



annual
report
2015

INSTITUTO
DE TECNOLOGIA
QUÍMICA E BIOLÓGICA
ANTÓNIO XAVIER / UNL

Knowledge Creation



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ABOUT ITQB

Instituto de Tecnologia Química e Biológica António Xavier (ITQB) is a scientific research and advanced training institute of the Universidade NOVA de Lisboa.

The ITQB is located in the Town of Oeiras, at the Tagus river mouth, just outside Lisbon.

The mission of the ITQB is to carry out scientific research and postgraduate teaching in chemistry, life sciences, and associated technologies, while also serving the community and performing university extension activities for the promotion of science and technology.

Brief account of ITQB's history

The origins of ITQB go back to 1986 when the concept of a new research centre was developed and took shape through a process led by Professor António V. Xavier (1943-2006), culminating in the launch of CTQB (Centro de Tecnologia Química e Biológica) in 1989. This research centre became Instituto de Tecnologia Química e Biológica in 1993, when it was integrated in Universidade Nova de Lisboa.

Since its foundation, and to the present date, ITQB works closely with its partner institution IBET (Instituto de Biologia Experimental e Tecnológica) – a private, not-for-profit biotechnology research organization that interfaces academia and industry.

In 1996, ITQB started to operate in the present site, in the campus of Quinta do Marquês, in Oeiras. The main building hosts most of the research groups and all administrative and support services; a few groups have remained in the previous location at Instituto Gulbenkian de Ciência or otherwise use laboratory space from the Instituto Nacional de Investigação Agrária e Veterinária (INIAV).

ITQB was one of the first research institutions to be awarded the status of Laboratório Associado (LA) by the Minister of Science and Technology, in 2001. Under the LA programme the

Institute established a partnership with IGC and IBET, and later with CEDOC, to maximize its research and development potential.

In 2015, a new funding mechanism determined the organization of ITQB research activities within research units. In line with its research strategy, ITQB coordinates two research units (MOSTMICRO and GREEN-IT) and participates in a third one (iNOVA4Health).

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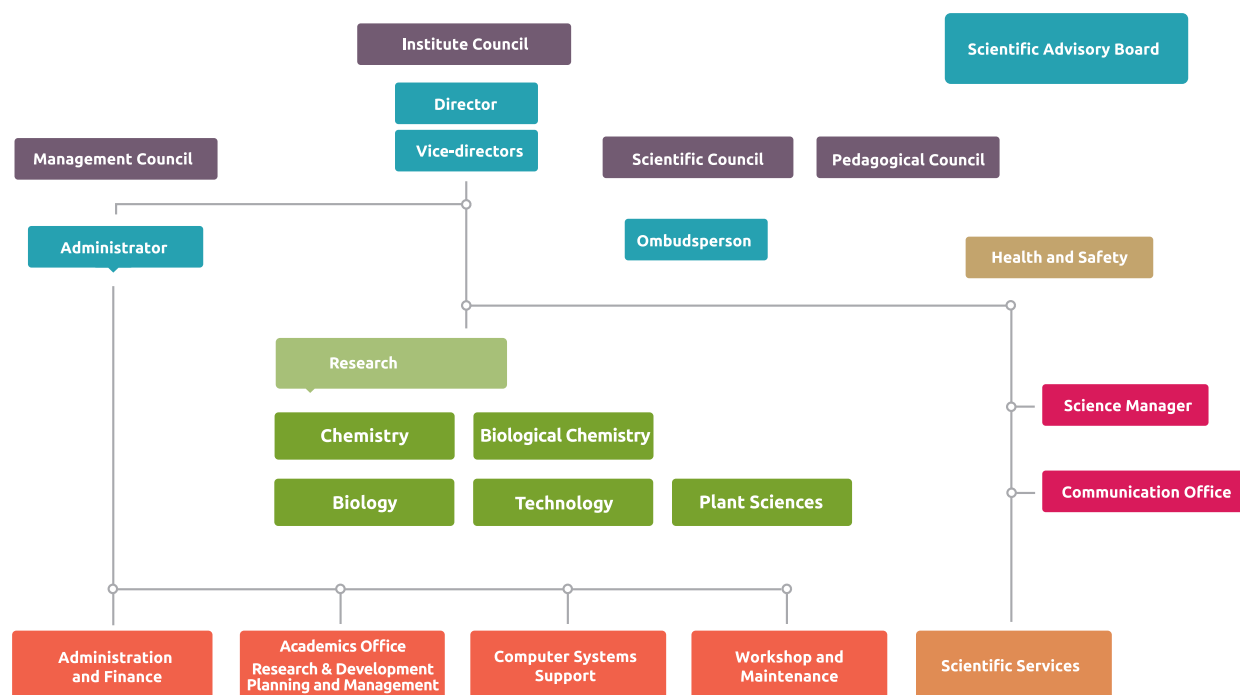
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Bioimaging Unit

Adriano O. Henriques

Library

Isabel Murta

Teaching Laboratory

Teresa Baptista da Silva

Technology transfer

Francisco Pereira do Valle

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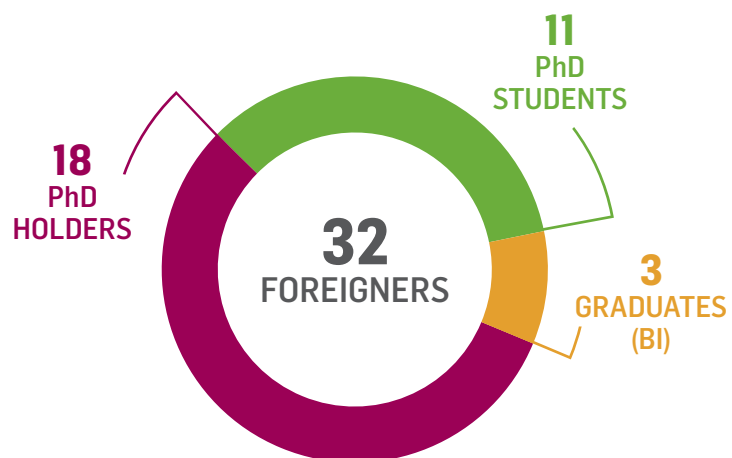
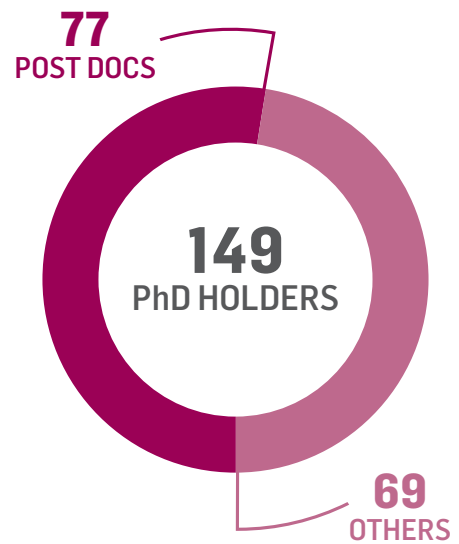
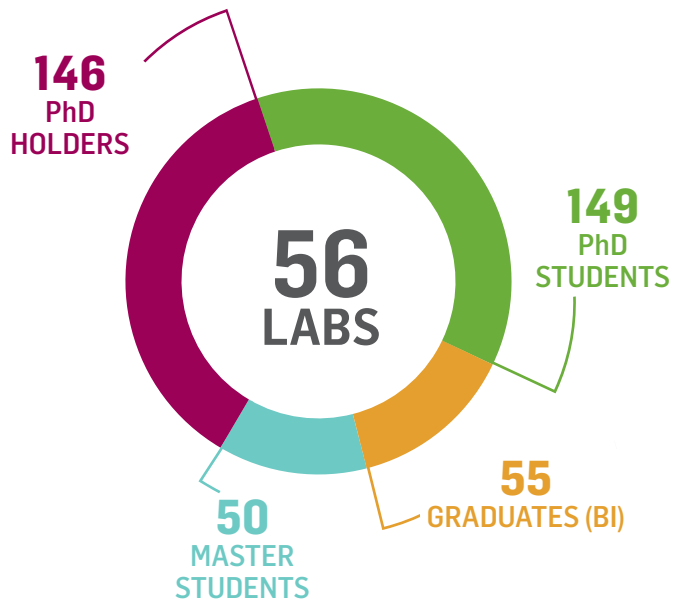
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Júlia Costa (Vogal)

