School of Biomedical Engineering & Imaging Sciences

Postgraduate Research Symposium

Programme

23 June 2021



Agenda

MS Teams Live Event 1

You can join Live Event 1 here.

Time	Speaker	Title
13:00 – 13:05	**Professor Sebastien Ourselin** *Head of the School of Biomedical Engineering & Imaging Sciences, King's College London*	**Introduction and Welcome**
13:05 – 13:15	**Dr Samantha Terry** *Senior Lecturer in Radiobiology, School of Biomedical Engineering & Imaging Sciences, King's College London* **Ines Costa** *PhD student, School of Biomedical Engineering & Imaging Sciences, King's College London* **Aishwarya Mishra** *PhD student, Centre for Doctoral Training (CDT) in Smart Medical Imaging, King's College London and Imperial College London*	**Public Engagement**
13:15 – 13:25	**Dr Valentina Vitiello** *Professional Services Deputy Representative for the School DDI Committee; Specialist Technical Operations Manager, School of Biomedical Engineering & Imaging Sciences, King's College London*	**Diversity and Bullying**
13:25 – 14:05	**Dr Stamatia Giannarou** *Royal Society University Research Fellow and Lecturer in Surgical Cancer Technology and Imaging at the Hamlyn Centre for Robotic Surgery, Department of Surgery and Cancer, Imperial College London* Please refer to page 7 for further details.	**Keynote Speaker** ***Cognitive Vision in Robotic Surgery***
14:05 – 14:35	**Please refer to page 4 for details.**	**Student Three-Minute Thesis Presentations**
14:35 – 15:00	**Please refer to pages 5-6 for details.**	**Student 1-Minute Poster Pitches**

Poster Sessions

The poster sessions will be taking place in two streams on the Wonder.me platform.

You can ioin Stream 1 here and Stream 2 here.

Time	Rooms	Title
15:00 – 15:45	**Stream 1: Biomedical Engineering and AI** Please refer to page 5 for further details.	**P101 – P112**
	Stream 2: Imaging Chemistry and Biology Please refer to page 6 for further details.	**P201 – P211**

MS Teams Live Event 2

You can join Live Event 2 here.

Time	Speaker	Title
15:45 – 16:30	**Dr Andrew P. King (Moderator)** *Reader in Medical Image Analysis, School of Biomedical Engineering & Imaging Sciences, King's College London* **Dr Yipeng Hu** *Lecturer in Surgical and Interventional Sciences, Department of Medical Physics & Biomedical Engineering, Faculty of Engineering Science, University College London* **Prof Jayashree Kalpathy-Cramer** *Associate Professor of Radiology, Harvard Medical School; Assistant in Neuroscience, Massachusetts General Hospital* **Dr Michael Ebner** *CEO & Co-Founder, Hypervision Surgical; Research Associate, School of Biomedical Engineering & Imaging Sciences, King's College London* Please refer to page 8-9 for speaker biographies.	**Debate** ***The role of AI in Healthcare***
16:30 – 17:00	**Please refer to page 4 for details.**	**Student Oral Presentations**

MS Teams Live Event 2

You can join Live Event 2 here.

Time	Speaker	Title
17:00 – 17:45	**Dr Rafael T. M. de Rosales (Moderator)** *Reader in Imaging Chemistry, School of Biomedical Engineering & Imaging Sciences, King's College London* **Prof Peter Caravan** *Director of the Institute for Innovation in Imaging (i3), Massachusetts General Hospital and Professor of Radiology at Harvard Medical School* **Prof Nerissa Viola** *Associate Professor, Molecular Imaging Program Leader, Karmanos Cancer Institute, Wayne State University* **Dr Patricia Ribeiro Pereira** *Assistant Professor, Department of Radiology, Washington University School of Medicine in St. Louis* Please refer to page 9-10 for speaker biographies.	**Panel Discussion** ***Imaging biomarkers of the past, present and future***
17:45 – 18:00	**Prize giving and closing**	
18:00	We are also organising a social online networking event after the Symposium. We invite you to join us on Wonder.me from 18.00, using this link.	

