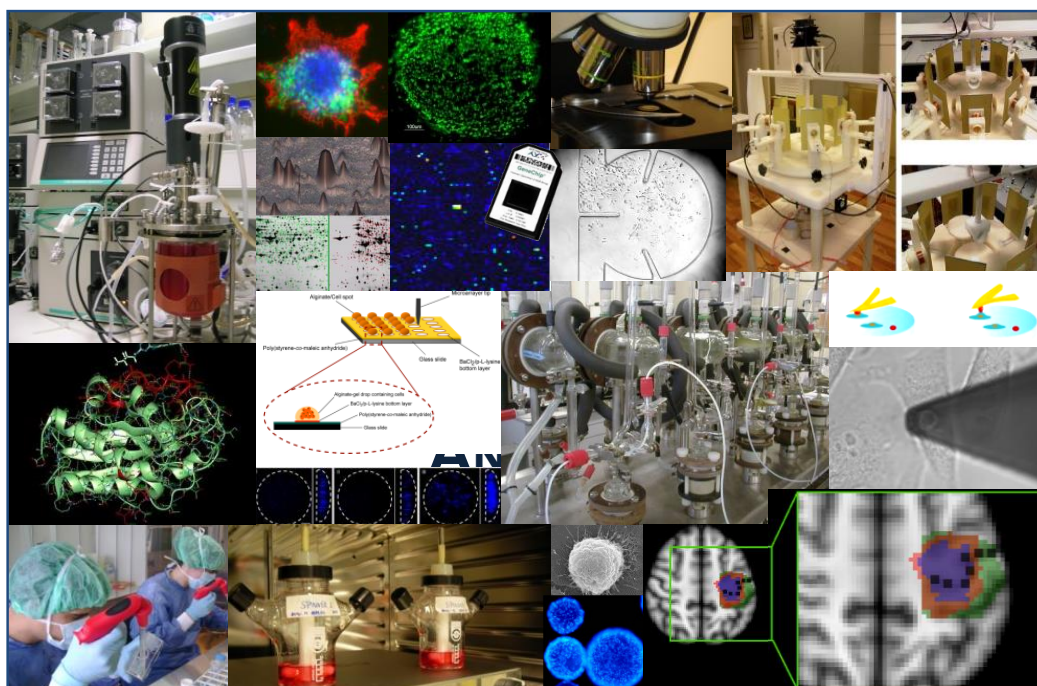




INSTITUTO SUPERIOR TÉCNICO
UNIVERSIDADE DE LISBOA

DEPARTMENT OF BIOENGINEERING



ANNUAL REPORT 2015

Department of Bioengineering - IST

Annual Report 2014

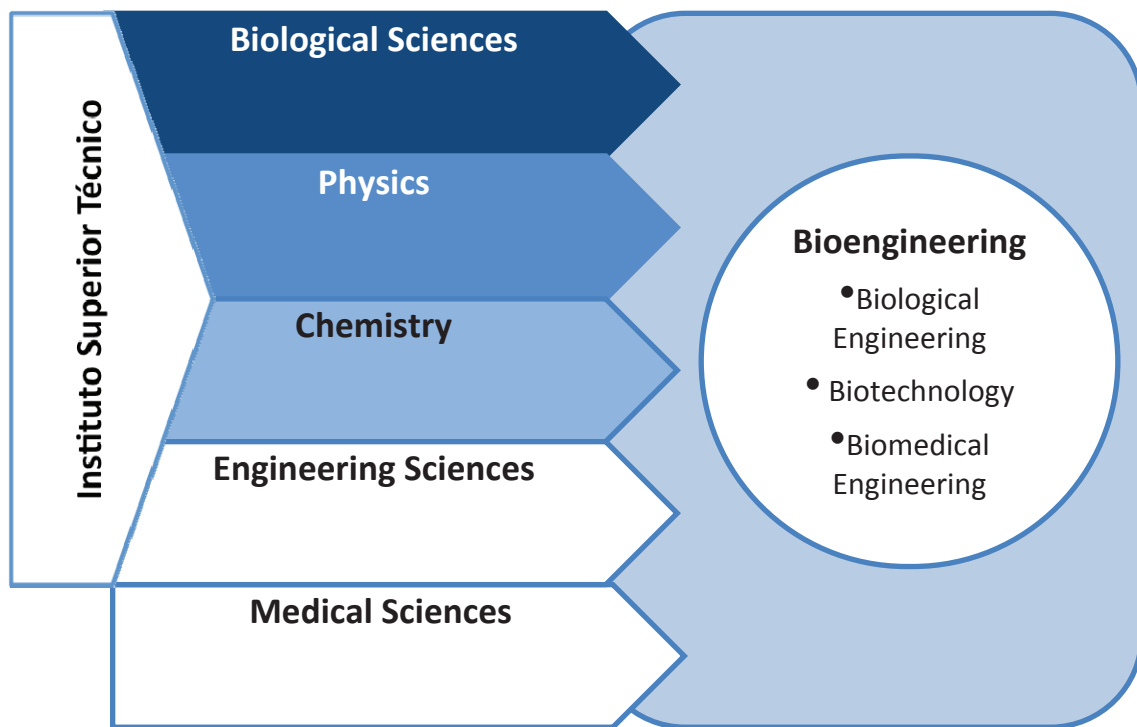


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<https://fenix.ist.utl.pt/departamentos/dbe/>

1. Welcome letter



The Department of Bioengineering (DBE), which initiated its activities in January 2011, is a very unique Department in Portuguese universities that brings together faculty members with expertise in different areas of Life Sciences, Biological Engineering and Biomedical Engineering. The DBE mission is to provide an advanced and high-level education in bioengineering and to promote science and technological development in the fields of biological and biomedical sciences and engineering.

The highest priorities of DBE are to contribute to the new paradigm of the convergence of Life Sciences and Engineering and to reinforce the pioneer role and leadership of IST in bioengineering and biotechnology education and research in Portugal, focusing on the translation of knowledge to the industrial and clinical applications, the creation of intellectual property, and formation of spin-offs.

The DBE main achievements in its 3rd year consisted of the consolidation of the integration of the faculty, teaching and research, and the coordination of the different cycles of study on Biological Engineering, Biomedical Engineering, and of the M.Sc. degrees on Biotechnology, Bioengineering and Nanosystems, Biomedical Technologies and Microbiology. The Department is also responsible for four FCT Doctoral Programmes: Bioengineering (MIT-Portugal Programme), Bioengineering: Cell Therapies and Regenerative Medicine, Biotechnology and Biosciences and Advanced Integrated Microsystems.

We welcome the scientific community interested in knowing our department to attend the Bioengineering Seminars. These seminars give an overview of the teaching and research activities of our faculty and introduce invited speakers. Prospective students and potential faculty are also very welcome to join an ambitious and active Department of the XXI century!

Joaquim M.S. Cabral
President of DBE

2. The Department of Bioengineering – DBE at IST

Bioengineering is a new scientific field in which an engineering approach is applied to life sciences, namely biology and medicine. Bioengineering applies the methods of engineering to biological and medical systems to answer some of the most challenging problems currently facing modern society. Likewise, Bioengineering takes inspiration in biological and medical systems to discover new methodologies for engineering practice. This integration of engineering and life sciences constitutes a new paradigm for engineering and is currently the area of engineering research and education undergoing the most explosive growth both in terms of student enrolment, course offerings, and research development worldwide.

The formation of the Department of Bioengineering of Instituto Superior Técnico (IST) was approved by the School Council of IST on December 13, 2010. The objective of DBE is to achieve an integrated coordination of the scientific research, teaching activities, and extension services of IST in the fields of Biological Engineering, Biomedical Engineering, Biotechnology and Biological Sciences. DBE aims at giving higher visibility and at reinforcing the pioneering and the leadership role that IST has had in these subjects, as well as leading the expansion to novel and strategic areas of Bioengineering, such as neuroengineering. The creation of the DBE is the keystone of the strategic development of IST in the area of Life Sciences and Technologies. The Department has currently 31 faculty members, 4 doctorate Research Scientists, and 5 staff members who support the administrative, computational, and laboratorial infrastructures. The planned development includes an important participation of the DBE in the formation of a new institutional platform between IST and Faculties of Medicine and related institutions so that the participation of IST in training related to medical sciences is reinforced and that the formation currently offered in Biomedical Engineering is consolidated and expanded. Enlarging the faculty to cover the different expanding areas of bioengineering and consolidating and improving the buildings of the DBE to potentiate the on-going research and the synergies between researchers are in addition current objectives of the DBE.

The mission of DBE is the advanced formation of human resources within the principles and methods of Engineering Sciences and Biological and Biomedical Sciences and Technologies and to support its translation into new products, processes and services that may contribute to the sustainable development and to the improve quality of life of our society. It is the DBE objective to achieve international recognition as one of the top departments of bioengineering at European level in 10 years, based on its indexes of scientific productivity, industrial translation, and ability to attract top 2nd and 3rd cycle international students.

Further information can be found in the DBE website: <https://fenix.ist.utl.pt/departamentos/dbe/>

3. The Activities of the DBE

Developed in 2014

- Launching of the 2nd cycle Master in Microbiology (in collaboration with other faculties of the Universidade de Lisboa)
- Coordination of 1st and 2nd cycle on Biological Engineering
- Coordination of 2nd cycles on Biotechnology; Bioengineering and Nanosystems; and Biomedical Sciences Medical Technologies (in collaboration with the Faculty of Medicine of the University of Lisbon)
- Coordination at IST of the Erasmus Mundus Master's Programme in Systems Biology - euSYSBIO
- Coordination of 3rd cycle on Biotechnology
- Coordination of 1st, 2nd and 3rd cycles on Biomedical Engineering
- Participation in the Coordination of 2nd cycle on Pharmaceutical Engineering
- Participation in the Coordination of FCT Doctoral program in Bioengineering (MIT-Portugal Program)
- Coordination of the FCT Doctoral program in Bioengineering: Cellular Therapies and Regenerative Medicine
- Organization of Advanced Courses on Systems Biology and Regenerative Medicine
- Launching of a new teaching laboratory (Cell Culture Engineering).
- Organization of the Bioengineering Seminar Series
- Mid-period evaluation of the DBE by the *Conselho de Escola* of IST

Planned for 2015

- Proposal of a new institutional platform (foreseen at doctoral level) with the Faculty of Medicine of the University of Lisbon: *Life and BioMedical Sciences and Engineering*
- Continuation of the integration of faculty, teaching, and research
- Review teaching offers of the DBE (1st, 2nd, and 3rd cycle)
- Development of an integrated a human resources/faculty recruiting plan/departamental buildings and laboratories plan for the next 5-10 years
- Continuation and expansion of the Bioengineering Seminar Series
- Launching of the FCT Doctoral programs in Advanced Integrated Microsystems and Biotechnology and Biosciences
- Launching Strategic Initiative in Neuroengineering.

Long-term planned activities

- Expansion of the faculty in all current scientific areas. Integration of new faculty in new teaching/research areas.
- Analysis with IST of the integration of new scientific areas, namely Biomechanics and Computational Biology, to expand and strengthen the Department of Bioengineering and to achieve a better integration of all bio-based activities at IST.

4. Education

The Department of Bioengineering is currently coordinating the following degree courses:

- Doctorate in Biotechnology (<https://fenix.ist.utl.pt/cursos/dbiotec>) (3rd cycle, includes the Advanced Specialization Diploma in Biotechnology, 30 ECTS)
- Doctorate in Biomedical Engineering (fenix.ist.utl.pt/cursos/debiom) (3rd cycle)
- FCT Doctoral Program in Bioengineering: Cell Therapies and Regenerative Medicine (3rd cycle, offered in association with IMM, CEDOC and IBET, and in collaboration with RPI)
- Integrated Masters in Biological Engineering (fenix.ist.utl.pt/cursos/mebiol) (1st and 2nd cycle, 300 ECTS, 65 places for candidates to the 1st year)
- Integrated Masters in Biomedical Engineering (fenix.ist.utl.pt/cursos/mebiom) (1st and 2nd cycle, 300 ECTS, 50 places for candidates to the 1st year)
- Masters in Biotechnology (fenix.ist.utl.pt/cursos/mbiotec) (2nd cycle, 120 ECTS, 25 places for candidates to the 1st year)
- Masters in Bioengineering and Nanosystems (fenix.ist.utl.pt/cursos/mbionano) (2nd cycle, with collaboration of the Physics and the Electrical Engineering Departments of IST, 120 ECTS, 20 places for candidates to the 1st year)
- Masters in Biomedical Technologies (fenix.ist.utl.pt/cursos/mtbiom) (2nd cycle, 120 ECTS, 20 places for candidates to the 1st year)
- Masters in Microbiology (fenix.ist.utl.pt/cursos/microbio) (2nd cycle, 120 ECTS, 25 places for candidates to the 1st year)

The Department of Bioengineering participates in the coordination of the following degree courses:

- FCT Doctoral Program in Bioengineering (fenix.ist.utl.pt/cursos/dbioeng) (3rd cycle, offered in association with the New University of Lisbon and the University of Minho, and in collaboration with the MIT (MIT-Portugal Program))
- Masters in Pharmaceutical Engineering (fenix.ist.utl.pt/cursos/MEFarm) (2nd cycle, in collaboration with the Faculty of Pharmacy of the University of Lisbon)
- Erasmus Mundus Master's Programme in Systems Biology - euSYSBIO (in collaboration with KTH, Stockholm, Sweden and Finland's Aalto University)

In addition, the Department of Bioengineering participates in the following PhD degree programs:

- Joint Doctoral Program IST-EPFL in the area of Biomedical Imaging.
- FCT Doctoral Program in Neurosciences.

The Department of Bioengineering exchanges students and staff in the framework of the Erasmus and other programmes with European and Latin American Universities, in the fields of Biological Engineering, Biomedical Engineering, Biotechnology and Bio/Nanotechnology.

Course Description and Objectives

Doctorate in Biotechnology (Coordinator: Prof. Isabel Sá-Correia)

The Biotechnology PhD programme offers a multidisciplinary university education of excellence that prepares a new breed of creative investigators able to translate basic bioscience discoveries into technological developments, as well as to lead scientific and technological innovation in a broad range of fields of Industrial, Agro- Food, Health and Environmental Biotechnology. The programme offers an in-depth understanding of the contemporary view of Molecular and Cellular Biology and Molecular Biotechnology, with emphasis on Functional and Comparative Genomics and Bioinformatics and on the Integrative and Systems and Synthetic Biology perspective (Biological Sciences track). The program also prepares the students with cross-cutting competences in Biomolecular and Bioprocess/Biosystems Engineering, Nanobiotechnology, and Stem Cell Bioengineering and Regenerative Medicine (Bioengineering track). This PhD degree has roots in the IST PhD Programme in Biotechnology that produced, in the early 90s, the first PhDs in Biotechnology in the country. In the last 10 years, 88 PhD theses were completed. The curricular structure of the 1st year of studies provides general and specific training in biotechnology. Students take three compulsory courses (18 ECTS) (General Doctoral Training, Advanced Experimental Techniques (and methodologies), Bioentrepreneurship) and three optional courses (18 ECTS) which allow each student to build an individual and flexible academic pathway. The Programme is in line with the ongoing interdisciplinary research developed by the teaching staff and researchers affiliated to the Department of Bioengineering and to IST-associated centers of excellence in the Bio/Technology field.

Doctorate in Biomedical Engineering (Coordinator: Prof. João Pedro Conde)

The Doctoral Program in Biomedical Engineering (PDEBiom) of Instituto Superior Técnico (IST), offered following the success of the MSc in Biomedical Engineering, in collaboration with the Faculty of Medicine, University of Lisbon (FMUL), aims to: (1) promote a multi-disciplinary university education for the 3rd cycle with the aim of training a new generation of PhD graduates in Biomedical Engineering in all its dimensions; (2) promote training and research in Biomedical Engineering, in order to maximize the synergies between the scientific and technological areas of Engineering and Health and Life Sciences. The doctoral projects are offered by faculty in the Departmente of Bioengineering and in other departments of Técnico, namely Mechanical Engineering, Informatics, Management and Physics, among others. Focus research areas are: (i) Biomedical imaging, Biomedical Instrumentation and Biosignals; (ii) Molecular and Cellular Bioengineering, Nanobiotechnology, Tissue Engineering and Regenerative Medicine; (iii) Biomechanics and Biomedical Devices; and (iv) Clinical Engineering. Besides their research, the doctoral students acquire a complete set of transversal skills in Entrepreneurship and in their General Doctoral Formation.

Doctorate in Bioengineering (MIT-Portugal Program) (Coordinator: Prof. Joaquim M.S. Cabral)

The main objective of the Doctorate in Bioengineering (MIT-Portugal Program) (PDBioeng) is to ensure that a PhD holder in this field is provided with systematic understanding and skills in the intersection of Life Sciences and Engineering. Through the combination of unique skills in bioengineering technical innovation, entrepreneurship, leadership and systems thinking, this PhD program aims to educate the next generation of industrial leaders in existing industries, promoters of new enterprises, and independent, interdisciplinary researchers in the field of Bioengineering. The cutting edge research in this program is focused on: (i) BioMolecular, Bioprocess & Biosystems Engineering to foster knowledge of complex biological systems and design of novel technologies,

e.g. nano-scale technologies, systems and synthetic biology, bioprocess monitoring and control using non-invasive sensing systems, for the intelligent production of high value products, e.g. biopharmaceuticals, sustainable bulk and specialty chemicals and fuels; (ii) Cells and Bio-inspired materials to develop novel robust cell production systems as well as novel materials and their interfaces of cells, to engineer innovative scaffolds and human-like substitutes for tissue engineering; and to target controlled release delivery cell systems; (iii) Biomedical Devices & Technologies to develop novel bioimaging technologies, advanced diagnosis sensors and novel designs, e.g. orthoses and wearable sensors to aid patient mobility with musculoskeletal disabilities; (iv) “Engineering” Processes for Health Care Practice to design and control health care complex systems using engineering systems concepts and approaches for solutions to the challenging problems of improving quality, safety and cost-effectiveness; and (v) Biosystems Innovation, Management & Policy to promote a strategic approach, empowering bioengineers to understand the innovation path and successfully translate research into new business.

Doctorate in Bioengineering: Cell Therapies and Regenerative Medicine (Coordinator: Prof. Joaquim M.S. Cabral)

The Doctoral Program in Bioengineering: Cell Therapies and Regenerative Medicine (PDRegMed) is designed to promote the emergence of research leaders in academia, hospitals and industry, able to produce cutting-edge developments on Regenerative Medicine, translated into clinical applications, and to promote new business ventures, improving human health and economic growth. The goal is to create a unique platform to foster new knowledge and scientific advances in Regenerative Medicine, with three main focuses: (i) Educational focus, through an innovative curricular structure promoting a holistic approach based on the bed-to-bench-to-bed paradigm, where research projects are driven by clinical needs, and outcomes are aimed at translation into clinical applications; (ii) Research focus, through promotion of ground-breaking research carried out in collaboration of Portuguese and top international groups, hospitals and companies, thereby contributing to the formation of professionals with a solid education and able to act in this emergent cross-disciplinary field with privileged access to a broad international network; and (iii) Clinical translation focus, aligned with a go-to-market attitude. This will be attained through integrated training of PhD students by MDs, bioengineers and business developers that pioneered the field of Regenerative Medicine in Portugal, aiming to promote the development of novel ATMPs with high technological impact in the healthcare sector, thereby allowing Portuguese SMEs to compete at international level.

Integrated Master in Biological Engineering (Coordinator: Prof. Duarte Miguel Prazeres)

The aim of the MSc in Biological Engineering (MEBiol) of Instituto Superior Técnico (IST) is to train engineers to fill positions in Bioengineering-related areas. The program offers a solid background in Mathematics, Physics, Chemistry and Engineering Sciences, and a cross-disciplinary and updated education in fields like Microbiology, Molecular and Systems biology, Bioprocess Engineering, Nanobiotechnology, Bioinformatics, and Tissue and Cell Culture Engineering. Throughout the course, students are empowered with skills like analytical and critical thinking, oral and written communication, time management, adaptability and team work. The program requires completion of 300 ECTS (10 semesters). By the end of the 1st cycle (semester 6) students complete their core training, obtaining a Diploma in Biological Engineering Sciences. The specialized training offered in the 2nd cycle leads to the obtention of a MSc Degree. The 50 Curricular Units cover subjects from Basic Sciences, Engineering Science, Speciality Sciences, Transversal Skills and include a Design Project and a Master dissertation. Program graduates are prepared for positions in sectors such as Agro-food, Environment and Water management, Bioenergy, Industrial Biotechnology, Technological and Management Consulting, Cosmetic and Pharmaceutical industry, Scientific Research and Technological Development, Intellectual property and Regulation, and Health (diagnostics, medical devices, services).

Integrated Master in Biomedical Engineering (Coordinator: Prof. João Pedro Conde)

The course of study MSc in Biomedical Engineering (MEBiom) of Instituto Superior Técnico (IST), in close collaboration with the Faculty of Medicine (FMUL), both of the University of Lisbon (UL), aims to provide training and relevant preparation for this new field open in the twenty-first century in life and health sciences and technologies. The link between engineering and medicine promoted by training in Biomedical Engineering at IST allows integrating the fundamental aspects and practical applications of engineering in research, diagnosis, and therapy in medical sciences. The 1st cycle of MEBiom is a general training in engineering and biomedical sciences. General training in Mathematics, Physics, Chemistry, Biology, Electronics, Computer Sciences, Mechanical Engineering, Management, and Medical Sciences is of a broad spectrum. The 2nd cycle of MEBiom consists of a set of 9 mandatory units, which represent a comprehensive training in various core areas of Biomedical Engineering, a design project in Biomedical Engineering, a set of profiles to be chosen by students, which allow an in-depth study of a field of Biomedical Engineering, and a semester-long master dissertation. The profiles are: (i) Imaging, Biomedical Instrumentation and Biosignals; (ii) Molecular and Cellular Bioengineering, Tissue Engineering and Regenerative Medicine; (iii) Biomechanics and Biomedical Devices; and (iv) Clinical Engineering.

Master in Biotechnology (Coordinator: Prof. Isabel Sá-Correia)

The Master's Programme in Biotechnology aims to provide students with high quality and up-to-date training in the highly interdisciplinary field of Biotechnology, which joins life sciences and technologies, at the level of a 2nd cycle of university studies. This Programme has demonstrated a great ability to attract to the Department of Bioengineering of IST BSc graduates from other Schools in a variety of fields of Life Sciences, strongly motivated by study subjects at the interfaces between biology, exact sciences, engineering and medicine. This Master's Programme resulted from the adaptation, under the auspices of the Bologna process, of the Master's Programme in Biotechnology that IST has continuously and successfully offered since 1986. The Programme has a strong focus on areas that have had significant scientific and technological advances in recent years, as it is the case of Functional and Comparative Genomics and Bioinformatics, Molecular Biotechnology, and Cell and Tissue Engineering, Stem Cell Engineering and Regenerative Medicine, and offers training in Environmental Biotechnology, Biochemical Engineering, and Project of Bio-Industries, in order to face the challenges of the strongly interdisciplinary and fast growing field of Biotechnology.