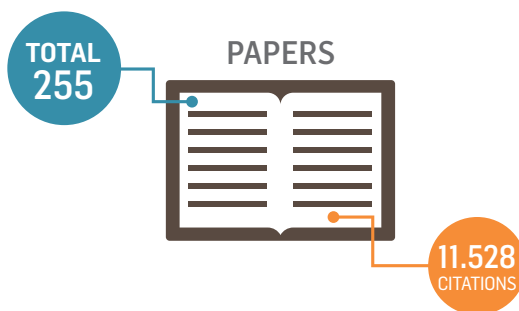


PEOPLE

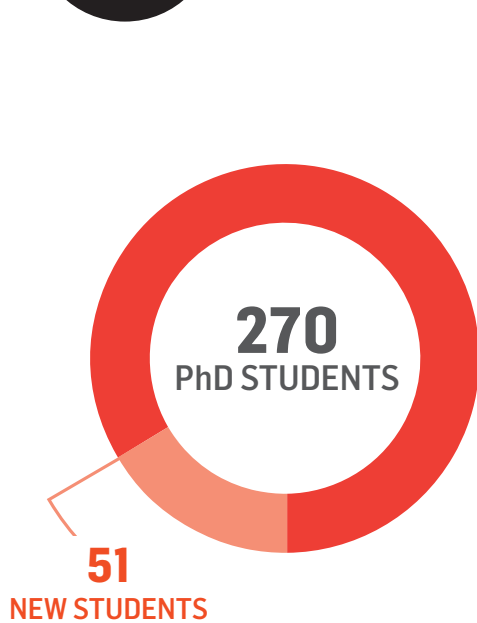




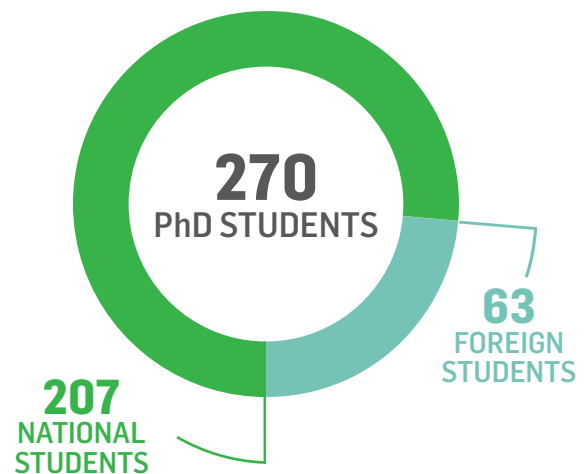
RESEARCH



EDUCATION

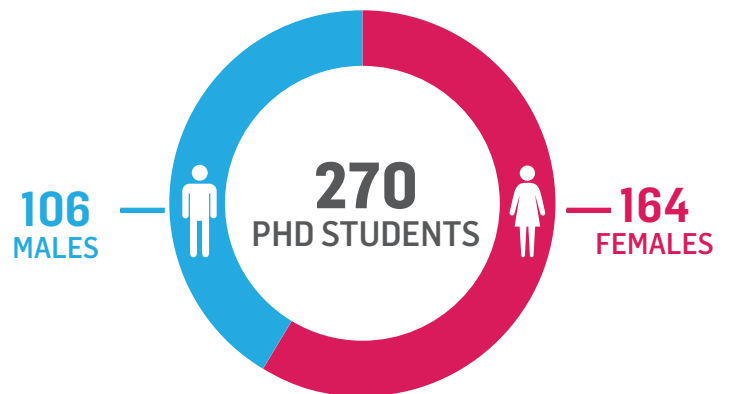
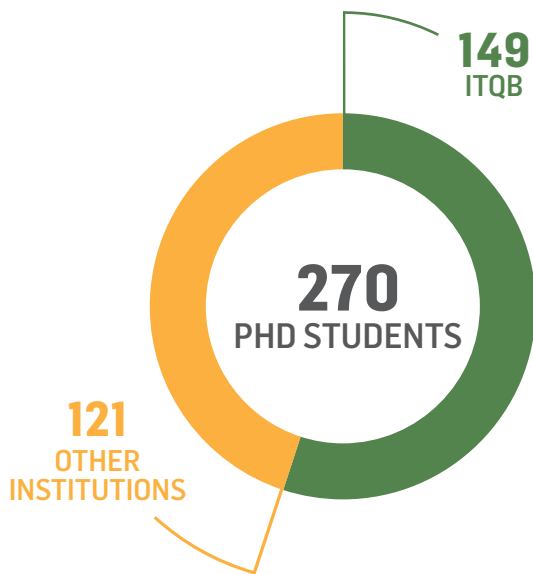


44
Phd
degrees
awarded

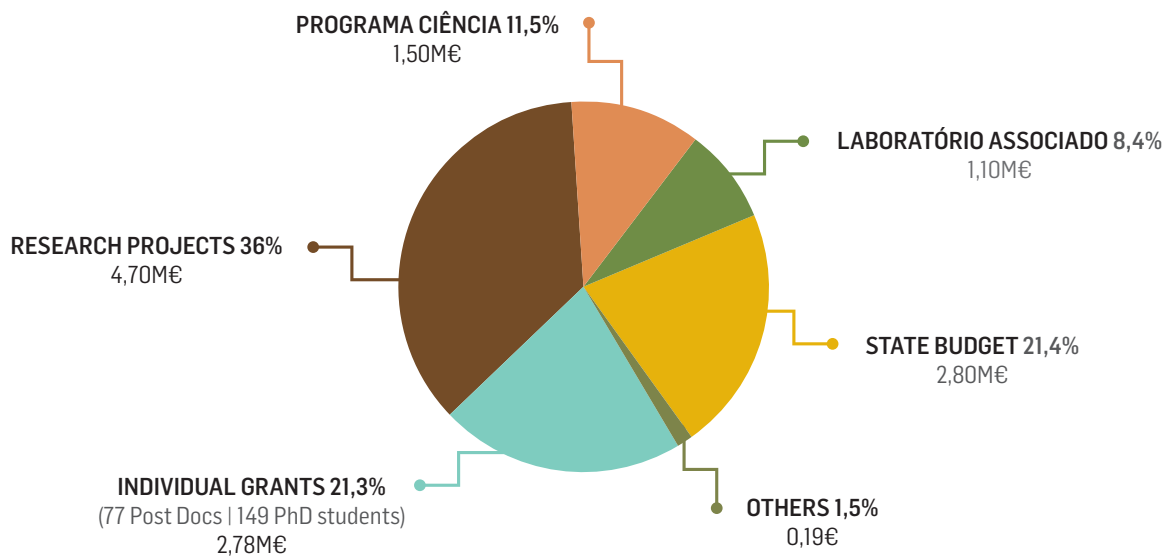




EDUCATION



FUNDING

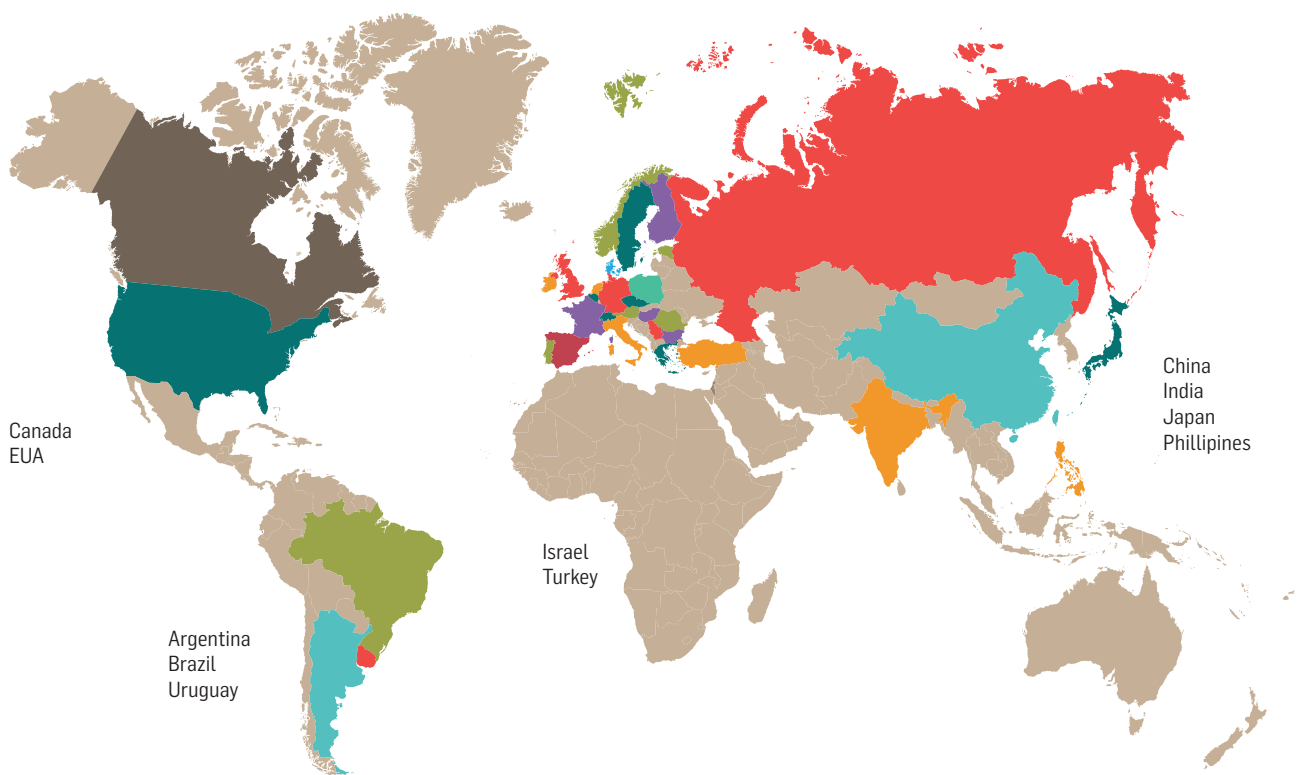




INTERNATIONALIZATION

Countries with projects in collaboration with ITQB NOVA.

Austria
Belgium
Bulgaria
Czech republic
Denmark
England
Estonia
Finland
France
Germany
Hungary
Ireland
Italy
Netherlands
Norway
Poland
Russia
Spain
Sweden
Switzerland



A YEAR IN REVIEW



MAR 31

NOVA stands out in U-Multirank 2015
Results from EU global university ranking announced

MAR 30

CEDOC and ITQB/iBET joint research project distinguished
Prémio de Investigação Colaborativa Santander Totta
Universidade Nova de Lisboa

MAR 16

MolBioS PhD Program 2016
Call for applications is now open

MAR 9

ITQB Bridge Fellowships
Applications are open till March 22

MAR 6

Plants for Life PhD Program: day 1
International PhD Program officially starts on March 6

JANUARY

FEBRUARY

MARCH

APRIL

FEB 2

ERC Consolidator Grant for Cristina Silva Pereira
Project will focus on antifungal strategies

JAN 20

Social Media for Scientists
NOVA Doctoral School course is now also an e-book

JAN 14

New Year Honour for Prof. Kenneth Seddon
Order of the British Empire attributed to ITQB's Visiting Professor

JAN 8

MolBioS PhD Program: day 1
PhD Program officially starts on January 8

APR 4

Announcing course on Cells for Compound Screening
The final registration deadline is June 30

Announcing 5th course on Animal Cell Technology
The early registration deadline is June 30

APR 23

4^o Workshop NOVASAÚDE envelhecimento

APR 17

Mariano Gago (1948-2015)
ITQB researchers pay tribute to his legacy to Portuguese science

Maria Arménia Carrondo to head FCT
Portuguese funding agency has new president

ITQB, a great choice for your PhD
Application deadline for MolBioS PhD Program is April 22

ITQB and iBET at *Festival Nacional de Biotecnologia Pavilhão do Conhecimento* and *Mercado da Ribeira* in Lisbon

**MAY 28**

Symposium - *Integração de doutorados nas empresas: desafios e soluções para o futuro*

MAY 27

Master in Biochemistry for Health 2015
Application are open till July 26

MAY 12

Integrating PhD holders in Portuguese companies
Núcleo de Bolseiros from ITQB
organizes symposium for May 28

Fascination of Plants Day

JULY 30

8th CERMAX practical course on basic NMR 30.07.15

JULY 20

Medical students' debut in research 20.07.2015
ITQB hosts first ANEM Science Summer School

JULY 10

Best PhD Thesis 2014
Best Thesis Prize awarded to Ana Filipa Rodrigues

António Xavier Prize

Award attributed ex-aequo to Silvia Diaz and Cláudia Rocha

Celebrating ITQB

ITQB Day marks 22 years within Universidade NOVA

MAY

JUNE

JULY

AUG

JUN 30

Biochemistry for Health Day

JUN 29

Course: Introdução ao Software R
Regina Bispo & Tiago A. Marques, Start Factor,
statistical consulting and training

JUN 25

Open Day of the Master in Biochemistry for Health

JUN 22

Students on the Master in Biochemistry for Health
Video collects 1st and 2nd year students' testimonies

JUN 19

1st NOVASAÚDE Workshop on Genetics 1

JUN 18

SMARTAgrifor Kick-off Meeting

Ciência Viva no Laboratório

Festa do Ambiente at Parque dos Poetas, Oeiras

JUN 8

Master Class: Germ Stories – Scene Two of Five
Decades in Microbiology
Roberto Kolter, Department of Microbiology and
Immunobiology, Harvard Medical School

JUN 3

Master in Medical Microbiology 2015/17

AUG 12

PhD Fellowships Plants for Life 2016
Applications to PhD Program till October 11



OCT 26*"Um cientista vem à nossa escola"*

Science and Technology Week 2015

OCT 13*Resistir - quando as bactérias resistem a antibióticos*Exhibition at *Centro Ciência Viva de Sintra* with ITQB partership**OCT 12**

Starting MOSTMICRO

Researchers organize kick-off meeting of research unit

OCT 10ITQB Open Day - *À luz da Ciência***OCT 4**

Cheers to Manuel Nunes da Ponte

Former ITQB Director honoured by colleagues and students

DEC 7

Prize for cork oak sequencing

Genosuber considered an elevated potential project

DEC 4

Mini-Symposium on Molecular Microbiology

Thinking mostly positive!

