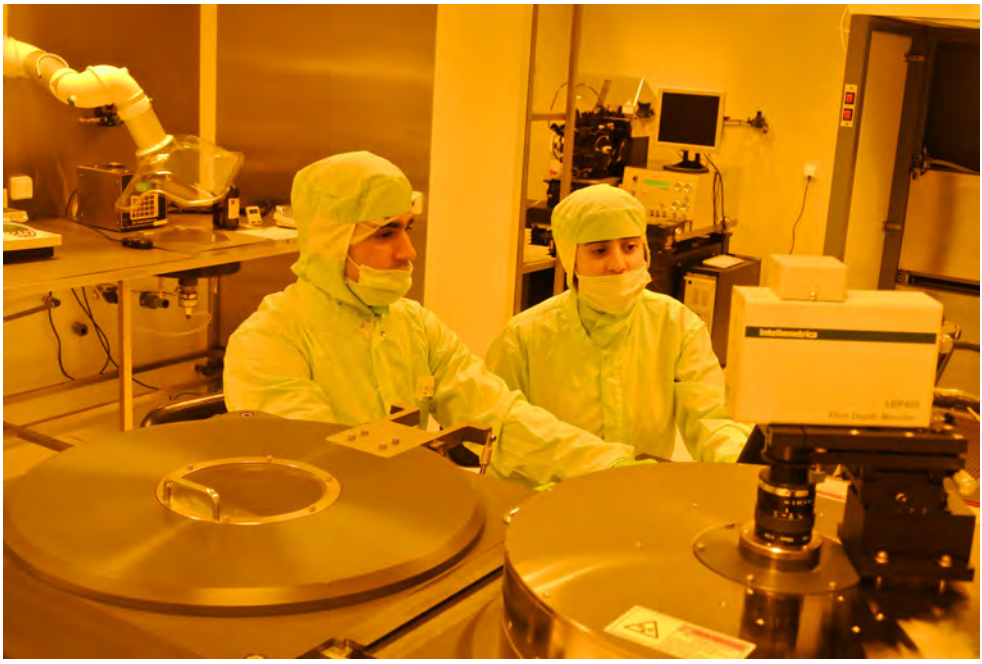
PDNN

Programa Doutoral em
Nanotecnologias e Nanociências



Nanotechnologies and Nanosciences Doctoral Program

Coordinated by the Department of Materials Science of
FCT-UNL in conjunction with
the Materials Research Centre from i3N

Departamento de Ciência dos Materiais
Faculdade de Ciências e Tecnologia
Universidade Nova de Lisboa

Contents

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Welcome Message from the President of the Department of Materials Science

As the head of the Department of Materials Science I am proud to welcome you to the wonderful world of research and innovation that we cultivate in our department and research units connected to it, as are the cases of CENIMAT|i3N and CEMOP/Uninova, going from Advanced Materials to Nanosciences and Nanotechnologies, where excellence is our target! I am pretty sure that your adrenaline will be always in the frontiers of your motivation, as our researchers are fully open to exploit your knowledge and imagination, to push creativity and innovation to the limit. Those are the challenges that you have to overcome by joining such a motivated and enthusiastic team of researchers, always focused to be in the forefront of R&D in the fields in which they work!

Welcome to our family!

Rodrigo Martins

Full Professor at the Department of Materials Science of FCT-UNL

Director of the Department of Materials Science

Short Bio of the Program Coordinator

Elvira Fortunato, the Program Director, received her PhD degree in Physics and Materials Science in 1995 at UNL with specialization in Microelectronics. She is Full Professor in the Department of Materials Science of FCT-UNL and has been director of the Materials Research Centre (CENIMAT) since 1998. Presently she is Director of the Institute of Nanostructures, Nanomodeling and Nanofabrication (i3N), the Representative of the Research Centers from FCT-UNL as well as Deputy Sub-Diretor for the area of the new reorganization project of FCT-UNL.

Fortunato pioneered European research on transparent electronics, namely thin-film transistors based on oxide semiconductors, demonstrating that oxide materials may be used as true semiconductors. She is co-inventor of the paper electronics concept worldwide: Paper-e®. In 2008 she wins an Advanced Grant from the European Research Council for the project "Invisible", grant n. 228144, with an amount of 2.25 M€. This project was selected as a Success Story (http://erc.europa.eu/succes-stories/see-through-electronics) from all the projects financed by ERC in all scientific areas. She has extremely relevant national positions, such as curator of Luso-American Foundation (FLAD)an member of the National Council of Science and Technology. Internationally, she is member of the ERC committee in the area of Materials, Nanotechnologies and Engineering and belongs to the Horizon 2020 advisory committee of Future Emerging Technologies (CONNECT DG of the EC). She has experience in conducting well succeeded research teams, nationally and internationally recognized (she got more than 11 international and national scientific awards in the last 5 years, such as the IdTEx R&D USA award), as well as in supervising well succeeded PhD students (13 in total), coordinating and being responsible for EU projects in cross cutting fields of advanced materials and nanotechnologies (30 up to now). She holds 68 international patents, published more than 460 ISI papers, with more than 10000 citations and several books and book chapters in the field. She is Associate Editor of Rapid Research Letters Physica Status Solidi (Wiley), Associate Editor of Applied Surface Science and Co-Editor of Europhysics Letters.

Contact information

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Google Scholar: http://scholar.google.com/citations?user=R_5IwQoAAAAJ&hl=en

Welcome Message from the Doctoral Program Coordinator

Dear Potential Candidate to the Doctoral Program,

First of all, thank you for your interest in pursuing a PhD in Nanotechnologies and Nanosciences at FCT-UNL. Studying for a doctorate with us is an unique and stimulating educational experience.

As a PhD student at FCT-UNL in close collaboration with the Department of Materials Science and CENIMAT|i3N, you will have the opportunity to realize and make your dreams a reality.

After completing the first year with some specific classes and seminars, you will pursue your own intellectual interests, on a truly rich interdisciplinary environment university campus.

Since the first day, the faculty will work with you to ensure your success, since the success of the faculty depends also on you. At FCT-UNL the doctoral students are like colleagues, and because of the nature of our program, you will be enrolled in our research teams, working closely in running research projects and by co-authoring scientific papers for publication. For some specific cases we can provide you some financial assistance as well as a reduced PhD tuition fee. Besides that, we have a supportive learning environment that includes office space, computer support, and access to an outstanding research library. As a result, almost all of those admitted to our program graduate with their PhD, usually within four years.

If you have any question or would like to arrange a visit to our faculty, please feel free to contact us.

See you soon in Caparica!

Elvira Fortunato

Full Professor at the Department of Materials Science of FCT-UNL

FACULDADE DE
CIÊNCIAS E TECNOLOGIA
UNIVERSIDADE NOVA DE LISBOA

FCT-UNL, the Coordinating Institution

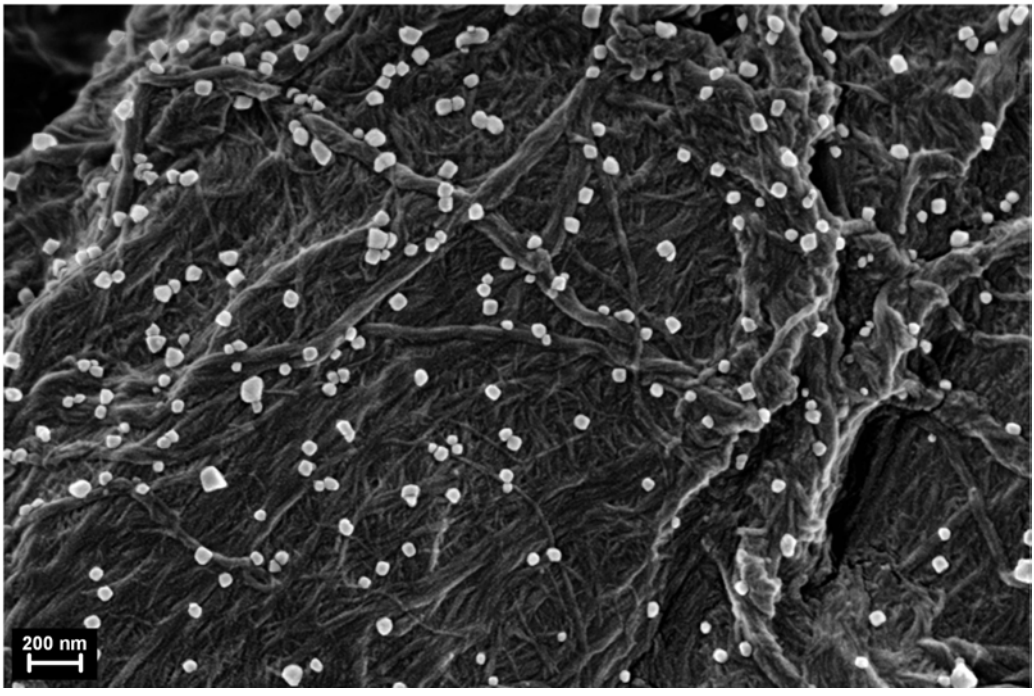
The Faculty of Sciences and Technology from New University of Lisbon (FCT-UNL) was founded in 1977 and is located in a university campus located at Monte de Caparica, south of Lisbon.

