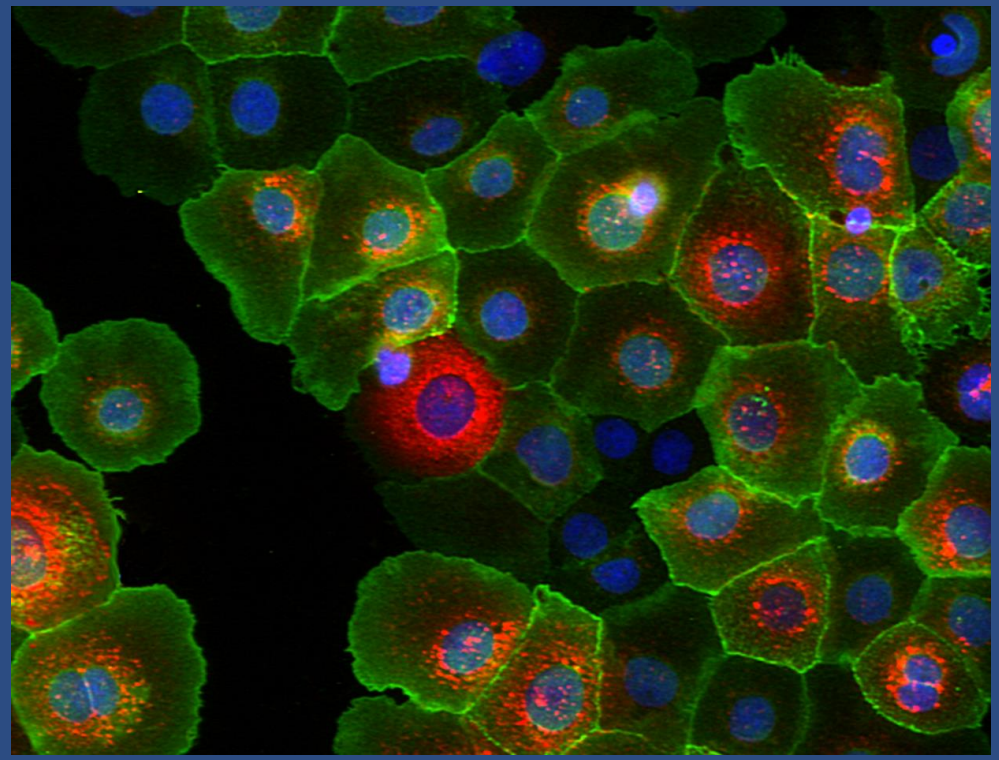
BioISI



Biosystems & Integrative Sciences Institute

Report 2017

Biosystems and Integrative Sciences Institute

Ciências ULisboa

Front Page Figure - CFBE cells expressing the traffic reporter protein tsO45-VSVG. In this cell monolayer VSVG can be seen in intracellular carrier vesicles (red) or at the cell surface (green). Cell nuclei are in blue. Using model systems like these the FunGP group studies the trafficking of proteins involved in the genetic disease Cystic Fibrosis to develop novel therapeutic approaches. Provided by Hugo Botelho, FunGP Group - FCUL

Contents

Front Page Figure - CFBE cells expressing the traffic reporter protein tsO45-VSVG. In this cell monolayer VSVG can be seen in intracellular carrier vesicles (red) or at the cell surface (green). Cell nuclei are in blue. Using model systems like these the FunGP group studies the trafficking of proteins involved in the genetic disease Cystic Fibrosis to develop novel therapeutic approaches. Provided by Hugo Botelho, FunGP Group - FCUL

BioISI Identification

Name of the Research Unit: Biosystems & Integrative Sciences Institute

Unit Acronym: BioISI

Scientific Director: Margarida D. Amaral

Scientific Areas:

Multidisciplinary/Interdisciplinary Research

Life and Health Sciences	Biomedicine
Exact Sciences & Engineering	Physics
Natural Science & Environment	Bio-based Product Technology or Food Sciences

Profile of the Research Unit

- Basic Research: 75%
- Applied research: 25%

Keywords

Molecular Systems Biology	Integrative Sciences
Agent and Systems Modelling	Biological Physics

Total Funding: 3 499 766 € (583 294 €/yr)

FCT Evaluation (2014): 24/25 - Excellent

Emails: Director: BioISIdirector@fc.ul.pt / Secretariat: BioISInfo@fc.ul.pt | Webpage: http://www.bioisi.pt

Address: Campo Grande C8 Bdg, room 8.2.42, 1749-016 Lisboa, Portugal | Tel - +351 21 7500857 Fax - +351 21 7500088

Introduction

Although recently created (January 2015), **BioISI**[1] already has a significant standing as a research institute with the vision of pursuing cutting-edge research on biosystems and integrative sciences so as to become the leading centre at the forefront of research in this area not just in Portugal but also internationally.

The main focus of **BioISI** research is to understand biological systems using integrative approaches to address emergent complex problems in Biology and Medicine and thus contribute to solve societal challenges related to human health and bioeconomy.

BioISI researchers come from different scientific backgrounds: Molecular and Cell Biology, Genetics, Biomedicine, Biochemistry, Microbiology, Plant Biology, Biophysics, Soft Matter Physics, Computational Sciences and Bioinformatics. The synergy and integration of researchers with complementary expertise from different disciplines at BioISI fosters creative thinking to solve problems through integrative approaches and creates a truly interdisciplinary and collaborative environment – a distinctive feature of BioISI – that provides an exciting environment for young creative scientists.

The Institute's extends research beyond the Faculty of Sciences of the University of Lisboa (FCUL[2]) as it comprises five sites (BioISI is also located at INSA[3], as well as Universities of Porto, Minho, and Trás-os Montes). Indeed, **BioISI** provides **research infrastructures** to its members through its facilities for bioimaging, screening, physics, computing, mammalian cell culture, and plant house.

BioISI acts on 4 major Thematic Lines – **Biomedicine, Biotechnology, Biophysics and Bioinformatics** – to comprehensively understand the underlying principles and mechanisms of living systems from single molecules, through cells and tissues, to entire organisms.

BioISI contributes to advanced training of early career researchers by hosting the interdisciplinary **BioSys PhD programme**[4] on *Biological Systems, Functional & Integrative Genomics*, and by participating in two other PhD programmes (DAEPHYS on Applied & Engineering Physics and EnviHealth&Co on Environmental Health). BioISI also hosts its own **cross-area post-doc programme**, and it fosters senior post-doctoral collaborators to become young group leaders through continuous mentoring to establish themselves independently. **BioISI** also offers advanced training to external visitors in the scope of collaborations and by organizing international workshops.

Technology development is another key mission of **BioISI** through the joint research of physicists and computational scientists working together with biologists to develop new instruments and technologies (e.g., innovative atomic force microscopy for bio-applications, biodevices to monitor biozards or to assess biomedical biomarkers or software generation for the life sciences). Finally, **BioISI** drives innovation through **technology transfer (KTT)** – as a significant proportion (25%) of **BioISI** activities are on applied research on a tight interaction with the socio-economic environment, at the level of both established companies and start-ups.

---

[1] https://www.bioisi.pt
[2] FCUL – Faculty of Sciences, the University of Lisboa (https://ciencias.ulisboa.pt/en)
[3] Portuguese National Institute of Health, a State Laboratory of the Ministry of Health (www.insa.pt/sites/INSA/English)
[4] http://biosys.campus.ciencias.ulisboa.pt/

MSc and PhD students from BioSys, post-docs and young PIs, together with the **BioISI interdisciplinary projects programme** (launched in 2016) constitute a valuable "cement" that strongly contributes to consubstantiate common interests. Such interdisciplinary research results in significant scientific outputs which contribute to to solve societal problems related to human health or bioeconomy.

In order to keep up with the rapid technological progresses and breakthroughs so as to achieve its ambitious goals, **BioISI** maintains key collaborations – through networking and partnerships – with top international institutions, namely through: promotion of collaborative projects (a Twinning project was submitted to the EU in 2017); co-supervision of PhD students and post-docs; updating in technology advances by organizing hands-on courses; and by accessing their cutting-edge facilities. This is an excellent way of internationalizing Portuguese science and of setting very high standards for a national research institution.

The dissemination of **BioISI** activities are carried out by the **BioISI Communications & Outreach Office** (BioISI-Com) which in 2017 started collaborating with a professional organization, assists BioISI researchers to participate in multiple outreach events (European Researcher's night, Science & Technology week, Wine with Science, etc) and disseminate its activities as well as the major achievements and prizes of its researchers. **BioISI** also organizes two programmes of seminars: one for internal and external senior researchers and another for BioISI post-docs and PhD students.

For its interactions with industry and KTT activities, **BioISI Company Liaison Office** (BioISI-Tech) collaborates with Tech-Labs[5], FCUL's organization for the creation and economic valorising of scientific knowledge.

FFCUL has acted as the legal front institution of **BioISI** (as of most FCUL's research centres) by supporting R&D activities with financial and administrative management of projects. In 2017 FFCUL has changed its legal status from being a public to a private institution (FCiencias.ID[6]) so as to lessen the administrative burden of its operational procedures.

The present report provides a concise overview of the research which **BioISI**'s 8 large research groups, supported by **BioISI**'s facilities, have conducted in 2017 along its 4 major Thematic Lines – **Biomedicine, Biotechnology, Biophysics and Bioinformatics**.

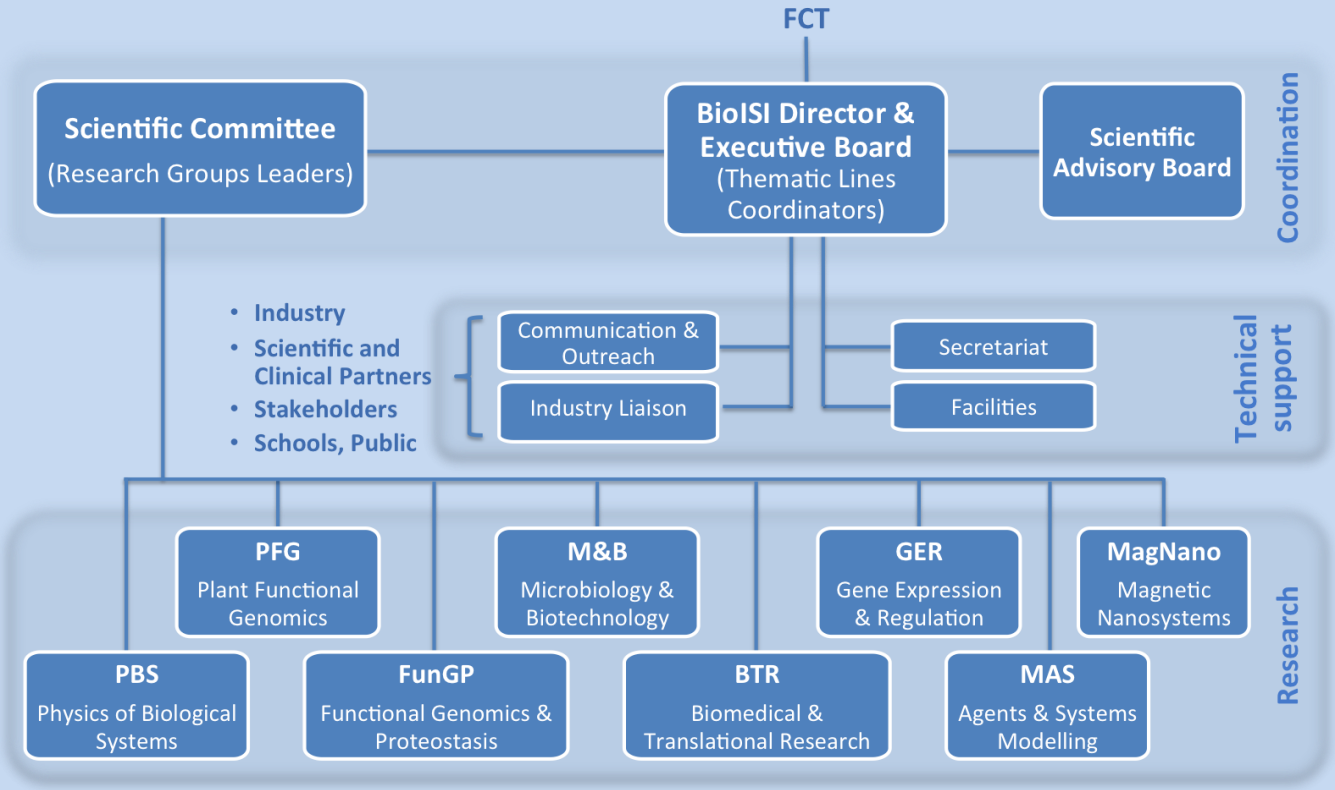
Early in 2018 however, BioISI will face a new challenge which is a new evaluation exercise by FCT – the Portuguese Science Foundation. BiosISI will now integrate more than 120 researchers with PhD and **a new Thematic Line: Biological Chemistry**. It will also create 2 new facilities (Genomics and Proteomics & Metabolomics). We believe that the integrative research already conducted during its 3 years of operation have set the stage to route **BioISI** science into the next level and leave us to be optimistic about its future.

At a time of balance we also want to thank **BioISI's** Scientific Advisory Board (SAB) for critically evaluating our research, and for guiding our progress towards this next level and the challenges ahead.

Margarida Amaral
BioISI Director

[5] www.teclabs.pt
[6] FCiências.ID - Associação para a Investigação e Desenvolvimento de Ciências (http://www.fciencias-id.pt/)

BioISI Organization



2017 Scientific Advisory Board:

Rainer Pepperkok (Molecular & Cell Biology) EMBL- European Molecular Biology Laboratory, Heidelberg (Germany)

Klaus Palme (Plant Molecular and Cell Biology) BIOSS Centre for Biological Signalling Studies, University of Freiburg (Germany)

Juan Valcarcel Juarez (Genomics and Systems) CRG-Centre de Regulacio Genomica & ICREA, Barcelona (Spain)

Michael Gill (Systems Medicine) Institute of Molecular Medicine, Trinity College Health Sciences Centre,Dublin (Ireland)

Eugene Shakhnovich (Physics) Biophysics Laboratory, Harvard University, Cambridge (MA, USA)

Bioinformatics – TBA

Hans Peter Wessel (Chemistry) Universidade de Aveiro (Portuga), New Member in 2018

Institutions:

FCT Fundação para a Ciência e a Tecnologia
Ciências ULisboa
FCiências.ID
Instituto Nacional de Saúde Doutor Ricardo Jorge
Universidade do Minho
utad

Biomedicine

The Biomedicine thematic line (TL), involves predominantly scientists from three BioISI groups (FunGP, BTR and GER) who work closely together with researchers from other areas (physicists, bioinformaticians, mathematicians) to elucidate the basic mechanisms underlying human disease at the molecular and cellular levels but also by uncovering genetic and epigenetic determinants of disease.

Biomedical research at BioISI can go from characterizing individual proteins at atomic level (by atomic force microscopy) to applying Bioinformatics to integrate large genetic and environmental datasets for improved diagnosis and clinical intervention or even using patient-derived organoids to predict their individual responses to drugs and propose clinical trials, in personalized medicine approaches.

Out of the seven BioISI projects awarded in 2017, five involve Biomedicine, in topics which range from mitochondrial disorders caused by protein misfolding to construction of protein networks at the plasma membrane related to signalling or discovering new potential drugs for CF therapy from natural products derived from Portuguese marine (and other) organisms.

Answering these challenging questions using 'omics' and integrative approaches to generate novel mechanistic hypotheses, takes a leading place at BioISI. Such aim, however, requires continuous innovation in both experimental (e.g., new cellular systems for high-throughput microscopy) and computational approaches (such as genomic data mining).

Intersection with other TLs. Biomedicine strongly intersects with all other Thematic Lines of BioISI. For example it fosters Bioinformatics to develop novel approaches to unravel biological meaning from large datasets or it presents BioPhysics challenging molecules to be dissected at atomic level. Biomedicine also strongly interacts with Biotechnology not just in methodology sharing buut also in developing innovative biomedical products and solutions of high bioeconomical potential.

Institutional Cooperation. To keep at the forefront of innovative research, Biomedicine at BioISI keeps strong collaborations. For example, in 2017 a joint Twinning project with EMBL and Karolinska Institute was submitted to the EU to set up a network for outstanding research and innovation, so as to reinforce BioISI's capacity in outstanding basic and translational research in Systems Biology. It aims to build BioISI's capacities/skills in: 1) cutting-edge technologies (at core-facilities) for high-throughput quantitative biological data acquisition; 2) big data analysis; 3) bioinformatic & computational approaches to integrate multi-level data; and 4) Knowledge and Technology Transfer. BioISI researchers also maintain key collaborations with National hospitals and academic clinical centres.

Facilities. Biomedicine benefits from the facility of high-throughput screening (pplying to become a node of EU-OpenScreen) and is currently creating a Proteomics & metabolomics facility. It will also benefit from the establishment of a genomics facility (Biotechnology TL).

Future plans:

1. To understand the molecular mechanisms and regulatory networks underlying traffic to disorders and their relationship to cellular epithelial differentiation.
2. To help elucidate the role of RNA metabolism in disease, and to develop novel diagnostic and therapeutic strategies based on this knowledge.
3. To unravel cell signalling mechanisms related to cancer.
4. To explain mechanisms of Alzheimer's disease (AD) by in vitro studies of self-assembly and amyloid formation of proteins involved in AD.
5. To develop innovative therapeutic strategies, based on tests in patients own cells/tissues towards personalized medicine.

"Flagship" projects: Cystic Fibrosis, Autism

Biotechnology

The research performed in the Biotech-TL is framed by the H2020 key enabling technologies and societal challenges: Health and Wellbeing [Functional foods for disease prevention, environmental rehabilitation, new drugs from marine organisms], food security and sustainable agriculture.

Research was conducted to acquire knowledge and develop modular tool kits that will enable rapid responses to unforeseen challenges, such as the emergence of new plant or diet-related diseases, changes in the distributions of plant pathogens and vectors, the emergence of new environmental conditions or the impact assessment of new bio-based products.

Plant health and crop improvement

Functional characterization of plants with relevant traits, namely those with increased tolerance to biotic (e.g., pest) or abiotic (e.g., temperature, drought, salinity) stress, ripening control and better nutritional characteristics.

Grapevine and cork oak studies are flagship projects for BioISI translational research and benefit from fundamental cutting-edge studies in the model plant *Arabidopsis*.

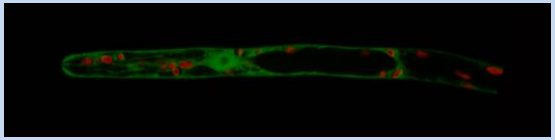
Development of pipeline for automated analyses of small RNAs in model and non-model plants

This key action involved networking activities of M&B (symbiotic and pathogen interaction), MagNano (phenotypic analysis – membrane and cell wall AFM imaging), GER and MAS (for protogenomics and systems networks).

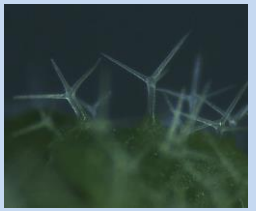
Internal funded projects –"OPTICAL TECHNIQUES FOR THE AUTOMATIC IDENTIFICATION OF FUNGAL INFECTION-RESISTANT GRAPEVINE CULTIVARS" & "Metabolic reprogramming of Trincadeira grapes by Botrytis cinerea infection: hormonal changes and impact in aroma development".

Phytoremediation

Functional characterization of plants and microrganisms which are able to concentrate pollutants (e.g. Ni stress). *This involved mapping of signaling pathways and identification of genes expressed in adaptation and survival.*



Microbial pharmacogenomics



Identification of molecular targets for development of therapeutic compounds and next generation of diagnostics to treat infectious diseases. Determination of mechanisms of action (MoA) based on Biolog phenoarrays; use of yeast genetic systems and their stress-specific transcriptional networks to dissect the effects of stress agents (anti-cancer drugs irradiation and fungicides) so as to understand their MoAs and potential effects in mammalian systems.

Internal funded projects – "Yeast SNT genetic tools and CF drugs", "A new class of drugs or CF therapy - Dual CFTR/ANO1 Modulators from Portuguese natural products"

This key action involved networking activities of M&B with MagNano groups concerning evaluation of the effects of antimicrobial compounds at a nanoscale by AFM).

Wine microbial biotechnology

Development and integrative characterization of adaptive evolved wine yeasts with higher performance and increased stress tolerance, to cope both with new tendencies of reducing wine preservatives and technological processment.

This key action involved networking between M&B, MAS (development of computational pipelines, complex metabolic traits) and MagNano groups - AFM-based characterization of yeast cell physiology and morphology changes in response to stress.

Marine microbial biotechnology

Characterization of marine microbes for bioactivity profiles for several applications in health and evaluation of sea host- associated microbiomes. Integrated step-forward approach using real-time whole genome sequencing for identification of industrial enzymes from deep sea vent prokaryotes.

Bioinformatics

The main scientific goal of BioInformatics thematic line BioInf TL is twofold: to research **fundamental properties of bio inspired models** and to gather BioISI research around the common goal of **modelling cellular processes**. BioInf TL aggregates research of BioISI concerning computational models and tools for molecular, biological, biomedical and social systems. The scope of modelling in BioISI is vertical in terms of systems, from the physical basis of biological systems to social organisation of such systems. Agent based modelling and simulation are basic techniques widely used in the BioInf TL. Seven research groups of BioISI have activities that converge into BioInf TL. In common all use numerical and algorithmic models of living systems for which computational implementations are fundamental. In particular, we can identify computer processing activities typical of BioInf TL.

Key Actions:

- Computing & storage common infrastructure set up
- Preprocessing pipelines for data analysis
- Data mining tools and data analysers
- Development of new computational tools to manage, integrate and interpret data
- Modelling of biological and biochemical processes at cellular and population levels
- Discussion of ideas for the strategic plan in 2018-2022 was initiated and should be concluded in January 2018

Actions in 2017

An internal two year post-doc grant is running in a joint project of BTR and MAS groups, focusing on Autism Spectrum Disorder Genomic Data Analysis – started: April 2016. This initiative of BioISI to stimulate the thematic lines is very effective
Project RESISTIR focusing on modelling microbial propagation in hospital settings and project MedPerSyst with a focus on mining data for personalised medicine of neurobehavioural disorders are two of the most relevant activity poles in this TL.
The new group of Biological Chemstry and the new configuration of the PBS group significantly improve activity along this TL.
Common computing facilities, recently acquired to overcome limitations felt, are being set up to enter production phase soon. We are also taking advantage of good quality national (INCD) and european (EGI) infrastructures to which BioISI has access. As far as possible, the usage of common computational infrastructures (national and European) is being exploited as one way of overcoming funding limitations. The post-doc of the BInf TL, Hugo Martiniano has been instrumental in this infrastructural activity.

Major achievements in flagship projects

Three of the internally launched one year research projects are concerned with BInf TL: Optigrape, CFTR-Proteins, and reproTrincadeira, integrated in an internal BioISI program to promote interdisciplinary research in promising areas. Results obtained are encouraging, which points to the importance of continuing the programme. Preliminary results in RESISTIR project look very encouraging.

Biophysics

The thematic line on Condensed Matter and Biological Physics, BioPHYSICS TL merges together the expertise of experimental/theoretical condensed matter/atomic physicists and of theoretical biological physicists, aiming to explore the unique research opportunities offered by the multidisciplinary environment of BioISI. The overall goal of this TL is to boost, in BioISI and FCUL, an interdisciplinary research activity rooted in Physics, grounded on the well established synergies between Physics, Chemistry, Biology and Engineering.

During 2017, the research activity followed along the key actions defined in the strategic programme.

Atomic Force Microscopy (AFM) related techniques

Development of a simple and effective method for determination of biological material elasticity parameters using AFM techniques allowed: i) the analysis of Arabidopsis Thaliana pollen tubes mechanical properties – see MagNano group (in collaboration with PFG group); the study of surface and mechanical properties of CBE pulmonary epithelium - fig.1&2 (BioISI internal project, in collaboration with FunGP group) and of saccharomyces cerevisiae (collaboration with iBB/IST) in the frame of a FCT 2016 project. Aiming at the assessment of protein-protein interactions using AFM/FFM techniques the optimization of tip specific functionalization protocols were established.

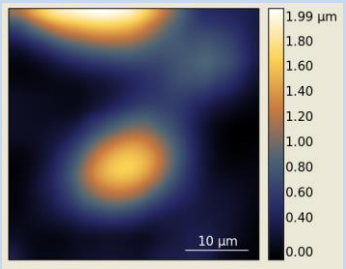


Figure.1 Topography

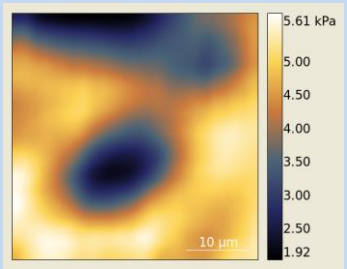


Figure.2 Young Modulus

Novel simulation approaches to study protein aggregation

By integrating results from folding and protein-protein docking simulations we were able to provide a microscopic rationale for the in vitro amyloidogenic behavior of the wild-type form, the DN6 variant and the D76N mutant of protein beta-2-microglobulin

Development of a novel protein-protein docking methodology that optimizes dimers for shape complementarity, electrostatic interactions and hydrophobic interactions. The method is general and can be used to study other model systems.

Development of nanostructured magnetic systems

The optimization of magnetic nanoparticles for hyperthermia methodologies allowed the determination of enhanced specific loss power (SLP), for MnFe2O4 nanoparticles and for γ-Fe2O3 surface modified particles.

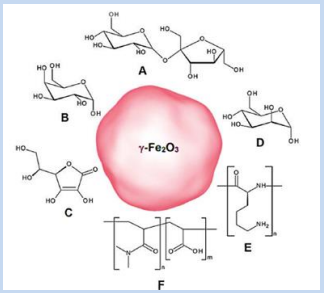
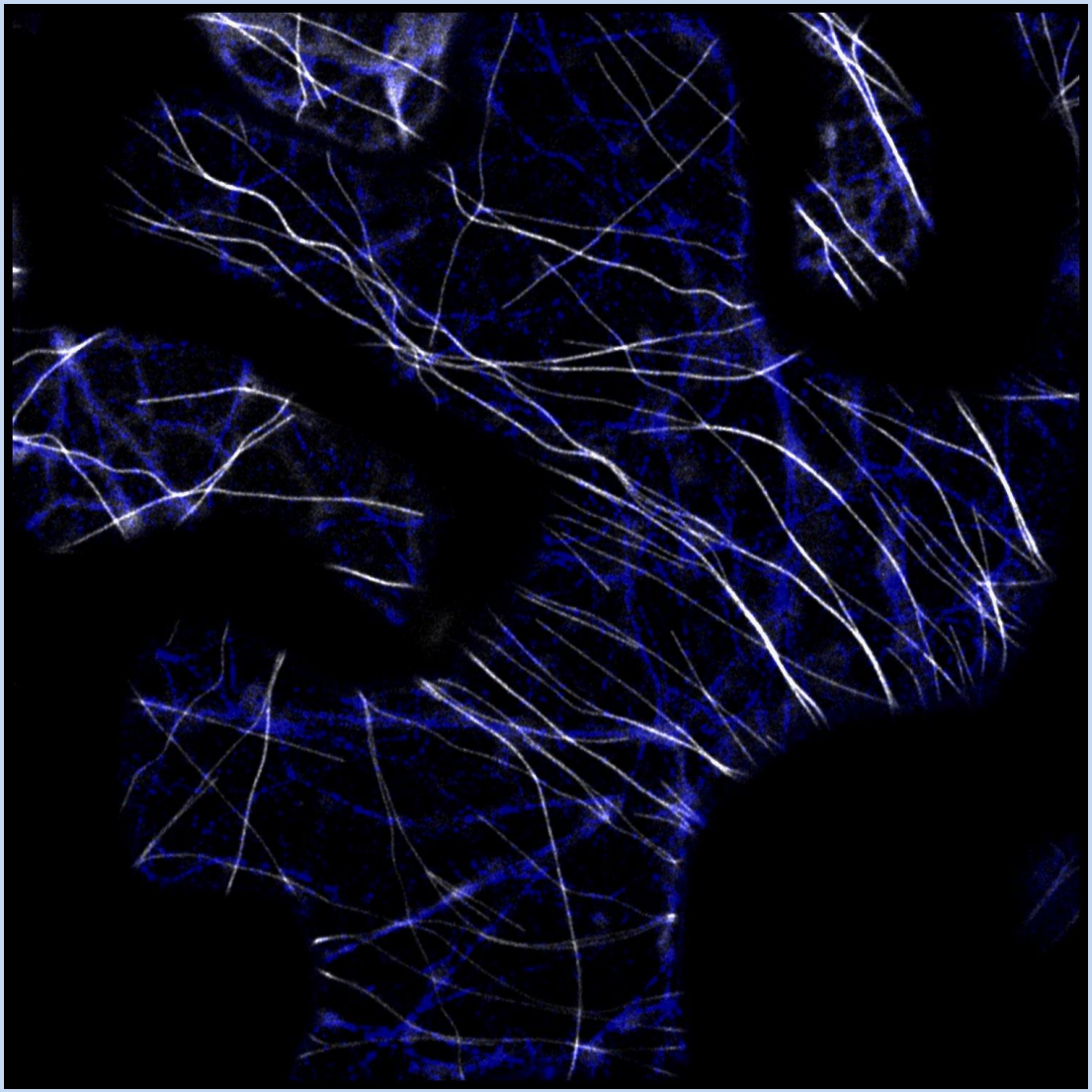


Figure 3: Surface modified γ-Fe2O3 nanoparticles



Nicotiana benthamiana epidermal leaf cells, expressing 2 X/FP fusion proteins for tubulin and an actin-binding protein

BioISI Projects

For the second year, BioISI opened a call for projects of 1 year duration. These projects aimed to develop activities strongly related to BioISI Thematic Lines and BioISI's Strategic Project. This call required the involvement of PIs from two different BioISI groups from different areas, and were evaluated by their scientific excellence, originality and impact and relation to BioISI strategic programme by the BioISI SAB early 2017.

