ROMA TRE
UNIVERSITÀ DEGLI STUDI

**Area Affari Generali**
Ufficio Ricerca

# 2009/2010 CALL FOR APPLICATIONS

PhD Level Courses ("Corsi di dottorato di ricerca"), Roma Tre University

***(Doctorates, Doctoral Schools)***

***THE PRESIDENT***

Rep. N. 1131 Data 26.06.2009
Prot. N. 22529

**In accordance with**
Law 09.05.89, n. 168;
**In accordance with**
Statute of the Roma Tre University;
**In accordance with**
Article 4 of Law 03.07.98, n. 210;
**In accordance with**
the rules about PhD courses ("corsi di dottorato di ricerca") provided by the D.M. 30.04.99, n. 224;
**In accordance with**
the rules of Roma Tre Doctorates enacted by D.R. n. 01/2005;
**In accordance with**
the decisions adopted by the Administrative Board (19.05.09) and the Academic Senate (26.05.09);
**In accordance with**
the Administrative Director

## DECREES

***Article 1***

Roma Tre University (Rome, Italy), hereafter referred as "Roma Tre", opens a competition for the access of foreign students to the Roma Tre "Corsi di dottorato di ricerca". All these courses are three academic years long (2009/2010 to 2011/2012) and confer the degree "Dottore di Ricerca", which is equivalent to the "Doctor Philosopiae" (PhD) degree.

The access is possible to DOCTORATES and DOCTORAL SCHOOLS, providing positions with fellowship and positions without fellowship according to the following descriptions:

## DOCTORAL SCHOOL ON BIOLOGY
## "Biology/Biomolecular and Cellular Sciences"

[2] position with fellowship (€ 13.638,47 - gross amount per year)

*The scientific interests of the doctoral school section "Biomolecular and Cellular Sciences" are focussed on basic and applied research in the fields of Biochemistry, Molecular Biology and Cell Biology. Research projects range from the study of protein chemistry and biophysics to the mechanisms that control gene expression and regulation, and the integration of molecular systems at the cellular level. In detail, the successful candidates will work on ongoing research projects regarding the study of the structural and functional properties of proteins belonging to different classes, including redox active (metallo)enzymes, bioactive peptides and protein folding model systems. The research activity will involve the study of the characteristics of the chosen model systems through a variety of experimental techniques as well as the use, and eventually the development, of bioinformatics and computational chemistry tools. Protein engineering and protein design studies for biomedical/biotechnological applications will also be part of the research activity of the successful candidates. Experience in multidisciplinary approaches in the study of macromolecules as well as a very good track record in basic disciplines such as biochemistry, molecular biology and bioinformatics will be preferred titles. In addition, ability to work in a team and good attitude to human relations are also required.*

*2. Partnerships and international activities*
*The research projects of the members of the "Biomolecular and Cellular Sciences" section involve international*

*collaborations with state-of-the-art laboratories in Europe, USA and China, with the possibility to carry out part of the Ph.D. thesis in one of the collaborating institutions.*
*Ph.D. students will have the opportunity to obtain the title of Doctor Europaeus, a title that can be conferred by the University if the following four conditions are met: a) two scientists from higher education institutions of two European countries, other than the one where the doctoral thesis will be defended, have given positive judgement to the thesis manuscript; b) at least one member of the judging comitee comes from a higher education institution of a European country other than the one where the doctoral thesis will be defended; c) part of the defence takes place in one of the EU official languages, other than the one(s) of the country where the doctoral thesis will be defended; d) the doctoral thesis reports results obtained in a period of research of at least one trimester spent in another European country.*

*3. Selection criteria*
*Candidates will be selected on the basis of:*
*- (mandatory) university (or equivalent) degree*
*- (mandatory) abstract of the final thesis*
*- (mandatory) list of passed examinations*
*- (mandatory) curriculum vitae et studiorum*
*- (mandatory) a proposed research project*
*- (mandatory) at least two reference letters provided and signed by relevant members of the international scientific community, relating to the candidate's chosen course;*
*- (if any) additional documents and/or publications (including GRE - Graduate Record Examination - test) that the candidate deems worthy of consideration, including associations to research institutions (MAX 05 documents).*

*specific informations will be available at dott_bio@uniroma3.it*

## DOCTORAL SCHOOL ON BIOLOGY
## "Biology applied to human health"

2 positions with fellowship (€ 13.638,47 - gross amount per year)

*The scientific interest of the doctoral school section "Biology applied to human health" encompasses fundamental biological discipline: Biochemistry, Genetics, Immunology, Microbiology, Microbial biotechnology, Physiology, Pathology and Virology. Research is centred on the biomedical aspects, with particular regard to the biological basis of emerging and/or rare pathologies, including infectious, genetic, metabolic end degenerative diseases. The student will benefit from the existence, within the doctoral programme, of areas of excellence in fundamental research as well as of the close cooperation existing between fundamental and medical research. Doctoral theses are prepared in laboratories with strong biomedical imprinting, in general involving multi-disciplinary research approaches, and benefit from the expertise and technical platforms developed by the fundamental sciences. Students will work in a creative environment with strong integration and cooperation between biomedical disciplines, and in contact with clinical centres. The course is aimed to developing professional skills and specialised knowledge for future career in of biomedical research.*
*1. Research areas*
*1.a. Biochemistry*
*Structure-function relationships of microbial proteins related to infectivity and pathogenicity; Development of new methods for the determination of drugs, metabolites and infectious agents in biological fluids; Hemoproteins.*
*1.b. Cell biology and pathology*
*Role of oxidative and nitrosative stresses in neurodegenerative diseases; Development of cellular and animal models to study the pathogenesis of neurodegenerative disorders; Role of HIV proteins in immune evasion, cell death and neurodegeneration; Identification of cell markers of neurodegenerative diseases.*
*1.c. Genetics*
*Molecular bases of DNA repair processes in rare human genetic disorders; Translational approaches in radio- and chemio-therapy: a) biological effects of ionizing radiation for treatment planning in adrontherapy and for assessment of risk in space; b) cellular and molecular markers of apoptosis induction and mitotic catastrophe in cells exposed to new antineoplastic molecules.*
*1.d Microbial biotechnology*
*Development, screening, and characterization of compounds and macromolecules endowed with biomedical and/or pharmaceutical interest; Characterization of bioactive compounds of microbial origin and of new antimicrobial agents.*
*1.e. Microbiology*
*Active transport mechanisms and their role in host-bacterium interactions; Regulation of microbial virulence genes through genomic, transcriptomic and proteomic approaches; Molecular basis of resistance to antimicrobial agents and*