Erasmus Mundus Master's Programme in SYSTEMS BIOLOGY – euSYSBIO (Coordinator: Prof. Isabel Sá-Correia)

The Erasmus Mundus master's programme in Systems Biology (euSYSBIO) is delivered by a consortium of three Schools of the CLUSTER, the Royal Institute of Technology in Sweden (KTH), Instituto Superior Técnico in Portugal (IST) and Aalto University in Finland, in close collaboration with Tsinghua University in China. The aim of euSYSBIO is to train professionals, researchers and entrepreneurs, on a fast-evolving systems biology field. After finishing the programme, the students will be competent in designing and implementing mathematical and statistical models of complex computational systems, and have the necessary understanding of the underlying biology in order to apply and interpret computational methods in the context of systems biology. It is a two-year Master's programme including compulsory mobility for the students, offering education of high international standard as well as the opportunity to experience a multicultural education by carrying out studies in two different European universities in two different countries. The programme includes an annual Winter School held at IST. The euSYSBIO programme ends with a master thesis, jointly supervised by the universities where the student was affiliated in the first and the second year. At the end of the programme students get and a double

degree from the two Institutions and a euSYSBIO Degree Supplement. From IST, students will get a Biotechnology Master's degree.

Master in Bioengineering and Nanosystems (Coordinator: Prof. Luís Fonseca)

MBioNano aims at offering advanced education with a strong background in biology, nanotechnology, chemistry, physics, materials science and engineering, electronics and informatics, and their integration in an inter- and trans-disciplinary approach between Life Sciences and Nanosystems. The MBioNano is offered by the Department of Bioengineering in collaboration with other IST Departments, namely the Physics Department, the Electrical and Computer Engineering Department, and the Department of Chemical Engineering. This master programme involves Faculty and Researchers belonging to several research centers but in particular three Associate Laboratories with IST leadership: IBB-Institute for Biotechnology and Bioengineering, IN-Institute of Nanotechnology (INESC-MN), and INESC-ID. The MBioNano provides formation unique in Portugal of high quality advanced training in bioengineering and micro and nanosystems and promotes the connection between the university, research centers and the productive sector. This Master course aims at applying the expertise and scientific research of its students in innovation in the private sectors and in technology transfer to new start-ups. Emergent areas of focus are analysis and application of new cell lines, new molecules, new devices and new systems of therapeutic (molecular and cellular therapies), as well as a hands-on education in cleanroom micro and nanofabrication techniques.

Master in Biomedical Technologies (Coordinator: Prof. Raul Martins)

The Masters in Biomedical Technologies (MTBiom) seeks to be a knowledge platform of health sciences and engineering aimed for candidates with professional experience who aspire to deepen their expertise in application domains in the field of biomedicine. The degree is supported by, and gives continuity to, the long standing partnership between the two renowned schools, IST and FMUL, which has been instrumental in developing and innovating at the engineering/medicine interface. The key learning outcome of MTBiom is a multidisciplinary education at the frontier between medicine and engineering, with a substantial experimental component that integrates the knowledge in engineering with specific applications in research, diagnostics and therapeutics in health sciences. The competences acquired by the students are expected to play a key role in the resolution of concrete biomedicine problems at an advanced level. MTBiom offers a common post-graduation background to medical doctors, engineers and other health professionals, in a lifelong learning perspective, which will not only potentiate and stimulate the complementary of functions through a profound understanding of the mutual domains, but will also foment the collaboration between universities and the productive sector, promoting the technology transfer through the application of the results of scientific research in business innovation.

Master in Microbiology (Coordinator: Prof. Isabel Sá-Correia)

The new MICROBIOLOGY Master's programme was started in 2013/2014 and offers a highly competitive education in modern microbiology. The study of microorganisms is instrumental for the understanding of the fundamental mechanisms of life and for new developments and applications in industrial biotechnology, environmental restoration and energy production and in human and animal health and food sectors. This joint Master's degree in Microbiology is based on a consortium of 4 Schools of the University of Lisbon (UL) (Instituto Superior Técnico, Faculty of Sciences, Faculty of Medicine and Faculty of Veterinary Medicine) and exploits the synergies made possible at the level of teaching, research and link to society in the UL. The programme spans from an in-depth understanding of molecular and cellular microbiology and the contemporary view of genome-based microbiology, to microbial diversity and evolution. It provides hands-on knowledge on the use of integrative approaches made available through the exploitation of Omics and

Bioinformatics tools in a system and synthetic microbiology perspective. Thanks to the contribution of the four schools and a teaching staff strongly involved in R&D in Microbiology and related areas in centers of excellence of the national scientific system, this study cycle offers versatile and comprehensive high quality training in the various fields of intervention of Microbiology. The Programme graduates are prepared for positions as microbiologists in the Biotechnology, Food Industry, Food Safety, Health and Environment sectors and developed the necessary skills for innovation and entrepreneurship in the microbiology field.

Master in Pharmaceutical Engineering (Coordinator: Prof. José Cardoso de Menezes)

A joint program taught by Instituto Superior Técnico (IST) and the Faculty of Pharmacy, both belonging now to The University of Lisbon. The aims are: (i) to provide a process systems engineering view of modern pharmaceutical manufacturing (small and large drug substances such as APIs or Mabs, as well as drug products such as solid dosage forms); (ii) to give students a solid background of the new paradigms of quality as manufacturing science (QbD, Quality by Design), (iii) present modern process development and manufacturing techniques (PAT, process analytical technology); (iv) teach the foundations of lean and six-sigma methods for achieving excellence in development and manufacturing. The program is taught by industry experienced staff and several case studies are used to ensure the learning outcomes desired are achieved. The program has three profile areas: (i) drug-substance synthesis and manufacturing, (ii) process engineering & in-process technologies, and (iii) quality management systems. The program is 3 + 1 semesters (120 ECTS) long with the 4th semester reserved for preparing a dissertation either in an industry placement or at some other host institution, and the previous 3 semesters having 9 mandatory units out of 11 possible choices. The desirable students profile is either an individual with a Pharmaceutical Sciences or Engineering (Chemical, Biological, Biomedical) degree either already working in the industry or having a 1st Cycle completed in any of those areas.

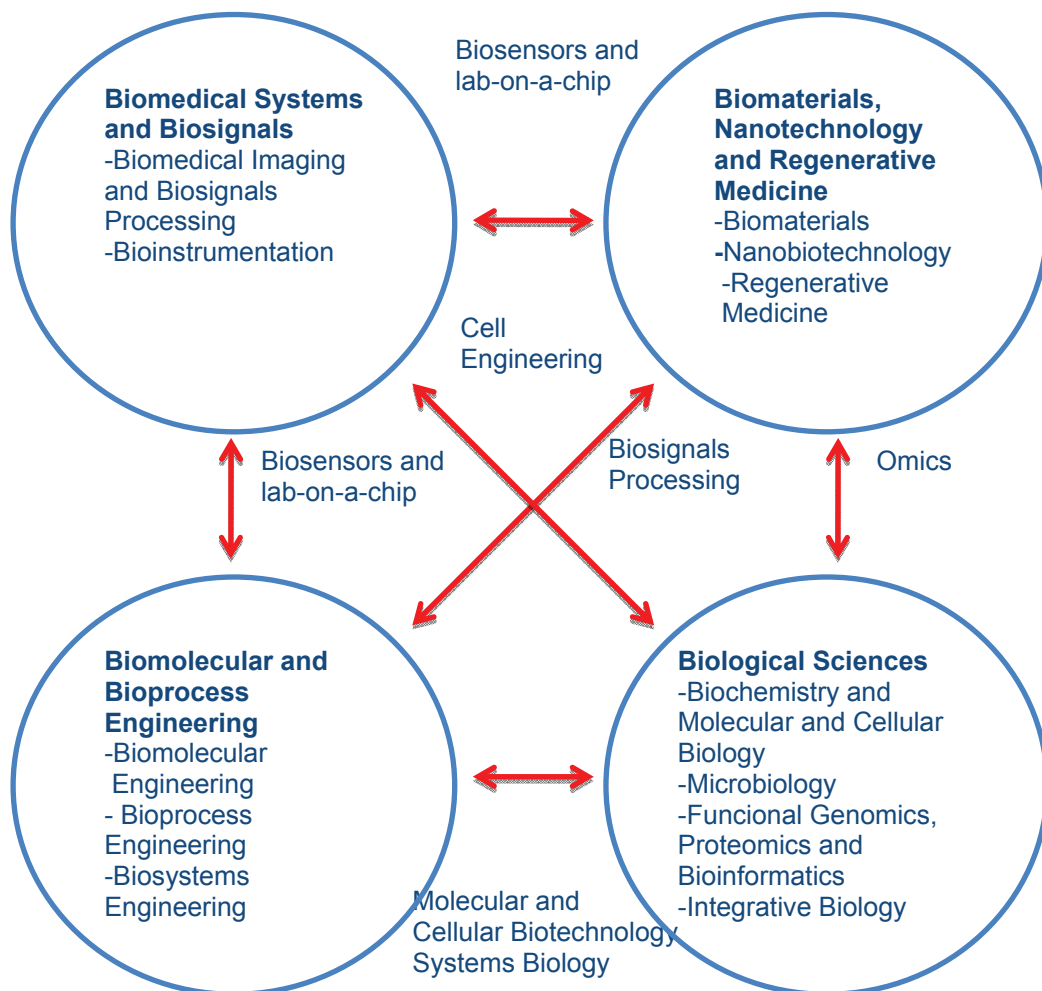
5. Research Activities

Scientific Areas

Bioengineering covers a wide domain. It is positioned in the overlap of three fundamental sciences: biology, engineering and medicine. This property provides the substrate for Health Science. The Department of Bioengineering **has four scientific areas** that cover the valences required for a solid development and human resource formation in Health Sciences. These are desired to interoperate fostering new approaches. These areas are:

- Biological Sciences
- Biomaterials, Nanotechnology and Regenerative Medicine
- Biomedical Systems and Biosignals
- Biomolecular and Bioprocess Engineering

The following graphical representation depicts some of the already existing synergies between the different scientific areas.



• Biological Sciences

In the Department of Bioengineering, research and teaching interests of the Biological Sciences scientific area range from Molecular and Cellular Biology, Biochemistry and Microbiology to the contemporary genome-based view of Biology. Ongoing interdisciplinary research programs involve molecular biosciences across disciplines, from molecules to systems, and synthetic and molecular systems biology strategies to understand how biological systems orchestrate their multiple functions envisaging the exploitation/control of their biological activities.

The scientific area of Biological Sciences offers a multidisciplinary education that involves the fundamentals of Molecular and Cellular Biology, Biochemistry and Microbiology, the molecular tools and the strategies of Genetic Engineering, the understanding of Microbial Biochemistry and Physiology, the Functional and Comparative Genomics and Bioinformatics, the Integrative Microbiology and the Molecular Systems and Synthetic Biology perspective. There is a focus on the study of microorganisms which is critical for the understanding of the fundamental mechanisms of life and for new developments and applications in industrial biotechnology, environmental restoration and energy production and in human and animal health and food sectors.

The Biological Sciences scientific area is involved in all the undergraduate and graduate training programs with a biological component offered at IST, as well as in advanced postdoctoral training in the field. Students, at all levels, do have the opportunity to actively participate in research training in the laboratories of the Biological Sciences Research Group of the Institute of Biotechnology and Bioengineering (IBB), Centre for Biological and Chemical Engineering at IST.

• Biomaterials, Nanotechnology and Regenerative Medicine

This scientific area integrates a set of technologies which have as a common point the controlled interaction, at the micro and nanoscale, of complex artificial constructs with biomolecules, cells and tissues. High impact applications in biotechnology and medicine are the goal, in particular in the development of novel strategies for biodiagnostics and regenerative medicine. Research at the DBE encompasses the interdisciplinary areas of biomaterials, nanotechnology and nanobiotechnology, and stem cell engineering and regenerative medicine.

Biomaterials: although biomaterials are primarily used for medical applications, they are also used to grow cells in culture, to assay for blood proteins in the clinical laboratory, in processing biomolecules in biotechnology, for fertility regulation implants in cattle, in diagnostic gene arrays, in the aquaculture of oysters and for investigational cell-silicon "biochips." The commonality of these applications is the interaction between biological systems and synthetic or modified natural materials.

Nanotechnology: the engineering of functional systems at the molecular scale. Nanotechnology is the understanding and control of matter at dimensions between approximately 1 and 100 nanometers, where unique phenomena enable novel applications. Nanobiotechnology consists on the application of nanotechnology concepts to bioengineering and biological sciences, in lab-on-a-chip systems, novel biosensors, nanoparticles for drug delivery, surface functionalization, etc. Bionanotechnology consists in the translation of biological concepts for engineering applications, namely taken from neural sciences, systems biology, biomaterials and biomimetics.

Regenerative Medicine: regenerative medicine is an interdisciplinary field of research and clinical applications focused on the repair, replacement or regeneration of cells, tissues or organs to restore impaired function resulting from any cause, including congenital defects, disease, trauma and ageing. It uses a combination of several converging technological approaches, both existing and newly emerging, that moves it beyond traditional transplantation and replacement therapies. The approaches often stimulate and support the body's own self-healing capacity. These approaches may include, but are not limited to, the use of soluble molecules, gene therapy, stem and progenitor cell therapy, tissue engineering and the reprogramming of cell and tissue types.

The Biomaterials, Nanotechnology and Regenerative Medicine scientific area is involved in the undergraduate formation in Biotechnology and Bioengineering, including in the degrees in Biological Engineering and Biomedical Engineering, as well as in advanced doctoral and postdoctoral training in the field. Students, at all levels, do have the opportunity to actively participate in research training in the laboratories of the BioEngineering Research Group of the Institute of Biotechnology and Bioengineering (IBB), Centre for Biological and Chemical Engineering at IST, in the INESC-MN micro and nanofabrication cleanroom facilities, and in the NanoLab.

• **Biomedical Systems and Biosignals**

This area has a broad scope, covering a very long list of topics. While the subarea of Biomedical Systems encompasses all hardware implementations and physical interaction with biological entities, the subarea of Biosignals relates to the signal processing associated with interpretation, representation and modelling of biological functional systems, both with a medical and engineering emphasis. The Biomedical Systems and Biosignals scientific area at DBE is particularly involved in the subareas of bioinstrumentation, bioelectromagnetism, medical imaging, modeling of biological systems and biosignal processing, and focuses its teaching activities in the undergraduate and graduate formation in Biomedical Engineering, although it also offers courses to the other degrees in Bioengineering and Biotechnology. An initiative in neural engineering is being considered by the DBE. Students, at all levels, do have the opportunity to actively participate in research training in the groups of Biomedical Imaging and Biosignals Processing and the Bioinstrumentation group, at the Associated Laboratories Institute of Systems and Robotics (ISR) and Institute of Telecommunications (IT), respectively.

• **Biomolecular and Bioprocess Engineering**

This scientific area aims at the development of biological processes to obtain value-added products with potential applications in key areas such as the pharmaceutical, food, cosmetics and fine chemicals as well as in biofuels production and processing effluent and pollution control. This area covers the Biological Technologies, including Biocatalysis, Fermentation, Biological Reactors, Process Separation and Purification of Biomolecules, Monitoring and Control of Bioprocess and Biosystems Engineering. One of the areas of greatest impact and a main point of focus at IST is the production, purification and stabilization of proteins/enzymes and the "design" of improved bioconversion processes of substrates and waste to obtain compounds with high added value.

The Bioprocess and Biomolecular Engineering is divided in the subareas of:

Biomolecular Engineering: engineering of proteins, nucleic acids engineering, enzyme engineering, biocatalysis and biotransformations, biomolecular recognition.

Bioprocess Engineering: bioreactor, bioseparation and purification processes, project engineering, biosystems engineering, pharmaceutical engineering, food engineering, bioenergy, environmental biotechnology.

The Biomolecular and Bioprocess Engineering scientific area is deeply involved in the undergraduate formation in Biotechnology and Biological Engineering, as well as in advanced doctoral and postdoctoral training in the field. Students, at all levels, do have the opportunity to actively participate in research training in the laboratories of the BioEngineering Research Group of the Institute of Biotechnology and Bioengineering (IBB), Centre for Biological and Chemical Engineering at IST.

Research

Most of the research performed by the DBE faculty is in laboratories/institutions supported by the FCT (Fundação para a Ciência e a Tecnologia).

Research

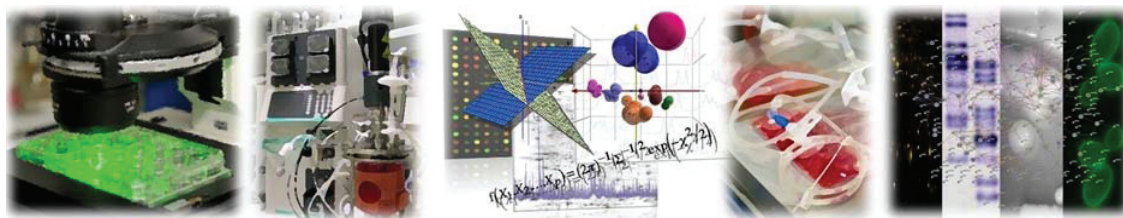
- **Laboratories of Biological Sciences and Bioengineering at Institute for Bioengineering and Biosciences** (<http://ibb.tecnico.pt>)
- **Laboratories of INESC-MN** (www.inesc-mn.pt)
- **NanoLab** (nanolab.ist.utl.pt)
- **Laboratories of Biomedical Imaging and Biosignals Processing at Associated Laboratory Institute for Systems and Robotics** (www.isr.ist.utl.pt)
- **Laboratory of Bioinstrumentation at Associated Laboratory**

Illustrative examples of the research carried on at the DBE can be found in the faculty pages that follow in Section 9.

iBB

Institute for Bioengineering and Biosciences

<http://ibb.tecnico.pt>



The Institute for Bioengineering and Biosciences (iBB) is a research unit at Instituto Superior Técnico (IST), Universidade de Lisboa (UL), classified as Excellent in the last international evaluation by FCT and ESF, aiming at excellence in research and advanced education in biotechnology by responding to the challenge of exploring innovative approaches to key scientific and technological questions in biosciences and bioengineering and of transforming scientific knowledge into tangible innovation. The mission of iBB is to promote cross-disciplinary research, development and education encompassing the biological and engineering disciplines for the benefit of the industrial, environmental and health sectors. iBB aims to create a research and educational environment to have an international impact, and to produce the next generations of leaders in Biotechnology.

This Institute was created in 2013, by the integration of the BioEngineering Research Group (BERG) and the Biological Sciences Research Group (BSRG), two research groups established in 1991. The research activities of BERG are focused on four core Research Programs on: Bioprocess and Biosystems Engineering, Bioseparation Engineering, Molecular Bioengineering and Stem Cell Bioengineering and Regenerative Medicine, whereas the research activities of BSRG are essentially focused in the fields of Molecular and Cellular Biology, Functional and Comparative Genomics and Microbial Biotechnology. The combined activities of the two Research Groups, BSRG and BERG,

aim at cutting edge research and strategic advanced education in fundamental and applied biological sciences, biotechnology and bioengineering.

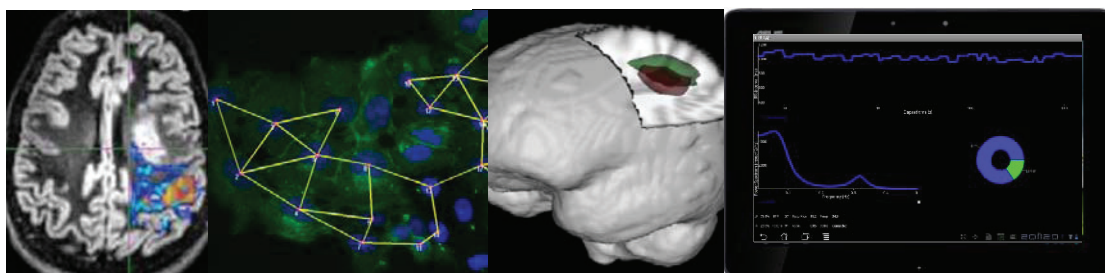
The iBB strategic program is focused on advancing knowledge, developing innovative tools, technologies and materials, solving pressing challenges and training human resources within four specific thematic lines: 1) STEM CELL ENGINEERING: TOOLS AND APPLICATIONS, 2) ADVANCED BIOPROCESS ENGINEERING, 3) POST-GENOMIC TECHNOLOGIES TO BOOST BIOLOGICAL SCIENCES AND BIOENGINEERING RESEARCH and 4) RESPONSE AND RESISTANCE TO ENVIRONMENTAL CHALLENGES.

iBB currently has 21 Faculty members, all from DBE, 5 Research Scientists and 18 post-doc fellows and 38 PhD students. DBE faculty members at iBB supervise students from the Doctoral Programs in Biotechnology, Bioengineering and Biomedical Engineering, and from the Masters programs in Biological Engineering, Biotechnology, Biomedical Engineering, Bioengineering and Nanosystems, Biomedical Technologies and Microbiology.

DBE faculty and research scientists: Joaquim Cabral, Isabel Sá Correia, Maria Raquel Aires-Barros, Duarte Miguel Prazeres, Luis Fonseca, Arsénio Fialho, José Cardoso Menezes, Jorge Leitão, Manuela Fonseca, Ana Cristina Viegas, Helena Pinheiro, Marília Mateus, José Santos, Leonilde Moreira, Ângela Taipa, Gabriel Monteiro, Cláudia Lobato da Silva, Miguel Teixeira, Nuno Mira, Margarida Diogo, Frederico Ferreira, Teresa Pinheiro, Pedro Fernandes, Carla Carvalho, Ana Azevedo.

ISR / LARSyS

Institute for Systems and Robotics, Av. Rovisco Pais, 1, 1049-001 Lisboa
www.isr.ist.utl.pt



The Institute for Systems and Robotics (ISR/IST), an IST's R&D unit, is home to more than 40 PhDs and one of the largest members of LARSyS (Laboratory for Robotics and Engineering Systems - www.larsys.pt). ISR/IST carried out multidisciplinary research addressing key scientific questions in Robotics and Engineering Systems, with impact in ocean, urban, aeronautic/space, biomedical and future work environments, leading to new frontiers of knowledge, its transfer to the industry and the training of skilled human resources that meet the highest international standards, including the leadership of and participation in world-class doctoral training programs with top universities (e.g. dual/joint degrees with MIT, EPFL, CMU). ISR/IST develops state-of-the-art engineering solutions and projects with a clear societal impact, and has a long track record of participation in EU and other international projects. ISR/IST hosts five groups working in Robotics and Information Processing, Systems and Control Theory, Signal Processing, Computer Vision, Optimization, Intelligent Systems and Biomedical Engineering.