FCT-UNL is one of the most prestigious public Portuguese engineering and science schools, engaged in extensive research activity developed in 18 research centres recognized by Fundação para a Ciência e a Tecnologia and involving 1 600 PhD and Masters' students of the total enrolment close to 8 800.

Its solid scientific production results in the publication of a large number of papers in leading academic journals, giving FCT-UNL a broad recognition at national and international university level.

FCT-UNL is also widely involved with the general community providing its expertise and skills to help Governmental and Local Institutions as well as businesses in studying and solving many different questions and problems related to in-house areas of knowledge.

FCT-UNL partners with foreign universities such as the MIT, CMU and UTA to offer some of its advanced international study programs.



Cellulose fibers with silver nanoparticles.

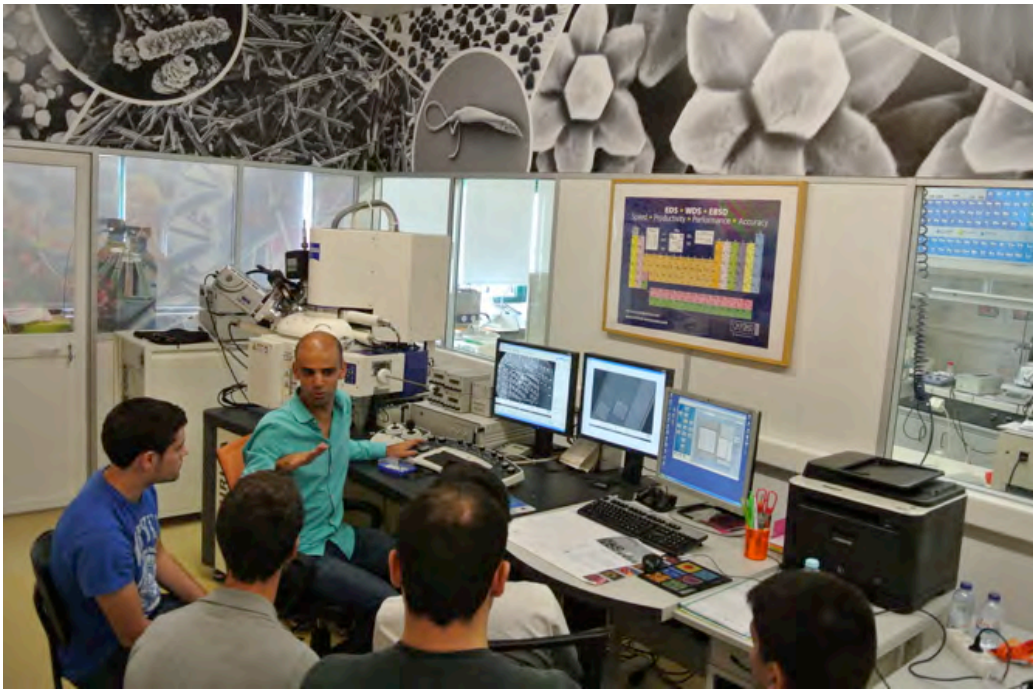
CENIMAT|i3N the Research Centre Supporting the Doctoral Program

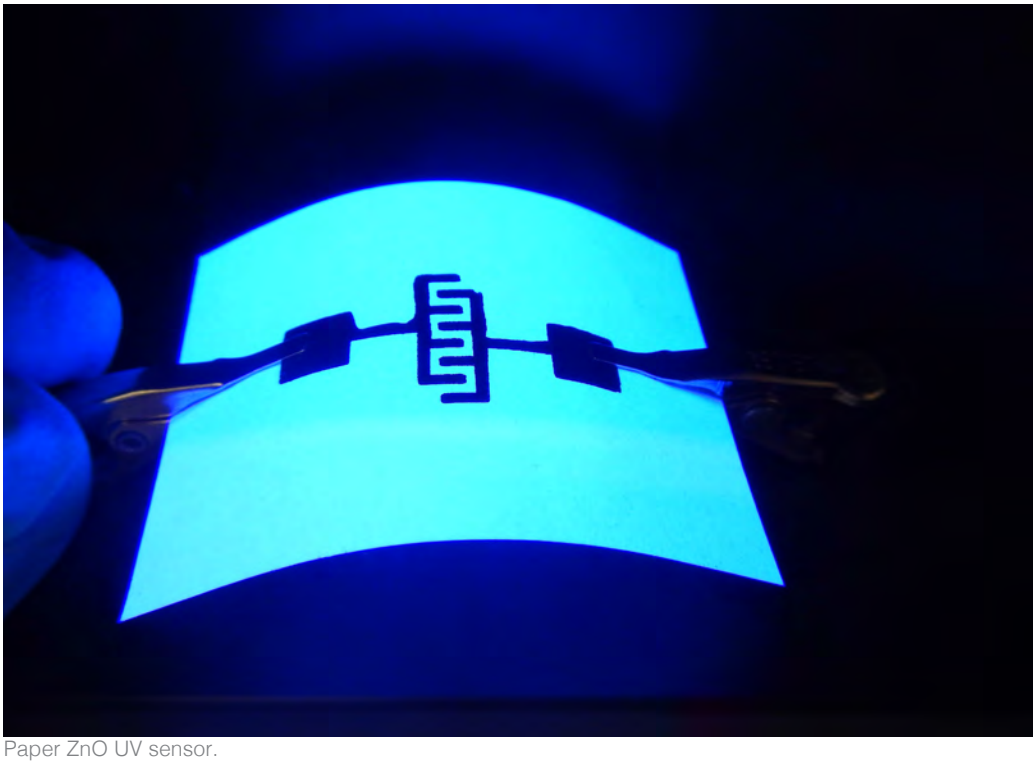
CENIMAT is a centre of excellence devoted to R&D activities within the field of materials science & engineering, which includes semiconductors, polymers, liquid crystals, thin film coatings, dielectrics, metals, ceramics and composite materials, covering all the scientific & technological aspects of processing and characterization related to nanotechnologies and microsystems. Since 2006 it integrates the National Associate Laboratory, the Institute for Nanotechnologies, Nanomaterials and Nanosciences, i3N.

CENIMAT has a strong experience in the development of novel multifunctional materials with emphasis in transparent electronics and paper electronics. For more than 20 years CENIMAT|i3N participates in several National, European and International projects in the field of optoelectronic sensors, biosensors, microfluidics, solar cells, thin film transistors among others.

CENIMAT hosts two clean rooms fully equipped with all the facilities for microelectronic processing and thin film technologies as well as the new Nanofabrication Laboratory, the first one installed in a Portuguese University.

CENIMAT supports service to industry by providing the facilities and the necessary expertise to carry out research, training and development programs in the above mentioned fields.



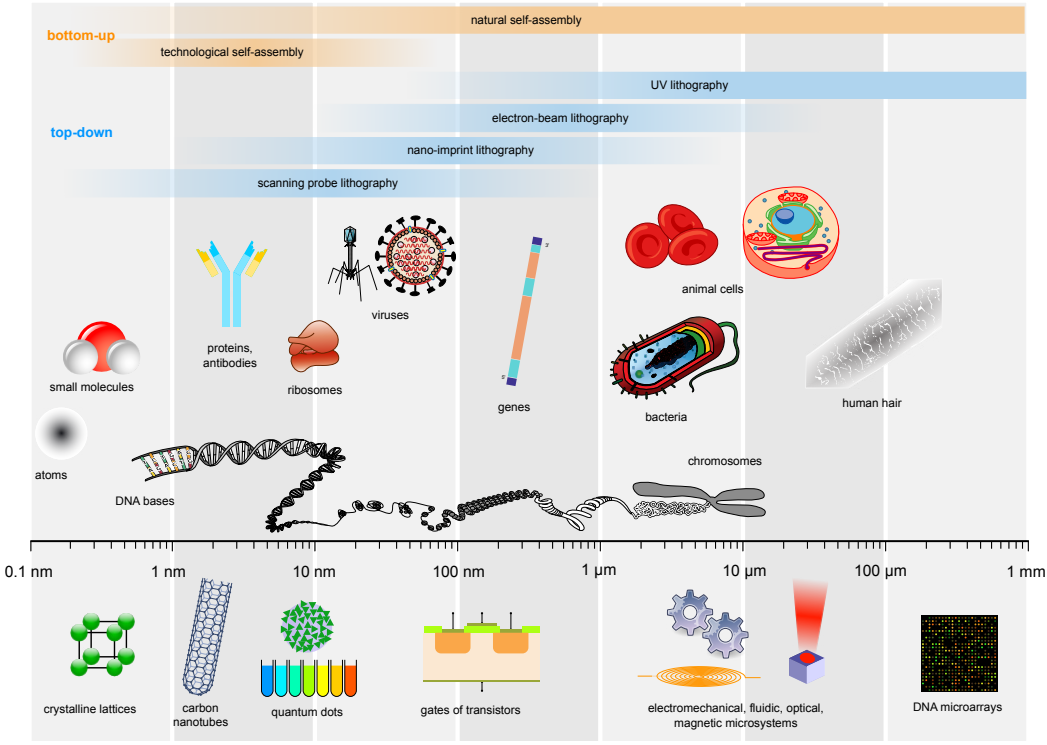


Paper ZnO UV sensor.