Student Presentations

3-Minute Thesis Presentations

Time	Speaker	Title
14:05 - 14:35	**Suzette Lust**	Developing a combined in-vitro in-silico model to study the interaction between vascular cells and flow in aortic aneurysms
	Ahmed Qureshi	Left Atrial Appendage Morphology Impacts Thrombus Formation Risks in Multi-Physics Atrial Models
	James Bezer	Microbubble dynamics in the brain microvasculature
	Melissa Gargaro	Does iron overload underpin cardiac metabolic and contractile dysfunction in anthracycline cardiotoxicity, and can we prevent it?
	Alina Psenicny	3D Whole Heart Grey-blood PSIR Slow Infusion Imaging for High-resolution Isotropic LGE Imaging
	Logan Williams	Structural and functional cortical asymmetry in the Developing Human Connectome Project

Oral Presentations

Time	Speaker	Title
16:30 - 17:00	**Antonia Agapi Pontiki**	Chest Wall Reconstruction Using Patient-Specific 3D Printing: Functional and Mechanical Results
	Amer Ajanovic	Motion-Dependent Low-Order Predictive SAR Model for Patient Safety Assessment at UHF MRI
	Lydia Smith	Cracking cancer resistance models

Poster Presentations

A series of 1-minute poster pitches will be played as part of the first MS Teams live event, followed by an interactive poster session, which will be hosted in two rooms on Wonder.me.

Details about the posters can be found below.

Time	Speaker	Title	P#
14:35 – 15:45	**Guillaume Corda**	Dense-Syn-Net: Inter-Modal and Self-Guided Deep Learned PET-MR Reconstruction	**101**
	Reuben Dorent	Inter Extreme Points Geodesics for End-to-End Weakly Supervised Image Segmentation	**102**
	Renyang Gu	Uncertainty-aware CNN improves prediction robustness for bone marrow segmentation with noisy labels and T1 weighted Dixon MR images	**103**
	Tareen Dawood	Learning to Trust AI Models in Cardiology	**104**
	Joshua Moo	Deep Generative Modelling for Enhanced Monte Carlo Simulation of Radionuclide Imaging Data	**105**
	Jessica Hopson	Pre-training and Transfer Learning on Reducing Training Data Needs and Improving Automated Clinical Assessments of PET Image Quality	**106**
	Robin Andlauer	Concept Bottleneck Models for the Prediction of Cardiac Resynchronization Therapy Response	**107**
	Shaheim Ogbomo-Harmitt	Exploring Interpretability in Deep Learning Prediction of Successful Ablation Therapy for Atrial Fibrillation	**108**
	Marica Muffoletto	Deep Learning Unsupervised Domain Adaptation of cardiac segmentation from CCTAs to CMRAs	**109**
	Georgia Doumou	Mapping human brain development at new spatial resolutions using Machine Learning and 7T Magnetic Resonance Imaging	**110**
	Maggie Shi	Enhancing photoacoustic visualisation of clinical needles with deep learning	**111**
	Matthieu Ruthven	A segmentation-informed deep learning framework to register dynamic magnetic resonance images of the vocal tract during speech	**112**

Stream 1 – Biomedical Engineering and AI

You can join Stream 1 here.

Poster Presentations (Continued)

Time	Speaker	Title	P#
14:35 – 15:45	**Cameron Dockerill**	SonoVue Ultrasound Contrast Agent as a Pressure Sensor in a Dynamic Flow Phantom	**201**
	Daniel Hughes	Correlation of 18F-FDG-PET/CT metabolic parameters with PD-L1 tumour proportion score (TPS) in resected non-small cell lung cancer (NSCLC)	**202**
	Richard Burns	The relationships between genotype and phenotype in cardiac shape	**203**
	Yannick Brackenier	Motion-corrected brain MRI incorporating pose dependent B0 fields	**204**
	Samuel Hill	Assessment of Left Ventricular Outflow-Tract Obstruction and Thrombotic Risk following Transcatheter Mitral Valve Replacement	**205**
	Kanik Chelani	Multimodal imaging and guided surgery of glioblastoma using biologically targeted quantum dots	**206**
	Shu Wang	Direct Silicone Printer Assembly for Healthcare Application with Self-Customized Components	**207**
	Johannes Steinweg	Fetal blood flow assessment in clinical practice using whole heart 4D cine MRI	**208**
	Beatriz Brito	Redox responsive Manganese-based MRI theranostics for cancer therapy	**209**
	Hélio Gil	Concentration-dependent Optical Properties of InP Quantum Dots	**210**
	Esra Korpe	Development of non-invasive method to understand relation between radioresistance and manganese	**211**

Stream 2 – Imaging Chemistry and Biology

You can join Stream 2 here.