In the area of Bioengineering, ISR is dedicated to research and development in Biomedical Systems and Signals, particularly focused on modeling and simulation of biological and population systems, signal and image processing applied to physiological signals and biological and medical images, and in classification problems under machine learning theory for diagnostic purposes. A special emphasis is given to the study of the human brain, particularly through the use of neuroimaging techniques, with applications in disease, sleep and cognition, as well as bio- and neuro-feedback applied to personal development and to therapy and rehabilitation, and more recently also in pathologies such as epilepsy, dementia and cerebrovascular disease.

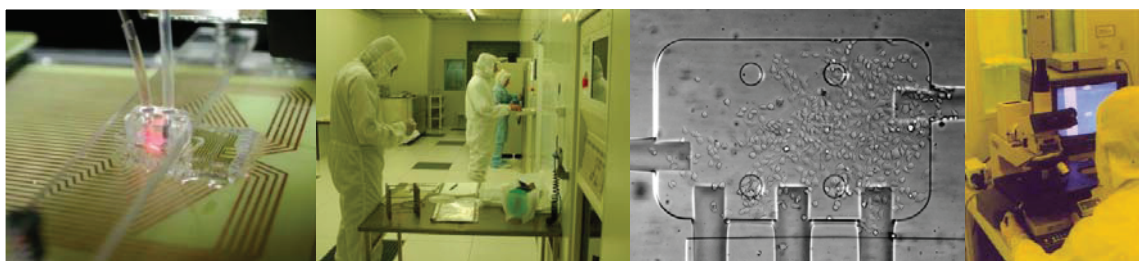
DBE faculty members at ISR/LARSyS supervise students predominantly from the Masters and Doctoral Programs in Biomedical Engineering, but also from the programs in Biological Engineering, Electrical and Computer Engineering, and Physics Engineering, among others.

Most of the research work is performed in collaboration with national institutions on the area of medicine and biology, such as the Medical School of the University of Lisbon (FMUL), the Institute of Molecular Medicine (IMM) in Lisbon, the Imaging Department of Hospital da Luz S.A., the Institute of Molecular Pathology and Immunology of the University of Porto (IPATIMUP) and the Electroencephalography and Clinical Neurophysiology Center (Centro de Electroencefalografia Neurofisiologia Clínica - CENC), as well as with several international institutions such as the Wellcome Centre for Neuroimaging and Institute of Neurology, University College London (UCL), the Center for Biomedical Imaging (CIBM), École Polytechnique Fédérale de Lausanne (EPFL), the Athinoula A. Martinos Center for Biomedical Imaging within the Harvard-MIT Program in Health Sciences and Technology (HST/HMS/MIT), and with the Meditron Electro Medicine, São Paulo, Brazil.

DBE faculty members: Agostinho Rosa, João Sanches, Patrícia Figueiredo

INESC MN

Instituto de Engenharia de Sistemas e Computadores - Microsistemas e Nanotecnologias, Rua Alves Redol, 9, 1000-029 LISBOA
www.inesc-mn.pt



INESC Microsistemas e Nanotecnologias is a private, non-profit research and development center whose core research activities are in the areas of nanoelectronics, information technology (magnetic data storage and non-volatile memories, magnetic thin films and nanostructures, thin film MEMS, large area electronics and sensors), and integrated lab-on-a-chip biosensors and biomedical devices. INESC-MN operates a 250 m² Class 100 and Class 10 Cleanroom for micro and nanofabrication constructed in 1992/1993. Available micro and nanofabrication for feature sizes down to 1.2 μm (optical) and 20 nm (e-beam). Extended experience in soft-lithography and microfluidics. INESC MN is the coordinating institution of IN – Institute of Nanoscience and Nanotechnology. INESC MN coordinates the FCT-Doctoral Programme on Advanced Integrated Microsystems (AIM). Recently, INESC MN became the Lisbon node of the Micro&NanoFabs@PT of the Roteiro Nacional de Infraestruturas (RNIE). The laboratory currently has 5 senior PIs, 6 post-doc fellows, 15 PhD students, ~10-15 master students, 3 research interns and 3 cleanroom engineers. INESC MN is an associated research institution and includes faculty from Instituto Superior Técnico (IST).

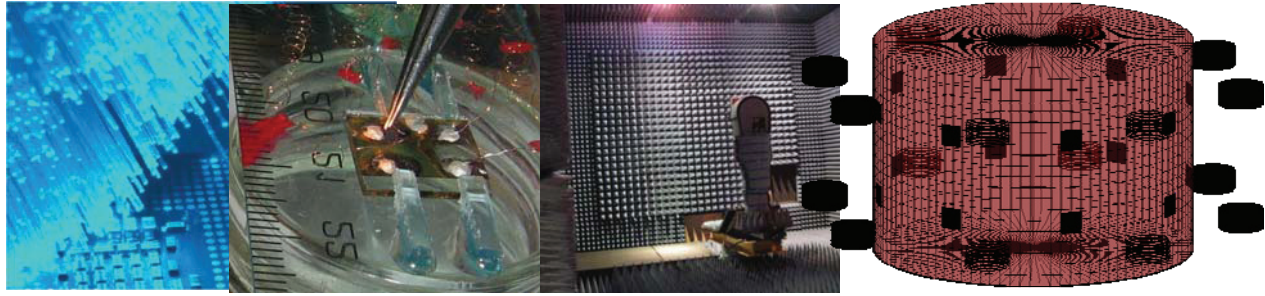
DBE students at the 2nd and doctoral level do thesis research at INESC MN mostly in the fields of microfluidics – including miniaturized biological separation and microreactors, lab-on-chip systems, biosensor development, and cell-chips. Main applications of these studies are in microsystems for food safety and point-of-care health applications, and in biochips for screening of cellular processes. An important part of this work is performed with collaborations of researchers from iBB.

DBE faculty members: João Pedro Conde

Instituto de Telecomunicações

Instituto Superior Técnico, Torre Norte Piso 10, Av. Rovisco Pais, 1, 1049-001 LISBOA

www.it.pt



Instituto de Telecomunicações **it** is a private, non-profit organization of public interest established in 1992 with a wide core of research interests spanning 4 main areas: Wireless Communications, Optical Communications, Networks and Multimedia and Basic Sciences and Enabling Technologies. Research activities are supported on over 40 research groups distributed through 3 sites (Lisboa, Aveiro and Coimbra) and 4 branches (Lisboa, Covilhã, Porto and Leiria) having direct partnerships with 6 Portuguese universities and 1 Portuguese polytechnic while hosting more than 300 PhD researchers (6 IEEE Fellows), 250 PhD students and 200 MSc students. The Instituto de Telecomunicações **it** also has a direct partnership with one public telecom operator and one telecom equipment manufacturer.

DBE students at the master and doctoral level do thesis research at Instituto de Telecomunicações **it**, Lisbon site, mostly in the area of Basic Sciences and Enabling Technologies, covering the fields of imaging, signal processing, organic electronics, bioelectronics and biomedical instrumentation.

DBE faculty members: Jorge Morgado, Ana Fred, Raul Carneiro Martins

6. Bioengineering Seminar Series

The following is the list of the DBE Bioengineering Seminar Series of 2014. We thank all the speakers for the generosity of their time and for their challenging and exciting presentations.

31 de Março

Bruno Sommer Ferreira

CEO, Biotrend - Inovação e Engenharia em Biotecnologia, S.A. Biocant Park, Cantanhede, www.biotrend.biz

Do curso a um percurso em curso

7 de Abril

Cecília Arraiano

Control of Gene Expression group, ITQB, Oeiras

RNA, RNases and the control of gene expression

14 de Abril

Ana Fred

Pattern and Image Analysis Group, IT, and Department of Bioengineering, IST

Physiological Computing: Emotion and Identity based on Biosignals

28 de Abril

Margarida Diogo

Stem Cell Bioengineering Lab, IBB, and Department of Bioengineering, IST

Bioengineering strategies for production and purification of human pluripotent stem cell derivatives

12 de Maio

Maria Carmo-Fonseca

Cell Biology, Instituto de Medicina Molecular, Faculdade de Medicina da Universidade de Lisboa

Combining mathematical modeling and live cell microscopy to track gene expression in real time

26 de Maio

João Gonçalves

Faculdade de Farmácia, Universidade de Lisboa, and Instituto de Medicina Molecular

Engineering multifunctional antibody-based proteins for therapy

27 de Outubro

Paulo Fernandes

Departamento de Engenharia Mecânica e IDMEC, Instituto Superior Técnico, Universidade de Lisboa

Scaffold design for bone tissue engineering

13 de Novembro

Fernando Lopes da Silva

Emeritus Professor, Center of Neuroscience, Swammerdam Institute for Life Sciences, Amsterdam, The Netherlands, Instituto Superior Técnico, and Faculdade de Medicina, Universidade de Lisboa

Sinais e Modelos: como prever e controlar crises epilépticas

24 de Novembro

Filipa Fixe

Responsável Unidades de Negócio: Saúde, Educação e Serviços Financeiros, PT-Telecom, Lisboa, Portugal

O futuro da saúde e educação?

1 de Dezembro

Fernando Bernardo

Faculdade de Medicina Veterinária, Universidade de Lisboa

Segurança alimentar

2 de Dezembro

Christopher R. Jacobs

Department of Biomedical Engineering, Columbia University

Integrating cellular mechanobiology and biomechanics and the emergence of primary cilia as mechanosensors

15 de Dezembro

Miguel Prazeres

Departamento de Bioengenharia, Insituto Superior Técnico, Universidade de Lisboa

Bioactive paper applications based on carbohydrate binding module fusions

7. Doctoral Thesis

The following are the Doctoral dissertations successfully defended in 2014 in the 3rd cycle courses coordinated by the DBE. We extend our congratulations to all the students, and wish them the best in their future careers. Many of these theses were supervised or co-supervised by the DBE members. Their names are in bold. We also extend our sincerest thanks to all the colleagues from other departments who participated in the supervision of many of these theses.

PhD in Biotechnology

Student Name: Fátima do Rosário Nunes Gil

Title: Development of bioassays for pesticide toxicity assessment using the eukaryotic models *Saccharomyces cerevisiae* and *Caenorhabditis elegans*

Supervisores: Cristina Viegas/Jorge Leitão

Student Name: Mário Rui Almeida dos Santos

Title: *Sinorhizobium meliloti* outer membrane protein TolC and the transcriptional repressor EmrR are bacterial determinants of root-nodule symbiosis

Supervisores: Leonilde de Fátima Moraes Moreira/ Jorj Becker

Student Name: Luís Miguel de Oliveira e Silva Raiado Pereira

Title: Hydrophobic Interaction Membrane Chromatography for the Downstream Processing of Plasmid DNA

Supervisores: Marília Clemente Velez Mateus/Duarte Miguel Teixeira dos Prazeres

Student Name: Ana Catarina da Silva Portinho e Costa

Title: Antifungal drug resistance in the pathogenic yeast *Candida glabrata*: emphasis on the role of uncharacterized drug:H⁺ antiporters

Supervisores: Miguel Teixeira

PhD in Biomedical Engineering

Student Name: Maria Filomena Jorge Ribeiro

Title: Personalized pseudophakic model

Supervisores: João Alberto dos Santos Mendanha Dias /António Joaquim Rodrigues Castanheira Dinis

Student Name: Paula Cristina do Rosário Fernandes

Title: Biomechanics of the Spine: the Anterior Cervical Fusion

Supervisores: Paulo Rui Alves Fernandes

Student Name: Alexandre Domingues

Title: Ambulatory Sleep Assessment From Behavioural and Physiological Data

Supervisores: João Miguel Raposo Sanches

Student Name: Lina Maria Correia Espinha

Title: Biomechanical study of primary cilia and microtubules

Supervisores: Paulo Rui Alves Fernandes

Student Name: Ângela Vanessa Chan

Title: Biomechanical analysis of the influence of different tibial tray designs in TKA

Supervisores: Paulo Rui Alves Fernandes

Student Name: Cláudia Sofia Marques Ferreira

Title: The ClearPEM detector in breast cancer: correction methods for improved imaging

Supervisores: Pedro Miguel Dinis de Almeida/ João Manuel Coelho dos Santos Varela

PhD in Bioengineering

Student Name: João Diogo da Trindade Guerreiro Guerreiro

Title: Strategies for Myogenic Differentiation of Adult Stem Cells Towards Therapeutic Applications

Supervisores: Cláudia Lobato da Silva/Joaquim M. Sampaio Cabral/Robert Langer/Daniel Griffith Anderson

Student Name: Jorge Augusto Dias Ventura de Carvalho

Title: Impedance Spectroscopy Analysis of Protein-Surface Interaction Using Acoustic and Interdigital Label-Free Sensors

Supervisores: Guilherme Matos Ferreira/ Joaquim M. Sampaio Cabral

Student Name: Nuno Ricardo Torres Faria

Title: Yeast mannosylerythritol lipids from lignocellulose: a novel strategy for the production of jet biofuel

Supervisores: Frederico Castelo Alves Ferreira/ César Simões da Fonseca/Bruce Tidor

Student Name: Paulo Emanuel Luzio de Melo

Title: A Novel Functional Electrical Stimulation System and Strategies For Motor Rehabilitation

Supervisores: Miguel Pedro Tavares da Silva/ Dava Newman

Student Name: Rúben Duarte Magalhães Alves Pereira

Title: Data-Based Modeling And Classification to Improve Outcomes In the Intensive Care Unit

Supervisores: João Miguel da Costa Sousa/Stan Neil Finkelstein-MIT

Student Name: Joana Maria Rosado da Silva Coelho

Title: Towards A Risk Assessment Model For Biocide Use

Supervisores: Ana Teresa Correia de Freitas

Student Name: Ana Rita Carvalho Domingues

Title: On the Development of an Active Soft Second-Skin Orthotic for Dropfoot Patients

Supervisores: Jorge Manuel Mateus Martins/ Prof. Miguel Tavares da Silva/Dava Newman

8. Master Thesis

The following are the Master dissertations successfully defended in 2014 in the courses coordinated by the DBE. We extend our congratulations to all the students, and wish them the best in their future careers. Many of these theses were supervised or co-supervised by the DBE members. Their names are in bold. We also extend our sincerest thanks to all the colleagues from other departments who participated in the supervision of many of these theses.

Integrated Master Degree (MSc) in Biological Engineering

Student Name: Ana Cláudia Teixeira Castanheiro

Thesis Title: A comparative study between biomagnetic analysis and scanning electron microscopy of particulate matter deposition on urban green

Supervisors: **Carla C. C. Rocha de Carvalho** and Roeland Samson

Student Name: Ana Filipa Santos Arronches

Thesis Title: Pesquisa de resistência a antibióticos em alguns enterococos intestinais provenientes de diferentes amostras de águas

Supervisors: **Helena M. R. V. Pinheiro** and Ricardo J. P. R. dos Santos

Student Name: Ana Lúcia Bulário Morais

Thesis Title: Definição e implementação de estratégias de melhoria contínua no processo produtivo de margarinas

Supervisors: **Marília C. V. Mateus** and Carla I. C. Pinheiro

Student Name: Ana Luísa Parruca da Cruz

Thesis Title: Mechanical properties of PTMC scaffolds constructed by Stereolithography for the repair of Annulus Fibrosus tissue. Effect of scaffold characteristics on cell adhesion and proliferation

Supervisors: **Frederico C. A. Ferreira** and André A. Poot

Student Name: Ana Margarida Couras dos Santos

Thesis Title: Projecto de melhoria contínua: aumento da 'Eficiência Global dos Equipamentos' e da capacidade instalada numa linha de produção alimentar

Supervisors: **Marília C. V. Mateus** and Cristina M. J. L. Faustino

Student Name: Ana Raquel Correia Pires

Thesis Title: Modelação da digestão anaeróbia da ETAR de Vila Franca de Xira com Redes Neurais Artificiais

Supervisors: **Helena M. R. V. Pinheiro** and Diana Figueiredo

Student Name: Ana Sofia Santos Sousa

Thesis Title: Produção microbiana de lípidos e carotenóides em culturas da levedura *Rhodospiridium toruloides* NCYC 921 desenvolvidas em regime semi-descontínuo

Supervisors: **José A. L. dos Santos** and Maria Teresa S. Lopes da Silva

Student Name: André Mendes Almeida

Thesis Title: Development and Optimization of a Polymer Microfluidic System for Magnetic Cell Capture

Supervisors: **Duarte Miguel F.T. dos Prazeres** and Pedro Nunes

Student Name: António Pedro Lopes Páscoa Ramos

Thesis Title: Effect of cell wall modifying enzymes on the rheological behaviour of citrus fibres dispersions

Supervisors: **Marília C. V. Mateus** and Harry van der Hijden
Student Name: Anton Sigmund Christoph Schultze-Jena
Thesis Title: Process strategy for food enzyme purification using Expanded Bed Absorption in laboratory and pilot scale
Supervisors: **Duarte Miguel F. T. dos Prazeres** and Gabriel E. J. Freydell

Student Name: Carla Sofia Fernandes Morais
Thesis Title: Escalonamento do Cultivo e Extração de Óleo das microalgas *Monoraphidium* sp. e *Scenedesmus* sp. para a produção de Biodiesel
Supervisors: **Helena M. R. V. Pinheiro** and Donato A. G. Aranda

Student Name: Carolina Gomes Sanches Fernandes
Thesis Title: Size doesn't matter: The influence of cell diameter on lipid productivity of *Chlorococcum littorale* using fluorescence cell sorting
Supervisors: **Frederico C. A. Ferreira** and Dorinde Kleinegris

Student Name: Cláudia Isabel Martins Paiva e Cunha
Thesis Title: Natural Organic Matter Characterization in Drinking Water by Fluorescence Spectroscopy
Supervisors: **Nídia D. M. Lourenço de Almeida** and Laura S. P. P. Monteiro

Student Name: Cláudia Patrícia Almeida Alves
Thesis Title: Development of a method for the purification of minicircles
Supervisors: **Duarte Miguel F. T. dos Prazeres** and **Gabriel A. A. Monteiro**

Student Name: Cláudia de Sousa Medeiros Cordeiro
Thesis Title: Scalable Expansion of Human Induced Pluripotent Stem Cells (hiPSC) under Xeno-free Conditions
Supervisors: **M. Margarida F. R. Diogo** and **Tiago P. G. Fernandes**

Student Name: Diogo de Sacadura Rodrigues
Thesis Title: Microbial community optimization for electricity generation in Microbial Fuel Cells
Supervisors: **Luís J. Pina da Fonseca** and Anne S. Meyer

Student Name: Eduarda Isabel Anacleto Espadinha
Thesis Title: Depicting the mechanism of action of an ATMP for the development of the potency assay
Supervisors: **Cláudia A. M. Lobato da Silva** and Francisco F. dos Santos

Student Name: Emanuel Filipe Alves Lopes
Thesis Title: Development of an online method for determination of the apparent viscosity inside stirred tank reactors
Supervisors: **José A. L. dos Santos** and Martin Wunderlich

Student Name: Filipa Martins Ribeiro
Thesis Title: Generation of liver specific endothelial cells for co-culture with hepatocytes
Supervisors: **M. Margarida F. R. Diogo** and Ruben Boon

Student Name: Filipa Vieira de Sousa
Thesis Title: The influence of surface chemistry on osteogenic differentiation of hMSCs
Supervisors: **Cláudia A. M. Lobato da Silva** and Lorenzo Moroni

Student Name: Giovanni Zaccaria
Thesis Title: Roots facing water deficit: abscisic acid plays a key role in mediating stress avoidance in poplar
Supervisors: **Gabriel A. A. Monteiro** and Christoph Sperisen

Student Name: Gonalo Nuno Barata Fonte
Thesis Title: The effect of key process parameters on human mesenchymal stem cell expansion and harvest
Supervisors: **Cl udia A. M. Lobato da Silva** and Qasim Ali Rafiq

Student Name: Guilherme Remane Benedito
Thesis Title: Preliminary evaluation of the biochemical composition of an ethanol producing *Synechocystis* sp. PCC 6803 strain with emphasis on carotenoid and phycobiliprotein fractions
Supervisors: **Jos  M. C. Menezes** and Lu sa M. R. Gouveia da Silva

Student Name: In s Carreiras Marques dos Santos
Thesis Title: Cell stiffness assessment based on nuclei morphological response to patterned surfaces
Supervisors: **Gabriel A. A. Monteiro** and Aliaksei Vasilevich

Student Name: In s Daniela Marques Graa
Thesis Title: Aumento de escala de produ o e ajustes nas especifica es de uma nova bolacha
Supervisors: **Mar lia C. V. Mateus** and Liliana I. P. S. Bernardino

Student Name: Joana Neves dos Reis
Thesis Title: Assessment of cell response to microcarriers biofunctionalisation with a bi-functional fusion protein
Supervisors: **Gabriel A. A. Monteiro** and Ivan Wall

Student Name: Joana Rita Mendes Tavares
Thesis Title: Mitochondria function and biogenesis on Oligodendrocyte Precursor Cells differentiation *in vitro*
Supervisors: **M. Margarida F. R. Diogo** and Ana Isabel P. Amaral

Student Name: Jo o Fernandes Mateus
Thesis Title: Towards a high-throughput microfluidic drug discovery platform for the screening of GPCR targets in cells
Supervisor: **Jo o Pedro E. R. Conde**

Student Name: Jo o Gil Fragoso Gaspar
Thesis Title: Optimization of the composition and recycling strategy of the culture medium for industrial production of microalgae
Supervisors: **Lu s J. Pina da Fonseca** and Lu s F. A. Costa

Student Name: Jo o Pedro Ara jo Fernandes
Thesis Title: Safety and Consumer Handling of Lettuce in the Belgian Consumer Market
Supervisors: **A. Cristina A. M. Viegas** and Mieke Uyttendaele

Student Name: Jos  Pedro Aranha Carvalho dos Santos
Thesis Title: Membrane-based purification of viral particles
Supervisors: **Mar lia C. V. Mateus** and Louis Villain

Student Name: Leonor Gabriel Guedes da Silva
Thesis Title: Phenotypic Signature of Drug Response in Prostate Cancer Cells
Supervisors: **Ars nio C. S. M. Fialho** and Denis Wirtz

Student Name: Liliana Mafalda Soares Fernandes
Thesis Title: Modela o da digest o anaer bia da ETAR da Guia com Redes Neurais Artificiais
Supervisors: **Helena M. R. V. Pinheiro** and Catarina Correia

