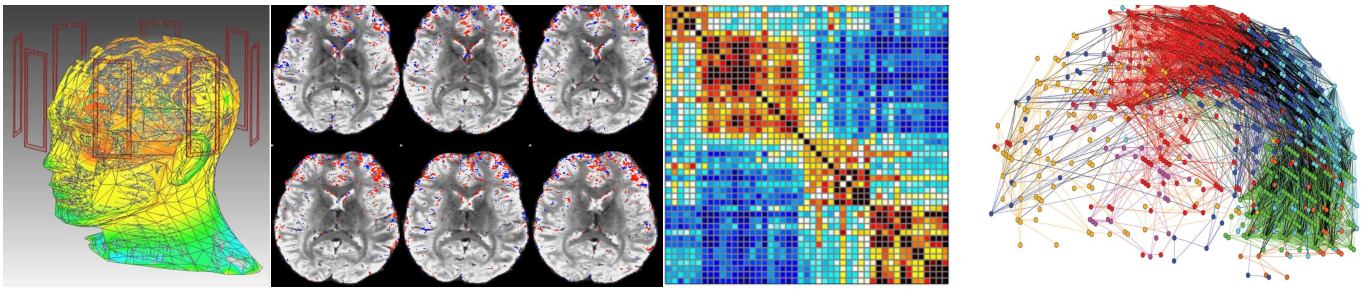

Advanced Brain Imaging Techniques Symposium

Anfiteatro Abreu Faro, Complexo Interdisciplinar, Instituto Superior Técnico

December 3rd 2015

Program

9h30 **New Directions for MRI Hardware and Acquisition, Lawrence Wald**
Massachusetts General Hospital A. Martinos Center, Harvard Medical School, Harvard-MIT HST

10h30 **Brain Microstructure at Ultra-High Fields, Noam Shemesh**
Champalimaud Neuroscience Program, Champalimaud Foundation

10h55 **Enhancing Simultaneous EEG-fMRI in humans: from 3T to 7T, Patrícia Figueiredo**
Institute for Systems and Robotics, Instituto Superior Técnico, Universidade de Lisboa

11h20 **Coffee Break**

11h35 **Echo-planar Imaging of Human Brain Function, Physiology and Structure at 7 Tesla: Challenges and Opportunities, Marta Bianciardi**
Massachusetts General Hospital, A. Martinos Center for Biomedical Imaging

12h00 **Reinforcement learning, habits, and tics, Tiago Maia**
School of Medicine, Universidade de Lisboa

12h25 **Modern Optimization in Imaging: Some Recent Highlights, Mário Figueiredo**
Telecommunications Institute, Instituto Superior Técnico, Universidade de Lisboa

12h50 **Closing Remarks**

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Project HiFI-MRI
PTDC/EEI-ELC/3246/2012

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Biographic notes:

Lawrence L. Wald, Ph.D. is the director of the Massachusetts General Hospital NMR Core imaging facility at the MGH Martinos Center and an Associate Professor of Radiology at Harvard Medical School. He was recently named the Charles and Sara Fabrikant MGH Research Scholar. He is a member of the affiliated faculty of the Harvard-MIT division of Health Sciences and Technology (HST) and has also been a visiting Professor of Electrical Engineering and Computer Science at MIT.His research interests focus on magnetic resonance methodology for high-field brain imaging. Dr. Wald's recent work has explored the benefits and challenges of highly parallel detection and its application to highly accelerated image encoding and parallel excitation. Additionally he is working on ultra-high-field MRI (7 Tesla) methodology for brain imaging and improved methods for studying the Human Connectome Project. He is an author on approximately 110 publications. Dr. Wald received undergraduate training in physics at Rice University, and a doctorate in physics from the University of California at Berkeley with a thesis related to optical detection of nuclear magnetic resonance (NMR). He obtained postdoctoral training in physics at Berkeley and then in radiology and MRI at the University of California at San Francisco, where he worked on MR spectroscopic imaging of brain tumors and the development of phased array coils for high- resolution imaging and spectroscopy. Dr. Wald enjoys an active role in educational programs at MGH and MIT and through the International Society of Magnetic Resonance in Medicine (ISMRM), the Organization of Human Brain Mapping (OHBM) and Radiological Society of North America (RSNA.) He was recently elected as a fellow of the ISMRM and to the College of Fellows of the American Institute for Medical and Biological Engineering (AIMBE).

