6th symposium on
BIOENGINEERING

GREAT AUDITORIUM OF THE FACULTY OF
ENGINEERING OF THE UNIVERSITY OF PORTO

6th symposium on
BIOENGINEERING
21st and 22nd November 2014
Porto, Portugal

"Bioengineering is the application of engineering design and technology to living systems."

The 6th Symposium on Bioengineering aims to bring together the very best of what is considered to be one of the fastest growing markets today: Bioengineering.

Broad and multidisciplinary, Bioengineering, the application of engineering principles to biological systems, encompasses areas as diverse and cutting edge as Molecular Biotechnology, Biological Engineering and Biomedical Engineering. These are at the forefront of current and future advances in health and industry, allowing for great leaps in technology by working at the interface of several fields on some of the greatest challenges and opportunities of our time: regenerative medicine and stem cells; space biology; bionics, neuralprosthesis and computer assisted diagnosis; as well as entrepreneurship and sustainability.

The Bioengineering Student Association from the University of Porto FEUP/ICBAS (NEB-Núcleo de Estudantes de Bioengenharia) is therefore proud to welcome you to this year's event on the exciting and diverse world of bioengineering hoping you might enjoy this glimpse of a not so distant future.

Organizing Committee

NEB-FEUP/ICBAS

núcleo de estudantes de bioengenharia

Núcleo de Estudantes de Bioengenharia - FEUP/ICBAS is a student association created on 06th November 2013 and is entirely run by students of the Faculty of Engineering and Abel Salazar Institute of Biomedical Sciences, both from the University of Porto.

NEB - FEUP/ICBAS was created in order to organize events for the Bioengineering student community and establish a means of communication with other student associations locally, nationally and internationally. This association is also a representative of the three specializations of Bioengineering, which are Biomedical Engineering, Biological Engineering and Molecular Biotechnology.

This association is legally recognized as a Non-Profit Association.

Scientific Committee

Prof. Dr. Perpétua Pinto-do-Ó

Perpétua Pinto do Ó is an associated Professor at ICBAS, where she is presently responsible for the "Stem Cell Biology" course.

During a postdoctoral training at Instituto de Biologia Molecular e Celular-IBMC (2003-2006), she got acknowledged with molecular immunology and late in 2007 became a researcher at INEB within the NEWTherapies group, where she now leads the Stem Cell Biology team. Parallel to her long-time interest on basic stem cell biology mechanisms Pinto-do-Ó got interested on understanding the role stem/progenitor cells allocated to specific tissue/organs might have on the regeneration in the adult organism.

Prof. Dr. Alexandre Quintanilha

Alexandre Quintanilha is a full Professor at ICBAS and he holds the position of co-director of MIB (Integrated Master on Bioengineering).

He works on physiological oxidative stress related to infection or inflammation mechanisms. He was appointed as President of the Ethic Commission for Clinical Investigation and member of the President's Science & Technology Advisory Council of the European Union.

Prof. Dr. Manuel Simões

Manuel Simões is assistant Professor and member of the LEPABE in the Department of Chemical Engineering of the Faculty of Engineering at the University of Porto. He teaches diverse subjects to the Bioengineering course, including Fermentation Engineering and Metabolic and Cellular Engineering.

His main research interests focus on the mechanisms of biofilm formation and their control with antimicrobial agents.

Prof. Dr. Francisco Xavier Malcata

Francisco Malcata is a full Professor of Chemical Engineering, co-Director of Integrated Master on Bioengineering and member of its Scientific Board.

Francisco Malcata is Portuguese Delegate to HORIZON 2020 in the societal challenge 2 on food and aquatic research.

Professor Doutor Mário Barbosa

Mário Barbosa is a full Professor at ICBAS.

He is internationally recognized for his contributions to biomaterials science, particularly in cell-biomaterial interactions. Natural and bioartificial matrices have been extensively studied by his group, with the purpose of delivering cells and proteins, e.g. in a context of repair/regeneration of tissues. More recently, his studies are focused on the role of inflammation in regeneration. He's a Fellow of the International Union of Societies for Biomaterials Science and Engineering. In 2001 he received the George Winter Award of the European Society for Biomaterials (ESB).

Prof. Dr. Luís Mira Vieira

Luís Vieira is connected to the MIB since the implementation of the Course in 2006 as a lecturer and currently also a member of the Monitoring Committee and Coordinator of Mobility for the areas of Biochemistry and Bioengineering in ICBAS-UP.

Luís Mira Vieira has a Degree in Pharmaceutical Sciences - Branch Industrial Pharmacy, in Organic and Technological Chemistry and a PhD in Biomedical Sciences, always working in the area of Chemistry of Natural Products. Currently continues to develop his research work in the area of natural products from plants in the Department of Chemistry ICBAS-UP.

Prof. Dr. João Paulo Cunha

João Paulo Cunha is Associate Professor at the Department of Electrical and Computer Engineering, FEUP and senior researcher at the INESC-TEC.

João Paulo Cunha at the INESC-TEC has created the BRAIN – Biomedical Research And INnovation - research group and co-founded the Center for Biomedical Engineering Research (C-BER) that aggregates ~30 researchers. He is also visiting professor at the Neurology Dep., Faculty of Medicine of the University of Munich, Germany since 2003. He presently serves as scientific director of the Carnegie-Mellon|Portugal program where he is a faculty since 2007. Prof. Cunha is senior member of the IEEE (2004) where he joined the Engineering in Medicine and Biology Society (EMBS) in 1986 as a student member. He co-founded in 2007 a spin-off company Biodevices SA to bring to the market innovative biomedical technology developed for several years in his lab.

Prof. Dr. Aurélio Campilho

Aurélio Campilho, PhD, is a Full Professor in the Department of Electrical and Computer Engineering, Faculty of Engineering, University of Porto (FEUP), and senior researcher at the INESC-TEC.

He coordinates the INESC-TEC Center for Biomedical Engineering Research (C-BER) and research leader of C-BER Biomedical Imaging Lab. He was an Adjunct Professor in the Department of Electrical and Computer Engineering and in the Department of Systems Design, Faculty of Engineering, University of Waterloo, Canada (2002-2008). From 1994 to 2000, he served as Chairman of the Institute for Biomedical Engineering (INEB). For several years, he also served as President of the Portuguese Association for Pattern Recognition, which is a member of the IAPR. He is the Director of Doctoral Program in Electrical and Computer Engineering, offered at the University of Porto. His current research interests include the areas of biomedical engineering, medical image analysis, image processing, and computer vision. Prof. Campilho served as the organizer of several special issues and conferences. He served as Associate Editor of the IEEE Transactions on Biomedical Engineering and of the Machine Vision Applications journal. He is chairman of the series of conferences ICIAR - International Conference on Image Analysis and Recognition.

Prof. Dr. Olga Nunes

Olga Nunes is an auxiliary Professor and Researcher at Chemical Department of FEUP.

Her research is focused on microbiology.

Prof. Dr. Pedro Moradas Ferreira

Pedro Moradas Ferreira is a full Professor of biochemistry at the ICBAS.