*to environmental stresses; Molecular typing and genomic evolution of bacterial pathogens.*
*1.f. Physiology*
*Relationship between oxidative stress, ageing, cholesterol metabolism and hormones; Effects of natural and synthetic compounds on estrogen receptor alpha-dependent cell proliferation; Role of endocrine disruptors on estrogen receptor activities: putative gender-related susceptibility; Study of the antioxidant activity of diet-derived and synthetic compounds; Role of endocrine disruptors on differentiation and potential protective effects of diet.*
*1.g. Virology*
*Studies of cell-virus interactions and functional analysis of HIV proteins in cellular models of infection, and development of new antiviral strategies.*
*2. Partnerships and international activities*
*Students will benefit from the opportunity of spending a 1-year period to perform part of their research activity in a selected foreign laboratory, preferably selected within EU coutries, with recognized experience in the student's investigation field. The tutor can designate an external co-tutor (either from Italy or any other EU country) among recognised scientific authorities in the student's investigation field. All students are strongly recommended to spend at least 3 months in a foreign (EU) laboratory to achieve the label of Doctor Europaeus (The European Doctorate refers basically to a label attachable to the Research Doctorate degree to be conferred by the University, when the following four conditions have been fulfilled: a) the doctoral thesis defence will be accorded if at least two professors from two higher education institutions of two European countries, other than the one where the doctoral thesis will be defended, have given their judgement concerning the manuscript; b) at least one member of the jury should come from a higher education institution in European countries, other than the one, where the doctoral thesis will be defended; c) part of the defence must take place in one of the official languages, other than the one(s) of the country, where the doctoral thesis will be defended; d) the doctoral thesis must partly have been prepared as a result of a period of research of at least one trimester spent in another European country).*
*3. Selection criteria*
*Candidates will be selected on the basis of:*
- *(mandatory) university (or equivalent) degree*
- *(mandatory) abstract of the final thesis*
- *(mandatory) list of passed examinations*
- *(mandatory) curriculum vitae et studiorum*
- *(mandatory) a proposed research project*
- *(mandatory) at least three reference letters provided and signed by relevant members of the international scientific community, relating to the candidate's choosen course;*
- *(if any) additional document and/or publication (including GRE - Graduate Record Examination - test) that the candidate deems worthy of consideration, including associations to research institutions (MAX 05 documents).*

*spcecific informations will be available at dott_bio@uniroma3.it*

## DOCTORAL SCHOOL in MATHEMATICAL AND PHYSICAL SCIENCES "Physics"

[1] position with fellowship (€ 13.638,47 - gross amount per year)

THE DOCTORATE IN PHYSICS AT ROMA TRE UNIVERSITY The Doctorate in Physics of Roma TRE University dates back to 1999. Each Ph.D. Course (here we say "Cycle") lasts for three years: so far, 10 "Cycles" have been started, involving more than 100 Ph.D. students in total. 6 Cycles have been completed, and about 70 Ph.D. students have already got their degree: it is worth noticing that more than 80% of Doctors have at the moment a research position (although, in most cases, a temporary one) at foreign or domestic Universities or Research Institutes. • Main features and Goals The Roma TRE Ph.D. School in Physics aims at training young people towards a research activity at a high international level, so that they could be successfully employed either in domestic or foreign Universities and Research Centres or in Industrial Companies carrying out programs with advanced technological content. A key role is played by the "Ph.D. Committee" who takes care of the Organisation of the Ph.D School in Physics and must guarantee that the above institutional scopes be achieved. It consists of 16 members, 13 belonging to the Physics Department and 3 to external research institutions. They are highly qualified scientists and work in different research areas (High Energy Physics, Theoretical and Mathematical Physics, Condensed Matter Physics, Astrophysics, Geophysics). The "Ph.D.Committee" is elected by the Physics Department and in turn elects one of his members as Chair of the Ph.D. School. He is in charge for 3 years. • Organization of the PhD School in Physics. So far, a formal branching in different "curricula" has not been established. Accordingly, no difference is made between "basic" and "specific" courses. There are however a number of different research areas that can be selected by the Ph.D. students, namely High Energy Physics , Mathematical Physics, Condensed Matter Physics, Astrophysics, Geophysics, and the delivered courses are supposed to cover all the above