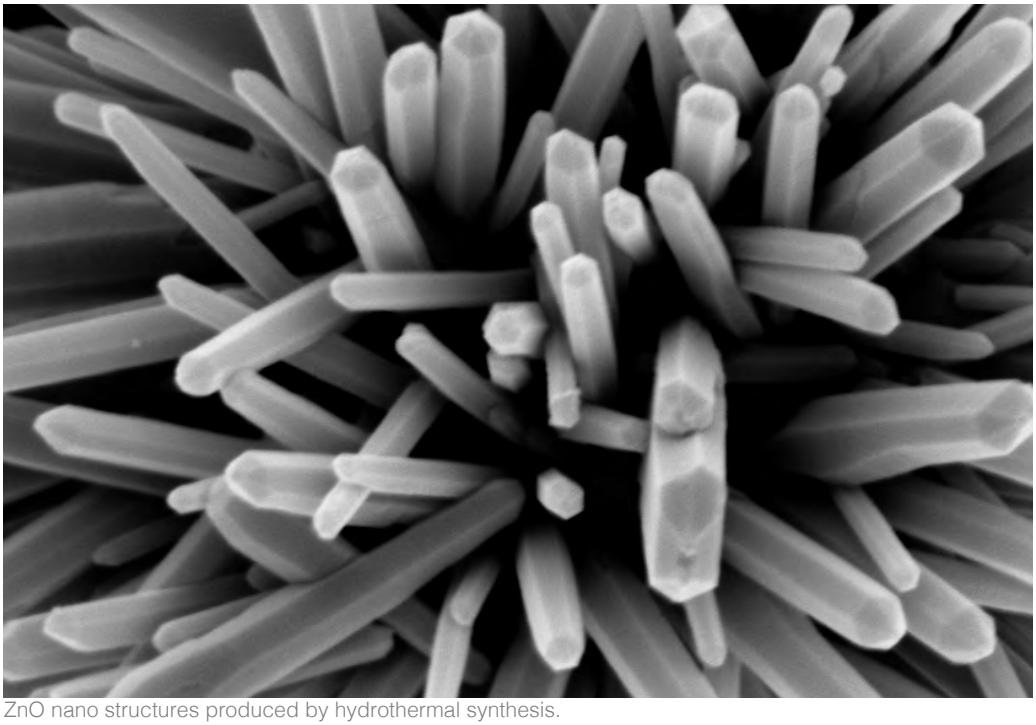
What is Nanotechnology and Nanoscience?

Nanotechnology and nanoscience are recent scientific areas, which have as their main objective the ability to control and manipulate matter at the nanoscale, usually between 1 and 100 nm. This new "dimension" matter has completely different properties, which enables the understanding of new phenomena, as well as creates new features for use in applications completely disruptive and innovative in a broad range of applications, going from information and communication technologies (ICT) to health technologies. In summary we can say that nanotechnologies and nanosciences act essentially in the areas of nanoelectronics, nanobiotechnology and nanomaterials. In this context, these intend to make an approximation of areas of knowledge of extreme relevance to the industry based on creativity and innovation. It is a multidisciplinary area, highly appealing to the development and training of entrepreneurs, with strong connections to Research and Innovation, for the so called "Research University", central goal of the New University of Lisbon, as set out in its statutes.

In the case of a recent and comprehensive emerging area, students are scarce for the multitude of topics that can be selected. So, in order to consolidate the scientific knowledge in main and complementary areas of doctoral thesis, part of the subjects are given in "as tutorial".



http://en.wikipedia.org/wiki/File:Biological_and_technological_scales_compared-en.svg



ZnO nano structures produced by hydrothermal synthesis.

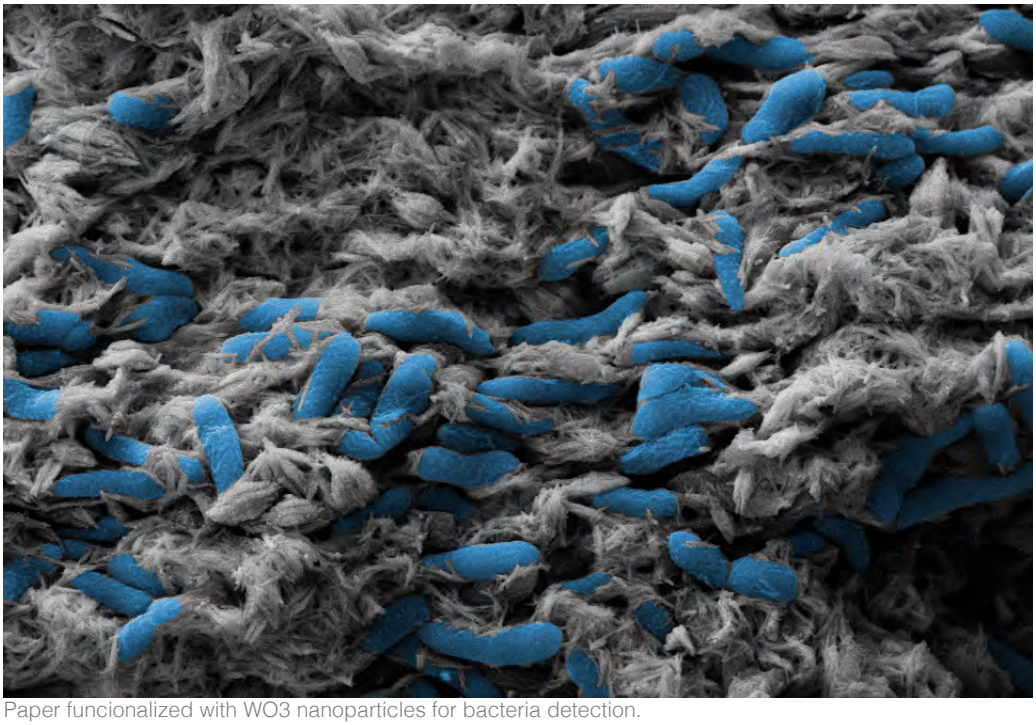
Why Study Nanotechnologies and Nanosciences?

Portugal needs urgently to be an export-oriented country, since its very poor in natural resources and its competitiveness will be definitely closely linked to future and innovative products/markets. In order to achieve this objective, coordinated efforts among several levels will be necessary and in particular in the field of highly qualified human resources.

Nanotechnology and Nanoscience are at the vanguard of modern research. The fast growing economy in this area requires experts who have an outstanding knowledge in the field, together with the skills to apply it in new products and systems, exploiting to the extreme their electronic, physical and chemical behaviours in the commodities in which they are integrated. A multidisciplinary scientific education is fundamental to provide industry and research institutes with top quality experts, who have a generic background in different subdisciplines such as electronics, physics, chemistry, materials science, biotechnology, and at the same time are experts in one particular field.

Moreover, in the program the students will also be able to specialize in a certain area. The combination of a solid multidisciplinary scientific basis and an individual high level specialisation in a certain area of nanoscience is the philosophy of this doctoral program offered by the first time in Portugal.

This doctoral program provides a strong foundation in the emerging areas of nano-engineering in preparation for the workforce or



Paper funcionalized with WO3 nanoparticles for bacteria detection.