DEC 3

Four MOSTMICRO Research Positions available

SEPTEMBER**OCTOBER****NOVEMBER****DECEMBER****SEP 8**

Symposium - Super-Resolution Microscopy in Infection and Immunity

SEP 9

Online gallery of Graphic Diaries from the constest "Drawing the Fascination of Plants Day at ITQB"

**NOV 25**

COHiTEC 2016 Presentation Session

NOV 18

6th ITQB-NOVA PhD Students' Meeting

PhD Students discuss their work from 18 to 20 April

NOV 13

Starting Green-it

Researcher organize kick-off meeting

NOV 6

Bringing Science into the Market: Projects developed by ITQB PhD students

Fourteen projects developed by MolBioS PhD students

NOV 4

Inter-institutional postdoc retreat in Setubal

More than 120 postdocs in life sciences gather to discuss their future

NOV 2

Be the Missing Link: Postdoc Interface Fellowships



RESEARCH

RESEARCH AREAS

ITQB has a strong expertise in **Molecular Biosciences**, covered by four broad scientific disciplines: Cellular and Molecular Biology, Molecular and Structural Biology, Biotechnology and Systems Biology, and Chemical Biology. These scientific disciplines drive ITQB research, contributing to strategic Societal Challenges focused on the well-being of human societies (Molecular Basis of Health and Disease) and on the environment (Biological Resources and Sustainable Development).

Molecular basis of health and disease is directed to the well-being of humans and animals. ITQB aims to understand **the biological questions at the molecular and cellular scale** exploiting complementary expertise within the Institute. Epidemiology, molecular basis of infection, and antimicrobials and resistance are areas where research is being pursued towards this goal. Our molecular expertise allows us to unveil the mechanisms of disease and drug action, while opening the way for the design of new drugs, including biopharmaceuticals and ATPs. In summary, ITQB addresses, at several levels of depth (from the atomic level, to organism biology), **the molecular mechanisms that sustain life**.

Biological resources and sustainable development deals mainly with the environment at large. The expertise of ITQB in Plant Sciences has a strong molecular edge and obvious impact on agriculture and the environment, placing the Institute on a very competitive position to make a difference at national and international level. Additionally, ITQB contributes substantially to the topics of food safety and security, which are strategic in our over-crowded planet.

Furthermore, ITQB expertise in clean production of useful products through (bio)catalysis (including bioenergy production), and microbiotechnology, can pave the way to a more sustainable development, while maintaining and improving the quality of life of advanced societies.

Research activities are currently integrated in **Research Units**, which involve researchers from other institutions. ITQB coordinates two Research Units – **MOSTMICRO** and **GREEN-IT** - and is further involved in a third one – **iNOVA4Health**. MOSTMICRO and iNOVA4Health operate in the area of Health and GREEN-IT operates in the area of Sustainability.

MOSTMICRO

Molecular, Structural and Cellular Microbiology

The **Molecular, Structural and Cellular Microbiology Unit** (MOSTMICRO) aims to advance the fundamental knowledge of living organisms, with emphasis on important bacterial pathogens, towards improving human health.

Research is focused on selected micro-organisms from all the three life domains, Bacteria, Archaea and Eukarya, for the study of basic biological questions, to improve our understanding of pathogens, and to contribute to the identification and design of novel systems/proteins/compounds with therapeutic potential.

The unit is coordinated by ITQB.

Green-it

Bioresources4Sustainability

The mission of the **BioResources 4 Sustainability Unit** (GREEN-IT) is to develop or design more sustainable biological and synthetic systems with application in food, feed, energy and the environment through the study of biological resources, ranging from complex systems like plants, bacteria and fungi, down to the level of proteins and molecules

GREEN-IT explores biological resources, using chemical and biological strategies, to address key societal challenges in agriculture, forestry and energy, ensuring environmental protection and supporting a bio-based economy.

The unit is coordinated by ITQB and also involves research groups from iBET and IGC.

iNOVA4Health

iNOVA4Health is a translational medicine programme organizing the efforts of biomedical researchers involved in biological understanding of disease, lead compounds and biopharmaceuticals "pre-discovery", technological scientists involved in "preclinical development", and clinicians involved in "early clinical and first in man clinical trials" from institutions within NOVA University of Lisbon. The programme has a strong emphasis on developing therapies to promote healthy ageing and in targeting chronic diseases that are responsible for two thirds of deaths worldwide and a major burden on healthcare systems for the future.

The unit is managed by iBET and also includes ITQB, CEDOC and the IPOLFG, Portuguese Oncology Institute.



RESEARCH DIVISIONS

At ITQB, **Research Laboratories** are organized into **five Research Divisions** - Chemistry, Biology, Biological Chemistry, Plant Sciences, and Technology. Collaboration between Divisions is strongly encouraged. The diversity of expertise present at ITQB contributes to the **multidisciplinary atmosphere** that makes this Institute unique in the country.

CHEMISTRY DIVISION

Ana Petronilho Lab **Bioorganometallic Chemistry**

Research in our group is centred in the synthesis of biologically relevant N-heterocyclic carbenes (NHCs), and on their applications as pharmaceuticals and catalysts.

Beatriz Royo Lab **Homogeneous Catalysis**

The homogeneous catalysis group works on the synthesis of novel catalyst based on organometallic species. Our final goal is to develop sustainable, efficient and selective organic transformations.

Carlos Romão Lab **Organometallic Chemistry**

The Laboratory of Organometallic Chemistry is presently studying new metal derivatives of carbon monoxide (CO) to be used for the production of renewable energy and as a new class of drugs based on the therapeutic activity of CO.

Chris Maycock Lab **Organic Synthesis**

Natural product syntheses are a great challenge since the product gross structure and stereochemistry are rigorously defined. Any synthesis is a test of the viability of the strategy and of the compatibility of the reagents. The organic synthesis group is dedicated to the synthesis of compounds which have a relatively complex three dimensional structure and which may not necessarily be related to the gross structure.

Eurico Melo Lab **Micro-heterogeneous Systems**

This group focus on the study of how the small volumes, the limited dimensions and the topology of the compartments in which biological reactions take place influence their kinetics and equilibrium.

Isabel M. Marrucho Lab **Separation and Extraction Technologies**

The Separation and Extraction Technologies group uses engineering tools to develop sustainable chemicals, materials and processes. Research ranges from fundamental studies on phase equilibria to applications in separation and extraction processes.

Luis Paulo N. Rebelo Lab **Molecular Thermodynamics**

Molecular thermodynamics of liquids and liquid solutions, in particular, studies of ionic liquids and ionic liquid-containing systems constitute the main activity of this group. Other research topics include isotope effects, polymer solutions, and metastable liquids.

Rita Delgado Lab **Coordination and Supramolecular Chemistry**

The Coordination and Supramolecular Chemistry group designs and synthesizes new molecules for the selective uptake of anions, neutral molecules or metal ions for environmental and medical applications.

Rita Ventura Lab **Bioorganic Chemistry**

Bioorganic Chemistry is the interface of organic chemistry and biology. Research in this lab uses the principles and techniques of organic chemistry to solve problems of relevance to biology, like designing synthetic derivatives of natural products that improve on nature.



BIOLOGICAL CHEMISTRY DIVISION

Antonio M. Baptista Lab

Molecular Simulation

The Molecular Simulation Laboratory develops and applies theoretical/computational methods to study the atomic-level determinants of the behavior of (bio)molecules.

Carlos Frazão Lab

Structural Biology

Macromolecular Crystallography Unit

The Structural Biology Laboratory works on the 3D structural determination of biological macromolecules aiming to understand biological processes at atomic and molecular level.

Claudina R. Pousada Lab

Genomics and Stress Laboratory

The genomics and stress laboratory works in the mechanisms involved in homeostasis control when yeast cells are exposed to different environmental cues. The function of Yap transcription factors in stress response is investigated.

Cláudio M. Soares Lab

Protein Modeling

The Protein Modelling Laboratory works on molecular modelling of proteins using physical methods. Our areas of work range from basic research in modelling methodologies to applications with biotechnological and biomedical interest.

Colin McVey Lab

Structural Virology

Macromolecular Crystallography Unit

Our research is focused on gammaherpesvirus viral modulation and the study of proteins encoded by herpesvirus to understand their structural and functional role in viral latency. Viral latency is the ability of a pathogenic virus to lie dormant within a cell. One of the most essential tasks during latency is to maintain the viral episome through cycles of mitotic cell divisions. The focal point of our research is LANA, a multifunctional protein that is critical for the establishment and maintenance of viral latency. My lab combines both biophysical (EMSA, ITC & Thermofluor) and structural methods (BioSAXS & X-ray crystallography) to understand protein interactions involved in viral latency and modulation of its host.

Inês A. Cardoso Pereira Lab

Bacterial Energy Metabolism

The Bacterial Energy Metabolism laboratory investigates the molecular basis of metabolic pathways for energy production, in microorganisms that are biotechnologically and environmentally important.

Ligia M. Saraiva Lab

Molecular Mechanisms of Pathogen Resistance

The Molecular Mechanisms of Pathogen Resistance Laboratory mainly focus on understanding the survival mechanisms of human pathogens that relate to oxidative and nitrosative stress imposed by the human immune system.

Ligia O. Martins Lab

Microbial & Enzyme Technology

The research activities are in the field of Molecular Biotechnology aiming at the eco-efficient use of natural resources, the set-up of new bioremediation processes, and the production of bio-based products.

Manolis Matzapetakis Lab

Biomolecular NMR

Our focus is the application of NMR to various biomolecular problems. We are interested in protein structure determination - dynamics, protein-protein interactions including the study of metalloproteins and large proteins.

Manuela M. Pereira Lab

Biological Energy Transduction

Metalloproteins and Bioenergetics Unit

The Biological Energy Transduction Group addresses a fundamental process for all living organisms: energy conservation. A wide range of biochemical and biophysical techniques is used to investigate the mechanisms of energy transduction by membrane respiratory chains.

Margarida Archer Lab

Membrane Protein Crystallography

Macromolecular Crystallography Unit

In the Membrane Protein Crystallography Laboratory, we determine the three-dimensional structure of biological macromolecules. The laboratory is integrated in the Macromolecular Crystallography Unit.

Maria Arménia Carrondo Lab

Structural Genomics

Macromolecular Crystallography Unit

The Structural Genomic Group develops structural studies by X-ray diffraction of proteins and protein interactions involved in the innate immune response and a number of different prokaryotic proteins that are targets for health and biotechnological applications, using a structural genomic approach.



Miguel Teixeira Lab

Metalloenzymes and Molecular Bioenergetics

Metalloproteins and Bioenergetics Unit

The main research themes of the Laboratory are the study at the molecular level of the structure and functional mechanisms of soluble and membrane-bound metalloenzymes, namely those involved in oxygen and nitric oxide metabolisms.

