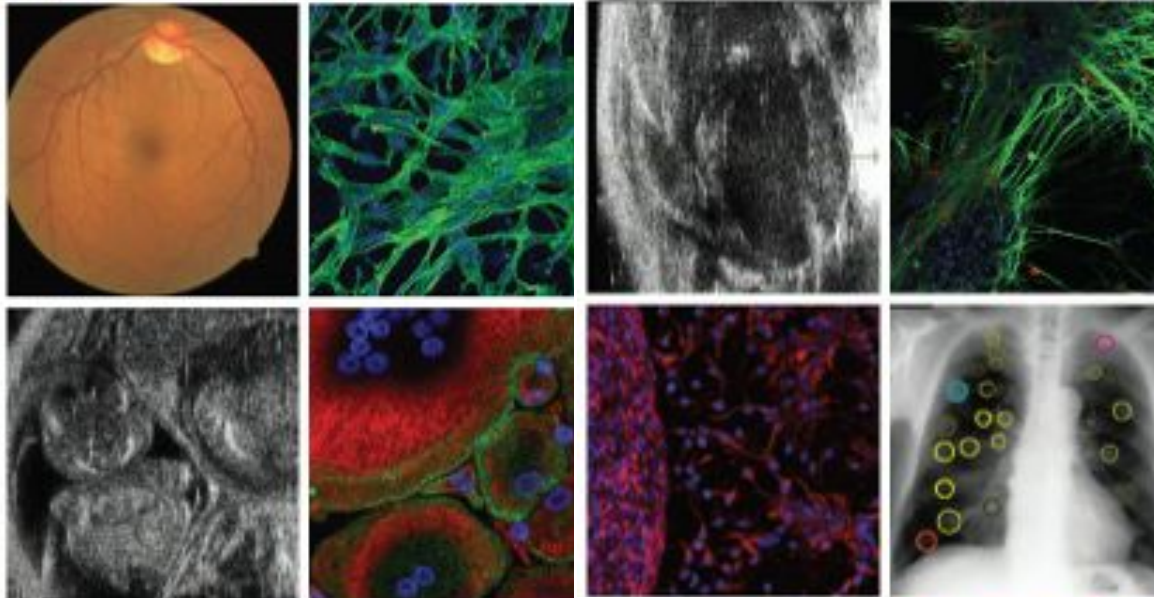


# BIOIMAGING 2012

1<sup>ST</sup> INTERNATIONAL SYMPOSIUM IN APPLIED BIOIMAGING  
BRIDGING DEVELOPMENT AND APPLICATION



## Final Report

Biblioteca Almeida Garrett, Porto, September 20-21, 2012

## Summary

The BioImaging 2012 symposium was organized in the follow up of the establishment of the Bioimaging Centre for Biomaterials and Regenerative Therapies at INEB (Instituto de Engenharia Biomédica, University of Porto). This is intended to be the first in a series of symposia in Applied Bioimaging that our Institute has decided to organize.

The first edition was held under the topic: **Bridging Development and Application**, and was aimed at presenting new imaging and image analysis approaches directed to the fields of tissue engineering and regenerative medicine.

The symposium had the duration of two days, preceded by a one-day hands-on lab sessions on bioimaging (see Final Program section).

Prominent scientists in the field were invited, covering a large number of topics bridging the views of image tools developers and applicants, in a very informal environment that stimulated lively discussions. The event had a total of 84 participants that contributed with their work, questions and comments to the advancement of knowledge in the field of Bioimaging applied to Biomaterials and Regeneration through integrative approaches.

The travel awards

The European Science Foundation in the framework of the project REMEDIC funded a total of **9 Travel Awards** on a competitive basis to assist graduate students and post-docs to present their work at the symposium.

Overall, the feedback of the participants was very positive. Participants felt that their expectations were met and that they gained relevant knowledge in the area of applied BioImaging.

## Description of the scientific content of and discussion at the event

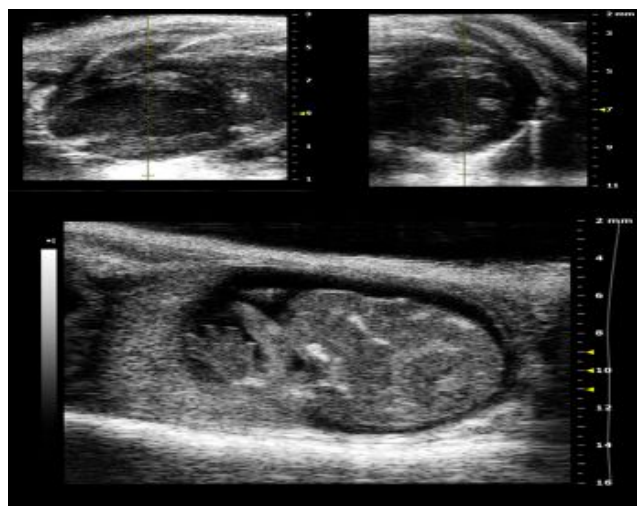
The symposium focus was on applied Bioluminescence Imaging in the field of biomaterials, tissue engineering and regenerative medicine. This was achieved through a number of lectures in different relevant areas of Bioluminescence Imaging, in an informal environment, encouraging all participants to bring questions and reflections, in order to contribute to the advancement of knowledge in their field. The lectures and related themes of discussion were given by leading researchers in each topic:

- **Reinhold Erben:** Animal model for unbiased cell tracking in regenerative
- **Daniel Sage:** Analysis in live Cell Imaging -ImageJ/Fiji Solutions
- **Denis Wirtz:** Cancer cell migration in 3D
- **Cristina Lo Celso:** In vivo imaging of normal and malignant haematopoiesis
- **Aart van Apeldorn:** Raman microscopy as imaging tool in tissue engineering
- **Boudewijn Lelieveldt:** Integrated analysis of multi-modal pre-clinical imaging studies
- **Robert Murphy:** Imaged-derived models of subcellular organization over time and space
- **Pj Chana:** The Image Stream platform and its applications

To provide graduate students with practical training in novel Bioimaging modalities and analysis techniques Lab Sessions were organized comprising an initial theoretical lecture and hands on practical examples in the context of the following three themes:

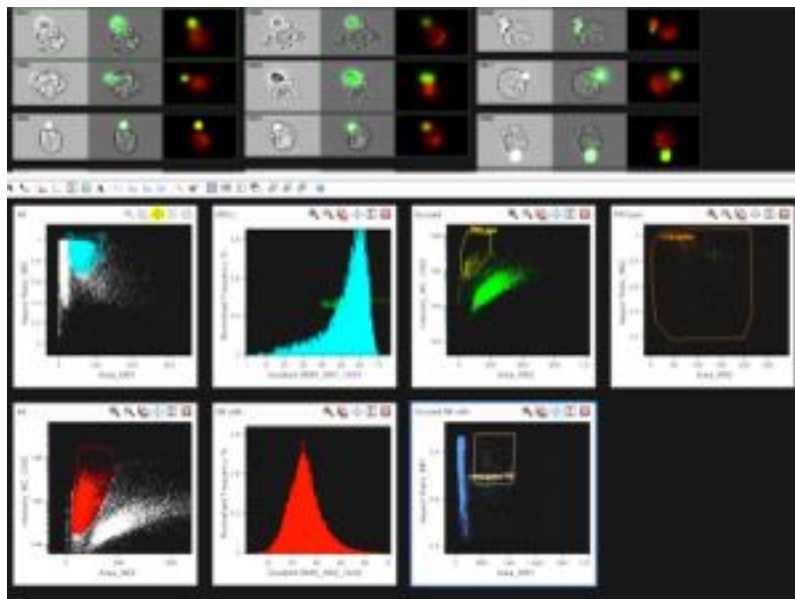
### Topic A - Non-invasive ultrasound imaging

The course will comprise a hands-on laboratory session on non-invasive ultrasound imaging for mouse and rat analysis of soft tissues and cardiac performance. The participants will be able to perform ultrasound imaging and monitor key physiological parameters, such as heart rhythm, using the high-frequency/high-resolution Vevo2100 digital imaging platform.



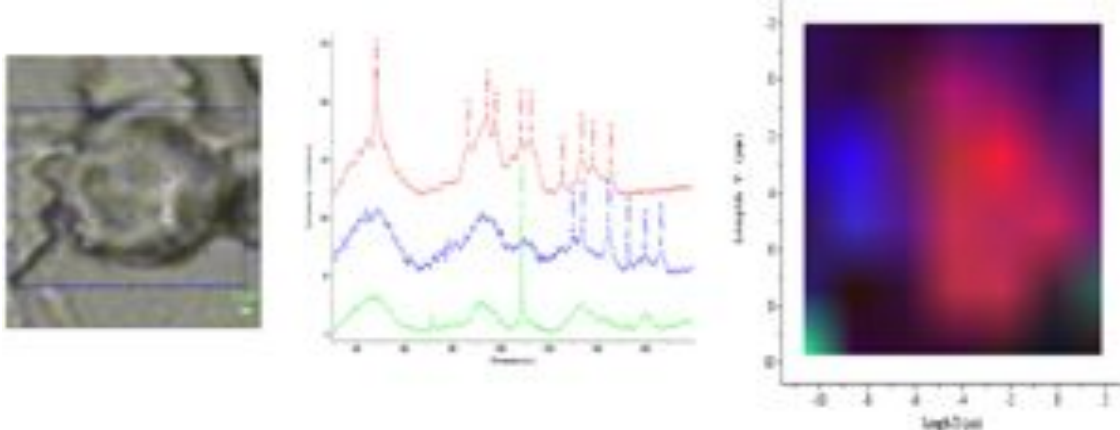
## Topic B - Imaging flow cytometry for quantification of cellular parameters.

Imaging Flow Cytometry is a technology that combines the advantages of flow cytometry with those of microscopy, enabling fast acquisition of images (both bright field and fluorescence) of each single cell, and the qualitative and quantitative analysis of several parameters extracted from such images. In this lab session, the participants had the opportunity to run labeled cells on an Imaging Flow Cytometer (ImageStreamX, from Amnis) and analyse them to quantify parameters, such as: cell morphology, marker(s) internalization, nuclear translocation, cell conjugation, amongst others.



## Topic C - Confocal Raman Microscopy

Confocal Raman microscopy probes the interaction of monochromatic laser light with chemical bonds, providing information rich spectra, giving detailed insight into the chemical composition of the sample. In this laboratory session the participants had the opportunity to identify molecular constituents in cells and to obtain Raman mapped images of their distribution. Participants also had the opportunity to analyze Raman spectra and maps using analytic computer tools, which empower them to perform such future analysis on their own.



