

# MIGUEL XAVIER, MSc, PhD

International Iberian Nanotechnology Laboratory (INL) - Braga, Portugal | Mobile: 0044 7521 685 413  
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## Summary

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Biomedical Engineer with 6+ years of experience in research. Adept at cell culture, stem cell biology, microfluidics and *in vitro* epithelial models. Highly-motivated researcher with permanent curiosity for knowledge. Excellent communicator who consistently maintains high standards of professionalism and works well on diverse teams. His PhD focused on the development of label-free microfluidic strategies to isolate skeletal stem cells from human bone marrow. Miguel worked as a post-doctoral fellow at the University of Southampton, developing a dynamic Lung-On-Chip with real-time impedance monitoring for and on a project targeting the identification of novel RNA biomarkers of skeletal stem cells using next generation sequencing strategies based on DropSeq. Currently works at the INL within the Food Processing research group towards the development of a new Gut-On-Chip platform.

## Professional Skills

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- Rapid prototyping, UV photolithography and soft lithography.
- Cell sorting using deterministic lateral displacement.
- Cell sorting using FACS and MACS.
- Microfluidic impedance cytometry.
- Real-time deformability cytometry.
- Next generation sequencing using DropSeq.
- Cell culture (including cell lines, primary cells and stem cells).
- Immunocytochemistry & fluorescence microscopy.
- Knowledge in TEM, NMR spectroscopy and particle characterisation techniques.
- Competent in MatLab, SPSS, GraphPad, ImageJ, CleWin, SolidWorks, and other software.

## Professional Experience

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- Research Fellow** **Oct 2018 to Present**  
**INL - International Iberian Nanotechnology Laboratory** – Braga, Portugal  
Gut-On-Chip: Development of a modular micro-device for simulation of the human gastrointestinal tract
- Post-doctoral Research Fellow** **Oct 2017 to Aug 2018**  
**University of Southampton** – Southampton, UK.  
Lung-On-Chip: Development of a novel 3D microfluidic assay platform for the assessment of human stem cell-derived epithelial function  
DropSeq: Identifying the skeletal stem cell for regeneration - harnessing smart nanoparticles and single cell DropSeq molecular profiling platforms
- PhD Student – Marie Curie Early Stage Researcher** **Sep 2014 to Oct 2017**  
**Faculty of Physical Sciences and Engineering, University of Southampton** – Southampton, UK.  
European Union's Seventh Framework Programme project – Label-free Particle Sorting (LAPASO).  
**Thesis title:** Label-free, microfluidic characterisation and sorting of skeletal stem cells.
- Visiting Researcher** **April and June 2015**  
**Biotechnology Center, Technische Universität Dresden (TUD)** – Dresden, Germany  
Real-Time Deformability Cytometry of HL-60, MG-63, whole blood and human bone marrow skeletal stem cells.
- Research Fellow** **Jan 2013 to Aug 2014**  
**Instituto de Engenharia Biomédica (INEB), I3S** – Porto, Portugal  
Developed a comprehensive and reproducible *in vitro* cell-based model of the blood-brain barrier.  
Investigated the impact of PAMAM dendrimers on the survival and differentiation of neural stem cells (NSCs), and assessed PAMAM-mediated transfection of NSCs with a BDNF-coding plasmid.
- Visiting Researcher** **Jan 2014 to Feb 2014**  
**Centro de Química da Madeira, Universidade da Madeira (CQM)** – Funchal, Portugal  
Chemical modification of PAMAM dendrimers with poly(ethylene glycol) chains and a fluorescent tag and characterisation using <sup>1</sup>H-NMR spectroscopy.
- Master Student** **Jan 2012 to Oct 2012**  
**Instituto de Engenharia Biomédica (INEB)**  
**Thesis title:** "Study and development of a model for mimicking the gastric mucosa".

## Teaching Experience

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**Demonstrator – BioNanotechnology course (Univ. of Southampton ELEC 6205)** 2014-2017  
Soft lithography, surface modification, contact angle, fluorescence microscopy and protein micro-contact printing.

## Education

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**Philosopher's Degree (PhD)** Sep 2014 to May 2018  
University of Southampton – Southampton, UK.  
Thesis title: Label-free, microfluidic characterisation and sorting of skeletal stem cells

**Master of Science, BioEngineering** Sep 2007 to Oct 2012  
Faculdade de Engenharia da Universidade do Porto – Porto, Portugal  
Final grade: 16/20 (European Grade A: Top 10% of course students)

**High School Degree – Sciences** Sep 2004 to Jul 2007  
Escola Secundária Martins Sarmiento – Guimarães, Portugal  
Final grade: 188/200 (Top 10% of course students)

## Publications

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### *Papers in international peer-reviewed journals*

**“Label-free enrichment of human bone marrow progenitor cells using deterministic lateral displacement”**  
Miguel Xavier, S. Holm, J. Beech, D. Spencer, J. Tegenfeldt, ROC Oreffo and H. Morgan  
Manuscript in preparation

**“PAMAM Dendrimers: Blood-Brain Barrier Transport and Neuronal Uptake after Focal Brain Ischemia”**  
Sofia D Santos, Miguel Xavier, Diana M Leite, Débora A Moreira, Rita Castro, Victoria Leiro, Joao Rodrigues, Ana P Pêgo, and Helena Tomas.  
*Journal of Controlled Release* (In Press; Accepted Manuscript).

**“Size and dielectric properties of skeletal stem cells change critically after enrichment and expansion from human bone marrow; consequences for microfluidic cell sorting”**  
Miguel Xavier, María C. de Andrés, Daniel Spencer, Richard OC Oreffo and Hywel Morgan.  
*J. R. Soc. Interface* 2017 14 20170233; DOI: 10.1098/rsif.2017.0233.

