities outside France such as the agreement between INRIA Sophia-Antipolis and the University of Bologna.

The agreement could be signed for a certain number (e.g. 4 or 5) of years, and also outline organizational matters, such as regular meetings (e.g. annual), and coordinating persons. The agreement should also outline the main objectives, such as:

- Strengthening the education activities between the two Institutions, including participation in thesis supervision (cotutelle) and committees, mini-courses offered by visitors or remotely, and joint organization

of thematic Schools or conferences. Strengthening the exchanges of students, including internships, participation in Master's programs and PhD / Postdoc fellowships.

- Enhancing the reseach collaborations and exchanges for researchers and faculty: beyond the existing actions, more specific actions can be designed such as extending the program COLOR (http://www-sop.inria.fr/COLOR/) to include NKUA, and extending 3+3 Méditerrannée to include Greece. Enhancing the technology transfer via common software development; the agreement may explicitly mention the most relevant axes of research (e.g. Computer algebra, Graphics, Theoretical informatics, Networks, Databases). Also, examining the possibility and modalities for creating joint research teams.

- Considering the association of NKUA with the Sophia-Antipolis Research Parc, since contacts exist with other institutions of the Parc, such as Eurecom. Also, considering creating larger networks of excellence around INRIA and NKUA (e.g. with other Mediterrenean regions) on specific themes.