subjects. During the first year, the Ph.D. students are asked to attend courses for 20 credits of 6 hours each provided by the School. The teachers are usually members of the Committee or of the involved departments: however, quite often we had external scientists, mostly foreign ones, who have delivered seminars or even series of lectures. Thanks to an existing agreement among the Ph.D. Schools of Rome area, students are allowed to attend a subset of their courses at La Sapienza or at Tor Vergata Universities. Additional credits are to be obtained by attending appropriate International Schools at the Ph.D. level. When choosing the courses and the Schools to attend the students are assisted by a "tutor", who has to be a member of the Ph.D. Committee. The tutor acts as a guide and a supervisor for the scientific activity of the Ph.D. student; normally he suggests the subject of the thesis and takes care of the student throughout the whole Ph.D. course. Exceptionally, the Ph.D. student can be allowed by the Committee to carry out his research activity under the supervision of an external scientist, pertaining to other Universities or Research Institutes: in this case, the internal "tutor" acts as a "link" between the external supervisor and the Ph.D. Committee, and guarantees that both the subject and the scientific level of the research be suitable. Moreover, we have at the moment a small, but non negligible number of Ph.D.students doing their Ph.D. course in joint tutorship with foreign laboratories or Universities. The admission to the second year is not automatic: on one hand, the student is requested to overcome a proof, usually consisting in an oral or written report, for each of the courses he has attended. On the other hand, he has to write down a report on his activity and a schematic description of his research project: both have to be validated by the tutor, who in turn has to submit his own report to the Ph.D. Committee for the approuval. The second and third year are essentially devoted to the research activity on the thesis subject, though in their second year Ph.D. students are in addition asked to attend specific Schools or Workshops. At the end of the second year, the student presents to the Committee an oral report, where the stage attained by his research work is discussed. In particular, he has to explain the achieved results and the perspectives for the third year, including open problems and possible drawbacks. If the report is approuved by the Committee, the student is admitted to the third year. One month before the end of the third year, each student submits his thesis to an external referee, suggested by the tutor and agreed by the Ph.D. Committee. The referee can recommend amendments, or even a deep revision of the thesis. Once the (amended) version of the thesis is approuved , the student presents his final report to the Ph.D.Committee, who admits him to the final exam, on thee basis of the final referee report (if needed), of the student report and of the tutor report. • The final exam It consists of a 30 minutes seminar in front of an external commission, followed by a 15 minutes discussion. The members of the commission cannot be part of the Ph.D.Committee. They usually belong to other Universities or Research Institutions, possibly foreign ones. They have to be at least 3, possibly supplemented by one or two experts on specific subjects. Different rules can be followed in case of Ph.D. students with joint tutorships. The members of the committee write a report on the candidates, where the scientific level of the thesis and of the presentation is evaluated, and it is made clear whether the candidate deserves (or not) the title of "Dottore di Ricerca in Fisica". However, no grades and no explicit ordering among the candidates is foreseen. •International relationships Our Ph.D. School enjoys several collaboration agreements with national Research Institutions (such as I.N.F.N and C.N.R.) as well as international ones, like CERN in Geneva. Moreover, our Ph.D. students have access to the large scale facilities located at Trieste (Electra), Grenoble, Readings (Rutherford Lab.). Exchange agreements at pre-doctoral level within the Socrates-Erasmus Program are established with French (Cergy-Pontoise) and Spanish (Madrid Compl., Valladolid, Burgos, Barcelona) Universities. They can involve both professors and Ph.D.students. Cotutorships are currently on with the Universities of Grenoble, Marseille, Savoie. They take place in the framework of the so called "French-Italian University". Bi-lateral agreements finalized to interchange of researchers and Ph.D. students have been signed with Universite' de la Savoie (France), Autonoma Barcelona (Spain), Augsburg University (Germany), New Jersey University at Rutgers (USA). In addition to the above institutional collaborations, the member of our Physics Department and of our Ph.D. Committee have a number of informal collaborations with foreign scientists. Those have been crucial for allowing our Ph.D. students to work in a true international context. The impressive number of publications on international Journals, as well as of (often invited) talks and posters presented by our Ph.D. students provides a meaningful indication of the scientific relevance of their work inside the international community of physicists

## DOCTORAL SCHOOL IN EARTH SCIENCE

3 positions with fellowship (€ 13.638,47 - gross amount per year)

1) MODELLING SUBDUCTION PROCESS. The Research project will be develop in the frame of a larger PhD network with different European Institution. The research will be mainly concentrated on design and development of new experimental-laboratory- technique to simulate subduction process. The research could also include development of numerical experiments and analysis of regional example for subduction zones. 2) TOPOGRAPHY OF SUBDUCTION ZONE. The PhD research project is focus on surface dynamic related to both oceanic and continental subduction zones. The PhD project is expected to analyse one or two regional examples (i.e. Greece and Colombia) with collection and analysis of different data set to constraint the evolution of the belt. The study will be completed with laboratory experiments to relate the surface dynamic

with deep structure. 3) INTEGRATED STRATIGRAPHY APPROACH FOR THE STUDY OF THE NEOGENE MEDITERRANEAN SEDIMENTARY BASINS. The aim of this research topic is to teach the PhD student a powerful tool as the use of the integrated stratigraphy for the study of the tectono-sedimentary evolution of the sedimentary basins. This approach will lead the student a) to detail times in which the sedimentary events occurred; b) to recognize the general causes which drove those events (climatic, tectonic). The Mediterranean area chosen for the 2009-2012 PhD research is the SE coast of the Anatolian Peninsula, in particular the Mut and Adana Basins (Turkey). This topic will be carried out in the frame of the International TopoEurope-Eurocores Project "VAMP – Vertical Anatolian Movements Project", within the Italian Research Unit IT1, in collaboration with other research units from The Netherlands, Germany, Switzerland, Slovakia and Turkey and within the Bilateral Research Project among Roma Tre University and the Çukurova University of Adana. The research will include field surveys and sampling in the Mut and Adana areas and the analyses of ostracod faunas from a biostratigraphical and palaeoecological perspective at the Dipartimento di Scienze Geologiche of Roma Tre University and other international research institutions.