Student Name: Luís Jorge Marques Carvalho
Thesis Title: Characterization of bioglass electrospun nanofibers and influence of RGD binding motifs on stem cell activity
Supervisors: **Frederico C. A. Ferreira** and Lorenzo Moroni

Student Name: Marcelo da Silva Ferreira
Thesis Title: The effect of mechanical loading on the viability of skeletal muscle cells
Supervisors: **Cláudia A. M. Lobato da Silva** and Christian P. Pennisi

Student Name: Margarida Castro Gomes
Thesis Title: Analysis of a role of the LysR-type regulator ShvR in virulence of *Burkholderia cenocepacia* using zebrafish as a model
Supervisors: **Jorge H. G. Leitão** and Annette C. Vergunst

Student Name: Mariana Simões de Araújo
Thesis Title: Caracterização e validação de novo fotobiorreator do tipo bubble column com agitação axial para produção de single-cell oil microalgal para biodiesel
Supervisors: Sebastião M. T. da Silva Alves and Alberto J. D. dos Reis

Student Name: Marina Sofia Ivanova Esteves
Thesis Title: Interação de dois ácidos biliares, um citotóxico e um citoprotetor, com modelos biomembranares
Supervisor: Benilde J. V. Saramago

Student Name: Maria Constança de Magalhães Ilharco Cornélio da Silva
Thesis Title: Pilot scale purification of Food Enzymes with Expanded Bed Chromatography
Supervisors: **Duarte Miguel F. T dos Prazeres** and Guilherme N. P. C. Matos Ferreira

Student Name: Maria Inês Baptista Leite
Thesis Title: Optimization of culture conditions for artificial blastocysts
Supervisors: **M. Margarida F. R. Diogo** and Erik J. Vrij

Student Name: Maria Inês Perestrelo Albuquerque de Pontes Leça
Thesis Title: Using CRISPR/Cas9 technology to probe centrosomal protein function
Supervisors: **Arsénio C. S. M. Fialho** and Fanni Gergely

Student Name: Maria João Pardelha da Cruz
Thesis Title: Using *Drosophila* to study regulation of neural stem cell quiescence by nucleocytoplasmic transport
Supervisors: **M. Margarida F. R. Diogo** and Rita M. D. de Sousa-Nunes

Student Name: Marisa Rebelo Clemente
Thesis Title: Revisão do Sistema HACCP e Aplicação de Estratégias de Melhoria Contínua para Redução de Defeitos Críticos do Produto Final em Linhas de Produção Alimentar
Supervisor: M. Mercedes L. T. Esquível

Student Name: Marta Alexandra Freire Alves
Thesis Title: Effect of cultivation conditions on antimicrobial production in *Lactococcus lactis*
Supervisors: **Duarte Miguel F. T. dos Prazeres** and Fátima C. C. Rodrigues

Student Name: Miguel Alexandre Perdigão Silva
Thesis Title: Protein and Dye conversion in Aerobic Granular Sludge process
Supervisors: **Nídia D. M. Lourenço de Almeida** and Marinus C. M. von Loosdrecht

Student Name: Nuno Coutinho Guardado Correia Alfarroba
Thesis Title: Flow entrapment of synthetic and bio-nanoparticles in monoliths
Supervisors: **Ana Margarida N. M. P. de Azevedo** and Alois Jungbauer

Student Name: Nuno Filipe Depetri Araujo
Thesis Title: Development of a model for the calculation of the CER in a RAMOS device
Supervisors: **Pedro C. B. Fernandes** and Andreas Schulte

Student Name: Pedro Gil Gameiro Eloy Sena Rego
Thesis Title: Paving a Freezing Way to Defeat Malaria
Supervisors: Miguel A. J. Rodrigues and Miguel Prudêncio

Student Name: Rafael Alexandre Mota Batista Santos
Thesis Title: Optimization of a Membrane Production Process according to PAT
Supervisors: **José M. C. Menezes** and Marek Hoehse

Student Name: Ricardo Afonso Gonçalves Pereira
Thesis Title: Adaptation Studies and Proteomic Analysis of Carboxidotrophic Methanogens
Supervisors: **Miguel N. P. C. Teixeira** and Diana Zita M. de Sousa

Student Name: Ricardo Jorge Carvalho Correia
Thesis Title: Influence of Physical and Chemical Treatments on Cell Survival and Acquisition of Pluripotency
Supervisors: **Cláudia A. M. Lobato da Silva** and Petra de Sutter

Student Name: Rita Alexandra Martins Caeiro
Thesis Title: Antioxidant effect of caffeic acid alkyl esters in sunflower oil and their combination with other antioxidants
Supervisors: **Marília C. V. Mateus** and Iveta Hradkova

Student Name: Sara Isabel da Conceição Dias
Thesis Title: Análise e melhoramento dos níveis de qualidade percebidos pelo consumidor através do controlo interno de variáveis relativas ao processo e ao produto
Supervisors: **Marília C. V. Mateus** and Sandra Filipa A. B. Borges

Student Name: Sara Ricardo Carvalho Mesquita
Thesis Title: Identification and quantification of unwanted coloring agents through spectroscopy and chemometrics
Supervisors: **José M. C. Menezes** and Åsmund Rinnan

Student Name: Sérgio Jacob Ribeiro
Thesis Title: Monitorização e Gestão dos efluentes produzidos na fábrica de biodiesel da Galp Energia, Enerfuel, em Sines
Supervisors: M. Joana C. B. A. T. Neiva Correia and Sandrina S. Amaral

Student Name: Sofia Tirado Santos
Thesis Title: Deep exploration of the benefits and drawbacks of sparse-based models in NIR, Raman and Hyperspectral Imaging
Supervisors: **José M. C. Menezes** and Jose M. A. Rubio

Student Name: Tiago Miguel da Chica Aguiar
Thesis Title: Integrated strategies for up- and down-stream bioprocessing of human mesenchymal stem cells
Supervisors: **Cláudia A. M. Lobato da Silva** and M. Margarida C. N. Serra

Student Name: Tiago José Sequeira Albano
Thesis Title: Development of production processes for new-to-nature biosurfactants
Supervisors: **Nuno G. P. Mira** and Sophie L. K. W. Roelants

Integrated Master Degree (MSc) in Biomedical Engineering

Student Name: Ana Catarina dos Santos Farinha
Thesis Title: A behavioral investigation of the algorithms underlying reinforcement learning in humans
Supervisors: **Patrícia M. P. Figueiredo** and Tiago V. Maia

Student Name: Ana Filipa do Rosário Mendes Vieira
Thesis Title: Computational Simulation of Buses Accidents with Biomechanical Models, Injury Analysis and Seat Belt Role
Supervisors: João M. P. Dias and Jorge M. M. C. Santos

Student Name: Ana Margarida Martins Barata
Thesis Title: Bone Remodeling Analysis After Total Ankle Arthroplasty
Supervisors: Paulo R. A. Fernandes and João O. M. G. Folgado

Student Name: Ana Raquel Pina Porteira
Thesis Title: Rett Syndrome Modeling from Human Induced Pluripotent Stem Cells Using a Monolayer Culture System
Supervisors: **M. Margarida F. R. Diogo** and **Tiago P. G. Fernandes**

Student Name: Ana Rita Simões Gonçalves de Carvalho
Thesis Title: Evaluation and improvement of the performance of an adaptive optics scanning laser ophthalmoscope
Supervisors: João A. S. M. Dias and Michael Pircher

Student Name: Ana Rita Sousa de Oliveira
Thesis Title: Development of a Musculotendon Model Within the Framework of Multibody Systems Dynamics
Supervisors: Miguel P. Tavares da Silva and Mamede A. de Carvalho

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Thesis Title: Development of Capacitive Electrodes
Supervisors: **Jorge M. F. Morgado** and M. Isabel S. Rocha

Student Name: Andreia Liliana Duarte Fernandes Ferreira
Thesis Title: Predicting the Conversion from Mild Cognitive Impairment to Alzheimer's Disease using Evolution Patterns
Supervisors: Sara A. C. Madeira and Alexandre V. de Mendonça

Student Name: Andreia Sofia Santana dos Santos
Thesis Title: Comprehensive characterization of human mesenchymal stem/stromal cells from healthy donors and acute myocardial infarction patients
Supervisors: **Cláudia A. M. Lobato da Silva** and **Joaquim M. S. Cabral**

Student Name: Ângelo Rodrigo Neto Dias
Thesis Title: Mechanistic characterization of reinforcement learning in healthy humans using computational models
Supervisors: **Patrícia M. P. Figueiredo** and Tiago Maia

Student Name: Carolina de Freitas Pereira Ruivo
Thesis Title: Multiplex detection of cell surface markers using Surface Plasmon Resonance Imaging
Supervisors: **Luís J. Pina da Fonseca** and Ivan Stojanovic

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Thesis Title: Computational Modeling of the Biodegradation Process in a Scaffold for Tissue Engineering
Supervisors: Paulo R. A. Fernandes and José A. P. L. Miranda Guedes

Student Name: Catarina Realista Coelho dos Santos Pedrosa
Thesis Title: Unravelling the molecular basis of α -Synuclein toxicity in yeast using a microfluidic structure with integrated photodiodes
Supervisors: **João Pedro E. R. Conde** and Tiago F. Outeiro

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Thesis Title: Automatic arrhythmia classification: a pattern recognition approach
Supervisors: **Ana Luísa N. Fred** and Rui C. Ferreira

Student Name: David Jorge Carvalho Fernandes
Thesis Title: Finite Element Analysis of the ACL-deficient knee
Supervisors: Paulo R. A. Fernandes and João O. M. G. Folgado

Student Name: Joana Catarina Capinha de Matos
Thesis Title: Design and production of silica and ORMOSIL nanoparticles for gene delivery
Supervisors: M. Clara H. B. Gonçalves and **Gabriel A. A. Monteiro**

Student Name: João Daniel Marques Ramalhinho
Thesis Title: Implementation of a 3D TRUS Acquisition System for Robotized Focal Biopsies of the Prostate: An approach using 3D Integrated Transducers
Supervisors: Jorge M. M. Martins and Jorge M. T. Rebola

Student Name: João Filipe Duarte Pina dos Santos
Thesis Title: Metodologia de Apoio à Contratualização de Cuidados de Saúde Primários
Supervisors: Mónica D. C. de Oliveira and Paulo J. M. Z. Nicola

Student Name: João Guilherme Antunes Martins
Thesis Title: Multimodal Data Acquisition for Dermatology Using Google Glass
Supervisors: Jorge S. S. Marques and João P. S. A. Costeira

Student Name: João Pedro Isaías Abrantes
Thesis Title: Functional connectivity measures of scalp EEG and multimodal EEG-fMRI integration in epilepsy
Supervisors: **Patrícia M. P. Figueiredo** and Alberto Leal

Student Name: Maíke Coelho Afonso Gomes
Thesis Title: Inverted colloidal crystal scaffolds based on a biodegradable polyester for cartilage tissue engineering: production, physico-chemical characterization, and in vitro evaluation
Supervisors: **Cláudia A. Martins Lobato da Silva** and Jorge A. M. C. Silva

Student Name: Maria Consiglieri Pedroso Bernardes
Thesis Title: Construção de probabilidades subjetivas para riscos de segurança e saúde no trabalho com base na abordagem MACBETH
Supervisors: Mónica D. C. de Oliveira and M. Fátima Reis

Student Name: Maria Inês Barbosa Silva Crujo Uva
Thesis Title: Detecting Conversion of Mild Cognitive Impairment to Alzheimer - A Comparison Between Classifiers
Supervisor: M. Margarida Campos da Silveira

Student Name: Marília Dias Silva
Thesis Title: High sensitivity MR sensors incorporated in silicon needles for magnetic neuronal response detection
Supervisors: Susana I. P. Cardoso de Freitas and Ana Maria F. S. Sebastião

Student Name: Marta Luísa Rodrigues Ornelas
Thesis Title: Towards an adenosine wave detection for neuroscience applications – an aptamer based approach
Supervisors: **João Pedro E. R. Conde** and Ana Maria F. S. Sebastião

Student Name: Miguel Guerreiro da Cunha de Almeida
Thesis Title: Bioglasses: Biosignal-based Biometrics using Sensors
Supervisors: **Ana Luísa N. Fred and Raúl D. L. C. Martins**

Student Name: Miguel Rodrigues Mendes
Thesis Title: Evaluating the electrode measurement sensitivity of subdermal electroencephalography electrodes
Supervisors: **Patrícia M. P. Figueiredo** and Katrina Wendel-Mitoraj

Student Name: Pedro Alvaro Chagas
Thesis Title: InVivo Muscle – Analysis of Functionality-related Patterns
Supervisors: **Ana Luísa N. Fred** and Mamede A. de Carvalho

Student Name: Pedro Miguel Falcato Velez
Thesis Title: Internationalization of Molecular Medicine Companies: GenoMed's Case Study
Supervisors: M. Teresa R. de Lemos and Gabriel M.-Miltenyi

Student Name: Pedro Nuno Brazão Faria
Thesis Title: Analyses of alternative splicing landscapes in clear cell renal cell carcinomas reveal putative novel prognosis factors
Supervisors: Susana A. M. V. Martins and Nuno L. B. Morais

Student Name: Rafael Filipe Lopes Gonçalves
Thesis Title: Electrical Impedance Tomography: Thorax
Supervisors: **Raúl D. L. C. Martins** and M. Isabel S. Rocha

Student Name: Rui Miguel Raposo Pinto
Thesis Title: Electrokinetic and optical detection of nucleic acids for biomedical diagnosis in microfluidics
Supervisors: **João Pedro E. R. Conde** and Francisco J. L. Enguita

Student Name: Sandro Daniel Sabudin Nunes
Thesis Title: Characterization of physiological noise in resting state fMRI data at 7T
Supervisors: **Patrícia M. P. Figueiredo** and Fernando H. Lopes da Silva

Student Name: Teresa Margarida Ponte Rodrigues Pereira
Thesis Title: Biomechanics of the Total Knee Replacement: Predicting the effect of the tibial component's alignment in the fixation of the implant
Supervisors: João O. M. G. Folgado and Paulo R. A. Fernandes

Student Name: Tiago Miguel Sousa Salgueiro
Thesis Title: Robot assisted needle interventions for brain surgery
Supervisors: Jorge M. M. Martins and Manuel H. Carvalho

Student Name: Vasco Manuel Aranha da Conceição
Thesis Title: Study of habit learning impairments in Tourette syndrome and obsessive-compulsive disorder using reinforcement learning models
Supervisors: José A. R. Santos Victor and Tiago V. Maia

Master Degree (MSc) in Biotechnology

Student Name: Ana Catarina dos Reis Faria
Thesis Title: Development of rapid tests for the detection of L-malic acid in wine using enzymes immobilized on paper via carbohydrate-binding modules
Supervisor: **Duarte Miguel F. T. dos Prazeres**

Student Name: Carlos Júnio Caridade Rodrigues
Thesis Title: The importance of lipids to biofilm formation
Supervisor: **Carla C. C. R. de Carvalho**

Student Name: Catarina Alexandra Simões Prata
Thesis Title: Studies on the involvement of the yeast ABC transporter Pdr18 in acetic acid tolerance at temperatures in the range 30-40°C
Supervisor: **Isabel M. Sá-Correia**

Student Name: Catarina Benavente Perdigão
Thesis Title: Azurin interferes with lipid raft organization by decreasing the membrane protein caveolin – 1
Supervisors: **Arsénio C. S. M. Fialho and Nuno F. S. Bernardes**

Student Name: Cátia Isabel Pereira Jorge
Thesis Title: Development of novel biomimetic affinity adsorbents for plasmid DNA purification: Preliminary results
Supervisors: **M. Ângela C. Taipa Meneses de Oliveira and Duarte Miguel F. T. dos Prazeres**

Student Name: Clara Patrícia Andrade Lopes
Thesis Title: Development and Characterization of lipid nanoparticles prepared by miniemulsion technique
Supervisor: **Luís J. Pina da Fonseca**

Student Name: Diana Sofia Cardoso Marques
Thesis Title: Construction of *Escherichia coli* strains for higher plasmid production: Evaluation of lon gene knockout and implementation of a marker-free system
Supervisors: **Gabriel A. A. Monteiro and Prof. Duarte Miguel F. T. dos Prazeres**

Student Name: Diana Varandas da Cunha
Thesis Title: Molecular mechanisms underlying tolerance to acetic acid in vaginal *Candida glabrata* clinical isolates: role of the CgHaa1-dependent system
Supervisor: **Nuno G. P. Mira**

Student Name: Dina de Jesus Marinheiro Antunes
Thesis Title: Downstream processing of cell culture-derived animal viruses
Supervisors: **Raquel M. S. Aires Barros** and Miguel A. S. P. R. Fevereiro

Student Name: Fábio Daniel Anastácio Gonçalves
Thesis Title: Influence of the cell membrane on bacterial persistence
Supervisor: **Carla C. C. R. de Carvalho**

Student Name: Isabel Cardoso Alves de Campos Pinto
Thesis Title: Clarification and capture of monoclonal antibodies from complex media using aqueous two-phase systems
Supervisors: **Ana Margarida N. M. Pires de Azevedo and M. Raquel M. S. Aires Barros**

Student Name: José António Vieira Rodrigues
Thesis Title: Role of the transcription factor Haa1p and Haa1p-mutant-proteins in yeast response to acetic acid: focus on mRNA levels from TPO2, HSP30 and HRK1, intracellular ATP levels and pH_i
Supervisor: **Isabel M. Sá-Correia**

Student Name: Liliana Isabel Casimiro Brito
Thesis Title: Minicircle production and delivery to human mesenchymal stem/stromal cells for angiogenesis stimulation
Supervisors: **Gabriel A. A. Monteiro and Teresa Catarina P. Madeira**

Student Name: Miguel Ângelo Freitas Ribeiro Gaspar Reis
Thesis Title: Optimization of a microfluidic assay for the detection of free prostate specific antigen
Supervisors: **João Pedro E. R. Conde** and Narayanan S. Madaboosi

Student Name: Nicole Martins Rodrigues
Thesis Title: Exploring *Saccharomyces cerevisiae* to improve microbe-based production of itaconic acid
Supervisor: **Nuno G. P. Mira**

Student Name: Pedro Henrique Magalhães Fernandes Pais
Thesis Title: Membrane proteome-wide response to the antifungal drug clotrimazole in *Candida glabrata*: role of the transcription factor CgPdr1 and the Drug:H⁺ Antiporters CgTpo1_1 and CgTpo1_2
Supervisor: **Miguel N. P. C. Teixeira**

Student Name: Rita Azevedo Fernandes
Thesis Title: The impact of zwf overexpression on plasmid biopharmaceutical production by *Escherichia coli*
Supervisor: **Gabriel A. A. Monteiro**

Student Name: Sara Isabel Fernandes Mateus
Thesis Title: Construction of plasmids for Schmallenberg virus proteins expression
Supervisors: **Gabriel A. A. Monteiro** and Sílvia C. S. de Barros

Erasmus Mundus em Systems Biology

Student Name: Andreas Constantinou
Thesis Title: Helping cells jump to conclusions. Design and implementation of a biological circuit capable of responding to pre-equilibrium information
Supervisors: **Miguel N. P. C. Teixeira** and Alejandro Colman-Lerner

Student Name: Ha Anh Tuan Nguyen
Thesis Title: Building the Vietnamese Reference Genome
Supervisors: **Isabel M. Sá-Correia** and Si Vinh Le

Student Name: Kul Shanker Shrestha

Thesis Title: Germline minisatellite instability in the presence and absence of MLH1, a mismatch repair protein

Supervisors: **Arsénio C. S. M. Fialho** and Juho Rousu

Student Name: Michail Pantourakis

Thesis Title: Ionic mechanisms in regulation of C-fiber following frequency: Insights from modeling using single and repetitive stimulation

Supervisors: **Patrícia M. P. Figueiredo** and Erik Fransén

Student Name: Nguyen Hoang Son

Thesis Title: Exploring optimal objective functions and additional constraints for flux prediction in genome-scale models

Supervisors: **Isabel M. Sá-Correia** and Rafael Costa

Master Degree (MSc) in Bioengineering and Nanosystems

Student Name: Ana Alexandra Navarro Rodrigues

Thesis Title: Characterization of gellan-like polymers for new biotechnological applications

Supervisors: **Leonilde F. M. Moreira** and **Frederico C. A. Ferreira**

Student Name: Ana Mafalda Marques Cardoso

Thesis Title: Caracterização de populações microbianas em células de combustível para a produção de bioeletricidade

Supervisors: **Jorge H. G. Leitão**

Student Name: Ana Rita Baldonero Valente

Thesis Title: Utilização de um tensoativo (CAC) para controlo da libertação de fármacos a partir de hidrogéis para lentes de contacto

Supervisors: Ana Paula V. A. do Serro and Benilde J. V. Saramago

Student Name: Andreia Filipa Costa Cuco

Thesis Title: Interação entre um péptido β -amilóide, responsável pela doença de Alzheimer, e modelos biomembranares

Supervisors: Benilde J. V. Saramago and Ana Paula V. A. do Serro

Student Name: Andreia Sofia Aguiar Dias

Thesis Title: Enhance the production and secretion into extracellular media of recombinant proteins by *Escherichia coli*

Supervisor: **Luís J. Pina da Fonseca**

Student Name: Elizabete Correia Coutinho

Thesis Title: Nanopartículas híbridas de sílica mesoporosas

Supervisors: José P. S. Farinha and Carlos M. C. Baleizão

Student Name: Gonçalo Filipe Fernandes Adriano

Thesis Title: Scaffolds de nanofibras termo-sensíveis para cultura de células estaminais

Supervisors: José P. S. Farinha and Carlos M. C. Baleizão

Student Name: Guilherme Ricardo Mendes da Silva Barreto de Figueiredo

Thesis Title: MEMS resonators in dissipative media - Towards the detection of biomolecules

Supervisors: **João Pedro E. R. Conde** and Virginia Chu

Student Name: Joana Anastácio Ramos
Thesis Title: Estudo experimental para transporte de microgotas por atuação electrostática
Supervisors: Ana Sofia O. H. Moita and **Duarte Miguel F. T. dos Prazeres**

Student Name: Joana Jorge da Costa
Thesis Title: Micronization of Astaxanthin by the Supercritical Anti-Solvent Process (SAS)
Supervisors: António M. F. Palavra and M. Beatriz P. P. Nobre

Student Name: Mariana Duarte de Pina
Thesis Title: Desenvolvimento de processos de adsorção molecular para remoção de impurezas genotóxicas de ingredientes farmacêuticos activos
Supervisors: **Frederico C. A. Ferreira** and **Duarte Miguel F. T. dos Prazeres**

Student Name: Micaela Sintra Torrado
Thesis Title: Papel da proteína tirosina fosfatase BceD na interação com *Burkholderia* e células epiteliais
Supervisor: **Leonilde F. M. Moreira**

Student Name: Samuel Duarte Jorge
Thesis Title: Expansion of multipotent mesenchymal stromal cells on gelatin coated alginate microcarriers
Supervisors: **Frederico C. A. Ferreira** and **Joaquim M. S. Cabral**

Student Name: Samuel Lourenço Jacob
Thesis Title: Development of a Micropatterned System to Study the Role of Protein Tethers in Lipid Membrane Organization
Supervisors: Fábio M. Fernandes and **João Pedro E. R. Conde**

Student Name: Vanessa Ribeiro Moreira
Thesis Title: Comportamento tribológico do sistema Zircónia/Ti6Al4V utilizado em implantes dentários
Supervisors: Ana Paula V. A. do Serro and **Rogério A. C. Colaço**

Master Degree (MSc) in Biomedical Technologies

Student Name: Cátia Inês Durão Ferreira
Thesis Title: E-cadherin mutations, cell cycle dynamics and morphology
Supervisor: **João M. R. Sanches**

Student Name: Daniel José Gonçalves Bidarra
Thesis Title: Biological Assessment for micro-AMSThyroid Cancer Cells using Iodine-125
Supervisors: Patrícia M. C.C. A. de Carvalho and M. Micaela Fonseca

Student Name: Dulce Isabel Marcolino Gadelha
Thesis Title: Comparison of liver parenchyma textural features from B-mode ultrasound with Fibroscan results
Supervisors: Ricardo M. S. T. Ribeiro and **João M. R. Sanches**

Student Name: Maria Miguel Fachadas Bandeira
Thesis Title: Hospital acquired infections: Biofilm assembly and increased antibiotic resistance of microorganisms
Supervisors: Patrícia M. C.C. A. de Carvalho and M. Luísa F. M. Jordão

Student Name: Maria Natália Figueiredo Martins dos Anjos Costa
Thesis Title: Design of Ankle-Foot Orthoses using Subject Specific Biomechanical Data and Optimization Tools
Supervisors: Miguel P. T. da Silva and Manuel C. Neves

Student Name: Marisa Isabel Clemente da Silva
Thesis Title: Biomechanical Analysis of subjects after surgical repair of the Achilles tendon
Supervisors: Miguel P. T. da Silva and Manuel C. Neves

Student Name: Simão Nunes Paula
Thesis Title: Exploring impedance spectroscopy as a mean of malaria diagnostic
Supervisors: **Raúl D. L. C. Martins** and M. Fátima C. Nogueira

Student Name: Vanessa Alexandra Magalhães Costa
Thesis Title: Detection of movement of hemozoin crystals in the digestive vacuole of malaria parasites
Supervisors: Patrícia M. C.C. A. de Carvalho and M. Fátima C. Nogueira

9. Staff

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Research Areas and Interests

Responsible for the Bioprocess Engineering Laboratory (BEL) of the Bioengineering Research Group (BERG) of Institute for Bioengineering and Biosciences (iBB). Current research interests include bioseparation of antibodies and cells through aqueous two-phase systems, magnetic nanoparticles and chromatography, and application of lan-on-a-chip microfluidic devices to biopharmaceuticals separation and process integration, and biomolecules concentration.