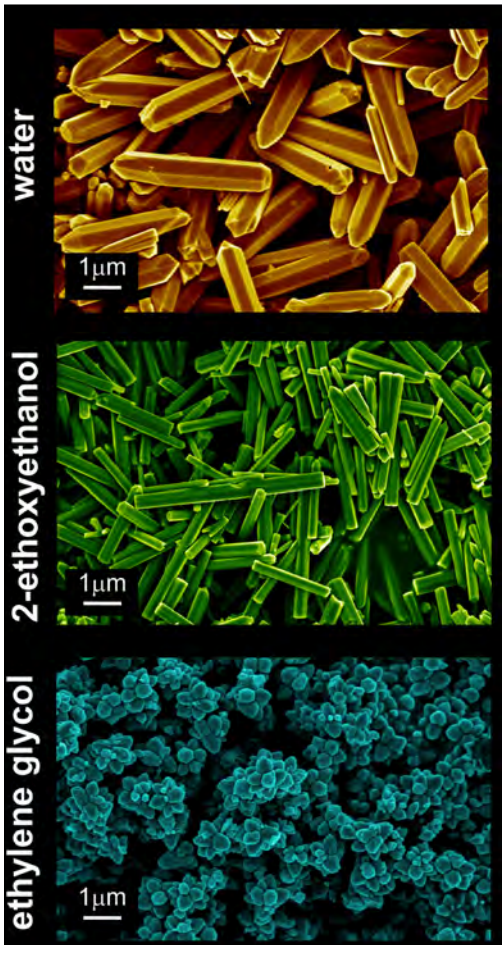
for further study and research leading to a doctoral degree. Three key areas of research have been identified: nano-materials, micro/nano-electronics and micro/nano-biosystems.

The program is tuned with high ranking European Universities, Institutes and running European PhD network programs, turning so the graduates more competitive worldwide and in particular in Europe, besides opening routes of R&D collaboration of the personnel involved, strengthen so Portuguese competitiveness towards European R&D projects and networking. Its implementation is consistent with the strategic goals of the institutions involved, whose objectives are:

1. Contribute to the development of a qualified, globally engaged, and diverse professional work force, tuned with European expectations that will benefit government agencies, industries, and academia;

2. Expand and enhance educational and research services through mutual collaboration and access to each other's existing education programs, research activities and student resources of the institutions involved;

3. Provide industry and multisectorial exposures and experiences to students via the envisaged collaborations.



Metal oxide nanostructures

Doctoral Program in Nanotechnologies and Nanosciences

New University of Lisbon, UNL, was the first (since 2008) Portuguese University offering a PhD program of its kind in Nanotechnologies and Nanosciences involving the areas of Nanofabrication, Nanobiotechnology and Multifunctional Nanomaterial's.

This doctoral program provides a strong foundation in the emerging areas of Nano-Engineering and Nanoscience in preparation for the workforce or for further graduate study and research leading to a doctoral degree being this particular area a central objective of Europe as can be seen in the framework of the new Horizon 2020, the largest Research and Innovation Programme ever with nearly 80 billion of funding available over 7 years (2014-2020).

This program was established due to an identified real need, where several PhD students from different scientific fields like Materials Science, Electronics, Micro and Nanotechnologies, Biotechnology, Physics, Biomedicine, Biology, Biochemistry and Chemistry, felt the necessity in attending courses able to complement their background knowledge or to be outside their main field, once more and more a multidisciplinary and interdisciplinary approach is needed to achieve the proposed creative or innovation objectives of a PhD student.

Indeed, an important cornerstone of nanoscience and nanotechnology is its interdisciplinary nature, and so, a strong consortium with all the expertise is needed to achieve the ambitious and multidisplinary objectives above defined.

Convocatória N.º 465/P/08

Convoca-se V. Exa., Senhores Professores, para uma reunião do Plenário do Conselho Científico, no dia 16 de Abril, às 14 horas, no Grande Auditório.

Ordem de trabalhos

0. Aprovação da Acta da reunião anterior

1. Informações

2. Aprovação de Programas de Doutoramento

    Doutoramento em Informática

    Doutoramento em Matemática

    Doutoramento em Estatística e Gestão do Risco

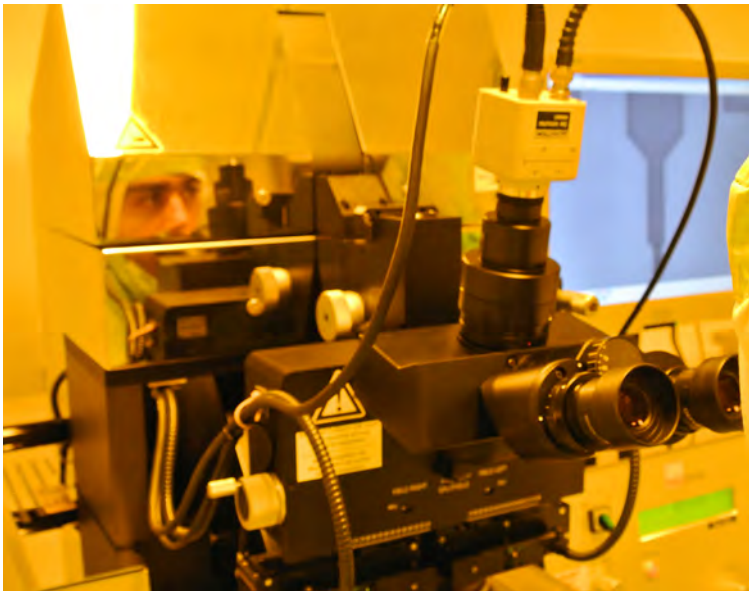
    Doutoramento em Nanotecnologias e Nanociências

    Doutoramento em Ciência e Engenharia dos Materiais

Besides that and broadly speaking the way in which science is today organized is completely different form that of the last 50 years, and in cutting-edge fields like nanotechnologies and nanosciences, growth within the topic is not favourable. In fact we are facing a revolution among the way that research is looked, specially the applied one. Today, at European level, it is felt the need in starting thinking about the future education of our PhD to turn them the grounds to boost Europe for the industry of future.

So, the objective of this PhD program is to prepare students for careers in academia, industrial and government research laboratories, besides allowing then to be involved in the upstream of new generation of enterprises with a multidisciplinary vision of the commodities required to be developed, which includes promoting also start-up out of their projects/ideas.

In order to achieve this high quality, the PhD program involves world-renowned researchers, with whom the candidates will collaborate in them state-of-the-art facilities and interdisciplinary laboratories.



Curricular Structure*

This 4 year PhD program requires a total of 240 ECTS along 8 semesters. The study plan has required curricular units and elective ones taking into account the previous background of the students.

An important note and that is very positive for the doctoral plans, is the recent (2012) established Doctoral School of UNL (New Doctoral School-http://www.unl.ptenescola-doutora-laescoladoutoralpid266). The new Doctoral School aims to promote the quality, interdisciplinary and the internationalisation of doctoral programs throughout the University.

Without wanting to interfere in doctoral programs already in place in various organic units, the new Doctoral School intends to promote the development of good Academic Practices and offer additional training. The aim is thus to strengthen the personal and professional training of doctoral students and tutors, through training programmes of **transversal skills**.

Scientific Area	Required ECTS	Elective ECTS
Communication Sciences	3	0
Social Sciences	6	0
Nanotechnologies and Nanosciences	219	0
Materials Science and Engineering	0	12

Required curricular units:

Semester 1

- Media, Science and Technology
- Nanostructured Materials
- Nanoelectronics
- Nanofabrication and Characterization Techniques
- Seminar in Nanotechnologies and Nanoscience I

Semester 2

- Innovation and Entrepreneurship in Nanotechnologies and Nanosciences
- Project in Nanoscience and Nanotechnology
- Seminar on Nanotechnologies and Nanosciences II

*The curricular structure is under reformulation in order to guarantee more flexibility to foreign students, especially in terms of the required ECTS, which will be less.

Admission Requirements

The target population will be graduates preferentially in micro and nanotechnology (first "integrated masters of science in engineering" in Portugal offered by FCT-UNL since 2008), materials science, chemistry, physics, electrical/electronics engineering, biology or related areas.

Prospective PhD students should hold a MSc (2nd Bologna cycle) or equivalent in natural or exact sciences from a recognized university.