In 2017 these included 7 projects:

1. Mitochondrial b-oxidation disorders- From Protein misfolding to cellular dysfunction
PIs: Bárbara Henriques | Ana Tenreiro
Thematic Lines involved: Biomedicine | Biotechnology

2. Protein complexes stabilizing CFTR at the plasma membrane: functional validation and construction of an integrated interaction network
PIs: Peter Jordan | Paulo Matos | Carlos Farinha | Francisco Pinto
Thematic Lines involved: Biomedicine | Bioinformatics

3. Measuring protein interactions – insights into Cystic Fibrosis
PIs: Carlos Farinha | Mário Rodrigues
Thematic Lines involved: Biomedicine | Biophysics

4. Yeast SNT genetic tools and CF drugs
PIs: Lisete Fernandes | Carlos Farinha
Thematic Lines involved: Biotechnology | Bioimedicine | Basic Biology

5. A new class of drugs for CF therapy - Dual CFTR/ANO1 Modulators from Portuguese natural products
PIs: Hugo Botelho | Helena Vieira
Thematic Lines involved: Biomedicine | Biotechnology

6. Optical techniques for the automatic identification of fungal infection- resistant grapevine cultivars II (Optigrape II)
PIs: Jorge Marques da Silva | Pedro Mariano
Thematic Lines involved: Biotechnology | Bioinformatics | Biophysics

7. Metabolic reprogramming of Trincadeira grapes by Botrytis cinerea infection: hormonal changes and impact in aroma development
PIs: Ana Margarida Fortes | Margarida Gama-Carvalho
Thematic Lines involved: Biotechnology | Bioinformatics

1. Mitochondrial b-oxidation disorders- From Protein misfolding to cellular dysfunction

PIs - Bárbara Henriques | Ana Tenreiro

Biomedicine | Biotechnology

Inborn errors of metabolism, although individually rare, are collectively quite numerous (>15% of single gene disorders), and comprise a group of disorders in which a single gene defect causes a clinically significant effect in a metabolic pathway. In Portugal these disorders are screened in the Newborn Screening Portuguese Program, and although links between clinical symptoms and disease progression are established, a clear relation between genotype and phenotype is still poorly understood for most disorders.

A specific gap in knowledge that needs to be established is the connection between the type of protein folding defect and disease severity. In this project, we investigated pathological mechanisms underlying glutaric acidurias, using as primary models the ETF/ETFQO hub, associated with MADD (Multiple Acyl-CoA Dehydrogenase Deficiency), and GCDH enzyme associated with Glutaric Aciduria type I.

We generated recombinant variants with mutations associated to disease for in vitro studies, aiming to establish a molecular rationale for enzymatic deficiency. Additionally, we investigated cellular models expressing disease associated mutants, and evaluated different markers for cell damage using flow cytometry methodologies.

Results:

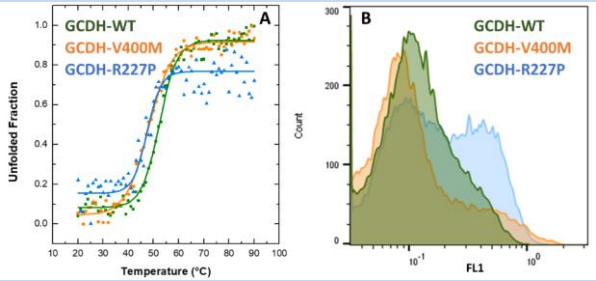


Figure 1: Impact of disease associated mutations on GCDH stability and aggregation. A) Thermal denaturation profile by Far-UV CD; B) Flow cytometry-based analysis with ProteoStat aggresome staining.

Conclusion:

We have performed protein production optimization, and were able to produce considerable amounts of several proteins (WT and disease associated variants). For these ones we have performed biochemical, structural and conformational stability studies. Moreover, we have used flow cytometry to define aggregation prone variants.

Outputs

Lucas et al. (2017) "The role of codon usage in the expression and folding of the disease-related metabolic enzyme ETF:QO", Chemistry and Biochemistry Postgraduate Students Meeting, FCUL (Lisboa, Pt) (best poster award)

Lucas et al. (2017) "The role of codon usage in the expression and folding of the disease-related metabolic enzyme ETF:QO", XIII International Symposium SPDM (Évora, Pt)

Master and PhD thesis undergoing

2. Protein complexes stabilizing CFTR at the plasma membrane: functional validation and construction of an integrated interaction network

PIs - Peter Jordan | Paulo Matos | Carlos Farinha | Francisco Pinto

Biomedicine | Bioinformatics

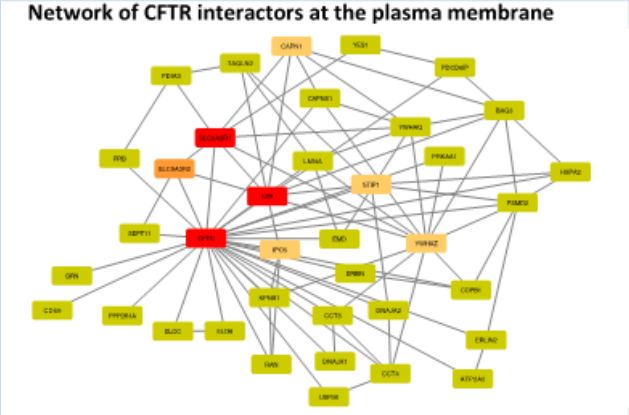
The proposing teams identified novel mechanisms regulating the stability of the CFTR protein at the plasma membrane: phosphorylation of CFTR by SYK kinase, EPAC1 activation through the increase of cellular cAMP levels and Rac1-dependent NHERF1 and Ezrin-mediated anchoring of F508del-CFTR to the cytoskeleton. In a previous BioISI project the team used co-immunoprecipitation and peptide-pull down strategies to identified nearly 300 proteins distinguishing wt and F508del CFTR macromolecular complexes at the PM. In the current project we used bioinformatics and protein network modelling to integrate all the collected data and identify and validate the most promising hits for the pharmacological stimulation of mutant CFTR stability at the PM.

Results:

- A specific algorithm was created to rank the protein interactions detected in the 3 experimental approaches according to replicate representation and quality scoring.
- Higher ranked hits were cross-referenced with existing protein interaction databases to generate a network of the most probable interactors distinguishing wt and corrector-rescued F508del-CFTR.
- The most functionally relevant neighbors were selected for validation.
- Hits from the three approaches were validated and are now being functionally characterized.

Conclusion:

A short-list of major putative drug targets was identified for enhancing the efficacy of currently available CF Treatments.



Outputs

3 ongoing PhD theses & 3 manuscripts in preparation

Lobo et al (2016) J Cell Sci129, 2599-2612

3. Measuring protein interactions – insights into Cystic Fibrosis

PIs - Carlos Farinha | Mário Rodrigues

Biomedicine | Biophysics

The current project was based on the expertise of the FunGP and MagNano groups, on studying protein-protein interactions and on development and use of the atomic force microscopy (AFM) and force feedback microscopy (FFM) and was aimed at expanding this technology to assess biologically relevant disease related protein-protein interactions and mechanical properties in human cells.

The specific objectives were:

To use AFM/FFM to assess specific protein-protein interactions.

To assess how CFTR expression (and modulation) at the plasma membrane modifies membrane roughness and rigidity.

Results:

- Experimental conditions for tip functionalization were optimized using model proteins.
- Work is in progress for the functionalization and assessment of interactions for proteins/regions of interest (CFTR peptides corresponding to PDZ-binding regions, NHERF1 PDZ1/2 domains and EPAC1 N-terminus peptide).
- Technical conditions were optimized for the assessment of mechanical properties in human bronchial epithelial cells.
- The membrane elasticity was found to be two-fold higher in cells expressing wt- versus F508del-CFTR.
- Work is in progress to assess membrane roughness and rigidity under CFTR modulation.

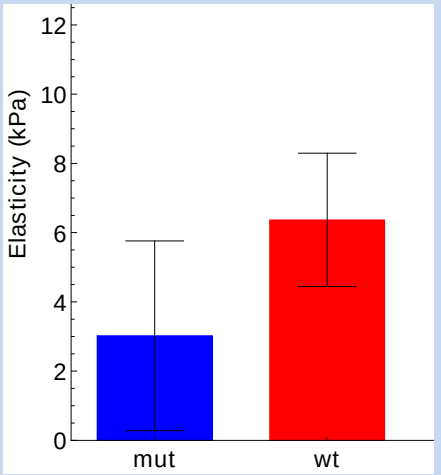


Figure 1: Membrane elasticity for human bronchial epithelial cells expressing wt- or mutant CFTR

Conclusion:

Optimization of experimental conditions for tip functionalization and assessment of membrane mechanical properties in human cells.

Outputs

1 manuscript in preparation

4. Yeast SNT genetic tools and CF drugs

PIs – Lisete Fernandes | Carlos Farinha

Biotechnology | Biomedicine

By exploiting Saccharomyces cerevisiae stimuli-specific transcription network (STN), a set of yeast genetic backgrounds that allows intracellular accumulation of drugs and tracking of responsive transactivators by fluorescence microscopy was generated (@M&B research group). This set of yeasts is intended to constitute tools to address the mechanism of action (MoA) of drugs and also to screen/scrutinize drugs (based on stimuli-responsive transactivators). These tools have broad relevance for pharmacological and environmental drug impact.

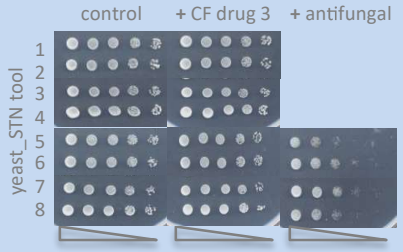
Cystic fibrosis (CF) is the most common rare life-threatening genetic disease. Finding new drugs (lead compounds) to treat CF and elucidating the MoA of CF drugs are key aims for the FunGP research group.

In this project we aimed at the validation of the set of yeast genetic tools/sensors with CF drugs and, concomitantly, the gain of knowledge on the MoA of CF drugs.

Results:

- ✓ the set of yeast_STN tools used comprises 8 strains
- ✓ CF drugs used: lead and VX compounds

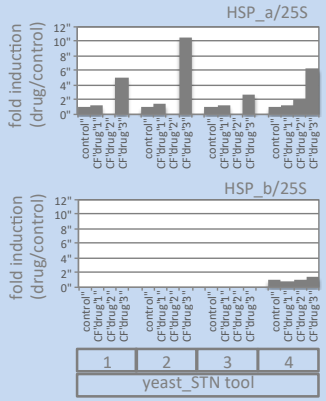
✓ sensitivity of the yeast_STN tools by spot assays



No inhibitory effect on growth were observed with all six CF drugs. However, a modest inhibitory effect was visible in liquid medium with CF drug 3.

✓ selected target genes expression of the yeast_STN tools by RT-qPCR after exposure to CF drugs

(in collaboration with LKuras, I2BC, FR)



Differential expression of HSP genes by CF drugs was observed. Statistical significance of differences in fold induction between the yeast strains is still under investigation.

✓ GFP_fluorescence microscopy assays of the yeast_STN tools after exposure to CF drugs

Transactivator_GFP fusion responsive to CF drug 3 was identified which correlates with the gene expression profiles. Quantitative analysis of the results is still ongoing.

Conclusion:

The responsive stress STN to CF drug 3 was identified.

Yeast_STN tools are not suitable for spot assays.

Validation of the yeast_STN tools is ongoing.

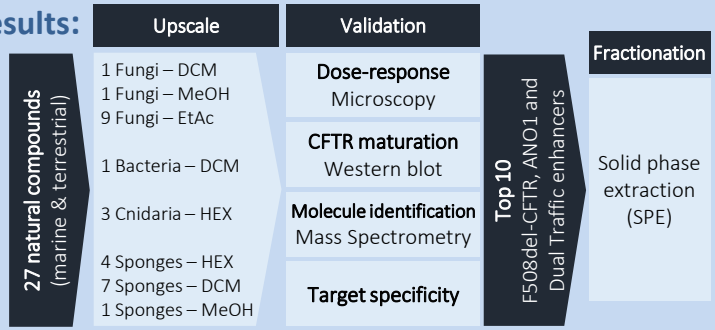
5. A new class of drugs for CF therapy - Dual CFTR/ANO1 Modulators from Portuguese natural products

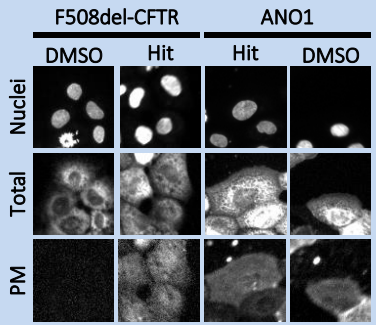
PIs – Hugo Botelho | Helena Vieira

Biomedicine | Biotechnology

Cystic Fibrosis (CF) is the most common life-shortening rare disease affecting ~85,000 individuals worldwide. It is caused by mutations in the CFTR gene, encoding an epithelial chloride/bicarbonate channel. About 85% of CF cases are due to F508del, a mutation preventing CFTR traffic to the plasma membrane (PM). Currently, only two drugs are approved for clinical use in CF but most eligible patients only enjoy modest lung function improvement. From our previous screening of a diverse natural products library (marine & terrestrial origin), a set of 27 hits was selected that improved CFTR and /or ANO1 traffic. In this project we aimed at validating the modulator/activator activity of the selected hits, following upscale and novel extraction of the active compounds, and to further characterize these extracts and analyze their specificity towards CFTR and ANO1.

Results:





Project workflow and main results

Left: We were able to upscale 27 of the 33 pre-selected hit extracts. Using microscopy, these extracts were re-screened for competent enhancement of F508del-CFTR and ANO1 traffic. 14 and 13 extracts were hits for F508del-CFTR or ANO1, respectively. The top 10 extracts (5 from marine, 5 from terrestrial organisms) are under SPE fractionation for the isolation of bioactives. Right: celular phenotype of a hit extract which increases the traffic of both proteins to the PM. Images show overall or PM localization of each protein.

Conclusion:

Out of 27 ANO1/CFTR dual hits, 19 were of marine origin. 10 extracts rescuing either F508del-CFTR and/or ANO1 traffic were selected for further development. Sample fractionation and purification of the active compound(s) as well as functional studies are ongoing.

Outputs

Baptista C et al (2017) High Throughput Microscopy Screens Identify F508del-CFTR Correctors and ANO1 Traffic Modulators in a Unique Portuguese Natural Compound Library. 15th ECFS Basic Science Conference

Baptista C et al (2017) From Portuguese Natural Heritage to Cystic Fibrosis therapies – a story of nature and technology for pharmaceutical applications. redeMAR 3rd Annual Conference.

Botelho HM et al (2017) CFTR Traffic – Functional genomics screens to identify novel regulators. 40th ECFS Conference.

6. Optical techniques for the automatic identification of fungal infection-resistant grapevine cultivars II (OPTIGRAPE II)

PIs - Jorge Marques da Silva | Pedro Mariano

Biotechnology | Bioinformatics | Biophysics

Diagnostic assays based on optical techniques have the advantage of being non-invasive and time- and cost-effective, being therefore effective in high-throughput plant phenotyping. In this project, we aimed to develop an optical diagnosis system that may automatically a) distinguish between Vitis and maize genotypes and b) detect the effects of water stress in plants. We compared the efficacy of different optical and spectroscopic systems, both in laboratory and on field trials. Collected data was used to construct classifiers based on different Machine Learning methods. The expected outputs have the potential for widespread application on the emerging field of plant phenomics.

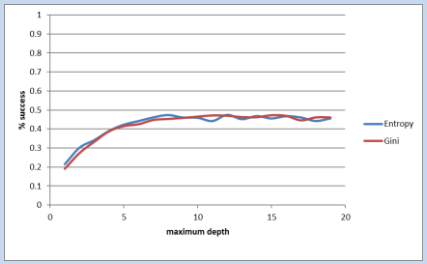


Figure 1: Percentage of success of the classification of 8 Vitis genotypes in a field trial using Kautsky curves, as a function of the maximum depth of the classification trees.

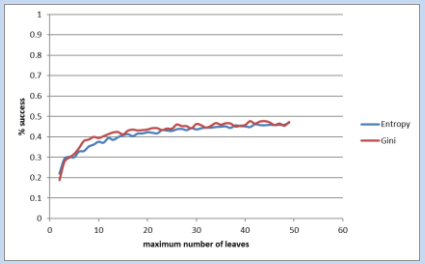


Figure 2: Percentage of success of the classification of 8 Vitis genotypes in a field trial using Kautsky curves, as a function of the maximum number of leaves in the classification tree.

Conclusion:

Preliminary analysis shows that the best classification obtained in a field trial of 8 Vitis genotypes with a Plant Efficiency Analyser reached 50%, which was not a high score. However, if we consider that the random classification would be around 12.5 %, since the dimension of the sample was approximately the same in all genotypes, we conclude that a significant degree of discrimination was reached by the classifier. We are now performing partial analysis in order to understand the determinants of the successful classification of Vitis genotypes.

Outputs:

Figueiredo A et al (2017) Plant-pathogen interaction in modern agriculture: grapevine as a case study. 4th Annual Conference - Foster Innovation through Resilient and Efficient Agro Food & Forestry Systems – redeAGRO

Cruz TO et al (2017) Using the chlorophyll fluorescence signal and machine learning techniques to automatically identify Quercus species: preliminary results. 3rd general meeting of the EU Cost Action FA1306 - The quest for tolerant varieties: phenotyping at plant and cellular level. Oeiras, Portugal, 27-28 March

Marques da Silva J et al (2017) Using chlorophyll fluorescence and artificial intelligence to automatically identify maize varieties and classify leaf relative water content. XV Hispano-Portuguese Congress of Plant Physiology, Barcelona, june 26 – 29 (poster and flash presentation)

7. Metabolic reprogramming of Trincadeira grapes by Botrytis cinerea infection: hormonal changes and impact in aroma development

PIs - Ana Margarida Fortes | Margarida Gama-Carvalho

Biotechnology | Bioinformatics

The complex interplay of growth regulators occurring during grape ripening was studied in detail using molecular and biochemical approaches for infected and control samples of Trincadeira and Syrah collected at green, véraison and harvest stages. This enabled the understanding of hormonal metabolism of grapes related to early and late responses to fungal infection. The results highlight the importance of basal levels of hormones in resistance since Syrah presented higher basal levels of jasmonates and salicylic acid. Salicylic acid, which had only been previously suggested to be involved in response against biotrophic fungi, also appears to play an important role during Botrytis cinerea infection together with auxins and ABA.

RNA from green infected and control berries of Trincadeira and Syrah were sent for sequencing and RNAseq data will be analyzed soon taking into account the expertise of both groups and enabling to study for the first time both plant and fungal strategies upon infection.

Results:

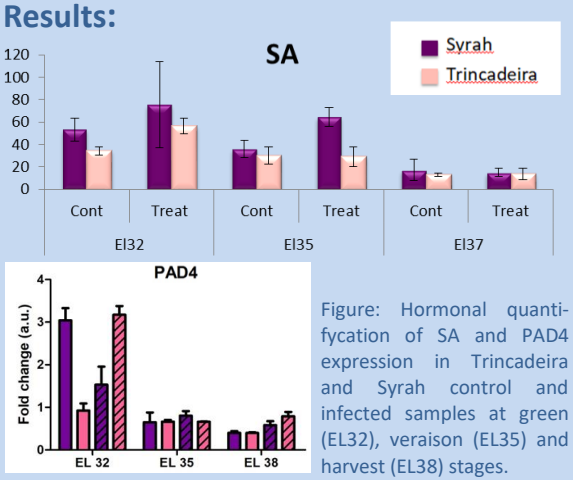


Figure: Hormonal quantifycation of SA and PAD4 expression in Trincadeira and Syrah control and infected samples at green (EL32), veraison (EL35) and harvest (EL38) stages.

Conclusion:

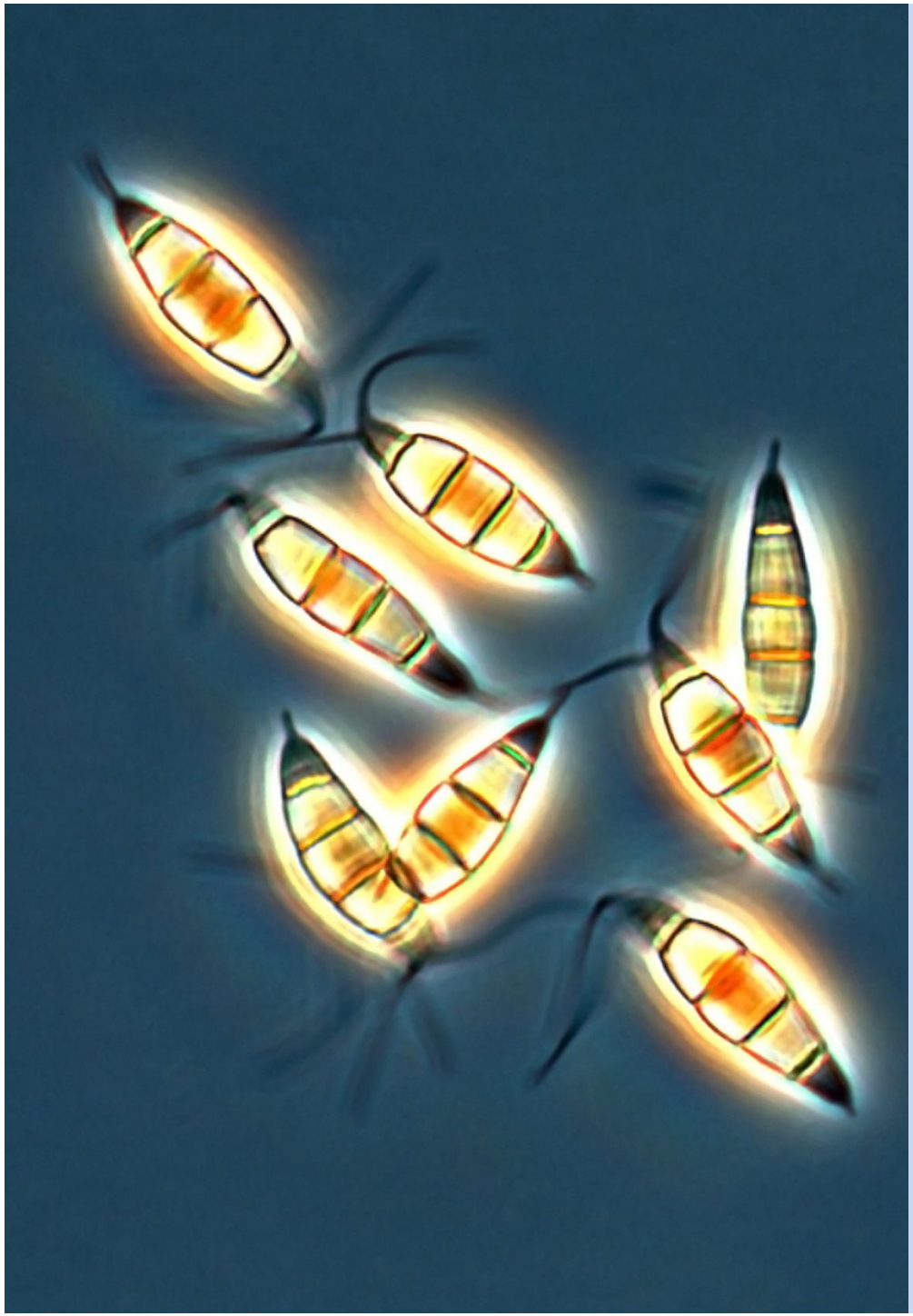
Disclosing the role played by hormones in grape ripening and grape defense against major fungal pathogens will enable improvement of fruit traits and productivity. The analysis of the hormonome together with targeted qPCR studies suggests that SA, JA-Ile and IAA, are involved in basal resistance against *B. cinerea.*

Outputs

Ana Margarida Fortes (2017) Transcriptome and metabolome reprogramming in grape berries upon infection with Botrytis cinerea- insights into hormonal metabolism and defense. Invited oral presentation at ITQB NOVA (Oeiras). 11 Oct.

João Coelho (2017) Master thesis: The study of the reprogramming of metabolism of Trincadeira grapes upon infection with Botrytis cinerea.

João Coelho et al. (2017). Complex interplay of hormonal signals occurring during ripening of Trincadeira and Syrah grapes and during grape defense towards Botrytis cinerea. Poster presented at 3rd Cost Meeting FA1306. 27-29 March. Oeiras, Portugal.



BioISI Research Units (Groups)

Asexual spores of a *Pestalotiopsis* species (fungus) found growing on decorative tiles at Palacio da Pena, Portugal. The image was taken with phase contrast optics

PFG Group

Plant Functional Genomics

http://bioisi.pt/pfg/

Research topic - Study of multiple aspects of plant growth and development with emphasis on functional aspects aiming biotechnological applications:

- Characterization of signalling and secretory pathways regulating growth and morphogenesis -omics analysis of plant (and fruit) development and responses to biotic interaction (parasitic and symbiotic) and abiotic stresses
- Plant responses to pollutants and their use as remediation tools
- Genetic variability and plant cytogenomics

Major Achievements:

- T-Omics analysis in Vitis. vinifera upon biotic infection and abiotic stresses revealed putative new proteins involved in plant resistance and adaptative responses.
- Functional characterization of oak roots symbiotic association with ectomycorrhizal fungus.
- Characterization of genetic tools for analysis of ploidy levels and crop diversity.
- Analysis of signaling pathways and physiological indicators upon abiotic metal toxicity stress.
- Characterization of novel proteins involved in angiosperms (Arabidopsis and Quercus) sexual reproduction.

Selected Publications:

The LOBs gene family in grapevine: genome-wide characterization and expression analyses during developmental processes and stress responses. Grimplet J, Pimentel D, Agudelo-Romero P, Martinez-Zapater, JM, Fortes AM. Scientific Reports 10.1038/s41598-017-16240-5.

Oak protein profile alterations upon root colonization by an ectomycorrhizal fungus. Sebastiana, M et al. Mycorrhiza 10.1007/s00572-016-0734-z

Metalaxyl effects on antioxidant defenses in leaves and roots of Solanum nigrum L. Sousa A, et al. Frontiers Pl Sci. doi: 10.3389/fpls.2017.01967

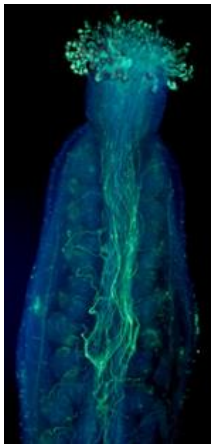


Figure 1

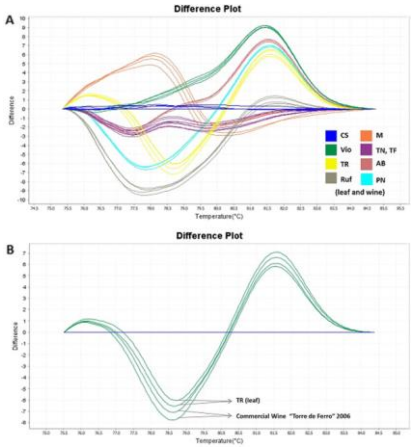


Figure 2

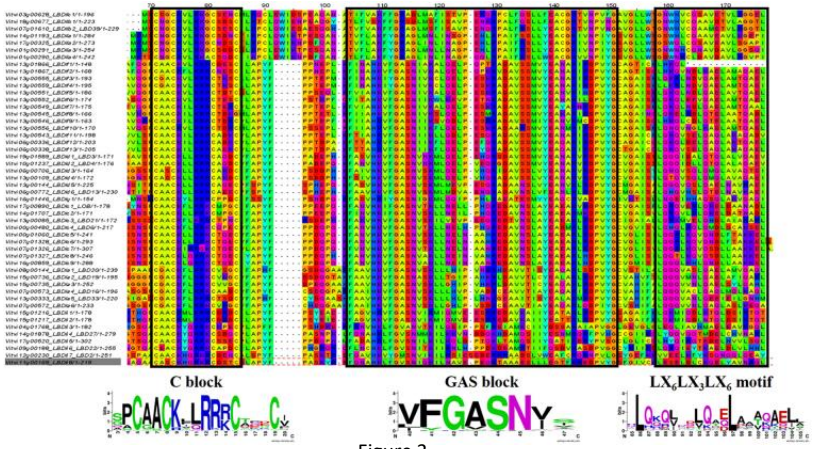


Figure 3

Figure 4

Figure 1: Pollen tube growth in the ovaries of Arabidopsis plants.

Figure 2-3: Omics and chromatography analysis in *Vitis vinifera*

Figure 4: Arabidopsis wild-type and mutant plants

Group Leader

Rui Malhó

Key Funded Projects:

PTDC/AGR-FOR/3356/2014- FCT - Characterisation of cork formation and reproductive biology in a cork hybrid population, 1 January 2016- 31 December 2018, 57.115,00 €, Partners.

Characterizing and monitoring cashew economically important diseases in West Africa as a prospective measure for sustainable production: a case study on GuineaBissau. FCT. 140.000€, PI. Jan2017-Dez2018.

Sexual Plant Reproduction – Seed formation. Project 690946 – SexSeed. H2020 MSCA-RISE-2015. 01 March 2016,

FunGP Group
Functional Genomics & Proteostasis

http://bioisi.pt/fungp/

Biomedicine: translating genes and genomics into personalized & systems medicine; elucidating mechanisms of disease; development of innovative therapeutic strategies & drug discovery; performing pharmaco-genetics & pharmaco-resistance tests.