He is a group leader at the IBMC. His research interests have focused in the underlying the molecular mechanisms of the stress response of yeast to oxidative stress.

Prof. Dr. Luís Melo

Luís de Melo is a full Professor at FEUP.

Luís Melo is coordinator at LEPABE - Laboratory for Process, Environmental, Biotechnology and Energy Engineering.

Programme

21th November 2014

9:00h Opening session

9:30h **MADE IN MIB**

Priscila Alves | Biomedical Engineering| CardioID
João Andrade | Biomedical engineering | IBILI
Cláudia Ribeiro | Molecular Biotechnology | IPATIMUP
Inês Pinho |Biological Engineering | Nestlé

10:30h Coffee Break

11:00h **TECH IN HEALTH: FROM REPLACEMENT TO DIAGNOSIS**

Design and Control of Dexterous Hand Prostheses
Christian Cipriani | ARTS Lab – Scuola Superiore Sant'Anna

Systems for Human Prosthesis and Clinical Analysis
Moisés Piedade | INESC-ID

Pioneering "Lab to Clinic" Genetic Testing
Hélder Barbosa | HeartGenetics

12:30h Lunch

14:00h **POSTER CONTEST**

15:00h **BIOENGINEERING AND SPACE**

The role of the ESA Biomedical Engineering in Timothy International Space Station Operations
Timothy Irawan | European Space Agency (Videoconference)

TBA
Nora Petersen | European Space Agency (Videoconference)

Why is it easier for the Cardiovascular System to adapt to Space than coming back?
Carole Leguy | German Aerospace Center

Influence of long-term simulated Microgravity on Cardiac function, Electrophysiology and Calcium handling in mice
Pavel Gershovich ! 3B's Research Group

16:30h Coffee Break

17:00h **BIOENGINEERING AND SPACE**

TBA
Jason Hatton | European Space Agency (Videoconference)

Preparation of a Spacial experiment on ISS: Seeding Growth
Miguel Valbuena | Centro de Investigaciones Biológicas

18:00h **MEET INESC TEC**

Fiber Sensors in Biomechanic Applications
Orlando Frazão | INESC TEC

22th November 2014

9:00h **STEM CELLS AND TISSUE ENGINEERING**

Scalable Production of Human Stem/Progenitor Cells for Cellular Therapy Setting
Cláudia Lobato da Silva | Instituto Superio Técnico

The role of Stem Cells and Extracellular Matrix in Tissue Engineering and Regeneration
Alexandra Marques | 3B's Research Group

10:15h Coffee Break

10:45h **BIOENTREPRENEURS**

Francisco Pereira | Letra
Hugo Silva | PLUX/Bitalino
Rui Pereira | Algaplus
Salomé Azevedo | Patient Innovation
Joana Carvalho | Kinematix

12:15h Lunch

13:45h **OPEN STAGE**

14:45h **SUSTAINABILITY**

TBA
Vítor Verdelho Vieira | Algae 4 Future

From Regenerative Medicine to Cultured Meat via Biochemical Engineering
Marianne Ellis | University of Bath, New Harvest

16:00h Coffee Break

17:00h **EDUCATION, RESEARCH AND INDUSTRY: FROM PORTUGAL TO THE WORLD**

Claudio Sunkel | IBMC-INEB Associate Laboratory
José Domingos Santos | FEUP/Biosckin
João Claro | Carnegie Mellon Portugal Program

18:00h CLOSING SESSION

Friday | 21th November |MADE IN MIB | 9:30h

CardioID, using your heart as a key

Priscila Alves | CardioID

The heart signal, in particular the electrocardiogram (ECG) has multiple applications. We are used to think only in the health domain, where the ECG is useful to diagnose several heart anomalies. However, this signal has much more information. Did you know that every person has a different ECG? What if we use the ECG to identify who you are?

CardioID is a company that uses the ECG for biometric recognition, where your heart signals work as a fingerprint. Your heart is the key.

Priscila Alves | CardioID

Natural from Porto, in 2006 Priscila Alves starts studying Bioengineering at Faculdade de Engenharia da Universidade do Porto. Being always passionate about the connection of different sciences, Bioengineering brought a very comprehensive insight into areas such as biology, electronics and programming. But with the multitude of knowledge, comes indecision about the route to follow. After finishing the course in 2011, she had the opportunity to do an IAESTE internship in Japan for 2 months, where she communicated with a very different culture, which helped her to expand horizons and see the world from another angle. But after returning to Portugal, the future was still unknown. After some initial reluctance about the possibility of doing research, in January 2012 she joined a research team from the Institute of Telecommunications in Lisbon. Today she claims to have been the best possible choice. Since then, she has worked with biosignals and was part of the team that developed the BITalino (www.bitalino.com), a Do-It-Yourself device for biosignal acquisition. In 2014 she became a co-founder of CardioID, being responsible for web and mobile development, as well as 3D design of prototypes.

Friday | 21th November |MADE IN MIB | 9:40h

TBA

João Andrade | IBILI

Advances in neuroimaging and electroencephalography have led to a better knowledge about the brain areas and processes related to a huge number of functions. Those advances have also allowed us to comprehend that it is possible to modulate our own brain signal just by looking at a certain stimuli or even only imagining it.

It is known that autistic people have difficulties with social interactions and recognition of social cues, such as facial expressions or the attention of other person to a certain object.

What if we could make a virtual person choose a certain object just paying attention to it, or imagining the avatar grabbing it?

What if we could modulate a virtual person's facial expression just by imagining it?

What if these experiments actually help autistic people to improve their attention to this kind of social stimuli?

João Andrade | IBILI

João Andrade started studying Bioengineering at FEUP in 2008. During his studies, he took the branch of Biomedical Engineering and had the opportunity to take one ERASMUS semester in Aalto University, in Helsinki. In November 2013, he joined a research team at Institute for Biomedical Imaging and Life Sciences (IBILI) in University of Coimbra, enrolled in an European Project related to neurofeedback. His current research interests include brain-computer interfaces based on electroencephalography and biomedical signal processing for assistive technology.