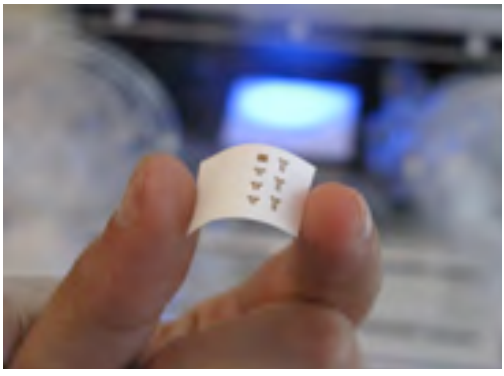
Besides that, the candidates must satisfy the admission conditions laid down by national legislation, regulations of the FCT-UNL and UNL, and should meet at least one of the conditions expressed in the following points:

a) Possess a masters' degree, or legal equivalent, or degree corresponding to a bachelor's degree with a number of ECTS equal or above 240, obtained in a national or foreign institution recognized as appropriate by the Scientific Program Committee. The candidate must have a final mark of fourteen out of twenty in these study cycles (or C in the ECTS scale);

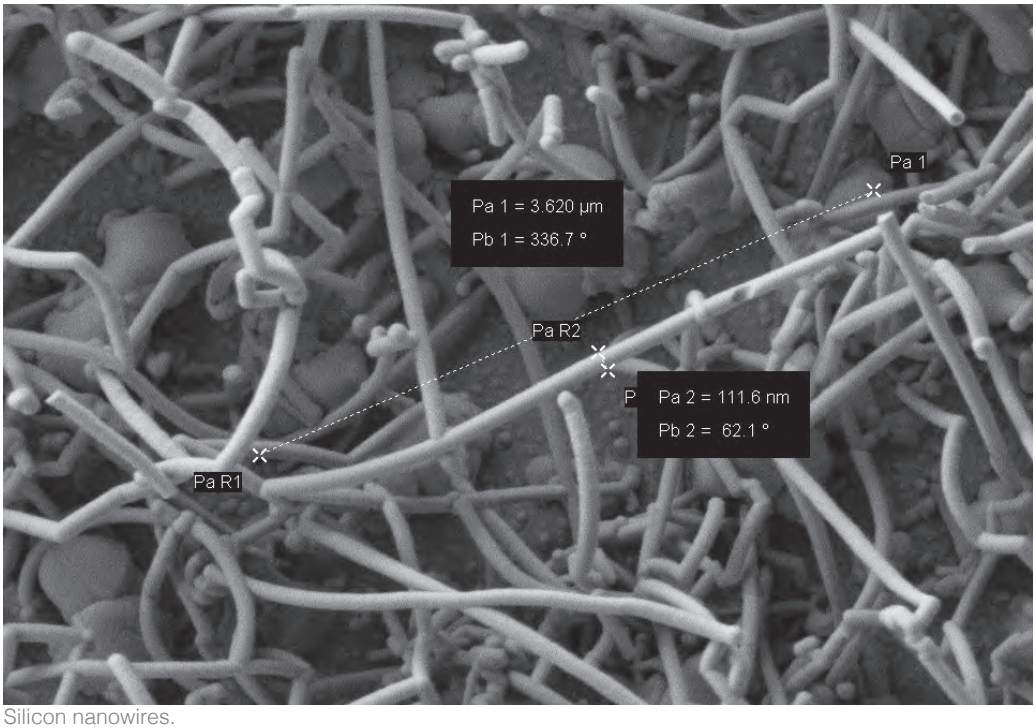
b) Possess a graduate degree and be an holder of an academic or scientific curriculum especially relevant that is recognized by the FCT-UNL Scientific Council as attesting the capacity to carry out this cycle of studies;

c) Be the holder of an academic, scientific or professional curriculum recognized by the FCT-UNL Scientific Council as attesting the capacity to carry out this cycle of studies.

The recognition referred in b) and c) takes into account the opinions issued by two professors or postdoctoral researchers, considered experts in the scientific field of application and appointed by the corresponding doctoral program Scientific Committee.



Paper transistor and conducting paper.



Silicon nanowires.

Application Procedure

Applications should contain:

a) Degree certificate listing the grades obtained;

b) Curriculum vitae and professional;

c) Declaration of Intent in which the candidate explains the reasons why he/she is interested in doing the PhD program;

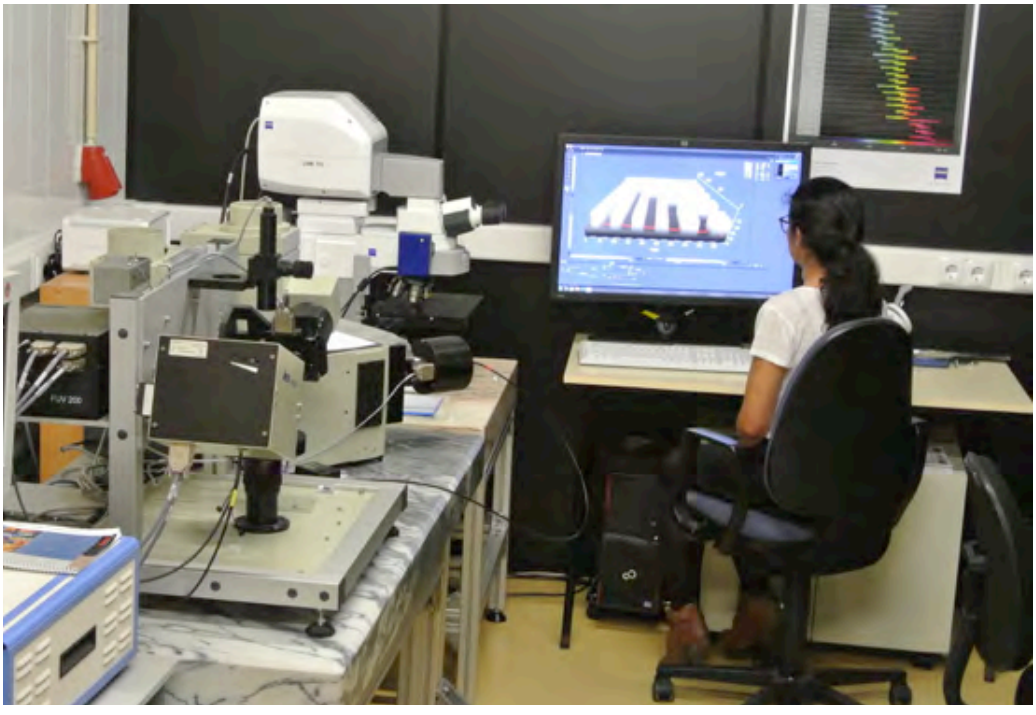
The candidates will be selected and ranked taking into account the following criteria:

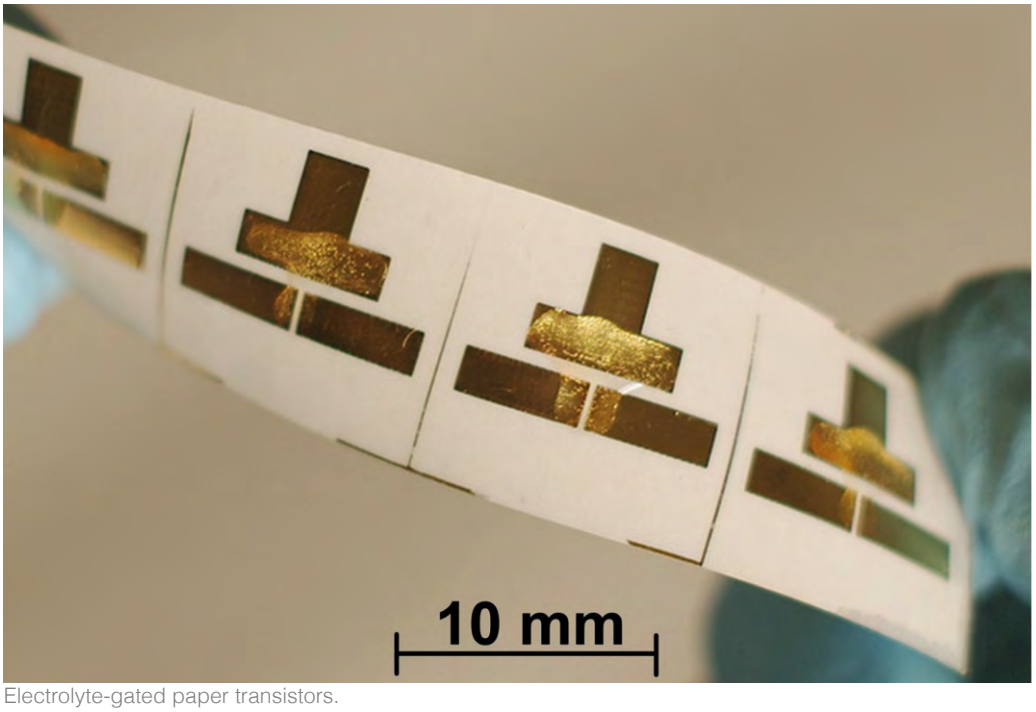
a) Academic and scientific curriculum;

b) Professional resume;

c) A text with a maximum of 5 pages showing the research subject they are interested in deepening.

The application process may include an individual interview to clarify the intentions, motivations and interests of the candidate.





Electrolyte-gated paper transistors.