1. Translational science and personalized medicine in Cystic Fibrosis.
2. Molecular and cellular mechanisms of secretory traffic of CF-related ion channels: CFTR, anoctamins.
3. Signalling/ signal transduction pathways in human disease.
4. Systems approaches to tackle mechanisms of disease: Cystic Fibrosis, cancer and neurodegeneration.
5. Drug development for CF, cancer and neurodegeneration.
6. Mechanisms of amyloid formation and biologics-based approaches for Alzheimer's Disease

Major Achievements:

- **Mechanisms of disease in Cancer:** Role of Rac1b in thyroid carcinogenesis [Faria *et al*, PlosOne 2017].
- **Translational and personalized medicine in Cystic Fibrosis:** Method for the characterization of CFTR mRNA [Felício *et al*, J Cyst Fibrosis 2017]
- **Molecular and cellular mechanisms of secretory traffic of Cystic Fibrosis related ion channels:** Novel traffic assay for Anctmin 1 developed and validated by idientification of Extended Synaptotagmin-1 (ESYT1) as a Regulator of Anoctamin 1 Traffic [Lérias et al, 2017]; Co-regulation of CFTR and Anoctamin 1 [Benedetto et al, 2017]
- **Nutritional BioChemestry:** Natural compounds reduced cholesterol absorption (in Caco-2 monolayers) and also inhibited the enzyme HMGR (drug target of statins). Action on the expression of cholesterol membrane transporter systems is currently under study.

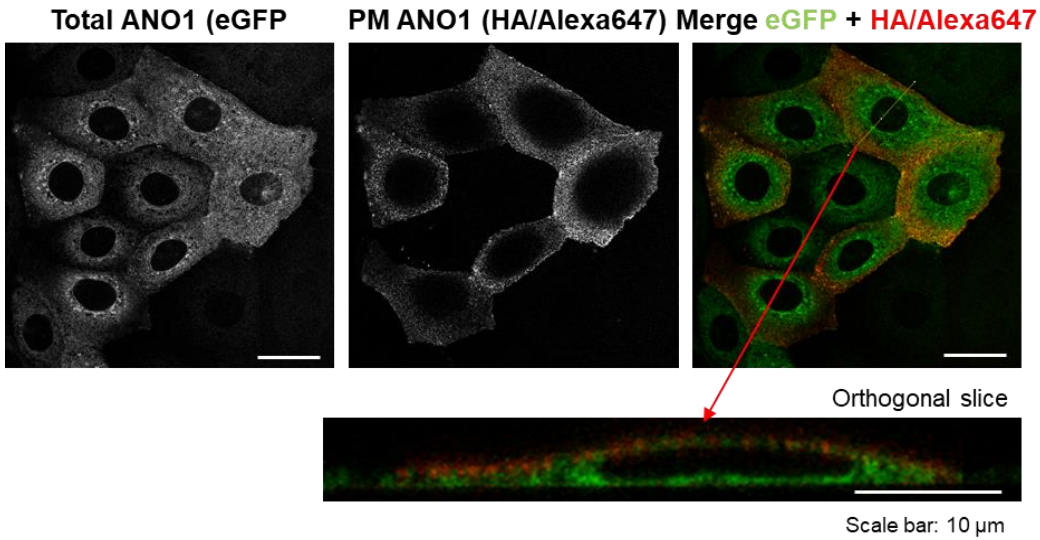
Selected Publications:

Farinha CM (2017) CFTR and Cystic Fibrosis – From Structure to Function. Springer International, ISBN: 978-3-319-65493-5.

Lérias JR*, Pinto MC*, Botelho HM, Awatade NT, Quaresma M, Wanitchakool P, Schreiber R, Pepperkok P, Kunzelmann K, Amaral MD (2017) A Novel Microscopy-Based Assay Identifies Extended Synaptotagmin-1 (ESYT1) as a Regulator of Anoctamin 1 Traffic. BBA- Mol Cell Res. In press. [PMID: 2915949]

Benedetto R, Ousingsawat J, Wanitchakool P, Zhang Y, Holtzman MJ, Amaral MD, Rock JR, Schreiber R, Kunzelmann K (2017) Epithelial Chloride Transport by CFTR Requires TMEM16A. Sci Rep 7: 12397. [PMID: 28963502]

J Henriques, PL Falé, R Pacheco, MH Florencio, MLM Serralheiro. Phenolic compounds from Actinidia deliciosa leaves: Caco-2 permeability, enzyme inhibitory activity and cell protein profile studies. Journal of King Saud University - Science, 2017.



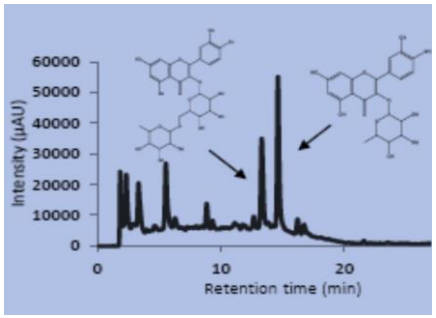


Figure 1. TMEM16A/Anoctamin 1 (ANO1) protein expression and plasma membrane (PM) fraction in unpermeabilized CFBE cells. [From: Lérias JR, Pinto MC *et al* (2017) *BBA- Mol Cell Res* **1865**: 421-431].

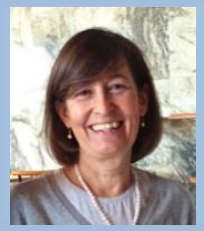
Figure 2. LC-MS/MS of auquoes decoiction present in leaves of A.deliciosa (kiwi plant)

Key Funded Projects:

European Union (H2020-SC1-2017-755021). HIT-CF – Personalised Treatment For Cystic Fibrosis Patients With Ultra-rare CFTR Mutations (and beyond). Total budget: 6.7M€ / FCID: 257K€; 5 yrs. Coordinator: Kors van der Ent, University Medical Centre Utrecht, Utrecht (Netherlands). Coordination FCUL Group: MD Amaral.

The calcium binding S100B protein as a modulator of amyloid β aggregation and potential therapeutic target in Alzheimer's disease Fundação para a Ciência e Tecnologia PTDC/NEU-NMC/2138/2014 (2016-2019) PI: C.M. Gomes, BioISI/FFCUL €199,972

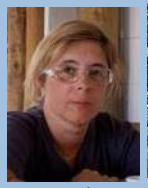
Isogenic models to study CF disease signatures: HITI geneedit to fix them, Funded by the Cystic Fibrosis Foundation (HARRIS17G0) 2018-2019. PI: Patrick Harrison, University College Cork. Co-investigator (PI at BioISI): Carlos M Farinha. Total funding: USD 206,000, BioISI funding: USD 75,600.



Group Leader

Margarida Amaral

PI's


Mª Luísa Serralheiro


Luka Clarke


Carlos Farinha


José Pedro Gil


Cláudio Gomes


Paulo Matos

Post Docs: Bárbara Henriques | Catarina Batista (BioISI) | Hugo Botelho| Ines Pankonien | Iris Silva | Javier Fernández | Miqueias Lopes-Pacheco | Patrícia Barros | Susana Igreja | Rita Pereira | Pero Falé

PhD Students: Ana Matos (BioSYS) | Daniel Cruz (BioSys) | Joana Cristovão |Joana Lérias (BioSys) | João Santos (BioSys) | Lúcia Santos (BioSys) |Luís Sousa (BioSys) | Madalena Pinto (BioSys) | Márcia Faria (BioSYS) | Margarida Quaresma (BioSys) | Mariana Romão (BioSys) | Nikhil Awatade (BioSys) | Sara Canato (BioSys) | Tânia Lucas | Verónica Felício| Joana Matos | Asma Ressaissi

MSc Students: Arsénia Massinga | Guilherme Moreira | Iris Petinga | Leonor Abrantes | Maria Joana Ribeiro | Raquel Centeio | Sofia Ramalho | Vanessa Neno | Rebeca Esperança | Bruno Soares | Violeta Railean | Joana Catarro | André Silva | Laura Guedes

BI Researchers: Joana Ferreira | Rodrigo David

Technicians: Sofia Correia

M&B Group

Microbiology & Biotechnology

http://bioisi.pt/mb/

M&B-BioISI focused on innovative integrated approaches in several areas of M&B and linking group know-how and expertise with SMEs and industry.

R&D translation to society was further achieved through nursering and promotion of new start-ups, participation of PhD members in networks of key value chains, partnerships established with SMEs, scientific training of MSc students in PALOPs, association with FabLab Lisboa (Lisbon Municipality) and co-involvement in outreach events like Young Creators'17, Science Days and International Microorganism Day.

Major Achievements:

Yellow and White M&B

- Selection and integrative analysis of saccharomyces and non-saccharomyces yeasts (natural and adaptively evolved) as novel starters for wine industry.
- Evaluation of adaptive yeast response to stress and of links of yeast nitrogen metabolism with wine aroma and quality.
- Integrative omics-based analysis of the microbiome of Douro Wine Region towards the enlightening of its adaptive potential to dry and warm conditions due to climate changes.
- Whole-genome sequencing by 3rd NGS of a cellulose-producing strain of acetic acid bacteria.

Grey and Green M&B

- Major contributions in the field of Ascomycete systematics, with proposal of new species and reappraisal of several families and genera.
- Unveiling the evolutionary history of fungal families and genera through dating divergence time in relation to major evolution events of angiosperms on a geological timescale.
- R&D on new biological pesticides innocuous for the environment.
- Identification of 154 differentially expressed genes by RNAseq analysis of Xanthomonas campestris pv. campestris / Brassica oleracea interactomes.
- Isolation and characterization of a collection of ca. 500 isolates from soils after enrichment for ammonium and nitrite oxidizers.
- Detection by FTICR-MS of metabolic pathways relevant in interactions of endophytic and associative bacterial strains with different wheat cultivars.

Blue M&B

- Characterization of marine microbes for bioactivity profiles for several applications in health and evaluation of sea host- associated microbiomes.
- Publication of a book chapter in Elsevier book Series on Grand Challenges in Marine Biotechnology for future experts reference.
- Positioning of a group member as an international expert at Blue contribution for BioBased and Bioeconomy networks in EU (BBI-JU and ERA-NET MARINE BIOTECH) as well as a national (BLUEBIO ALLIANCE) and EU Comission reference for marine biotech.
- Integrated step-forward approach using real-time whole genome sequencing for identification of industrial enzymes from deep sea vent prokaryotes.
- Development of new antifouling compounds as additives for marine paints.

Gold and Red M&B

- Intelligent Decision Support Systems for personalized prevention and clinical management of infectious diseases.
- New approaches for taxonomic identification and profiling of poli-clonal samples based in Next Generation Sequencing
- Validation of yeast STN genetic tools with drugs able to modify the ethiology of cystic fibrosis.
- Whole-genome sequencing by 3rd NGS of five strains of Streptococcus dysgalactiae subsp. dysgalactiae and disclosure of integrated prophages and phage resistomes by comparative genomic analysis.
- Detection of Aedes albopictus mosquito (dengue vector) in the North of Portugal (Penafiel) within the vector surveillance network- REVIVE

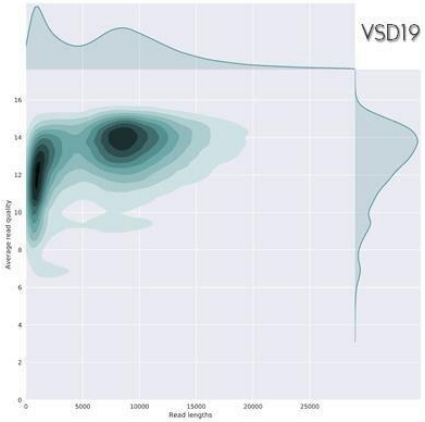


Figure 1

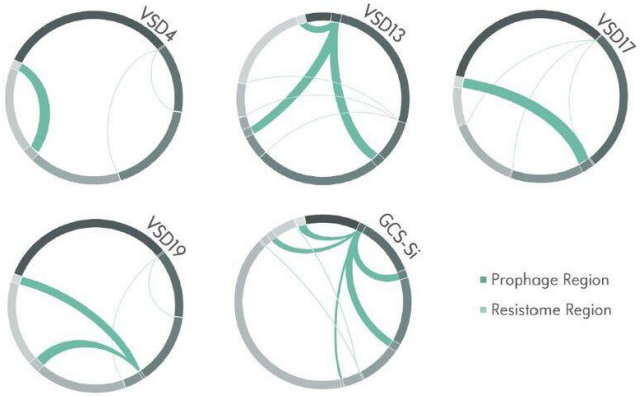


Figure 2

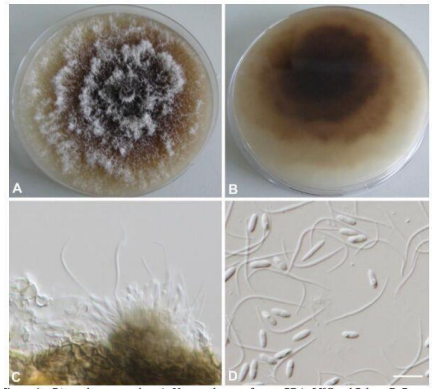


Figure 3

Figure 1: Read quality vs. read length kernel distribution using 3rd NGS ONT's MinION.

Figure 2: Distribution of prophage and resistome regions within S. dysgalactiae subsp. dysgalactiae genome assemblies.

Figure 3: *Diaporthe pyracanthae.* (A, B) Upper and reverse culture surface on PDA; (C) conidiogenous cells; (D) alpha, beta and gamma conidia.

Key Funded Projects:

RESISTIR - Intelligent information system to control infection and personalized antibiotherapy. POCI and POR Lisboa. P2020 project nº 3379. Proponent Company: MAXDATA Software SA. Partner: FCUL. 2016-2018. Total funding: 1.02 M€. M&B-BioISI funding: 531 k€. FCUL PI: R. Dias (FCUL/BioISI). [Gold/Red M&B]

SMARTWINE - Smarter wine fermentations: integrating Omics-tools for development of novel mixed-starter cultures for tailor-made wine production. FCT, COMPETE, FEEI. PTDC/AGR-TEC/3315/2014, 2015-2019. Total funding: 196 k€. No BioISI amount. PI: A. Mendes-Faia (UTAD/BioISI). [Yellow/White M&B]

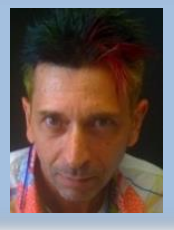
BIOCLUB - Designing biofertilizers by mimicking plants' recruitment of rhizospheric partners. FCT. PTDC/AGR-PRO/1852/2014. 2016-2019. Proponent: FFCUL (CE3C). Total funding: 199 k€. No BioISI amount. BioISI partner: R. Tenreiro (FCUL/BioISI). [Grey/Green M&B]

Selected Publications:

Amorim AF, Pinto D, Kuras L, Fernandes L (2017). Absence of Gim proteins, but not GimC complex, alters stress-induced transcription. Biochim Biophys Acta - Gene Regulatory Mechanisms. 1860: 773-781. DOI: 10.1016/j.bbagrm.2017.04.005. IF: 5.049. Q1.

Ferreira AC, Tenreiro R, de Sá MI, Dias R (2017). Evolution and genome specialization of Brucella suis biovar 2 Iberian Lineages. BMC Genomics 12;18(1): 726. DOI: 10.1186/s12864-017-4113-8. IF: 3.729. Q1.

Wijayawardene NN et al. (2017). Notes for genera: Ascomycota. Fungal Diversity 86: 1–594. DOI: 10.1007/s13225-017-0386-0. IF: 13.465. Q1.



Group Leader

Rogério Tenreiro

Post Docs: Catarina Baptista

PhD Students: Ana Cristina Reis| Anabela Esteves | Camila Fernandes | Inês Alemida | Joana Cruz | João Pais | Pablo Vaglini | Patrícia Lage | Pedro Teixeira | Susana Marques | Tiago Silva

MSc Students: Alexandra Lança | Ana Marta Lourenço | Ana Raquel Nogueira | Ana Sofia Oliveira | Bernardo Vicente | Fabiana Quintas | Inês Santos | Maria Cristina Matias | Mariana Nascimento | Melissa Badrudin | Miguel Guerreiro | Pedro Cerqueira | Rafael Mamede | Rodolfo Ferreira | Rui Carvalho

Lab Staff: Francisca Moreira| Filipa Silva

Other Collaborators: João Melo | Abdelhak Lemsaddek | Cristina Cruz | João Baptista-Ferreira | Mário Gadanho | Mónica Cunha | Patrick Freire | Sandra Chaves

BTR Group

Biomedical and Translational Research

http://bioisi.pt/btr/

Understanding how genetic, epigenetic, clinical, lifestyle and environmental determinants and modulators interact to influence health, disease and treatment efficacy; integrating large human datasets and translating findings into personalized medicine tools for improved diagnosis and intervention using Systems Medicine frameworks.

Major Achievements:

- Two families with a clinical diagnosis of Familial Hypercholesterolaemia (FH) were found to have mutations in the ABCG8 gene that lead to Sitosterolaemia, which requires a different therapeutic approach, highlighting the importance of correct genetic etiology identification. For this purpose, a new NGS panel is being optimized with a broad number of genes selected from GWAS functional hits and lab data. Furthermore, functional studies for 16 variants in the LDLR and APOB genes will contribute to a more accurate FH diagnosis, and consequently for improved patient management and prognosis.
- Human host IFITM3-linked SNP rs34481144-A allele confers protection against the most aggressive forms of pandemic A(H1N1)pdm09 influenza virus infection.
- TLR2 haplotypes and alpha-thalassemia determinants are associated to different levels of infection susceptibility, namely recurrent respiratory infections and at least one severe bacterial infection episode, in pediatric sickle cell anemia patients.
- The BTR Deafness Research Group integrates European networks on age-related hearing loss and quality of life in elderly;
- Clustering analysis of clinical parameters in autism and integration with variants in brain expressed genes using machine learning methods identified main biological processes associated with severity in ASD;
- The ASDEU prevalence study field work was carried out, with Autism Spectrum Disorder (ASD) preliminary estimates close to 1%; this ASD population-based dataset is currently under study to explore gene-environment interactions;
- Studies on stroke and autism that included thousands of individuals identified common variants for stroke (COL4A2) and autism (locus on 10q24.32, overlapping several genes), reinforcing the notion that the contribution of common variants to complex disorders can be clarified through cooperative efforts analysing very large datasets. A large scale ASD study showed that common variants contribute additively to risk in cases with de novo variants and severe phenotypes, while per se polygenic risk variation associates with milder ASD presentation;
- In Bartter syndrome type 3, a clinically heterogeneous hereditary salt-losing tubulopathy, the younger age at diagnosis was found to be associed with the complete loss-of-function mutations of the CLCNKB gene.
- A mitochondrial DNA analysis of the present-day Tunisian population revelead a recent expansion and a mosaic genetic structure, probably due to a complex settlement history with demographic effects, like endogamy and/or genetic drift.

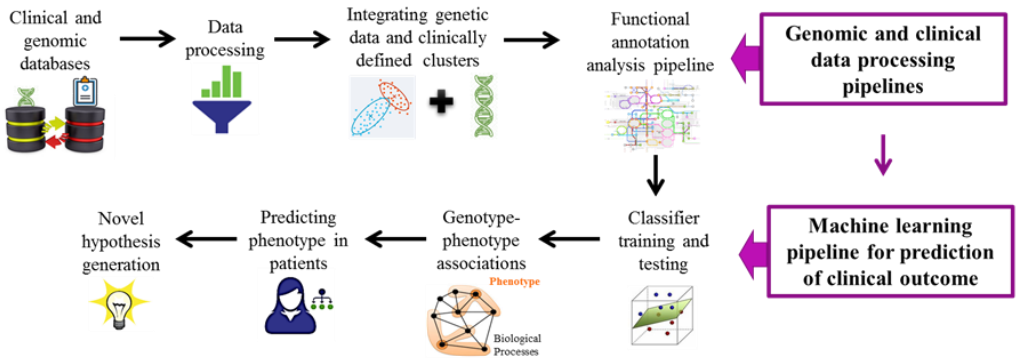


Figure 1: Integrative analysis pipeline for a large cohort of individuals with autism, including genomic and clinical data.

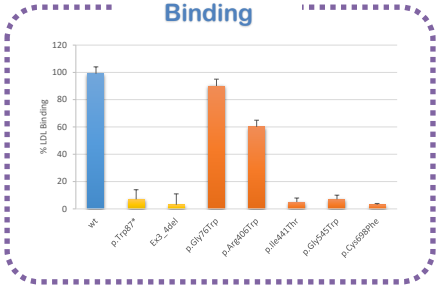


Figure 2: LDL/LDLR binding FACS quantification for 5 variants under study (Orange bars). (blue bar wt, yellow bars positive controls).

Group Leader
Astrid Vicente

PI's

João Lavinha | Graça Fialho | Helena Caria | Luísa Mota-Vieira | Mafalda Bourbon | Luciana Costa

Post Docs: Ana Catarina Alves|Célia Rasga|Cláudia Branco|Inês Conceição|Tiago Matos |Renato Pires | Hugo Martiniano

PhD Students: Ana Margarida Medeiros|Ana Rita Marques (BioSys)| Cibelle Mariano (BioSys)|Haula Haider|Joana Chora| João Pedro Santos (BioSys)| Muhammad Asif (BioSys)|Niccolo Rosi (BioSys)| Marta Correia (BioSys)|Rafel Graça (BioSys)|Joana Vilela (BioSys)|

Technicians: Leonor Abrantes | Joana Duarte| Lisa M Esteves |

Selected Publications:

Chora, J. R., Medeiros, A. M., Alves, A. C. & Bourbon, M. Analysis of publicly available LDLR, APOB, and PCSK9 variants associated with familial hypercholesterolemia: application of ACMG guidelines and implications for familial hypercholesterolemia diagnosis. Genet. Med. 2017.

Haider HF, Flook M, Aparicio M, Ribeiro D, Antunes M, Szczepek AJ, Hoare DJ, Fialho G, Paço JC and Caria H. (2017). Biomarkers of Presbycusis and Tinnitus in a Portuguese Older Population Front. Aging Neurosci. 9:346.

Caroça, C; Campelo, P; Caria, H; Paço, J and Silva, SN (2017). G6PD Variants, Malaria and Sensorineural Hearing Loss in São Tomé and Príncipe: A Case-Control Study. Int J of Med Resear & Health Scienc, 6(6): 8-16.

Key Funded Projects:

LALD.pt 2015-2017 Funded by Alexion Pharmaceuticals, Total Budget 104000€. PI Mafalda Bourbon

ALHTOUR – Assisted Living technologies for the health tourism sector. 2015-2018. H2020-TWINN-2015. Instituição proponente: Universidade de Lisboa. Instituições parceiras: Pertencentes à Universidade de Lisboa – Faculdade de Ciências (BioISI), Instituto de Ciências Sociais, Faculdade de Motricidade Humana, Faculdade de Medicina e Faculdade de Arquitectura; Katholieke Universiteit Leuven (KUL), Maastricht University e a Universitá di Macerata. Funded by EU.

TINNET - Tinnitus research Network. Action number BM1306. Funded by EU. 2016-2018. COST action.

GER Group

Gene Expression and Regulation

http://bioisi.pt/ger

Our research aims to explore the organization and regulation of eukaryotic genomes and gene expression programs at the transcriptional and post-transcriptional levels and their connection to signalling pathways, with a preferential focus on the study of processes relevant for human health and disease. Our approach ranges from dissecting molecular mechanisms to understanding their impact on systems level regulation, using a combination of molecular, cell biology and computational approaches.

Major Achievements:

- **sncRNAs in T cell function and HIV infection:** identification of miR-34c-5p induction by TCR-stimulation in human naïve CD4 T cells and its positive impact on HIV replication[1], and of novel classes of host/HIV-derived sRNAs with the potential to regulate infection (in preparation).
- **Translation mechanisms:** identification of a novel regulatory mechanism for mTOR expression under translational inhibitory conditions through cap-independent initiation involving a highly structured 5'UTR, required for mTOR-dependent cell cycle progression into S phase[2].
- **Genomes and repetitive DNA:** the cat archetypal satellite DNA sequence FA-SAT is highly conserved and transcribed to ncRNA across Bilateria genomes, in spite of variation in centromeric, telomeric or interspersed genomic location[3].
- **RNA in neurodegeneration:** identification of gene and protein interactions linking RNA metabolism genes involved in ALS and SMA (published) and a novel algorithm to identify overlaps between the two disease networks (submitted); definition of conserved neural genes dependent on SMN function (submitted).
- **Post-transcriptional control in development:** modulation of *fgf8a* alternative polyadenylation increases Fgf signalling and leads to sensory system development defects in zebrafish (submitted).
- **Signaling and splicing:** co-culture between epithelial colon cells and macrophages was found to induce alternative splicing of a tumor-related variant.

Selected Publications:

Amaral et al (2017). miRNA profiling of human naive CD4 T cells links miR-34c-5p to cell activation and HIV replication. EMBO Journal 36(3):346-360.

Marques-Ramos et al (2017). Cap-independent translation ensures mTOR expression and function upon protein synthesis inhibition. RNA, 23: 1712-1728.

Chaves et al (2017). FA-SAT Is an Old Satellite DNA Frozen in Several Bilateria Genomes, Genome Biology and Evolution 9(11):3073–3087.

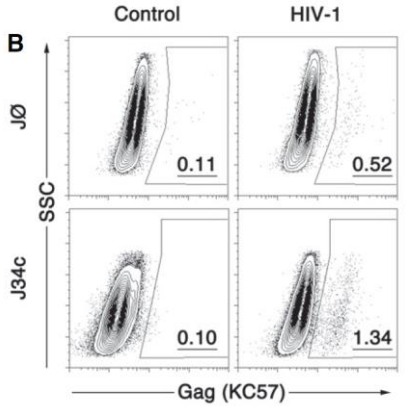


Figure 1

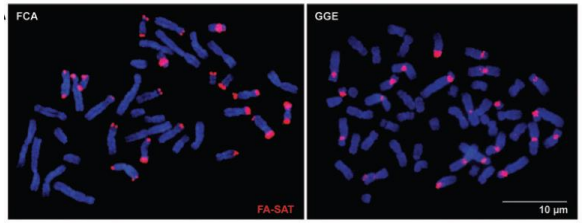


Figure 3

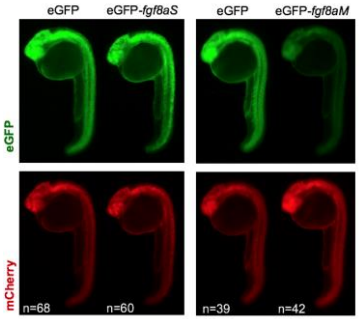


Figure 4

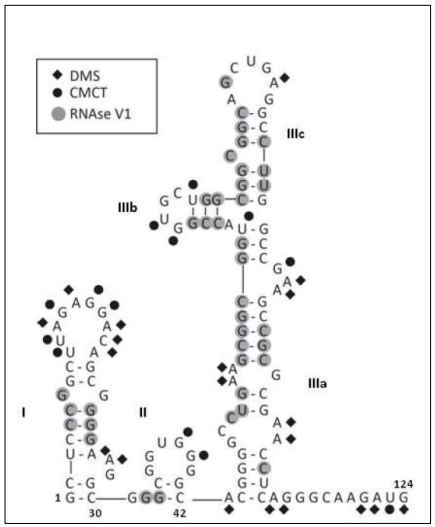


Figure 2

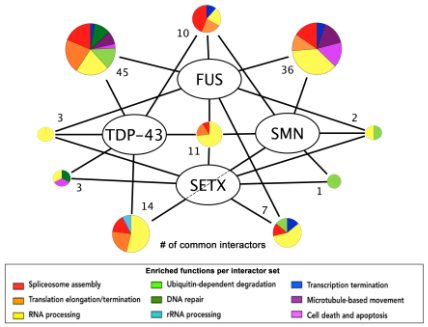


Figure 5

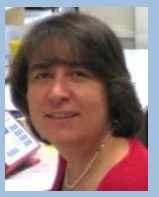
Group Leader
Margarida Gama-Carvalho

PI's


Raquel Chaves


Francisco Pinto


Peter Jordan


Luísa Romão

Post Docs: Maria Filomena Adega | Vânia Gonçalves | Juliane Menezes | Rafaela Santos | Marcelo Pereira

PhD Students: Ana Escudeiro | Andreia Henriques | Cláudia Loureiro | Daniel Olivença | Daniela Ferreira | Hugo Santos | Joana Pereira | Joana Silva | Mariana Pinhão | Marina Garcia-Vaquero | Nuno Domingues | Paulo Costa | Rafael Fernandes

Other researchers: Ana Luísa Borges | Bruna Pereira | Inês Martins | Joao Paulo Silva | Miguel Pereira | Patrícia Dias | Tânia Marques

Key Funded Projects:

LungCARD. EU project 734790 Call H2020-MSCA-RISE-2016. Proponent: STAB VIDA. Jan 2017-Dec 2020 Budget: 1M€ global/144K€ local

Nonsense-mediated mRNA decay in genetic diseases and cancer: key players, mechanisms, and a novel approach for suppression therapy, PTDC/BIM-MEC/3749/2014, May 2016-April 2019 Budget: 200K€

FlySMALS: Common RNA-dependent pathways for motorneuron degeneration in SMA and ALS. EU Joint Program in Neurodegenerative Disorders (JPND-CD/0002/2013) May 2015-December 2018 Budget: 796K€ global/139K€ local

Figure 1: Flow cytometry analysis of HIV Gag protein expression in control and miR-34c-5p overexpressing Jurkat T cells[1]
Figure 2: Secondary structure of the mTOR 5'UTR[2]
Figure 3: FA-SAT in situ hybridization in cat and genet chromosomes[3]
Figure 4: GFP-fgf8a-3'UTR reporter expression levels in zebrafish embryos
Figure 5: Interaction network of the ALS/SMA genes FUS, TDP-43, SMN and SETX

PBS Group

Physics of Biological Systems

http://bioisi.pt/pbs

The PBS group is organized in three research teams focusing on:

T1) Protein Physics (protein folding, misfolding and aggregation)

T2) Population Dynamics (contact networks, epidemic spread and viral evolution)

T3) Dynamics and Electronic Structure of Complex Systems (electronic and magnetic properties of hydrogen bond networks).

