



**DOCTORAL SCHOOL IN
NANOTECHNOLOGY**

GENERAL DESCRIPTION

SUBJECT AREAS COVERED BY THE SCHOOL:

- main area: FIS/03
- other areas: BIO/06, CHIM/03, CHIM/04, CHIM/08, FIS/01, ING-IND/22, ING-INF/01, MED/08, MED/18, MED/28, MED/30, ING-IND/24, FIS/07, CHIM/01, MED/35, BIO/10, BIO/11, BIO/14, FIS/03, AGR/12

RESEARCH FIELDS:

1. applications of nanotechniques to energy-focused research
2. nanotechnological applications to medical, pharmacological and biomedical areas
3. multiscale molecular modelling of materials and relevant phenomena through computational simulation techniques
4. human health with particular attention to the study and treatment of tumours and degenerative diseases
5. synthesis of nanostructures
6. study of the relations between microstructure and the properties of materials and engineering of nanostructured materials
7. development of new experimental techniques to investigate process, manipulate and visualize nanostructured materials on a nanometric scale
8. development of spectroscopic techniques to detect isolated molecules on nanostructured substrates

ORGANIZING DEPARTMENT: Dip. di Fisica

PARTICIPATING DEPARTMENTS (UNIVERSITY OF TRIESTE):

- Dipartimento di Ingegneria Meccanica e Navale
- Dipartimento di Scienze chimiche e farmaceutiche
- Dipartimento di Scienze mediche, chirurgiche e della salute
- Dipartimento di Scienze della vita
- Dipartimento di Ingegneria Industriale e dell'Informazione

OTHER PARTICIPATING INSTITUTIONS (Italian):

- Laboratorio Nazionale TASC-IOM CNR
- ICGEB – International Centre for Genetic Engineering and Biotechnology
- IRCCS Burlo Garofolo
- CRO Aviano
- Sincrotrone Trieste S.C.p.A.

DURATION: 3 years

MAXIMUM NUMBER OF MONTHS TO BE SPENT ABROAD: 12

OFFICIAL LANGUAGE OF THE SCHOOL: English

ADMISSION INFORMATION

NUMBER OF PLACES AVAILABLE:31

Please note that the number of seats available has increased from 20 to 30, the amendment added 25/10/2011

Please note that the number of seats available has increased from 30 to 31, the amendment added 16/11/2011

- SCHOLARSHIPS: 16

Please note that the number of scholarships available has increased from 15 to 16, the amendment added 16/11/2011

- FUNDING BODY/IES:

- [cod MD/1] Università degli Studi di Trieste + Dip. Scienze della Vita funded by IRCCS CRO - Aviano (Project title "*innovative tools for pharmacogenomics and pharmacokinetics*")..... 1
- [cod D/2] Dipartimento Universitario Clinico di Scienze mediche, chirurgiche e della salute funded by FIRB