## **Assessment of the results and impact of the event on the future direction of the field**

One of the main aims of the symposium was to promote a forum for those who have an interest in the application of Bioluminescence, especially in the field of biomaterials, tissue engineering and regenerative medicine, so that the participants could discuss the latest advances in the field, as well as have the opportunity to show their recent work.

Prior to the event there was a call for abstracts to be presented during the event, either in oral or poster presentations. The participants that submitted abstracts that were assessed to be of high quality by members of the scientific committee were given the opportunity to present their work during the podium presentations (10 minutes + 5 minutes for discussion). In total, 15 works were presented orally and 29 were presented in the poster sessions. Awards to the best oral and poster presentations were attributed.

The organized Bioluminescence lab sessions were organized into three separate themes:

- a) non-invasive ultrasound imaging
- b) imaging flow cytometry for quantification of cellular parameters
- c) confocal Raman microscopy.

A total of 28 students participated in the lab sessions and 9 of those requested testing and ECTS attribution.

Nine travel awards, funded by the European Science Foundation within the framework of the project REMEDIC, were attributed on a competitive basis to assist graduate students and post-docs to present their work at the symposium. The candidates had to submit an abstract accompanied by a motivation letter, and the applications assessed by the scientific committee. The awardees were:

- Annalisa Tirella (University Pisa, Italy)
- Anu Hyysalo (University Tampere, Finland)
- Gianni Orsi (University Pisa, Italy)
- Greet Kerckhofs (University Leuven, Belgium)
- Julian Daich (University Autonomous Madrid, Spain)
- Roberto Gramignoli (Karolinska University Hospital, Sweden)
- Sandra Santos (ITQB, Portugal)
- Estrela Neto (INEB, Portugal)
- Tiago dos Santos (University College Dublin, Ireland)

The travel awards consisted of a contribution of 500 € to cover the registration costs, as well as aid other travel and accommodation expenses. The only exception was in the case of the candidates Estrela Neto and Tiago dos Santos for whom the awards covered only the registration costs, as the candidates' address at the time of the event was Porto. In this way, one could attribute nine travel awards instead of offering the initially predicted eight grants.

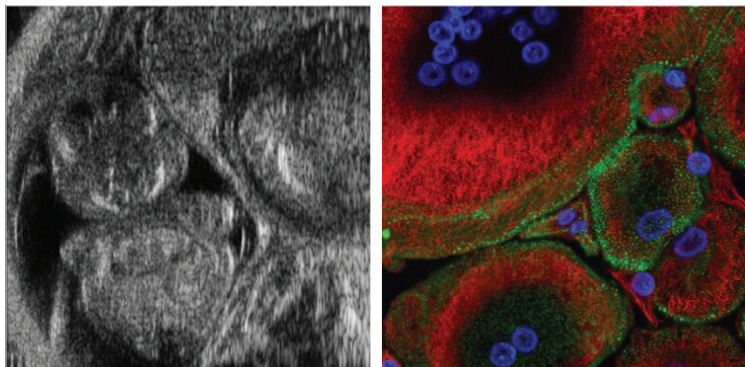
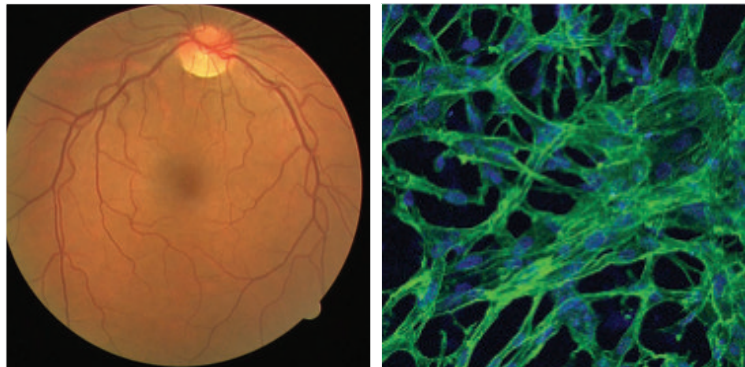
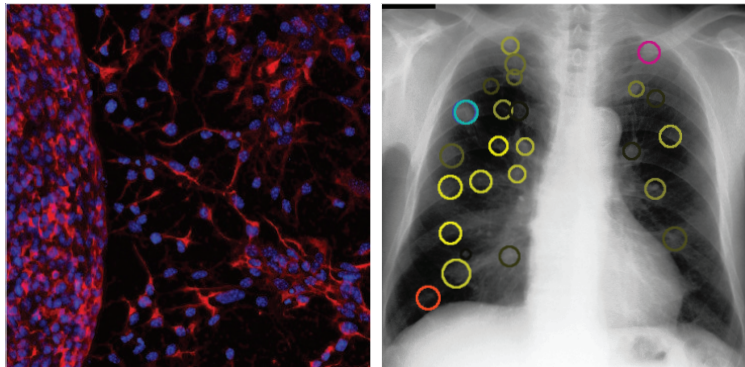
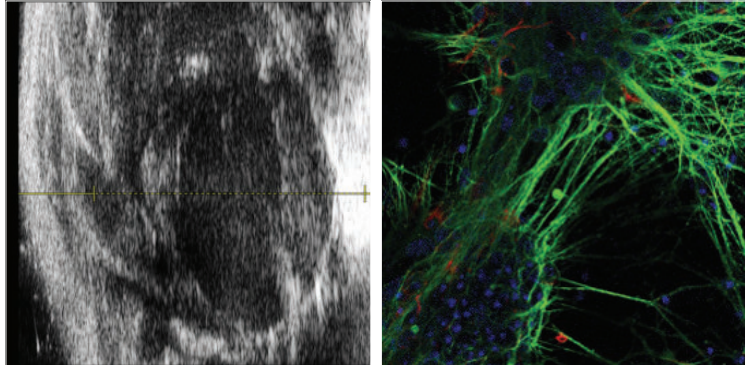
Overall, the feedback of the participants was very positive. Participants felt that their expectations were met and that they gained relevant knowledge in the area of applied Bioluminescence. From the inquiries that were performed at the end of the event, almost all the points received very good or excellent ratings and

the majority replied that they are highly motivated to participate in future editions of the symposium.