Major Achievements:

- **T1) Protein Physics** - Discrete Molecular Dynamics simulations results predict that the D76N mutant of protein beta-2-microglobulin populates two intermediate states structurally characterized by having one (I1) or two (I2) unstructured termini. Docking simulations indicate that I2 is the key species for aggregation at acidic and physiological pH contributing to rationalize the higher amyloidogenic potential of D76N relative to the wild-type protein and the ΔN6 variant.

- **T3) Dynamics and Electronic Structure of Complex Systems -** The relationship between magnetic properties determined by NMR (magnetic shielding constants) and electronic properties (core electron binding energies) from ESCA/XPS experiments has been extensively discussed in the literature. In a classical work, Kai Siegbahn (Nobel Prize in Physics 1981), investigated the correlation between chemical shifts from NMR and ESCA and concluded that for many systems, this correlation is not observed. Recently, in agreement with this conclusion we provided evidence that the σ(17O) magnetic shielding constant in liquid water is not correlated with the O1s core electron binding energy. However, our major achievement was to point out a correlation between σ(17O) and the gap between the O1s (core) and O2s (inner valence) electron binding energies (2).

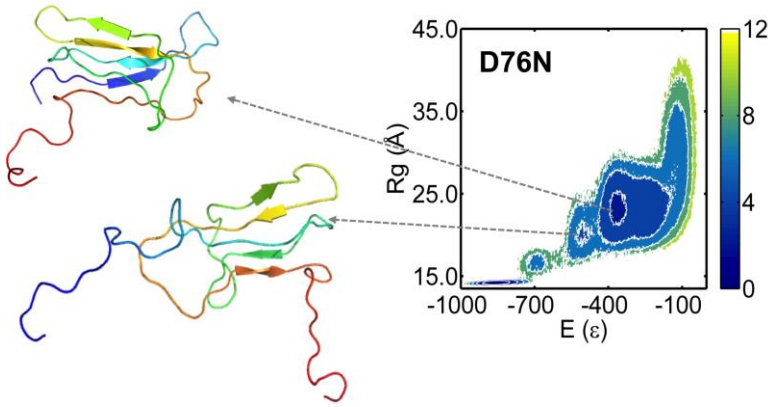


Figure 1

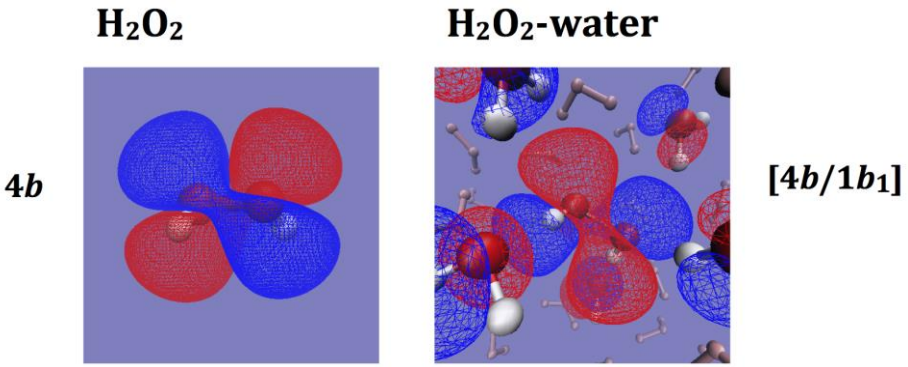
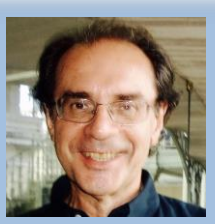


Figure 2

Group Leader
Patrícia Faísca

PIs

Ana Nunes



Benedito Cabral

Post Docs: Jules Morand (funded by BioISI)

PhD Students: Rui J Loureiro (BioSYS), João P Santos (BioSYS – with BTR)

MSc Students: João Especial (DF-FCUL), Elsa Teixeira (DF-FCUL), and Gabriel Martins (DQB-FCUL)

Selected Publications:

R.J. Loureiro, D. Vila-Voçosa, M. Machuqueiro, E.I. Shakhnovich and P.F.N. Faísca, A tail of two tails: The importance of unstructured termini in the aggregation pathway of beta-2-microglobulin, Proteins: Structure, Function and Bioinformatics 85, 2045-2057 (2017)

B.J. Cabral, Dynamics, magnetic properties, and electron binding energies of H2O2 in water, J. Chem. Phys., 146, 234502 (2017)

Figure 1: Conformational space of the D76N **mutant** of protein beta-2-mocroglobulim

Figure 2: Electronic density for the outer valence orbitals of H2O2 in the gas-phase and liquid water (JCP2017)

MagNano Group

Magnetic Nanosystems

http://bioisi.pt/magnano/

Research activities are focused on: investigation of nanostructured magnetic systems and atomic systems for diverse applications (biomedicine, spintronics); development/refinement of Atomic Force Microscopy techniques targeting the study of physical/biological systems; exploitation of high resolution techniques for magnetic properties assessment of systems with potential applications in nanomedicine, catalysis and sensors technology.

Magnetic nanoparticles for biological/biomedical applications

- Ring tests within COST Action TD1402 – RADIOMAG – optimization of heating efficiency measurements and dependence on the ac magnetic field amplitude.
- Book Chapter - Nanoparticles for Magnetic Hyperthermia, Maria Margarida Cruz, Liliana P. Ferreira, André F. Alves, Sofia G. Mendo, Paula Ferreira, Margarida Godinho, Maria Deus Carvalho, Chapter 19, 485–511, in Nanostructures for Cancer Therapy, 1st Edition.

AFM/FFM development

- Effect of stress on mechanical and adhesion properties of pollen tubes, in collaboration with PFG/BioISI group (manuscript under preparation)
- Aggregation of S100A9 molecules in presence of divalent metal ions (manuscript under preparation), in collaboration with Protein Folding and Misfolding Laboratory/BioISI.
- Adhesion and mechanical properties of burkholderia cepacia, a dangerous bacteria for cystic fibrosis disease patients, in collaboration with IBB-IST.
- Effect of sliding friction in harmonic oscillators, [M. Vitorino et al, Scientific Reports 2017]

MagNano expertise/facilities

- Study of the spin cross-over kinetics in transition metal complexes using complementary SQUID magnetometry and Mössbauer spectroscopy data.
- In the framework of collaborations with Malmö/Lund and Canberra groups, research projects submitted to FCT “Auger Inputs for Targeted Cancer Therapy” (Portugal 2020), by J. P. Marques (PI), and to Australian Research Council “Auger electron processes in the 21st century”, J. P. Marques (team member).
- Development of 2 new AFMs using different operation modes; upgrade of home built FFM equipment for signal to noise ratio improvement.

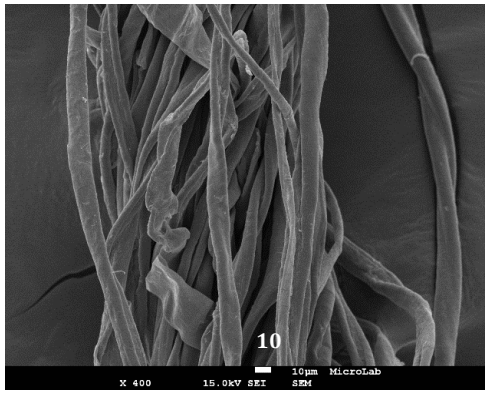


Figure 1

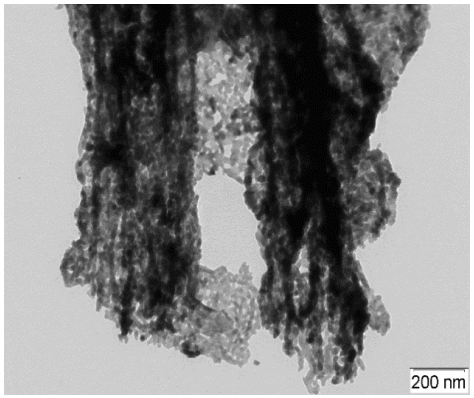


Figure 2

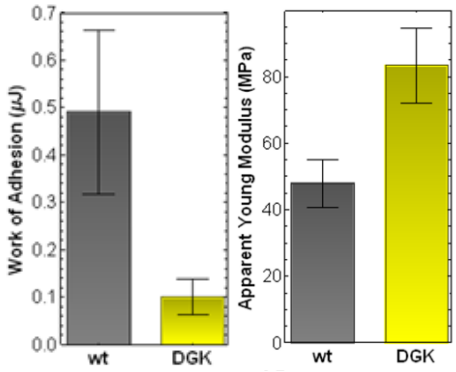


Figure 3

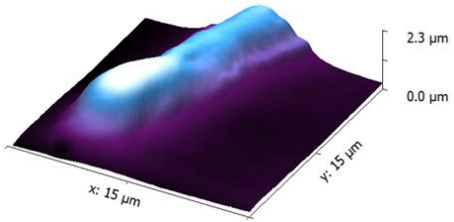
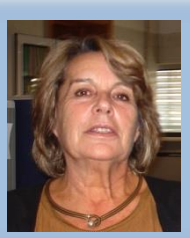


Figure 4

Figure 1 - SEM image of gauze fiber
Figure 2 - TEM image of CoFe2O4 nanoparticles prepared using gauze as template
Figure 3 - Mechanical and adhesion properties (WT and DGK)
Figure 4 - Topography, of Arabidopsis Thaliana polen tubes.



Group Leader

Maria Margarida Godinho

PI's

Margarida Cruz

Liliana Ferreira

Mário Rodrigues

José Pires Marques

Post Docs: Mário S. Rodrigues | Ana Carapeto

Other Integrated members: Margarida Pires | Guiomar Evans | Thomas P. Gasche | António Casaca | M. Estrela M. Jorge

PhD Students: Miguel Vargas Vitorino | Rodrigo Antunes

Other Researchers: Arthur Vieira

Selected Publications:

M. M. Cruz, L. P. Ferreira, J. Ramos, S. G. Mendo, A. F. Alves, M. Godinho and M. D. Carvalho, Enhanced magnetic hyperthermia of CoFe2O4 and MnFe2O4 nanoparticles, Journal of Alloys and Compounds 703, 370 (2017)

Alichandra Castro, Jacobo Morère, Albertina Cabañas, Liliana P. Ferreira, Margarida Godinho, Paula Ferreira and Paula M. Vilarinho, Designing nanocomposites using supercritical CO2 to insert Ni nanoparticles into the pores of nanopatterned BaTiO3 thin films, J. Mater. Chem. C 5, 1083 (2017)

A. Wilhelm, E. Gruber, J. Schwestka, R. Kozubek, T.I. Madeira, J. P. Marques, J. Kobus, A.V. Krasheninnikov, M. Schleberger, and F. Aumayr, "Highly charged ion neutralization and de-excitation driven by multiple interatomic coulombic decay". Phys. Rev. Lett 119, 103401 (2017)

Key Funded Projects

Molecular and Mechanical Forces in Biology measured with Force Feedback Microscopy, FCT project grant ; Start Date: 01/04/2016 – 3 years; BioISI total amount – 145.600,0€; Total amount of the project – 199.979€; PI: Mário Silveira Rodrigues.

Multifunctional Luminiscent Spin Label Hybrid Materials, FCT project grant; Start Date: 01/03/2016 – 3 years ; BioISI total amount 27.500,0€ ; Total amount of the project – 191.879,0€; BioISI partner: Liliana P. Ferreira.

MAS Group

Agent and Systems Modelling

http://bioisi.pt/mas/

MAS research focuses three main themes:

- Artificial intelligence approaches of agent and multi-agents systems, mobile robotics, artificial life, and natural language
- Complex multi-agent systems, including agent visualisation and animation, and social simulation
- Data mining and knowledge discovery

Major Achievements:

- "Best of Computing 2016" **award** of ACM Computing Reviews, for Silva F.; Duarte M.; Correia L.; Oliveira S.; Christensen A.L. Open issues in evolutionary robotics. Evolutionary Computation 24, 2 (August 2016), 205-236.
- J. Gomes (2017). Novel Approaches to Cooperative Coevolution of Heterogeneous Multiagent Systems. **PhD thesis**. Faculdade de Ciências da Universidade de Lisboa. Supervision: P. Mariano, A.L Christensen
- F. Silva (2017). Evolutionary Online Behaviour Learning and Adaptation in Robotic Systems. **PhD thesis**. Faculdade de Ciências da Universidade de Lisboa. Supervision: L. Correia, A.L. Christensen
- R.F. Antunes, **keynote speaker** in Videogames VJ2017, Univ. Lusófona, Lisbon, Portugal
- Coelho, H., Beyond Mechanisms, Mind-Brain Doctoral College **Lecture**, ICS, March 27, 2017.

Selected Publications:

Coelho, F., Neto, J.P. (2017). A Method for Regularization of Evolutionary Polynomial Regression, Applied Soft Computing Journal 59C, pp. 223-228.

Gomes, J., Mariano P., Christensen, A.L. (2017). Dynamic Team Heterogeneity in Cooperative Coevolutionary Algorithms. IEEE Transactions on Evolutionary Computation

Silva, F., Correia, L., Christensen, A.L., (2017). Evolutionary online behaviour learning and adaptation in real robots. Royal Society open science , 4:160938.

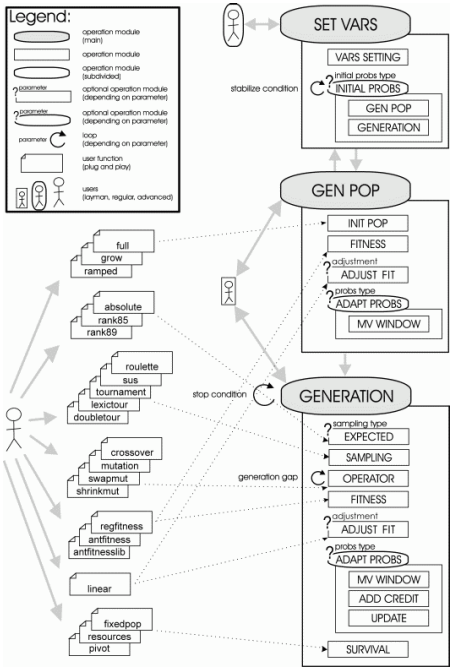
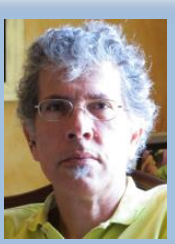


Figure 1

Figure 2



Group Leader
Luís Correia

PI's

Helder Coelho

Luís Antunes

Paulo Urbano

Sara Silva

Beatriz Carmo

Post Docs: Pedro Mariano| Rob Mills| Rui Antunes| Hugo Martiniano (jointly with BTR)

PhD Students: Cláudio Reginaldo| Davide Nunes| Gustavo Martins| Nuno Henriques| Nuno Magessi

Key Funded Projects:

EU-FP7 Animal and robot Societies Self-organise and Integrate by Social Interaction (ASSISIbf)", 1/Feb/13 - 31/Jul/18 (BioISI funding 515,776 EUR). Main contractor Univ. Graz (Austria) / Local coordinator L. Correia

EU-H2020-MSCA-IF-2014-GF Project 655226 - BIHC- Bio-inspired models of human crowds, 1/Jul/2015 – 31/Dec/2017 (BioISI funding 80,318 EUR). Rui Antunes (Post-Doc) / L. Correia (Supervisor)

FCT VIRTUAL TUTORING, 1/Jul/2016 – 30/Jun/2018. BioISI funding: 60,967 EUR. Main contractor Univ. Aberta / Local coordinator AP Cláudio.

Figure 1 - GPLAB – Matlab tool
Figure 2 - BIHC project – Mértola model

Technology & Instrumentation

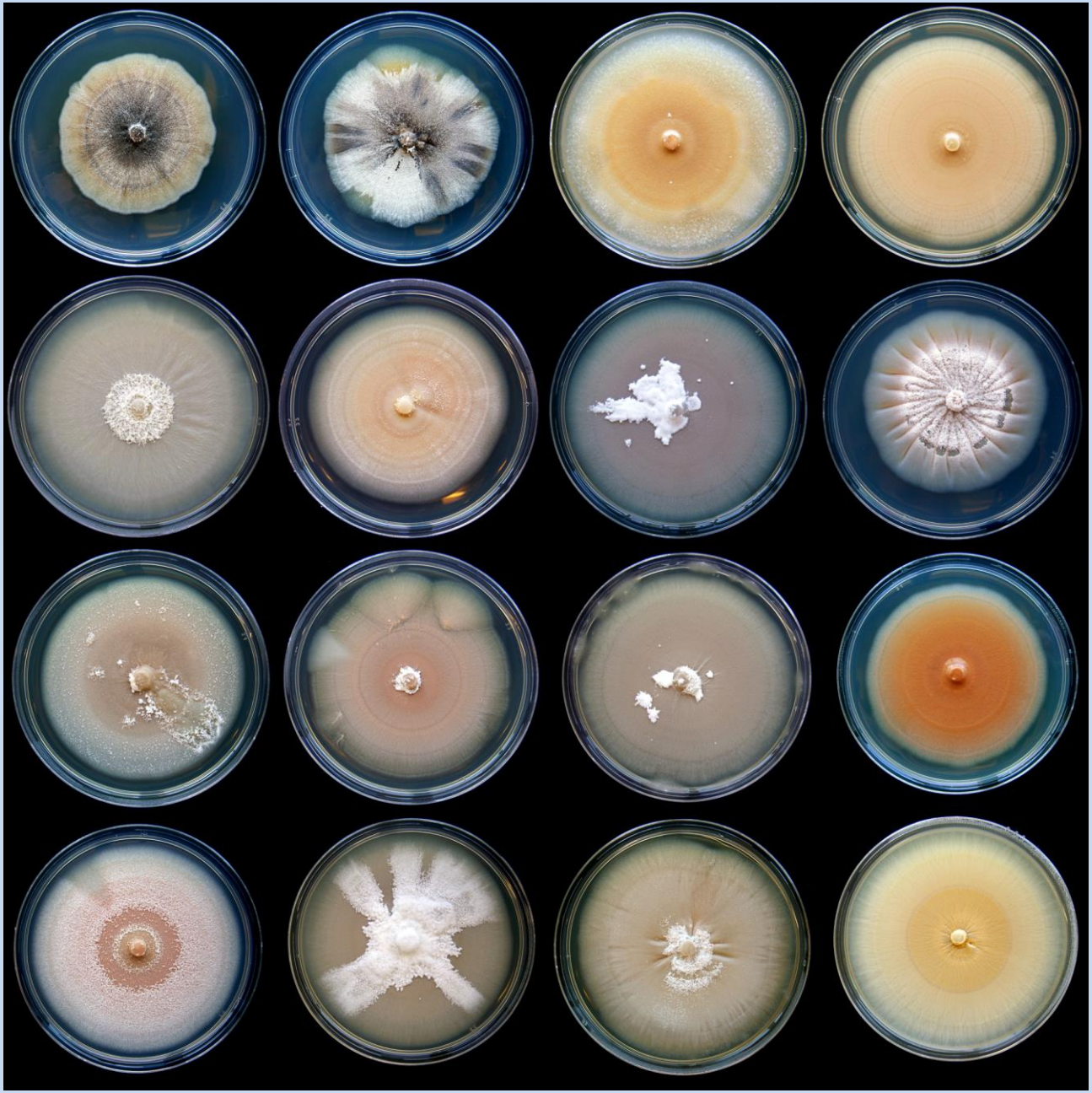
Gathering physicists and computational scientists together with biologists in one institute, puts BioISI in a privileged, unique multidisciplinary position in Portugal to develop new instruments. In 2016 BioISi filed 2 patents and 6 computational applications:

Patents:

- Costa D, Miranda M, Tavares R, Baptista P, Lino-Neto T (2017) Diversity of fungal endophytic community in Quercus suber L. under different climate scenarios (Published)
- Bruno Loureiro, Fernanda Leal (2017) “Meio protetor para meios de cultura de base gelificante” (submitted)

Computational Applications:

- Chaves I, Costa B, Rodrigues AS, Bohn A, Miguel CM (2017) mhrpursuit - Analysis workflow for smallRNA sequenced data



Cultures of *Plectospherella cucumerina* showing the wide range of cultural morphology of this fungus that infects the roots of melon and other cucurbits.

BioISI Facilities & Services

Coordinator: Rui Malhó

At BioISI facilities constitute an important instrument to recruit the most talented young scientists and significantly contribute to advanced training: PhD, MSc students, workshops. In 2015-2020, resources will be applied to maintain, update, and support BioISI facilities with expert staff, so that their usage can be applied to maximize expertise and technologies to solve specific biological problems.

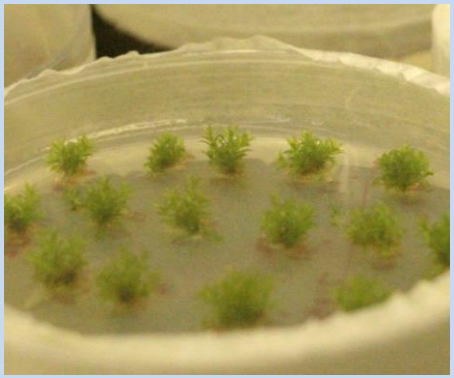
The goals of BioISI facilities are:

1) Providing excellent services with state-of-the-art equipment, user support and appropriate computational infrastructure;
2) Turning BioISI into a key player in the creation and operation of the next generation of biological research infrastructures within ULisboa;
3) Making lab available to society initiative goals (FabLabs as proposed by the PRP-National Reform Plan for Portugal) by which citizens, companies, researchers and public institutions work together (in co-creation) to innovate faster and more effectively.

Science Support Facilities

Mammalian Cell Culture: This facility provides expertise and advice in advanced methodologies for mammalian cell culture. Mammalian cell culture facility services include: expert consultation for researchers regarding primary cultures of human cells and organoids; general cell culture (media and experimental design); large-scale production of cells; cryopreservation of cell lines; mycoplasma screening; training in usage of environmental and safety of laminar flow hoods, incubators, cell seeder and microporator.

Plant House: The Plant House Facility has specialized plant growth chambers and provides support to research groups. Several chambers are capable of providing exceptional environmental conditions i.e. low temperature (chilling), high temperature, different light intensities and different relative humidity, allowing precise environmental simulation across different climate zones and the simulation of various environmental stress conditions.



NGS (INSA): The goal of the Next Generation Sequencing Facility is to provide cutting edge next generation sequencing technology to its users. NGS has become a key analysis method for biological research. The capacity to expand analysis from defined genomic regions to genome wide studies has boosted the pace of research discovery and enabled researchers to obtain a global view on biological processes.

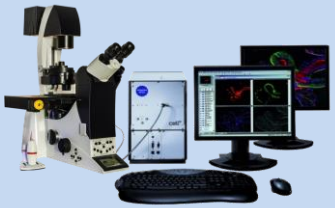
BioImaging

BioISI BioImaging facility is part of FCUL Microscopy Facility, a research and academic infrastructure that functions as a service provider and technical support hub for Research Units and teaching staff, as well as the rest of the scientific and student communities.

Its main areas of operation are:
1) Research: microscopy services for in-house, as well as external, Research Units
2) Academia: bioimaging tutoring and facilities for FCUL undergraduate classes
3) Outreach: guided tours and science communication events for high school visits
4) Mentoring: advanced courses and workshops on bioimaging for students and researchers

Technology: confocal microscope | widefield & fluorescence microscopes | fluorescence stereoscope | scanning and transmission electron microscope | high-throughput imaging system.

Technicians: Telmo Nunes (FCUL) | Luís Marques



Physics

The Atomic Force Microscopy and Related Techniques Laboratory (AFM-RT Laboratory) serves both scientists and students. There are 3 microscopes: one commercial AFM, one commercial AFM converted into an FFM and one home developed Force Feedback Microscope (FFM). The main activities of this laboratory are:
1) Research
   - Imaging: protein structures, cells, DNA, surfaces in general
   - Mechanical properties of cells
   - Instrumentation: development of new instruments, software and experimental strategies that support our research activity
   - study of nanotribology and nanofluidics by AFM and similar techniques
2) Education: AFM training classes for graduate students
3) Outreach: Visits from high school students and displays for the general public.

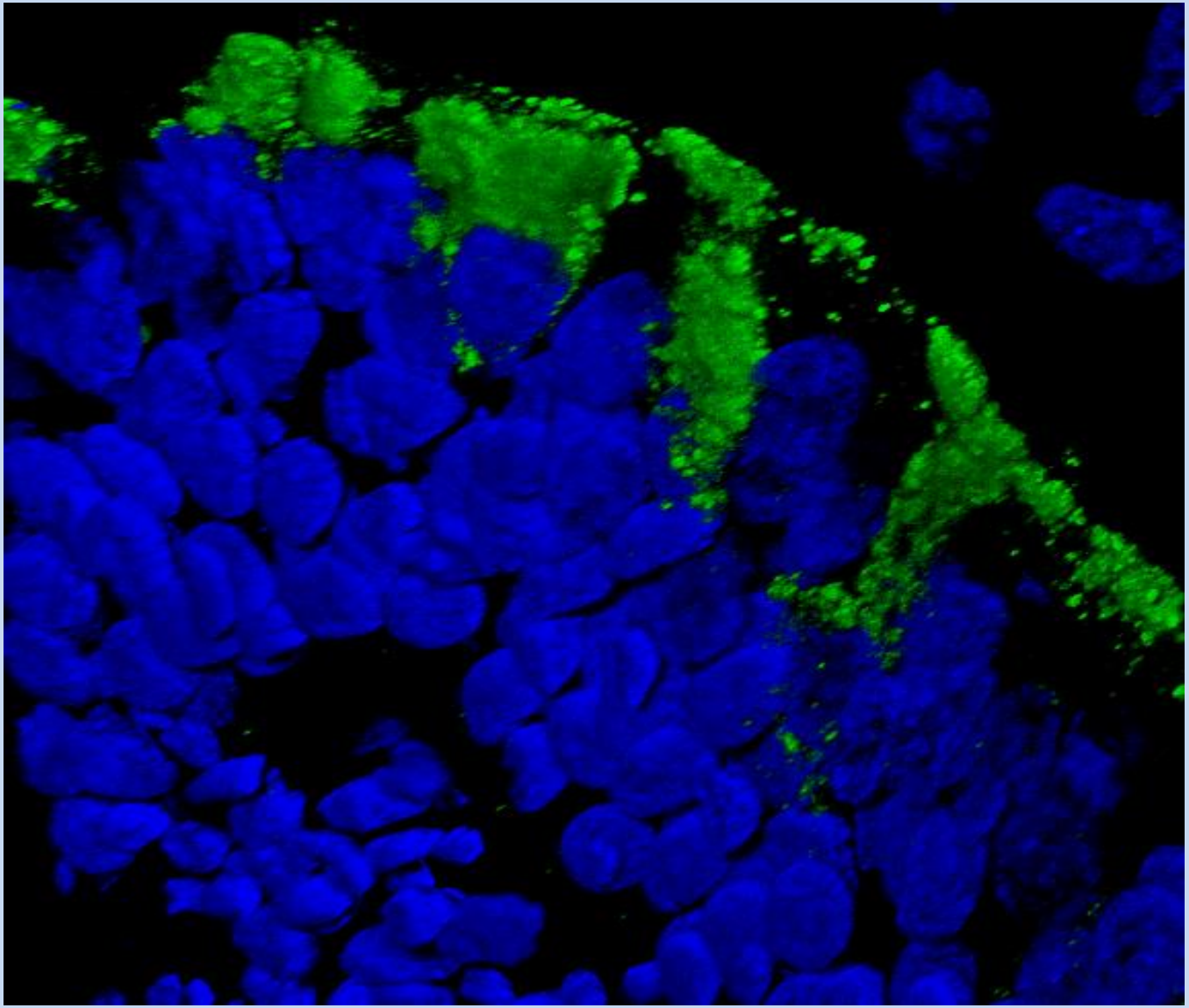
Computing

In terms of computing and data storage facilities, BioISI has currently installed 408 cores, 1144 GB RAM, and 88 TB storage in equipment concentrated essentially in 4 groups: GER, PBS, M&B, and FunGP.

We have been following an approach of exploiting common facilities available nationwide and at european level, INCD and EGI, respectively. The former is currently operational with an availability for BioISI of 200 virtual CPUs, 870 GB RAM and 5 TB storage.

Infraestrutura Nacional de Computação Distribuída

BioISi Facilities WebSite: http://bioisi.ciencias.ulisboa.pt/node/24



3D reconstruction of mucin 5AC in human trachael epithelia. Nuclei are depicted in blue and Muc5AC in green.

Teaching &Training

BioISI contributes to advanced training, as it hosts the multidisciplinary BioSys PhD programme and participates in two more PhD programmes. In 2016 BioISI launched a post-doc programme, besides its continuous mentoring of young PIs to establish themselves independently. BioISI offers also advanced training to external visitors in the scope of collaborations or to use its facilities and through the organization of international workshops.

BioSYS PhD Programe

BioSys - PhD Program in Biological Systems, Functional & Integrative Genomics, is a multidisciplinary PhD Programme in the framework of the FCT PhD Programmes Call.

BioSys was awarded with 11 PhD scholarships for each edition of the Programme for a total of 4 editions. BioSys has already enrolled 44 highly promising young scientists from 6 different countries and will enroll another 11 students in 2018. BioSYS received more than 400 applications from all around the world.

Our International PhD Programme offers a post-graduate training during the first semester involving manely international experts in different fields that bring their own experience to the discussion. This will allow each student to contact with internationaly recognized researchers and make contacts and collaborations with them. The following 3 ½ years are devoted to research in either national or international laboratories.