Pedro Matias Lab

Industry and Medicine Applied Crystallography

Macromolecular Crystallography Unit

Many proteins in nature have either industrial and/or medicinal applications. Knowledge of their three-dimensional structure is essential to understanding their function at the atomic level, and can be used to control or improve their functional activity by the production of small molecules to act as substrates or ligands with specific purposes (e.g., drugs to fight disease) or by engineering selected mutants with enhanced biological activity. Our research program is dedicated to doing just that: determining the 3D structure of selected proteins, and using that knowledge, in combination with other studies (biochemical, spectroscopic, etc.) to understand how these molecules work.

Ricardo O. Louro Lab

Inorganic Biochemistry and NMR

The Inorganic Biochemistry and NMR Laboratory is devoted to the structural and functional characterization of redox proteins that participate in the anaerobic bioenergetic metabolism of microorganisms, using biophysical methods.

Smilja Todorovic Lab

Raman Spectroscopy of Metalloproteins

Research in the Laboratory for Raman spectroscopy of metalloproteins is focused on structural and functional characterization of redox proteins that perform diverse functions in cells, including electron transport, detoxification and enzymatic catalysis.



BIOLOGY DIVISION

Adriano O. Henriques Lab **Microbial Development**

Bacterial spores are encased in a protein shield (or coat) that confers resistance against noxious chemicals and predation, protects the underlying cortex peptidoglycan layer from the action of lytic enzymes, and is a key sensor of the environment. The spore surface proteins are synthesized in the mother cell, one of the two compartments of the sporulating cell.

Cecilia Arraiano Lab **Control of Gene Expression**

Our studies focus on the control of gene expression. We have studied RNA degradation and characterized enzymes that mediate decay. Other interests are stress and microbial growth. This work has many applications in Biotechnology and Health.

Federico Herrera Lab **Cell Structure and Dynamics**

The overall aim of my laboratory is to lay the groundwork for the application of regenerative medicine in central nervous system (CNS) disorders involving neuronal loss, such as neurodegenerative disorders, spinal cord injury or stroke.

Helena Santos Lab **Cell Physiology and NMR**

Research at the Cell Physiology & NMR Lab is focused on beneficial microbes, i.e., microorganisms that promote human health or well-being, or are sources of new metabolites and enzymes with potential application in biotechnology.

Hermínia de Lencastre Lab **Molecular Genetics** **Microbiology of Human Pathogens Unit**

The long-range interest of the laboratory is in the epidemiology, genetics, evolutionary and biochemical mechanisms of antibiotic resistant pathogens, specifically, staphylococci, *Streptococcus pneumoniae*, and enterococci.

Júlia Costa Lab **Glycobiology**

Most mammalian proteins contain oligosaccharides covalently linked. We are studying the glycosylation of neuronal tissue.

Karina Xavier Lab **Bacterial Signaling**

In our laboratory we to study a process called Quorum Sensing which enables bacteria to synchronize their behaviour and act in group to regulate important processes such as virulence, biofilm formation and antibiotics production.

Maria Miragaia Lab **Bacterial Evolution and Molecular Epidemiology** **Microbiology of Human Pathogens Unit**

The Laboratory of Bacterial Evolution and Molecular Epidemiology aims to understand the molecular basis of bacterial evolution with focus on the evolution of antimicrobial resistance determinants and antimicrobial resistant clones in coagulase-negative staphylococci (CoNS).

Mariana G. Pinho Lab **Bacterial Cell Biology**

In the Bacterial Cell Biology laboratory we use the Gram positive pathogen *Staphylococcus aureus* to study the mechanisms of cell division and of antibiotic resistance to cell wall targeting antibiotics.

Pedro Domingos Lab **Cell Signaling in Drosophila**

We use *Drosophila* as a model system to study the molecular and cellular signaling mechanisms involved in the degeneration of the photoreceptors, the cells that sense light in the visual system.

Raquel Sa-Leão Lab **Molecular Microbiology of Human Pathogens** **Microbiology of Human Pathogens Unit**

In our group we are studying how human interventions, such as the use of vaccines and antibiotics, impact on the nasopharyngeal ecosystem, a rich niche frequently inhabited by potentially pathogenic bacteria such as *Streptococcus pneumoniae*.

Sergio R. Filipe Lab **Bacterial Cell Surfaces and Pathogenesis**

We study how bacteria synthesize a major component of their cell surface, the peptidoglycan, while simultaneously preventing the infected host from detecting this inflammatory macromolecule that can trigger an innate immune response.



PLANT SCIENCES DIVISION

Cândido Pinto Ricardo Lab

Plant Biochemistry

The Plant Biochemistry Laboratory applies transcriptomics, proteomics and metabolomics to study plant development and stress response. Cellular processes of model plants and molecular plasticity of plant genetic resources are areas of research.

Carla António Lab

Plant Metabolomics

At the Plant Metabolomics Lab we use Analytical Chemistry and Mass Spectrometry-based strategies to study Plant Development and Stress Biology. We aim to elucidate primary metabolite accumulation patterns in plants present in a defined developmental period and abiotic stress condition.

Célia Miguel Lab

Forest Biotech

Forest trees have a huge ecological and socio-economic impact. They provide the biomaterials for highly competitive forest industries. Efficient strategies for tree selection, improvement and clonal propagation are required in order to meet the increasing demand for forest products better suited for industry applications. However, the establishment of such strategies depends on a better knowledge of the biological processes underlying the traits of interest.

Isabel Abreu Lab

Proteome Regulation in Plants

GPlantS Unit

At the Proteome Regulation Lab, we study the fast regulation of the cell proteome by post-translational occurring when plants are exposed to changes in their environment.

Margarida Oliveira Lab

Plant Functional Genomics

GPlantS Unit

At GPlantS lab we study the effect of environmental factors on the regulation of gene expression and plant development, with special focus on salt, drought and temperature stresses, using a number of different genomics approaches.

Maria Carlota Vaz Patto Lab

Genetics and Genomics of Plant Complex Traits (PlantX)

At the PlantX Lab we unveil the genetic and genomic basis of plant Complex traits, such as nutritional or organoleptic quality or biotic/abiotic stress resistance, using different statistical genetic and genomic approaches.

Manuela Chaves Lab

Plant Molecular Ecophysiology

Our general interests concern the understanding of physiological and molecular mechanisms underlying plant responses to environmental stresses as well as the differences among genotypes in the capacity to utilize external resources.

Nelson Saibo Lab

Plant Gene Regulation

GPlantS Unit

In the Plant Gene Regulation Laboratory we use model and crop plants to study gene regulatory mechanisms underlying plant growth and plant responses to adverse environmental conditions

Pedro Fevereço Lab

Plant Cell Biotechnology

Our aim is to develop molecular strategies to support plant selection and breeding programs, to apply biotechnology to the development of company's strategies and to train researchers in plant biotechnology and plant molecular biology.

Rita Abranches Lab

Plant Cell Biology

The Plant Cell Biology Laboratory works on several aspects of the biology of the plant cell, including the functional organization of the cell nucleus and protein processing within the plant secretory pathway.



TECHNOLOGY DIVISION

Abel Gonzalez Oliva Lab **Biomolecular Diagnostics**

This multidisciplinary research team is committed to develop new biomolecular tools, such as nanoparticles (CdSe@ZnS quantum dots) and biosensors, for practical applications like disease diagnostic and bioprocess monitoring..

Ana Coelho Lab **Mass Spectrometry**

The information obtained with the powerful Mass Spectrometry techniques is fundamental for the structural characterization of chemical and biochemical species.

Ana Luisa Simplicio Lab **Pharmacokinetics and Biopharmaceutical Analysis**

The PABA group develops in vitro models to study pharmacokinetics and metabolism. Those models are applied to dietary supplements or prospective drugs.

Ana Sofia Coroadinha Lab **Cell Line Development and Molecular Biotechnology** **Animal Cell Technology Unit**

The primary research activity is centered in development and improvement of animal cell lines for the manufacturing of complex biopharmaceuticals, as recombinant proteins and recombinant virus for vaccines and gene therapy.

Ana Teixeira Lab **Bioengineering and Systems Biology** **Animal Cell Technology Unit**

Our research is primarily focused on studying the systems level metabolism of animal cells, combining computational and experimental tools to identify key regulatory mechanisms that control cell metabolic phenotypes (target biological systems include biopharmaceutical cell factories, stem cells used in expansion and differentiation protocols, as well as brain and cancer cell models). We also develop monitoring and control tools to support bioprocess optimization and batch-to-batch consistency.

Andreas Bohn Lab **Systems Biodynamics**

The Systems Biodynamics Laboratory uses computational and mathematical methods to analyze and predict the response of biological systems like plant leaves or microbial biofilms to dynamical variations of environmental conditions.

Catarina Duarte Lab **Nutraceuticals and Delivery**

This laboratory uses clean technologies for isolation and development of health promoting products. High pressure methodologies are applied for the extraction of bioactive compounds and preparation of new delivery systems.

Catarina Brito Lab **Advanced Cell Models** **Animal Cell Technology Unit**

Our research is mostly translational and focused on the study of cellular microenvironment in disease onset and progression. To address these questions we develop and employ advanced cell-based disease models using stem cells and other patient-derived cell and exploring three-dimensional culture strategies, along with cell biological and biochemical approaches. Our main research targets are Central Nervous System diseases and Cancer.

Cristina Silva Pereira Lab **Applied and Environmental Mycology**

The Applied and Environmental Mycology group aims to enlarge filamentous fungi biotechnological potential. Research ranges from fundamental studies on fungal biology to applications in bioremediation and biocatalysis, also highlighting ionic liquids higher interest.

Manuel J. T. Carrondo Lab **Engineering Cellular Applications** **Animal Cell Technology Unit**

Our research is centered on integrative development of bioprocesses for complex biopharmaceuticals namely vaccines, recombinant proteins and viral vectors for gene therapy .

Paula M. Alves Lab **Cell Bioprocesses** **Animal Cell Technology Unit**

Our research is centered on the development of bioprocesses for complex biopharmaceuticals namely vaccines, recombinant proteins and viral vectors for gene therapy. Current efforts include also the development of tools and methodologies for cell therapy applications and pre-clinical research (novel 3D in vitro models for toxicology namely the use of Stem Cells (hESC, iPSC and Adult Stem Cells) and primary cultures of human hepatocytes. Our main research areas are liver, cardiac and brain cell 3D in vitro models.

Teresa Crespo Lab **Microbiology of Man-made Environments**

The main aim of the laboratory is the study of isolated microbial strains and of microbial populations and in natural environments and mostly in environments created by man like food products, polluted waters or microbial/host pairs.