Career Prospects

In the next decades, nanotechnologies and nanosciences will become undoubtedly the driving force for a new set of products, systems and equipments. It is also claimed that this new scientific area will be the basis for the **new industrial revolution.**

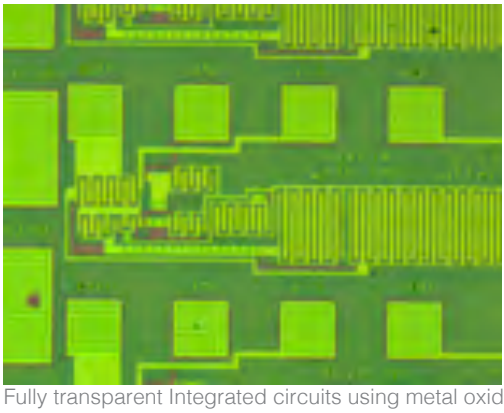
The impact of nanotechnology is already in our life and extends from medical, ethical, mental, legal and environmental applications, to fields such as engineering, biology, chemistry, computing, materials science, and communications.

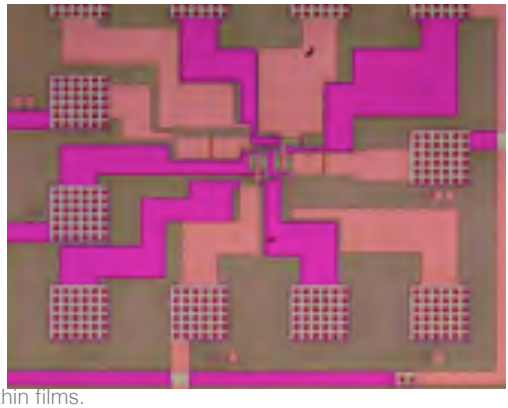
The major benefits of nanotechnology include enhanced manufacturing processes, water purification systems, energy systems, physical enhancement, nanomedicine, better food production methods, nutrition and large-scale infrastructure auto-fabrication.

The PhD students who graduate in Nanotechnologies and Nanosciences will be able to join industries developing these new technologies as well as into R&D institutions.

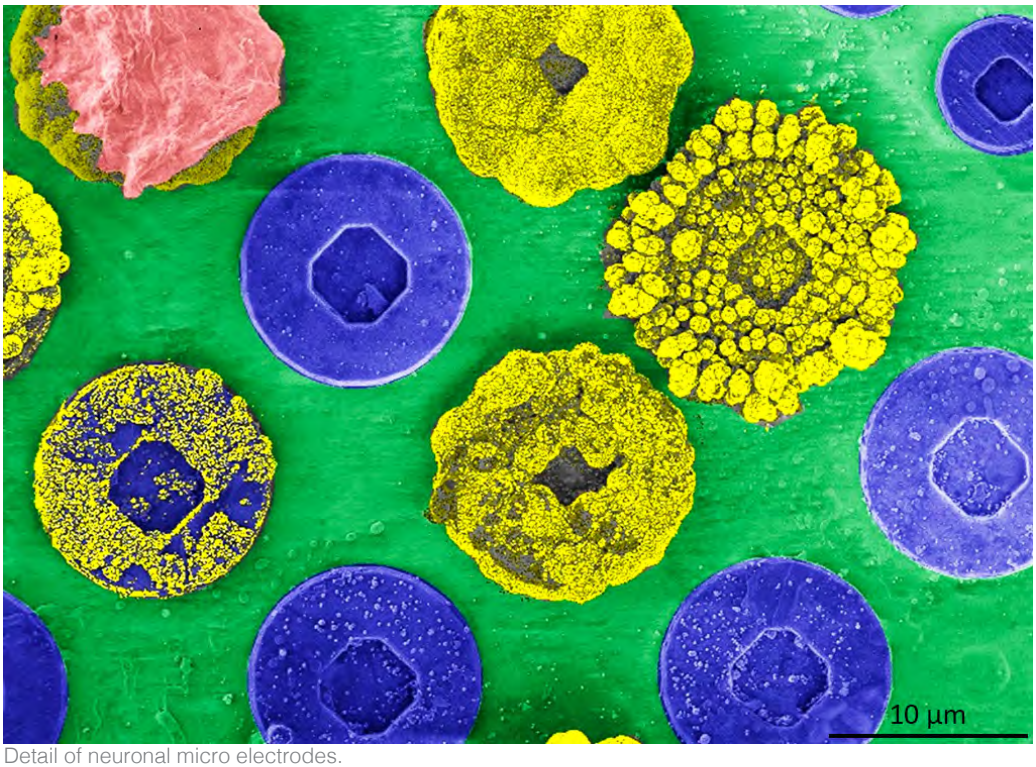
We believe that in the coming years a strong need for scientists and engineers having this expertise at the interface of these different disciplines will have opportunities at the education/research sectors and new and conventional industries in the areas of: chemistry; biotechnology; materials science; microelectronics among others.

Besides that and with such background you will be able to use your broad perspective of nanotechnology not only to be the interface between experts in different disciplines as well as to use your knowledge to develop and create new products or even to start up your own company.





Fully transparent Integrated circuits using metal oxide thin films.



Detail of neuronal micro electrodes.

Testimonials of Former Students

Pedro Barquinha, Assistant Professor at FCT-UNL, Portugal

I obtained my PhD degree in Nanotechnologies and Nanosciences in May 2010, being one of the first students to conclude this doctoral program. My dissertation was on Transparent Oxide Thin-Film Transistors, a topic that is still of high scientific and industrial relevance these days. Despite the high risk of embracing such an innovative research field I found some crucial aspects in this doctoral program that enabled the great success and international recognition of this ambitious work: the integration in a research group full of new ideas and with a broad range of expertise areas; making part of a team participating in international research projects, allowing me to gain a multidisciplinary knowledge that would be impossible to achieve by any other means; the impressive infrastructures available for research, which today continue to grow in quality and quantity, being definitely on pair with world-leading laboratories that I had the opportunity to visit during the last years.

I am currently an assistant professor lecturing on materials characterization techniques, nanofabrication, microelectronics and flat panel displays. The doctoral program was definitely crucial establishing the roots for my expertise on these topics and to enable the expansion of my research towards nanoelectronics using oxide nanostructures.

Gonçalo Gonçalves, Application Engineer, AIXTRON Ltd., England

I was one of the first PhD students to join the doctoral program on Nanotechnologies and Nanosciences at the Department of Materials Science from New University of Lisbon. At that time, the scientific content was already on the leading edge of nanotechnology. Internationally recognized professors run the program and scientists that are always one step ahead and at the same time available to exchange ideas with students.

The diversity of nanotechnology itself is also present at many levels. For example, your colleagues often have different backgrounds, which add valuable perspectives to the challenges that you will be facing in the future. Access to world-class facilities in a perfect location near the beach makes your PhD not only a degree but a remarkable and internationally recognized experience.

Rita Branquinho, Invited Assistant Professor at FCT-UNL, Portugal

I've been a PhD in Nanotechnologies and Nanoscience since December 2012.

When considering a PhD program I aimed to complement my knowledge in Chemistry and had the goal to be a part of the edge of technology. Nanotechnology was then, and still is today, one of the most promising areas of development and that was why I chose the Nanotechnologies and Nanosciences PhD program; and it turned out to be a great choice!

The Nanotechnologies and Nanosciences PhD program was a major step in the development of my career in scientific research and allowed me to attain a teaching position at FCT-UNL. I'm currently involved in the Integrated Masters in Micro and Nanotechnologies Engineering, supervising students and lecturing subjects that are closely related to nanomaterials technologies for synthesis and characterization of nanoparticles and thin films for microelectronic and biosensing applications.

Raquel Barros, Post-Doc CENIMAT|i3N, Portugal

The doctoral program in Nanotechnologies and Nanosciences is the more suitable choice for a scientific study of different types of materials, allowing working with expert leaders in the Nanotechnology and Nanoscience fields.

Within the doctoral program in Nanotechnologies and Nanosciences it was possible to develop my PhD work, focused on the development of p-type materials for application on transparent and flexible Thin Films Transistors (TFTs) due to the facilities for nanofabrication and characterization techniques existing at CENIMAT and CEMOP laboratories.

Also the group is leader in the fabrication of oxide materials and its application in thin film transistors and solar cells.

Ana Pimentel, Post-Doc FCT/UNL

After I finished my degree in Physics Engineering, I had the opportunity to start working in the development of materials to be used in micro and optoelectronic applications. So the PhD in Nanotechnologies and Nanosciences would be the best way to acquire some more knowledge that would help me with my work.

I had the chance to do the PhD in Nanotechnologies and Nanosciences in an industrial environment (KEMET), were I develop new materials and processes for the tantalum capacitors industry. This PhD gave me more knowledge in nanomaterials processing and nano characterization and also the opportunity to work in applied research applied to the industry.

At the moment I work in synthesis of ZnO nanostructures to be used as single crystal transistors, UV sensors and nano Lasers, were all the knowledge acquired during the PhD is put into practice.