# BIOIMAGING 2012

1<sup>ST</sup> INTERNATIONAL SYMPOSIUM IN APPLIED BIOIMAGING  
BRIDGING DEVELOPMENT AND APPLICATION



## FINAL PROGRAMME

BIBLIOTECA ALMEIDA GARRETT, PORTO, SEPTEMBER 20-21, 2012

# PROGRAMME AT A GLANCE

	SEPTEMBER 19	SEPTEMBER 20	SEPTEMBER 21
8:30 9:00	Registration Lab Sessions	Registration	
9:00 9:30	Welcome Lab Sessions	Welcome	
9:30 10:30	Lab Sessions	Reinhold Erben	Aart van Apeldoorn
10:30 11:00		Coffee Break	Coffee Break
11:00 12:00		Daniel Sage	Boudewijn Lelieveldt
12:00 13:00		ORAL PRESENTATIONS	ORAL PRESENTATIONS
		Group Photo	
13:00 14:00	Lunch	Lunch	Lunch
14:00 15:00	Lab Sessions	Denis Wirtz	Bob Murphy
15:00 15:30		Coffee Break	Coffee Break
15:30 16:30		POSTER SESSION I Odd number posters	POSTER SESSION II Even number posters
16:30 17:30		ORAL PRESENTATIONS	ORAL PRESENTATIONS
17:30 18:30		Cristina Lo Celso	Pj Chana
18:30 19:00			Awards & Closing Session
19:30		Dinner	Visit Casa da Música



## VENUE

### MEETING



BIBLIOTECA ALMEIDA GARRETT - Jardins do Palácio de Cristal, Porto

### LAB SESSIONS



**Topic A** - IBMC.INEB - Rua do Campo Alegre, 823, 4150-180, Porto



**Topics B and C** - IPATIMUP - Rua Dr. Roberto Frias, 4200-465 Porto

### DINNER

The Symposium dinner will be held on September 20 in the restaurant Homem do Leme, starting at 19:30.



**ADDRESS: Avenida de Montevideu, 4150-516 Nevogilde, Porto**  
**(Bus 200, direction Castelo do Queijo, from stop Praça da Galiza to Molhe)**

### VISIT TO CASA DA MÚSICA

The visit is scheduled for September 21 at 19:30. The visit has the cost of 3€ that is not included in the registration fee. A minimum of 15 persons is required for the visit to take place, and the number of participants is limited to 40 (priority will be given on a first come first served basis).

The group will leave from Biblioteca Almeida Garrett at 19:00 and will go to Casa da Música walking (walking distance 20 min). The visit will take approximately 1 hour.

To register and pay for the visit, please refer to the Secretariat located in the foyer. The number of participants is limited. Registrations will be accepted till 15:30 of September 20. The organization cannot guarantee vacancies for requests made after this time.

# INFORMATIONS

## REGISTRATION DESK

The Registration desk will open at 8:30 on September 20 and 21.

## NAME BADGERS

For identification and security purposes, participants must wear their name badgers when in the venue. The use of the badge is mandatory for the access to the coffee breaks and lunches.

## PRESENTATION INSTRUCTIONS

The plenary sessions should last up to 45 minutes followed by 15 minutes discussion. Oral presentation should last up to 10 minutes followed by a maximum of 5 minutes for discussion.

Speakers presenting in the morning should hand in their presentations in the auditoriums until 09h00 of the presentation day. Speakers presenting in the afternoon sessions, should hand in their presentations during lunch break.

A data-show and personal computer will be at the presenters' disposal. Technicians will be available to make sure that you have successfully submitted your presentation. You will be requested to provide your presentation in a USB key. Speakers will not be allowed to use their own personal computers.

## POSTER PRESENTATIONS

Posters should have 1.20m high and 0.90m wide, and will be presented on the designated poster area. Conference staff will be present to provide assistance. Authors should remain next to their poster during the poster session.

**Poster Session I** - Odd number posters

**Poster Session II** - Even number posters

All posters must be placed before Poster Session I and remain in place until the end of Poster Session II.

## INTERNET ACCESS

Wireless internet is freely available in the symposium venue.

## MEALS AND COFFEE BREAKS

Coffee breaks will be served in the exhibition area in the morning (10:30-11:00) and afternoon (15:00-15:30). Lunch will be served at the Galeria do Palácio from 13:00-14:00 (same building of the symposium, ground floor).

## TRAVEL AWARD

The European Science Foundation in the framework of the project REMEDIC funded 9 Travel Awards on a competitive basis to assist graduate students and post-docs to present their work at the symposium.