Speaker Biographies

Keynote Speaker



Dr Stamatia Giannarou
Royal Society University Research Fellow and Lecturer in Surgical Cancer Technology and Imaging at the Hamlyn Centre for Robotic Surgery, Department of Surgery and Cancer, Imperial College London

Cognitive Vision in Robotic Surgery

With recent advances in medical imaging and surgical robotics, surgical oncology is entering a new era that is set to bring major healthcare and socio-economic benefits. The main goal of surgical oncology is to achieve complete resection of cancerous tissue with minimal iatrogenic injury to surrounding tissue. In practice, this often presents a formidable challenge to surgeons. Surgery on tumours residing within the brain is particularly demanding, and the prognosis for patients afflicted with such tumours remains very poor. Intrinsic brain tumours are highly infiltrative making it difficult to distinguish tumour tissue from surrounding tissue. Moreover, it is imperative to preserve unaffected brain tissue, which is delicate, often eloquent, and has little capacity for regeneration.

The aim of my research is to integrate multimodal intraoperative imaging and navigation technologies into a cognitive robotic platform. In this talk, I will present an intraoperative vision system for surgical navigation and real-time tissue characterisation during robot-assisted neurosurgery to improve both the efficacy and safety of tumour resections. The focus will be on the recovery of 3D morphological structures in the presence of tissue deformation, the efficient robot-assisted tissue scanning with imaging probes and the tissue characterisation for on-line diagnosis support.

Biography

Stamatia (Matina) Giannarou received the MEng degree in Electrical and Computer Engineering from Democritus University of Thrace, Greece in 2003, the MSc degree in communications and signal processing and the Ph.D. degree in image processing from the department of Electrical and Electronic Engineering, Imperial College London, UK in 2004 and 2008, respectively. Currently she is a Royal Society University Research Fellow and a Lecturer in Surgical Cancer Technology and Imaging at the Hamlyn Centre for Robotic Surgery, Department of Surgery and Cancer, Imperial College London, UK.

Her research focuses on enhanced surgical vision for intraoperative navigation in minimally invasive and robot-assisted operations. In 2017, she won “The President’s Award for Outstanding Early Career Researcher” at Imperial College London. She has been selected as a member of the IdeasLab of Imperial College London on the “Frontiers of Imaging” at the World Economic Forum Annual Meeting of the New Champions 2016 in Tianjin, China. She received best paper awards at international conferences and symposia including the “Rank Prize Symposium on Medical Imaging Meets Computer Vision 2013”, the M2CAI-MICCAI 2014, IPCAI 2016, AE-CAI-MICCAI 2020, IPCAI 2020. She has also been invited to present her work at a number of international workshops and symposia. She is a regular reviewer for high impact journals and conferences in the fields of medical robotics, medical imaging and biomedical engineering and the chair of the annual Hamlyn Winter School on Surgical Imaging and Vision.

Debate Panel – *The role of AI in Healthcare*



Panel Moderator: **Dr Andrew P. King**
Reader in Medical Image Analysis, School of Biomedical Engineering & Imaging Sciences, King's College London

Dr Andrew King received a BSc. (Hons) degree in Computer Science from Manchester University in 1989, an MSc. (with distinction) in Cognition, Computing and Psychology from Warwick University in 1992, and a PhD degree in Computer Science from Warwick University in 1997. From 2001-2005, he worked as an Assistant Professor in the Computer Science department at Mekelle University in Northern Ethiopia. Since 2006 he has worked in the School of Biomedical Engineering & Imaging Sciences at King's, focusing on machine learning and medical image analysis.



Dr Yipeng Hu
Lecturer in Surgical and Interventional Sciences, Department of Medical Physics & Biomedical Engineering, Faculty of Engineering Science, University College London

Dr Yipeng Hu is a lecturer at the Department of Medical Physics & Biomedical Engineering, University College London (UCL), affiliated with the Wellcome / EPSRC Centre for Interventional & Surgical Sciences (WEISS) and the Centre for Medical Image Computing (CMIC). He is also a visiting fellow at the Institute of Biomedical Engineering, University of Oxford. He has a BEng from Sichuan University, and received his master and PhD degrees from UCL. His research area has been in surgical and interventional sciences, with a current interest in translating modern machine learning methods for computer assisted medical procedures.



Prof Jayashree Kalpathy-Cramer
Associate Professor of Radiology, Harvard Medical School; Assistant in Neuroscience, Massachusetts General Hospital

Prof Jayashree Kalpathy-Cramer is the Director of the QTIM lab and the Center for Machine Learning at the Athinoula A. Martinos Center for Biomedical Imaging and an Associate Professor of Radiology at MGH/Harvard Medical School. Prof Kalpathy-Cramer is also Scientific Director at MGB Center for Clinical Data Science, a Senior Scientist at the American College of Radiology Data Science Institute and a member of the RSNA Machine Learning Steering Subcommittee. Her research interests include medical image analysis, machine learning and artificial intelligence for applications in radiology, oncology and ophthalmology. The work in her lab at the intersection of computer science and medicine spans the spectrum from novel algorithm development to clinical deployment. Prof Kalpathy-Cramer has authored over 150 peer-reviewed publications and has written over a dozen book chapters. She is a Deputy Editor for the Radiology-AI journal, an Associate editor for the BJR and Editorial Board Member for TVST.