Pawel Jerzy Wojcik, Post-Doc at Linköping University, Sweden

I have received the PhD title from New University of Lisbon in December 2013, for the work entitled 'Printable organic and inorganic materials for flexible electrochemical devices' performed in CENIMAT/i3N and CEMOP/UNINOVA.

The main motivation and driving force during my PhD studies was my involvement in two large European FP7 projects Smart-EC (FP7-ICT-2009.3.9/258203) and A3Ple (FP7-NMP-2010-SME/262782-2) co-financed by European Commission. For me personally, that was the most important as it guarantees a high level of interdisciplinary collaboration between many academic and industrial partners from other European countries. On the other hand it also ensures exploitation of results via proper technology transfer to industry at all product chain levels (materials, devices and end users).

Iwona Bernacka-Wojcik, Post-Doc at Linköping University, Sweden

I have received my PhD title from New University of Lisbon in 2014 for the work entitled 'Design and development of a microfluidic platform for use with colorimetric gold nanoprobe assays' performed in CENIMAT/i3N and CEMOP.

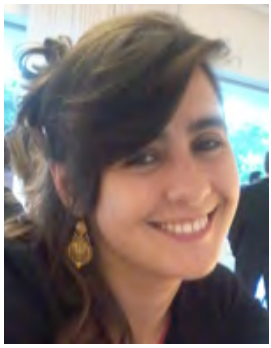
During the PhD studies, I have obtained large experience in multidisciplinary fields. I had opportunity to carry a new research area within the group (microfluidics) and to present the results in international meetings. The directors of the institutes have provided all necessary facilities. I was allowed to conduct research in an independent way, learning about responsibility and creative thinking. I have had the opportunity to train/supervise several under graduate students, to give practical laboratory classes and also to assist high school students during a summer school.

Testimonials of PhD students

Paula Soares

When I finished my master degree in Pharmaceutical Sciences one of the main gaps in my background was related to the development of new systems for biomedical applications. In this context nanotechnology has emerged as a solution for several problems in the pharmaceutical industry. So when I decided to continue my formation and make a PhD, I decided that the choice of this doctoral program will be a "win-win" situation, where I could learn a lot from this area, but also I could take my knowledge to materials' area.

Nowadays science is an unstable area to work in, due to constant budget reductions. Also, the number of PhDs has increased, so the competition is getting tougher. One can see this reality as a reason to give up, or as a reason to work harder and to overcome myself and make the best. In my case, I prefer to overcome these difficulties by working hard and efficiently to conquer my place in Science.



Ana Rovisco

I am a Physics Engineer, so I have skills on electronics and physical processes that are essential in nanotechnology. When I chose my Masters degree one of my motivations was that I would be able to work in this area. In the masters thesis I started to work in materials science, which, adding to the experience of having classes in the Department of Materials Science, resulted on my decision of working in this area. This way, I have been working in this area for the last year and half and this has given me new skills and new motivation to continue doing investigation and pursue a career in academia.

In my opinion this Nanotechnologies and Nanosciences doctoral programme is a great opportunity for personal and professional development, giving the opportunity to gain extensive knowledge in different areas and addressing a huge range of topics, which is a real asset for the future and that I hope opens the best opportunities for me.

Furthermore, it is important to take into account that the laboratories available for the developing programme have the best conditions and, also, the host centre counts with a team, including my supervisors, which hold the necessary knowledge and partnerships creating the ideal conditions for holding PhD workplans as my own.

Daniela Salgueiro

I have a masters degree in Chemistry, which allowed me to work as a researcher in this area. After this experience, I decided that I would like to focus into a diverse area, one with more applicability. So, I choose materials science and for the last two years I have been doing research in this field.

Suddenly I stumbled upon the details of this Nanotechnologies and Nanosciences program and I felt it was exactly what I had been looking for. It was the opportunity to reinforce my previous knowledge and at the same time acquire new skills and explore unfamiliar aspects of the subject. I was attracted by the flexibility of the programme and its multi-disciplinary approach. In my experience my supervisor and all the staff from this PhD programme provides me all the help that I am going to need to develop an excellent work during the next years.

Jonas Deuermier, Dual Degree between UNL and Darmstad University

Most importantly, I was attracted by the conditions of the research centre CENIMAT and by the scientific orientation of the group. Even though my work in the field of p-type oxide thin film transistors is only slightly touching the world of Nanoscience, I benefit from the additional knowledge in the nanoscale, which the group can provide. The obligatory classes give the necessary insight into this topic. Fortunately, the amount of these classes is low, which allows for every grant holder to dedicate most of his time to his thesis topic.

Nanotechnology is a very recent field and became quite popular even outside of the scientific community. Once holding the respective PhD title, I believe I have a wide range of possibilities to continue working in such an innovative field. Particularly, a migration to industry should be facilitated due to the applied character of this PhD program.

Mafalda Costa

The doctoral program in Nanotechnologies and Nanosciences is the appropriate choice for a scientific study encasing the synthesis and characterization of different types of materials.

My PhD program encloses the adaptation of a commonly known material, cellulose paper, as an active layer in the assembly of economic and sustainable point-of-care platforms that will have an important role in the diagnostic of infectious diseases mainly in economically challenged regions.

The PDNN allows the opportunity to work with leading experts in the biosensors and nanotechnology fields and access CENIMAT and DCM facilities equipped with state of the art characterization techniques and equipment essential to the synthesis and characterization of nanomaterials. Besides the mentioned expertise, the group has extensive work applying paper substrates in added value applications such as thin film transistors, solar cells, and batteries.

Jorge Gomes

As an engineer I keep following curiously the advances in the sciences. With the recent technical advances, nanotechnology is now turning a reality with several emerging industrial application. The new capabilities to "mould" matter to behave as we like is something amazing that I couldn't let go without further understanding. This is why I'm starting my PhD in Nanotechnologies and Nanosciences.

I'm currently working for a major telecommunication company in Portugal, and focusing my studies around the applications of nano structured oxides to optical communications.

As networks are growing in speed to tera bps new material are fundamental to support this escalating demand.

Gabriela Martins

I have been developing scientific work for the last 7 years as a chemist. During that time I have worked mostly with modification and characterization of biopolymers for biomedical purposes. Thus, I have experienced the need to know how materials behave under the nano-scale. The choice of this Doctoral Programme in "Nanotechnologies and Nanoscience" is directly related with my PhD proposal concerning "New sensing devices for biomolecule detection". Specifically, my goal is to develop a sensitive multiple-analyte biosensing platform for the most relevant biomarkers of oxidative stress in cancer disease.

In the modern world, "Nanotechnologies and Nanosciences" have become important tools for a full understanding of reaction and interaction phenomena in the nanometric scale. After this 4 year program, I expect to hold a more global and multidisciplinary understanding of how biology, materials and electronics can be interconnected for application in the biosensor field.

Joana Neto

As a researcher I would like to improve and create new medical devices. Joining this PhD program allowed me to bridge the nanotechnology into neurosciences by collaborating with the Champalimaud Foundation. As a team we are transferring the knowledge from a material and technology department in order to improve the tools that have been used for years in the field of brain research.

Kasra Kardarian

The stimulating and competitive environment encouraged me to pursue a research project after my graduation at CENIMAT/i3N. Being awarded the opportunity to work in the development of all-oxide-heterojunctions for solar cells applications using oxide based nanostructures was the starting point toward doctoral study.

With the ultimate career goal of becoming a researcher in industry and implementing nanotechnology in electronics as well as developing new ideas and concepts, I planned to spend the coming year completing a PhD in the field of Nanotechnologies and Nanosciences at CENIMAT/i3N.

Andreia Araújo

With this doctoral program in Nanotechnologies and Nanosciences I am fully able to develop my PhD work, focused on the development of metal nanoparticles for application on silicon solar cells. The excellent conditions of the CENIMAT and CEMOP laboratories and also the expert leaders in the area of renewable energies were definitely crucial for my choice.

Lídia Santos

I joined the PhD program in Nanotechnologies and Nanosciences as it is an emerging field in sciences with a huge variety of applications in materials, chemistry, engineering and medicine. Since my background education was in chemistry, the possibility of combining that knowledge with materials science was a great opportunity to expand my experience, regarding synthesis of metal oxide nanoparticles, and learn about new applications in different fields, like electrochromic devices, sensors and transistors. My expectation in the future is to apply this knowledge in others areas of science and technology.