Recent Selected Publications:

Dragana P.C. de Barros, Sara R.R. Campos, Pedro P. Madeira, Ana M. Azevedo, António M. Baptista, M. Raquel Aires-Barros, “Modeling the partitioning of amino acids in aqueous two-phase systems”, *J. Chromatogr. A*, 1329, 52-60 (2014.)

D.F.C. Silva, A.M. Azevedo, P. Fernandes, V. Chu, J.P. Conde, M.R. Aires-Barros “Determination of aqueous two phase system binodal curves using amicrofluidic device”, *J. Chromatogr. A*, 1370, 115-120 (2014).

R. R. G. Soares, P. Novo, A.M. Azevedo, P. Fernandes, V. Chu, J.P. Conde, M.R. Aires-Barros, “Aqueous two-phase systems for enhancing immunoassay sensitivity: Simultaneous concentration of mycotoxins and neutralization of matrix interference”, *J. Chromatogr. A*, 1361, 67-76 (2014).

Rimenys J. Carvalho, James Woo, M. Raquel Aires-Barros, Steven M. Cramer and Ana M. Azevedo, “Phenylboronate chromatography selectively separates glycoproteins through the manipulation of electrostatic, charge transfer, and cis-diol interactions”, *Biotechnol. J.*, 9, 1250–1258 (2014).

Dhadge VL, Morgado PI, Freitas F, Reis MA, Azevedo A, Aires-Barros R, Roque ACA., “An extracellular polymer at the interface of magnetic bioseparations”, *J. R. Soc. Interface* 11: 20140743 (2014).

Marta F. F Silva, Ana Fernandes-Platzgummer, M.R. Aires-Barros, Ana M. Azevedo, “Integrated purification of monoclonal antibodies directly from cell culture medium with aqueous two-phase systems”, *Separation and Purification Technology*, 132, 330-335 (2014).

Academic Info and Highlights

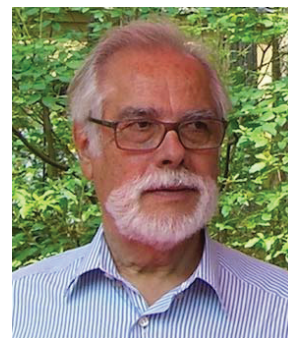
- President of the Pedagogical Council of IST
- President of the of the Working Group in the Downstream Processing- ESBES (European Society of Biochemical Engineering Sciences)
- Vice-President of the Portuguese Society for Biotechnology and editor of Biotechnology Bulletin

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Research Areas and Interests

Bioelectronics, Organic Electronics, Molecular Electronics, Nanotechnology, Solid State Physics, Soft Condensed Matter, Quantum Chemistry, Physical Chemistry. Current research interests include implantable and bioresorbable electronics, organic field effect transistors, organic electrochemical transistors, computational quantum chemistry, unimolecular electronic devices.

Recent Selected Publications

Books:

Luís Alcácer, "Introdução à Mecânica Quântica, com Aplicações à Química Computacional Moderna, 2014

Luís Alcácer; "O Diabo no Mundo Quântico", Gradiva, 2013 (scientific divulgation)

Papers in Journals:

Ferreira, Q.; A. Bragança; Alcácer, L.A.; Morgado, J.; "Conductance of Well-Defined Porphyrin Self-Assembled Molecular Wires up to 14 nm in Length", *Journal of Physical Chemistry C*, Vol. 118, No. 3, pp. 7229 - 7234, (2014)

Morgado, J.; A. T. P. Pereira; Bragança, A.; Ferreira, Q. ; S. C. M. Fernandes; C. S. R. F. Ferreira; A. J. D. Silvestre; C. Pascoal Neto; Alcácer, L.; "Self-standing chitosan films as dielectrics in organic thin-film transistors", *Express Polymer Letters*, Vol. 7, No. 12, 960 - 965 (2013).□

Ferreira, Q. ; Bragança, A.; O. N. O. Oliveira; N.M.M. Moura; M.A.F.Faustino; Alcácer, L.; Morgado, J.; "Dynamics of porphyrin adsorption on highly oriented pyrolytic graphite monitored by scanning tunnelling microscopy at the liquid/solid interface", *Applied Surface Science*, Vol. 273, 220 - 225 (2013).□

Ferreira, Q. ; Alcácer, L.; Morgado, J.; "Stepwise preparation and characterization of molecular wires made of zinc octaethylporphyrin complexes bridged by 4,4-bipyridine on HOPG", *Nanotechnology*, Vol. 22, No. 43, 435604 - 435610 (2011).

Farinhas, J.; Ferreira, Q. ; R. Paolo; Alcácer, L.; Morgado, J.; Charas, A.; "Nanostructured donor /acceptor interfaces in photovoltaic cells using columnar-grain films of a cross-linked poly(fluorene-alt-bithiophene)", *Journal of Materials Chemistry*, Vol. 21, No. 33, 12511 - 12519 (2011).□

Academic Info and Highlights

Coordinator of the Organic Electronics Group of Instituto de Telecomunicações-Associated Laboratory.

Area Coordinator of the "Basic Sciences and Enabling Technologies" research line of Instituto de Telecomunicações-Associated Laboratory.

Ana Margarida Azevedo

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Research Scientist

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Research Areas and Interests

Research Scientist of the Bioengineering Research Group of the Institute for Bioengineering and Bioscience. Current research interests include production of monoclonal antibodies by animal cell culture and design of novel downstream processes for the purification of biological products.

Recent Selected Publications

R.Jr. Carvalho, J. Woo, M.R. Aires-Barros, S.M. Cramer, A.M. Azevedo, “Phenylboronate chromatography selectively separates glycoproteins through the manipulation of electrostatic, charge transfer, and cis-diol interactions”, *Biotechnol. J.*, 9, 1250-1258 (2014) (doi: 10.1002/biot.201400170)

V.L. Dhadge, A. Hussain, A.M. Azevedo, R. Aires-Barros, A.C.A. Roque, “Boronic acid-modified magnetic materials for antibody purification”, *J. R. Soc. Interface*, **11**:20130875 (2014) (doi: 10.1098/rsif.2013.0875)

A. Nascimento, S.A.S.L. Rosa, M. Mateus, A.M. Azevedo, “Polishing of monoclonal antibodies streams through convective flow devices”, *Sep. Purif. Technol.* **132**, 593–600 (2014) (doi: 10.1016/j.seppur.2014.06.005)

R. Santos, S.A.S.L. Rosa, M.R. Aires-Barros, A. Tover, A.M. Azevedo, “Phenylboronic acid as a multi-modal ligand for the capture of monoclonal antibodies: Development and optimization of a washing step”, *J. Chromatogr. A* **1355**, 115-24 (2014) (doi: 10.1016/j.chroma.2014.06.001)

F.F.S. Silva, A. Fernandes-Platzgummer, M.R. Aires-Barros, A.M. Azevedo, “Integrated purification of monoclonal antibodies directly from cell culture medium with aqueous two-phase systems”, *Sep. Purif. Technol.* **132**, 330–335 (2014) (doi: 10.1016/j.seppur.2014.05.041)

R.R.G. Soares, P. Novo, A.M. Azevedo, P. Fernandes, M.R. Aires-Barros, V. Chu, J.P. Conde, “On-chip Sample Preparation and Analyte Quantification using a Microfluidic Aqueous Two Phase Extraction coupled to an Immunoassay”, *Lab Chip* **14**, 4284-4294 (2014) (doi: 10.1039/C4LC00695J)

A.M.M. Rosa, A.F. Louro, S.A.M. Martins, J. Inácio, A.M. Azevedo, D.M.F. Prazeres, “Capture and Detection of DNA Hybrids on Paper via the Anchoring of Antibodies with Fusions of Carbohydrate Binding Modules and ZZ-Domains”, *Anal. Chem.* **86**, 4340–4347 (2014) (doi: 10.1021/ac5001288)

Academic Info and Highlights

Classes in 2014/15: Introduction to Biological Engineering, Separation and Purification of Biological Products, Biological Engineering Laboratory I, Biochemical Engineering.

Joaquim M.S. Cabral

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Post Doctoral Fellow, MIT, 1983-1984
Professor

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Research Areas and Interests

Stem Cells Research for Tissue Engineering and Regenerative Medicine; Stem Cell Bioprocessing and Manufacturing: development of novel stem cell bioreactors and advanced bioseparation and purification processes.

Recent Selected Publications

- P.H. Oliveira; C.L. da Silva; J.M.S. Cabral, "Concise Review: Genomic Instability in Human Stem Cells: Current Status and Future Challenges" **Stem Cells** 32 (11): 2824-2832 (2014)
 - L. Meli; H.S.C. Barbosa; A.M. Hickey; L. Gasimli; G. Nierode; M.M. Diogo; R.J. Linhardt; J.M.S. Cabral; J.S. Dordick, "Three dimensional cellular microarray platform for human neural stem cell differentiation and toxicology" **Stem Cell Research** 13 (1): 36-47 (2014)
 - F. dos Santos; A. Campbell; A. Fernandes-Platzgummer; P.Z. Andrade; J.M. Gimble; Y. Wen; S. Boucher, S M.C. Vemuri, MC; C.L. da Silva; J.M.S. Cabral, "A Xenogeneic-Free Bioreactor System for the Clinical-Scale Expansion of Human Mesenchymal Stem/Stromal Cells" **Biotechnol. Bioeng.** 111 (6): 1116-1127 (2014)
 - S. Choi; O. Levy; M.B. Coelho; J.M.S. Cabral, J.M. Karp, R. Karnik "A cell rolling cytometer reveals the correlation between mesenchymal stem cell dynamic adhesion and differentiation state" **Lab on a Chip** 14 (1): 161-166 (2014)
 - G.M.C. Rodrigues; A.F.S. Matos; T.G. Fernandes; C.A.V. Rodrigues; M. Peitz; S. Haupt; M.M. Diogo; O. Brüstle; J.M.S. Cabral, "Integrated Platform for Production and Purification of Human Pluripotent Stem Cell-derived Neural Precursors" **Stem Cell Rev Rep** 10(2):151-61 (2014)
 - A. Santhaganam; F. dos Santos; C. Madeira; J.B. Salgueiro; J.M.S. Cabral "Isolation and ex-vivo expansion of Synovial Mesenchymal Stromal Cells for Cartilage Repair" **Cytherapy** 16(4):440-53 (2014)

Academic Info:

Head of Department of Bioengineering
Coordinator of the Ph.D. programmes on Bioengineering (MIT-Portugal Program) and Bioengineering: Cell Therapies and Regenerative Medicine
Classes in 2014/15 Introduction to Biological Engineering
Director of the Institute for Bioengineering; and Biosciences; Principal Investigator of the Stem Cell Bioengineering and Regenerative Medicine Laboratory
Evaluation panel European Research Council Advanced, Consolidated and Starting Grants, Process and Product Engineering
Section Editor *BMC Biotechnology*, Cellular and Tissue Engineering
Member of the Editorial Board of *Biocatalysis and Biotransformation*, *Bioprocess and Biosystems Engineering*, *Current Tissue Engineering*, *Electronic Journal of Biotechnology*, *Enzyme Research*, *Journal of Biotechnology*, *Journal of Chemical Technology and Biotechnology*, *Journal of Regenerative Medicine and Tissue Engineering*, *Journal of Tissue Engineering and Regenerative Medicine*, *Trends in Biotechnology*

Carla C.C.R. de Carvalho

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M.Sc. Instituto Superior Técnico, 1999
Principal Investigator
("FCT Investigator 2013" - Development Grant)

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Research Areas and Interests

Formation of persister cells. Effect of toxic compounds and stressful conditions on cellular membranes and cell surface properties of bacteria and mechanisms of bacterial adaptation. Prevention and eradication of biofilms. Fluorescence microscopy and image analysis to assess cell physiology and morphology. Production of compounds with marine bacteria. Biotransformation and design of bioreactors for the production of high-value compounds from low-value substrates in organic/aqueous systems using whole cells.

Recent Selected Publications

Carla C. C. R. de Carvalho, Marco P. C. Marques, Nancy Hachicho, Hermann J. Heipieper. "Rapid adaptation of *Rhodococcus erythropolis* cells to salt stress by synthesizing polyunsaturated fatty acids." *Applied Microbiology and Biotechnology* 98(2), 5599-5606 (2014). (doi: 10.1007/s00253-014-5549-2)

Carla C. C. R. de Carvalho, Maria José Caramujo. "Bacterial diversity assessed by cultivation-based techniques show predominance of *Staphylococcus* species on coins collected in Lisbon and Casablanca". *FEMS Microbiology Ecology* 88(1), 26-37 (2014). (doi: 10.1111/1574-6941.12266)

Carla C.C.R. de Carvalho, Maria-José Caramujo. "Fatty acids as a tool to understand microbial diversity and their role in food webs of Mediterranean temporary ponds". *Molecules* 19, 5570-5598 (2014). (doi:10.3390/molecules19055570)

Carla C. C. R. de Carvalho, Pedro Fernandes. "Siderophores as "Trojan Horses": tackling multidrug resistance?" *Frontiers in Microbiology* 5, 290 (2014). (doi: 10.3389/fmicb.2014.00290)

Carla C. C. R. de Carvalho, Sofia Santos Costa, Pedro Fernandes, Isabel Couto and Miguel Viveiros. "Membrane transport systems and the biodegradation potential and pathogenicity of genus *Rhodococcus*". *Frontiers in Physiology* 5, article 133 (2014). (doi:10.3389/fphys.2014.00133)

Telmo G. Santos, R. M. Miranda, Carla C. C. R. de Carvalho. "A new NDT technique based on bacterial cells to detect micro surface defects". *NDT&E International* 63, 43-49 (2014). (<http://dx.doi.org/10.1016/j.ndteint.2014.01.006>)

Academic Info and Highlights

Member of the Review Editors' Board of "Frontiers in Marine Biotechnology". Member of the Editorial Advisory Board of the journals "Recent Patents on Biotechnology" and "The Open Food Science Journal".

Rogério Colaço

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Professor

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Research Areas and Interests

Researcher of CQE - Centro de Química Estrutural (CQE), responsible of the NanoLab - The Nanostructured Materials and Nanotechnologies Laboratory. Current scientific interest are centred on the synthesis and advanced characterization of engineering materials and systems, namely for biomedical applications, by using Atomic Force Microscopy based techniques.

Recent Selected Publications

R. Colaço, *From Nano and Microcontacts to Wear of Materials* in Fundamentals of Friction and Wear on the Nanoscale, Enrico Gnecco and Ernst Meyer Eds, NanoScience and Technology 2015, pp 517-543, Springer International Publishing DOI 10.1007/978-3-319-10560-4_23, ISBN, 978-3-319-10559-8.

P. Paradiso, R. Galante, L. Santos, A. P. A Matos, R. Colaço, A. P. Serro, B. Saramago, Comparison of two hydrogel formulations for drug release in ophthalmic lenses Journal of Biomedical Materials Research: Part B - Applied Biomaterials, Vol 102(6) pg 1170-1180, 2014.

P. Paradiso, V. Chu, L. Santos, A. P. Serro, R. Colaco, B. Saramago, Effect of plasma treatment on the performance of two drugloaded hydrogel formulations for therapeutic contact lenses, Journal of Biomedical Materials Research: Part B, SEP 2014 DOI: 10.1002/jbm.b.332872014.

R. Galante, P. Paradiso, M. G. Moutinho, A. I. Fernandes, J. L. Mata, R. Colaço, B. Saramago, A. P. Serro, About the effect of eye blinking on drug release from pHEMA based hydrogels: an in vitro study, Journal of Biomaterials Science, Polymer Edition, 2014; <http://dx.doi.org/10.1080/09205063.2014.994948>

B. Nunes, S. Magalhães, N. Franco, E. Alves, R. Colaço Microstructure and nanomechanical properties of Fe⁺ implanted silicon, Applied Surface Science, Volume 284, 1, 2013, Pages 533-539.

Academic Info

Vice-President of IST – Financial and Administrative Affairs.

Classes in 2013/14: Biomaterials Science and Biomateriald Technology

João Pedro Conde

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Professor

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Research Areas and Interests

Co-responsible for the Thin Film MEMS and BioMEMS research group of INESC Microsystems and Nanotechnologies (a laboratory member of IN-Institute of Nanoscience and Nanotechnology). Current research interests include novel thin film devices such as thin film silicon MEMS and NEMS and Lab-on-Chip microfluidic devices with integrated biosensors using cells, proteins, and nucleic acids. Our biochip research currently focuses on microfluidic platforms for the fast, point-of-use detection of toxins in food and biomarkers for cancer detection directly from the relevant matrices at regulatory sensitivity. Our current thin-film silicon MEMS research aims at achieving electronic integration of MEMS arrays and ultra-high-sensitivity gas and biosensors.

Recent Selected Publications

P. Novo, V. Chu, J.P. Conde, “Integrated fluorescence detection of labeled biomolecules using a prism-like PDMS microfluidic chip and lateral light excitation”, *Lab Chip* **14**, 1991-1995 (2014). (DOI:10.1039/C4LC00241E)

P. Novo, V. Chu, J.P. Conde, “Integrated optical detection of autonomous capillary microfluidic immunoassays: a hand-held point-of-care prototype”, *Biosensors and Bioelectronics* **57**, 284-291 (2014). (DOI: 10.1016/j.bios.2014.02.009)

R.R.G. Soares, P. Novo, A.M. Azevedo, P. Fernandes, M.R. Aires-Barros, V. Chu, J.P. Conde, “On-chip Sample Preparation and Analyte Quantification using a Microfluidic Aqueous Two Phase Extraction coupled to an Immunoassay”, *Lab Chip* **14**, 4284-4294 (2014). (DOI: 10.1039/c4lc00695j)

J.T.S. Fernandes, S. Tenreiro, A. Gameiro, V. Chu, T.F. Outeiro, J.P. Conde, “Modulation of alpha-synuclein toxicity in yeast using a novel microfluidic-based gradient generator”, *Lab Chip* **14**, 3949-3957 (2014). (DOI: 10.1039/c4lc00756e) (*selected for themed collection Lab on a Chip 2014 HOT Articles*)

Academic Info and Highlights

Vice-President of the DBE for Post-Graduation and Research

Coordinator of the Master Degree in Biomedical Engineering and the Doctoral Program in Biomedical Engineering

Classes in 2013/14: Nanotechnology, Nanobiotechnology and Biomaterials

Coordinator of IN – Institute of Nanoscience and Nanotechnology

Member of the MatSEEC (Materials Science and Engineering Expert Committee) of the European Science Foundation

Member of the Scientific Board of the Marie Curie Initial Training Network PROSENSE “Cancer Diagnostics: Parallel Sensing of Prostate Cancer Biomarkers”

Member of the Scientific Board of the Marie Curie Initial Training Network PROSENSE “Cancer Diagnostics: Parallel Sensing of Prostate Cancer Biomarkers”

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Research Areas and Interests

Member of the Energy and Environment Engineering Group at CERENA, Centre for Natural Resources and Environment. Current research interests include two different topics:

- Advanced phytoremediation of contaminated water and soil through the establishment of the main triggering factors that promote the xenobiotic detoxification mechanisms;
- Non-hazardous waste valorization from processing to storage and use

Recent Selected Publications

Wang, G., Silva, R.B., Azevedo, J.L.T., Martins-Dias, S., Costa, M., “Evaluation of the combustion behaviour and ash characteristics of biomass waste derived fuels, pine and coal in a drop tube furnace”, *Fuel* **117**, 809-824 (2014). (DOI: 10.1016/j.fuel.2013.09.080)

Ferreira, Renata Alexandra; Duarte, Joana Gouveia; Vergine, Pompilio; Freire F, Martins-Dias S., “Environmental Science and Pollution Research, **21**(16), 9626-9643 (2014). (DOI: 10.1007/s11356-014-2988-3)

Silva, Rita Barros; Fragoso, Rui; Sanches, Carlos; Martins-Dias S., “Which chlorine ions are currently being quantified as total chlorine on solid alternative fuels”, *Fuel Processing Technology*, **128**, 61-67, (2014). (DOI: 10.1016/j.fuproc.2014.07.003)

Academic Info and Highlights

President of the Technical Committee, TC 172 “Combustíveis Derivados de Resíduos e Biocombustíveis sólidos”.