The awardees were:

Annalisa Tirella (University Pisa, Italy), Anu Hyysalo (University Tampere, Finland), Estrela Neto (INEB, Portugal), Gianni Orsi (University Pisa, Italy), Greet Kerckhofs (University Leuven, Belgium), Julian Daich (University Autonomous Madrid, Spain), Roberto Gramignoli (Karolinska University Hospital, Sweden), Sandra Santos (ITQB, Portugal) and Tiago dos Santos (University College Dublin, Ireland).

## ECTS

The University of Porto has designated the present Symposium as a Continuing Educational Activity, with equivalence to 1.5 credits, according to the European Credit Transfer System (ECTS).

To claim the 1.5 credits, participants need to meet the following criteria:

- i) participate in a laboratory session and in all Symposium sessions;
- ii) obtain approval in a written exam.

To attest the participation in lectures, poster sessions and lab sessions, candidates must sign the presence sheets at the course secretariat and with the respective lab session responsible.

The exam is scheduled to take place on **October 4<sup>th</sup> at 15:00 GMT**. The exam will contain questions that cover the different topics discussed during the Symposium and lab sessions. Candidates can answer to the exam via email. For this purpose, questions will be available online at

**[http://www.bioimaging2012.ineb.up.pt/exam\\_bioimaging2012.rtf](http://www.bioimaging2012.ineb.up.pt/exam_bioimaging2012.rtf)**.

The candidates will have 2 hours (from 15:00 to 17:00 GMT) to answer the questions and send the answers in digital format to the email [bioimaging2012@ineb.up.pt](mailto:bioimaging2012@ineb.up.pt). During the exam period technical support will be available by phone (+351 226 074 982).

The exam will be an open book written examination. The candidates may make use of any notes or texts during the exam. However, the candidates should not receive any kind of third party help. **Plagiarism is not allowed.**

Participants interested in receiving an ECTS certificate should fill in the Declaration of Interest at the Secretariat of the Symposium and hand it until September 21, 2012 along with a copy of the identity card or passport and a copy of the certificate of the higher education degree.



# PROGRAMME

## THURSDAY, SEPTEMBER 20

**8:30 – 9:15** Registration

**9:15 – 9:30** **WELCOME**  
Mário Barbosa, Ana Paula Pêgo, Pedro Quelhas

**9:30 – 10:30** **INVITED LECTURE**

*Chair: Meriem Lamghari*

**Reinhold Erben**, University of Veterinary Medicine Vienna, Austria  
Animal model for unbiased cell tracking in regenerative medicine

**10:30 – 11:00** Coffee Break

**11:00 – 12:00** **INVITED LECTURE**

*Chair: Paula Sampaio*

**Daniel Sage**, École Polytechnique Fédérale de Lausanne, Switzerland  
Analysis in live Cell Imaging - ImageJ/Fiji Solutions

**12:00 – 12:45** **ORAL COMMUNICATIONS**

*Chair: Paula Sampaio*

**Estrela Neto**, INEB - Instituto de Engenharia Biomédica, Universidade do Porto / Faculdade de Medicina, Universidade do Porto

Quantitative method for assessing axonal outgrowth on microfluidic devices

**Steffen Petersen**, INL - International Iberian Nanotechnology Laboratory / Department of Health Science and Technology, Aalborg University

Drift Compensation in Fluorescence Microscopy

**Silvia Bessa**, INEB - Instituto de Engenharia Biomédica, Universidade do Porto / Faculdade de Engenharia, Universidade do Porto

An automatic image analysis system for the quantification of cell outgrowth from neurospheres

**12:45 – 13:00** GROUP PHOTO

**13:00 – 14:00** Lunch

**14:00 – 15:00** **INVITED LECTURE**

*Chair: Raquel Seruca*

**Denis Wirtz**, John Hopkins University, USA  
Cancer cell migration in 3D

**15:00 – 15:30** Coffee Break

**15:30 – 16:30 POSTER SESSION I**

Odd number posters

**16:30 – 17:30 ORAL PRESENTATIONS**

*Chair: Maria José Oliveira*

**João Miguel Sanches**, *Institute for Systems and Robotics, Department of Bioengineering-Instituto Superior Técnico / Technical University of Lisbon*

Characterization of E-Cadherin distribution from fluorescence images

**Raquel Conceição**, *IBEB - Instituto de Biofísica e Engenharia Biomédica, Faculdade de Ciências, Universidade de Lisboa*

Initial analysis of novel multimodal PEM-UWB technique for breast cancer detection: localization of cancer in homogeneous model of the breast

**Greet Kerckhofs**, *Department of Metallurgy and Materials Engineering, KU Leuven / Prometheus, Division of Skeletal Tissue Engineering Leuven, KU Leuven*

High-resolution non-destructive 3D quantitative imaging of the cartilage subarchitecture

**Daniel Simão**, *ITQB-UNL – Instituto de Tecnologia Química e Biológica, Universidade Nova de Lisboa / IBET – Instituto de Biologia Experimental e Tecnológica*

Novel strategies for 3D neural culture & gene delivery: towards human CNS *in vitro* models for preclinical research