Dr Michael Ebner
CEO & Co-Founder, Hypervision Surgical; Research Associate, School of Biomedical Engineering & Imaging Sciences, King's College London

Dr Michael Ebner is Co-founder and CEO of Hypervision Surgical Ltd, a King's College London spin-out that develops computational hyperspectral imaging systems for real-time data-driven surgical guidance. Dr Ebner is an Enterprise Fellow at the Royal Academy of Engineering and holds a PhD in medical image computing from University College London. He has more than six years of R&D experience in computational imaging for surgery and previously developed image fusion technology for improved surgical guidance during spine surgery at Medtronic.

Panel Discussion – *Imaging biomarkers of the past, present and future*

Panel Moderator: **Dr Rafael T. M. de Rosales (Moderator)**
Reader in Imaging Chemistry, School of Biomedical Engineering & Imaging Sciences, King's College London



Prof Peter Caravan
Director of the Institute for Innovation in Imaging (i3), Massachusetts General Hospital and Professor of Radiology at Harvard Medical School

Prof Peter Caravan is the Director of the Institute for Innovation in Imaging (i3) at Massachusetts General Hospital and Professor of Radiology at Harvard Medical School. He leads a multidisciplinary and translational molecular imaging lab focused on the invention of novel molecular probes and their broad applications in cardiovascular, pulmonary, renal, and hepatic diseases as well as in cancers. His research spans novel chemistry technologies to advanced MRI and PET imaging in animal models through to applications in patient populations. Prof Caravan received his BSc(Hons) from Acadia University followed by a PhD in Inorganic Chemistry from the University of British Columbia under the mentorship of Prof Chris Orvig. Following a NSERC post-doctoral fellowship with Prof André Merbach at the Université de Lausanne, he worked in industry developing targeted MR probes. He joined the faculty of Harvard Medical School in 2007 and has been a continuously funded NIH researcher ever since. Prof Caravan has published over 170 peer-reviewed articles, is a named inventor on over 20 issued patents, has brought multiple PET and MRI probes to first-in-human studies, and has co-founded two companies.



Prof Nerissa Viola
Associate Professor, Molecular Imaging Program Leader, Karmanos Cancer Institute, Wayne State University

Prof Nerissa Viola is an associate professor in Oncology at Wayne State University and the program leader of the molecular imaging program at the Karmanos Cancer Institute (KCI). She obtained my PhD in Chemistry at Syracuse University in June 2009 under Prof Robert Doyle, followed by postdoctoral research at Memorial Sloan Kettering Cancer Center with Prof Jason S. Lewis to train in molecular imaging and radiochemistry. Her research focuses on developing PET immune imaging probes and radioimmunotherapy agents to "seek" and "destroy" cancer and allied diseases respectively.



Dr Patricia Ribeiro Pereira
Assistant Professor, Department of Radiology, Washington University School of Medicine in St. Louis

Dr Patricia Ribeiro Pereira received a BSc (2010) in Biotechnology and an MSc (2012) in Biochemistry Specialization in Biomolecular Methods, both from the University of Aveiro, Portugal. From 2013 to 2016, she pursued a Ph.D. in Medicinal Chemistry at the University of Aveiro & Faculty of Medicine University of Coimbra (Portugal). During her Ph.D. studies, she undertook international work exchange programs at BAM in Berlin (Germany) and Hunter College in New York (USA). Dr Pereira then did her postdoc, 2016-2021, in the Department of Radiology at Memorial Sloan Kettering Cancer Center (New York, USA). She has recently joined Washington University School Of Medicine as an Assistant Professor. Dr Pereira's research program aims to tune surface targets' availability by elucidating their regulatory mechanisms to enhance cancer imaging and targeted therapies.

The Organising Committee

The 2021 BMEIS PGR Symposium was organised by a student-led committee including Irina Grigorescu, Jie Tang, Mengjie Shi, Nadia Chaher, Omar Darwish, Sara Neves Silva, Qi Han and Zhen Yuan from the School of Biomedical Engineering & Imaging Sciences.

Acknowledgments

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