National representative on CEN TC\ 343 “Solid Recovered Fuels” and (CEN TC 335) Solid Biofuels

Classes in 2013/14: Biological Engineering Processes, Waste to Energy, Environmental Installations and Technologies, Integrated Solid Waste Management

President of the Organizing Committee of the 8th JTIR “Waste Management for Resources Sustainability”, a IST/APESB/ISWA event, 16-18 July, IST, Portugal (2013)

Maria Margarida Diogo

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Research Areas and Interests

Current research interests include bioprocessing strategies for expansion and controlled differentiation of pluripotent and neural stem cells and purification of their derivatives envisaging applications in Regenerative Medicine and drug discovery and their integration with microscale culture systems to explore the effect of microenvironmental factors on stem cell fate.

Recent Selected Publications

Fernandes-Platzgummer A, Diogo MM, Lobato da Silva C, Cabral JMS, “Maximizing mouse embryonic stem cell production in a stirred tank reactor by controlling dissolved oxygen concentration and continuous perfusion operation”, *Biochem Eng J*, 82:81-90, (2014). IF= 2.6.

Meli L, Barbosa HS, Hickey AM, Gasimli L, Nierode G, Diogo MM, Linhardt RJ, Cabral JM, Dordick JS, “Three dimensional cellular microarray platform for human neural stem cell differentiation and toxicology”, *Stem Cell Res.*, 13(1):36-47, (2014). IF= 4.5.

Rodrigues GMC, Matos AFS, Fernandes TG, Rodrigues CAV, Peitz M, Haupt S, Diogo MM, Brüstle O, Cabral JMS, “Integrated Platform for Production and Purification of Human Pluripotent Stem Cell-derived Neural Precursors”, *Stem Cell Rev Rep*, 10 (2): 151-161, (2014). IF= 4.5.

Fernandes TG, Rodrigues CAV, Diogo MM, Cabral JMS, “Stem cell bioprocessing for Regenerative Medicine”, *J Chem Technol Biot*, 89 (1): 34-47, (2014). IF= 2.5.

Rodrigues GMC, Fernandes TG, Rodrigues CAV, Cabral JMS, Diogo MM, “Purification of Human Induced Pluripotent Stem Cell-Derived Neural Precursors using Magnetic Activated Cell Sorting”, in *Methods Mol Biol*, DOI:10.1007/7651_2014_115. [Epub ahead of print].

Badenes SM, Fernandes TG, Rodrigues CA, Diogo MM, Cabral JM. “Scalable Expansion of Human-Induced Pluripotent Stem Cells in Xeno-Free Microcarriers”, *Methods Mol Biol*, DOI:10.1007/7651_2014_106, [Epub ahead of print].

Academic Info and Highlights

Classes in 2013/14: Stem Cell Bioengineering, Cell and Tissue Engineering, Regenerative Medicine and Bioethics

Classes in 2014/2015: Project in Biomedical Engineering

Management committee of the PhD Program in Bioengineering – Cell Therapies and Regenerative Medicine

Coordinator of the Mobility Programs for the Integrated MSc in Biomedical Engineering in 2014/2015

Pedro C. B. Fernandes

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Research Scientist

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https://www.researchgate.net/profile/Pedro_Fernandes7/?ev=hdr_xprf



Research Areas and Interests

Pedro is a member of the Institute for Bioengineering and Biosciences (IBB). Current research interests focus on bioprocess intensification through miniaturization. Particular emphasis is given in the development of enzymatic and whole cell based processes within the food and pharmaceutical areas, and in the production of chemicals from renewable resources.

Recent Selected Publications

J. Anes, P. Fernandes, “Towards the continuous production of fructose syrups from inulin using inulinase entrapped in PVA-based particles”, *Biocatalysis and Agricultural Biotechnology* **3**, 296-302 (2014). (DOI: 10.1016/j.bcab.2013.11.006)

P. Fernandes, “Marine enzymes and food industry: insight on existing and potential interactions”, *Frontiers in Marine Sciences* **1**, 1-18 (2014). (DOI: 10.3389/fmars.2014.00046)

C.C.C.R. de Carvalho, P. Fernandes, “Siderophores as “Trojan Horses”: tackling multidrug resistance?”, *Frontiers in Microbiology* **5**, 1-3 (2014). (DOI: 10.3389/fmicb.2014.00290)

M.A.P. Nunes, M.E. Rosa, M.E., P.C.B. Fernandes, M.H.L. Ribeiro, “ Operational stability of naringinase PVA lens-shaped microparticles in batch stirred reactors and mini packed bed reactors - one step closer to industry”, *Bioresource Technology* **164**, 362–370 (2014). (DOI: 10.1016/j.biortech.2014.04.108)

Academic Info and Highlights

Classes in 2013/14: Biological Engineering Laboratory II; Biochemical Engineering; Biotechnology
Member of the Member of the Portuguese Engineers Association (Ordem dos Engenheiros),
Chemical Engineering branch

Frederico Castelo Ferreira

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Research Areas and Interests

Assistant Professor at the Department of Bioengineering; scientific area of Biomolecular and Bioprocess Engineering and Member of the BioEngineering Research Group at Institute for Bioengineering and Biosciences. My current research interests, balance between fundamental and applied research, with potential translation into the market of sustainable products and processes. The three current research lines aim at the development of new processes, reactors and materials, with an emphasis on membrane based systems, for (i) tailored materials to mimicking stem cell microenvironments, (ii) advanced separations in pharmaceutical industry and (iii) biorefineries for sustainable production of aviation biofuels and biosurfactants.

Recent Selected Publications

N. T. Faria, M.V. Santos, P. Fernandes, L.L. Fonseca, C. Fonseca, F.C. Ferreira, “Production of glycolipid biosurfactants, mannosylerythritol lipids, from pentoses and D-glucose/D-xylose mixtures by *Pseudozyma* yeast strains” *Process Biochem* 49 (2014) 1790–1799 (DOI:10.1016/J.PROCBIO.2014.08.004)

N.T. Faria, M. Santos, C. Ferreira, S. Marques, F.C. Ferreira, C. Fonseca “Conversion of cellulosic materials into glycolipid biosurfactants, mannosylerythritol lipids, by *Pseudozyma* spp. under SHF and SSF processes” *Microb Cell Fact*, *Microb Cell Fact* 13 (2014) 155 (DOI:10.1186/S12934-014-0155-7)

N. G. Oliveira, T. Sirgado, L. Reis, L. Pinto, C. L Silva, F. C. Ferreira, A. Rodrigues “In vitro assessment of three dimensional dense chitosan-based structures to be used as bioabsorbable implants” *J Mec Behav Biomed* 40 (2014), 413-425 (DOI:10.1186/S12934-014-0155-7)

J. Hatami, P.Z. Andrade, D. Bacalhau, F. Cirugião, F.C. Ferreira*, J. M. S. Cabral, C. Lobato da Silva, “Proliferation extent of CD34+ cells as a key parameter to maximize megakaryocytic differentiation of umbilical cord blood-derived hematopoietic stem/progenitor cells in a two-stage culture protocol”, *Biotechnol Rep*, 4 (2014) 50-55 (DOI:10.1016/J.BTRE.2014.07.002)

R.F. Canadas, J.M.B.T. Cavaleiro, J.D.T. Guerreiro, M.C.M.D.de Almeida, E. Pollet, C.Lobato da Silva, M.M.R. da Fonseca, F.C. Ferreira*, “Polyhydroxyalkanoates: Waste glycerol upgrade into electrospun fibrous scaffolds for stem cells culture.”, *Int J Biol Macromol*, 71 (2014) 131-140 (DOI:10.1016/J.IJBIOMAC.2014.05.008)

Academic Info and Highlights

Classes in 2013/14: Green Technologies and Strategic Management; Entrepreneurship in Bioengineering; Innovation and Entrepreneurship course (MIT Portugal), iTeams- Innovation Teams (MIT Portugal), Biomaterials Science, Project in Biomedical Engineering

Arsénio M. Fialho

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Associate Professor with Habilitation

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Research Areas and Interests

His current scientific interests, in the field of Molecular and Cellular Microbiology, are centered on the study of bacterial proteins, such as cupredoxins, as novel drug candidates with anticancer activity. Studies aiming to elucidate the cellular and molecular effects of treating breast cancer cell models with azurin, a particular cupredoxin produced by *Pseudomonas aeruginosa*. His research interests are also focused on the study of trimeric autotransporter adhesins as novel and key virulence determinants in members of the Burkholderia cepacia complex, a group of bacteria prevalent in the natural environment that can cause serious infections in patients suffering from Cystic Fibrosis.

Recent selected Publications

Chakrabarty A.M., Bernardes N., Fialho A.M. “Bacterial Proteins and Peptides in Cancer Therapy: Today and Tomorrow” *Bioengineered*, 5:4 – 3, 2014

Mil-Homens D., Leça M.I., Fernandes F., Pinto S.N., Fialho A.M. “Characterization of BCAM0224, a multifunctional trimeric autotransporter from the human pathogen Burkholderia cenocepacia” *Journal of Bacteriology*, 196(11):1968-79, 2014

Bernardes N., Ribeiro A. S., Abreu S., Vieira A.F., Carreto L., Santos M., Seruca R., Paredes J., Fialho A.M. “High-throughput molecular profiling of a P-cadherin overexpressing breast cancer model reveals new targets for the anti-cancer bacterial protein azurin” *International Journal of Biochemistry & Cell Biology*, 50:1-9, 2014

El-Kirat-Chatel S., Mil-Homens D., Beaussart A., Fialho A.M., Dufrêne Y.F. “Single-molecule atomic force microscopy unravels the binding mechanism of a Burkholderia cenocepacia trimeric autotransporter adhesin” *Molecular Microbiology*, **89**(4):649-659 (2013)

Bernardes N., Ribeiro A.S., Abreu S., Mota B., Matos R.G., Arraiano C.M., Seruca R., Paredes J., Fialho A.M. “The bacterial protein azurin impairs invasion and FAK/Src signaling in P-cadherin-overexpressing breast cancer cell models” *PLoS One*, **8** (7), e69023, (2013)

Academic Info and Highlights

Vice-Coordinator of the Master Degree in Biological Engineering

Member of the Students Training Committee of the DBE

Classes in 2013/14: Biochemistry and Molecular Biology (1st and 2nd semester); Comparative and Functional Genomics; Molecular and Cellular Microbiology (1st semester)

Patrícia Figueiredo

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Research Areas and Interests

My research interests are focused on the noninvasive study of brain function in humans using a combination of neuroimaging and biophysical modelling methods, and include the following topics:

- Functional neuroimaging using BOLD fMRI.
- Quantitative perfusion imaging using ASL MRI.
- Multimodal neuroimaging using combined EEG-fMRI.
- Biophysical modelling of neuronal activity, haemodynamics and physiological fluctuations.
- Clinical applications, including epilepsy, cerebrovascular disease, and dementia.

Recent Selected Publications

Jorge J, Grouiller F, Stoermer R, Michel C, Figueiredo P, van der Zwaag W, Gruetter R (2015) Simultaneous EEG-fMRI at ultra-high field: artifact prevention and safety assessment. *NeuroImage* 105:132-144.

Rothlubbers S, Relvas V, Leal A, Murta T, Lemieux L, Figueiredo P (2014) Characterization and reduction of the EEG artefact caused by the Helium cooling pump in the MR environment. *Brain Topogr* [Epub ahead of print].

Murta T, Leite M, Carmichael D, Figueiredo P, Lemieux L (2014) Electrophysiological correlates of the BOLD signal for EEG-informed fMRI. *Hum Brain Mapp* [Epub ahead of print].

Sousa I, Vilela P, Figueiredo P (2014) Reproducibility of hypocapnic cerebrovascular reactivity measurements using BOLD fMRI in combination with a paced deep breathing task. *NeuroImage* 98:31-41.

Jorge JP, van der Zwaag W, Figueiredo P (2014) EEG-fMRI integration for the study of human brain function. *NeuroImage* 102: 24–34.

Sousa I, Vilela P, Figueiredo P (2014) Reproducibility of the quantification of arterial and tissue contributions in multiple post-labeling delay ASL. *J Magn Reson Imaging* 40(6):1453-62.

Academic Info and Highlights

- Vice-Coordinator of the Master Degree in Biomedical Engineering
- Mobility coordinator for Biomedical Engineering at IST.
- Course Teaching: Medical Imaging, Biomedical Imaging, Neuroimaging
- Member of the Scientific Council of ISR/IST.
- Honorary Senior Lecturer, Institute of Neurology, University College London
- António Xavier Prize for best Portuguese PhD Thesis in NMR, EPR or MRI in 2013 (supervisor)

Luis Joaquim Pina da Fonseca

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<https://fenix.ist.utl.pt/homepage/ist12136>



Research Areas and Interests

Luís P. Fonseca Research areas focus on the development of bioanalytical methods and biosensors integrated in FIA systems and *lab-on-a-chip* devices for monitoring pathogens, toxic pollutants, and biological compounds. The development of nano/micro-biocatalysts (biocomposites) mostly based on hydrogels containing protein/cell assemblies and encapsulating nano-magnetic particles resulting as biocomposites used as nano/micro-biocatalysts is another field of research.

Recent Selected Publications

Fernando Teles, Luís Fonseca "Nucleic-Acid Testing, New Platforms and Nanotechnology for Point-of-Decision Diagnosis of Animal Pathogens" Eds Mónica V. Cunha and João Inácio in *Veterinary Infection Biology: Molecular Diagnostics and High-Throughput Strategies Methods in Molecular Biology* (volume 1247) Springer New York, 2014, pp 253-283

Teles, F.R.R. and Fonseca, L.P. "The contribution of smart materials and clinical diagnostic micro-devices on the progress and improvement of human health care" in "Advanced Healthcare Nanomaterials" Editor Ashutosh Tiwari, WILEY-Scrivener Publishing LLC, USA., 2014, chapter 6, pp 203-236.

PN Sampaio, MS Pais, LP Fonseca "A novel fed-batch based strategy for enhancing cell-density and recombinant cyprosin B production in bioreactors" *Bioprocess and biosystems engineering* 37(12) 2515-2527 (2014).

Dragana PC de Barros, Fátima Pinto, Luís P Fonseca, Joaquim Cabral, F Lemos "Kinetic model for the esterification of ethyl caproate for reaction optimization" *Journal of Molecular Catalysis B: Enzymatic* 101, 16-22 (2014).

Sara C Matias, Ângelo Rocha, Raquel Teixeira, Luis JP Fonseca, Nuno MT Lourenço "Synthesis of choline sulfonate buffers and their effect on cytochrome c dissolution and oxidation state" *RSC Advances* 30(4) 15597-15601 (2014).

Academic Info and Highlights

Coordinator of the Master Degree in Bioengineering and Nanosystems.

Classes in 2012/13: Enzyme Engineering, Integrated Biological Engineering Processes, Biological Project Design, Biofuels,

Member of Editorial Board of *Microbial Cell Factories*, *The Open Catalysis Journal* and *Journal of Industrial Microbiology & Biotechnology*

Associate Editor of *Biocatalysis and Biotransformations* and *Journal of Integrated OMICS*.

Member of the Scientific Committee of the European Section of Applied Biocatalysis (ESAB) of the European Federation of Biotechnology.

Member of the Steering Committee of the Bioencapsulation Research Group (BRG).

Maria Manuela R. da Fonseca

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Research Areas and Interests

Manuela Fonseca is a iBB (Institute for Bioengineering and Biosciences) member. Her research interests are in the industrial biotechnology/bioprocess areas, with current topics including (i) production of chemical intermediates and biopolymers (namely polyhydroxyalkanoates, PHAs) from industrial by-products and hydrolysates (from agro-residues and algae) by microbial cultures, (ii) optimization of cultivation conditions to obtain tailor-made co-polymers for use in specific areas (e.g., scaffolds for cell culture, composite materials for house-ware applications), (iii) implementation of green methods for the extraction of lipophilic intracellular compounds and (iv) exploitation of organic-aqueous systems for the degradation of xenobiotics by selected bacterial species.

Recent Selected Publications

M.T. Cesário, R.S. Raposo, M.C.D. de Almeida, F. van Keulen, B.S. Ferreira, J.P. Telo, M.M.R. da Fonseca (2014), “Production of poly (3-hydroxybutyrate-co-4-hydroxybutyrate) by *Burkholderia sacchari* using wheat straw hydrolysates and gamma-butyrolactone”, *Int J Biol Macromol.* **71**, 59-67.

R.F. Canadas, J.M.B.T. Cavaleiro, J.D.T. Guerreiro, M.C.D. de Almeida, E. Pollet., C.L. da Silva, M.M.R da Fonseca, F.C. Ferreira, (2014) “Polyhydroxyalkanoates: Waste glycerol upgrade into electrospun fibrous scaffolds for stem cells culture” *Int J Biol Macromol.* **71**, 131-140.

T. Cesário, R.S. Raposo, M.C.D. de Almeida, F. van Keulen, B.S. Ferreira, M.M.R da Fonseca (2013) “Enhanced bioproduction of poly-3-hydroxybutyrate from wheat straw lignocellulosic hydrolysates”, *New Biotechnol* **31**, 104-113.

J. M. B. T. Cavaleiro, E. Pollet, H.P. Diogo, M.T. Cesário, L. Avérous, M.C.D. de Almeida, M.M.R da Fonseca (2013), “On the heterogeneous composition of bacterial polyhydroxyalkanoate terpolymers”, *Bioresour Technol* **147**, 434–41.

J.M.B.T Cavaleiro, R.S. Raposo, M.C.D. de Almeida, M.T. Cesário, C. Sevrin, C. Grandfils, M.M.R. da Fonseca, “Effect of Cultivation Parameters on the Production of Poly(3-Hydroxybutyrate-co-4-Hydroxybutyrate) and Poly(3-Hydroxybutyrate-4-Hydroxybutyrate-3-Hydroxyvalerate) by *Cupriavidus necator* using Waste Glycerol”, *Bioresour Technol* **111**, 391-397 (2012).

Academic Info and Highlights

Classes in 2013-14: 1st sem.: Biological Reactors
Coordinator at IST of Task 2 of BUGWORKERS project (FP7/2008-2014)

Ana Luisa Nobre Fred

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Research Areas and Interests

Member of the group Pattern and Image Analysis, in the scientific area Networks and Multimedia of Instituto de Telecomunicações, Lisbon. Research areas include: pattern recognition and machine learning; statistical and syntactic pattern recognition; unsupervised learning; ensemble methods in clustering; data mining; signal processing; behavioral and web biometrics; biomedical application; pervasive computing.

Recent Selected Publications

H. P. da Silva, A. L. N. Fred, "Harnessing the Power of Biosignals", IEEE Computer, Vol. 47, No. 3, pp. 74 - 77, March, (2014). (DOI: 10.1109/MC.2014.60)
H. P. da Silva, A. Lourenço, A. L. N. Fred, N. Raposo; M. Aires-de-Sousa; "Check Your Biosignals Here: A New Dataset for Off-the-Person ECG Biometrics", Computer Methods and Programs in Biomedicine, Vol. 113, No. 2, pp. 503 - 514, February, (2014). (DOI: 10.1016/j.cmpb.2013.11.017)
P. L. Carmona, J. S. Sánchez Garreta, A. L. N. Fred. Special issue: Advances in pattern recognition applications and methods. Neurocomputing, 123:1–85, January (2014). (DOI: 10.1016/j.neucom.2013.03.010)
H. P. da Silva, A. Lourenço, A. L. Fred, R. Martins. BIT: Biosignal Igniter Toolkit. Computer Methods and Programs in Biomedicine, 115(1), 20 – 32, (2014). (DOI:10.1016/j.cmpb.2014.03.002)
A. Lourenço, S. Buló; N. Rebagliati, A. L. N. Fred, M. A. T. Figueiredo, M. Pelillo; "Probabilistic Consensus Clustering using Evidence Accumulation", Machine Learning, Volume 98, Issue 1-2, pp 331-357, January (2015). (DOI: 10.1007/s10994-013-5339-6)

Academic Info and Highlights

Classes in 2013/14: Modelling and Classification of Biomedical Signals; Biometrics; Functional Genomics and Bioinformatics; Control theory; Introduction of Biomedical Engineering
Founding Member of Institute for Systems and Technologies of Information, Control and Communication - INSTICC
Conference Chair of the International Conferences: ICPRAM 2014; BIOSTEC 2014; KDIR 2014
Best Paper Award at the conference ICINCO 2014 (www.icinco.org) with the paper: "ECG Signals for Biometric Applications: Are we there yet?", co-authored by Carlos Carreiras, André Lourenço, Ana Fred and Rui Ferreira
Invited Talk: "Pervasive ECG - Emotion and Identity at your Fingertips", at Cardiotechnix 2014.
Coordinator of the team that developed BITalino (www.bitalino.com).
Organizer of the "Laboratórios Abertos" initiative

Jorge Humberto Gomes Leitão

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Research Areas and Interests

Identification and characterization of virulence factors and determinants from bacteria of the *Burkholderia cepacia* complex and their exploitation to identify potential targets for therapeutic intervention;
Identification and characterization of small non-coding regulatory RNAs from *Burkholderia cepacia* complex bacteria;
Molecular characterization of microbial populations of environmental and medical interest;
Biochemistry, molecular biology and physiology of exopolysaccharide biosynthesis by gram-negative bacteria;
Exploitation of the nematode *Caenorhabditis elegans* as a toxicity and as an infection model.