SCIENTIFIC SERVICES

CERMAX

Centro de Ressonância Mag. António Xavier

CERMAX is one of the centers of the Rede Nacional de Ressonância Magnética and aims to facilitate the access and use of Nuclear Magnetic Resonance by the Portuguese scientific community, as well as to disseminate the possibilities of this technique. CERMAX accepts project proposals from scientists and researchers from other academic institutions or from the industry, in Portugal and abroad. CERMAX hosts the highest field spectrometer in Portugal (Bruker Avancell+ 800MHz equipped for experiments with solids as well as liquids), two 500 MHz spectrometers (one of which is also equipped for the acquisition of spectra of solids), and one 400 MHz spectrometer. These instruments support a wide range of applications, such as structure determination of proteins and small molecules, metabolic studies, science of materials, and in vivo NMR. CERMAX is located on the 1st floor of the ITQB main building.

UniMS (ITQB/iBET)

The goal of UniMS is to guarantee the continuing increase of Mass Spectrometry know-how and infrastructures at ITQB and iBET in order to provide the appropriate support of MS services to the scientific community and to the industry.

iBET/ITQB Mass Spectrometry Unit (UniMS) is equipped with five mass spectrometers: a time-of-flight MS/MS system (MALDI TOF-TOF 4800Plus, ABSciex), two ion traps coupled to HPLC systems (nano and conventional flows, Thermo Finnigan), one linear ion trap; and has recently acquired a top performing Triple-TOF mass spectrometer (ABSciex TripleTOF® 6600) combined with SWATH acquisition 2.0 and equipped with Ion Mobility Technology. UniMS is also one of the Nodes of the Portuguese National Mass Spectrometry Network (RNEM) – recently integrated in the National Roadmap of Research Infrastructures of Strategic Relevance (evaluated by FCT).

Research Services (ITQB)

The Research Services of ITQB include Amino Acids Analysis, Protein Sequencing and Elemental Analysis, with over 20 years of experience. These services are available to ITQB researchers and to the scientific community.

Bacterial Imaging Cluster

The Bacterial Imaging Cluster comprises light microscopy instrumentation optimized for imaging of fixed or live bacterial cells. The type of work possible includes, but is not restricted to, the following examples: i) cell shape analysis and how it varies using culturing conditions and upon genetic lesions; ii) the analysis of gene expression at the single cell and population levels, cell type-specific gene expression, or transcriptional cascades, through the localization and quantification of the signal from fluorescent reporters, auto-fluorescent proteins or through the direct localization of mRNAs; iii) studies of protein sub-cellular localization, co-localization, dynamics, and inter-

actions during the cell cycle and differentiation processes, which have also been extended to the assembly of supra-molecular structures and bacterial organelles; iv) localization and dynamics of bacterial chromosome replication and segregation. The BIC has a laser micropoint system coupled to a high-end camera, which allows fluorescence resonance after photobleaching (FRAP) experiments to be implemented. Appropriate filter combinations allow the implementation of fluorescence resonance energy transfer (or FRET) applications. Image acquisition uses the Metamorph software suite. Off-site licenses are installed for image analysis and processing. Charges for external uses may be applied. BIC is located on the 5th floor of the ITQB main building.

RESEARCH FUNDING

Research at ITQB is mainly supported by contracted projects (upon evaluation) with national and international R&D funding agencies such as Fundação para a Ciência e Tecnologia or the European Commission.

ITQB has a Research Management office dedicated to finding funding opportunities, supporting the institution and researchers in applications for external funding, and strengthening ties with other stakeholders, namely helping to find a common language with non-academic partners. The Research Management provides pre-award support by identifying, advising and assisting in the preparation and submission of grant proposals, and post-award support through contract negotiation and project management.

ITQB secures most of its funding competitively through its three Research Units, MOSTMICRO, Green-it (both coordinated by ITQB) and iNOVA4Health (coordinated by iBET). In 2014, ITQB's researchers secured 121 grants (amounting €4.7M) from national, in particular from the Fundação para a Ciência e Tecnologia, and international agencies (13 of which corresponding to EU awards, including 1 ERC and 2 Interreg SUDOE, and institutional partnerships with MIT and Harvard Medical School).



EDUCATION

PHD PROGRAMS

ITQB awards PhD degrees in Chemistry, Biochemistry, Biology and Engineering and Technological Sciences. ITQB PhD students are registered in one of the PhD Programs ongoing at the institute.

All ITQB PhD Programs are funded by Fundação para a Ciência e a Tecnologia and as such may provide PhD Fellowships; open calls are announced through all institutional channels. Students with other sources of funding may also apply

Coordinated by ITQB



The **PhD Program in Molecular Biosciences** is a flexible state-of-the-art research oriented program in life sciences. The Program trains students in molecular approaches needed to understand the mechanisms of life.



The **International PhD Program Plants for Life** aims to train a prominent body of future top researchers in plant sciences able to address key biological questions related to plant growth and development, plant responses to environmental stress, and improvement of crop varieties and plant products.

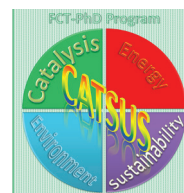
Participating institution



The **PhD in Sustainable Chemistry** is a multidisciplinary program in the central/broad area of chemistry, which will provide new focus on sustainable research strategies towards the development of new chemical processes and products in line with current needs of the Chemical Industry and the demands of society.

Cell Therapies & Regenerative Medicine

The **International Advanced Studies Diploma in Bioengineering – Cell Therapies and Regenerative Medicine** 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 **PhD Programme on Catalysis and Sustainability (CATSUS)** aims to strengthen the advanced teaching and research in modern Catalysis, promoting a synergic cooperation of the different types of Catalysis, in Chemistry and Chemical Engineering, by gathering teams with complementary expertises in various institutions and favouring their interaction.



MIT Portugal BIO-E Doctoral Program

The **PhD on Bioengineering Systems** attracts the highest-performing students and involves exchanges with MIT faculty and their laboratories. Curriculum development as well as teaching activities involves the Portuguese institutions as well as MIT faculty.



The **PhD in Advanced Integrated Microsystems** provides advanced training in the design and implementation of miniaturized multifunctional devices and systems, fabricated using top-down and bottom-up micro and nanofabrication techniques, to be applied to bioprocessing, biotechnology, biomedicine, pharmaceutical sciences, biosensing for biomedical, environmental and food safety, and physical sensing.



[DP_AEM]
DOCTORAL PROGRAM IN
APPLIED AND ENVIRONMENTAL
MICROBIOLOGY

The **Doctoral Program in Applied and Environmental Microbiology** is an inter-university and inter-research centre program offering multidisciplinary training that includes in-depth understanding of molecular and cellular microbiology and of the contemporary view of genome-based microbiology, microbial diversity and evolution.

NUCLEAR MAGNETIC RESONANCE APPLIED TO CHEMISTRY, MATERIALS & BIOSCIENCES

Nuclear Magnetic Resonance Applied to Chemistry, Materials and Biosciences (coordinated by FCT-UNL)



PGCD

PROGRAMA DE PÓS-GRADUAÇÃO
CIÊNCIA PARA O DESENVOLVIMENTO

The **Graduate Program Science for Development** is an innovative advanced training program, aiming to help prepare African and East Timorese students to pursue a scientific career and to train a new generation of University professors. The programme is funded by FCT and Fundação Calouste Gulbenkian.



NOVA DOCTORAL SCHOOL



ITQB PhD Students can access courses within the **NOVA Doctoral School**, a transdisciplinary structure within Universidade NOVA, which offers a range of complementary and transferable activities that support the personal and professional development of PhD students and supervisors.

MASTER COURSES

ITQB awards Master degrees and also hosts students registered at other academic institutions for their thesis research project.

MASTERS DEGREE IN MEDICAL MICROBIOLOGY

The **Masters Degree in Medical Microbiology**, is a collaborative Masters Course from Universidade Nova de Lisboa initiated in 2003 and involving ITQB, the Instituto de Higiene e Medicina Tropical, Faculdade de Ciências Médicas and Faculdade de Ciências e Tecnologia.

The course trains specialists in medical microbiology, providing a solid training both for professionals in laboratory and clinical settings, and for those wishing to pursue their studies in research (3rd cycle).

Biochemistry for Health masters course

The **Masters Degree in Biochemistry for Health** is a collaborative Masters from Universidade NOVA de Lisboa, involving ITQB, Faculdade de Ciências Médicas and Faculdade de Ciências e Tecnologia. The course provides a critical and analytical perspective of Human Health from a Biochemical point of view.

Masters Course in
**Science
Communication**

The **Masters Course in Science Communication** is a collaborative project of Faculdade de Ciências Sociais e Humanas and ITQB. With an essentially practical approach, the course covers the application of different communication tools to science communication in three major domains: journalism, institutional communication and education.



Master Projects

Research laboratories at ITQB welcome Master students registered at other academic institutions to develop their research projects. In this case, the credits are awarded by the institution awarding the Master degree. Available Research Projects are regularly announced on the ITQB's webpage.

OTHER COURSES

ITQB offers several research training options each corresponding to a number of credits (ECTS) to be awarded as **University Extension or Post-Graduation Courses**. Summer students may apply to a short "Introduction to the Research Lab" course.

Selected students carry out their scientific training integrated in one of the research laboratories at ITQB (or within the Oeiras Associated Laboratory). Candidates from any nationality can apply at any time and should contact directly the PI of the lab they would like to join.

POST-GRADUATION COURSE

Scientific Research Training A
(Licenciados e/ou Mestres)
60 ECTS

University Extension Courses

Scientific Research Training B
(Licenciados ou Mestres)
40 ECTS

Scientific Research Training C
(Licenciados ou Mestres)
30 ECTS

Scientific Research Training D
(Licenciados, Mestres, Estudantes 1º ciclo)
15 ECTS

Research Integration
(Estudantes 1º ciclo)
16 ECTS

Scientific Research Training E
(Estudantes 1º ciclo/2º ciclo)
1.5 ECTS

Summer Training
Introduction to the Research Lab
(Estudantes de 1º ciclo)
6 ECTS



SOCIETY

OUTREACH ACTIVITIES

SCHOOL VISITS

Since its foundations, ITQB receives regular visits from high-schools throughout the year. In each visit, students (age 15 onwards) and their teachers meet two different research labs and have the opportunity to discuss with ITQB researchers both about the science and about research career prospects. Typically, ITQB welcomes between 150-200 students each year.

UM CIENTISTA VAI À ESCOLA

ITQB researchers are also available to visit the neighbouring schools and take some of their research outside the institute's walls. These are excellent occasions for students of all ages to contact with active scientists in different fields.

DIA ABERTO

Organized every two years, the Dia Aberto (Open Day) is a Science fair like event for the general public. On a Saturday, ITQB opens its doors and organizes a set of activities to share some of the excitement of everyday research. This event includes exhibitions, hands-on activities, demonstrations, and visits and is different every time, usually integrated in an international celebration, like the International Year of Light in 2015.

SEMANA DA CIÊNCIA E TECNOLOGIA

Every year, in Portugal, November 24th celebrates the day for scientific culture. In that week, the whole country – ITQB included – organizes activities to disseminate science and technology. The Science and Technology week at ITQB takes different formats, including visits to the schools, SciArt workshops, or debates.

OTHER INITIATIVES

As an associate of Ciência Viva, ITQB is often invited to participate in science outreach activities of different formats; some at the Pavilhão do Conhecimento in Lisbon. Recent examples include the Biotechnology Festival, an international initiative which included

In collaboration with the Portuguese Society of Plant Physiology, ITQB has organized the Portuguese activities of the Fascination of Plants Day, an international initiative of the European Plant Sciences Organization scheduled for May 18th and organized every two years.