Galectin-3 is part of the cell response to stressful conditions in canine mammary tumors

Cláudia Ribeiro[1], Joana T. de Oliveira[1,2,3], Rita Barros[1], Catarina Gomes[1], Augusto J. de Matos[2,4], Celso A. Reis[1,2], Gerard R. Rutteman[5,6] , Fátima Gärtner [1,2] | [1] Institute of Molecular Pathology and Immunology (IPATIMUP), University of Porto, [2] Instituto de Ciências Biomédicas de Abel Salazar (ICBAS), University of Porto [3] Faculty of Veterinary Medicine of the Lusophone University of Humanities and Technologies, [4]Animal Science and Study Central (CECA), Food and Agrarian Sciences and Technologies Institute (ICETA), University of Porto, Portugal [5] Department of Clinical Sciences of Companion Animals, Faculty of Veterinary Medicine, Utrecht University, Utrecht, The Netherlands [6] Specialist Veterinary Centre De Wagenrenk, Utrecht, The Netherlands

The tumor microenvironment encompasses several stressful conditions for cells such as hypoxia, oxidative stress and pH alterations. Galectin-3, a well-studied member of the beta-galactoside-binding animal family of lectins, has been implicated in tumor progression and metastasis by promoting cell-cell and cell-extracellular matrix adhesion, angiogenesis, cell proliferation and preventing tumor cell apoptosis. Its abnormal up- and down-regulated expression has been observed in several types of cancer. However, the mechanisms that regulate galectin-3 expression in neoplastic settings are not clear. In order to demonstrate the putative role of hypoxia in regulating the galectin-3 expression by canine mammary tumors (CMT), *in vitro* and *in vivo* studies were performed to evaluate its expression under hypoxic conditions. In malignant canine mammary cells, hypoxia was observed to induce an increased expression of galectin-3, a characteristic that is almost completely prevented when cells are treated with catalase. The protein increased expression was confirmed at the mRNA level. Under hypoxic conditions the expression of galectin-3 shifts from a predominant nuclear location to cytoplasmic and membrane expressions. In *in vivo* studies, galectin-3 was overexpressed in hypoxic areas of primary tumor and well-established metastases. Thus tumor hypoxia up-regulates the expression of galectin-3 that may increase tumor aggressiveness.

Cláudia Ribeiro | IPATIMUP

Ana Cláudia Pinto Ribeiro is graduated in Integrated Master in Bioengineering-Molecular Biotechnology in the Faculty of Engineering, University of Porto in 2013. She developed an academic internship at Laboratory of Ecotoxicology and Ecology of the University of Porto Interdisciplinary Center of and Environmental Research (CIIMAR) between 2011 and 2012. Her master thesis was developed at the Institute of Molecular Pathology and Immunology of Porto University (IPATIMUP) entitled “Hypoxia-Dependent regulation of Galectin-3 in Mammary Tumors”. She is currently at IPATIMUP in the project "The role of sialylation in modulating galectin-3 functions in the metastatic process of canine mammary tumors".

Friday | 21th November |MADE IN MIB | 10:00h

TBA

Inês Pinho | Nestlé

Inês Pinho | Nestlé

Inês Pinho started her Master on Bioengineering at FEUP on 2006 and after 2 years she chose the branch of Biological Engineer. During the master she had the amazing chance of integrate a project about *Removal mechanisms of Pharmaceutical and Personal Care Products with heterotrophic bacteria* during her ERASMUS in the University of Santiago de Compostela, Departament of Chemical Engineering. In February of 2011 Inês had her first experience out of academic world, during her thesis internship, dedicated to implement a quality management system in a department of a healthcare unit.

After concluding the degree, Inês decided to look for opportunities out of research options. In October of 2011 she started a professional internship on Quality Assurance Department on Avanca Factory from Nestlé Portugal, where are produced brands as Cerelac, Nestum, Chocapic and cereal beverages as Mokambo. At the end she was integrated in the team, where nowadays her main responsibilities are related with food safety management of the different production lines and with the integration of Focused Improvement Team of the factory.

Design and Control of Dexterous Hand Prostheses

Christian Cipriani | ARTS Lab – Scuola Superiore Sant'Anna

The hand is a powerful tool and its loss, due to amputation, causes severe psychological and physical drawbacks. Despite the significant impact of losing a hand, the numbers of amputees requiring prosthesis are too small to push manufacturers to innovate their products; thus control interfaces and hand designs have changed very little in the past 40 years.

The talk will provide an overview of the requirements and design criteria suggested to design multi-digit prosthetic hands and physiologically appropriate control systems to be used by transradial amputees. First I will review the state of the art and open challenges, then I will focus on the most recent research in the field carried out within the BioRobotics Institute of Scuola Sant'Anna, Pisa Italy. This will include examples of hand designs, control interfaces based on intramuscular electrodes and vibrotactile systems able to provide sensory feedback based on a "discrete-event" approach and to induce in the person the feeling of ownership of the prosthesis.

Christian Cipriani | ARTS Lab – Scuola Superiore Sant'Anna

Christian Cipriani received the M.Sc. degree in electronic engineering from the University of Pisa, Italy, in 2004 and the Ph.D. in BioRobotics from the IMT Institute for advanced studies, Lucca, Italy in 2008. He is currently an Associate Professor and Head of the Artificial Hands Area at The BioRobotics Institute, Scuola Superiore Sant'Anna, Pisa, Italy. He is the Coordinator and PI of the WAY Project (ICT #288551) funded by the European Commission, of the MY-HAND Project (no. RBFR10VCLD) funded by the Italian Ministry of Research and of the PPR3 Project funded by the National Workers' Compensation (INAIL). He was Visiting Scientist at the University of Colorado Denver | Anschutz Medical Campus, in 2012, and he founded a spin-off company, in 2009. His research interests cover mechatronic, controllability and sensory feedback issues of dexterous robotic hands to be used as thought-controlled prostheses.

Cipriani won the d'Auria Award for prototypes of innovative robotic devices to aid the motor disabled from the Italian Robotics and Automation Association, in 2009. In 2011 he was awarded with an early career grant (FIRB program) by the Italian Ministry of Research and with a Fulbright Research Scholar fellowship. He is a Senior Member of the IEEE Robotics and Automation Society and the IEEE Engineering in Medicine and Biology Society.

Systems for Human Prosthesis and Clinical Analysis

Moisés Piedade | INESC-ID

Recently advances in micro and nonoelectronics led to the development of useful bio-electronic implants for the human body and the development of ultra-compact microsystems for clinical analysis.

In this talk we refer some research results, obtained in the past 10 years by the group SIPS "Signal Processing Systems" of INESC-ID, related with systems for neuronal signal sensing and stimulation and new systems for clinical analysis.

In more detail will be referred: new monolithic biosensors, new medical diagnostic platforms for DNA analysis "Lab on Pocket", and strategies for the design of bio implants for visual prosthesis and Parkinson disease control that, in future, can improve the quality of life of individuals.

Moisés Piedade | INESC- D

Moisés Piedade received the Ph.D. degree in electrical and computer engineering from Instituto Superior Técnico (IST), Technical University of Lisbon, Lisbon, Portugal, in 1983. He was Full Professor in the Electrical and Computers Engineering Department, IST, retired since July 2012. He was the Founder of Signal Processing Systems Research Group (http://sips.inesc.pt), Instituto de Engenharia de Sistemas e Computadores—R&D (INESC-ID), Lisbon, Portugal, where he does scientific research. His main research interests include electronic systems, signal acquisition and processing systems, and circuits and systems for biomedical and telecommunication applications.

Pioneering "Lab to Clinic" Genetic Testing

Hélder Barbosa | Heart Genetics

HeartGenetics, a Spin-off from Técnico Lisboa, is a startup company that has developed "solutions in a box", including genetic tests and computational tools, to increase the efficiency of "lab to clinic" genetic testing in the cardiovascular field. The efficiency of our solutions is measured by the ability to engage medical doctors to prescribe a genetic test that will provide actionable results for diagnosis and prognosis; by the accuracy of the genetics tests developed; by the quality and reproducibility of the genetic reports and by the cost-effectiveness of the overall process.