BioSys-PhD

BioISI Post-Doc Programe

BioISI has the ideal training environment for post-docs to further develop as scientists. BioISI post-docs find a supportive and mentoring faculty, have access to facilities, and are part of a lively scientific community. BioISI Post-Doc programme includes four 2yr fellowships to enrol into activities related with BioISI Thematic Lines:

Hugo Martiniano - Develop of computational pipelines combining machine learning/data mining and systems biology methods for multilevel data analysis, Supervisors: Luís Correia, Astrid Vicente

Catarina Baptista - The identification of new natural compounds of high therapeutic potential for Cystic Fibrosis by high-throughput microscopy screens, Supervisors: Hugo Botelho, Helena Vieira

Ana Carapeto - Exploring protein - protein interactions with Atomic Force Microscopy

Jules Morand – The physical basis of Dialysis Related Amyloidosis, Supervisors: Patrícia Faísca, Mário Rodrigues

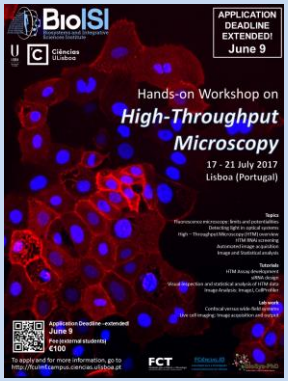
BioISI Post-DOC

BioISI Workshops

One of the BioISI missions is to share knoledge with the scientific community and society. To accheve this goal BioISI invites to our intituition many international experts on theis working areas to teach in several workshops such as:

- HTM2017 | Hands-On Workshop On Fluorescence And High-Throughput Microscopy, 17-21 July 2017, Lisboa

- Epithelial Systems: Physiology and Pathophysiology Workshop, 24-28 July 2016, Lisboa



BioSYS 1- Enrolled Students

- **Ana Margarida Matos** - siRNA screen for modulators of CFTR surface retention, Supervisor - Paulo Matos (FCUL), Co-supervisor - Rainer Pepperkok (EMBL) *
- **Cibelle Costa** - System Biology Approach for Cardiovascular Medicine, Supervisor - Mafalda Bourbon (FCUL), Co-supervisor - Marília Antunes (FCUL)
- **Cláudia Loureiro** - Regulation of epithelial chloride transport by phospho-tyrosine-initiated protein networks, Supervisor - Peter Jordan (FCUL), Co-supervisor - Luka Clarke (FCUL)
- **Daniel Olivença** - A mathematical model of the phosphoinositide pathway in human pulmonary epithelial cells., Supervisor - Francisco Pinto (FCUL), Co-supervisor - Eberhard Voit (Georgia Institute of Technology) *
- **Hugo Santos** - Gene networks for motor neuron degeneration: from disease model transcriptomes to cellular systems, Supervisor - Margarida Gama-Carvalho (FCUL), Co-supervisor - David Van Vactor (Harvard Medical School) *
- **Joana Lérias** - Anoctamin 1 – A Member of A Novel Family of Ion Channels with Extended Functions and Significance in Disease, Supervisor - Rainer Schreiber (Univ Regensburg), Co-supervisor - Margarida Amaral (FCUL) *
- **Muhammad Asif** - System medicine approach to improve diagnosis and prognosis in Autism Spectrum Disorders (ASD), based on extensive genomic, biochemical and clinical data, Supervisor - Astride Vicente (FCUL), Co-supervisor - Francisco Couto (FCUL)
- **Nikhil Awatade** - CFTR2Drugs - Using a Systems Approach to Identify the Mechanism of Action of Correctors, Supervisor - Margarida Amaral (FCUL), Co-supervisor - Rainer Pepperkok (EMBL) *
- **Paulo Costa** - Functional networks in which the DIS3 and DIS3L1 exosome subunits participate and their relevance in colorectal cancer, Supervisor - Luísa Romão (FCUL), Co-supervisor - Margarida Gama-Carvalho (FCUL)
- **Rita Catarino** - Functional studies of members of the matrix-plasma membrane-actin cytoskeleton continuum and responses to abiotic stress, Supervisor - Rui Malhó (FCUL), Co-supervisor - Patrick Hussey (Univ Durham) *
- **Sara Canato** - The ER quality control: Dissecting protein networks to identify drug targets for Cystic Fibrosis, Supervisor - Carlos Farinha (FCUL), Co-supervisor - André Falcão (FCUL)

BioSYS 2- Enrolled Students

- **Ana Marques** - Neuropsychiatric disease clustering in families with Autism Spectrum Disorder (ASD): genetic, epigenetic and environmental issues., Supervisor - Astride Vicente (FCUL), Co-supervisor - Luísa Romão (FCUL)
- **André Lamúrias** - Development of a Text Mining Approach to Disease Network Discovery, Supervisor - Francisco Couto (FCUL), Co-supervisor - Luka Clarke (FCUL)
- **Andreia Henriques** - Regulation of glucose uptake in mammalian cells by protein phosphorylation networks, Supervisor - Peter Jordan, Co-supr - Luka Clarke (FCUL)
- **Joana Silva** - Analysis of the translatome by ribosome profiling in colorectal cancer, Supervisor - Luísa Romão (FCUL), Co-supervisor - Augusto Luchessi (Univ. de Campinas) *
- **João Santos** - Nucleotide signalling in the regulation of CFTR trafficking and function, Supervisor - Carlos Farinha (FCUL), Co-supervisor - Manuela Zaccolo (Univ. de Oxford) *
- **Luís Sousa** - Role of CFTR in epithelial differentiation by functional genomics, Supervisor - Margarida Amaral (FCUL), Co-supervisor - Marc Chanson (Univ Geneva) *
- **Niccolò Rossi** - IdentifIcation and characterization of the cause of lipid metabolism disruption in patients with severe and unexplained familial dyslipidaemia, Supervisor - Mafalda Bourbon (FCUL), Co-supervisor - Cesar Martin (Univ País Vasco) *
- **Nuno Domingues** - sncRNA regulatory networks in T cell activation and viral response, Supervisor - Margarida Gama-Carvalho (FCUL), Co-supervisor - Francisco Pinto (FCUL)
- **Rui João Loureiro** - The aggregation mechanism of β 2-microglobulin in amyloid disease investigated through molecular simulations, Supervisor - Patrícia Faísca (FCUL), Co-supervisor - Eugene Shakhnovich (Univ Harvard) *
- **Rute Teixeira** - The role of sorting nexins and binding phosphoinositides in metabolite (ex)changes in tip growing cells., Supervisor - Rui Malhó (FCUL), Co-supervisor - Patrick Moreau (Univ Bordeaux) *
- **Samina Kausar** - An integrated systems approach to identify receptor and ion-channel binding networks in the Human brain, Supervisor - André Falcão (FCUL), Co-supervisor - Rita Mendes (Fac Farmácia - ULisboa)

*International / mixed scholarships

BioSYS 3- Enrolled Students

- **Daniel Cruz** - LMTK2 signalling in cystic fibrosis: an interactomics approach, Supervisor - Carlos Farinha (FCUL), Co-supervisor - Agnieszka Swiatecka-Urban (UPitt) *
- **Diana Pimentel** - Functional Genomics applied to the study of resistance against powdery mildew in grapevine, Supervisor - Ana Margarida Fortes (FCUL), Co-supervisor - Antonio Granell *
- **João Pedro Santos** - Gene-Environment interactions in Autism Spectrum Disorders (ASD), Supervisor - Astride Vicente (FCUL), Co-supervisor - Ana Nunes
- **Madalena Pinto** - Anoctamin 6 - A novel ion channel regulator with extended functions and significance in disease, Supervisor - Karl Kunzelmann (UReg/FCUL), Co-supervisor - Margarida Amaral (FCUL) *
- **Márcia Faria** - Targeting Rac1-signaling to enhance iodide-related therapy in breast cancer, Supervisor - Paulo Matos (FCUL), Co-supervisor - Rune Matthiesen (INSA)
- **Margarida Quaresma** - Role of CFTR in epithelial mesenchymal transition (EMT) by functional genomics, Supervisor - Margarida Amaral (FCUL), Co-supervisor - Jonas Fuxe (I Karolinska) *
- **Maria Teresa Braga** - Functional studies of plant cytoskeleton and membrane trafficking in responses to abiotic stress, Supervisor - Rui Malhó (FCUL), Co-supervisor - Patrick Hussey (Univ Durham) *
- **Mariana Romão** - S100 Proteins as novel modifiers of proteostasis in cancer and neurodegeneration, Supervisor - Cláudio Gomes (FCUL), Co-supervisor - Frederic Rousseau
- **Marina Luque** - A systems approach to the mechanisms of neurodegeneration, Supervisor - Margarida Gama-Carvalho (FCUL), Co-supervisor - Javier De Las Rivas (USalamanca) *
- **Marta Correia** - LiPID - Lipid profile ID - Identification of novel biomarkers to distinguish polygenic and monogenic dyslipidemia by a system biology approach, Supervisor - Mafalda Bourbon , Co-supervisor - Margarida Gama-Carvalho (FCUL)
- **Rafael Fernandes** - Regulation of nonsense-mediated mRNA decay (NMD) and the transcriptome: implications for physiology and myocardial infarction, Supervisor - Luísa Romão (FCUL), Co-supervisor - Mafalda Bourbon (FCUL)

BioSYS 4- Enrolled Students

- **Ana Rita Mendes Cavaco** - Lipid signaling in grapevine resistance against fungal pathogens, Supervisor - Andreia Figueiredo (FCUL), Co-supervisor - Ana Rita Matos (FCUL)
- **Filipa Simões** - Functional characterization of complexes regulating chloride and mucus transport and their significance in disease, Supervisor - Karl Kunzelmann, Co-supervisor - Margarida Amaral (FCUL) *
- **Flávio Soares** - Functional analysis of VviPAT6 and orthologous SlGRAS10: role in non-climacteric and climacteric fruit ripening, Supervisor - Ana Margarida Fortes (FCUL), Co-supervisor - Serge Delrot *
- **Gonçalo Nogueira** - The interplay between the mechanisms of PTC definition, mRNA translation, and NMD, Supervisor - Luísa Romão (FCUL), Co-supervisor - Francisco Pinto (FCUL)
- **Pedro Escudeiro** - Identification of biotechnological potential on genomic nonfunctionalized orthologs elements, Supervisor - Ricardo Dias (FCUL), Co-supervisor - Christopher Henry *
- **Joana Vilela** - Regulatory RNAs in Autism Spectrum Disorder – modulation of genomic variant effects on clinical phenotype and brain structure and function, Supervisor - Astrid Moura Vicente (FCUL), Co-supervisor - Guiomar Oliveira (U Coimbra)
- **Lúcia Santos** - CFTR orphan mutations in Cystic Fibrosis – towards a detailed understanding of disease mechanisms, Supervisor - Carlos M Farinha (FCUL), Co-supervisor - Patrick T Harrison *
- **Mariana Pinhão** - What are the determinants of human genetic individuality?, Supervisor - Francisco Couto (FCUL), Co-supervisor - Margarida Gama-Carvalho (FCUL)
- **Pedro Correia** - Feeding 10 Billion: building upon plant systems biology to understand grain productivity in a warming climate, Supervisor - Jorge Marques da Silva (FCUL), Co-supervisor - Elizabete Carmo-Silva
- **Rafael Graça** - Functional genomics in familial dyslipidaemia, Supervisor - Mafalda Bourbon (FCUL), Co-supervisor - Rainer Pepperkok (EMBL) *
- **Cartarina Pereira** - Systems-wide Identification of Cystic Fibrosis Disease Map, Supervisor - André Falcão (FCUL), Co-supervisor - Margarida Amaral (FCUL) and Alexander Mazein *

* International / mixed scholarships

BioISI Post-Doc programme

Hugo Martiniano

Sup: Luís Correia | Astrid Vicente

Bioinformatics | Biomedicine

Development and application of combined data mining/machine learning and systems biology approaches to multilevel data (demographic, life style, clinical, physiological, genetic) from cohorts of Autism Spectrum Disorder (ASD) patients, with the objective of understanding the biological processes underlying this pathology, predicting the effects of molecular perturbations and ultimately developing improved diagnostic tools and more efficient and personalized therapeutic targets.

Major Achievements

- Development of variant prioritization methods for sequencing data
- Development of machine learning-based analysis methods for Whole Exome/Whole Genome Sequencing Data

BioISI Projects involved:

- Data Mining of Genomic Data of ASD patients
- MedPerSyst

Ana Carapeto

Sup: Mário Rodrigues | Carlos Farinha | Cláudio Gomes

Bioinformatics | Biomedicine

Atomic force microscopy (AFM) is used to detect interactions of a ligand attached to the measuring tip with proteins present in cells, fixed to the surface. This setup is employed to the characterization of two distinct biological systems: a) CFTR interactions, in which we move from antibody-peptide antigen to antibody-CFTR domain and ultimately to specific interactions between CFTR and other proteins (NHERF1 and EPAC1); b) S100/Aβ amyloid interactions, in which we image supramolecular S100 protein and Aβ assemblies and determine a number of S100 – mediated interactions.
Addicionaly, AFM allows to obtain mechanical properties of cells and, in that context, we have studied the elasticity of human bronchial epithelial cells in interaction with different drugs.

Major Achievements

We optimized the process of functionalization of AFM tips with proteins
Technical conditions were optimized for the assessment of mechanical properties in human bronchial epithelial cells.
The obtained images demonstrate that AFM is a high-resolution imaging technique with vast potential to characterize protein topographies and to investigate protein self-assemblies, functional high order oligomers as well as pathologic aggregates and amyloids

BioISI Projects involved: Measuring protein interactions – insights into Cystic Fibrosis; Atomic Force Microscopy approaches to study protein self-assemblies and interactions

Jules Morand

Sup: Patrícia Faísca | Mário Rodrigues
Biomedicine | Biophysics

By using discrete molecular dynamics (DMD) simulations, we study folding transition and early aggregation stage of protein be-ta-2-microglobulin (b2m), associated with dialysis related amyloi-dosis. On the folding pathway towards the native conformation, the protein populates intermediate states, which may trigger the amyloid cascade. The population is modulated either by intrinsic or external factors.
In vivo, b2m aggregates in a confined collagen environ-ment. To mimic this effect we modified the DMD code, introduc-ing a box with reflective walls, and study its effect on the folding transition.
We also investigate the role of the disulphide bond in native state's stability. This bond, between residues 25 and 80, is bro-ken at low pH, suggesting the aggregation prone intermediate states.

Major Achievements

- Learn the DMD simulation code
- Learn replica-exchange molecular dynamics simulations
- Learn the weighted histogram analysis method to
- compute free energy profiles and surfaces
- Conduct several simulations for the different scenarios

BioISIProjects Involved: Condensed matter physics, bioinformatics and modelling and biomedicine

Catarina Baptista

Sup: Hugo M. Botelho | Helena M. Vieira
Biomedicine | Biotechnology

Cystic Fibrosis (CF) is the most common life-shortening rare disease, often characterized by severe respiratory impairment. CF is caused by mutations in the gene coding for the epithelial anion channel CFTR, most notably F508del, a mutation preventing traffic to the plasma membrane and occurring in ~85% of cases. The two only CFTR-targeting drugs afford modest lung function improvement for most eligible patients. In this project, we aim at improving CF pharmacotherapy by generating novel drug leads. By screening a diverse library of natural products of marine and terrestrial origin we validated 10 extracts which increase the traffic of F508del-CFTR or the alternative channel ANO1. Phenotypically-guided purification of active compounds as well as complementary functional studies are ongoing.

Major Achievements

- Screening of >3700 natural extracts from Portuguese marine and terrestrial ecosystems for CFTR and ANO1 modulation potential;
- Classification of 27 primary screen hit extracts regarding F508del-CFTR and ANO1 traffic enhancement and cellular toxicity;
- Establishment of the effective concentration range for the top 10 dual (CFTR and ANO1) modulator extracts in cellular models;
- Production upscaling, characterization and fractionation of the top 10 hit extracts;
- Identification of bioactive fractions regarding F508del-CFTR and ANO1 traffic enhancement.

BioISI Projects involved: "A new class of drugs for CF therapy - Dual CFTR/ANO1 Modulators from Portuguese natural products"

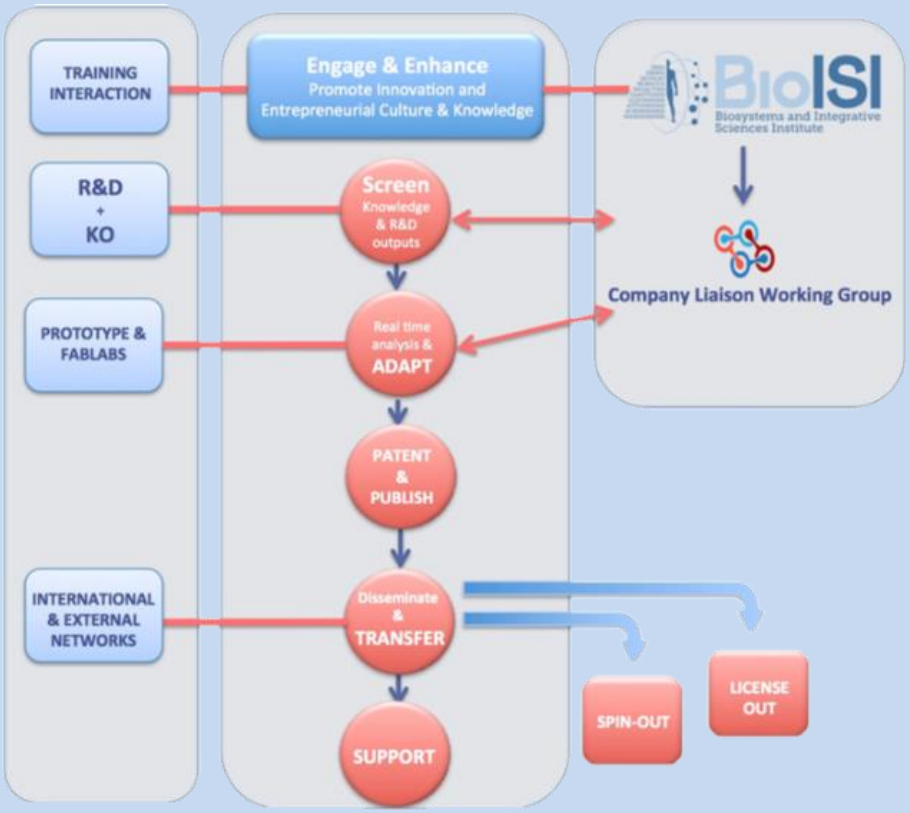
BioISI - KTT
Knowledge & Technology Transfer

BIOISI's team believes deeply in the concept of science contributing back to society. That is the principle behind the KTT concept of BIOISI – Knowledge & Technology Transfer. BioISI is actively engaged in developing its scientific and technological discoveries to benefit society, as indeed 25% of BioISI activities are on applied research. Thus, interacting with the socio-economic environment is an important BioISI aim.

To achieve such goal the centre has created the BioISI Company Liaison Working Group (CL-WG) which will help PIs to screen, develop and promote R&D knowledge outputs and support their market valorisation and industry interaction, given its privileged links to industry. A strategic KTT activities within the centre comprise, amongst other:

- internal and external awareness activities for the current KTT thematic realities, opportunities and challenges
- promote other activities, like service providing, contract R&D, project collaborations, Fablabs, etc, that can lead to economic valorisation of the knowledge outputs generated by the centre
- promote intergroup extended collaborations and strengthen international and external reach activities and outputs

The management of KTT within BioISI will be under the responsibility of each PI who will communicate on commercially valuable results to the UL-INOVAR, after which they will work closely with CL-WG and external IP experts to identify and develop all necessary steps for IP protection and commercial exploitation deals.



Communication and Outreach Workgroup

Workgroup Coordinator: Margarida Gama Carvalho

The main aim of the Communication and Outreach Workgroup is the promotion of scientific knowledge and its impact on society, making the public aware of the value of research for society and human well-being through the promotion of the public dissemination of BioISI's science

Major Achievements:

- **BioISI Website:** development of the new BioISI website.
- **Social Media:** investiment in social media comunication (Facebook and linkedin) to promote BioISI's visibility.
- **European Researcher's Night 2017:** continued participation.
- **Science and Technology Week:** continued participation with focus on the Biotechnology Thematic line, with the active participation of industry and community leaders. BioISI promoted the event "Wine with Science", for the third year.
- **Outreach publications:** leaflets, press-releases and support for BioISI researchers actively engaged in sicence writing.

Figure 1

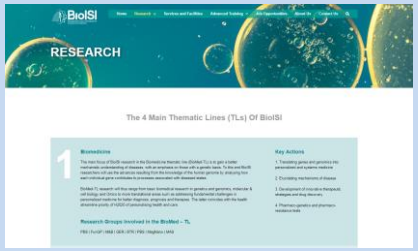


Figure 2

Figure 3

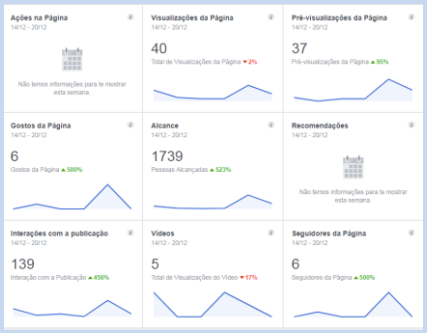


Figure 4

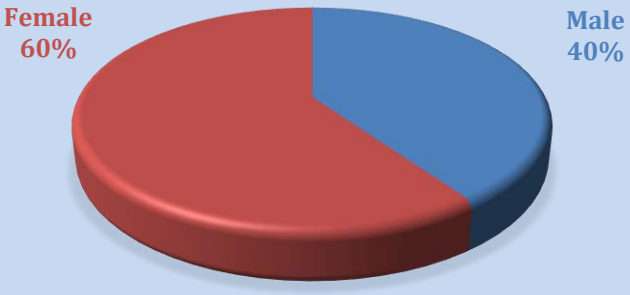
Figure 5

Figure 1: September 29th European Researcher's Night
Figure 2: The new BioISI Webpage
Figure 3: Leaflet Biotechnology at BioISI: 'Grape culture and Wine Science"
Figure 4: Key metrics for BioISI social media – Facebook page – (posts, reach and evolution of total likes for 2017
Figure 5: "Wines with Science" - Wine Tasting Event - Science and Technology Week

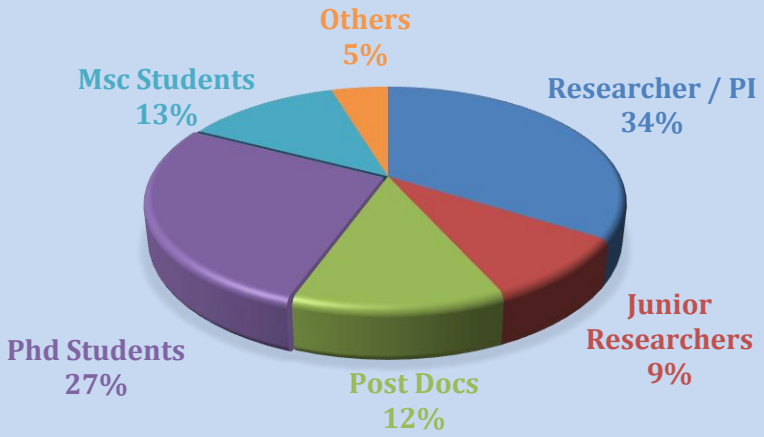
BioISI in Numbers

Members:

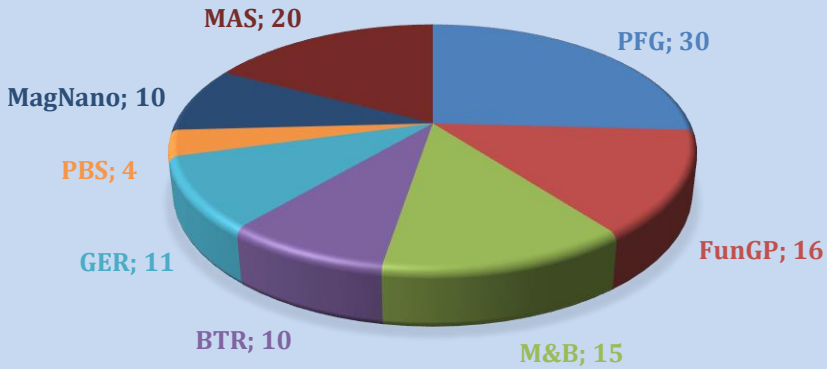
BioISI Gender Distribution

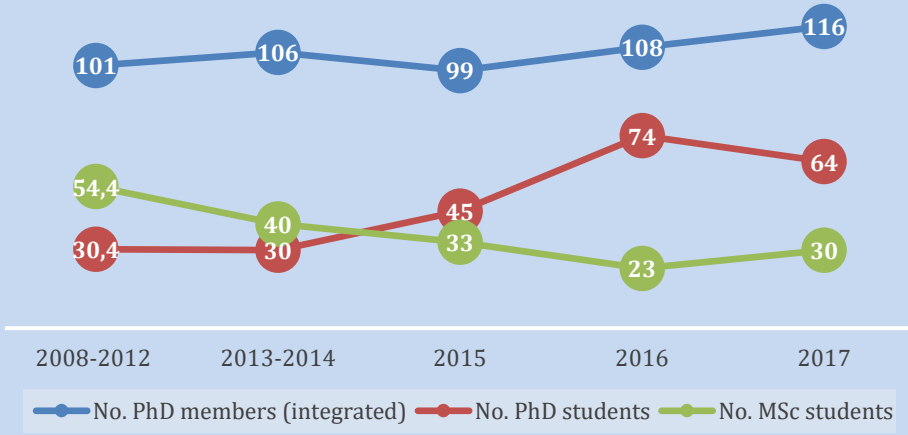


Bioisi Members per Position

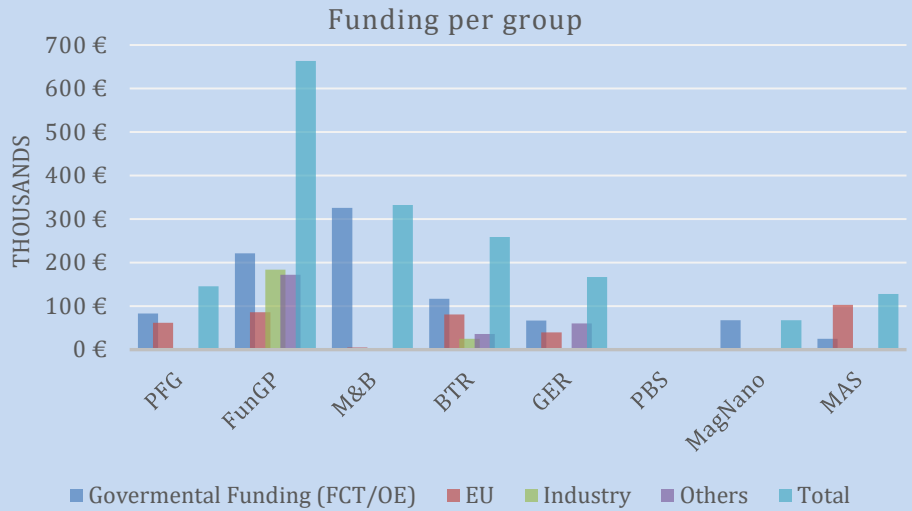


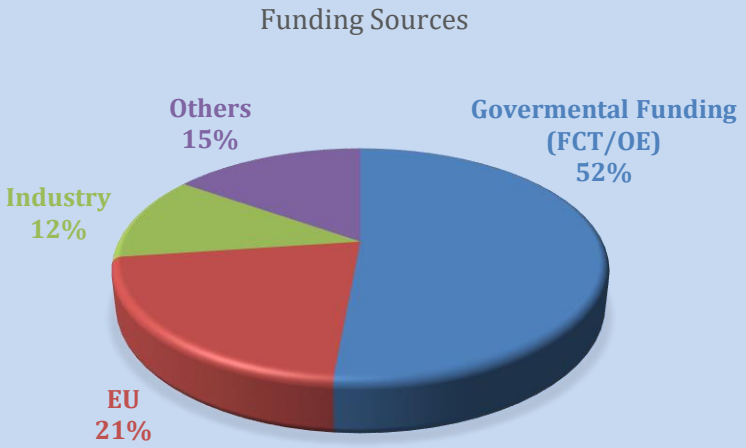
PhD Integrated Members per Group
Total 116



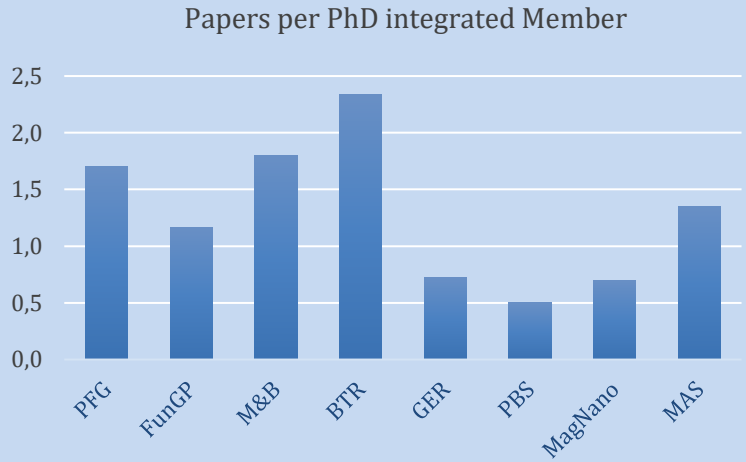


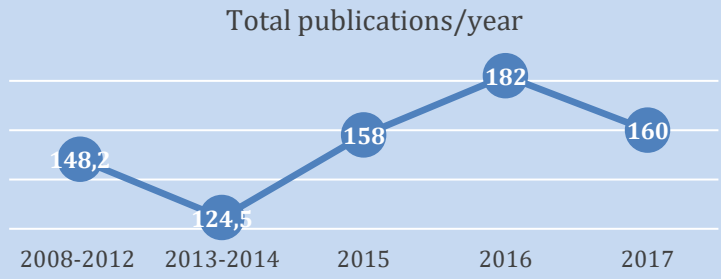
BioISI Funding in 2017

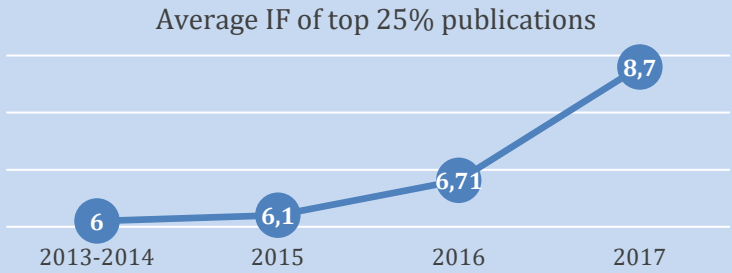




Bibliometrics







BioISI Publications

PFG Group

Adessi A, Cruz de Carvalho R, De Philippis R, Branquinho C, Marques da Silva J (2018) Microbial extracellular polymeric substances improve water retention in dryland biological soil crusts. Soil Biology and Biochemistry, 116, 67–69. https://doi.org/10.1016/j.soilbio.2017.10.002

Aires A, Carvalho R, Matos M,| Carnide V, Silva AP, Gonçalves B (2017) Variation of chemical constituents, antioxidant activity, and endogenous plant hormones throughout different ripening stages of highbush blueberry (Vaccinium corymbosum L.) cultivars produced in centre of Portugal. J Food Biochem, 41, e12414. doi.org/10.1111/jfbc.12414

Alexandra de Sousa, Hamada AbdElgawad, Asard Han, Ana Pinto, Cristiano Soares, Simão Branco-Neves, Teresa Braga, Manuel Azenha, Samy Selim, Soad Al Jaouni, Fernanda Fidalgo and Jorge Teixeira (2017) Metalaxyl Effects on Antioxidant 66 67 Defenses in Leaves and Roots of 68 69 Solanum nigrum L. Frontiers in Plant Science. Doi: 10.3389/fpls.2017.01967

Ana Margarida Fortes, Antonio Granell, Mario Pezzotti, Mondher Bouzayen. (2017) Molecular and Metabolic Mechanisms Associated with Fleshy Fruit Quality. . Frontiers in Plant Science. , 8, 1236. doi.org/10.3389/fpls.2017.01236

Branco Neves S, Soares C, de Sousa A, Martins V, Azenha M, Gerós H, Fidalgo F (2017) An efficient antioxidant system and heavy metal exclusion from leaves make Solanum cheemaniae more tolerant to Cu than its cultivated counterpart. Food and Energy Security , 6, 126-133. doi: 10.1002/fes3.114

Carvalho A, Pavia I, Fernandes C, Pires J, Correia C, Bacelar E, Moutinho-Pereira J, Maria João Gaspar M J, J, Silva M, José Luís Lousada J L, Lima-Brito J. (2017) Differential physiological and genetic responses of five European Scots pine provenances to induced water stress. Journal of Plant Physiology, Volume 215, Pages 100-109. ISSN 0176-1617, https://doi.org/10.1016/j.jplph.2017.05.027.