## DOCTORAL SCHOOL IN ENGINEERING
## "Computer Science and Automation"

2 positions with fellowship (€ 13.638,47 - gross amount per year)

The PhD program of the Computer Science and Automation Section of the Doctoral school of Engineering aims at preparing first class researchers and future leaders in Computer Engineering, Automation and Robotics who will either continue the research career, both in Universities and in research centers, or will lead industrial research and development projects. A Faculty of internationally recognized researchers and professors from the Department of Informatics and Automation (DIA) of Roma Tre University is responsible for the educational activities and takes part in the organization of the doctoral program. The course covers a three-year period. The first year is mainly devoted to deepening the background of each student with introductory courses covering the relevant topics in the research areas of the PhD program and advanced courses illustrating new results and techniques in specific fields. These courses aim to facilitate students in choosing the PhD research topic. The second and third years are devoted to research with emphasis on active participation in the research projects of DIA, attendance to conferences, schools and seminars, publication of papers in journals and conference proceedings, and the preparation of the final thesis. Usually, each student spends a period of six months in an international research center.
The research areas of the PhD program span the whole spectrum of the department research programs, which are the following:
(1)AUTOMATION AND INDUSTRIAL ORGANIZATION: this program focus on the development of models, methods and tools for the efficient utilization of resources. The theoretical background is in the fields of Operations Research and Control Theory, including discrete optimization, complexity theory, discrete event systems and the development of algorithms in these contexts. Recent works in the applications area include finite capacity scheduling, supply chain management, real time traffic management, agent-oriented decentralized management systems.
(2) ARTIFICIAL INTELLIGENCE: the program relates to AI models, methods and tools and their applications to create extremely flexible, autonomous, adaptive and reliable systems, well-grounded from a theoretical point of view. The program's research projects particularly focus on the formal base and theoretical grounds, both regarding the use of exploration and empirical experimental techniques to analyze, create and assess the conceived systems.
(3) NETWORK ANALYSIS AND VISUALIZATION: the general goal of this program is to develop new methodologies and tools for network analysis and visualization, with applications to computer network discovery and management. Given the great research opportunities offered by the new generation computer networks, the focus of the program progressively embodied, together with the visualization and analysis problems, pure computer networks research topics.
(4) DATABASES AND INFORMATION SYSTEMS: the general goal of the database program is the study of new principles, methods and tools for the organization and management of information, in the form of databases, that is, systematic collections of data that are large, persistent, and shared. The current focus of the program is on the new requirements generated by the growth of the Internet and WWW, with the possible availability of different and heterogeneous sources of information. The program includes various projects in each of which the attention is both on principles and on experimentation.

(5) COMPUTER-AIDED DESIGN: the mission of this program is to pursue research on geometric modeling and visual simulation of engineering problems using CAD/PLM technologies. The group has concentrate its efforts on the following areas: functional programming with design languages, parallel and distributed processing, geometric and solid modeling, computer-aided design and computer graphics for scientific visualization, and geometrical and physical modeling of bio-systems.
(6) ROBOTICS: the robotics program is mainly focused on methodologies and technologies for sensor based navigation of cooperating autonomous vehicles in partially structured environments. Research interests include: processing of sensors data for the purpose of localization, motion planning, and environmental mapping, modelling and control of mobile robots with lightweight manipulators, development of distributed control and estimation techniques, and modelling of complex interconnected systems.
(7) CRITICAL INFRASTRUCTURES: the Critical Infrastructure Protection program is oriented to the modeling and analysis of networks of infrastructures. The vulnerability analysis and study of interdependencies are the focus of such program that is developed in coordination of some European Research Projects.

## DOCTORAL SCHOOL IN ENGINEERING
## "Biomedical electronics, electromagnetics and telecommunications"

2 positions with fellowship (€ 13.638,47 - gross amount per year)

This Doctoral Section has the following objectives:
1) training of specialized professional figures and new researchers to be employed into European, national and local, public and private Institutions;
2) promotion of the research in University structures through the contribution of innovative and stimulating professional figures;
3) supporting Industrial Companies dealing with Information Technology, by using excellent professional figures for research, development and industrial applications;
4) support the teaching in the Italian University through new researchers.
The Section relates to the following thematic areas and research sectors:
(1) Electrochemistry: research on electronic materials and hybrid organic-inorganic materials.
(2) Electromagnetics: microwave integrated antennas, microwave passive components realized by innovative materials (e.g. metamaterials, nanomaterials); antennas for plasma heating for nuclear fusion; electromagnetic compatibility; scattering of electromagnetic waves in cylindrical structures; electromagnetic methods for optics; numerical methods for complex electromagnetic structures.
(3) Biomedical engineering: algorithms and systems for biomedical engineering; image processing for human movement analysis; posture analysis for clinical and research trials; biomedical signal processing; biosensors; biological materials; protheses; integrated multimedia systems for telemedicine; neural systems for motor control studies.
(4) Electrotechnics: magnetohydrodynamic energy conversion; models, neural nets and genetic algorithms applied to dynamic magnetic hysteresis; neural networks to RNA e DNA sequences recognition.
(5) Photonics: partially coherent sources; fiber-optic natural lighting; optical methods for non invasive diagnosis of thermal flows in electronic systems and development of air conditioning in mobile environments; properties of partially polarised optical fields and gratings.
(6) Superconductivity and microwaves: experimental systems for the measurement of microwave surface impedance, and magnetic and electric characterisation of new materials.
(7) Telecommunications: SOA amplifiers in optical networks; images coding; mobile and multimedia communications; laser quantum dot devices; image modelling; modelling of highly ordered quantum dot short wavelength lasers/LEDs; modelling PhC and nanoimprinted sub-wavelength photonic components; project of components and planar devices for optical communications; wavelets and multimedia signals; packet GMPLS in optical networks; fourth generation TLC systems; OCDMA division optical transmission systems; vision systems; bayesian techniques for image quality improvement; non-conventional techniques for spatio-temporal signal processing.