Noam Shemesh received his BSc in 2006 from the school of Chemistry, Tel Aviv University, Israel, where he continued to a direct-track PhD in Prof. Yoram Cohen's group. During his PhD, Noam harnessed advanced Magnetic Resonance Imaging (MRI) methodologies to investigate micro-architectures of highly heterogeneous and complex systems, with special emphasis on the elusive–yet equally paramount–characterizations of the brain's gray matter. For this work, Noam received the Young Investigator Award from the International Society of Magnetic Resonance in Medicine, and was subsequently elected a Junior Fellow of the Society. In 2011, Noam joined Prof. Lucio Frydman's group at the Chemical Physics Department in the Weizmann Institute of Science as a post-doctoral fellow, where he worked on ultrahigh field MR Spectroscopy of brain metabolites and on the development of novel ultrasensitive MRI techniques aimed at resolving cellular size distributions in the brain. In 2014, after a brief EMBO Fellowship in the Ecole Polytechnique Federale de Lausanne (EPFL), Noam moved to the Champalimaud Neuroscience Programme in Lisbon, Portugal, to establish his own Lab, which focuses on investigating neural plasticity and its correlation with ensuing behaviors in both normal and diseased animal models via advanced, ultrahigh field MRI coupled with optogenetics and optical microscopy. Recently, the Shemesh Lab began developing novel nonBOLD fMRI methodologies at ultrahigh fields, a project for which he was recently awarded the Marie Sklodowska Curie Individual Fellowship and the ERC starting grant in 2015.

Patrícia Figueiredo graduated in Physics and Engineering from Instituto Superior Técnico (IST) at the Technical University of Lisbon, and subsequently received the D.Phil. degree in Clinical Neurology from the University of Oxford. She is currently a tenured Assistant Professor at IST, and a principal researcher at the Biomedical Engineering Lab of the Institute for Systems and Robotics (ISR-Lisboa/LARSyS). During the past ten years, she has been responsible and participated in several national and international research projects in brain imaging, neuroscience and biomedical engineering, and she has been the author of 26 articles in international journals of high impact in these fields. Her work has been distinguished with a Prize for Women in Science by L'Oréal Portugal, a best paper award by the Portuguese League against Epilepsy, and the António Xavier Prize for the best Portuguese PhD Thesis in NMR, EPR or MRI in 2013, as advisor. Her current research interests are focused on imaging human brain function and physiology in both health and disease, using multiple perfusion and functional MRI techniques as well as their multimodal integration with EEG.

Marta Bianciardi received an M.S. degree in Physics, a Ph.D. in Biophysics, and a Specialization in Medical Physics from University of Rome "La Sapienza", Italy. After a short post-doctoral fellowship at Fondazione Santa Lucia I.R.C.C.S. (Neuroimaging Laboratory, Rome, Italy), she completed her post-doctoral research at the National Institutes of Health (Advanced MRI Section, LFMI, NINDS, Bethesda, USA). She is currently a junior faculty – Instructor of Radiology – at Harvard Medical School, and an Assistant in Biomedical Engineering at the Athinoula A. Martinos Center for Biomedical Imaging, Massachusetts General Hospital (Boston, MA). Over the last decade, her research has been focused on the development of ultra-high field magnetic resonance imaging (MRI) techniques to investigate *in vivo* brain function, physiology and structure. Her current work focuses on the development of endogenous and fast MRI measures of cerebrovascular and brain parenchymal compliance, and on the structural and functional delineation of tiny nuclei of the human brainstem by multi-contrast and distortion-matched ultra-high field MRI.

Tiago V. Maia is Assistant Professor ("Professor Auxiliar") at the School of Medicine, University of Lisbon (Portugal). He did his Ph.D. in Psychology at Carnegie Mellon University. Before returning to Portugal in 2011, he was an Assistant Professor of Clinical Neurobiology in the Department of Psychiatry at Columbia University. Research in his lab focuses on the integrated use of computational modeling, brain imaging, and behavioral experiments to understand the neural bases of several psychiatric disorders. He is the author or co-author of 23 journal articles (8 of which in journals with impact factor greater than 10) and 2 encyclopedia chapters. He is first author of 11 of these articles (including in journals such as the *Proceedings of the National Academy of Sciences* and *Nature Neuroscience*) and co-first author in another 2 articles. In 2013, he was considered a "Rising Star" by the Association for Psychological Science.

Mário A. T. Figueiredo received MSc and PhD degrees in electrical and computer engineering, both from Instituto Superior Técnico (IST), the engineering school of the University of Lisbon, in 1990 and 1994. He has been with the faculty of the Department of Electrical and Computer Engineering, IST, since 1994, where he is now a Full Professor. He is also area coordinator and group leader at Instituto de Telecomunicações, a private non-profit research institute. His research interests include image processing and analysis, machine learning, and optimization. Mário Figueiredo is a Fellow of the IEEE and of the IAPR and is included in the 2014 and 2015 Thomson Reuters' Highly Cited Researchers lists; he received the 1995 Portuguese IBM Scientific Prize, the 2008 UTL/Santander-Totta Scientific Prize, the 2011 IEEE Signal Processing Society Best Paper Award, the 2014 IEEE W. R. G. Baker Award, and several conference best paper awards. He is/was associate editor of several journals (e.g., IEEE Transactions on Image Processing, IEEE Transactions on Pattern Analysis and Machine Intelligence, SIAM Journal on Imaging Sciences, Journal of Mathematical Imaging and Vision) and served as organizer or program committee member of many international conferences.