Based on a DNA MICROCHIP array platform for genetic analysis, our team of researchers has developed genetic tests for several cardiac pathologies, e.g.: Hypertrophic cardiomyopathy, genetic risk factors for thrombophilia, molecular markers for arterial hypertension, molecular markers for familial hypercholesterolemia among others.

The genetic data is analyzed by our proprietary expert system "HeartDecode", providing highly accurate and reproducible analysis and the integration of both genetic and clinical data. The system enables the efficient generation of an unlimited number of comprehensive clinical reports, reducing the time and costs of the genetic test.

HeartGenetics is a VC-backed company since April 2013, by Portugal's unique world-class VC player.

Hélder Barbosa | Heart Genetics

Hélder (COO - Chief Operating Officer) received is PhD in Biotechnology (2009) from University of Minho (PT) and University of Cambridge (UK). His project was in the field of DNA downstream processing, having published several papers in this field.

Prior to working at Heartgenetics, Hélder worked in 3D microarray technology at Instituto Superior Técnico (PT) and at Rensselaer Polytechnic Institute (USA).

Hélder holds The Lisbon MBA (2013) and he was awarded several prizes, including the Malcolm Lilly Award (2012), attributed by the European Society of Biochemical Engineering Sciences to a promising young scientist working in the field of Bioengineering

The role of the ESA Biomedical Engineering in Timothy International Space Station Operations

Timothy Irawan | European Space Agency

Timothy Irawan | European Space Agency

Friday | 21th November |BIOENGINEERING AND SPACE | 15:10h (Videoconference)

TBA

Nora Petersen | European Space Agency

TBA

Nora Petersen | European Space Agency

TBA

Why it is easier for the Cardiovascular System to adapt to Space than coming back?

Carole Leguy | Institute of aerospace medicine, German Aerospace Center, Cologne, Germany

For long space missions, astronauts follow a specific training program to maintain their physical shape. However, the efficiency of these countermeasure programs is still not fully understood. A mission to Mars will definitely be very challenging for the human body. Thus, appropriate countermeasures have to be provided. Cardiovascular deconditioning (the adaptation of the cardiovascular system to less a demanding environment) is one of the most important adaptations to space. To improve countermeasure programs, a better understanding of the response of the cardiovascular system to changes in hydrostatic pressure is crucial.

During this seminar, I will review the several methods that can be used on earth to study the orthostatic stress response as tilt-table tests, LBNP, centrifuge tests or parabolic flights. Then, I will present more in details blood pooling and muscle pump dynamics under orthostatic stress which are major physiological phenomena associated with orthostatic intolerance. Finally, I will show the results of vascular ultrasound measurements performed under partial gravity during parabolic flight and present future experiment to study the relative contribution of chemo- and baro-reexes on cerebral perfusion under gravitational stresses.

Carole Leguy | German Aerospace Center

Carole Leguy is researcher in the field of cardiovascular biomechanics at the Space Physiology Division, DLR-Institute of Aerospace Medicine, Cologne, Germany. She has been co-investigator on ESA/DLR parabolic flight campaigns and led tilt-table and LBNP (lower body negative pressure) studies. Dr. Leguy has a strong expertise in the field of cardiovascular biomechanics and is developing a new closed-loop computational model of the artero-venous system.

Specialties: Biomechanical models of the blood pressure and blood flow (0D, 1D, 3D), Vascular ultrasound measurement, Particle Image Velocimetry set-up, Fluid mechanics, Space biology, Space physiology.

Influence of long-termed simulated Microgravity on cardiac function, Electrophysiology and Calcium handling in mice

Pavel M. Gershovich, Jonathan L. Respress, Tiannan Wang, Julia O. Reynolds, Darlene G. Skapura, Jeffrey P. Sutton, Christina Y. Miyake, Xander H.T. Wehrens | 3B's Research Group

Exposure to microgravity during spaceflight causes various changes in the human cardiovascular system, including a cephalic fluid shift, changes in cardiac systolic volume, and, over time, a loss of left ventricle mass. It has been suggested that microgravity leads to a reduction in cardiac output and stroke volume due to cardiac remodeling, triggered by a reduction in circulating blood volume. Documented observations in crewmembers over several years support that long-term exposure to microgravity can alter the electrical properties of the heart, increasing the propensity toward cardiac rhythm disturbance. However, at present, it remains unclear whether microgravity is a direct cause of arrhythmias and cardiac dysfunction, or it is caused indirectly by a previously asymptomatic cardiovascular disease. In this study, we tested the hypothesis that cardiac remodeling following hindlimb unloading (HU) in mice involves abnormal intracellular Ca regulation through the cardiac ryanodine receptor (RyR2). Mice were subjected to HU for 28 to 56 days in order to induce cardiac remodeling. Experimental animals displayed decreases in bone mineral density and differential muscle atrophy in the femur regions. In addition, transthoracic echocardiography studies showed that prolonged exposure to simulated microgravity affects cardiac performance. Moreover, the number of non-sustained ventricular tachycardia (NSVT) episodes was significantly increased, consistent with a susceptibility to pacing-induced ventricular tachycardia (VT) after 28 and 56 days of HU. The arrhythmias are likely caused by an increased susceptibility to calcium leak from the sarcoplasmic reticulum. These data suggest that abnormal intracellular Ca handling, likely due to increased CaMKII phosphorylation of RyR2, plays a role in cardiac remodeling following simulated microgravity in mice. Thus, future strategies to prevent arrhythmias in spaceflight participants might focus on normalizing intracellular calcium handling or prevention of excessive activation of CaMKII in the heart.

Pavel Gershovich | 3B's research Group

Dr. Pavel Gershovich received his PhD from Institute for Biomedical Problems (Moscow, Russia) in 2010, where he worked as a research specialist in the field of space biology and medicine since 2006. He was awarded by National Space Biomedical Research Institute (NSBRI) and participated in International Postdoctoral Fellowship program 2011-2012, continuing to study space biology as the postdoctoral fellow in Baylor College of Medicine (Houston, USA). In early 2014, he joined the 3B's research group, University of Minho (Braga, Portugal) as a postdoc.

TBA

Jason Hatton | European Space Agency

Jason Hatton | European Space Agency

Jason Hatton is the Head of the Biology and Environmental Monitoring Unit in the Directorate of Human Spaceflight at the European Space Agency. Since 2005 he has been responsible for the overall definition and coordination of biology and astrobiology science within the ESA ELIPS programme, which are implemented on a variety of ground and flight research platforms, including the ISS.

Furthermore he is responsible for the overall coordination of the ESA ISS Experiments relevant to climate change, which includes a GNSS reflectometry / scatterometry experiment which is currently in a study phase. Dr Hatton also coordinated the joint ESA-NASA airborne observation campaign for the first ESA Automated Transfer Vehicle (ATV-1) re-entry in 2008.