**17:30 – 18:30 INVITED LECTURE**

*Chair: Maria José Oliveira*

**Cristina Lo Celso**, *Imperial College London, UK*

*In vivo* imaging of normal and malignant haematopoiesis

**19:30**

Conference Dinner

**FRIDAY, SEPTEMBER 21**

**9:30 – 10:30 INVITED LECTURE**

*Chair: Cristina Ribeiro*

**Aart van Apeldoorn**, *University of Twente, The Netherlands*

Raman microscopy as imaging tool in tissue engineering

**10:30 – 11:00**

Coffee Break

**11:00 – 12:00 INVITED LECTURE**

*Chair: Diana Nascimento*

**Boudewijn Lelieveldt**, *Leiden University Medical Center, The Netherlands*

Integrated analysis of multi-modal pre-clinical imaging studies



**12:00 – 13:00 ORAL COMMUNICATIONS**

*Chair: Diana Nascimento*

**Luís Metello**, Nuclear Medicine Department, ESTSP.IPP, Polytechnic Institute of Porto  
NanoSPECT/MRI: a “new generation” high performance tool in pre-clinical imaging

**Julian Daich**, UAM - Universidad Autónoma de Madrid  
Substrates with magnetic functionality for in situ reporting of enzymatic activity

**Annalisa Tirella**, Interdepartmental Research Center “E. Piaggio”, University of Pisa  
Assessment of nanomaterial toxicity through Quantitative Imaging

**Tiago dos Santos**, Centre for BioNano Interactions, School of Chemistry and Chemical Biology, University College Dublin

Uptake of polystyrene nanoparticles of different size into multiple cell lines: approaches to control and understand bio-nano interactions

**13:00 – 14:00** Lunch

**14:00 – 15:00 INVITED LECTURE**

*Chair: Pedro Quelhas*

**Bob Murphy**, Carnegie Mellon University, USA  
Imaged-derived models of subcellular organization over time and space

**15:00 – 15:30** Coffee Break

**15:30 – 16:30 POSTER SESSION II**

Even number posters

**16:30 – 17:30 ORAL PRESENTATIONS**

*Chair: Catarina Almeida*

**Susana Santos**, NewTherapies Group, INEB - Instituto de Engenharia Biomédica  
Exploring dendritic cell – mesenchymal stromal cell crosstalk

**Juan Carlos Moreno**, CMUC – Department of Mathematics, University of Coimbra  
A numerical approach for Multiphase Image Segmentation

**José Santos**, Group Dynamics of Host-Pathogen Interactions, Institut Pasteur / Doctoral Program in Areas of Basic and Applied Biology (GABBA), Universidade do Porto  
Hierarchies of host factor dynamics at the entry site of *Shigella flexneri* during host cell invasion

**Hemmel Amrania**, Experimental Solid State Group, Physics Dept., Imperial College  
Digistain: a digital staining instrument for histopathology

**17:30 – 18:30 INVITED LECTURE**

*Chair: Catarina Almeida*

**Pj Chana**, Flow cytometry Laboratory, Biomedical Research Centre, Guy’s Hospital, UK  
The Image Stream platform and its applications

**18:30 – 19:00** Awards and Closing Session

**19:30** Visit to Casa da Música [Optional - registration is mandatory]



# LAB SESSIONS



## LAB SESSIONS

# TOPIC A: NON INVASIVE ULTRASOUND IMAGING

**LOCATION: IBMC.INEB  
RUA DO CAMPO ALEGRE, 823, 4150 180 PORTO**



The course will comprise a hands-on laboratory session on non-invasive ultrasound imaging for mouse and rat analysis of soft tissues and cardiac performance. The participants will be able to perform ultrasound imaging and monitor key physiological parameters, such as heart rhythm, using the high-frequency/high-resolution Vevo2100 digital imaging platform.