**“Skeletal stem cell isolation: A review on the state-of-the-art microfluidic label-free sorting techniques”**  
Miguel Xavier, R OC Oreffo and H. Morgan  
*Biotechnology Advances*, Volume 34, Issue 5, September–October 2016, Pages 908-923

**“Mechanical phenotyping of primary human skeletal stem cells in heterogeneous populations by real-time deformability cytometry”**  
Miguel Xavier, Philipp Rosendahl, Maik Herbig, Martin Kräter, Daniel Spencer, Martin Bornhäuser, Richard O.C. Oreffo, Hywel Morgan, Jochen Guck and Oliver Otto  
*Integrative Biology*, 2016, 8, 616-623.

## Awarded Grants

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**Institute for Life Sciences Research Stimulus Fund (£18,277)** Feb-Jul 2018  
Development of a Microfluidic Lab-On-a-Chip Device into a Working Prototype for Clinical Application in Bone Tissue Engineering

## Awards

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### Merit Awards

**Gold Medal for Excellence in Engineering by a Young Engineer** March 2017  
STEM for Britain Competition 2017  
<https://www.southampton.ac.uk/medicine/news/2017/03/bone-research-winner.page>

**Winner of the 3-Minute Thesis Faculty Competition** March 2017  
Faculty of Physical Sciences and Engineering, University of Southampton  
<https://www.youtube.com/watch>

**Honourable Mention to Team FedOx** July 2016  
Miguel Xavier, Catarina Costa Moura, Antonio de Grazia, Gianluca Cidonio and Estrela Neto  
TERMIS-EU 2016 Business Plan Competition - Final

## Curriculum Vitae

(<https://www.southampton.ac.uk/ifls/news/2016/07/22-termis-european-finals.page>)

<b>Best Science Student Award</b> Associação dos Antigos Estudantes do Liceu de Guimarães.	2007
<b>Best Mathematics Student Award</b> Associação dos Antigos Estudantes do Liceu de Guimarães.	2007
<b>Merit and Excellence Award</b> Escola Secundária Martins Sarmento	2007

### Oral communication awards

<b>Best Oral presentation</b> European Workshop on Label-free Particle Sorting, Lund, Sweden. <a href="https://www.southampton.ac.uk/chdscr/news/2017/09/lapaso-conference.page?">https://www.southampton.ac.uk/chdscr/news/2017/09/lapaso-conference.page?</a>	September 2017
<b>Best Oral presentation</b> Southampton Medical & Health Research Conference 2017, University of Southampton <a href="https://www.southampton.ac.uk/chdscr/news/2017/06/conference-awards.page">https://www.southampton.ac.uk/chdscr/news/2017/06/conference-awards.page</a>	June 2017

### Poster communication awards

<b>Best Poster presentation</b> Precision Cancer Medicine: Forefront Technologies at the Clinical Interface, Southampton, UK.	September 2017
<b>Best Poster Award</b> "Gene/Drug Delivery to the Central Nervous System: Overcoming the Blood-brain Barrier". INEB 2nd Summer Science Club	July 2013

### Travel awards

<b>TCES travel fellowship to present at TERMIS-EU 2016</b>	June 2016
<b>Funding to present at TERMIS-EU 2016 Business Plan Competition</b> Awarded to Team FedOx ( <b>Miguel Xavier</b> , C.C. Moura, A. de Grazia, G. Cidonio and E. Neto) by the Institute for Life Sciences, University of Southampton.	June 2016
<b>Funding to present at TERMIS-EU 2016 Business Plan Competition</b> Awarded to Team FedOx ( <b>Miguel Xavier</b> , C.C. Moura, A. de Grazia, G. Cidonio and E. Neto) by the Southampton Opportunity Fund.	June 2016
<b>Funding to present at TERMIS-EU 2016 Business Plan Competition</b> Awarded to Team FedOx ( <b>Miguel Xavier</b> , C.C. Moura, A. de Grazia, G. Cidonio and E. Neto) by the University of Southampton Education Enhancement Fund.	June 2016

## References

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<b>Dr. Catarina Gonçalves (PhD) – Supervisor at INL</b> INL - International Iberian Nanotechnology Laboratory – Braga, Portugal E-mail: catarina.goncalves@inl.int	Oct 2018 to Present
<b>Professor Hywel Morgan (PhD) – PhD Advisor</b> Electronics and Computer Sciences, University of Southampton – Southampton, United Kingdom. E-mail: hm@ecs.soton.ac.uk	Sep 2014 to Present
<b>Professor Richard Oreffo (PhD) – PhD Advisor</b> Institute of Developmental Sciences, University of Southampton – Southampton, United Kingdom. E-mail: roco@soton.ac.uk	Sep 2014 to Present
<b>Dr. Ana Paula Pêgo (PhD) – Supervisor at INEB, I3S</b> Instituto de Investigação e Inovação da Universidade do Porto (I3S) – Porto, Portugal. E-mail: apego@ineb.up.pt	Jan 2013 to Aug 2014
<b>Dr. Pedro L. Granja (PhD) – MSc thesis Advisor</b> Instituto de Investigação e Inovação da Universidade do Porto (I3S) – Porto, Portugal. E-mail: pgranja@ineb.up.pt	Jan 2012 to Oct 2012
<b>Dr. Bruno Sarmento (PhD) – MSc thesis Advisor</b> Instituto de Investigação e Inovação da Universidade do Porto (I3S) – Porto, Portugal. E-mail: bruno.sarmiento@ineb.up.pt	Jan 2012 to Oct 2012