Prior to joining ESA he worked as a researcher at the VA Medical Center / UCSF in San Francisco from 2001 to 2005 and obtained his Ph.D. from Universite Louis Pasteur Strasbourg in France. Dr Hatton has performed research on immune cell early signal transduction under microgravity conditions, including a series of experiments using the ESA Biorack facility on Shuttle during the 1990's.

Preparation of a Spatial experiment on ISS: Seeding Growth

Miguel Valbuena | Centro de Investigaciones Biológicas

For million years, evolution of plants on Earth has had gravity as a constant parameter. In this moment of the history, we can study gravity as an independent factor on the International Space Station (ISS). But plants undergo important stress and developmental damage like cell proliferationgrow uncoupling under microgravity (Matía I, 2010), and
plants are essential as a bioregenerative life support system in a space exploration program. Therefore, we need to improve our knowledge on mechanism involved in tropism, specially to know the response to light stimulation in microgravity conditions.

NASA process requires approving preflight activities. There are some simulators of microgravity called Ground Based Facilities (GBF). We tested several strains on GBFs to determine which ones could provide more information on real microgravity.

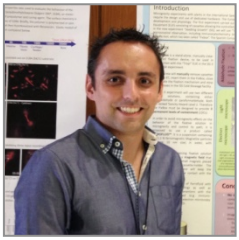
Seedling Growth is an international project (NASAESA) to study light and gravity signaling in plants. Seeds will be hydrated on ISS and their movement and growth in response to selected light and gravity conditions will be monitored from then on. The seedlings will be frozen and returned to Earth for postflight biochemical analysis.

Seedling Growth 2 was set up this summer, launched on SpaceX Dragon in September and performed on ISS in November. Results will be completed with the third part of SG and conclusions will apport knowledge for making plants grow in weightlessness in order to produce oxygen and even food for a longduration space travel.

Matía I, González-Camacho F, Herranz R, Kiss JZ, Gasset G, Van Loon J, Marco R, Medina FJ (2010). Plant cell proliferation and growth are altered by microgravity conditions in spaceflight *Journal of Plant Physiolgy* 167:184193

This work has been funded by Spanish Natinal Plan for R&D, ESAELIPS and NASA.

Miguel Valbuena | Centro de Investigaciones Biológicas



Miguel Ángel Valbueno Crespo is writing his PhD at Centro de Investigaciones Biológicas (CIB-CSIC) in Madrid at present. He studied a Biotechnology degree at University of León (Spain) and a Master in Genetics at Complutense University of Madrid. During his PhD studies about plant development under microgravity conditions, he performed the analysis of the spatial experiment Seedling Growth 1, the pre-flight activities and set up of Seedling Growth 2 and the pre-flight activities of Seedling Growth 3. He also performed several experiments with microgravity simulators as clinostat and Random Positioning Machine. He is currently the Vice-president of the ELGRA students (SELGRA).

Speed Dating - INESC TEC hosts bioengineering students (16:00h)

Orlando Frazão, **José Correia** | INESC TEC

Did you know that next year INESC Technology and Science will be celebrating its 30th anniversary as an institute specialising in R&D and technology transfer? We have 800 collaborators working in six locations in the cities of Porto, Braga and Vila Real, and we comprise 12 multidisciplinary R&D centres, always looking to the international market.

We have numerous projects and activities in the areas of Health and Bioengineering, and we host qualified human resources to work in areas such as bioinstrumentation, brain-machine interfaces, biomedical imaging, neuroengineering and brain imaging, optical fibre sensors, optical imaging and measurement, electronic and optoelectronic systems integration, physiological sensors and instrumentation, computer vision, pattern recognition and machine learning, signal and image computing, wearable monitoring solutions, systems and technology, computer graphics and virtual environments, bionics and robotics, optimisation and decision support, data mining and simulation, computational models and languages for scalable computing, information management and information systems, digital preservation, technology management, innovation and entrepreneurship.

Come get to know us on this speed dating. Improve yourself by doing research with us while pursuing your master's and doctoral studies or your dream of becoming a young entrepreneur, joining a team to create your own company!

Fiber Sensors in Biomechanic Applications (18:00h)

Orlando Frazão, Paulo Roriz, Lídia Carvalho, Manuel B. Marques | INESC TEC

In vivo measurement, not only in animals but also in humans, is a demanding task and is the ultimate goal in experimental biomechanics. For that purpose, measurements in vivo must be performed, under physiological conditions, to obtain a database and contribute for the development of analytical models, used to describe human biomechanics. The knowledge and control of the mechanisms involved in biomechanics will allow the optimization of the performance in different topics like in clinical procedures and rehabilitation, medical devices and sports, among others. Fiber optic sensors rely on the principle of changing the properties of light that propagate in the fiber due to the effect of a specific physical or chemical parameter. We demonstrate the potentialities of this sensing concept in biomedical and biomechanical applications such as:

- *In vivo* measurement of intradiscal pressure of an anesthetized sheep, with a fiber optic cavity pressure sensor implanted into the nucleus pulposus of the intervertebral disc;
- Real-time characterization of bone cement using embedded fiber Bragg grating sensors, to measure its temperature, longitudinal strain and load transfer;
- Monitoring of human joint angles, like elbow flexion, using intensity fiber optic sensor, integrated in a specifically designed garment.

- *In vitro* evaluation of the performance of orthodontic appliances, measuring the strain field and load mechanism transfer, using fiber Bragg grating sensors.

Orlando Frazão | INESC TEC

Orlando Frazão graduated in Physical Engineering from the University of Aveiro, Portugal. He received his Ph. D. in Physics from University of Porto, Portugal. From 1997 to 1998, he was with the Institute of Telecommunications, Aveiro. Presently, he is an invited Assistant Professor at Dept. Physics and Astronomy of Faculty of Science at University of Porto and he is also a Senior Researcher at Centre for Applied Photonics, INESC TEC. His present research interests included optical fiber sensors and optical communications. He has more than 300 papers in international journals and conferences. He participated as organized committee of several International conferences. He has three scientific awards. He is senior member of the SPIE and OSA.

José Correia | INESC TEC

José Correia is a Researcher and Area Leader at INESC TEC. He has a degree in Electrical and Computer Engineering, concluded in 1990 at FEUP, and a postgraduate degree in Information Management, concluded in 2004, also at FEUP. Over the last 24 years, he has been involved in numerous R&TD projects in Computer Engineering and Information Systems.

Between 2006 and 2008, he was the Coordinator of the Centre of Excellence "Rede de Competência em Mobilidade" (mobility cluster).

He is, since 2008, Board member of the ITS Portugal Association (www.its-portugal.eu/), where he represents INESC Porto.

Since 2012, he has been representing INESC Porto in the Health Cluster Portugal (www.healthportugal.pt).

Born in Porto, he is naturally a big fan of the FC Porto football team. Besides sports, he also enjoys cinema, literature, music, history, food and travelling.