Some of ITQB local outreach activities are organized with the Oeiras city council.

CENTRO CIÊNCIA VIVA DE SINTRA

Since 2014, ITQB is the scientific partner of Centro Ciência Viva de Sintra, a science center located in the neighbouring region of Sintra, one of the most populated in Portugal. As the scientific partner, ITQB provides scientific consultancy, materials, and science protocols. In 2015, ITQB contributed to the exhibition "Resistance-when bacteria resist antibiotics", that is now on tours in schools around the country.

ITQB AND THE OUTSIDE WORLD

ITQB strives to maintain an active communication with the outside world. This is achieved through media releases, when justified, and making use of web 2.0. Besides the traditional website, which is regularly updated, ITQB maintains active accounts on Facebook, YouTube and Instagram.

www.itqb.unl.pt

www.facebook.com/itqbnova

[instagram.com/itqb.unl](https://www.instagram.com/itqb.unl)

www.youtube.com/user/ITQBchannel

twitter.com/itqbnova

linkedin.com/company/itqb-unl

MAIN SEMINARS

INVITED SPEAKERS

Making sense of science in contemporary societies

Pierre Delvenne, University of Liège, SPIRAL Research Centre

Rich Genomics Resources Facilitate Gene Discovery - Uncovering Cryptic Protein Functions

Gerald Tuskan, Biosciences Division, Oak Ridge National Laboratory (US Department of Energy)

Rich Genomics Resources Facilitate Gene Discovery - Uncovering Cryptic Protein Functions

Impartial Assessment and Bounded Engagement

David Cope, Foundation Fellow of Clare Hall, Univ. of Cambridge, UK

How to make a living in the human host: survival strategies of *Acinetobacter baumannii*

Beate Averhoff, Molecular Bioscience Institute, Goethe-Universität, Frankfurt

How to make a living by producing acetate from carbon dioxide: From the origins of bioenergetics to modern biotechnology

Volker Müller, Molecular Bioscience Institute, Goethe-Universität, Frankfurt

Cross-talk between the "Target Of Rapamycin" (TOR) pathway and energetic metabolism in plants

Camila Caldana, Max Planck Partner Group do Laboratorio Nacional do Bioetanol, Campinas, Brasil

Iron catalysis with hydrosilanes and hydroboranes.

Jean-Baptiste Sortais, Centre of Catalysis and Green Chemistry, University of Rennes, France

Plants are beautiful, useful and rather simple (?) biological objects

Fernando Catarino, FCUL, Lisbon, Portugal

The importance of quiescent stem cells for plant development

Lieven De Veylder, VIB Department of Plant Systems Biology, Ghent University, Belgium

Temperature Sensing and Plant Development

Philip Wigge, Sainsbury Laboratory, Cambridge University, UK

Mechanisms of neuronal algescic potentiation: Thermosensory channels and beyond

Antonio Ferrer-Montiel, Universidad Miguel Hernández, Elche, Spain.

Physical interaction of plant TCA cycle enzymes – additional way for metabolic regulation?

Toshihiro Obata, Max Planck Institute Molecular Plant Physiology, Potsdam-Golm, Germany

Re-investigation of plant plasma membrane lipids: role in sphingolipid- and sterol-enriched membrane rafts, and their involvement in plant defense through the phosphorylated protein REMORIN

Sebastien Mongrand, Laboratoire de Biogenèse Membranaire, Université Bordeaux, France

Glutathione: from the chloroplast to the nucleus and back

Christine Foyer, Centre for Plant Sciences, University of Leeds

The role of Bayer CropScience in sustainable agriculture

Lino Dias, Bayer CropScience

Pathogen recognition and signaling in plant immunity

Dierk Scheel, Leibniz Institute of Plant Biochemistry

Identification, Confirmation and Authentication Strategies by High Resolution Mass Spectrometry Techniques

Oscar Núñez and Encarnación Moyano, Analytical Chemistry, University of Barcelona, Spain

Cellular ageing in the Zebra fish brain

Ayca Ergul, Michelle Adams Lab, Bilkent University, Turkey

Oeiras Advanced Seminar on Biological Inorganic Chemistry

And yet they oscillate: functional analysis of circadian long non-coding RNAs

Rossana Henriques, Centre for Research in Agricultural Genomics, CRAG, Barcelona

Applications of Archaeal Model Systems to Vaccines and Human Inherited Disease

Frank Robb, University of Maryland School of Medicine, Baltimore, USA

Microbial Wikileaks: Deciphering Microbial Conversations and an Opportunity to Interfere

Michael J. Federle, University of Illinois, Chicago, USA

Different strategies to pathway engineering in *E. coli*

Martin Warren, Department of Biosciences, University of Kent, UK

Recruitment of C4NADP-malic enzyme from housekeeping roles: on the identification of molecular alterations

Veronica Graciela Maurino, Cluster of Excellence in Plant Sciences, Heinrich-Heine-University

Neuro-Mass spectrometry: from basic research to bed side, and back again

Bruno Manadas, Center for Neuroscience and Cell Biology, University of Coimbra

Case studies in translational pathogen genomics

Jason Hinds, Institute for Infection & Immunity, St George's, University of London, UK

Understanding the molecular and biochemical regulation of plant suberin synthesis

Dylan Kosma, Department of Biochemistry and Molecular Biology, University of Nevada

Plant breeding only makes sense in the light of evolution

Paul Gepts, University of California, Davis

Living in a GMO world

Wayne Parrott, University of Georgia in Athens, Georgia (USA)

Plants under stress - priming agents to the rescue

Vassilis Fotopoulos, Cyprus University of Technology, Cyprus

The Development of beans resistant to golden mosaic virus

Francisco Aragão, Genetic Resources and Biotechnology Unit, Embrapa, Brazil

The kynurenine pathway and neurodegeneration: mechanisms and therapeutic targets

Flaviano Giorgini, Department of Genetics, University of Leicester

Frataxin knockdown in Drosophila alters mitochondrial homeostasis and degradation in muscles and glia

Juan Navarro, Institut für Zoologie, Universität Regensburg, Germany

Unfolded Protein Response in Drosophila development, disease and lifespan

Hyung Don Ryoo, New York University School of Medicine, USA

PROVAS DE AGREGAÇÃO BIOQUÍMICA

Doutor Ricardo Louro

FRONTIER LEADERS**The evolutionary significance of gene and genome duplications**

Yves Van de Peer, Bioinformatics & Systems Biology, Ghent University, Belgium

Synthetic Tools for Chemical Biology: Methods, Binders and Sensors

Jose Luis Mascareñas, University of Santiago, Spain

X-ray spectroscopic studies of biological dinitrogen reduction in the Molybdenum and Vanadium Nitrogenases

Serena DeBeer, Max Planck Institute for Chemical Energy Conversion, Germany

Coevolution of viruses, plasmids and cells in Archaea: pattern and process (EVOMOBIL)

Patrick Forterre, Pasteur Institute, Paris, France

Prosthetic Gene Networks for Biomedical Applications

Martin Fussenegger, ETH Zürich, Department of Biosystems Science and Engineering, Switzerland

The Role of a Small Signaling Molecule in Coordinating Development and Cell Cycle Control

Urs Jenal, Biozentrum, University of Basel, Switzerland

George Coupland

George Coupland, Max Planck Institute for Plant Breeding Research, Cologne, Germany

AVX SEMINARS**How cells coordinate growth and shape: unravelling the complexity of ion signalling in pollen tubes**

José Feijó, University of Maryland, College Park & Instituto Gulbenkian de Ciência

Site-selective chemical protein modification for basic biology and drug development

Gonçalo Bernardes, IMM, Faculdade de Medicina, Universidade de Lisboa & University of Cambridge

Chemical Engineering in a Material(s) World

João Paulo Crespo, FCT, Universidade Nova de Lisboa

The role of telomeres in cancer and ageing

Miguel Godinho, Instituto Gulbenkian de Ciência, Oeiras, Portugal

Plant ammonium nutrition: from mechanisms to management

Cristina Cruz, Faculdade de Ciências, Univ. de Lisboa, Portugal

Computational metagenomics: A Stepping Stone for Enhanced Oil Recovery

Ana Teresa Freitas, IST, Universidade de Lisboa, Portugal

Ongoing Organic Synthetic Methodologies@FF.Ulissboa

Carlos A. M. Afonso, iMed.Ulissboa, Fac. of Pharmacy, Uni. of Lisbon

Actin in Axons: Rings and Dynamics for optimal growth

Mónica Sousa, Instituto de Biologia Molecular e Celular (IBMC)

Strategies for Bioprocesses Intensification

António José Teixeira, Centre of Biological Engineering, UMI

ANEM SUMMERSCHOOL**Science and Motivation**

Maria João Amorim (IGC), Sandra Garcês (IGC), Manolis Matzapetakis (ITQB)

No money, no fun

Andreia Feijão (FCT), Pedro Almeida (FCUL), Cristina Silva Pereira (ITQB)

Don't believe everything you read!

António Vaz Carneiro (FMUL), Pedro Câmara Pestana (AMP), Ricardo Louro (ITQB)

Bench to bedside

Maria do Carmo Fonseca (IMM), Manuel Carrondo (iBET), Paula Alves (ITQB/iBET),

Round table - The Future of Science

Isabel Zilhão (CIUHCT), Catarina Vale (FMUL), Carlos Romão (ITQB) | Moderator: Maria Miragaia (ITQB)

A personal perspective on the relation between Science and Medicine

Maria Mota (IMM)

SCAN SEMINARS

Science Communication at ITQB: ten years and counting
Ana Sanchez, Communication Office, ITQB

Bioorganic Chemistry
Rita Ventura, Bioorganic Chemistry Lab, ITQB

Community-associated methicillin-resistant *Staphylococcus aureus* (CA-MRSA) in Portugal: origin, epidemiology and virulence
Ana Tavares, Molecular Genetics Lab, ITQB

Molecular markers of amyotrophic lateral sclerosis
Julia Costa, Glycobiology Lab, ITQB

Raman spectroscopy - a powerful tool for studying metalloproteins and metal-oxide materials for biosensor applications
Célia Silveira, Raman Spectroscopy of Metalloproteins Lab, ITQB

A structural overview of Pontin, Reptin and their complex(es)
Pedro Matias, Ind. and Medicine Applied Crystallography Lab, ITQB

Catabolism of aromatic hydrocarbons in *Aspergillus nidulans*
Tiago Martins, Applied and Environmental Mycology Lab, ITQB

Staphylococcus aureus Resistance to Immune Defenses
Lígia Saraiva, Mol. Genetics of Microbial Resistance Lab, ITQB

Olive oil health benefits – new evidences from animal models and human interventions
Sandra Silva, Nutraceuticals and Delivery Lab, ITQB

Exploring NADH:quinones oxidoreductases
Manuela Pereira, Biological Energy Transduction Lab, ITQB

Nanopore-based sensing: More than just DNA sequencing!
James Yates, Single Molecule Processes, ITQB