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Sezione Ricerca e Dottorati

Ripartizione Dottorati

- (Project title “nanotechnology in adhesive dentistry”) 1
- [cod MD/3] Università degli Studi di Trieste + Dipartimento Universitario Clinico di Scienze mediche, chirurgiche e della salute funded by FIRB (Project title “nanofilled materials in adhesive dentistry”)..... 1
- [cod MD/4] Università degli Studi di Trieste + Dip. di Fisica funded by CNR Istituto Officina dei Materiali (Project title “Synthesis and characterization of DNA-based nanostructures”)..... 1
- [cod MD/5] Università degli Studi di Trieste + Dip. di Fisica funded by CNR Istituto Officina dei Materiali (Project title “Characterization of the mechanical properties of cancer cells”)..... 1
- [cod D/6] Dip. di Fisica funded by Dip. Scienze mediche e biologiche di Udine – funded by the European Union FP7/Programme IDEAS/ERC-2010-Adg Grant Agreement n. 269051-QUIDPROQUO (Project title “Micro mechanical oscillators for biochemical applications”) 1
- N.B: This scholarship does not provide extra funding for eventual periods of study abroad within the duration of the doctorate, unless the organizing Department decides to make these funds available.
- [cod MD/7] Università degli Studi di Trieste + Dip. di Fisica funded by CNR Istituto Officina dei Materiali (Project title “Growth and characterisation of semiconductor nanowires”) 1
- [cod MD/9] Università degli Studi di Trieste + Dip. di Scienze chimiche e farmaceutiche funded by CNR Istituto di chimica dei composti organometallici – ICCOM (Project title “Design, synthesis and characterization of nanostructured materials for electrocatalysis”) 1
- [cod D/10] Dip. di Scienze della Vita funded by BRACCO IMAGING S.p.a. (Project title “Nanostructured biomolecular glasses”) 1
- [cod MD/11] Università degli Studi di Trieste + Dip. di Scienze della Vita funded by AIRC (Project title “Use of chemotherapeutic-loaded nanoparticles in the treatment of cancer”) 1
- [cod MD/12] Università degli Studi di Trieste + Dip. di Fisica funded by CNR Istituto Officina dei Materiali (Project title “Development of quantum well structures for multi band photon detection”)..... 1
- [cod G/13] MIUR “Progetto Giovani Ricercatori” for the action on “Human health” (Project title “Computer-assisted design of nanovectors for gene therapy”) 1
- N.B: This scholarship does not provide extra funding for eventual periods of study abroad within the duration of the doctorate, unless the organizing Department decides to make these funds available.
- [cod G/14] MIUR “Progetto Giovani Ricercatori” on the action of “Energy savings” (Project title “Study of charge transfer processes at interfaces for photovoltaics applications”) 1
- N.B: This scholarship does not provide extra funding for eventual periods of study abroad within the duration of the doctorate, unless the organizing Department decides to make these funds available.
- [cod MD/15] Università degli Studi di Trieste + Dip. di Fisica funded by Dip. Scienze mediche e biologiche di Udine – funded by the European Union FP7/Programme IDEAS/ERC-2010-Adg Grant Agreement n. 269051-QUIDPROQUO (Project title “Application of AFM based immune assays to few cells proteomics”) 1
- N.B: This scholarship does not provide extra funding for eventual periods of study abroad within the duration of the doctorate, unless the organizing Department decides to make these funds available.
- [cod MD/16] Università degli Studi di Trieste + Dip. di Fisica funded by Dip. Scienze mediche e biologiche di Udine – funded by the European Union FP7/Programme IDEAS/ERC-2010-Adg Grant Agreement n. 269051-QUIDPROQUO (Project title “Application of Micro mechanical oscillators to miRNA detection for heart diseases”)..... 1
- N.B: This scholarship does not provide extra funding for eventual periods of study abroad within the duration of the doctorate, unless the organizing Department decides to make these funds available.
- [cod D/17] Dip. di Scienze della Vita (Project title “Preparation and Study of Novel Highly Compatible Dental Adhesives”) 1

Please note that there is an extra scholarship available as from 16 November 2011

Candidates who accept an earmarked scholarship are committed to the pre-assigned topic

Candidates have to list (in order of preference) which scholarships they apply for in the comments box at the bottom of the “[QUALIFICATION EVALUATION FORM](#)”. If extra earmarked scholarships become available after candidates have completed their application, they can modify their preference list within

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the deadline for receiving certificates.

NON-FUNDED PLACES

- holders of a research grant (see Art. 1.1 - Requirements).....1
- grant-holders funded by the Italian Ministry of Foreign Affairs sitting the entrance examination in the country of origin.....1
- non-EU citizens residing abroad2

ACADEMIC QUALIFICATION REQUIRED: see Announcement (art. 1.1 - Requirements)

DEADLINE FOR COMPLETION OF DEGREE: **22.11.2011**

ASSESSMENT CRITERIA: Qualifications

- FINAL SCORE: 100
- MINIMUM FINAL SCORE REQUIRED: 70/100

- a. a detailed curriculum vitae et studiorum (including qualifications, degree transcript, certificate of English).
The Board will also evaluate the attachment to the cv, eg publications, abstracts, school attendance: 10/100
- b. a copy of the Master's degree thesis and a summary of the results obtained during the Master's course (or equivalent). The Board will especially take into consideration the degree score: 50/100
For students with a degree awarded by a non-Italian university, an abstract of the thesis in English or Italian is sufficient.