Thesis Completed in the Last Five Years

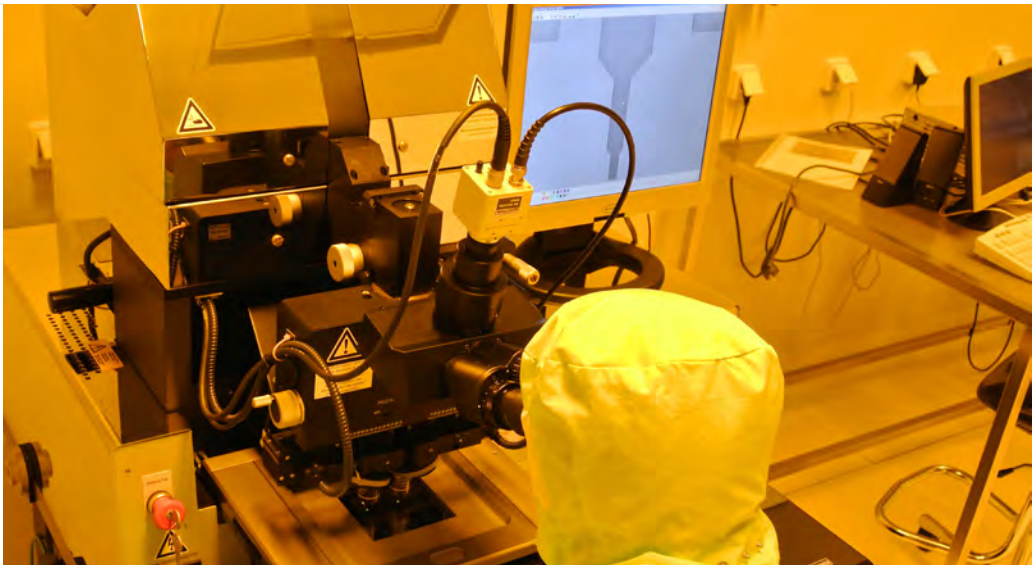
Name	Diploma Date	Thesis Title	Supervisor/Co-Supervisor(s)	Actual Position
Edivaldo Queiroz	15/01/2009	Studies of the electrical properties of polymeric diodes with zinc oxide based electrodes	Prof. Roberto Faria/Prof. Elvira Fortunato (Dual degree between USP and UNL)	Assistant Professor Universidade Federal do Piauí, Brasil
Pedro Miguel Cândido Barquinha	07/05/2010	Transparent Oxide Thin-Film Transistors: production, characterization and integration	Prof. Elvira Fortunato/ Prof. Rodrigo Martins	Assistant Professor FCT/UNL
Leonardo Bione da Silva	18/11/2010	Development of a new portable system for detection of specific sequences of DNA/RNA from Golden Nanoprobes with integration of optical sensors based on silicon technology	Prof. Rodrigo Martins/ Prof. Elvira Fortunato/ Prof. Pedro Baptista	CTO GestRedes, Lda, Portugal-Angola
Gonçalo Pedro Gonçalves	14/12/2011	Filmes Finos de óxidos de índio e zinco e sua aplicação em díodos orgânicos emissores de luz	Prof. Elvira Fortunato/ Prof. Roberto Faria (Dual degree between UNL and USP)	Application Engineer at AIXTRON Ltd Cambridge, United Kingdom
Ana Cláudia Madeira Botas Gomes Pimentel	22/12/2011	Coverage factor optimization of tantalum capacitors manufactured with high specific load powders	Prof. Elvira Fortunato/ MSc. Rui Monteiro (PhD in industrial environment, KEMET)	Post-doc FCT/UNL
Anca-Ionela Danciu	16/10/2012	Nanostructured semiconductor materials for transparent electronics	Prof. Viorica Musat/ Prof. Elvira Fortunato (Dual Degree between Dunarea de Jos University and UNL)	Scientific Researcher at IMT Bucharest, Romania
Ioan Bogdan Diaconu	16/10/2012	Multifunctional semiconductor films with applications in optoelectronic and photovoltaic devices	Prof. Viorica Musat/Prof. Rodrigo Martins (Dual Degree between Dunarea de Jos University and UNL)	Arcelor Mittal, Galați, Romania
Rita Maria Mourão Salazar Branquinho	05/12/2012	Label-free detection of biomolecules with Ta_2O_5-based field effect devices	Prof. Elvira Fortunato/ Prof. Pedro Baptista (PhD in conjunction with INL)	Invited Assistant Professor FCT/UNL
Vitor Manuel Loureiro Figueiredo	17/12/2012	Development of copper and nickel based oxide thin films: design and fabrication of thin-film Transistors	Prof. Elvira Fortunato/ Prof. Rodrigo Martins	Launch Manager, Process Expert Engineer, Continental TEMIC Microelectronic, Germany
Pawel Jerzy Wojcik	13/12/2013	Printable organic and inorganic materials for flexible electrochemical devices	Prof. Elvira Fortunato/ Prof. Rodrigo Martins	Post-Doc at Linköping University (Department of Science and Technology), Sweden

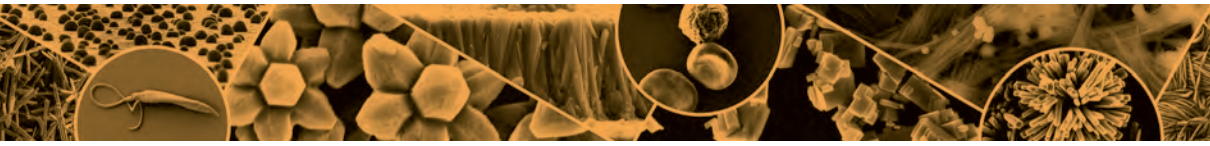
Name	Diploma Date	Thesis Title	Supervisor/Co-Supervisor(s)	Actual Position
Iwona Anna Bernacka-Wójcik	06/10/2014	Design and development of a microfluidic platform for use with colorimetric gold nanoprobe assays	Prof. Rodrigo Martins/ Prof. Hugo Águas/Prof. Pedro Baptista	Post-Doc at Linköping University (Department of Science and Technology), Sweden
Ana Raquel Barros	06/11/2014	Development of p-type oxide semiconductors based on tin oxide and its alloys: application to thin film transistors	Prof. Elvira Fortunato/ Prof. Rodrigo Martins	Post-Doc FCT-UNL

Thesis Not Yet Submitted

Name	Thesis Title	Supervisor/Co-Supervisor(s)
Paula Isabel Pereira Soares	Chitosan based magnetic nanoparticles for osteosarcoma theranostics	Prof. João Paulo Borges/Prof. Isabel Ferreira/Dr. Carlos Novo (In collaboration with IHMT)
Joana Sofia Pereira Neto	Developing high-performance microfabricated devices for recording neural activity	Prof. Pedro Barquinha/Dr. Adam Kampff (In collaboration with Champalimaud Foundation)
Jonas Deuermeier	Transparent p-type transistors based on Cu2 - Understanding material properties to enhance device performance	Prof. Elvira Fortunato/Prof. Andreas Klein (Dual Degree between UNL and TU Darmstadt)
Andreia Cristina Joia Araújo Cardoso	Development of nanoparticle based plasmonic structures for Si solar cell applications	Prof. Rodrigo Martins/Prof. H. Águas
Mafalda Quintino do Nascimento Costa	Lab-on-Paper platforms for assembling inexpensive diagnostic assays	Prof. Elvira Fortunato/Prof. Pedro Baptista
Ana Isabel Bento Rovisco	Solution-based multicomponent oxide semiconductor nanowires for electronic applications: from synthesis to circuit fabrication	Prof. Pedro Barquinha/Prof. Rodrigo Martins
Daniela Adriana Lopes Salgueiro	Ink-jet printing of indium-free amorphous metal oxide semiconductors for high performance TFTs	Prof. Elvira Fortunato
Gabriela Ferreira de Vasconcelos Martins	New devices to monitor oxidative stress biomarkers in point-of-care: a new tool for cancer prevention	Prof. Goreti Sales/Prof. Elvira Fortunato (In collaboration with ISEP)
Jorge de Souto Martins	Transparent electronics: implementation of process/physical device simulation tools and analog circuit fabrication with oxide TFTs	Prof. Pedro Barquinha/Prof. Victor Tavares (In collaboration with FEUP)
Jorge Miguel de Melo Gomes	Fabrication and Characterization of VO2 thin films	Prof. Rui Igreja/Prof. Elvira Fortunato
Kasra Kardarian	High performance solution-processed metal oxide conductors and semiconductors produced at low temperature	Prof. Elvira Fortunato/Prof. Rodrigo Martins
Lídia Sofia Leitão Santos	Synthesis, characterization and processing of nanostructured inorganic materials for electrochromic device applications	Prof. Elvira Fortunato/Prof. Luís Pereira
Alexandru Alexa	Solution based metal oxide thin films and corresponding nanostructures processed at low temperature	Prof. Viorica Musat/Prof. Elvira Fortunato (Dual degree between University of Galati and UNL)

Microelectronic clean rooms.





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