## DOCTORAL SCHOOL IN ENGINEERING
## "Mechanical and Industrial Engineering"

2 positions with fellowship (€ 13.638,47 - gross amount per year)

The PhD program of the Mechanical and Industrial Engineering section is aimed at creating researchers with broadband skills, each one specialised on a particular subject offered at the school. Those skills would be oriented to the development of proper methodologies for integrating different kinds of problems: thermo mechanical, fluid-dynamics and electro mechanics problems with constructive, technical, measurements, economical and managerial problems with attention to the chemical and noise pollution and workers' safety. All of these problems are related to a complex industrial system and the attention on them will be important for a good cost-benefit analysis in also economic aspects and cost-performance ratio. Industrial systems involved in the production of goods and services are continuously evolving toward new and highly diversified forms providing specialised solutions for complex problems. In the same time a greater attention is paid for the interactions with the environment (both in the field of noise and chemical pollution and in the field of workers' safety and wellness): all this requires the use of new investigation and risk management procedures based on clear and well designed standards. As a consequence for this growing demand, the diffusion of a new approach has to be supported through the widening of technical and scientific knowledge in which the interdisciplinary aspect plays a decisive role. In fact, only an interdisciplinary knowledge would assure highly qualified professional staff having a high efficiency and reliability which otherwise would be lost, with bad economic and environmental consequences. The actual inefficiency is mainly due to the lack of the correct philosophy for approaching the problem, as old methodologies were not oriented to the solution of the whole system but only to a part of it. So, event though each solution was right, the absence of a general guide line led to an ineffective integration of results and to a decrease in effectiveness and affordability of the system. Developed areas are involved in activities based on design and management of complex system, is therefore needed to create suitable abilities. Also in our country, the attention of the scientists is focused on this problem not only in industrial field but also in the academic one. In this field, the research is encouraged by improved numerical simulation that allow a greater and stricter specific approach. The course covers a three-year period. The first year is mainly devoted to deepening the background of each student with introductory courses covering the relevant topics in the research areas of the PhD program and advanced courses illustrating new results and techniques in specific fields. These courses aim to facilitate students in choosing the PhD research topic. The second and third years are devoted to research with emphasis on active participation in the research projects of the Mechanical and Industrial Engineering dept., attendance to conferences, schools and seminars, publication of papers in journals and conference proceedings, and the preparation of the final thesis. Students can spend a period in an international research center. The research areas of the PhD program span the whole spectrum of the department research programs, which are the following: Aeronautical Constructions Chemistry Converters, Machines and Electrical Actuators Excavation Engineering and Safety Fluid Dynamics and Machines Mechanical and Thermal Measurements Mechanical Design and Machine Constructions Materials Science and Technology Technical Physics

## DOCTORAL SCHOOL IN ENGINEERING
## "Civil engineering"

2 positions with fellowship (€ 13.638,47 - gross amount per year)

This Doctoral Section has at the following objectives:
1) training of specialized professional figures and new researchers to be employed into European, national and local public and private Institutions;
2) promotion of the research in University structures through the contribution of innovative and stimulating professional figures;
3) support the teaching in the Italian University through new researchers.
The Section relates to the following thematic areas and research topics and subsectors:

1) Hydraulics
1.1 Theoretical and experimental modelling of complex fluids and interaction with the environment

1.1.1 Sloshing of a free surface liquid in a moving container
1.1.2 Two-phase transient pipe-flow
1.1.3 Local scour downstream of hydraulic structures
1.1.4 Gravity currents and their interaction with the environment

2) Water Management
2.1 Hydrology and Water Resources
2.1.1 Flow and transport of solutes in heterogeneous porous media
2.1.2 Inference of transmissivity through pumping test
2.1.3 Solute transport in the combined vadose zone-groundwater system
2.1.4 Effective properties in heterogeneous porous media
2.1.5 Residence time and streamflow generation in small catchments
2.1.6 Rainfall-runoff modelling
2.1.7 Analysis of the statistical properties of rainfall fields
2.1.8 Analysis of the statistical properties of the peak flow annual maxima
2.1.9 Flood plain modelling

2.2 Coastal Protection and Design of Maritime Structures
2.2.1 Analysis of directional wave records
2.2.2 Hydro-morphodynamic modelling of sandy beaches
2.2.3 Prototype measurement of wave overtopping
2.2.4 Study of generation, propagation and interaction with coasts and maritime structures of tsunamis
2.2.5 Field measurement and numerical modelling of short and long waves and currents in harbours
2.2.6 Study of the interaction between waves and innovative structures for the defence of the Venice lagoon

3) Roads, Railways and Airports 3.1 Advanced geometric design of roads and motorways
3.1.1 Systemic check of the road project's property under the profile of the road safety
3.1.2 Validation of the systemic operability of the road referring to the existing infrastructures
3.1.3 Analysis of driver behaviour 3.1.4 Analysis of systemic operability of road Italian networks
3.1.5 Geometric design consistency and operational effects

3.2 New materials and technologies for development and management of transport infrastructures
3.2.1 Optimization of technical strategies for road networks rehabilitation
3.2.2 Rehabilitation of existing roads for increasing road safety
3.2.3 Pavement damage diagnosis using GPR
3.2.4 Standardization of high performance techniques for pavement damage diagnostic using Ground Penetrating Radar
3.2.5 Road pavement monitoring using GPR
3.2.6 Recycling of construction and demolition wastes – Analysis of the standards for applications in road and railway constructions
3.2.7 Waste recycling for roads and railways construction

4) Transportation
4.1 Urban transportation network
4.1.1 Instruments for the evaluation and monitoring of strategic actions in large degraded urban areas
4.1.2 Innovative vehicles; analysis and validation of a new dualmode trolleybus
4.1.3 Development and experiment of cold start and hot soak emission modelling during the parking process