Recent Selected Publications

F.N. Gil, M. Moreira-Santos, S. Chelinho, C. Pereira, J.R. Feliciano, J.H. Leitão, J.P. Sousa, R. Ribeiro, C.A. Viegas, “Suitability of a *Saccharomyces cerevisiae*-based assay to assess the toxicity of pyrimethanil sprayed soils via surface runoff: Comparison with standard aquatic and soil toxicity assays”, *Science of the Total Environment* **505**, 161–171 (2015). (DOI: 10.1016/j.scitotenv.2014.09.094)

C.S. Couras, V.L. Louros, A.M. Grilo, J.H. Leitão, M.I. Capela, L.M. Arroja, H. Nadais, “Effects of operational shocks on key microbial populations for biogas production in UASB reactors”, *Energy* **73**, 866-874 (2014). (DOI: 10.1016/j.energy.2014.06.098)

C.G. Ramos, A.M. Grilo, J.R. Feliciano, P.J.P. da Costa, S.A. Sousa, J.H. Leitão, “Regulation of Hfq mRNA and protein levels in *Escherichia coli* and *Pseudomonas aeruginosa* by the *Burkholderia cenocepacia* MtvR sRNA”, *PLoS ONE* **9**, e98813 (2014). (DOI: 10.1371/journal.pone.0098813)

S.A. Sousa, J.R. Feliciano, A.M. Grilo, J.H. Leitão, “Bioinformatics: a molecular microbiologist’s perspective”, *Current Bioinformatics* **9**, 8-17 (2014). (DOI: 10.2174/1574893608999140109121908)

J.H. Leitão, C.G. Ramos, J.R. Feliciano, S.A. Sousa, A.M. Grilo, P.J.P. da Costa, “Hfq-like RNA chaperones and small non-coding regulatory RNAs: a new paradigm of bacterial gene regulation”. *In: Prokaryotes: Physiology, Biochemistry and Cell Behavior* (Ed. Marina Nisnevitch), Nova Science Publishers, pp. 91-108 (2014). (ISBN: 978-1-63463-284-3).

Academic Info and Highlights

Classes in 2013/14: Microbial Biochemistry and Physiology; Molecular and Cellular –Microbiology; Genetic Engineering, Molecular Biotechnology; Functional and Comparative Genomics; Microbial Cell Factories

Member of the Scientific Committee of the MSc in Microbiology
Coordinator of the Tutors of the Bioengineering Department

Cláudia Lobato da Silva

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Research Areas and Interests

Current research interests are focused on the *ex-vivo* expansion of human stem cells, Cellular Therapies with human adult stem cells, isolation and purification of stem cells, and bioreactors for stem cell culture. In particular, I have been focused on establishing optimal conditions for the maximization of the expansion of umbilical cord blood-derived hematopoietic stem/progenitor cells, as well as developing bioreactor strategies for the clinical-scale production of mesenchymal stem/stromal cells from different human sources.

Recent Selected Publications

Hatami J, Andrade PZ, Bacalhau D, Cirurgião F, Ferreira FC, Cabral JMS, da Silva CL, “Proliferation extent of CD34+ cells as a key parameter to maximize megakaryocytic differentiation of umbilical cord blood-derived hematopoietic stem/progenitor cells in a two-stage culture protocol”, *Biotechnology Reports*, 4:50-55, doi: 10.1016/j.btre.2014.07.002 (2014)

Oliveira PH, Silva CL, Cabral JMS, “Genomic instability in human stem cells: Current status and future challenges”, *Stem Cells*, doi: 10.1002/stem.1796. [Epub ahead of print] (2014)

Boura JS, Vance M, Yin W, Madeira C, da Silva CL, Porada CD, Almeida-Porada G, “Evaluation of gene delivery strategies to efficiently overexpress functional HLA-G on human bone marrow stromal cells”, *Molecular Therapy-Methods & Clinical Development* 1, 14041, doi:10.1038/mtm.2014.41 (2014)

dos Santos F, Campbell A, Fernandes-Platzgummer A, Andrade PZ, Gimble JM, Wen Y, Boucher S, Vemuri MC, da Silva CL, Cabral JMS, “A xenogeneic-free bioreactor system for the clinical-scale expansion of human mesenchymal stem/stromal cells”, *Biotechnology & Bioengineering*, 111:1116-1127, doi: 10.1002/bit.25187 (2014)

Canadas RF, Cavalheiro JM, Guerreiro JD, de Almeida MC, Pollet E, da Silva CL, da Fonseca MM, Ferreira FC, “Polyhydroxyalkanoates: Waste glycerol upgrade into electrospun fibrous scaffolds for stem cells culture”, *International Journal of Biological Macromolecules*, doi: 10.1016/j.ijbiomac.2014.05.008 (2014)

Fernandes-Platzgummer A, Diogo MM, da Silva CL, Cabral JMS, “Maximizing mouse embryonic stem cell production in a stirred tank reactor by controlling dissolved oxygen concentration and continuous perfusion operation”, *Biochemical Engineering Journal*, 82:81–90, doi: 10.1016/j.bej.2013.11.014 (2014)

Academic Info and Highlights

Member of the Coordination of the Integrated Master Degree in Biomedical Engineering and 2nd cycle Masters Degree in Bioengineering and Nanosystems
Classes in 2013/14: Stem Cell Bioengineering, Cell and Tissue Engineering, Regenerative Medicine, Introduction to Biomedical Engineering, Bioethics
Associate Editor BMC Biotechnology

Catarina Madeira

PMP, Project Management Institute, 2014
Ph.D. Instituto Superior Técnico, 2005
Research Scientist

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Research Areas and Interests

Research Scientist at Stem Cell Bioengineering and Regenerative Medicine Laboratory. Current research interest is focused on setting-up gene delivery strategies for stem cells expansion, differentiation or for being used as drug delivery vehicles, specially using non-viral vectors such as plasmids or minicircles associated with cationic liposomes or physical methods.

Recent Selected Publications

C. Madeira, A. Santhagunam, J.B. Salgueiro, J.M.S. Cabral, “Advanced cell therapies for articular cartilage regeneration”, *Trends in Biotechnology* **33**, 35–42 (2015). (DOI: 10.1016/j.tibtech.2014.11.003)

J. Boura, M. Soland, W. Yin, C. Madeira, C.L. da Silva, C. Porada, G. Almeida-Porada, “Evaluation of gene delivery strategies to efficiently over-express functional HLA-g on human bone marrow stromal cells”, *Molecular Therapy - Methods & Clinical Development* 14041 (2014). (DOI: 10.1038/mtm.2014.41)

A. Santhagunam, F. dos Santos, C. Madeira, J. Salgueiro, J.M.S. Cabral, “Isolation and ex-vivo expansion of Synovial Mesenchymal Stromal Cells for Cartilage Repair” *Cytherapy* 16, 400-453 (2014). (DOI: 10.1016/j.jcyt.2013.10.010)

C. Madeira, C.A.V. Rodrigues, M.S.C. Reis, F.C.G. Ferreira, R.E.S.M. Correia, M.M. Diogo, J.M.S. Cabral, “Non-viral gene delivery to neural stem cells with minicircles by microporation”, *Biomacromolecules* 14, 1251-1710 (2013). (DOI: 10.1021/bm400015b)

J. Boura, F. dos Santos, J.M. Gimble, C.M.P. Cardoso, C. Madeira, J.M.S. Cabral, C.L. da Silva, "Direct head-to-head comparison of cationic liposome-mediated gene delivery to mesenchymal stem/stromal cells of different human sources: a comprehensive study", *Human Gene Therapy Methods* 24, 38-48 (2013). (DOI: 10.1089/hgtb.2012.185.)

Raul Carneiro Martins

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Assistant Professor

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Research Areas and Interests

Electromagnetic tissue imaging using impedance tomographic maps. Tissue characterization through Impedance spectroscopy. Anisotropic tissue characterization. Electromagnetic source localization. Hyperbaric instrumentation. Pulsed Electric Field cell growth conditioning. Electromagnetic surgical navigation. Electrophoresis and Magnetophoresis.

Recent Selected Publications

Silva, H.; A. Lourenço; Fred, A. L. N.; Martins, R.C.M.; "BIT: Biosignal Igniter Toolkit", Computer Methods and Programs in Biomedicine, Vol. 115, No. 1, pp. 20 - 32, June, 2014.

Silva, H.; Fred, A. L. N.; Martins, R.C.M.; "Biosignals for Everyone", IEEE Pervasive Computing, Vol. 13, No. 4, pp. 64 - 71, October, 2014.

Academic Info and Highlights

Information Technologies Coordinator for the Department of Bioengineering
Coordinator of Biomedical Technologies Master
Scientific Secretary IMEKO Technical Committee Measurements in Biology and Medicine

Marília Mateus

Ph.D. Instituto Superior Técnico, 1994
Assistant Professor

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Research Areas and Interests

Focus on the application of synthetic membranes to bioengineering fields, entailing membrane processing (membrane crossflow filtration and membrane chromatography), modification of the surface of membranes (for biocompatibility and selective adsorption capacity), and membrane bioreactors. Recent research projects address the development of membrane adsorbers and membrane chromatography for the purification of protein and plasmid biopharmaceuticals and the characterization of nanoparticles designed for delivery of plasmids.

Recent Scientific Publication and Communications

M.E. Monteiro, L. Raiado-Pereira, D.M.F. Prazeres, M.Mateus, "Preparation of liposome membrane adsorbers and testing for plasmid purification", *Biochem. Eng. J.* **93**, 1-10 (2015).
(DOI: 10.1016/j.bej.2014.09.005)

A. Nascimento, S.A.S.L. Rosa, M. Mateus, A.M. Azevedo, "Polishing of monoclonal antibodies streams through convective flow devices", *Sep. Purif. Technol.* **132**, 593-600 (2014).
(DOI: 10.1016/j.seppur.2014.06.005)

L. Raiado-Pereira, J.D.L. Vega, D.M.F. Prazeres, M. Mateus, "Development of a phenyl membrane chromatography-based process yielding pharmaceutical grade plasmid deoxyribonucleic acid for mammalian cells transfection", *J. Chromatogr. A* **1337**, 67-74 (2014).
(DOI: 10.1016/j.chroma.2014.02.024)

Rauta, P.R., Mateus, M., Monteiro, G.A., Nayak, B., "Development of DNA vaccine to boost antigenic Omp (outer membrane protein) using nanoparticle based delivery", 2nd International Conference on Frontiers in Biological Sciences (InCoFIBS-2015), Rourkela, India, January 22-24, 2015.

L. Raiado-Pereira, J. de la Vega, D.M.F. Prazeres, M. Mateus, "Membrane chromatography-based purification of plasmid DNA for mammalian cells transfection", Sartorius European Upstream & Downstream Forum, Goettingen, Germany, 8-10 September, 2014.

Academic Info and Highlights

Classes in 2013/14: Food Technology, Design Project (Biological Engineering), Design Project (Bioindustry), Biological Engineering Laboratory (bioprocessing).

Memberships: Member of the European Membrane Society;
Member of the Portuguese Society for Biotechnology.

José Cardoso de Menezes

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Research Areas and Interests

Coordinates the BioEngineering Systems Lab at IST's iBB (Institute for Bioengineering and Biosciences). My interests and experience established over the past 20 years relate to proposing innovative strategies based on Systems Engineering approaches to support Quality as a Manufacturing-Science, in processes & products design, development and manufacturing.

My main areas of activity include: Process Analytical Technology (PAT) to improve process state estimation, with in-process monitoring intensification paradigms; Quality by Design (QbD), linking process to product in design and industrialization phases; End-to-End and over the Lifecycle process/product analysis to support continuous improvement; and Knowledge Management Approaches to support timely development of processes and products through the use of complex data and information acquired over very long periods of time.

Recent Selected Publications

Menezes JC, Manufacturing-Sciences & Technologies: QbD 2.0, *EuroPACT2014* - 3rd European Conference on Process Analytics and Control Technology, Barcelona, Spain, May 6th – 9th 2014.

Vicente J, Pinto J, Menezes JC, Gaspar F. Fundamental analysis of particle formation in spray drying. *Powder Technol.*, **247**, 1-7 (2013). (listed #2 on Science Direct "TOP 25 Hottest Papers" of Elsevier's Powder Technology papers).

Markl D, Wahl PR, Menezes JC, Koller DM, Kavsek B, Francois K, Roblegg E, Khinast JG (2013) Supervisory Control System for Monitoring a Pharmaceutical Hot Melt Extrusion Process. *AAPS PharmSciTech*, **14**(3), 1034-1044.

Hakemeyer C, Strauss U, Werz S, Folque F, Menezes JC (2013) Near-infrared and two- dimensional fluorescence spectroscopy monitoring of monoclonal antibody fermentation media quality: Aged media decreases cell growth. *Biotechnol. J.* (Wiley), **8**(7), 835–846.

Alcalà, M., Blanco, M., Menezes, J. C., Felizardo, P. M., Garrido, A., Pérez, D., Zamora, E., Pasquini, C. and Románach, R. J. (2012). Near-Infrared Spectroscopy in Laboratory and Process Analysis. *Encyclopedia of Analytical Chemistry*. (Review, 46 pgs), Wiley.

Academic Info and Highlights

Pharmaceutical Engineering Masters Program Coordinator (IST and Faculty of Pharmacy UL).
2013 – Presidential Award for Merit in Excellence in University-Industry Collaborations (COTEC).
2014 – Hovione Farmaciencia SA, Innovation Award of the Year.
Responsible for the following 2nd Cycle courses: “Bioreactors”, “Process Analytical Technology”, “Chemical Engineering Sciences”, “Chemometrics, Monitoring and Control”.

Nuno P. Mira

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Assistant Professor

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Research Areas and Interests

Current research interests are focused on: *i*) Physiology and molecular biology of *Candida glabrata*, *Saccharomyces cerevisiae* and *Zygosaccharomyces bailii*; *ii*) Regulation of gene and genomic expression in *C. glabrata* and *S. cerevisiae* under stress; *iii*) Exploitation of *Saccharomyces cerevisiae* as a cell factory for the production of add-value chemicals; *iv*) Molecular mechanisms of pathogenesis and antifungal resistance in *Candida glabrata*; *v*) Epidemiology of invasive fungal infections;

Selected Publications

1. Nuno P Mira, Martin Münsterkötter, Filipa Dias-Valada, Júlia Santos, Margarida Palma, Filipa Roque, Joana Guerreiro, Fernando Rodrigues, Maria J Sousa, Cecília Leão, Ulrich Guldener and Isabel Sá-Correia, The genome sequence of the highly acetic acid-tolerant *Zygosaccharomyces bailii* derived interspecies hybrid strain ISA1307, isolated from a sparkling wine plant, DNA Research, 21(3):299-313, (2014)
2. Costa, C., Nunes, J., Henriques, A., Mira, N.P., Nakayama, H., Chibana, H., Teixeira, M.C., The *Candida glabrata* drug:H⁺ antiporter CgTpo3 (ORF CAGL0I10384g): role in azole drug resistance and polyamine homeostasis, Journal of Antimicrobial Chemotherapy, 201469:1767-76, (2014)
3. Teixeira, M.C., Monteiro, P.T., Guerreiro, J.F., Gonçalves, J.P., Mira, N.P., dos Santos, S.C., Cabrito, T., Palma, M., Costa, C., Francisco, A.P., Madeira, S.C., Oliveira, A.L., Freitas, A.T., Sá-Correia, I., "The YEASTRACT database: an upgraded information system for the analysis of gene and genomic transcription regulation in *Saccharomyces cerevisiae*", Nucleic Acids Research, D161-D166, (2014)
4. Mira, N.P., Teixeira, M.C., 2013, Microbial mechanisms of tolerance to weak acid stress, Frontiers in Microbiology, (Editorial article), 4, 416 (2013)
5. Nuno P. Mira, Sílvia Henriques, Greg Keller, Miguel C. Teixeira, Rute G. Matos, Cecília M. Arraiano, Dennis R. Winge and Isabel Sá-Correia, Identification of a DNA binding site for the transcription factor Haa1p, required for *Saccharomyces cerevisiae* response to acetic acid stress, Nucleic Acids Research, 16, 6896-907, (2011)

Academic info and highlights

- Classes in 2014/2015: Comparative and Functional Genomics (1st semester); Genetic Engineering (1st semester)(responsible for the course); Molecular Biotechnology (1st Semester))(responsible for the course); Functional Genomics and Bioinformatics (2nd Semester); Biochemistry and Molecular Biology (2nd semester); Microbial Cell Factories (2nd Semester)
- Member of EFISG (European Fungal Infection Study Group) from the European Society of Clinical Microbiology and Infectious Diseases

Gabriel A. Monteiro

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Research Areas and Interests

Manufacturing of plasmid- and minicircle-biopharmaceuticals by designing more efficiently expression vectors for its in vivo administration and by engineering of bacterial host strains to improve vectors production.

Recent Selected Publications

Šimčíková M, Prather KLJ, Prazeres DMF, Monteiro GA (2014) On the dual effect of glucose during production of pBAD/AraC-based minicircles, Vaccine 32: 2843-2846, doi:10.1016/j.vaccine.2014.02.035

Gonçalves GAL, Oliveira PH, Gomes AG, Prather KLJ, Lewis LA, Prazeres DMF, Monteiro GA (2014) Evidence that the insertion events of IS2 transposition are biased towards abrupt compositional shifts in target DNA and modulated by a diverse set of culture parameters, Appl. Microb. Biot. 98: 6609-6619, doi:10.1007/s00253-014-5695-6

Pereira PMM, Moita AS, Monteiro GA, Prazeres DMF (2014) Characterization of the topography and wettability of English weed leaves and biomimetic replicas, J. Bionic Eng. 11: 346-359, doi:10.1016/S1672-6529(14)60048-2

Gonçalves GA, Prather KLJ, Monteiro GA, Carnes AE, Prazeres DMF (2014) Plasmid DNA production with Escherichia coli GALG20, a pgi-gene knockout strain: fermentation strategies and impact on downstream processing, J. Biotechnol. 186: 119-127, doi:10.1016/j.jbiotec.2014.06.008

Magalhães S, Duarte S, Monteiro GA, Fernandes F (2014) Quantitative evaluation of DNA dissociation from liposome carriers and DNA escape from endosomes during lipid mediated gene delivery, Hum. Gene Ther. Method. 25, 303-313, doi:10.1089/hgtb.2014.080

Academic Info and Highlights

Classes in 2013/14: Ecology, Biomolecular Engineering, Cell and Tissue Engineering; Bioethics, Regenerative Medicine, Biomimicry

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Assistant Professor

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Research Areas and Interests

- Exopolysaccharide biosynthesis and regulation in *Burkholderia*
- Role of protein tyrosine phosphorylation in *Burkholderia* virulence
- Genomics and transcriptomics in clinical isolates of *Burkholderia cepacia* complex
- Functional characterization of *Sinorhizobium meliloti* proteins with role in nitrogen fixation symbiosis with legume plants.

Recent Selected Publications

A.S. Ferreira, I.N. Silva, F. Fernandes, R. Pilkington, M. Callaghan, S. McClean, L.M. Moreira, “The tyrosine kinase BceF and the phosphotyrosine phosphatase BceD of *Burkholderia contaminans* are required for efficient invasion and epithelial disruption of a cystic fibrosis lung epithelial cell line”, *Infection and Immunity* **83**, 812-821 (2015). (DOI:10.1128/IAI.02713-14)

I.N. Silva, P.M. Santos, L.M. Moreira, “Draft genome sequence of two *Burkholderia multivorans* sequential isolates from a chronic lung infection of a cystic fibrosis patient”, *Genome Announcements* **3**(1):e01531-14 (2015). (DOI:10.1128/genomeA.01531-14)

M.R. Santos, A.T. Tomás, J.D. Becker, L.M. Moreira, “*Sinorhizobium meliloti* EmrR regulator is required for efficient colonization of *Medicago sativa* root nodules”, *Molecular Plant-Microbe Interactions* **27**, 388-399 (2014). (DOI: 10.1094/MPMI-09-13-0284-R)

S.G. Pereira, A.C. Rosa, A.S. Ferreira, L.M. Moreira, D.N. Proença, P.V. Morais, O. Cardoso, “Virulence factors and infection ability of *Pseudomonas aeruginosa* isolates from a hydropathic facility and respiratory infections”, *Journal of Applied Microbiology* **116**, 1359-1368 (2014). (DOI:10.1111/jam.12463)

Academic Info and Highlights

Classes in 2013/14: Sabbatical

Jorge Morgado

Ph.D. Instituto Superior Técnico, 1989
Associate Professor with Habilitation

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Research Areas and Interests

The research is carried out within the organic electronics group at Instituto de Telecomunicações-Lisboa, an Associated Laboratory. Current research interests range from conjugated polymers and low molecular weight systems synthesis and their applications in various devices (light-emitting diodes, photovoltaic cells, thin-film transistors and memories). In addition, there is also a research line devoted to the “unimolecular” electronics, encompassing the self-organization of molecular systems on conducting substrates and their electrical characterization.

Recent Selected Publications

G. Brotas, J. Farinhas, Q. Ferreira, R. Rodrigues, I. L. Martins, J. Morgado, A. Charas,, “Synthesis, characterization, and applications in photovoltaic cells of oxetane-functionalized P3HT derivatives”, *Journal of Polymer Science, Part A: Polymer Chemistry*, **52**, 652-663 (2014).

R. Rodrigues, Q. Ferreira, A. L. Mendonça, J. Morgado, “Template role of polyhexylthiophene nanowires on efficient bilayer photovoltaic cells”, *Synthetic Metals*, **190**, 72-78 (2014).

D. Suresh, P. S. Lopes, B. Ferreira, C. A. Figueira, C. S. B. Gomes, P. T. Gomes, R. E. Di Paolo, A. L. Maçanita, M. T. Duarte, A. Charas, J. Morgado, M. J. Calhorda, “Tunable Fluorophores Based on 2-(N-Arylimino)pyrrolyl Chelates of Diphenylboron: Synthesis, Structure, Photophysical Characterization, and Application in OLEDs”, *Chem. Eur. J.*, **20**, 4126-4140 (2014).

R. B. Restani, J. Conde, P. V. Baptista, M. T. Cidade, A. M. Bragança, J. Morgado, I. J. Correia, A. Aguiar-Ricardo and V. D. B. Bonifácio, “Polyurea dendrimer for efficient cytosolic siRNA delivery”, *RSC Advances*, **4**, 54872-54878 (2014).

Q. Ferreira, A. M. Bragança, L. Alcácer, J. Morgado, “Conductance of Well-Defined Porphyrin Self-Assembled Molecular Wires up to 14 nm in Length”, *J. Phys. Chem. C*, **118**, 7229-7234 (2014).

R. Rodrigues, R. Meira, Q. Ferreira, A. Charas, J. Morgado, “Improving the Efficiency of Organic Solar Cells upon Addition of Polyvinylpyridine”, *Materials* **7**, 8189-8196 (2014).

Academic Info and Highlights

Since November 2013, Vice-President of IST for Academic Affairs

Classes in 2013/14: BiomaterialsPhysical Chemistry, Biomaterials Technology, Biomaterials Science

Helena M. Pinheiro

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Assistant Professor

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Research Areas and Interests

Current research interests include the biological treatment of wastewaters with emphasis on the biodegradation of recalcitrant pollutants with mixed cultures in sequencing-batch bioreactors. Interests extend to wastewater quality monitoring using in situ spectroscopy and chemometrics and its application in model-based supervision, diagnosis and control of wastewater treatment bioreactors.