Scalable Production of Human Stem/Progenitor Cells for Cellular Therapy settings

Cláudia Lobato da Silva | Instituto Superior Técnico (IST)

The major advances in stem cell research have driven the progress in cell-based therapies observed over the last years. In order to fully realize the therapeutic potential of stem cells and their derived products, cell manufacturing platforms should evolve to GMP-compliant processes able to meet rigorous quality/regulatory standards while generating cells with well-defined characteristics and in quantities that meet clinically meaningful doses. Bioprocess engineering approaches, namely bioreactor systems combined with the use of xenogeneic(xeno)-free components, will allow the establishment of robust, fully-controlled and cost-effective cell manufacturing platforms. We have successfully established scalable microcarrier-based bioreactor systems under serum/xeno-free culture conditions for the *ex-vivo* expansion of (i) mesenchymal stem/stromal cells from different human sources and (ii) hematopoietic progenitors from the umbilical cord blood.

Cláudia Lobato da Silva | IST

Cláudia Lobato da Silva (1978) graduated in Chemical Engineering (Biotechnology), at Instituto Superior Técnico (IST), Universidade Técnica de Lisboa (UTL) (2001). Cláudia got her PhD in Biotechnology (2006) at IST/UTL "A human stromal-based serum-free culture system for the ex-vivo expansion/maintenance of hematopoietic stem/progenitor cells", in collaboration with the University of Reno, Nevada, USA. Presently, Cláudia is an Assistant Professor at Department of Bioengineering, IST, and the objective of her current research in the Stem Cell Bioengineering and Regenerative Medicine Laboratory, Institute for Bioengineering and Biosciences (IBB) at IST is to contribute for a better knowledge of the *ex-vivo* expansion of human stem cells in controlled bioreactor systems for cellular therapies.

The role of Stem Cells and Extracellular Matrix in Tissue Engineering and Regeneration

Alexandra Marques | 3B's Research Group - Biomaterials, Biodegradables and Biomimetics, University of Minho, Headquarters of the European Institute of Excellence on Tissue Engineering and Regenerative Medicine, AvePark, 4806-909 Taipas, Guimarães, Portugal | ICVS-3B's – PT Government Associate Laboratory, Braga/Guimarães, Portugal

Current research indicates that the interactions between resident progenitor cells and their niche dictate the triggering of tissue regeneration. In alignment, mesenchymal stem cells (MSCs)-based therapies, have been proposed to enhance healing. The rationale lies on transplanted cells ability to interact/respond to the injured microenvironment, which is advantageous when compared to the exogenous administration of healing factors. However, the involved mechanisms are still elusive and poor outcomes were achieved in terms of attainment of functional neotissue due to low cell survival rates, and poor engraftment or cell fusion upon transplantation. Extracellular matrix (ECM)-mimicking is currently seen as the "Holy Grail" of Tissue Engineering in the sense that by recreating natural tissues microenvironments researchers will be able to increase the residence time and consequently the action of the transplanted cells and thus uncover "therapeutic niches".
Under this context we have been exploring the potential of mesenchymal stem cells under two perspectives; one takes advantage of the tunable ECM-like properties along with the 3D support that hydrogels can provide, and the second benefits from an intact native ECM offered by cell sheet engineering technology. We have been able to demonstrate the correlation between cell-cell and cell-ECM interactions, as well as the relevance of paracrine signaling with resident cells in tissue healing and regeneration.

Ultimately the understanding of the biological mechanisms underlying healing problems will lead the generation of knowledge on how to direct tissue regeneration, and the creation of "off-the-shelf" 3D stem cell-based engineered products inspired in the role of healing microenvironments.

Alexandra Marques | 3B's Research Group

Alexandra P. Marques concluded her four years graduation in Biochemistry, in 2007 in the Faculty of Sciences of the University of Porto. In 2004 Alexandra P. Marques obtained her PhD on Materials Science and Technology - Biomaterials in the University of Minho and in cooperation with the University of Liverpool in the United Kingdom. Alexandra P. Marques is a founder member of 3B's Research Group where she is currently Principal Investigator leading the Skin Regeneration Research Line. Currently, and as from October 2009 Alexandra P. Marques is Assistant Editor of the Journal of

Tissue Engineering and Regenerative Medicine, launched in 2007. She is also member of the Editorial Board of Current Tissue Engineering journal and has been acting as referee of several scientific journals.

Alexandra P. Marques is member of several International Scientific Organizations. She has been actively participating in the societies as member of the organizing committee, scientific committee and of the International Advisory Board of different meetings, and chair and co-chair of different Symposia in several of those.

Alexandra P. Marques is co-editor of the Handbook Natural-based Polymers for Biomedical Applications, Woodhead Pub., Cambridge, (2008) and author of 133 publications: 62 peer-reviewed, 9 book chapters, 3 patents, 2 conference proceedings, 57 indexed conference abstracts and more than one hundred communications in major conferences of the field.

Letra

Francisco Pereira | Letra

Fermentum, Lda is an academic spin-off launched in 2011, that dedicates its work in the agro-food and biotechnological field. The company has a highly skilled technical framework, working towards innovative solutions mainly on fermentation technology, currently producing craft beer and selling it by the brand name "Letra - Cerveja Artesanal Minhota". The efforts of the company and growing investment on the Research and Development (R&D) department were recognized by the award of “Best Agro-industrial Start-up of the year 2013” by the Ministry of Agriculture of Portugal.

Francisco Pereira | Letra

Francisco Pereira finished his master degree in Biological Engineering at University of Minho (2008). Its scientific career begin as researcher on Center of Biological Engineering collaborating in different national and international projects on bioethanol production field. (2008-2010). Francisco is author of several scientific papers in international journals on his focus scientific area: fermentation technology. He is finishing its PhD program untitled “Bioethanol: Robust production strains for process intensification” (2010-2014).

Francisco was also co-founder of an academic spin-off – Fermentum, Lda- and, now, he is brewing engineer at Fermentum launching in the market LETRA craft beers.

PLUX

Hugo Silva | PLUX - Wireless Biosignals, S.A.

PLUX is a medtech company specialized on the creation of innovative biomedical products for industry, clinicians and researchers, by developing advanced biosignals monitoring platforms that integrate wearable body sensors combined with wireless connectivity, algorithms and software applications. Established in 2007, PLUX bridges academia and market, by applying and projecting research grade know-how to problems and practical needs, in several technological areas.

From high know-how on signal conditioning and communication electronics, PLUX technologies enable real-time and robust acquisition of signals with very low noise characteristics, high sensitivity and high immunity to electronic interferences. The current customer base spans across more than 30 countries, including flagship references such as Volkswagen, Intel, Samsung, Boeing, MIT, Stanford University, among many others.

Over the course of its history, PLUX has been an active participant in global R&D networks and policy-making forums in the field of biomedical engineering, through the regular participation in both national and EU-funded research projects. PLUX has also seen its activity widely recognized with distinctions such as the selection as one of the top 20 most innovative European companies at the IVC HealthTech Summit in 2014, the honorable mention at the National Rehabilitation Institute yearly awards for technological innovation in 2013 (Jaime Filipe Award), or the Life Sciences award in 2010 at the MIT | Portugal / ISCTE BGI initiative.

Hugo Silva | PLUX

Hugo Plácido da Silva believes he's one of the few lucky people that can say he worked very few days in his life... not because of lack of a job (fortunately), but because when you do stuff you love and you're passionate about almost every single day, there's no boundary between what's work and what's just pure fun.