4.2 Systems and technologies for traffic control and regulation
4.2.1 Interaction between signal settings and traffic flow patterns on road networks
4.2.2 Development of a mobility model on ANAS traffic network to evaluate traffic volumes parameters, optimal location of traffic count sections, impact of a single link change on the global network
4.2.3 Validation of traffic monitoring systems

5) Structures 5.1 Mechanics of Materials and Structures
5.1.1 Masonry Mechanics
5.1.2 Nonlinear analysis of Trusses, Tensegrities and Thin Walled Beams

5.1.3 Dynamics and identification of uncertain structures
5.1.4 Durability and performance decay of structural elements
5.1.5 Response analysis and aerodynamics of very long span suspension bridges

5.2 Structural Engineering.
5.2.1 1Safety evaluation for masonry structures
5.2.2 Seismic risk assessment of industrial plants
5.2.3 Analytical and experimental studies of the behavior of structures and structural elements
5.2.4 Post-earthquake evaluation of RC bridges.
5.2.5 Evaluation, rehabilitation, and repair of existing structures.
5.2.6 Performance-based earthquake engineering.
5.2.7 Probabilistic risk assessment of structures and Life-lines
5.2.8 Passive and semi-active risk reduction methods
5.2.9 Assessment and rehabilitation of historic structures
5.2.10 Reinforcement of masonry and concrete structures with composites
5.2.11 Low impact technologies

6) Geotechnics
6.1 Slope stability and tunnelling in rock masses
6.1.1 Prediction of lining loads and displacements around bored tunnels;
6.1.2 Application of passive reinforcements in rock foundations;
6.1.3 Slope stability problems in the preservation of ancient towns.

## DOCTORAL SCHOOL IN POLITICAL STUDIES

[1] position with fellowship (€ 13.638,47 - gross amount per year)

[1] position without fellowship (no fees requested)

THE DOCTORAL SCHOOL IN POLITICAL STUDIES Established in 2004, the Doctoral School in Political Studies offers PhD courses in four basic areas of the social sciences. The School develops research programs on issues related to the study of politics such as: - economics and statistics - history and cultural studies - law - sociology and political science The Doctoral School offers an interdisciplinary and international approach. Interdisciplinarity is at the heart of the PhD curriculum in its cross-disciplinary seminars and study groups designed to complement the more specialized formation offered by each program. Our international approach takes several forms, including visiting professors from abroad, manifold opportunities to do research abroad, integration of students into the international community of scholars through lectures and colloquia. A number of foreign professors are also invited to sit on PhD committees. PhD PROGRAMS IN THE SECTION OF EUROPEAN AND INTERNATIONAL STUDIES In the section of European and International Studies students can choose from a wide range of subjects such as Comparative Politics, Area Studies (Western and Eastern Europe, Africa, Asia, USA, Latin America), International Relations, European Integration, European Institutions, Modern and Contemporary History, Economics, International Law and Political Sociology. In the Academic year 2009-2010 PhD Programs will include: • Africa • Central and Eastern Europe • Cultural Studies • European Studies • Migrations, Networks, Conflicts • History of International Politics • History of Politics • International Law • Peace Studies • Political Science • Political Thought Our Doctoral School Program offers a variety of courses providing skills marketable for a wide range of professional arenas. Moreover, doctoral students will have a chance to participate in research projects run by the Department of Political Institutions, Economics and Society, and by the Department of International Studies. The School's PhD Programs count roughly 40 doctoral candidates. About 12 defend their dissertations each year. Students are taught and supervised by a faculty of more than 40 university professors and lecturers. The researchers of the Department of Political Institutions, Economics and Society, and of the Department of International Studies are heavily involved in the studies program. The close links between the Doctoral School and the two Departments allow young scholars to participate in such activities of the academic community as research groups/contracts, publications and academic reports. The Doctoral School also invites outside academics and representatives of the private sector to take part in various activities. Every year, the Doctoral School welcomes many visiting professors to teach, take part in various activities and deliver lectures. In particular, every year an outstanding international scholar leads a specific multidisciplinary seminar with our students.

Inaugural lectures at the Doctoral School have been given in recent years by Lucien Sfez, Director of the Doctoral School in Political Sciences of the Sorbonne, Bengt-Arne Wickström of the Von Humboldt University, Berlin, and Marc Lazar (SciencesPo, Paris). The Doctoral School in Political Science has also launched student exchange programs and research collaboration projects with the following partner Universities and Research Centres in Italy and abroad: - Centro de Estudios Politicos y Constitucionales - Madrid - Centro Interuniversitario "Machiavelli" sulla Storia dei conflitti strutturali durante la guerra fredda - CRIE (Centro di ricerca sulle Istituzioni Europee) presso l'Istituto Universitario Suor Orsola Benincasa - Napoli - Friedrich Schiller-Universität - Jena - Istituto De Gasperi di Studi Europei - Istituto Jeremy Bentham di Studi Giuridici e Politologici - SciencesPo - Paris - Scuola Superiore dell'Amministrazione dell'Interno - Roma - The National Security Archives - Washington - Universidad de Valencia - Universidad Rey Juan Carlos – Madrid - Universitat Autònoma – Barcelona (Dipartimento di Storia contemporanea) - Universidad Carlos III - Madrid (Dipartimento di Scienze Politiche e Sociali) - Universidad de Castellon - University of Cluj-Napoca (Dipartimento di Storia) - University of Craiova (Dipartimento di Storia) - University of Groningen (Departement of Political Sciences) - Universidad de Sevilla (Dipartimento di Metafisica y Corientes Actuales de la Filosofia, Etica y Filosofia Politica) - Universität Bremen (Department of Political Sciences) - Université Charles De Gaulle Lille III - Université Montpellier III Paul Valery (Département de Philosophie) - Université Nancy - Université Nantes - Université Paris I Sorbona (Ecole doctorale en Sciences Politiques) - Université Paris III - Université Paris XIII (Département d'Histoire) - University of Leiden (Department of Public Administration) - Woodrow Wilson Center for International Studies APPLICATION