as well as

1. Two letters of presentation from scholars/researchers acquainted with the candidate. Original signatures and institutional letterheads are required: 20/100
 2. A concise research programme in one of the research fields listed in the general description of the School: 20/100
- Qualifications Evaluation Form (unless this form is presented, qualifications and publications CANNOT be assessed by the Examining Board)

MINIMUM SCORE REQUIRED FOR QUALIFICATIONS/PUBLICATIONS:..... 70/100

ABSOLUTE DEADLINE FOR RECEIVING CERTIFICATES: **22.11.2011**

All documents must be:

- either submitted from 11:00 am to 1:00 pm to: Dipartimento di Fisica - Scuola Dottorato in Nanotecnologie - via A. Valerio, 2 - 34127 TRIESTE – room 108 – first floor – “Servizio Ricerca e Formazione”
- or sent by mail with acknowledgement of receipt to the address above. They have to be received **before** the deadline.
- or else emailed to: segrfisica@ts.infn.it by **22.11.2011 midnight CET** – they have to be duly scanned in pdf and attached to the email with the subject: "Name, Surname, qualifications and publications, Doctorate in Nanotechnology".

Receipt will be acknowledged by email. If not please request confirmation of receipt.

N.B.: The qualifications and publications submitted may be requested by the candidates or by proxies carrying a photocopy of the candidate's id 60 days after the merit lists have been published. All the remaining documents will be destroyed 120 days after the merit lists have been published.

CEFR LEVEL: C1

CONTACT INFORMATION

DIRECTOR OF THE SCHOOL: Prof. Maurizio FERMEGLIA - Dipartimento di Ingegneria industriale e dell'informazione - Università degli Studi di Trieste - tel. 040/558.3438 fax 040/558.3438 e-mail mauf@dicamp.units.it

VICE-DIRECTOR: Prof. Alberto MORGANTE – Dipartimento di Fisica - Università degli Studi di Trieste - tel. 040/558.3373 fax 040/558.3350 e-mail morgante@tasc.infm.it

WEB SITE: <http://www.nanotech.units.it>

SCIENTIFIC PROJECT: The approach is inter-disciplinary: physicists, chemists, biologists, engineers, physicians, pharmacologists, odontologists, biotechnologists and agronomists combine and reinforce their specific competences and skills while

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developing the ability to carry out their research in synergy and in a wider perspective.

PhD graduates will be professional researchers and technological developers. They will apply their knowledge and their critical evaluation skills to the development of methods to design, produce and evaluate new materials and to improve the existing ones. The target is to make industrial production more efficient, economical and sustainable both in terms of consumption of resources and environmental impact.

EDUCATIONAL AIMS AND RESEARCH TOPICS: The main objective is to teach researchers to plan, build, use and test nanotechnological tools and devices that meet the growing needs of the society in diverse fields of application:

- 1) the development of new experimental techniques to investigate, process, manipulate and visualize nanostructured materials on a nanometric scale,
- 2) the development of spectroscopic techniques to detect isolated molecules on nanostructured substrates,
- 3) the study of the relations between microstructure and the properties of materials and the engineering of nanostructured materials,
- 4) the synthesis of nanostructures,
- 5) the applications of nanotechniques to energy-focused research,
- 6) the multiscale molecular modelling of materials and relevant phenomena through computational simulation techniques,
- 7) human health with particular attention to the study and treatment of tumours and degenerative diseases,
- 8) nanotechnological applications to medical, pharmacological and biomedical areas.

This is made possible by the availability of top rate facilities and equipments in the University laboratories and in the public and private research bodies partnering with the University, i.e. the International Centre for Genetic Engineering and Biotechnologies (ICGEB), Elettra Sincrotrone Trieste, the Oncological Referral Center in Aviano (CRO), and the Advanced Technology and Nanoscience National Laboratory TASC- INFN- CNR just to cite a few.

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