He completed a BSc in Computer Science, and a MSc in Electrical and Computers Engineering. Since 2004, Hugo is a researcher at the IT - Instituto de Telecomunicações (http://www.it.pt/person_detail_p.asp?id=1293), where he's currently pursuing his PhD. In 2012 he was a visiting researcher at the Computational and NeuroEgineering Laboratory (CNEL) from the University of Florida.

He is also one of the co-founders of PLUX – Wireless Biosignals (http://www.plux.info), established in 2007 as an innovative technology-based company operating in the field of medical devices for healthcare and quality of life, where Hugo is currently a Board Member and Innovation Advisor.

More recently, he has been actively working (i.e. having fun) towards making the world a bit more physiological, through BITalino (http://www.bitalino.com), an open source software

and low-cost hardware toolkit, that allows anyone from students to professional app developers, to create cool projects and applications with physiological sensors.

His main interest areas include physiological computing (aka biosignals), system engineering, signal processing, and pattern recognition.

Algaplus

Rui Pereira | Algaplus - Produção e comercialização de algas e seus derivados Lda.

Algaplus is a private Portuguese company that initiated its activity in 2012. The company works in the B2B and B2C sectors for the food and well-being markets, using the brand "Tok de Mar" for the B2C. Its mission is to produce and trade seaweed and seaweed-derived products in an ecological and social sustainable way through continuous innovation and strict parameters of quality and traceability. The strategies are to associate the cultivation of seaweed with animal aquaculture, taking advantages of the nutrients released in those systems to produce more and better seaweed (IMTA system); to promote the environmental and economical sustainability of the aquaculture industry; to adjust the quantity and quality of seaweed produced to the demands of the markets sought; to keep a strong R&D component in order to optimize processes and develop new products. ALGAPLUS is currently established at a seabass and seabream farm with 14 ha of seawater surface. Current production activities focus on *Ulva, Gracilaria, Chondrus* and *Porphyra* species, being able to implement new production lines for the species sought by our customers.

Rui Pereira | Algaplus

Rui Pereira (PhD), Production manager and co-founder of ALGAPLUS. Expert in seaweed physiology, strain isolation and life cycle studies, with more than 10 years of experience acquired in Portugal and the United States of America reflected on his extensive publication record. Dr. Pereira has worked with several seaweed species but is main focus has been on *Porphyra, Gracilaria and Ulva* spp. Over the last years, has focused his research on the application of seaweed as in Integrated Multi-Trophic Aquaculture (IMTA), both as biofilter (nutrient removal) and as raw material for fuel or ingredient in fish-feed. While in academia, Dr. Rui Pereira collaborated in several national and EU funded projects, like SEAPURA, MARBEF, IBEROMARE and others.

Patient Innovation

Salomé Azevedo | Patient Innovation

Patients of chronic diseases and their non-professional caregivers have developed a significant number of non-drug medical innovations that have proven valuable in dealing with their diseases. In some cases, patients even saved their own lives! These innovations usually occur behind closed doors and might never be knowledge or used by anyone else. However, if successful solutions and knowledge were shared with other patients with similar need, it could improve the lives of many others. To promote collaboration and foster the diffusion and use of those innovations, we developed Patient Innovation, an international multi-lingual online platform http://www.patient-innovation.com) to facilitate sharing of solutions developed by patients or caregivers.

Considering the fact that healthcare spending is rising worldwide, helping patients help themselves by sharing innovations developed by patients and caregivers is of great social value, not only promotes knowledge exchange among target stakeholders and it can also save significant resources and reduce costs.

Salomé Azevedo |Patient Innovation

Salomé Azevedo is a research assistant of the Catolica-Lisbon School of Business and Economics. Her work focuses on how patients and caregivers develop treatments, therapies and medical devices to improve their disease condition. Salomé is working on a project called Patient Innovation and she has been supervised by Professor Pedro Oliveira from Catolica-Lisbon School of Business and Economics and by Professor Helena Canhão from University of Lisbon School of Medicine. Her main focus relies on publishing a book that translates an investigation of solutions developed by Patients of Chronic Diseases, in order to understand the predisposition of patients to innovate.

Recently, Salome was in an internship at Carnegie Mellon University, Pittsburgh, USA, working in the Engineering and Public Policy, within the project of Patient Innovation.

She graduated from Instituto Superior Técnico in Lisbon with a Master degree in Biomedical Engineering in 2013.

Kinematix

Joana Carvalho | Kinematix

Kinematix develops inteligent devices that extract knowledge from movement and posture to improve human function.

Its products use advanced inertial and pressure sensing technologies, sophisticated firmware and software analytics to measure and report essential information, in real-time, through wireless communication.

Kinematix technologies are targeted for the medical and sports industry (diabetes, osteo-arthritis, stroke, musculoskeletal disorders and orthopedic injuries). Kinematix is headquartered in Portugal and has subsidiaries in the US and in the UK, as well as an office in Netherlands.

Joana Carvalho |Kinematix

Joana Carvalho e Afonso has a BA in Communication Science, and a MA in Marketing Management, and has been working for Kinematix since 2013. Joana is Kinematix content creator and curator, with daily oversight of the website, social media channels, media relations, and using business intelligent content. Her primary focus is to increase Kinematix global impact, developing blended marketing and brand awareness.

Saturday | 22th November |SUSTAINABILITY | 14:45h

TBA

Vítor Verdelho Vieira | Algae 4 Future

Vítor Verdelho Vieira | University of Bath

Born at 9th of March in 1966. Currently the president of EABA - European Algae Biomass Association, Necton's R&D manager, Member of the Board and Shareholder of A4F – Algae for Future, SA. Graduated in Physics, with more than 20 years of experience in Biotechnology.

Moreover Victor´s basics specialties are expertise and experience in: Solid State Physics (University background), Biotechnology (marine biotechnology, Agrofood, Environment and Health) and Microalgae biotechnologies (applications for Food, Feed, Nutraceuticals, Cosmetics, Aquaculture, Biofuels).

Participated in over forty courses, seminars, congresses and conferences, on topics either scientific (particularly in the areas of Physics, Biology, Environment and Archaeology) or in different areas of management, marketing and business strategy and organization.

Extensive experience in developing and managing several national and international Projects. Executive functions in 20 'scenarios' of entrepreneurial management in different industrial areas, service or innovation, formulation, application and management of 25 R & D projects in multiple national and international contexts.

Expert in management and training of people and teams, negotiation and conflict management, strategic analysis, models of management and organization, transforming ideas into projects, business development.

From Regenerative Medicine to Cultured Meat via Biochemicual Engineering

Marianne Ellis | University of Bath

Livestock production contributes 15% of global greenhouse gas emissions (Gerber et al. 2013), 33% of the global land use (FAO 2006), and 27% of the global water footprint (Mekonnen & Hoekstra 2011). The consumption of livestock products has been predicted to increase by 70% between 2010 and 2050 (Gerber et al. 2013). Conversion of forests to feed production is one of the main drivers of deforestation and degradation of wildlife habitats. An earlier study showed that cultured meat production could potentially have substantially lower greenhouse gas emissions, land use and water use compared to conventionally produced meat (Tuomisto & Teixeira de Mattos 2011).