Candidates will have to specify in the application form:
• the basic area of social sciences which is the ground of their research project:
☐ economics and statistics
☐ history and cultural studies
☐ law
☐ sociology and political science
• the PhD Program in which they want to develop their research project:
☐ Africa
☐ Central and Eastern Europe
☐ Cultural Studies
☐ European Studies
☐ Migrations, Networks, Conflicts
☐ History of International Politics
☐ History of Politics
☐ International Law
☐ Peace Studies
☐ Political Science
☐ Political Thought
• The application form and a reference letter format to be signed by a referee (compulsory) are available for dowloading on the School's website. All personal data will be kept as absolutely confidential.
• On preparing the research project, candidates should read the file "Research Project Assessment Criteria", also available on the website.
SELECTION OF CANDIDATES The selection of candidates will be carried out by the Supervising Committee. The first test will be the exam of the candidates' dossier:
- (mandatory) a copy of the final thesis (in electronic format)
- (mandatory) list of passed examinations
- (mandatory) curriculum vitae et studiorum
- (mandatory) a proposed research project
- (mandatory) at least three reference letters provided and signed by relevant members of the international scientific community, relating to the candidate's chosen course
- any additional document and/or publication (including GRE - Graduate Record Examination - test) that the candidate deems worthy of consideration, including associations to research institutions (MAX 05 documents).
Dossiers will be evaluated with these criteria:
- CV, additional documents and/or publications (points 0-5);
- thesis (points 0-15)
- reference letters (points 0-10);
- research project (points 0-30).

The second test will be an interview of the selected candidates with the Supervising Committee.
The candidate's cultural and research background will be discussed, examining the research project, the curriculum vitae et studiorum, the thesis (and publications). As most courses are taught in Italian, a good command of Italian (and English) is necessary to pursuing studies at the Doctoral School. Such skills will be assessed.
For any further information please contact Mrs. Antonietta Mazza: mmazza@uniroma3.it.

## DOCTORAL SCHOOL IN LAW AND ECONOMICS "TULLIO ASCARELLI"

[5] positions without fellowship (no fees requested)

The INTERNATIONAL DOCTORATE SCHOOL OF LAW AND ECONOMICS "TULLIO ASCARELLI" releases a joint National Doctoral Degree of European status in the statutory fields offered by the School (Law and Economics). The degree is conferred by Roma Tre and by the italian Universities which are in partnership with the School according to article 3, paragraph 9 of the MD 509/99. The School also releases a joint degree of European status with foreign Universities which have an equivalent National degree in their own country or national degrees which are mutually recognised in the above said countries. The School, devoted to Higher Education, is also dedicated to scientific research in the various statutory fields it offers. The School, based on conventions established between universities, is divided into various multidisciplinary fields and sections. The school offers different statutory fields: Civil Law, Commercial Law, Labour Law, Criminal Law, Institutional Economics, Business Economics, Competition and Consumers Law, Public Law, International and EU Law.
Contact: scuola.ascarelli@uniroma3.it

## DOCTORATE in PHYLOSOPHY

[1] positions with fellowships (€ 13.638,47 - gross amount per year)

[1] position without fellowship (no fees requested)

The Dottorato in Filosofia of Roma Tre aims at training graduate students according to the international standards, in the main fields of Philosophy. Each doctorate student will be tutored by a member of the Dipartimento di Filosofia of Roma Tre. All the students will be required to attend the regular courses and the talks and seminars delivered by the Visitors of the Department. The research areas in the doctorate programme concern Philosophy of Mind; Philosophy of Language; Philosophy of Science; Aesthetics; Social Philosophy; Woman Studies; History of Philosophy; Logic and Communication Theory; Ethics; Philosophy of Religion; Phenomenology Students who will follow the curriculum in "Logic and Communication Theory" will attend the activities organised together with the Université de la Méditerranée of Marseille. During the first year of the programme, the students attend all the regular courses and talks offered in the program. They will also determine the topic of their dissertations and choose of their tutor. During the second year of the programme the students are highly recommended to spend at a foreign University Center of Research a period of three to six months. During the other part of the second year, they attend classes on topics connected with their dissertation. The third year is totally devoted to write the dissertation. At the end of each year the students present a written report, which is discussed with the Supervising Committee. If the report and discussion are approved by the Committee, the student is admitted to the following year. At the end of the third year, the students present their theses to the Supervising Committee who admits the student to the final examination, on the basis of the student report, the tutor report and, if needed, the written opinion of an external referee. The final defense is done in front of an external committee of experts. If the discussion is judged favorably, the students obtain the title of "Dottore di Ricerca in Filosofia". Students of the curriculum in "Logic and Communication Theory" will also obtain the "Doctorat en Matématiques Discrètes et Fondements de l'Informatique" of the French University. Research fields: Analitic Philosophy: Philosophy of Mind; Philosophy of Language; Philosophy of Science. Aesthetics: Art Theory and Landscape Aesthetics Social Philosophy; Woman Studies History of Philosophy Logic and Communication Theory Ethics Philosophy of Religion Phenomenology The scholarship will be awarded through a competition based on academic qualifications and publications of the applicants The applicants should send: 1. The certification of their first degree or of an equivalent degree. The equivalence of a foreign degree with the "Laurea Magistrale" will be evaluated by the Supervising Committee. 2. The curriculum vitae et studiorum (CV) in Italian or English 3.