Carvalho A., Pavia I., Fernandes C., Pires J., Correia C., Bacelar E., Moutinho-Pereira J., Gaspar M.J., Bento J., Silva M.E., Lousada J.L., Lima-Brito J. (2017) Differential physiological and genetic responses of five European Scots pine provenances to induced water stress. Journal of Plant Physiology, 215, 100-109. 10.1016/j.jplph.2017.05.027

Carvalho C, Muñoz-Amatriaín M, Castro I, Lino-Neto T, Matos M, Egea-Cortines M, Rosa E, Close T, Carnide V (2017) Genetic diversity and structure of Iberian Peninsula cowpeas compared to worldwide cowpea accessions using high density SNP markers. BMC Genomics, 18, 891-899. 10.1186/s12864-017-4295-0

Carvalho M, Bebeli PJ, Pereira G, Castro I, Egea-Gilabert C, Matos M, Lazaridi E, Duarte I, Lino-Neto T, Ntatsi G, Rodrigues M, Savvas D, Rosa E, Carnidea (2017) European cowpea landraces for a more sustainable agriculture system and novel foods. J Sci Food Agric, 97(13), 4399-4407. Doi: 10.1002/jsfa.8378

Carvalho M, Lino-Neto T, Rosa E, Carnide V. (2017) Cowpea: a legume crop for a challenging environment. Journal of the Science of Food and Agriculture, 97, 4273–4284. Doi: 10.1002/jsfa.8250

Chaves I, Costa B, Rodrigues AS, Bohn A, Miguel CM. (2017) miRPursuit – a pipeline for automated analyses of small RNAs in model and non-model plants. FEBS Letters, 591, 2261-2268. 10.1002/1873-3468.12746

Cruz de Carvalho R, Catalá M, Branquinho C, Marques da Silva J, Barreno E. (2017) Dehydration rate determines the degree of membrane damage and desiccation tolerance in bryophytes. Physiologia Plantarum, 159, 277-289. DOI: 10.1111/ppl.12511

D. Wetzel-Gastal, F. Feitor, S. van Harten, M. Sebastiana, L. M. R. Sousa, L. A. Cardoso (2017) A genomic study on mammary gland acclimatization to tropical environment in the Holstein cattle. Tropical Animal Health Production, NA, 1-9. Doi: 10.1007/s11250-017-1420-7

Daniel Gaspar, Cândida Trindade , Ana Usié , Brígida Meireles, Pedro Barbosa, Ana M. Fortes, Cátia Pesquita, Rita L. Costa and António M. Ramos. (2017) Expression Profiling in Pinus pinaster in Response to Infection with the Pine Wood Nematode Bursaphelenchus xylophilus. Forests, 8, 279. Doi: 10.3390/f8080279

de Sousa A, AbdElgawad H, Asard H, Pinto A, Soares C, Branco-Neves S, Braga T, Azenha M, Selim S, Jaouni SA, Fidalgo F, Teixeira J (2017) Metalaxyl effects on antioxidant defenses in leaves and roots of Solanum nigrum L.. Frontiers on Plant Science, 8, 1967. Doi: 10.3389/fpls.2017.01967

Delgado A., Carvalho A., Martín A.C., Martín A., Lima-Brito J. (2017) Genomic reshuffling in

advanced lines of hexaploid tritordeum. Genetic Resources and Crop Evolution, 64(6), 1331–1353. Doi: 10.1007/s10722-016-0439-3

Delgado A., Carvalho A., Martín A.C., Martín A., Lima-Brito J. (2017) Genomic restructuring in F1 Hordeum chilense x durum wheat hybrids and corresponding hexaploid tritordeum lines revealed by DNA fingerprinting analyses. Journal of Genetics, 96, e13–e24. Doi:10.1007/s12041-017-0772-0

Diniz I, Figueiredo A, Loureiro A, Batista D, Azinheira H, Várzea V, Pereira AP, Gichuru E, Moncada P, Guerra-Guimarães L, Oliveira H, Silva MC. (2017) A first insight into the involvement of phytohormones pathways in coffee resistance and susceptibility to Colletotrichum kahawae. PLoS ONE, 12(5), e0178159. doi:10.1371/journal.pone.0178159

Duarte B, Cabrita MT, Gameiro C, Matos AR, Godinho R, Marques JC, Caçador I (2017) Disentangling the photochemical salinity tolerance in Aster tripolium L.: connecting biophysical traits with changes in fatty acid composition. Plant Biol (Stuttg), 19(2), 239-248. Doi:10.1111/plb.12517

Eduardo Feijão, Carla Gameiro, Marco Franzitta, Bernardo Duarte Isabel Caçador, Maria Teresa Cabrita, Ana Rita Matos (2017) Heat wave impacts on the model diatom Phaeodactylum tricornutum: Searching for photochemical and fatty acid biomarkers of thermal stress . Ecological Indicators, In Press, Corrected Proof, In Press, Corrected Proof. Doi: 10.1016/j.ecolind.2017.07.058

Esquível, M.G., Matos, A.R., Marques Silva, J. (2017) Rubisco mutants of Chlamydomonas reinhardtii display divergent photosynthetic parameters and lipid allocation. Applied Microbiology and Biotechnology, 101, Issue 13, 5569–5580. https://doi.org/10.1007/s00253-017-8322-5

Félix LM, Serafim C, Martins MJ, Valentim AM, Antunes LM, Matos M, Coimbra AM (2017) Morphological and behavioral responses of zebrafish after 24h of ketamine embryonic exposure. Toxicol Appl Pharmacol, 321, 27-36. 10.1016/j.taap.2017.02.013

Felix LM, Serafim C, Valentim AM, Antunes LM, Matos M, Coimbra AM (2017) Apoptosis-related genes induced in response to ketamine during early life stages of zebrafish. Toxicology Letters, 279, 1-8. 10.1016/j.toxlet.2017.07.888

Fernandes C, Gaspar M J, Pires J, Alves A, Simões R, Rodrigues J, Silva M, Carvalho A, Brito J, Lousada J L (2017) Physical, chemical and mechanical properties of Pinus sylvestris wood at five sites in Portugal. iForest - Biogeosciences and Forestry, 75, 511–526. . 10.1007/s00107-016-1130-2

Fernandes C., Gaspar M.J., Pires J., Silva M.E., Carvalho A., Lima-Brito J., Lousada J.L. (2017) Within and between-tree variation of wood density components in Pinus sylvestris at five sites in Portugal. European Journal of Wood and Wood Products, 75(4), 511-526. 10.1007/s00107-016-1130-2

Ferreira, MJ, Vale, D, Cunha L, Melo, P. (2017) Role of the C-terminal extension peptide of plastid located glutamine synthetase from Medicago truncatula: Crucial for enzyme activity and needless for protein import into the plastids. . Plant Physiology and Biochemistry, 111, 226-233. 10.1016/j.plaphy.2016.11.015

Figueiredo A, Martins J, Sebastiana M, Guerreiro A, Silva A, Matos AR, Monteiro F, Pais MS, Roepstorff P, Coelho AV (2017) Specific adjustments in grapevine leaf proteome discriminating resistant and susceptible grapevine genotypes to Plasmopara viticola. Journal of Proteomics, 152, 48–57. http://dx.doi.org/10.1016/j.jprot.2016.10.012

Figueiredo J, Maia M, Sousa Silva M, Figueiredo A (2017) Grapevine subtilase family: update on new sequences and nomenclature proposal. . Frontiers in Plant Science, 8, 716. doi: 10.3389/fpls.2017.00716

Figueiredo J, Sousa Silva M, Figueiredo A (2017) Subtilisin-like proteases in plant defence: the past, the present and beyond. Molecular Plant Pathology. Doi: 10.1111/mpp.12567

Fortes AM, Gallusci P. (2017) Plant stress responses and phenotypic plasticity in the Epigenomics era: perspectives on the grapevine scenario, a model for perennial crop plants. Frontiers in Plant Science, 8, 82. https://doi.org/10.3389/fpls.2017.00082

Gomes V., Fernandes A., Martins-Lopes P., Pereira L., Mendes Faia A., Melo-Pinto P. (2017) Characterization of neural network generalization in the determination of pH and anthocyanin content of wine grape in new vintages and varieties. Food Chemistry, 218, 30-46. Doi: 10.1016/j.foodchem.2016.09.024

Grimplet J, Diana Pimentel, Patricia Agudelo-Romero, José Miguel Martinez-Zapater, Fortes AM. (2017) The LOBs gene family in grapevine: genome-wide characterization and expression analyses during developmental processes and stress responses. Scientific Reports, 7, 15968. 10.1038/s41598-017-16240-5.

Haque MS, de Sousa A, Soares C, Kjaer KH, Fidalgo F, Rosenqvist E, Ottosen C-O (2017) Temperature variation under continuous light restores tomato leaf photosynthesis and maintains the diurnal pattern in stomatal conductance. Frontiers in Plant Science, 8, 1602. doi: 10.3389/fpls.2017.01602

Irene Gouvinhas, Nelson Machado, Carla Sobreira, Raúl Domínguez-Perles, J.L., Ramos, M.J.N., Cunha, J., Silva, H.G., Amâncio, S.,Costa, M.M.R., Rocheta (2017) VviAPRT3 and VviFSEX: Two Genes Involved in Sex Specification Able to Distinguish Different Flower Types in Vitis. . Front. Plant Sci., 8, 98. Doi.org/10.3389/fpls.2017.00098

Sónia Gomes, Eduardo Rosa, Ana I. R. N. A. Barros (2017) Critical Review on the Significance of Olive Phytochemicals in Plant Physiology and Human Health. Molecules, 22 (11), 35. 10.3390/molecules22111986

Marques da Silva J, Cruz S, Cartaxana P (2017) Inorganic carbon availability in benthic diatom communities: photosynthesis and migration. Philosophical Transactions of the Royal Society London B, 372, 20160398. http://dx.doi.org/10.1098/rstb.2016.0398

Marques da Silva, J. (2017) Apontamentos sobre a ideia de animal na ciência e na filosofia. Revista Jurídica Luso Brasileira , 6, 161 - 177.

Matos AC, Figueira L, Martins MH, Matos M, Álvares S, Mendes A, Pinto ML, Coelho AC (2017) Detection of Mycobacterium avium subsp paratuberculosis in kidney samples of red deer (Cervus elaphus) in Portugal: Evaluation of different methods. J Vet Med Sci, 79(3), 692-698. 10.1292/jvms.16-0153

Merelo P, Agustí J, Arbona V, Costa ML, Estornell LH, Gómez-Cadenas A, Coimbra S, Gómez MD, Pérez-Amador MA, Domingo C, Talón M and Tadeo FR. (2017) Cell Wall Remodeling in Abscission Zone Cells during Ethylene-Promoted Fruit Abscission in Citrus. Frontiers in Plant Science, 8, article 126. 10.3389/fpls.2017.00126

N. Mariz-Ponte, R.J. Mendes, S. Sario, J.M.P. Ferreira Oliveira, P. Melo, C. Santos (2018) Tomato plants use non-enzymatic antioxidant pathways to cope with moderate UV-A/B irradiation: a contribution to the use of UV-A/B in horticulture. Journal of plant physiology, 221, 32-42. 10.1016/j.jplph.2017.11.013

Pereira L., Gomes, S., Barrias S., Fernandes, J.R., Martins-Lopes, P. (2018) Applying high-resolution melting (HRM) technology to olive oil and wine authenticity. . Food Research International, 103, 170-181. 10.1016/j.foodres.2017.10.026

Pereira, L., Gomes, S., Castro, C., Eiras-Dias, J.E., Brazão, J., Graça, A., Fernandes, J.R., Martins-Lopes, P. (2017) High Resolution Melting (HRM) Applied to Wine Authenticity. . Food Chemistry, 216, 80-85. 10.1016/j.foodchem.2016.07.185

Quentin Gascuel, Gianfranco Diretto, Antonio J. Monforte, Ana Margarida Fortes, Antonio Granell. (2017) Use of natural diversity and biotechnology to increase the quality and nutritional content of tomato and grape. Frontiers in Plant Science, 8, 652. 10.3389/fpls.2017.00652

Ramos, M.J., Coito, J.L., Fino, J., Cunha, J., Silva, H., de Almeida, P.G., Costa, M.M., Amâncio, S., Paulo, O.S., Rocheta (2017) Deep analysis of wild Vitis flower transcriptome reveals unexplored genome regions associated with sex specification.. Plant Mol Biol, 93, 151-170. Doi: 10.1007/s11103-016-0553-9

Reis F, Pereira E, Tavares RM, Baptista P, Lino-Neto T (2017) Hypholoma fasciculare distribution in chestnut groves disturbs the ectomycorrhizal community. Revista de Ciências Agrárias, 7, 124-132. 10.19084/RCA15153

Reis F, Pereira E, Tavares RM, Baptista P, Lino-Neto T. (2017) Fungal community in chestnut orchards with different Hypholoma fasciculare aboveground abundance: potential implications for sustainable production. Revista de Ciências Agrárias, 140, 124-132 . 10.19084/RCA15153

Rita Teresa Teixeira, Ana Margarida Fortes, Hua Bai, Carla Pinheiro, Helena Pereira. (2017) Transcriptional profiling of cork oak phellogenic cells isolated by laser microdissection. . Planta, x, x. 10.1007/s00425-017-2786-5

Rodrigues AS, Miguel CM. (2017) The pivotal role of small non-coding RNAs in the regulation of seed development. Plant Cell Reports, 36, 653-667. DOI 10.1007/s00299-017-2120-5

Santos E, BenitoC, Silva-Navas J, Gallego FJ, Figueiras AM, Pinto-Carnide O, Matos M (2017) Characterization, genetic diversity, phylogenetic relationships, and expression of the aluminum tolerance MATE1 gene in Secale species. Biologia Plantarum, on line, 1-12. 10.1007/s10535-017-0749-0

Sebastiana M, Martins J, Figueiredo A, Monteiro F, Sardans J, Penuelas J, Silva A, Roepstorff P, Pais MS, Coelho AV (2017) Oak protein profile alterations upon root colonization by na ectomycorrhizal fungus. . Mycorrhiza, 27(2), 109-128. 10.1007/s00572-016-0734-z

Silva S, Silva P, Oliveira H, Gaivão I, Matos M, Pinto-Carnide O, Santos C (2017) Pb low doses induced genotoxicity in Lactuca sativa plants. . Plant Physiology and Biochemistry, 112, 109 -116. 10.1016/j.plaphy.2016.12.026

Sobral, R., Costa, M.M.R. (2017) Role of floral organ identity genes in the development of unisexual flowers of Quercus suber L. Scientific Reports, 7, 10368. 10.1038/s41598-017-10732-0

Teresa Dias, Casparus J. Crous, Dario Liberati, Silvana Munzi, Catarina Gouveia, Florian Ulm, Ana Catarina Afonso, Raúl Ochoa-Hueso, Esteban Manrique, Lucy Sheppard, Maria Amélia Martins-Loução, Anabela Bernardes da Silva, Cristina Cruz (2017) Alleviating Nitrogen Limitation in Mediterranean Maquis Vegetation Leads to Ecological Degradation. Land Degradation & Development, 28, 2482–2492. 10.1002/ldr.2784

FunGP Group

Ana M. Matos, Joana S. Cristóvão, Dmitry V. Yashunsky, Nikolay E. Nifantiev, Ana S. Viana, Cláudio M. Gomes, Amélia P. Rauter (2017) Synthesis and effects of flavonoid structure variation on amyloid-β aggregation. Pure and Applied Chemistry, 89(9), 1223-1378. https://doi.org/10.1515/pac-2017-0201

Beekman JM, Wang CM, Casati S, Tuggle KL, Gulmans VAM, Amaral M, De Boeck K (2017) Biobanking: towards increased access of biomaterials in cystic fibrosis. . J Cyst Fibros. Epub, 16(5), 616-621. 10.1016/j.jcf.2017.04.009

Benedetto R, Ousingsawat J, Wanitchakool P, Zhang Y, Holtzman MJ, Amaral MD, Rock JR, Schreiber R, Kunzelmann K (2017) Epithelial Chloride Transport by CFTR Requires TMEM16A. . Sci Rep, 7(1), 12397. 10.1038/s41598-017-10910-0

Bosch B, Bilton D, Sosnay P, Raraigh KS, Mak DY, Ishiguro H, Gulmans V, Thomas M, Cuppens H, Amaral M, De Boeck K (2017) Ethnicity impacts the cystic fibrosis diagnosis: A note of caution. . J Cyst Fibros., 16(4), 488-491. 10.1016/j.jcf.2017.01.016

Faria M, Matos P, Pereira T, Cabrera R, Cardoso BA, Bugalho MJ, Silva AL (2017) RAC1b overexpression stimulates proliferation and NF-kB-mediated anti-apoptotic signaling in thyroid cancer cells. PLoS One, 12, e0172689. doi: 10.1371/journal.pone.0172689

Farinha CM, Matos P (2017) Rab GTPases regulate the trafficking of channels and transporters - a focus on cystic fibrosis. . Small GTPases., 2, 1-9. 10.1080/21541248.2017.1317700

Farinha CM, Canato S (2017) From the endoplasmic reticulum to the plasma membrane: mechanisms of CFTR folding and trafficking. Cell Mol Life Sci. 74, 39-55. 10.1007/s00018-016-2387-7.

Farinha CM, Miller E, McCarty N (2017) Protein and lipid interactions - Modulating CFTR trafficking and rescue. J Cyst Fibrosis, S1569-1993, 30877-9. 10.1016/j.jcf.2017.08.014

Lamurias A, Clarke LA, Couto FM (2017) Extracting MicroRNA-Gene Relations from Biomedical Literature using Distant Supervision.. Plos ONE, 12, e0171929. https://doi.org/10.1371/journal.pone.0171929

Lamurias A, Ferreira JD, Clarke LA, Couto FM (2017) Generating a Tolerogenic Cell Therapy Knowledge Graph from Literature. Frontiers in Immunology, 8, 1656. 10.3389/fimmu.2017.01656

Lérias JR, Pinto MC, Botelho HM, Awatade NT, Quaresma M, Wanitchakool P, Schreiber R, Pepperkok P, Kunzelmann K, Amaral MD (2017) A Novel Microscopy-Based Assay Identifies Extended Synaptotagmin-1 (ESYT1) as a Regulator of Anoctamin 1 Traffic. . BBA- Mol Cell Res, 1865(2), 21-431. 10.1016/j.bbamcr.2017.11.009

Santos G, Barateiro A, Gomes CM, Brites D, Fernandes A (2017) Impaired oligodendrogenesis and myelination by elevated S100B levels during neurodevelopment. Neuropharmacology, 129, 69-83. 10.1016/j.neuropharm.2017.11.002

Zélia Gouveia, Ana R. Carlos, Xiaojing Yuan, Frederico Aires-da-Silva, Roland Stocker, Ghassan J. Maghzal, Sónia S. Leal, Cláudio M. Gomes, Smilja Todorovic, Olga Iranzo, Susana Ramos, Ana C. Santos, Iqbal Hamza, João Gonçalves, Miguel P. Soares (2017) Characterization of plasma labile heme in hemolytic conditions. FEBS Journal, 284(19), 3278-3301. 10.1111/febs.14192

Liu J, Bihler H, Farinha CM, Awatade NT, Romão AM, Mercadante D, Cheng Y, Musisi I, Jantarajit W, Wang Y, Cai Z, Amaral MD, Mense M, Sheppard DN (2017) Partial rescue of F508del-CFTR channel gating with modest improvement of protein processing, but not stability by a dual-acting small molecule. Br J Pharmacol. Accepted for publication.

M&B Group

Alves de Matos AP, Zé-Zé L, Amaro F, Alves MJ (2017) Ultrastructural and immunofluorescence studies of Zika infection.. Ultrastructural Pathology, 41, 105-106. 10.1080/01913123.2016.1270737

Amorim AF, Pinto D, Kuras L, Fernandes L. (2017) Absence of Gim proteins, but not GimC complex, alters stress-induced transcription. Biochim Biophys Acta, 1860, 773-781. 10.1016/j.bbagrm.2017.04.005

Andrade E, Gonçalves A, Mendes-Ferreira A, Silva V, Pinheiro V, Rodrigues M, Ferreira L (2017) A novel feedstuff: Ensiling of cowpea (Vigna unguiculata L.) stover and apple (Malus domestica Borkh.) mixtures. Evaluation of the nutritive value, fermentation quality and aerobic stability. Journal of the Science of Food and Agriculture, 97 (13), 4306-4313. 10.1002/jsfa.8307

B Silva, A Nunes, R Rocha, L Vieira, DA Sampaio, R Dias & M Oleastro (2017) The expression of

Helicobater pylori plasticity zone tfs cluster is regulated by pH and adherence and its composition is associated with differential gastric IL-8 secretion. Helicobacter, e12390. http://doi.org/10.1111/hel.12390

Bandara AR, Karunarathna SC, Phillips AJL, Mortimer PE, Xu J, Kakumyan P, Hyde KD (2017) Diversity of Auricularia (Auriculariaceae, Auriculariales) in Thailand. Phytotaxa, 292, 19-34. http://dx.doi.org/10.11646/phytotaxa.292.1.2

Barradas C, Pinto G, Correia B, Castro BB, Phillips AJL, Alves A (2017) Drought × disease interaction in Eucalyptus globulus under Neofusicoccum eucalyptorum infection. Plant Pathology. Doi: 10.1111/ppa.12703

Dissanayake AJ, Phillips AJL, Hyde KD, Yan JY, Li XH (2017) The current status of species in Diaporthe. Mycosphere, 8, 1106-1156. Doi 10.5943/mycosphere/8/5/5

Ekanayaka AH, Ariyawansa HA, Hyde KD, Jones EBG, Daranagama DA, Phillips AJL, Hongsanan S, Jayasiri SC, Zhao Q (2017) DISCOMYCETES: the apothecial representatives of the phylum Ascomycota. Fungal Diversity, Not yet available, Not yet avalable. DOI 10.1007/s13225-017-0389-x

Ferreira AC, de Sá MI, Dias R & Tenreiro R (2017) MLVA-16 typing of Brucella suis biovar 2 strains circulating in Europe . Vet Microbiol , 210, 77-82. doi: 10.1016/j.vetmic.2017.09.001

Ferreira AC, Tenreiro R, de Sá MI & Dias R (2017) Evolution and genome specialization of Brucella suis biovar 2 Iberian Lineages. BMC Genomics , 12;18(1), 726. DOI 10.1186/s12864-017-4113-8

Isabel Seixas, Catarina Barbosa, Sara B Salazar, Arlete Mendes-Faia, Yu Wang, Ulrich Güldener, Ana Mendes-Ferreira and Nuno P. Mira (2017) Genome sequence of the non-conventional wine yeast Hanseniaspora guilliermondii UTAD222.. Genome Announc, 5(5), e01515-16. 10.1128/genomeA.01515-16

Julia A. Kreß, Kay-Martin O. Hanschmann, Michael Chudy & the Collaborative Study Group (2017) Collaborative Study to Evaluate a Candidate World Health Organization International Standard for Chikungunya Virus for Nucleic Acid Amplification Technique (NAT)-Based Assays. EXPERT COMMITTEE ON BIOLOGICAL STANDARDIZATION Geneva, 17 to 20 October 2017, WHO/BS/2017.2330, WHO/BS/2017.2330. www.who.int

Liu J-K, Hyde KD, Jeewon R, Phillips AJL, Maharachchikumbura SSN, Ryberg M, Liu Z-Y, Zhao Q (2017)). Ranking higher taxa using divergence times: a case study in Dothideomycetes. Fungal Diversity, 84, 75-99. doi:10.1007/s13225-017-0385-1

Lopes A, Phillips AJL, Alves A (2017) Mating type genes in the genus Neofusicoccum: Mating strategies and usefulness in species delimitation. Fungal Biology, 121, 394-404. http://dx.doi.org/10.1016/j.funbio.2016.08.011

Nalin N. WijayawardeneKevin D. HydeKunhiraman C. RajeshkumarDavid L. HawksworthHugo MadridPaul M. KirkUwe BraunRajshree V. SinghPedro W. CrousMartin KukwaRobert LückingCletus P. KurtzmanAndrey YurkovDanny HaelewatersAndré AptrootH. Thorsten LumbschEinar TimdalDamien ErtzJavier EtayoAlan J. L. PhillipsJohannes Z. GroenewaldMoslem PapizadehLaura SelbmannMonika C. DayarathneGothamie WeerakoonE. B. Gareth JonesSatinee SuetrongQing TianRafael F. Castañeda-RuizAli H. BahkaliKa-Lai PangKazuaki TanakaDong Qin DaiJariya SakayarojMartina HujslováLorenzo LombardBelle D. ShenoyAve SuijaSajeewa S. N. MaharachchikumburaKasun M. ThambugalaDhanushka N. WanasingheBharati O. SharmaSubhash GaikwadGargee PanditLaura ZucconiSilvano OnofriEleonora EgidiHuzefa A. RajaRampai KodsuebMarcela E. S. CáceresSergio Pérez-OrtegaPatrícia O. FiuzaJosiane Santana MonteiroLarissa N. VasilyevaRoger G. ShivasMaria PrietoMats WedinIbai OlariagaAdebola Azeez LateefYamini AgrawalSeyed Abolhassan Shahzadeh FazeliMohammad Ali AmoozegarGuo Zhu ZhaoWalter P. PflieglerGunjan SharmaMagdalena OsetMohamed A. Abdel-WahabSusumu TakamatsuKonstanze BenschNimali Indeewari de SilvaAndré De KeselAnuruddha KarunarathnaSaranyaphat BoonmeeDonald H. PfisterYong-Zhong LuZong-Long LuoNattawut BoonyuenDinushani A. DaranagamaIndunil C. SenanayakeSubashini C. JayasiriMilan C. SamarakoonXiang-Yu ZengMingkwan DoilomLuis QuijadaSillma RampadarathGabriela HerediaAsha J. DissanayakeRuvishika S. JayawardanaRekhani H. PereraLi Zhou TangChayanard PhukhamsakdaMargarita Hernández-RestrepoXiaoya MaSaowaluck TibprommaLuis F. P. GusmaoDarshani WeerahewaSamantha C. Karunarathna (2017) Notes for genera: Ascomycota. Fungal Diversity, 86, 1-594. DOI 10.1007/s13225-017-0386-0

Paulo CO, Zé-Zé L, Jordão S, Pena ER, Neves I, Alves MJ (2017) Dengue virus serotype 3 and Chikungunya virus co-infection in a traveller returning from India to Portugal, November 2016. IDCases, 9, 30-33. https://doi.org/10.1016/j.idcr.2017.03.015

Santos L, Phillips AJL, Crous P, Alves A (2017) Diaporthe species on Rosaceae with descriptions of D. pyracanthae sp. nov. and D. malorum sp. nov.. Mycosphere, 8, 485-511. Doi 10.5943/mycosphere/8/5/2

Senanayake C, Crous PW, Groenewald JZ, Maharachchikumbura SSN, Jeewon R, Phillips AJL, Bhat DJ, Perera RH, Li QR, Li WJ, Tangthirasunun N, Norphanphoun C, Karunarathna SC, Camporesi E, Manawasighe IS, Al-Sadi AM, Hyde KD (2017) Families of Diaporthales based on morphological and phylogenetic evidence.. Studies in Mycology, 86, 217-296. http://dx.doi.org/10.1016/j.simyco.2017.07.003

Sequeira SO, Laiad SAT, Phillips AJL, Cabrita EJ, Macedo MF (2017) Clotrimazole and calcium hydroxide nanoparticles: A low toxicity antifungal alternative for paper conservation. . Journal of Cultural Heritage, 24, 45-52. https://doi.org/10.1016/j.culher.2016.12.004

Sequeira SO, Phillips AJL, Cabrita EJ, Macedo MF (2017) Antifungal treatment of paper with calcium propionate and parabens: Short-term and long-term effects. . International Biodeterioration & Biodegradation, 120, 203-215. https://doi.org/10.1016/j.ibiod.2017.03.005

Smahi H, Belhoucine-Guezouli L, Berraf-Tebbal A, Chouih S, Arkam M, Franceschini A, Linaldeddu BT, Phillips AJL (2017) Molecular characterization and pathogenicity of Diplodia corticola and other Botryosphaeriaceae species associated with canker and dieback of Quercus suber in Algeria. . Mycosphere, 8, 1261-1272. Doi 10.5943/mycosphere/8/2/10

Thambugala KM, Daranagama DA, Phillips AJL, Bulgakov TS, Bhat DJ, Camporesi E, Bahkali AH, Eungwanichayapant PD, Liu Z-Y, Hyde KD (2017) Microfungi on Tamarix. . Fungal Diversity, 82, 239-306. DOI 10.1007/s13225-016-0371-z

Thambugala KM, Wanasinghe DN, Phillips AJL, Camporesi E, Bulgakov TS, Phukhamsakda C, Ariyawansa HA, Goonasekara ID, Phookamsak R, Dissanayake A, Tennakoon DS, Tibpromma S, Chen YY, Liu ZY, Hyde KD (2017) Mycosphere notes 1-50: Grass (Poaceae) inhabiting Dothideomycetes. . Mycosphere, 8, 697-796. Doi 10.5943/mycosphere/8/4/13

Tibpromma S et al. (2017) Fungal diversity notes 491–602: taxonomic and phylogenetic contributions to fungal taxa. . Fungal Diversity, 83, 1-261. DOI 10.1007/s13225-017-0378-0

Wanasinghe DN, Hyde KD, Jeewon R, Crous PW, Wijayawardene NN, Jones EBG, Bhat DJ, Phillips AJL, Groenewald JZ, Dayarathne MC, Phukhamsakda C, Thambugala KM, Bulgakov TS, Camporesi E, Gafforov YS, Mortimer PE, Karunarathna SC (2017) Phylogenetic revision of Camarosporium (Pleosporineae, Dothideomycetes) and allied genera.. Studies in Mycology, 87, 207-256. ; http://dx.doi.org/10.1016/j.simyco.2017.08.001.