Recent Selected Publications

R. Salgado Brito, H. M. Pinheiro, F. Ferreira, J. Saldanha Matos, N. D. Lourenço, “In situ UV-Vis spectroscopy to estimate COD and TSS in wastewater drainage systems”, *Urban Water J.* **11**(4), 261-273 (2014). (DOI: 10.1080/1573062X.2013.783087)

R. Ribeiro, C. I. C. Pinheiro, T. Arriaga, H. M. Pinheiro, M. C. Almeida (2014), “Model Based Fault Diagnosis for Performance Control of a Decentralized Wastewater Treatment Plant”, *Computer Aided Chemical Engineering* **33**, 691-696 (2014). (DOI: 10.1016/j.bios.2014.02.009)

C. A. Santos, B. Nobre, T. Lopes da Silva, H. M. Pinheiro, A. Reis, “Dual-mode cultivation of *Chlorella protothecoides* applying inter-reactors gas transfer improves microalgae biodiesel production”, *J. Biotechnol.* **184**, 74-83 (2014). (DOI: 10.1016/j.jbiotec.2014.05.012)

Academic Info and Highlights

Elected member of the School Assembly of IST.

Elected member of the Executive Committee of the Environmental Sciences and Engineering Platform of IST (IST-Environment).

Appointed member of the Scientific Committees of the Integrated MSc. in Biological Engineering, Integrated MSc. in Environmental Engineering and MSc in Biotechnology of IST.

Classes in 2014/15: Design Project (Biological Engineering); Design Project (Bioindustry); Environmental Technology; Environmental Biotechnology.

Duarte Miguel Prazeres

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Research Areas and Interests

Responsible for the Molecular Bioengineering Lab of the Bioengineering Research Group at IBB-Institute for Biotechnology and Bioengineering. Current research interests include nucleic acid engineering (development of plasmid biopharmaceuticals and diagnostics), nanobiotechnology (lab-on-a-chip microfluidic devices with integrated biosensors using cells, proteins, and nucleic acids), bioactive paper applications and biomimetic surfaces, ligands and materials.

Recent Selected Publications

Responsible for the Molecular Bioengineering Lab of the Bioengineering Research Group at iBB-Institute for Bioengineering and Biosciences. Current research interests include nucleic acid engineering (development of plasmid biopharmaceuticals and diagnostics), nanobiotechnology (lab-on-a-chip microfluidic devices with integrated biosensors using cells, proteins, and nucleic acids), bioactive paper applications and biomimetic surfaces, ligands and materials.

Recent Selected Publications

Martins, S.A.M., Moulas, G., Trabuco, J.R.C., Monteiro, G.A., Chu, V., Conde, J.P., Prazeres, D.M.F., “Monitoring Intracellular Calcium in Response to GPCR Activation Using Thin-film Silicon Photodiodes with Integrated Fluorescence Filters”, *Biosensors Bioelectronics* **52**, 232-238 (2014). (doi: 10.1016/j.bios.2013.08.037)

Rosa, A.M.M., Louro, A.F., Martins, S.A.M., Silva, J.J.I., Azevedo, A.M., Prazeres, D.M.F. “Capture and Detection of DNA Hybrids on Paper via the Anchoring of Antibodies with Fusions of Carbohydrate Binding Modules with ZZ-domains”, *Analytical Chemistry* **86**, 4340-4347 (2014). (doi: 10.1021/ac5001288)

Pereira, P.M.M., Moita, A.S., Monteiro, G.A., Prazeres, D.M.F., “Characterization of the Topography and Wettability of English Weed Leaves and Biomimetic Replicas”, *Journal of Bionic Engineering* **11**, 346-359 (2014). (doi: 10.1016/S1672-6529(14)60048-2)

Gonçalves, G.A.L., Prather, K.L.J., Monteiro, G.A., Carnes, A.E., Prazeres, D.M.F., “Plasmid DNA Production with *Escherichia coli* GALG20, a *pgi*-gene Knockout Strain: Fermentation Strategies and Impact on Downstream Processing”, *Journal of Biotechnology* **186**, 119-127 (2014). (doi: 10.1016/j.jbiotec.2014.06.008)

Gonçalves, G.A.L., Prather, K.L.J., Monteiro, G.A., Prazeres, D.M.F., “Engineering of *Escherichia coli* Strains for Plasmid Biopharmaceutical Production: Scale-up Challenges”, *Vaccine* **32**, 2847-2850 (2014). (doi: 10.1016/j.vaccine.2014.02.023)

Academic Info

Coordinator of the Integrated Masters Degree in Biological Engineering

Classes in 2013/14: Bioprocess Engineering Principles, Bioentrepreneurship (1st semester); Biomimicry, Bioengineering and Market, Bioethics (2nd semester)

Agostinho Claudio da Rosa

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Research Areas and Interests

Biomedical Signal and Image Processing. Automatic Sleep Analysis. Evolutionary Computation in Search and Optimization. Artificial Life Modelling and Simulation (epidemiology and pest control). Brain Computer Interface, Biofeedback and Neurofeedback Systems.

Recent Selected Publications

Biomedical Signal and Image Processing. Sleep Research. Evolutionary Computation in Search and Optimization. Artificial Life Modelling and Simulation. BioFeedback and Neurofeedback Systems.

Recent Selected Publications

Kurosh Madani, António Dourado Correia, Agostinho Rosa and Joaquim Filipe. “Computational Intelligence”, Revised And Selected Papers Of The International Joint Conference, IJCCI 2012, Barcelona, Spain. Studies In Computational Intelligence, Volume 577, 2014. DOI: 10.1007/978-3-319-11271-8

C.M. Fernandes, A.M. Mora, J.J. Merelo, A.C.Rosa, “KANTS: A Stigmergic Ant Algorithm for Cluster Analysis and Swarm Art”, IEEE Transactions on Systems, Man and Cybernetics, (2014).

CM Fernandes, JJ Laredo, JJ Merelo, C Cotta, R Nogueras, AC Rosa “Shuffle and Mate: A Dynamic Model for Spatially Structured Evolutionary Algorithms” Parallel Problem Solving from Nature–PPSN XIII, 50-59, 2014.

Carlos M. Fernandes, Agostinho C. Rosa, Juan L. J. Laredo, Carlos Cotta and J. J. Merelo. “Performance and Scalability of Particle Swarms with Dynamic and Partially Connected Grid Topologies”. LCNS Transaction of Computational Collective Intelligence Journal, Springer (2014).

Nuno Fachada, Vitor Lopes, Rui Martins, M Figueiredo, A Rosa. “Spectrometric differentiation of yeast strains using minimum volume increase and minimum direction change clustering criteria” Pattern Recognition Letters 45C (2014), pp. 55-61. DOI: 10.1016/j.patrec.2014.03.008

Wenya Nan, Feng Wan, Mang I Vai, Agostinho Rosa “Resting alpha activity predicts learning ability in alpha neurofeedback” Front. Hum. Neurosci. 8 Published on 14 Jul 2014

Wenya Nan, Daria Migotina, Feng Wan, Chin Ian Lou, João Rodrigues, João Semedo, Mang I Vai, Jose Gomes Pereira, Fernando Melicio, Agostinho Claudio da Rosa “Dynamic peripheral visual performance relates to alpha activity in soccer players” Front. Hum. Neurosci. 8 Published on 11 Nov 2014

Academic Info

Head of Evolutionary Systems and Biomedical Engineering Lab at ISR - LarSys
Chair ACM SAC 2014 & 2015 – Computational Intelligence and Video and Image Analysis
Chair IJCCM-ECTA 2014 & 2015 – Evolutionary Computation Theory and Applications
Classes in 2013/14: Human Machine Communication. Bio Signal Processing. Signal Processing in Medicine

Isabel Sá-Correia

Ph.D., Instituto Superior Técnico, 1984 (Microbiology, IGC)
Fulbright Assistant Prof., Univ. Illinois at Chicago, Medical Center,
Chicago, 1985/86
Professor

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Webpage: <http://scholar.google.pt/citations?user=IOqDH2sAAAAJ>

Research Areas and Interests

Research areas: Molecular and Cellular Microbiology, Functional and Comparative Genomics, Systems and Synthetic Microbiology, Microbial Biotechnology. Current research interests: Stress Response and Resistance in Yeasts (gene and genomic expression regulation; drug efflux pumps; design and engineering of more robust strains for biotechnology); *Burkholderia cepacia* complex bacteria in cystic fibrosis: epidemiology, adaptive evolution in the lung and virulence determinants.

Recent selected Publications

Teixeira, MC, Monteiro, PT, Guerreiro, JF, Gonçalves, JP, Mira, NP, dos Santos, S, Cabrito, T, Palma, M, Costa, C, Francisco, AP, Madeira, SC, Oliveira, AL, Freitas, AT Sá-Correia, I, "The YEASTRACT database: an upgraded information system for the analysis of gene and genomic transcription regulation in *S. cerevisiae*", **Nucleic Acids Research**, 42: D161-D166, 2014 (Highly Cited Paper-Web of Science)

Mira, NP, Münsterkötter, M, Dias-Valada, F, Santos, J, Palma, M, Roque, F, Guerreiro, J, Rodrigues, F, Sousa, MJ, Leão, C, Guldener, U, Sá-Correia, I, "The genome sequence of the highly acetic acid-tolerant *Zygosaccharomyces bailii* derived interspecies hybrid strain ISA1307, isolated from a sparkling wine plant, **DNA Research**, 21,299-313, 2014

Dias, PJ, Sá-Correia, I, "Phylogenetic and syntenic analyses of the 12-spanner drug: H⁺ antiporter family 1 (DHA1) in pathogenic *Candida* species: evolution of MDR1 and FLU1 genes, **Genomics**, 104, 45-57, 2014

Moreira AS, Coutinho, CP, Azevedo, P, Lito, I, Melo-Cristino, J, Sá-Correia, I, *Burkholderia dolosa* phenotypic variation during the decline in lung function of a cystic fibrosis patient during 5.5 years of chronic colonization, **Journal of Medical Microbiology**, 63, 594-601, 2014

Academic Info and Highlights

Vice-President of the DBE and Coordinator of the scientific area of Biological Sciences.
Coordinator: Master's Programmes in "Biotechnology", "Microbiology", "Erasmus Mundus EuSYBIO in Systems Biology" and PhD Programme in "Biotechnology".
Director, FCT PhD Programme BIOTECnico-Biotechnology and Biosciences
Classes in 2013/14: Molecular & Cellular Microbiology, Project in Biotechnology
IST Scientific Board and University of Lisbon General Council member
Coordinator: Biological Sciences Research Group, iBB (Institute for Bioengineering & Biosciences)
President, Portuguese Society of Microbiology; FEMS Council delegate.
Editorial Board member: "Microbial Cell", "FEMS Yeast Research", "Omics"
President/member of External Assessment Teams of Agency for Assessment and Accreditation of Higher Education - A3ES

João Miguel Sanches

PhD

Assistant Professor with Habilitation

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Research Areas and Interests

His work has been focused in Biomedical Engineering (BME), namely, in biological (fluorescence microscopy) and medical (US and MRI) image processing, physiological modeling (Cardiovascular system) and statistical signal processing of physiological and behavioral data (ECG and Actigraphy). In this last topic the goal is the development of signal processing algorithms for long term monitoring for sleep disorders diagnosis purposes and epileptic seizures characterization and detection where the correlation of the Autonomic Nervous System (ANS) activity with the Heart Rate Variability (HRV) is a central issue. His research work is usually in collaboration with medical and biological institutions, namely, Medical School of the University of Lisbon (FMUL), the Institute of Molecular Medicine (IMM) in Lisbon, the Institute of Molecular Pathology and Immunology of the University of Porto (IPATIMUP) and the Electroencephalography and Clinical Neurophysiology.

Recent Selected Publications

- Manyá V. Afonso and J.M.R. Sanches, Image Reconstruction Under Multiplicative Speckle Noise using Total Variation, Neurocomputing, 2014.
- David Afonso, José Seabra, Luís Pedro, J. Fernandes e Fernandes and J. Miguel Sanches, J., "An Ultrasonographic Risk Score For Detecting Symptomatic Carotid Atherosclerotic Plaques", Biomedical and Health Informatics, IEEE Journal of , vol.PP, no.99, pp.1,1 doi: 10.1109/JBHI.2014.2359236.
- João Miguel Sanches, Joana Figueiredo, Martina Fonseca, Cecília Durães, Soraia Melo, Sofia Esménio and Raquel Seruca, Quantification of mutant E-cadherin using bioimaging analysis of in situ fluorescence microscopy. A new approach to CDH1 missense variants, European Journal of Human Genetics (2014), 1–8.
- Domingues, A; Paiva, T.; Sanches, J.M., Hypnogram and Sleep Parameter Computation From Activity and Cardiovascular Data, Biomedical Engineering, IEEE Transactions on , vol.61, no.6, pp.1711,1719, June 2014, doi: 10.1109/TBME.2014.2301462.
- G. Vegas-Sánchez-Ferrero, José Seabra, S. Aja-Fernández, M. Martín-Fernández, C. Palencia, A. Serrano, O. Rodriguez, João Sanches, Gamma Mixture Classifier for Plaque Detection in Intravascular Ultrasonic Images, IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control, 61(1):44-61, January, 2014

Academic Info and Highlights

- Member of the executive board of the Institute of Systems and Robotics (ISR)
- Coordinator of the thematic area of Engineering for and from the Life Sciences at the LARSYS
- Senior member of the IEEE Engineering in Medicine and Biology Society since 2011
- Member of the Bio Imaging and Signal Processing Technical Committee (BISP-TC) of the IEEE Signal Processing Society

José A. L. Santos

Ph.D. Instituto Superior Técnico, 1996
Assistant Professor

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Research Areas and Interests

My current research is focused on plasmid DNA (pDNA) manufacturing processes (production, separation, purification, quality control and monitoring) for application in gene therapy or DNA vaccination. The utilization of membrane processes (ultra and microfiltration) and the development of alternative methods (sonication and microfluidization) to alkaline lysis for plasmid release are under research. The development of alternative microbial GRAS (generally recognized as safe) platforms for pDNA production will be other goal of my research.

Recent Selected Publications

DMF Prazeres, JAL Santos, “Production and Purification of Adenovirus Vectors for Gene Therapy”, Handbook of Pharmaceutical Biotechnology, 1261-1295 (2010)

S Freitas, S Canário, JAL Santos, DMF Prazeres, “Alternatives for the intermediate recovery of plasmid DNA: performance, economic viability and environmental impact”, Biotechnology journal 4 (2), 265-278 (2009)

ML Wu, SS Freitas, GA Monteiro, DMF Prazeres, JAL Santos, “Stabilization of naked and condensed plasmid DNA against degradation induced by ultrasounds and high-shear vortices”,

Biotechnology and applied biochemistry 53 (4), 237-246 (2009)

SS Freitas, JAL Santos, DMF Prazeres, “Plasmid purification by hydrophobic interaction chromatography using sodium citrate in the mobile phase”, Separation and Purification Technology 65 (1), 95-104 (2009)

Academic Info and Highlights

Departmental Erasmus Coordinator

Classes in 2013/14:

- Chemical and Biological Process Engineering (MEBiol)
- Process in Biological Engineering (MEBiol)

M. Ângela Taipa

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Research Areas and Interests

Biomolecular Engineering: Biomimetics; combinatorial approaches; molecular recognition; synthetic mimic affinity ligands for identification, separation and stabilization of biomolecules (antibodies, enzymes, plasmid DNA) ; Bio-inspired affinity nanoparticles for immunorecognition.

Selected Publications

I.T. Sousa, N.M.T Lourenço , C.A.M. Afonso, M.A. Taipa, “Protein Stabilization with a triazine-scaffolded dipeptide-mimic synthetic affinity ligand”, *J. Mol. Recognit.* **26**,104-112 (2013)(DOI: 10.1002/jmr.2252)

Silva, C.S.O., Lansalot, M., Garcia, J.Q., Taipa, M.A., Martinho, J.G., “Synthesis and characterization of biomimetic nanogels for immunorecognition”, *Coll Surf B: Biointerfaces* **112**, 264-271 (2013) (DOI. 10.1016/j.colsurfb.2013.08.003)

Taipa, M.A., Immunological Assays: Biotools for High Throughput Screening and Characterisation of Combinatorial Libraries, in “Advances in Combinatorial Chemistry & High Throughput Screening”; Chaguturu, R. (ed.); Bentham Science Publishers e-book Series, Vol.1, pp. 130-158 (2013) (DOI: 10.2174/9781608057450113010008)

Taipa M.A, Affinity Separations | Rational Design, Synthesis and Evaluation: Affinity Ligands. In: Reedijk, J. (Ed.) Elsevier Reference Module in Chemistry, Molecular Sciences and Chemical Engineering. Waltham, MA:Elsevier. (2014) (DOI:10.1016/B978-0-12-409547-2.10738-3).

Sousa, I.T., Taipa, M.A., Biomimetic Affinity Ligands for Protein Purification, in “Protein Downstream Processing: Design, Development and Application of High and Low-Resolution Methods”, Labrou, N. (ed.), Springer Science MIMB Series, Volume 1129, pp. 231-262 (2014) (DOI: 10.1007/978-1-62703-977-2_20)

Academic Info

Classes in 2013/14: Biomolecular and Cellular Engineering;; Biological Engineering Laboratory I; Biological Engineering Laboratory II; Project in Biotechnology; Master Thesis Dissertation in Biotechnology.

Miguel Cacho Teixeira

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Assistant Professor

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Research Areas and Interests

Mechanisms of antifungal drug resistance in *Candida glabrata*
Yeast physiology and Molecular Biology
Environmental stress response of yeasts
Proteomics and Transcriptomics
Systems biology tools for the study of transcriptional regulatory networks

Selected Publications in 2014

Pereira, F.B., Teixeira, M.C., Mira, N.P., Sá-Correia, I., Domingues, L., "Genome-wide screening of *Saccharomyces cerevisiae* genes required to foster tolerance towards industrial wheat straw hydrolysates", **Journal of Industrial Microbiology & Biotechnology**, 41: 1753-61, 2014.

Costa, C., Dias, P.J., Sá-Correia, I., Teixeira, M.C., "MFS multidrug transporters in pathogenic fungi: do they have real clinical impact?", **Frontiers in Physiology**, 5:197, 2014.

Remy, E., Cabrito, T.R., Batista, R.A., Hussein, M.A.M., Teixeira, M.C., Athanasiadis, A., Sá-Correia, I., Duque, P., "Intron Retention in the 5'UTR of the Novel ZIF2 Transporter Enhances Translation to Promote Zinc Tolerance in *Arabidopsis*", **PLoS Genetics**, 10(5):e1004375, 2014.

Costa, C., Nunes, J., Henriques, A., Mira, N.P., Nakayama, H., Chibana, H., Teixeira, M.C., The *Candida glabrata* drug:H⁺ antiporter CgTpo3 (ORF *CAGL0I10384g*): role in azole drug resistance and polyamine homeostasis, **Journal of Antimicrobial Chemotherapy**, 69:1767-76, 2014.

Teixeira, M.C., Monteiro, P.T., Guerreiro, J.F., Gonçalves, J.P., Mira, N.P., dos Santos, S.C., Cabrito, T., Palma, M., Costa, C., Francisco, A.P., Madeira, S.C., Oliveira, A.L., Freitas, A.T., Sá-Correia, I., "The YEASTRACT database: an upgraded information system for the analysis of gene and genomic transcription regulation in *Saccharomyces cerevisiae*", **Nucleic Acids Research**, 42: D161-D166, 2014.

Academic Info and Highlights

Member of the coordination team and scientific committee of the Masters Degree in Bioengineering and Nanosystems and of the ERASMUS MUNDUS Masters Degree in Systems Biology EuSysBio.

Classes in 2013/14: Functional and Comparative Genomics (as coordinator); Biological Sciences Lab (as coordinator); Functional Genomics and Bioinformatics; Molecular and Cellular Microbiology; Microbial Cell Factories; Biochemistry and Molecular Biology; Genetic Engineering; Molecular Biotechnology; Microbiology; Pharmaceutical Biotechnology and Bioengineering; Biosystems Science and Engineering.

Cristina Anjinho Viegas

Ph.D. Instituto Superior Técnico, 1993
Assistant Professor

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Webpage: <http://ibb.tecnico.ulisboa.pt/CV.html>



Research Areas and Interests

Current research interests include the bacterial biodegradation of chloro-*s*-triazine herbicides (atrazine and terbuthylazine) and optimization of bioremediation strategies for the cleanup of soils contaminated with herbicide formulations focused on worst-case scenarios of environment contamination, the toxicity of pesticides and other environmentally relevant chemicals and response mechanisms in the microbial eukaryotic model *Saccharomyces cerevisiae* and in bacterial strains used in the bioaugmentation of *s*-triazine herbicides contaminated soil, and the development of yeast-based bioassays for screening of the potential toxicity of pesticides, synthetic dyes, and other xenobiotics in environmental samples.

Recent selected publications

F.N. Gil, M. Moreira-Santos, S. Chelinho, C. Pereira, J.R. Feliciano, J.H. Leitão, J.P. Sousa, R. Ribeiro, C.A. Viegas. Suitability of a *Saccharomyces cerevisiae*-based assay to assess the toxicity of pyrimethanil sprayed soils via surface runoff: Comparison with standard aquatic and soil toxicity assays, *Science of the Total Environment*, **505**, 161-171 (2015).
(doi: 10.1016/j.scitotenv.2014.09.094)

F.N. Gil, J.D. Becker, C.A. Viegas. Potential mechanisms underlying response to effects of the fungicide pyrimethanil from gene expression profiling in *Saccharomyces cerevisiae*, *Journal of Agricultural and Food Chemistry*, **62**, 5237-5247 (2014). (doi: 10.1021/jf5007775)

C.A. Viegas, V. Silva, C. Mateus, S. Chelinho, M. Moreira-Santos, J. Gonçalves, V. Varela, R. Ribeiro, A.M. Fialho, J. P. Sousa, "Bioremediation strategies based on *Pseudomonas* sp. strain ADP for worst-case scenarios of soil contamination with herbicidal formulations containing chlorinated *s*-triazines", *In*: A. Méndez-Vilas (ed), "Industrial, medical and environmental applications of microorganisms: current status and trends", ISBN Print version: 978-90-8686-243-6, ISBN E-book: 978-90-8686-795-0, Wageningen Academic Publishers, NL, pp. 59-64 (2014).

Academic Info

Coordinator of the Teaching Laboratory in Biological Sciences.

Classes in 2013/14: Genetic Engineering/Molecular Biotechnology (labs; 1st semester); Microbiology; Environmental Biotechnology (2nd semester).

Contacts

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Department of Bioengineering
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