First or Second Degee Thesis (if present) 4. A paper of 8-10 pages concerning a relevant philosophical topic 5. The list of the courses successfully attended by the applicant. 6. A proposed Research Project (about 4-5 pages) 7. The publications, if any is available Satisfactory knowledge of written and oral Italian language is required. Knowledge of other European languages can be certified, too, but is not mandatory. The Supervising Committee will examine and evaluate the applications by September, 7 2009.

## DOCTORATE in COMPARATIVE CULTURES AND LITERATURES

[1] positions with fellowships (€ 13.638,47 - gross amount per year)

The PhD programme in Comparative Cultures and Literatures at the Department of Comparative Literatures is intended to investigate responses to those processes of transformation which now, also in Italy, characterize the whole system of the production and the transmission of culture. This has had a particularly strong impact on the Humanities. There is thus an awareness that the PhD programme should be based upon a well-defined and well considered response to the new challenges posed by inter-cultural issues and the transversal nature of knowledge. Indeed, doctorate studies in Comparative Cultures and Literatures intend to privilege an interdisciplinary view of linguistic phenomena and literary texts. Language and literature are investigated through various methodological approaches and according to various modes of communication. Therefore, the main aim of the programme is to promote, develop and transmit a trans-disciplinary and multimedial dimension, represented by a prime insistence on 'textual competence'. This is explored from both literary and a linguistic / philological viewpoints, thus providing the critical tools necessary to investigate other forms of communication.

## DOCTORATE in HISTORY

[1] positions without fellowships (no fees requested)

The topics of interest of the PhD programme are the following: the political history, with the analysis of the forms of power, the construction of the political idioms and the process of formation of a political culture in a European context, the process of formation and strengthening of the Modern State, the role of the religious dimension in the framework of the political relationships and in the carrying out and the legitimation of the forms of domination, the influence of the juridical cultures, the practice of negotiation and diplomacy, the exchange flows (from a cultural and economic point of view) in the formation of the European networks of relationships; the cultural history, with the analysis of the conditions of construction of the modalities of diffusion of the knowledge on a European scale, the formation and the use of the symbolic idioms and of the representations in the processes of identity self-consciousness and of confrontation with the "other" which contributed to the process of construction of the European consciousness; the social history, with the study of the transformations of the urban elites in the long period and the processes of disciplining of the lower classes, the relationships between the urban elites and those of the subject dominions, the formation and the circulation of the elites; the economic history, through the integration of topics such as the economy of the feudal systems, the credit's circuits in pre-industrial world, the public finances in the Ancien Régime's states. Basic knowledge of Italian language will be a preferential element of evaluation

## DOCTORATE in AMERICAN STUDIES

[1] positions without fellowships (no fees requested)

This is the only Doctorate exclusively on American Studies existing in this country. It tackles the American Continent (North, Central and South) from a multidisciplinary point of view. The main areas of study are: Literature, Linguistics, History, Cultural History, Cinema, Theatre, Philosophy, Sociology, International Relationships.

### *Article 2*

The competition is open to students who:

(i) are not Italian citizens;

(ii) are not residents of Italy;

(iii) have gained (or will gain before 31 August 2009) an university degree or an equivalent degree of a higher education institution giving him/her access to doctoral studies without any further qualifications in the country where it was obtained. The equivalence of the degree with the Italian "Laurea Specialistica/Magistrale" will be evaluated by the Supervising Committee of the selected course;

Students who already obtained a doctoral (or equivalent level) degree are not eligible.

Article 3

To be admitted the candidate shall submit - by the term specified in the following article 5 - his/her application for ONLY ONE of the courses described above.

Article 4

For each course, the selection of candidates will be carried out by the Supervising Committee.

Except for those courses that requires a specific list of documents, candidates will be selected on the basis of:

- ✓ (mandatory) university (or equivalent) degree
- ✓ (mandatory) abstract of the final thesis
- ✓ (mandatory) list of passed examinations
- ✓ (mandatory) curriculum vitae et studiorum
- ✓ (mandatory) a proposed research project
- ✓ (mandatory) at least three reference letters provided and signed by relevant members of the international scientific community, relating to the candidate's choosen course;

- ✓ (if any) additional document and/or publication (including GRE - Graduate Record Examination - test) that the candidate deems worthy of consideration, including associations to research institutions (MAX 05 documents).

For each course, this selection will produce a pass-list, and suitable candidates for the different positions will be contacted with an official notification, that will be sent by e-mail before 30 September 2009.

To be admitted to the course the candidates shall deliver:

- formal documentation of qualifications as outlined in the application form;
- formal declaration of acceptance.

Only on receiving this documents they will be enrolled to the selected course (all starting 2010, January 01).

Article 5

Applications should be sent exclusively by WEB, filling the form (including the upload of the ".pdf" requested documents) available on-line at the address: http://www.uniroma3.it/ (DOCTORATE/DOCTORAL SCHOOLS - FOREIGN STUDENTS CALL FOR APPLICATIONS).

**The EXPIRATION DATE of the application is: 25 August 2009 (h. 24.00).**

The administration of Roma Tre takes no responsibility for loss of communication due to possible errors either postal, Internet or otherwise not ascribable to the University itself.

Roma Tre takes no responsibility for loss of communication due to inexact information regarding candidate's residence, postal or e-mail address, or to changes of address not communicated in good time.

Article 6

Doctorate Fellowships are incompatible with any other one granted by Italian or International subjects.

Doctorate Fellowships cannot be awarded to candidates who have already (either entirely or partially) benefited from a similar grant to attend a Ph.D. Course provided by an Italian University.

Article 7

Any other matters not included in the present call for application will be referred to the Italian legal regulations concerning doctorates ("corsi di dottorato di ricerca").

For any other information send an e-mail to dottorat@uniroma3.it

Rome, 25 GIU. 2009

Rep. Rep. N. 1131 Data 26.06.2009

Prot. Prot. N. 22529

The President
*Prof. Guido FABIANI*