Wijayawardene NN, Papizadeh M, Phillips AJL, Wanasinghe DN, Bhat DJ, Weerahewa HLD, Shenoy BD, Wang Y, Huang YQ (2017) Mycosphere Essays 19: Recent advances and future challenges in taxonomy of coelomycetous fungi. . Mycosphere, 8, 934-950. Doi10.5943/mycosphere/8/7/9

Yan JY, Zhao WS, Chen Z, Xing QK, Zhang W, Chethana KWT, Xue MF, Xu JP, Phillips AJL, Wang Y, Liu JH, Liu M, Zhou Y, Jayawardena RS, Manawasinghe IS, Huang JB, Qiao Gh, Fu CY, Guo FF, Dissanayake AJ, Peng YL, Hyde KD, Li XH (2017) Comparative genome and transcriptome analyses reveal adaptations to opportunistic infections in woody plant degrading pathogens of Botryosphaeriaceae. DNA Research. doi: 10.1093/dnares/dsx040

BTR Group

Autism Spectrum Disorders Working Group of The Psychiatric Genomics Consortium (2017) Meta-analysis of GWAS of over 16,000 individuals with autism spectrum disorder highlights a novel locus at 10q24.32 and a significant overlap with schizophrenia. Molecular Autism, Volume: 8, 9-17. 10.1186/s13229-017-0137-9

Bañares VG, Corral P, Medeiros AM, Araujo MB, Lozada A, Bustamante J, Cerretini R, López G, Bourbon M, Shreider L. (2017) Preliminary spectrum of genetic variants in familial hypercholesterolemia in Argentina. Journal of Clinical Lipidology 2017, Mar - Apr; 11(2):, 524-531. 10.1016/j.jacl.2017.02.007.

Bourbon M, Alves AC, Alonso R, Mata N, Aguiar P, Padró T, Mata P. . (2017) Mutational analysis and genotype-phenotype relation in familial hypercholesterolemia: The SAFEHEART registry. Atherosclerosis 2017, Jul; 262: , 8-13.. 10.1016/j.atherosclerosis.2017.04.002

Bourbon M, Alves AC, Sijbrands EJ. . (2017) Low-density lipoprotein receptor mutational analysis in diagnosis of familial hypercholesterolemia. Curr Opin Lipidol. 2017, Apr;28(2):, 120-129. 10.1097/MOL.0000000000000404

Caroça C, de Matos TM, Ribeiro D, Lourenço V, Martins T, Campelo P, Fialho G, Silva SN, Paço J, Caria H (2016) Genetic Basis of Nonsyndromic Sensorineural Hearing Loss in the Sub-Saharan African Island Population of São Tomé and Príncipe: The Role of the DFNB1 Locus? . OMICS, 20(8), 449-455. doi: 10.1089/omi.2016.0067.PMID: 27501294

Caroça, C., de Lima, J.P., Campelo, P., Carolino, E., Caria, H., Paço, J., Silva, S.N. (2016) Sickle Cell Trait, Malaria and Sensorineural Hearing Loss–A Case-Control Study from São Tomé and Príncipe. Otolaryngology, 6(6), 1-7. doi: 10.4172/2161-119X.1000278

Caroça, Cristina; Campelo, Paula; Caria, Helena; Paço, João and Silva, Susana N (2017) G6PD Variants, Malaria and Sensorineural Hearing Loss in São Tomé and Príncipe: A Case-Control Study. International Journal of Medical Research & Health Sciences, 6(6), 8-16. ISSN No: 2319-5886

Caroça, C.; Vicente,V.; Campelo,P.; Chasqueira, M.; Caria, H; Silva, S.; Paixão, P. and Paço,J (2017) Rubella in Sub-Saharan Africa and sensorineural hearing loss: a case control study. BMC Public Health, 17, 146-153. doi: 10.1186/s12889-017-4077-2

Chora JR, Alves AC, Medeiros AM, Mariano C, Lobarinhas G, Guerra A, Mansilha H, Cortez-Pinto H, Bourbon M. (2017) Lysosomal acid lipase deficiency: A hidden disease among cohorts of familial hypercholesterolemia?. Journal of Clinical Lipidology 2017, Mar - Apr;11(2):, 477-484.e2. 10.1016/j.jacl.2016.11.002.

Chora, J. R., Medeiros, A. M., Alves, A. C. & Bourbon, M. (2017) Analysis of publicly available LDLR, APOB, and PCSK9 variants associated with familial hypercholesterolemia: application of ACMG guidelines and implications for familial hypercholesterolemia diagnosis. . Genet. Med. 2017. 0, 0. doi:10.1038/gim.2017.151

Conceição IC, Rama MM, Oliveira B, Café C, Almeida J, Mouga S, Duque F, Oliveira G, Vicente AM (2017) Definition of a putative pathological region in PARK2 associated with autism spectrum disorder through in silico analysis of its functional structure. Psychiatric Genetics, Volume: 27 Edição: 2 , 54-61. 10.1097/YPG.0000000000000159

David S, Aguiar P, Antunes L, Dias A, Morais A, Sakuntabhai A, Lavinha J (2017) Variants in the non-coding region of the TLR2 gene associated with infectious subphenotypes in pediatric sickle cell anemia.. Immunogenetics, na, na. doi: 10.1007/s00251-017-1013-7

David S, Correia V, Antunes L, Faria R, Ferrão J, Faustino P, Nunes B, Maltez F, Lavinha J, Rebelo de Andrade H (2017) Population genetics of IFITM3 in Portugal and Central Africa reveals a potential modifier of influenza severity. . Immunogenetics. doi: 10.1007/s00251-017-1026-2

Ferrão J, Silva M, Gonçalves L, Gomes S, Loureiro P, Coelho A, Miranda A, Seuanes F, Reis AB, Pina F, Maia R, Kjöllerström P, Monteiro E, Lacerda JF, Lavinha J, Gonçalves J, Faustino P (2017) Widening the spectrum of deletions and molecular mechanisms underlying alpha-thalassemia. . Annals of Hematology, 96, 1921-1929. doi: 10.1007/s00277-017-3090-y

Fialho, G (2017) Biomarkers of Presbycusis and Tinnitus in a Portuguese Older Population. Front. Aging Neurosci. , 9, 346. doi: 10.3389/fnagi.2017.00346

Fletcher-Watson S, Apicella F, Auyeung B, Beranova S, Bonnet-Brilhault F, Canal-Bedia R, Charman T, Chericoni N, Conceição IC, Davies K, Farroni T, Gomot M, Jones E, Kaale A, Kapica K, Kawa R, Kylliäinen A, Larsen K, Lefort-Besnard J, Malvy J, Manso de Dios S, Markovska-Simoska S, Millo I, Miranda N, Pasco G, Pisula E, Raleva M, Rogé B, Salomone E, Schjolberg S, Tomalski P, Vicente AM, Yirmiya N (2017) Attitudes of the autism community to early autism research. Autism, Volume: 21 , 61-74. DOI: 10.1177/1362361315626577

Fraga B, Firmino-Machado J, Borges M, Almeida C, Mota-Vieira L, Peixoto-Rebelo F (2017) Associação dos distúrbios do sono com variáveis sociodemográficas e escolares em crianças açorianas: estudo transversal numa população de alunos do ensino primário. MGF & Ciência, 1, 72-81.

Frigi S, Mota-Vieira L, Cherni L, van Oven M, Pires R, Boussetta S, El-Gaaied ABA (2017) Mitochondrial DNA analysis of Tunisians reveals a mosaic genetic structure with recent population expansion.. Homo, 68, 298-315. 10.1016/j.jchb.2017.05.003

Gonçalves, AC; Santos,R; O'Neill,A; Escada,P; Fialho,G and Caria,H (2016) Further characterisation of the recently described SLC26A4 c.918+2T > C mutation and reporting of a novel variant predicted to be damaging. ACTA otorhinolaryngologica italica doi: 10.14639/0392-100X-889 , 36:, 233-238. doi: 10.14639/0392-100X-889

Guiomar R, Pereira da Silva S, Conde P, Cristóvão P, Maia AC, Pechirra P, Rodrigues AP, Nunes B; Portuguese Laboratory Network for the Diagnosis of Influenza Infection, Milho L, Coelho AP, Fernandes A, Caseiro P, Rodrigues F, Correia L, Pereira-Vaz J, Almeida S, Branquinho P, Côrte-Real R, Viseu R, Peres MJ, Sanches R, Dantas F, Freitas L, Andrade G, Maurílio M, Caldeira F, Cabral Veloso R, Mota-Vieira L, Soares M, Couto AR, Bruges-Armas J, Pinto RM, Sobrinho Simões J, Costa MDR, Guimarães JT, Martins L, Cunha M. (2017) Cross-protection to new drifted influenza A(H3) viruses and prevalence of protective antibodies to seasonal influenza, during 2014 in Portugal. Vaccine, 35, 2092-2099. 10.1016/j.vaccine.2017.02.019

Haider,HF; Hoare,DJ; Costa,PD; Potgieter,I.; Kikidis,D.; Lapira,A.; Nikitas,C.; Caria,H.; T. Cunha,N. and Paço,JC. (2017) Pathophysiology, Diagnosis and Treatment of Somatosensory Tinnitus: A Scoping Review. . Front. Neurosci. , 11, 207. doi: 10.3389/fnins.2017.00207

Lima-Martínez MM, Paoli M, Vázquez-Cárdenas A, Magaña-Torres MT, Guevara O, Muñoz MC, Parrilla-Alvarez A, Márquez Y, Medeiros A, Bourbon M. (2017) Frequency and clinical and molecular aspects of familial hypercholesterolemia in an endocrinology unit in Ciudad Bolívar, Venezuela. . Endocrinol Diabetes Nutr. 2017, Oct; 64(8):, 432-439. . doi: 10.1016/j.endinu.2017.05.007.

Rannikmäe K, Sivakumaran V, Millar H, Malik R, Anderson CD, Chong M, Dave T, Falcone GJ, Fernandez-Cadenas I, Jimenez-Conde J, Lindgren A, Montaner J, O'Donnell M, Paré G, Radmanesh F, Rost NS, Slowik A, Söderholm M, Traylor M, Pulit SL, Seshadri S, Worrall BB, Woo D, Markus HS1, Mitchell BD, Dichgans M, Rosand J, Sudlow CLM; Stroke Genetics Network (SiGN), METASTROKE Collaboration, and International Stroke Genetics Consortium (ISGC). (2017) COL4A2 is associated with lacunar ischemic stroke and deep ICH: Meta-analyses among 21,500 cases and 40,600 controls. NEUROLOGY, vol. 89 no. 17 , 1829-1839.
https://doi.org/10.1212/WNL.0000000000004560

Rasga, Célia; Vicente, Astrid M. (2017) O que acontece quando as crianças com autismo crescem? Um estudo exploratório. Boletim Epidemiológico Observações, 6 (Supl 9), 24-28.
Santos RD, Bourbon M, Alonso R, Cuevas A, Vasques-Cardenas NA, Pereira AC, Merchan A, Alves AC, Medeiros AM, Jannes CE, Krieger JE, Schreier L, Perez de Isla L, Magaña-Torres MT, Stoll M, Mata N, Dell Oca N, Corral P, Asenjo S, Bañares VG, Reyes X, Mata P; (2017) Clinical and molecular aspects of familial hypercholesterolemia in Ibero-American countries. . Journal of Clinical Lipidology 2017 , Jan - Feb;11(1), 160-166. doi: 10.1016/j.jacl.2016.11.004.

Santos, João Xavier; Rasga, Célia; Marques, Ana Rita; Asif, Muhammad; Vicente, Astrid M. (2017) Interações gene-ambiente na perturbação do espetro do autismo. Boletim Epidemiológico Observações, 6 (Supl 9), 29-33.

Seys E, Andrini O, Keck M, Mansour-Hendili L, Courand PY, Simian C, Deschenes G, Kwon T, Bertholet-Thomas A, Bobrie G, Borde JS, Bourdat-Michel G, Decramer S, Cailliez M, Krug P, Cozette P, Delbet JD, Dubourg L, Chaveau D, Fila M, Jourde-Chiche N, Knebelmann B, Lavocat MP, Lemoine S, Djeddi D, Llanas B, Louillet F, Merieau E, Mileva M, Mota-Vieira L, Mousson C, Nobili F, Novo R, Roussey-Kesler G, Vrillon I, Walsh SB, Teulon J, Blanchard A, Vargas-Poussou R. (2017) Clinical and Genetic Spectrum of Bartter Syndrome Type 3. J Am Soc Nephrol, 28, 2540-2552. 10.1681/ASN.2016101057

Weiner DJ, Wigdor EM, Ripke S, Walters RK, Kosmicki JA, Grove J, Samocha KE, Goldstein JI, Okbay A,Bybjerg-Grauholm J, Werge T, Hougaard DM, Taylor J; iPSYCH-Broad Autism Group;Psychiatric Genomics Consortium Autism Group, Skuse D, Devlin B, Anney R, Sanders SJ, Bishop S, Mortensen PB, Børglum AD, Smith GD, Daly MJ, Robinson EB (2017) Polygenic transmission disequilibrium confirms that common and rare variation act additively to create risk for autism spectrum disorders. Nature Genetics, Volume: 49. Edição: 7, 978-985. 0.1038/ng.3863

GER Group

Amaral AJ, Andrade J, Foxall RB, Matoso P, Matos AM, Soares RS, Rocha C, Ramos CG, Tendeiro R, Serra-Caetano A, Guerra-Assunção JA, Santa-Marta M, Gonçalves J, Gama-Carvalho M, Sousa AE (2017) miRNA profiling of human naive CD4 T cells links miR-34c-5p to cell activation and HIV replication. EMBO J.36, 346-360. 10.15252/embj.201694335

Camelo C, Vilas-Boas F, Cepeda AP, Real C, Barros-Martins J, Pinto F, Soares H, Marinho HS, Cyrne L. (2017) Opi1p translocation to the nucleus is regulated by hydrogen peroxide in Saccharomyces cerevisiae.. Yeast, 34, 383-395. 10.1002/yea.3240

da Costa PJ, Menezes J, Romão L (2017) The role of alternative splicing coupled to nonsense-mediated mRNA decay in human disease. Int J Biochem Cell Biol, 91, 168-175. 10.1016/j.biocel.2017.07.013

Gama-Carvalho M, L Garcia-Vaquero M, R Pinto F, Besse F, Weis J, Voigt A, Schulz JB, De Las Rivas J. (2017) Linking amyotrophic lateral sclerosis and spinal muscular atrophy through RNA-transcriptome homeostasis: a genomics perspective. J Neurochem, 141, 12–30. 10.1111/jnc.13945
Gomes-Duarte A, Lacerda R, Menezes J, Romão L (2017) eIF3: a factor for human health and disease. RNA Biology, 3, 1-9. 10.1080/15476286.2017.1391437

Marques-Ramos A, Candeias MM, Menezes J, Lacerda R, Willcocks M, Teixeira A, Locker N, Romão L (2017) Cap-independent translation ensures mTOR expression and function upon protein synthesis inhibition. RNA, 23, 1712-1728. 10.1261/rna.063040.117

Menezes J, Ventura C, Matos Costa J, Parreira E, Romão L, Gonçalves J (2017) PROS1 novel splice site variant decreases protein S expression in patients from two families with thrombotic disease. Clinical Case Reports, 5, 2062-2065. 10.1002/ccr3.1226

Raquel Chaves, Daniela Ferreira, Ana Mendes-da-Silva, Susana Meles, Filomena Adega (2017) FA-SAT Is an Old Satellite DNA Frozen in Several Bilateria Genomes, Genome Biology and Evolution. Genome Biology and Evolution, 9, 3073–3087. 10.1093/gbe/evx212

PBS Group

B.J.C. Cabral (2017) Dynamics, magnetic properties, and electron binding energies of H2O2 in water. Journal of Chemical Physics, 146, 234-502. 10.1063/1.4985667

Rui JS Loureiro, Diogo V Viçosa, Miguel Machuqueiro, Eugene Shakhnovich, Patricia FN Faísca (2017) A tale of two tails: The importance of unstructured termini in the aggregation pathways of beta-2-microglobulin. Proteins: Structure, Function and Bioinformatics, 85, 2045-2057. 10.1002/prot.25358

MagNano Group

Alichandra Castro, Jacobo Morère, Albertina Cabañas, Liliana P. Ferreira, Margarida Godinho, Paula Ferreira and Paula M. Vilarinho (2017) Designing nanocomposites using supercritical CO2 to insert Ni nanoparticles into the pores of nanopatterned BaTiO3 thin films. J. Mater. Chem. C, 5, 1083-1089. 10.1039/C6TC04232E

J. P. Santos, F. Parente, M. C. Martins, P. Indelicato, E. M. Benis, T. J. M. Zouros, and J. P. Marques (2017) Radiative transition rates of 1s2s(3S)3p levels for Li-like ions with $5 \leq Z \leq 10$. Nucl. Instrum. Meth. B , 408, 100. 10.1016/j.nimb.2017.04.015

M. M. Cruz, L. P. Ferreira, J. Ramos, S. G. Mendo, A. F. Alves, M.Godinho and M. D. Carvalho (2017) Enhanced magnetic hyperthermia of CoFe2O4 and MnFe2O4 nanoparticles. Journal of Alloys and Compounds,703,370-380.
https://doi.org/10.1016/j.jallcom.2017.01.297

MV Vitorino, A Vieira and MS Rodrigues (2017) Effect of sliding friction on harmonic oscillators. Scientific Reports, 7, 3726. 10.1038/s41598-017-03999-w

N. Kup Aylikci, J. M. Sampaio, A. Kahoul, V. Aylikci, I. H. Karahan, M. Guerra, J. P. Santos, J. P. Marques, E. Tirasoglu (2017) The investigation of K-shell fluorescence parameters of Zn-Fe alloys with different grain size and microstrain values. X-Ray Spectrometry, 46, 242. 10.1016/j.nimb.2017.04.015

R.A. Wilhelm, E. Gruber, J. Schwestka, R. Kozubek, T.I. Madeira, J.P. Marques, J. Kobus, A.V. Krasheninnikov, M. Schleberger, and F. Aumayr (2017) Highly charged ion neutralization and de-excitation driven by multiple interatomic coulombic decay. Physical Review Letters, 119, 103401. 10.1103/PhysRevLett.119.103401

Sara Realista, Susana Quintal, Paulo N. Martinho, Ana I. Melato, Adrià Gil, Teresa Esteves, Maria de

Deus Carvalho, Liliana P. Ferreira, Pedro D. Vaz & Maria José Calhorda (2017) Electrochemical studies and potential anticancer activity in ferrocene derivatives. Journal of Coordination Chemistry, 70-2, 314-327. Doi.org/10.1080/00958972.2016.1257125

MAS Group

Ana Paula Cláudio, Maria Beatriz Carmo, Alexandre Carvalho, Willian Xavier, Rui Antunes (2017) "Recreating a medieval urban scene with virtual intelligent characters: steps to create the complete scenario". Virtual Archaeology Review, 8(17), 8, 10. 10.4995/var.2017.6557

Antonio J. Tallón-Ballesteros and Luís Correia (2017) Medium and high-dimensionality attribute selection in bayes-type classifiers. Proc. International Work Conference on Bioinspired Intelligence (IWOBI 2017), 121-126, doi.org/10.1109/IWOBI.2017.7985539.

Antonio J. Tallón-Ballesteros, María Rodríguez-Romero, and Luís Correia (2017) Neural networks based on radial basis function in high dimension domains. Proc. 3rd International Conference on Numerical and Symbolic Computation, SYMCOMP 2017, 31-37.

F. Silva, L. Correia, and A. Lyhne Christensen (2017) Evolutionary online behaviour learning and adaptation in real robots. Royal Society open science, 4, 160938. 10.1098/rsos.160938

Fernando Silva, Luís Correia, and Anders Lyhne Christensen (2017) Evolutionary online learning in multirobot systems. AI Matters, 3(1),23-24. doi.org/10.1145/3054837.3054846

Fernando Silva, Luís Correia, and Anders Lyhne Christensen (2017) Hyper-learning algorithms for online evolution of robot controllers. ACM Trans. Auton. Adapt. Syst., 12(3), 14:1-14:26. https://doi.org/10.1145/3092815

I Gonçalves, S Silva, CM Fonseca, M Castelli (2017) Unsure when to stop?: ask your semantic neighbors. Proceedings of the Genetic and Evolutionary Computation Conference, 929-936

Jorge Gomes, Pedro Mariano, and Anders Lyhne Christensen (2017) Dynamic team heterogeneity in cooperative coevolutionary algorithms. IEEE Transactions on Evolutionary Computation, early access, early access. 10.1109/TEVC.2017.2779840
Jorge Gomes, Pedro Mariano, and Anders Lyhne Christensen (2017) Novelty-driven cooperative coevolution. Evolutionary computation, 25, 275--307. 10.1162/EVCO_a_00173

Julliano Trindade Pintas, Luís Correia, and Ana Cristina Bicharra Garcia. (2017) Crowd-based feature selection for document retrieval in highly demanding decision-making scenarios. Knowledge-Based and Intelligent Information & Engi- neering Systems: Proceedings of the 21st International Conference, 822-832, doi.org/10.1016/j.procs.2017.08.074.

L Vanneschi, M Castelli, I Goncalves, L Manzoni, S Silva (2017) Geometric semantic genetic programming for biomedical applications: A state of the art upgrade. 2017 IEEE Congress on Evolutionary Computation (CEC).
L Vanneschi, M Castelli, L Manzoni, K Krawiec, A Moraglio, S Silva, I Goncalves (2017) PSXO: population-wide semantic crossover. Genetic and Evolutionary Computation Conference. Doi: 10.1145/3067695.3076003.

Luís Correia, Ana M. Sebastião, and Pedro Santana (2017) On the role of stigmergy in cognition. Progress in Artificial Intelligence, 6, 79-86. doi.org/10.1007/s13748-016-0107-z

Luís Cruz-Filipe, Graça Gaspar, Isabel Nunes (2017) From description-logic programs to multi-context systems. Journal of Logical and Algebraic Methods in Programming, 88, 26-44. 10.1016/j.jlamp.2017.01.005

M Castelli, L Manzoni, S Silva, L Vanneschi, A Popovič (2017) The influence of population size in geometric semantic GP. Swarm and Evolutionary Computation, 32, 110-120. 10.1016/j.swevo.2016.05.004

Martin Stefanec, Martina Szopek, Rob Mills, and Thomas Schmickl. (2017) Governing the swarm.. Proceedings of IEEE ALife conference.

Mateus Calado, Luis Antunes, Ana Ramos (2016) Managing the Access to Medical Emergencies Services. DCAI 2016, 359-365, 10.1007/978-3-319-40162-1_39.

Miguel Duarte, Jorge Gomes, Sancho Moura Oliveira, Anders Lyhne Christensen (2017) Evolution of Repertoire-based Control for Robots with Complex Locomotor Systems. IEEE Transactions on Evolutionary Computation, in press, in press. 10.1109/TEVC.2017.2722101

Paula Redweik, Ana Paula Cláudio, Maria Beatriz Carmo (2017) Digital Preservation of Cultural and Scientific Heritage: Involving University Students to Raise Awareness of its Importance. Virtual Archaeology Review, 8, 13. 10.4995/var.2017.4629

Pedro Mariano, Ziad Salem, Rob Mills, Payam Zahadat, Luís Correia, and Thomas Schmickl (2017) Animal-guided evolutionary computation in honeybees and robots. Proceedings of the 14th European Conference on Artificial Life 2017, 529--536, 10.7551/ecal_a_085.

Pedro Mariano, Ziad Salem, Rob Mills, Payam Zahadat, Luís Correia, and Thomas Schmickl (2017) Design choices for adapting bio-hybrid systems with evolutionary computation. GECCO '17 Proceedings of the Genetic and Evolutionary Computation Conference Companion.

Pedro Mariano, Ziad Salem, Rob Mills, Payam Zahadat, Luís Correia, and Thomas Schmickl. (2017) Animal-guided evolutionary computation in honeybees and robots. ECAL 2017, 0, 529-536. 10.7551/ecal_a_085

Pedro Vieira, Tiago Gonçalves, Ana Paula Afonso, Maria Beatriz Carmo (2017) Animated Maps for Analysis of Personal Performance in Games. Encontro Português de Computação Gráfica e Interação 2017, 8

Rui Antunes, Ana Paula Cláudio, Maria Beatriz Carmo, Luís Correia (2017) Animating with a Self-organizing Population the Reconstruction of Medieval Mértola. 15th Eurographics Workshop on Graphics and Cultural Heritage, 10, 10.2312/gch.20171286.

Rui F. Antunes, Ana Paula Cláudio, Maria Beatriz Carmo, and Luis Correia (2017) Animating With a Self-organizing Population the Reconstruction of Medieval Mértola. Eurographics Workshop on Graphics and Cultural Heritage, 1-10, http://dx.doi.org/10.2312/gch.20171286.

S Silva, L Vanneschi, A I R Cabral, M J P Vasconcelos (2017) A semi-supervised Genetic Programming method for dealing with noisy labels and hidden overfitting. Swarm and Evolutionary Computation, online, online. 10.1016/j.swevo.2017.11.003

U López, L Trujillo, Y Martinez, P Legrand, E Naredo, S Silva (2017) RANSAC-GP: Dealing with Outliers in Symbolic Regression with Genetic Programming. European Conference on Genetic Programming, 114-130.

Victor Conceição, Maria Beatriz Carmo, Joakim Dahlman, Ana Ferreira (2017) Visualization in Maritime Navigation: a Critical Review. International Conference on Human Factors in Transportation 2017, 14, http://doi.org/10.1007/978-3-319-60441-1_20.

W La Cava, S Silva, L Vanneschi, L Spector, J Moore (2017) Genetic programming representations for multi-dimensional feature learning in biomedical classification. European Conference on the Applications of Evolutionary Computation, 158-173.

Books

PFG Group

Martins, L.M., Silva, C.A., Sousa, H., Mariano, A., Madeira, S., Pinto-Sintra A., Leal, F, Ferreira-Cardoso, J., Pinto, T. (2017) O Freixo Duarte de Armas: a História e recuperação da árvore.

Book Chapter

Ana Séneca, Susana Pereira (2017) Visualization of Recombinant Proteins in Agarose Gels. An Example with Fluorescent mCherry and GFP. Hands-on Science. Growing with Science, 2017, 50-54.
Bruno Peixoto, Susana Pereira, José Pissarra (2017) Plant Vacuolar Sorting: An Overview. Progress in Botany, 78, 67-94.

Costa, ML, Lopes, AL, Amorim, MI, and Coimbra, S. (2017) Immunolocalization of AGPs and pectins in Quercus suber gametophytic structures. Plant Germline Development: Methods and Protocols, Chapter 11, 117-137.

Costa, ML, Solís M-T, Testillano, PS, and Coimbra, S. (2017) In situ/Subcellular localization of arabinogalactan protein expression by fluorescent in situ hybridization, FISH. The plant cell wall: Methods and protocols.

Guerreiro A, Figueiredo J, Sousa Silva M, Figueiredo A (2017) Linking Jasmonic Acid to Grapevine Resistance against the Biotrophic Oomycete Plasmopara viticola,. in Pietro D. Spanu and Ralph Panstruga (ED), BIOTROPHIC PLANT-MICROBE INTERACTIONS, Frontiers in Plant Science and Frontiers in Microbiology, 385.
Leal F, Taghouti M, Nunes F, Silva A, Coelho AC, Matos M (2017) Thymus Plants: A Review—Micropropagation, Molecular and Antifungal Activity. Active Ingredients from Aromatic and Medicinal Plants, Chapter 7, 107-126.