### LAB ASSISTANTS



Diana S. Nascimento, PhD



Tatiana P. Resende, PhD



Susana Santos, PhD



Isabel Amaral, PhD

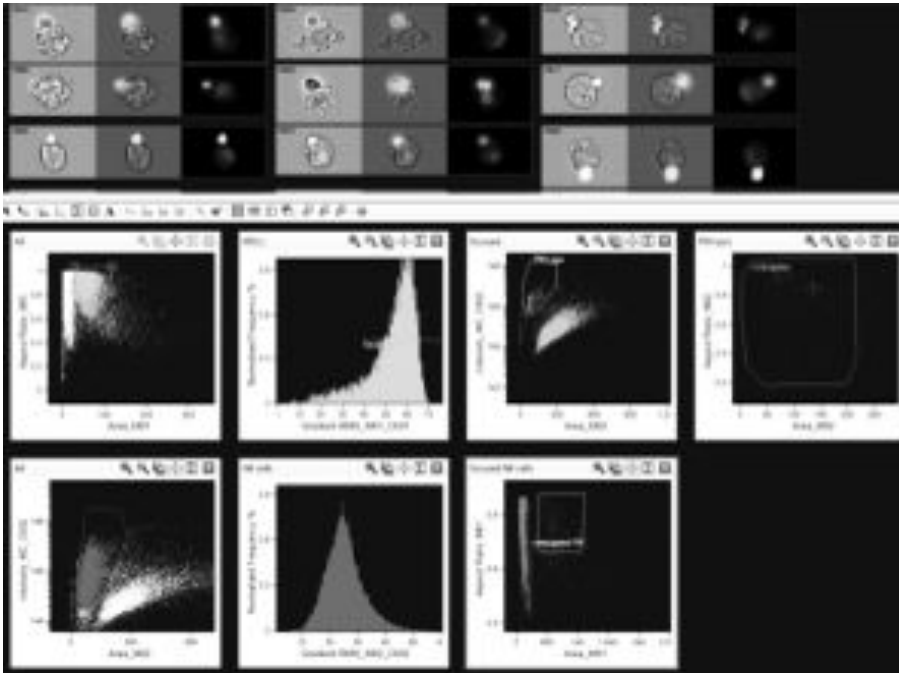






# TOPIC B: IMAGING FLOW CYTOMETRY FOR QUANTIFICATION OF CELLULAR PARAMETERS

**LOCATION: IPATIMUP  
RUA DR. ROBERTO FRIAS, 4200 465 PORTO**



Imaging Flow Cytometry is a technology that combines the advantages of flow cytometry with those of microscopy, enabling fast acquisition of images (both bright field and fluorescence) of each single cell, and the qualitative and quantitative analysis of several parameters extracted from such images. In this lab session, the participants will have the opportunity to run labelled cells on an Imaging Flow Cytometer (ImageStreamX, from Amnis) and analyse them to quantify parameters, such as: cell morphology, marker(s) internalization, nuclear translocation, cell conjugation, amongst others.

## LAB ASSISTANTS



Catarina Almeida, PhD



Marina Leite, PhD



Raquel Gonçalves, PhD



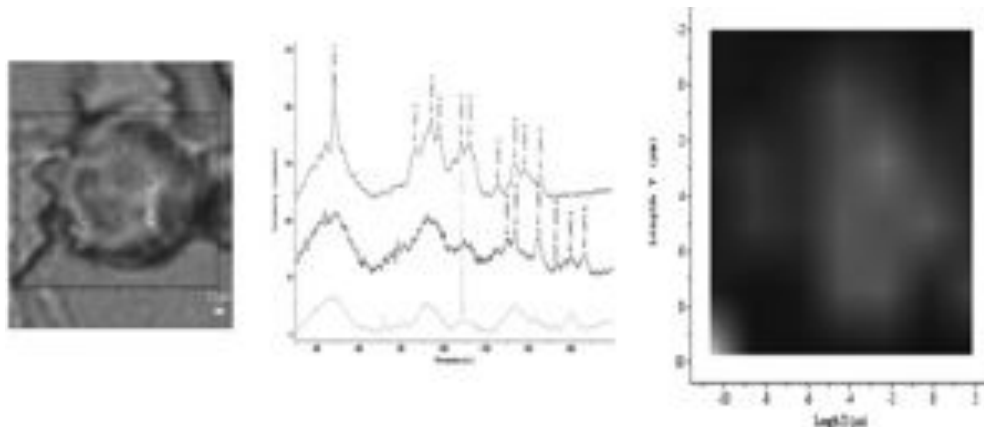
Inês Alencastre, PhD





# TOPIC C: CONFOCAL RAMAN MICROSCOPY

**LOCATION: IPATIMUP  
RUA DR. ROBERTO FRIAS, 4200 465 PORTO**



Confocal Raman microscopy probes the interaction of monochromatic laser light with chemical bonds, providing information rich spectra, giving detailed insight into the chemical composition of the sample. In this laboratory session the participants will have the opportunity to identify molecular constituents in cells and to obtain Raman mapped images of their distribution.

## LAB ASSISTANTS



Cristina Ribeiro, PhD



Pedro Quelhas, PhD

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# INVITED SPEAKERS





# INVITED SPEAKERS

## INVITED SPEAKER 1

### Reinhold Erben

University of Veterinary Medicine Vienna, Austria



Reinhold G. Erben studied Human and Veterinary Medicine in Munich, Germany, and received his MD and DVM degrees from the University of Munich. He is currently Professor of Physiology and Pathophysiology at the University of Veterinary Medicine in Vienna, Austria. His research is focussed on the molecular endocrinology of bone and mineral metabolism as well as on bone and cartilage regeneration.

## INVITED SPEAKER 2

### Daniel Sage

École Polytechnique Fédérale de Lausanne, Switzerland



Daniel Sage received the M.S. and Ph.D. degrees in control and signal processing from the Institut National Polytechnique de Grenoble (INPG), Grenoble, France, in 1986 and 1989, respectively. From 1989 to 1998, he was a Consulting Engineer developing vision systems for quality control, then Head of the Industrial Vision Department. In 1998, he joined the Biomedical Imaging Group at the Ecole Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland, as the Head of software development. He is involved in numerous image-processing and image-analysis projects dealing with life cell imaging and microscopy. He is also engaged in the development of methods for computer-assisted teaching.

## INVITED SPEAKER 3

### Dennis Wirtz

John Hopkins University, USA



Dr. Denis Wirtz's research area is Nanotechnology for Cancer Research and has been funded by the NIH, NSF, and the American Heart Association. He is co-Director of the Johns Hopkins Institute for NanoBioTechnology (INBT), Director of the HHMI graduate training program, Director of the NCI-funded postdoctoral training program in nanotechnology for cancer medicine, and Director of the new NCI-funded Engineering in Oncology Center. Wirtz is author and co-author of 135 peer-reviewed articles published in journals such as Science, Nature, Nature Cell Biology, Nature Methods, Nature Materials, Nature Protocols, PNAS, Nature Communications, and Nature Reviews Cancer. His work at Hopkins has been cited > 6,700 times and has an h-index of 48. Wirtz received the NSF Career award in 1995, was named Theophilus H. Smoot Professor of Engineering and Science in 2009, fellow of the Institute for Medical and Biological Engineering in 2007, fellow of the American Association for the Advancement of Science (AAAS) in 2009, and fellow of the American Physical Society in 2010. Wirtz received a physics engineering degree from the Free University of Brussels in 1988, and MSc and PhD in Chemical Engineering from Stanford University in 1993.