Bioprocess Engineering for Vaccines Production
António Roldão, Cell Bioprocesses Lab, ITQB

Plant–environment interactions: using leaf temperature as a phenotyping tool
Miguel Costa, Plant Molecular Ecophysiology Lab, ITQB

Time travel – how tree rings contribute to the study of climate change
Sofia Leal, Forest Biotechnology Lab, ITQB

How the radiation resistant bacteria *Deinococcus radiodurans* deals with stress conditions: insights into the manganese homeostasis
Célia Romão, Structural Genomics Lab, ITQB

Bacterial strategies to groom a concealed armour
Sérgio Filipe, Bacterial Cell Surfaces and Pathogenesis Lab, ITQB

Biocatalysis for industrial biotechnology
Ligia Martins, Microbial & Enzyme Technology Lab, ITQB

In search of unforeseen paths to fight the threat of mycotic diseases
Cristina Silva Pereira, Applied and Environ. Mycology Lab, ITQB

Identification of vaccine candidate antigens of *Staphylococcus pseudintermedius* by serological proteomic analyses
Natacha Couto, Mass Spectrometry Lab, ITQB

Deciphering transcriptional regulation in plants: towards an improved crop production
Nelson Saibo, GPlantS Lab, ITQB

Elucidation of the electron transfer processes in exoelectrogens
Catarina Paquete, Inorganic Biochemistry and NMR Lab, ITQB

From cork development to stress response: what cork oak has revealed so far
Pedro Barros, GPlantS Lab, ITQB

Fields of Genes: Time to Harvest
Carlota Vaz Patto, PlantX, Genetics and Genom. of Plant Complex Traits, ITQB

Magnifying the knowledge on *Staphylococcus epidermidis* by Whole Genome Sequencing analysis
Maria Miragaia, Bacterial Evolution and Molecular Epidemiology Lab, ITQB

From spins to protein structure and dynamics
Manolis Matzapetakis, Biomolecular NMR Lab, ITQB

Cell shape dynamics during the staphylococcal cell cycle
Mariana G. Pinho, Bacterial Cell Biology Lab, ITQB

A bacterial umbilical cord
Adriano O. Henriques, Microbial Development Laboratory, ITQB

Turning a Hyperthermostable Metallo-Oxidase into a Laccase by Directed Evolution
Vânia Brissos, Microbial & Enzyme Technology Lab, ITQB

Development of multifunctional Carbon-monoxide Releasing Molecules (CORMs) for therapeutic applications
João D. Seixas, Gonçalo J. L. Bernardes Lab, IMM

N-Heterocyclic carbenes... What else?
Ana Petronilho, Bioorganometallic Chemistry Lab, ITQB

Alternative splicing of root membrane transporter controls plant tolerance to zinc toxicity
Paula Duque, Plant Molecular Biology, IGC

NMR metabolomics: what is going on at ITQB
Luís Gafeira, Cell Physiology and NMR Lab, ITQB

Challenging catalysis with Earth-abundant metals
Beatriz Royo, Homogeneous Catalysis Lab, ITQB

Manuela Pereira
Manuela Pereira, Biological Energy Transduction Lab, ITQB

Gene therapy viral vectors: how to develop and dose them
Ana Sofia Coroadinha, Cell Line Development and Molecular Biotechnology Lab

PHD THESES

Ana Maria da Silva Esteves, Biochemistry

Insights into the biochemical strategies of adaptation to heat stress in the hyperthermophilic archaeon *Pyrococcus furiosus*

Fernando João Gomes dos Santos, Biology

Learning new tricks: Corticostriatal dynamics during novel skill learning

Lígia Antunes Gonçalves, Biology

Host genetic factors in mouse malaria liver stage infection

Bahtiyar Yilmaz, Biology

A Natural Protective Mechanism Against Malaria – The Role of Gut Flora

Piergiuseppe Nestola, Technological and Engineering Sciences

Improving downstream processing for viral vectors and viral vaccines

Paulo David M. Fernandes, Technological and Engineering Sciences

Bioprocess design of canine adenovirus vectors for gene therapy applications

Cátia Maria Nunes Trindade Soares, Biology

Inhibition of SNF1-related protein kinase1 by trehalose 6-phosphate and other metabolites and the interrelation with plant growth

Ana Laura Machado Seara Paixão, Biochemistry

The role of pneumococcal carbon metabolism in colonization and invasive disease

Ana Isabel Aires Amaral, Biology

Functional MRI of stimulus interference on auditory processing in normal listeners and tinnitus patients

Sónia Alexandra Gonçalves Mendes, Biochemistry

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A fresh look at sulfur metabolism

Researchers challenge textbook description of microbial sulfur pathway
Science (2015) 350 (6267):1541-1545 DOI: 10.1126/science.aad3558

Carbon monoxide carriers as antimicrobial drugs

Seven CO releasing molecules analysed in detail
Dalton Trans. (2015) DOI: 10.1039/C5DT02238J

Turning microbes into factories

Engineering bacteria for producing bulk chemicals
Microbial Cell Factories 2015, 14:171 doi:10.1186/s12934-015-0362-x

From hot springs to new antimicrobials

Biosynthesis in hyperthermophiles paves the way to novel anti-tuberculosis targets
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Bend it like KSHV

Herpesvirus protein promotes DNA bending required for replication
Nucl. Acids Res. (2015) doi: 10.1093/nar/gkv987 (Open Access)

Know your targets

Biochemistry of bacterial respiratory chain protein elucidated
Molecular Microbiology (2015) 98(2): 272–288

Sensing the ground

Rice roots response to touch involves specific protein degradation
Plant Physiology (2015) doi: <http://dx.doi.org/10.1104/pp.15.01131>

Yet a new role for multirole proteins

RuvBL1 and RuvBL2 involved in protein disaggregation
The EMBO Journal (2015) DOI: 10.15252/embj.201591245

Double effect against inflammation

CO releasing molecule works best when coupled to anti-inflammatory drug
Chemistry - A European Journal (2015) Early View DOI: 10.1002/chem.201502474

Strengthening bonds

An archetypal protein cross-linking enzyme unraveled
Biochemistry (2015) Just Accepted Manuscript DOI: 10.1021/acs.biochem.5b00661

Genomes uncover life's early history

Study coordinated by ITQB visiting professor published in Nature
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How do bacteria divide?

Super-resolution microscopes challenge Staph division model
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New enzyme by directed evolution

Researchers turn metallo-oxidase into a laccase
ACS Catalysis (2015) 5: 4932–4941

A new additive for better crystals

Researchers explore solid-supported ionic liquids for protein crystallization
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How much is enough?

Researchers identify essential proteins for peptidoglycan synthesis in bacteria
PLOS Pathogens (2015) DOI: 10.1371/journal.ppat.1004891

Odd enzymes as antibiotic targets

Researchers explore unconventional haem biosynthesis in *Staphylococcus aureus*
Molecular Microbiology (2015) Accepted Article DOI: 10.1111/mmi.13041

Simulating virus-host interaction

Researchers assess how viral fusion protein promotes membrane fusion
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The action of a key player in metastasis

In vitro study shows central role of microRNA molecule miR-200c
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Old bacteria with fancy tricks

New genetic regulatory mechanism of spore development identified
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Protecting the healthy microbes

New Strategy protects gut microbes from antibiotics
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Mitigation by fungi

Fungal communities degrade active environmental pollutant
Environmental Microbiology Accepted Article doi: 10.1111/1462-2920.12837

Storing energy

Membrane-bound hydrogenase induces a pH gradient at a membrane-electrode interface
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A global perspective of RNases

Next generation sequencing reveals effect of bacterial exoribonucleases
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A new family of proteins for energy metabolism

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A switch between life forms

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Plant Metabolomics

Review paper sets base for research area at ITQB
Mass Spectrometry Reviews DOI: 10.1002/mas.21449

In support of curiosity-driven research

Researchers identify a new pathway for the synthesis of inositol phospholipids in cell membranes
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Different from equal

Cell differentiation in plant roots is associated to histone dynamics
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ONGOING PROJECTS 2015

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1	Patogenia da proteína LANA do herpesvírus do sarcoma de Kaposi	HMSP-ICP/0021/2010	M ^a Arménia Carrondo
2	The effect of divalent cations on G-Quadruplex formation and stability in genes related to neurodegenerative processes	PTDC/QUI-QUI/117105/2010	Patrick Groves
3	Ionic Liquids under tension	PTDC/QUI-QUI/117340/2010	José Esperanca
4	Redox necklaces: functional characterization of a multidomain poly-heme cytochrome	PTDC/QUI-BIQ/117440/2010	Catarina Paquete
5	Tracking the evolution of methicillin resistance in staphylococci: stages in the evolution of the mecA determinant and the SCCmec structure	PTDC/BIA-EVF/117507/2010	Leopoldina Ryder
6	Molecular mechanisms that orchestrate a two-electron reduction step coupled with protonation in redox enzymes that contain chains of single electron redox co-factors	PTDC/BIA-PRO/117523/2010	Catarina Paquete
7	NEW PROTECTION: NativE, Wild PRObiotic sTrain EfficCT In Olives in briNe	PTDC/AGR-ALI/117658/2010	Francisco Malcata
8	Mechanisms of SOD1 toxic aggregation in neurodegenerative processes	PTDC/QUI-BIQ/117789/2010	Cláudio Gomes
9	Recovery of misfolded and aggregated proteins using biological nano-reactors and small molecules	PTDC/EBB-BIO/117793/2010	Cláudio Gomes
10	An integrated approach to identify stress-related regulatory genes in cork oak (SuberStress)	PTDC/AGR-GPL/118505/2010	Margarida Oliveira
11	Structural biology of Histidine Kinases: a new target for novel antibacterial drugs	PTDC/BIA-PRO/118535/2010	Margarida Archer
12	Development of New Oxygen Therapeutics using Fluorinated Ionic Liquids	PTDC/EQU-FTT/118800/2010	Ana Belén
13	A molecular insight into the respiratory alternative complex III	PTDC/BIA-PRO/120949/2010	Manuela Pereira
14	Creating value from bio-wastes: suberin extraction and biotransformation in biocompatible ionic liquids aiming on novel biomaterials and compounds	PTDC/QUI-QUI/120982/2010	Cristina Silva Pereira
15	On the thermophysical characterization of new room temperature ionic liquids	PTDC/CTM-NAN/121274/2010	José Esperanca
16	Ionic Liquids as Promoters of Aqueous Biphasic Systems: The Role of van der Waals and Coulomb Interactions	PTDC/QUI-QUI/121520/2010	Isabel Marrucho
17	Lactation and milk production in Goat (<i>Capra hircus</i>): identifying molecular markers underlying adaptation to seasonal weight loss	PTDC/CVT/116499/2010	Manolis Matzapetakis
18	Protein interaction with CO Releasing Molecules (CORM)	PTDC/QUI-BIQ/117799/2010	Carlos Romão
19	On characterization polarity within phospholipid/cholesterol lipid bilayers and its effects in membrane enzymology.	PTDC/AGR-PRO/118081/2010	Pedro Fevereiro
20	hCE- expression and characterization in vitro and in silico models.	PTDC/QUI-QUI/118315/2010	Ana Coelho
21	Prevalence and characterization of <i>Staphylococcus aureus</i> in portuguese-speaking african countries and in East Timor	PTDC/SAU-SAP/118813/2010	Hermínia Lencastre/ T. Conceição
22	Soil function profiling during fungal bioremediation: integrated bio-geochemical and meta-proteomics assessment	PTDC/AAC-CLI/119100/2010	Andreas Bohn
23	Characterization of ER-quality control for the F508del-CFTR protein: potential therapeutic targets for cystic fibrosis	PTDC/SAU-GMG/122299/2010	Cláudio Gomes