The 'devil is in the detail' and careful design of the bioreactor will be a key factor in the fate of cultured meat as an affordable product. To achieve this it is necessary to combine cell culture principles with sound biochemical engineering if we are to achieve a cost effective method for growing cultured meat. Cultured meat is muscle tissue engineering with the added challenge of the scale of production being beyond that of any cell therapy. Whereas the aim of regenerative medicine is high quality at an affordable cost, and sustainability is (currently) lower on the list of requirements, cultured meat on the other hand must have the quality and be both affordable and sustainable. *In vitro* mammalian cell culture requires heat input so is energy intensive if the bioreactor is not carefully designed for an efficient process. Similarly, the media components for mammalian cells are not cheap and so conversion of raw material should be maximized; this too will contribute to the sustainability of the process.

This talk will demonstrate how the principles of biochemical engineering for regenerative medicine can be applied to cultured meat manufacture, and suggests ways of how we can begin to tackle the affordability and sustainability challenges alongside the quality.

References:

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Mekonnen, M. M., and A. Y. Hoekstra. 2011. The green, blue and grey water footprint of crops and derivered crop products. Hydrology and Earth System Sciences 15:1577-1600.

Tuomisto, H. L., and M. J. Teixeira de Mattos. 2011. Environmental Impacts of Cultured Meat Production. Environmental Science & Technology 45:6117-6123.

Marianne Ellis | University of Bath

Dr. Marianne Ellis is a Senior Lecturer in Biochemical Engineering at the University of Bath and a Royal Academy of Engineering/The Leverhulme Trust Senior Research Fellow. Her research interests are focused on bioreactor and bioprocess design for the scale up of cell therapies and cultured meat, and to produce physiologically-relevant *in vitro* models for toxicology and bioartificial organs.

She studied for a BEng in Chemical & Bioprocess Engineering (2001) and a PhD in Biochemical Engineering at The University of Bath (2005). After a year as a postdoctoral researcher she took up an academic position in 2005. She is a Chartered Engineer and Member of the Institution of Chemical Engineers (IChemE); Leader of the Biochemical & Biomedical Engineering Group at Bath; a Deputy-Director of the Bath Centre for Regenerative Medicine; and a Board Member of New Harvest. Marianne's core research is cell therapies and tissue engineering, and as a typical engineer always works with 'end users', in this case surgeons and drugs companies. Projects range from expanding regulatory T-cells to (in the future) replace immunosuppressant drugs, to developing an *in vitro* model for liver with Unilever, Astra Zeneca and Syngenta. Her interest in cultured meat began at TERMIS 2012 when she met Hanna Tuomisto, the life cycle analysis, who was after a biochemical engineer to carry out a detail bioreactor energy balance for growing meat. One thing led to another and she is now an active member of New Harvest.

Discussion

Claudio Sunkel | IBMC-INEB Associate Laboratory
José Domingos Santos | FEUP/Biosckin
João Claro | Carnegie Mellon Portugal Program

Claudio Sunkel | IBMC-INEB Associate Laboratory

Claudio Sunkel is a Full Professor of Molecular Biology at the Biomedical Institute of University of Porto, Director of the Institute of Molecular Cellular Biology and head of the Molecular Genetics Group at the same institute. He is a Member of the European Molecular Biology Organization since 2000, was Vice-President of the European Molecular Biology Conference (2007-2010), Vice-President of the European Molecular Biology Laboratory Council (2010-2012), elected Chair of the EMBL Council (2013). Currently is a member of the Wellcome Trust-India Alliance fellowship selection committee (2009-2014). During 2007-2008 was the National Coordinator for the Evaluation of Research Units by the Foundation for Science and Technology of Portugal. His laboratory is mostly devoted to the study cell division and of the mechanisms involved in maintaining genomic stability in higher eukaryotes. Started these studies during his posdoctoral work at Imperial College, UK, and later continued in Porto. Has published over 100 original peer review articles. Supervised 24 PhD students and many postdocs. Teaches Molecular Genetics for Biochemistry and Bioengineering BsC Major at ICBAS, University of Porto. First Degree Honors in Biology (1979) and a Ph.D. in Genetics (1983) from Sussex University, UK. Was born in Santiago, Chile, 1958.

José Domingos Santos | FEUP/Biosckin

José Domingos Santos is currently Associate Professor with Habilitation (Aggregation) at FEUP-Faculty of Engineering, University of Porto (2005-present) and is presently researcher of CEMUC – Centro de Engenharia Mecânica da Universidade de Coimbra, and coordinator for the Research line ***"Advanced Materials, Technologies & Structures for Health".*** He developed all the experimental work for his PhD at IRC in Biomedical Materials, University of London, and in 1993 obtained his PhD at FEUP, where he developed all his academic career to present.

He has actively participated in 24 Research Projects financed by National and International institutions and was the scientific coordinator of 13 of them. He has been involved in the scientific supervision of 8 Post-Doctoral researchers, 19 PhD students and 10 MSc, all

concluded. He has published 147 scientific papers in International scientific reviews of SCI, edited 3 books and 9 book chapters.

He is founding member of two companies that operate in the Health Sciences sector since 2002, Medmat Innovation Lda and Biosckin - Molecular and cell Therapies SA (*www.criovida.pt; www.biosckin.com*) as results of I&D activity. He is the co-inventor of 5 registered International Patents in the Biomaterials and Cell Therapies fields which have resulted in very important trademarks currently sold worldwide, namely a large family of bone graft substitutes for bone regeneration applications and several kits for cell therapies using stem cell collected from umbilical cord blood and Wharton´s Jelly.

João Claro | Carnegie Mellon Portugal Program

João Claro (National Director of the Carnegie Mellon Portugal Program (também podem utilizar CMU Portugal Program) is professor at the Faculdade de Engenharia of the Universidade do Porto (FEUP), and holds appointments with INESC TEC, where he is Executive Advisor to the Board in the areas of Knowledge Valorization and Technology Transfer and heads the Innovation and Technology Transfer Unit, and with Porto Business School (PBS), where he heads the Entrepreneurship and Innovation academic area. Since January 2013, João Claro has been the National Director of the Carnegie Mellon Portugal Program, an international partnership in Information and Communication Technology between Portuguese universities, research labs and companies, and Carnegie Mellon University. He was also recently a visiting scholar with the Engineering Systems Division at MIT. In the past decade, he has taught and mentored close to 60 technology commercialization teams from Portuguese universities, research labs and companies, in multiple initiatives with COTEC Portugal, FEUP, INESC TEC, and PBS.

João Claro has a Ph.D. in Electrical and Computer Engineering from FEUP (2008), an MSc in Quantitative Methods in Management from PBS (2002), and an undergraduate degree in Electrical and Computer Engineering from FEUP (1993). Prior to returning to the University, he was a software engineer and project manager at Edinfor (1994-1998).

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