## INVITED SPEAKER 4

### Cristina Lo Celso

Imperial College London, UK



Cristina Lo Celso is Lecturer in Immunology at Imperial College London. After her PhD in London and a PostDoc at the Harvard Stem Cell Institute, Cristina has recently obtained a Cancer Research UK Career Establishment Award. She has developed an in vivo imaging methodology to visualise transplanted stem cells within the bone marrow space. She continues developing new and improved intravital microscopy approaches to study haematopoietic stem and progenitor cells in the bone marrow microenvironment during steady state and in response to perturbations, such as inflammation and leukaemia development.

**INVITED SPEAKER 5**

**Aart van Apeldorn**

University of Twente, The Netherlands



Aart van Apeldoorn is assistant professor at Twente University, at the MIRA Institute of Biomedical Technology and Technical Medicine (the Netherlands). His main research focus is on developing extra-hepatic beta cell therapies for type 1 diabetes patients using tissue engineering strategies. He is coordinator of reconstructive medicine study at the technical medicine master study and chairman of the steering committee of the diabetes cell therapy initiative in the Netherlands. He has worked in the past on developing confocal Raman microscopy in combination with scanning electron microscopy, which has ultimately led to a spin-off company for commercialization of this technology. In his current work he is using Raman microscopy as an imaging tool besides other imaging techniques for studying single cells, tissues and biomaterials.

**INVITED SPEAKER 6**

**Boudewijn Lelieveldt**

Leiden University Medical Center, The Netherlands



Boudewijn P.F. Lelieveldt is professor at the Department of Radiology, Leiden University Medical Center, Leiden, the Netherlands, where he is heading the Division of Image Processing (LKEB, [www.lkeb.nl](http://www.lkeb.nl)). He is also appointed at the Department of Intelligent Systems, Delft University of Technology, Delft, the Netherlands in the context of the Medical Delta consortium. His main research interest is the integration of a-priori knowledge into image segmentation and registration algorithms, with main applications: cardiac imaging and multi-modal pre-clinical imaging. He serves as a member of the Editorial Board of Medical Image Analysis and the International Journal of Cardiovascular Imaging, and is an Associate Editor of IEEE Transactions on Medical Imaging.

**INVITED SPEAKER 7**

**Robert F. Murphy**

Carnegie Mellon University, USA



Prof. Robert Murphy is the Ray and Stephanie Lane Professor of Computational Biology and Professor of Biological Sciences, Biomedical Engineering, and Machine Learning at Carnegie Mellon University, and Director (Department Head) of the Lane Center for Computational Biology in the School of Computer Science. He is also Honorary Professor of Biology at the Albert Ludwig University of Freiburg, Germany. Dr. Murphy has co-edited two books and three special journal issues on cell imaging, and has published over 180 research papers. He is Past-President of the International Society for Advancement of Cytometry, and is a member of the National Advisory General Medical Sciences Council and the NIH Council of Councils. Dr. Murphy's career has centered on combining fluorescence-based cell measurement methods with quantitative and computational methods. In the mid 1990's, his group pioneered the application of machine learning methods to high-resolution fluorescence microscope images depicting subcellular location patterns. His current research interests include image-derived models of cell organization and active machine learning approaches to experimental biology.

**INVITED SPEAKER 8**

**Pj Chana**

Flow cytometry Laboratory, Biomedical Research Centre, Guy's Hospital, UK



Pj Chana completed his Bsc in Biological studies and Msc in Immunology at King's College London University. From there he went on to work for an expanding contract research organization based in Cambridge, specializing in biomarker discovery and immune monitoring. He next moved into academic focusing on Flow Cytometry and is currently a Manager at the BRC Flow Cytometry Core Facility based at Guy's and St. Thomas Hospital London. Here he has concentrated on the introduction and application of the Amnis ImageStreamX platform, integrating the technology into a successful core facility. The areas of its applications include translocation studies, phagocytosis, marker polarization, co-localization, autophagy and cell-cell interactions.

# ORAL COMMUNICATIONS



# ORAL COMMUNICATIONS LIST

## ORAL COMMUNICATION 1

### **Quantitative method for assessing axonal outgrowth on microfluidic devices**

EC Neto, P Aguiar, R Almeida and M Lamghari

## ORAL COMMUNICATION 2

### **Drift Compensation in Fluorescence Microscopy**

Steffen B. Petersen, Viruthachalam Thiagarajan, Isabel Coutinho, Gnana Prakash Gajula, Maria Teresa Neves-Petersen

## ORAL COMMUNICATION 3

### **An automatic image analysis system for the quantification of cell outgrowth from neurospheres**

S. Bessa, I.F. Amaral, P. Quelhas

## ORAL COMMUNICATION 4

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Raquel C. Conceição, Martin O'Halloran, Ricardo M. Capote, Cláudia S. Ferreira, Edward Jones, Martin Glavin, Pedro Almeida

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G. Kerckhofs, J. Sainz, M. Wevers, T. Van de Putte, J. Schrooten

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Daniel Simão, Catarina Pinto, Paulo Fernandes, Margarida Serra, Giampietro Schiavo, Eric Kremer, Paula Alves, Catarina Brito

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A. Silva, C.R. Almeida, M.I. Oliveira, M.A. Barbosa and S.G. Santos

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J.C. Santos, S. Ehsani, C.D. Rodrigues, R. Henriques, J. Enninga

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