24	Sampling and biomarker optimization and harmonization in ALS and other motor neuron diseases	JPND/0003/2011	Júlia Costa
25	Tailor-made expression hosts depleted in protease activity for recombinant protein production	ERA-IB/0001/2012	Rita Abranches
26	An Omics approach for diagnosis tuberculosis (Tbomics)	New-Indigo/0001/2012	Ana Coelho
27	The intriguing function of cytoskeleton-associated proteins in Gram-positive bacteria	ANR/BEX-BCM/0150/2012	Mariana Pinho
28	NMR Net - National facility for nuclear magnetic resonance: from molecular structure and dynamics to protein function, cell physiology and metabolics	RECI/BBB-BQB/0230/2012	Pedro Lamosa
29	Well defined iron catalysts for challenging tasks	PTDC/QEQ-QIN/0565/2012	Beatriz Royo
30	Energy conservation by a novel NADH dehydrogenase family wide-spread in bacteria	PTDC/BBB-BQB/0684/2012	Inês Pereira
31	Structural Determinants of Oxygen Tolerance in a NiFeSe Hydrogenase	PTDC/BBB-BEP/0934/2012	Pedro Matias
32	Heme biosynthesis in Staphylococcus aureus: old bug new challenges	PTDC/BBB-BQB/0937/2012	Lígia Saraiva
33	Mechanisms of post transcriptional regulation of Xbp1: a potential modulator of the UPR and associated pathologies	PTDC/BEX-BCM/1217/2012	Fátima Cairrao
34	Development of microfluidic platform for single cell studies	PTDC/BBB-IMG/1225/2012	Abel Oliva
35	Reverting the carbon cycle: from CO ₂ to biodiesel	EXPL/BIA-MIC/1455/2012	Helena Santos
36	Increasing the realism of membrane modelling in constant-pH molecular dynamics methods: inclusion of electrochemical gradients and lipid titration	PTDC/QEQ-COM/1623/2012	António Baptista
37	Green ionic liquids: new solutions for old engineering problems	PTDC/QEQ-FTT/1686/2012	Isabel Marrucho
38	Understanding echinoderms outstanding nervous system regeneration capabilities using a phosphoproteomics approach	PTDC/MAR-BIO/2174/2012	Catarina Ferraz Franco
39	Disentangle the Functional and Structural Modularity of the Peripheral Arm from Respiratory Complexes I	PTDC/BBB-BQB/2294/2012	Manuela Pereira
40	Epigenetic modulation of transgene expression in plant cell cultures for the improved production of recombinant proteins	PTDC/BIA-PLA/2411/2012	Rita Abranches
41	Structural investigation of the anti-tuberculosis drug target phosphatidylinositol phosphate synthase (PIPS)	PTDC/BBB-BEP/2532/2012	David Turner
42	Development of multimodal imaging probes for intravascular molecular imaging of inflammation	PTDC/QEQ-MED/2656/2012	Olga Iranzo
43	Development of Dinuclear Cu(II) and Zn(II) complexes as potential inhibitors of oncogenic protein-protein interactions	PTDC/QEQ-SUP/2718/2012	Rita Delgado
44	Interaction between Legionella pneumophila and the host cell actin cytoskeleton	PTDC/BIA-MIC/2821/2012	Margarida Archer
45	Ionic liquid-based systems for protein crystallization	PTDC/BBB-BEP/3058/2012	Magdalena Kowacz
46	Amidation of the peptidoglycan of Gram-positive bacteria: an unexplored potential target for antibiotics	PTDC/BIA-MIC/3195/2012	Hermínia Lencastre
47	Plant strategies for detection of the inflammatory bacterial peptidoglycan molecule	PTDC/BIA-PLA/3432/2012	Sérgio Filipe

48	Salmonella Persistence in eukaryotic cell: Examining the Role of RNases and Small Functional RNAs	PTDC/BIA-MIC/4142/2012	Cecília Arraiano
49	A systems approach to understand salt stress tolerance in <i>Casuarina glauca</i> and its relationship with symbiotic nitrogen fixation.	PTDC/AGR-FOR/4218/2012	Ana Isabel Ribeiro
50	Exploiting Bean Genetics for food Quality and Attractiveness innovations	PTDC/AGR-TEC/3555/2012	Carlota Vaz Pato
51	Carbon Nanomaterials and Ionic Liquids; From fundamentals to sustainable technology applications.	FCT-ANR/CTM-NAN/0135/2012	Luís Paulo Rebelo
52	Molecular and Nano Tools for Cancer Theranostics	EXCL/QEQ-MED/0233/2012	Olga Iranzo
53	Biosynthesis of rare methylmannose polysaccharides in nontuberculous mycobacteria	PTDC/BIA-MIC/2779/2012	Rita Ventura
54	SUMOdulator - Researching SUMO modulation of plant abiotic stress responses	PTDC/BIA-PLA/3850/2012	Isabel Abreu
55	Cerebrospinal fluid metabolome: an instructive niche for CNS metastasis	PTDC/BIM-ONC/1242/2012	Luis Gafeira
56	Immunogenicity of vaccine candidate antigens from <i>Staphylococcus pseudintermedius</i> in <i>Canis canis</i>	PTDC/CVT-EPI/4345/2012	Ana Coelho
57	Rethinking Bacterial Cell Wall Synthesis: a combined synthetic and enzymatic approach	PTDC/QEQ-QOR/2132/2012	Sérgio Filipe
58	Driving Mitochondrial Effectors of Apoptosis Toward Neural Differentiation	PTDC/BIM-MED/0251/2012	Ana Coelho
59	Exploration of novel molecular mechanisms involved in iron homeostasis	EXPL/BIA-MIC/2525/2013	Catarina Pimentel
60	Targets and mechanism of action of a novel enzyme involved in eukaryotic RNA degradation	EXPL/BEX-BCM/1317/2013	Sandra Veigas
61	Specific isotopic labelling of membrane proteins as a new tool to monitor structural and conformation changes	EXPL/BBB-BEP/1356/2013	Afonso Duarte
62	Discovery and characterization of ligninocellulolytic bacterial enzymes	EXPL/BBB-BIO/1932/2013	Vânia Brissos
63	Nanoengineered exosomes to treat glioma	ENMed/0001/2013	Júlia Costa
64	Modulation Ire1 to prevent Parkinson' Disease	FCT-ANR/NEU-NMC/0006/2013	Pedro Domingos
65	Investigating Novel Valuable bio-therapeutics and expression systems (INNOVATE)	ERA-IB2/0006/2013	Paula ALves
66	Implications of uncertain transgene insertion in maize: effect in protein-coding and non-coding regulatory genes	PTDC/AGR-GPL/121536/2010	Rita Abranches

Projects coordinated by ITQB Researchers/ Projects where ITQB Researchers participate

EXPLORATORY PROJETS (IF POSITIONS)

67	Carla António	IF/00376/2012/CP0165/CT0003	Carla António
68	Colin Edward McVey	IF/01023/2013/CP1173/CT0003	Colin Edward McVey
69	Federico Herrera	IF/00094/2013/CP1173/CT0005	Federico Herrera
70	Monica Serrano	IF/00268/2013/CP1173/CT0006	Monica Serrano
71	Ana Petronilho	IF/00109/2014/CP1244/CT0007	Ana Petronilho
72	João Araújo	IF/00210/2014/CP1244/CT0003	João Araújo
73	José Andrade	IF/00961/2014/CP1244/CT0012	José Andrade
74	João Vicente	IF/01004/2014/CP1244/CT0011	João Vicente

PROJECTS FUNDED BY PFIZER

75	Pneumo S-Influence of cigarette smoking in the dynamics of carriage of <i>Streptococcus pneumoniae</i> : a longitudinal study	WI183695	Raquel Sá Leão
76	PneumoY2: Evolution and adaptation of <i>Streptococcus pneumoniae</i> population in the era of expanded conjugates vaccines	WI182109	Raquel Sá Leão
77	CoPneumo - Co-colonization by pneumococci in the era of the thirteen-valent pneumococcal conjugate vaccine	WI191571	Raquel Sá Leão

PROJECTS FUNDED BY EUROPEAN COMMISSION

78	Parliaments and Civil Society in Technology Assessment (PACITA)	266649	Mara Almeida
79	Standardization and orthogonalization of the gene expression flow for robust engineering of NTN (new-to-nature) biological properties (ST-FLOW)	289326	Cecília Arraiano
80	Transnational access and enhancement of integrated Biological Structure determination at synchrotron X-ray radiation facilities (BioStruct-X)	283570	M ^a Arménia Carrondo
81	3 to 4: Converting C3 to C4 photosynthesis for sustainable agriculture (3 to 4)	289582	Manuela Chaves
82	Combining innovation in vineyard management and genetic diversity for a sustainable European viticulture (INNOVINE)	311775	Manuela Chaves
83	Innovative ionic polymers from natural sources for energy & environment (IONRUN)	318873	Isabel Marrucho
84	Legumes for the Agriculture of tomorrow (LEGATO)	613551	Carlota Vaz Pato
85	Understanding the <i>Clostridium</i> Spore, a Prerequisite for disease interventions and exploitation (CLOSPORE)	642068	Adriano Henriques
86	Embedding crop diversity and networking for local high quality food systems (DIVERSIFOOD)	633571	Carlota Vaz Pato

87	A stepping stone approach towards the genetics clinic of the future (GCOF)	643439	Mara Almeida
88	Exploiting native endowments by re-factoring, re-programming and implementing novel control loops in <i>Pseudomonas putida</i> for bespoke biocatalysis (EmPowerPutida)	635536	Cecília Arraiano
89	Infrastructure for NMR, EM and X-ray crystallography for translational research (iNEXT)	653706	Margarida Archer

PROJECT FUNDED BY EUROPEAN RESEARCH COUNCIL (ERC)

90	Finding new mechanisms for protein localization in Bacteria (Protein-Localization)	ERC-2012-StG-20111109 - Grant Agreement 310987	Mariana Pinho
91	Development of biomaterials through mimesis of plant defensive interfaces to fight wound infections (MIMESIS)	ERC-2014-CoG- Grant Agreement 647928	Cristina Silva Pereira

PROJECT FUNDED BY EUROPEAN DEFENCE AGENCY

92	Risk Assessment for CB Exposure after Decontamination (RACED)	A-1152-RT-GP	Adriano O. Henriques
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INDIVIDUAL FELLOWSHIPS FUNDED BY EUROPEAN COMMISSION

93	Ion Transport at atomic level (iTrans)	PCIG11-GA-2012-322346	Afonso Duarte
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