Marques da Silva J (2017) Água e azeite? Sobre as relações entre agricultura biológica e agrobiotecnologia. Será a Agricultura Biológica Sustentável? (Carla Amado Gomes & Rute Saraiva, coordenadoras), Instituto de Ciências Jurídico-Políticas / Centro de Investigação de Direito Público, Faculdade de Direito da Universidade de Lisboa, Lisboa (ISBN: 978-989-8722-21-8), 0, 97 – 117.

Marques da Silva, J. (2017) Sobre o Valor da Vida Intrauterina: Perspetivas da Bioética.. Pensar para o Outro: Desafios Éticos Contemporâneos - Homenagem a Cristina Beckert -, (F. Afonso, J.L. Pérez, L. Pereira, M.J. Varandas, M.L. Ribeiro Fereira, S. Escobar e V. Soromenho-Marques orgs.). Centro de Filosofia da Universidade de Lisboa, Lisboa., 0, 219 – 228.

Reis F, Tavares RM, Baptista P, Lino-Neto T. (2017) Mycorrhization of Fagaceae florests in Mediterranean ecosystems. Mycorrhiza: Function, Diversity, State of the Art, 0, 75-97.

Tiago Ribeiro, Marta Paz, Susana Pereira (2017) Game of Genomes: Didactic adaptation of the Nature's Dice Kit (NCBE). Hands-on Science. Growing with Science. , 2017, 38-45.

FunGP Group

Farinha CM (2017) CFTR and Cystic Fibrosis – from structure to function. Springer International Publishing, Switzerland.

Book Chapter

Matos P, Goncalves V, Jordan P (2017) Therapeutic approaches targeting the serrated pathway of colorectal cancer characterized by mutation in the BRAF gene and overexpression of GTPase RAC1b. Therapeutic targets for Inflammation and Cancer: Novel Therapies for Digestive Diseases, 233-255.

M&B Group

Kreß JA, Hanschmann K-M, Chudy M & the Collaborative Study Group (2017) Collaborative Study to Evaluate a Candidate World Health Organization International Standard for Chikungunya Virus for Nucleic Acid Amplification Technique (NAT)-Based Assays. . EXPERT COMMITTEE ON BIOLOGICAL STANDARDIZATION, Geneva, 17 to 20 October 2017

Mendes-Ferreira A, del Olmo M, García-Martínez J, Pérez-Ortín JE (2017) Functional Genomics in Wine Yeast: DNA Arrays and Next Generation Sequencing. In: König H., Unden G., Fröhlich J. (eds) Biology of Microorganisms on Grapes, in Must and in Wine. Springer, Cham.

Book Chapter

Pereira AP, Oliveira JM, Mendes-Ferreira A, Estevinho LM, Mendes-Faia A (2017) Mead and other fermented beverages.. In: Current Developments in Biotechnology & Bioengineering (A comprehensive series of seven volumes) Series Editor-in-chief: Ashok Pandey (India) Volume III: Food and Beverages Industry Volume Editors-Ashok Pandey (India), Guocheng Du (China), Maria Angeles Sanroman (Spain), Carlos Ricardo Soccol (Brazil), Claude-Gilles Dussap (France). Elsevier, 407-434.

Ricardo Calado, Miguel Costa Leal, Helena Gaspar, Susana Santos, António Marques, Maria Leonor Nunes, Helena Vieira (2017) How to Succeed in Marketing Marine Natural Products for Pharmaceutical, Cosmetics & Nutraceutical Markets". Book Chapter: Grand Challenges in Marine Biotechnology book, from the ELSEVIER Series "Grand Challenges in Biology & Biotechnolog

MagNano Group

Maria Margarida Cruz, Liliana P. Ferreira, André F. Alves, Sofia G. Mendo, Paula Ferreira, Margarida Godinho, Maria Deus Carvalho (2017) NANOPARTICLES FOR MAGNETIC HYPERTHERMIA. Nanostructures for Cancer Therapy 1st Edition Editors: Alexandru Grumezescu Anton Ficai, Micro and Nano Technologies, 485–511.

MAS Group

Luis G. Nardin, Luis Antunes (2017) Multi-Agent Based Simulation XVII - International Workshop, MABS 2016, Singapore, May 10, 2016, Revised Selected Papers.. Multi-Agent Based Simulation XVII - International Workshop, MABS 2016, Singapore, May 10, 2016, Revised Selected Papers, 10399.

Book Chapters:

A. Gonçalves, A. Correia, L. Cavique (2017) Data Protection Risk Modeling into Business Process Analysis. ICCSA, 17th International Conference Trieste, Italy, Proceedings, LNCS 10404, Springer, pp. 667-676.

A. Gonçalves, A. Correia, L. Cavique (2017) Developing Anti-Bribery Organization System Based on Quantitative Pair-Wise Information: An approach based on Activity Theory. 12th Iberian Conference on Information Systems and Technologies, CISTI, pp. 1819-1824.

L Cavique, AB Mendes, HFMC Martiniano (2017) A Feature Selection Algorithm Based on Heuristic Decomposition. in Progress in Artificial Intelligence, EPIA, LNAI 10423, Springer International Publishing, pp. 525-536.

L Trujillo, E Z-Flores, PSJ Smith, P Legrand, S Silva, M Castelli, L Vanneschi, O Schütze, L Munoz (2017) Local Search is Underused in Genetic Programming. Genetic Programming Theory and Practice XIV.

BioISI Theses

MSc theses:

PFG Group

Alexandra Manuela Silva Barros (2017) Estudo do potencial adaptativo de diferentes espécies florestais em resposta às alterações climáticas BioISI Supervisor: Gaspar, M. J.

Cindy Marlene Mesquita Serafim (2017) Análise do efeito da Cetamina no desenvolvimento embrionário de peixe-zebra (Danio rerio) por avaliação da expressão génica. BioISI Supervisor: M Matos

Clemente Silva (2017) Characterization and expression of subtilases involved in grapevine resistance to Plasmopara viticola. BioISI Supervisor: Andreia Figueiredo, Clemente Silva

Daniela Ferreira (2017) Identification and real time PCR expression analysis of drought-related lipid metabolism genes in soybean. BioISI Supervisor: Andreia Figueiredo, Ana Rita Matos

Eduardo Feijão (2017) Consequences of Global Warming and Metal Pollution on the metabolism of omega-3 and -6 fatty acids of Phaeodactylum tricornutum. BioISI Supervisor: Ana Rita Matos

Leonor Martins (2017) Metabolic pinpointing of Solanum lycopersicumL. response to high Zn levels -the relevance of metallothioneins, GSH metabolism and the antioxidant system. BioISI Supervisor: Fernanda Fidalgo, Jorge Teixeira

Miguel Gaspar (2017) Identification and study of lipid metabolism genes by qPCR in Rubisco mutants of Chlamydomonas reinhardtii BioISI Supervisor: Ana Rita Matos

Rui Nascimento (2017) Characterization of metabolic pathways involved in grapevine resistance to Plasmopara viticola. BioISI Supervisor: Andreia Figueiredo

Sara Isabel Mourão Barrias (2017) Effect of the probe structure design in the biosensor response: the case of Vitis vinifera L. BioISI Supervisor: Paula Martins-Lopes

Sérgio Bartolomeu dos Santos João (2017) Rastreio de agentes zoonóticos bacterianos pela técnica de PCR. BioISI Supervisor: M Matos

Sofia Teixeira Saraiva (-2017) Epidemiologia e diagnóstico de dermatofitose em humanos e animais: uma abordagem “One Health”. BioISI Supervisor: M Matos

FunGP Group

André Filipe Couto Cardoso da Silva (2017) Propriedades anticancerígenas de um óleo essencial: identificação de compostos e avaliação de atividades biológicas BioISI Supervisor: Rita Pacheco

Arsénia Joana Massinga (2017) Study and Characterization of CFTR Mutations in vitro and in Native Tissues from non CF Patients with Chronic Airways Diseases.

Bruno Soares (2017) Toxicidade versus ação terapêutica de arsénio no cancro. BioISI Supervisor: Pedro Falé

Catarina Cotovio de Oliveira (2017) Síntese de catinonas psicoativas e avaliação da sua hepatotoxicidade e permeabilidade gastrointestinal. BioISI Supervisor: Rita Pacheco

Íris Lameiro Petinga (2017) Solute Carrier Transporters (SLCs) as Possible Drug Targets for Cystic Fibrosis. BioISI Supervisor: Margarida Amaral

Leonor Bárbara Freire Abrantes (2017) Validação de genes alvo da via Rac1/PAK1/BCL-6 envolvidos na progressão tumoral. BioISI Supervisor: Paulo Matos

Maria João Álvaro Albuquerque Martins (2017) Síntese e avaliação da atividade antitumoral de novas tiobenzanilidas BioISI Supervisor: Rita Pacheco

Rebeca Esperança André (2017) Ação de extratos de Ageratina adenophora na quimioterapia de cancro BioISI Supervisor: Pedro Falé

Sofia Santos Ramalho (2017) Characterization of Orphan CFTR Mutations. BioISI Supervisor: Margarida Amaral

Vanessa Isabel Rodrigues Neno (2017) Caracterização dos domínios da proteína adaptadora Ezrina essenciais à estabilização membranar do canal CFTR-F508del BioISI Supervisor: Paulo Matos

Violeta Railean (2017) Compostos fenólicos na metabolização do tamoxifeno na quimioterapia de cancro» (Mestrado em Bioquímica BioISI Supervisor: Pedro Falé

M&B Group

Alexandra Sofia Baptista Lança (2017) Metabolism of non-conventional wine yeasts. BioISI Supervisor: Co-Supervisor: R. Tenreiro (FCUL/BioISI).

Alina Kryshen (2017) Avaliação do potencial antimicrobiano de óleos essenciais e nisina. BioISI Supervisor: Ana Reis

Ana Sofia Eria Oliveira (2017) SEAVENTzymes II: an integrated step-forward approach using whole-genome sequencing for the identification of industrial relevant enzymes from deep-sea vent prokaryotes. BioISI Supervisor: Supervisors: R. Dias (FCUL/BioISI) and R. Tenreiro (FCUL/BioISI).

Arlete da Silva (2017) Identificação de Schistosoma haematobium por técnicas convencionais e de PCR em amostras de urina em crianças da Província do Bengo. BioISI Supervisor: Lélia Chambel.

Bárbara Lola Baptista Pocongo (2017) HIV-1: mutations associated with anti-retroviral resistance in subtypes prevailing at individuals with therapeutic failure. BioISI Co-supervisor: R. Dias (FCUL/BioISI).

Celestino Nzuau Mansanga (2017) Análise da diversidade intraespecífica de estirpes de Pseudomonas aeruginosa isoladas em pacientes hospitalizados BioISI Supervisor: Lélia Chambel.

Esther Nataly Baptista Batista (2017) Caracterização microbiológica e físico-quimica de queijos tradicionais portugueses com denominação de origem protegida. BioISI Supervisor: Ana Reis

Fabiana Quintas (2017) Evaluation of starter cultures for application in oenology. BioISI Supervisor: A. Mendes-Ferreira

Ferreira Paulo Afonso (2017) Phenotypic and molecular characterization of Klebsiella spp. strains isolated from raw milk in two production farms in Luanda (In Portuguese| work performed in Angola). BioISI Co-supervisor: R. Tenreiro (FCUL/BioISI).

Inês Graça Gonçalves Santos (2017) Nitrification: hunting for soil prokaryotes. BioISI Supervisor: Co-Supervisor: R Tenreiro (FCUL/BioISI).

Inês Lírio Barroso (2017) Listeria monocytogenes biofilms produced under nutrient scarcity and cold stress: disinfectant susceptibility of persistent strains collected from the meat industry in Spain. BioISI Supervisor: Ana Reis.

Isabel Tima Pequeno Buange (2017) Analysis of the microbiological quality of raw salads consumed in central restaurants in Luanda. BioISI Co-supervisor: S. Chaves

Maria Manuela Conceição Silva (2017) Validation of a Real-Time PCR method for detection of Giardia lamblia and Cryptosporidium spp. in fecal samples and relationship with anthropometric data and anemia (In Portuguese| work performed in Angola). BioISI Co-supervisor: R. Tenreiro (FCUL/BioISI).

Mariana Mara Nascimento (2017) Lysogeny in Streptococcus dysgalactiae subsp. dysgalactiae: lethargy or failure? BioISI Supervisors: R Tenreiro (FCUL/BioISI) and R Dias (FCUL/BioISI).

Matondo Ernesto Tondo (2017) Isolation and identification of yeasts from Candida genus in biological samples from patients of a private clinic and a public hospital (In Portuguese| work performed in Angola). BioISI Co-supervisor: R. Tenreiro (FCUL/BioISI).

Rui Pedro Conceição Carvaho (2017) Comparative genomic analysis of three commercial Saccharomyces cerevisiae wine strains. BioISI Supervisor: A. Mendes-Ferreira (UTAD/BioISI).

Teresa Arsénio Freitas Cruz (2017) Food microbiology laboratories: challenges and perspectives (In Portuguese| work performed in Angola). BioISI Co-supervisor: S. Chaves (FCUL/BioISI).

BTR Group

Bárbara Correia (2017) Analysis of DFNB1 locus in Presbycusis. BioISI Supervisor: H Caria

Mariana Aparicio (2016) Presbycusis patterns in the Portuguese population identification and association with epidemiological end genetic factors. BioISI Supervisor: H Caria

Marisa Flook Pereira (2017) Unravelling the Causes of Inner Ear Diseases. BioISI Supervisor: H Caria

GER Group

Patrícia Dias (2017) Establishment of a suppression therapy for beta-thalassemia due to a nonsense mutation.

MagNANO Group

Cátia Patrícia Santos Silva (2017) Magnetic thin films for spintronic applications. BioISI Supervisor: M. Margarida Cruz

Cátia Rato (2017) Controlo e teste do sistema de distribuição de alta tensão do calorímetro TILECAL/ATLAS. BioISI Supervisor: Guiomar Evans

Paulo Neves (2017) Building a Low-Cost AFM with a Quartz Sensor and its Advantages. BioISI Supervisor: M S Rodrigues

Rafael Martinho Vieira (2017) Magnetic calculations: from atomic to nano-scale BioISI Supervisor: Thomas P. Gasche, M. Margarida Cruz

PhD theses:

PFG Group

Sobral, R. (2017) Molecular characterization of flower development of Quercus suber L

M&B Group

Ana Cristina Ribeiro Alves Ferreira Inácio (2017) Comparative genomics in Brucella suis: from intraspecific and inter-specific distinctive features to diagnostic molecular markers. BioISI Supervisor: R. Dias (FCUL/BioISI) and R. Tenreiro (FCUL/BioISI)

Carina Luísa da Costa Carvalho (2017) The role of wild hares as reservoirs of infectious agents. PhD thesis INSA-RJ. BioISI Co-supervisor: Libia Zé-zé

Joana Costa Cardoso Cruz (2017) New Insights on Black Rot of Crucifers: disclosing novel virulence genes by in vivo host/pathogen transcriptomics and functional genetics. BioISI Supervisor: L. Cruz (INIAV/BioISI) and R. Tenreiro (FCUL/BioISI).

BTR Group

Cristina Caroça (2017) Contribution to the study of epidemiological factors associated with Sensorineural hearing loss in the population of São Tomé and Principe". BioISI Supervisor: H Caria

GER Group

Rafaela Lacerda Santos (2016) Non-canonical translation initiation of proteins with potential relevance in colorectal cancer

MagNANO Group

Arthur Vieira (2017) Desenho e conceção de um microscópio de força atómica BioISI Supervisor: M S Rodrigues

MAS Group

Fernando Goulart da Silva (2017) Evolutionary Online Behaviour Learning and Adaptation in Robotic Systems BioISI Co-Supervisor: Luís Correia

Jorge Gomes (2017) Novel Approaches to Cooperative Coevolution of Heterogeneous Multiagent Systems.

BioISI Projects in 2017

PFG Group

2017 Desenvolvimento de processos de produção e extracão de resina de pinheiro para a melhoria da eficiência, racionalização e expansão da atividade., PRODER. BioISI Budget: 0€ (Total Amount of the project: 108550,67€).

2016 Sexual Plant Reproduction – Seed formation, H2020-MSCA-RISE-2015. BioISI Budget: 247500€ (Total Amount of the project: 720000€). BioISI PI: Silvia Coimbra

2016 EvoMod- Origem e estabelecimento evolutivo de um módulo transcricional que controla a assimetria floral, PTDC/BIA-PLA/1402/2014, FCT. BioISI Budget: 160416€ (Total Amount of the project: 196.716,00 € €). BioISI PI: Manuela Costa

2016 Characterisation of cork formation and reproductive biology in a cork hybrid population, PTDC/AGR-FOR/3356/2014- FCT, FCT. BioISI Budget: 57115€ (Total Amount of the project: 199987€). BioISI PI: Manuela Costa

2016 PLATAFORMA DE INOVAÇÃO DA VINHA E DO VINHO - INNOVINE&WINE, FEDER through NORTE 2020. BioISI Budget: 0€ (Total Amount of the project: 5293984,76€). BioISI PI: Paula Martins-Lopes, Ana Carvalho, Manuela Matos, Fernanda Leal, Sónia Gomes, José Lima-Brito

2016 INTERACT project - Integrated Research in Environment, Agro-Chain and Technology, ERDF through NORTE2020. BioISI Budget: 0€ (Total Amount of the project: 3508607,47€). BioISI PI: Paula Martins-Lopes, Manuela Matos, Ana Carvalho, Sónia Gomes, Fernanda Leal, José Lima-Brito

2014 RESIMPROVE - Desenvolvimento de processos de produção e extracão de resina de pinheiro para a melhoria da eficiência, racionalização e expansão da atividade, PRODER. BioISI Budget: 0€ (Total Amount of the project: 108.550, 67€€). BioISI PI: Maria João Gaspar, Ana Carvalho, José Lima-Brito

2016 Characterizing and monitoring cashew economically important diseases in West Africa as a prospective measure for sustainable production: a case study on GuineaBissau, FCT. BioISI Budget: 21780€ (Total Amount of the project: 140375€). BioISI PI: Filipa Monteiro, Andreia Figueiredo

2017 Hg-PLANKTARCTIC - Unravelling interactions between phyto- and zooplankton and mercury cycling in Deception Island waters impacted by volcanic-mercury, Propolar. BioISI Budget: 0€ (Total Amount of the project: 1700€). BioISI PI: Ana Rita Matos

FunGP Group

2014 INOVCF- Innovative non-CFTR Approaches for Cystic Fibrosis Therapies, CF Trust Strategic Research Centre Award. BioISI Budget: 178400€ (Total Amount of the project: 845327,59€). BioISI PI: MD Amaral

2015 INSTINCT - Induced Pluripotent Stem Cells for Identification of Novel Drug Combinations Targeting Cystic Fibrosis Lung and Liver Disease, ERARE15-pp-010/JTC 2015. BioISI Budget: 124000€. BioISI PI: MD Amaral

2016 RNA LIFE – Novel RNA Regulators as Potential Drug Targets for Cystic Fibrosis, CFF Cystic Fibrosis Foundation, USA (Ref. AMARAL15XX1) . BioISI Budget: 305000€ (Total Amount of the project: 305000€). BioISI PI: MD Amaral

2016 MIMED - Mining the Molecular Metric Space for Drug Design, FCT. BioISI Budget: 0€ (Total Amount of the project: 127000€). BioISI PI: A Falcão

2016 FARMTRANSANION Anion transmembrane transport promoted by drug-like molecules: building a library of anion carriers inspired in Ataluren (PTC124), FCT. BioISI Budget: 200000€ (Total Amount of the project: 200000€). BioISI PI: V Félix

2016 CFTR mRNA Stability Studies for PTC Mutations, CFF Cystic Fibrosis Foundation. BioISI Budget: 209000€ (Total Amount of the project: 209000€). BioISI PI: MD Amaral

2016 DIFFTARGET-Novel Factors of CFTR Traffic Related to Epithelial Cell Differentiation: Potential Therapeutic Targets for Cystic Fibrosis, FCT. BioISI Budget: 200000€ (Total Amount of the project: 200000€). BioISI PI: MD Amaral

2016 Predicting Clinical Drug Efficacy of CFTR Protein Modulators Using Intestinal Organoids and Nasal Cells from Patients with Cystic Fibrosis, Gilead GENESE Programme. BioISI Budget: 30000€ (Total Amount of the project: 30000€). BioISI PI: MD Amaral

2016 Mechanisms NIS expression at the plasma membrane of thyroid cells. , SPEDM/Genzyme. BioISI Budget: 5000€ (Total Amount of the project: 10000€). BioISI PI: Paulo Matos

2016 Regulação da beta oxidação mitocondrial por modificações pós-traducionais não-enzimáticas na saúde e em estados patológicos, FCT. BioISI Budget: 182810€ (Total Amount of the project: 182810€). BioISI PI: Cláudio Gomes and Bárbara Henriques

2016 Characterization of Orphan CFTR mutations, CFF Cystic Fibrosis Foundation. BioISI

Budget: 101500€ (Total Amount of the project: 101500€). BioISI PI: MD Amaral

2017 Complete CFTR gene mutation analysis in Portuguese patients with Cystic Fibrosis, Vertex Pharmaceuticals. BioISI Budget: 20000€ (Total Amount of the project: 20000€). BioISI PI: MD Amaral

2017 Isogenic models to study CF disease signatures: HITI geneedit to fix them, Cystic Fibrosis Foundation. BioISI Budget: 63036,77€ (Total Amount of the project: 171766,86€). BioISI PI: Carlos M Farinha

2018 HIT-CF – Personalised Treatment For Cystic Fibrosis Patients With Ultra-rare CFTR Mutations (and beyond). European Union (H2020-SC1-2017-755021). BioISI Budget: 257000€ (Total Amount of the project: 6700000€). BioISI PI: MDAmaral

M&B Group

2015 Molecular and Mechanical Forces in Biology measured with Force Feedback Microscopy, FCT. BioISI Budget: 197000€ (Total Amount of the project: 197000€). BioISI PI: Lisete Fernandes

2015 BIOCLUB - Designing biofertilizers by mimicking plants' recruitment of rhizospheric partners. , FCT. BioISI Budget: 0€ (Total Amount of the project: 199000€). BioISI PI: Rogério Tenreiro

2015 HOSTSTREP II - Specific evaluation of the host and pathogen-host interactions agent in Streptococcus, FCT. BioISI Budget: 0€ (Total Amount of the project: 199000€). BioISI PI: Lélia Chambel

2015 SMARTWINE - Smarter wine fermentations: integrating Omics-tools for development of novel mixed-starter cultures for tailor-made wine production, FCT, COMPETE, FEEI. BioISI Budget: 0€ (Total Amount of the project: 196000€). BioISI PI: Arlete Mendes Faia

2016 BIOPEPPERtec - Production of fermented peppers paste and pepper serum vinegar: integrated approach in the implementation of biotechnological processes, POCI and POR Lisboa. BioISI Budget: 351000€ (Total Amount of the project: 599000€). BioISI PI: Rogério Tenreiro

2016 RESISTIR - Intelligent information system to control infection and personalized antibiotherapy. , POCI and POR Lisboa. BioISI Budget: 449000€ (Total Amount of the project: 1059675€). BioISI PI: Ricardo Dias

2014 I&D INNOVINE&WINE - Vineyard and Wine Innovation Platform, NORTE-01-0145-FEDER-000038. BioISI Budget: 123340€ (Total Amount of the project: 5 293 984,76€). BioISI PI: Alexandra Mendes Ferreira

2017 Cost Action 16107 - Integrating science on Xanthomonadaceae for integrated plant disease management in Europe (Acronym: EuroXanth), EU framework programme H2020. BioISI Budget: 0€ (Total Amount of the project: 680000€). BioISI PI: Leonor Cruz

2017 Projet Euphresco 2016-A-180 - Development, validation and verification of a diagnostic tool for detection and identification of Ralstonia solanacearum and Clavibacter michiganensis subsp. sepedonicus directly on plant tissue, Euphresco network/ INIAV. BioISI Budget: 20589€ (Total Amount of the project: 79929€). BioISI PI: Leonor Cruz

2016 Unveiling host specificity and host pathogen interactions of Streptococcus, FCT. BioISI Budget: 20000€ (Total Amount of the project: 199782€). BioISI PI: Lélia Chambel / Rogério Tenreiro

2016 BioClub: Designing biofertilizers by mimicking plants' recruitment of rhizospheric partners, FCT. BioISI Budget: 20000€ (Total Amount of the project: 199143€). BioISI PI: Ana Reis, Ana Tenreiro, Sandra Chaves, Rogerio Tenreiro

2017 Sistema Satelital de Monitoreo Ambiental en Tiempo Real para el estudio del cambio climático basado en un biosensor bacteriano altamente sensible, Vicerrectoria De Investigacion Y Estudios Avanzados - Chile. BioISI Budget: 0€ (Total Amount of the project: 500000€). BioISI PI: Ricardo Dias

2017 NewID - New approaches for taxonomic identification and profiling of poli-clonal samples based in Next Generation Sequencing, SGS Molecular. BioISI Budget: 0€ (Total Amount of the project: 0€). BioISI PI: Ricardo Dias

2016 Precision Oncology by Innovative Therapies and Technologies. POINT-PAC 2016, LISBOA-01-0145-FEDER-016405. BioISI Budget: 0€ (Total Amount of the project: 1900000€). BioISI PI: Helena Vieira

2017 BIOINVENT: Generic bio-inventory of soil microbial diversity and functioning in permanent grassland ecosystems across management and climate gradients.. BioISI Budget: 0€ (Total Amount of the project: 1680000€). BioISI PI: Rogério Tenreiro

2016 LEVEalliance II - towards a portfolium of adaptively evolved yeasts for the production of lower ethanol content wines. Industry - Projects in collaboration with industry. BioISI Budget: 3000€ (Total Amount of the project: 6000€). BioISI PI: AC Rocha, Ana Tenreiro, Rogério Tenreiro

2017 CRASSOREAB - Rehabilitation of Portuguese oyster (Crassostrea angulata) production using autochthonous microalgae., Industry - Projects in collaboration with industry. BioISI Budget: 0€ (Total Amount of the project: 353000€). BioISI PI: Ana Tenreiro, Rogério tenreiro.

BTR Group

2015 Autism Spectrum Disorders in Europe (ASDEU), Health Programme of the European Union DG-SANCO. BioISI Budget: 144000€. BioISI PI: Astrid Vicente

2015 ALHTOUR – Assisted Living Technologies for the health tourism sector, European Commission. BioISI Budget: 322752,5€. BioISI PI: Helena Caria

2014 COST Action TINNET (Action number BM1306), European Commission. BioISI PI: Helena Caria

2016 LALD Portugal - molecular testing of LIPA gene., Alexion Pharmaceutical. BioISI Budget: 50000€ (Total Amount of the project: 50000€). BioISI PI: Mafalda Bourbon

2017 Synaptic networks and Personalized Medicine Approaches to Understand Neurobehavioural Diseases Across the Lifespan (MEDPERSYST), PROGRAMAS DE ATIVIDADES CONJUNTAS (PAC), Portugal 2020. BioISI Budget: 469 678,33€ € (Total Amount of the project: 2487042,85€). BioISI PI: Astrid M Vicente, Margarida Gama Carvalho, Luis Correia, Patricia Faísca, Hugo Martiniano

GER Group

2015 Tumor cell plasticity through alternative splicing in response to a 3D pro-inflammatory microenvironment, Maratona da Saúde- Cancro. BioISI Budget: 25000€ (Total Amount of the project: 25000€).

2015 Common RNA-dependent pathways for motor-neuron degeneration in spinocerebellar muscular atrophy and amyotrophic lateral sclerosis, JPND. BioISI Budget: 138847€.

2016 Perturbation of the intestinal barrier function in Inflammatory Bowel Diseases: role of the Rac1b /cytokine axis, Portuguese Society of Inflammatory Bowel Disease (GEDII). BioISI Budget: 15000€ (Total Amount of the project: €).

2016 Nonsense-mediated mRNA decay in genetic diseases and cancer: key players, mechanisms, and a novel approach for suppression therapy, FCT. BioISI Budget: 199662€ (Total Amount of the project: €). BioISI PI:

2017 LungCARD - Blood test for clinical therapy guidance of non-small cell lung cancer patients, EU Call H2020-MSCA-RISE-2016. BioISI Budget: 144000€ (Total Amount of the project: 1000000€). BioISI PI: M Gama Carvalho, R Chaves

MagNANO Group

2016 Colaboração na Experiência ATLAS do LHC (CERN/FIS-NUC/0005/2015), FCT. BioISI Budget: 16800€ (Total Amount of the project: 400000€). BioISI PI: Guiomar Evans

2016 Multifunctional Luminescent Spin Labile Hybrid Materials, FCT. BioISI Budget: 27500€ (Total Amount of the project: 191879€). BioISI PI: Liliana Ferreira

2016 Interações Moleculares e Mecânicas em Biologia estudadas por Microscopia de Força Atómica com Retroação em Força, FCT. BioISI Budget: 149568€ (Total Amount of the project: 197568€). BioISI PI: Mário Rodrigues

MAS Group

2013 Animal and robot Societies Self-organise and Integrate by Social Interaction (ASSISIbf), FP7-ICT-2011-9 of EU. BioISI Budget: 515776€ (Total Amount of the project: €).

2016 PERSEIDS - Personalizing cancer therapy through integrated modeling and decision, FCT. BioISI Budget: 17591€ (Total Amount of the project: 199997€). BioISI PI: Sara Silva

2016 Geometria Intuitiva e Interativa, FCG. BioISI Budget: 0€ (Total Amount of the project: 45500€). BioISI PI: Ana Paula Cláudio; Maria Beatriz Carmo

2016 VIRTUAL TUTORING - the virtual tutor as learning mediating artifact in online university education, FCT. BioISI Budget: 60967€ (Total Amount of the project: 199706€). BioISI PI: Ana Paula Cláudio, João Balsa

2017 Assistente virtual para facilitar o autocuidado de pessoas mais velhas com diabetes tipo 2 (VASelfCare), CDPOR de Lisboa e do Alentejo + FCT. BioISI Budget: 0€ (Total Amount of the project: 139361,69€).