



26-27 February 2018, Royal Marsden Conference Centre

CONFERENCE PROGRAMME

Monday 26th February

9:30 Registration and refreshments

Imaging in Cancer Diagnosis

10:15 Opening remarks

10:25 Clinical panel; assessing the unmet needs in oncological imaging

- Perspectives from radiology, oncology and medical physics
- Current challenges and performance issues with medical imagers
- Where should R&D teams focus their efforts for improved results?

Dr Dimitra Darambara, Team Leader Multi-Modality Molecular Imaging, **Institute of Cancer Research**

Dr Phil Marsden, Director, **Unitive Design**

Professor Nandita deSouza, Professor of Translational Imaging and Co-Director of the MRI Unit, **Institute of Cancer Research**

11:00 Nuclear imaging; a state of the industry overview

- The move to solid state detectors and readout systems
- A wider acceptance of quantitative SPECT/CT
- The influence of time-of-flight on PET/CT performance
- The expansion of hybrid imaging to include PET/MRI and potentially SPECT/MRI
- Future directions: pushing the boundaries of resolution and sensitivity

Professor Brian Hutton, Institute of Nuclear Medicine, **UCL**

Image quality and hybrid imaging

11:25 Increasing clinical sensitivity and specificity through hybrid imaging

- Why hybrid imaging is needed
- Hybrid imaging technologies
- Clinical advantages of hybrid imaging
- Quantitative advantages of hybrid imaging

Dr John Dickson, Head of Clinical Nuclear Medicine Physics, Honorary Senior Lecturer, Institute of Nuclear Medicine, **University College London Hospital**

11:50 A Multimodality Hybrid Gamma-Optical Camera for Intraoperative Imaging

- Hybrid imaging – combined optical and gamma imaging
- Camera design and application areas
- Phantom and preclinical imaging
- Images from a current clinical evaluation
- Future developments including combined gamma and Near Infra-red imaging

Professor John Lees, Bioluminescence Unit, Space Research Centre, Dept. Physics and Astronomy, **University of Leicester**

12:15 *Networking lunch break*



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New technological advances in specific modalities for diagnosis

- 13:45 Optical molecular medical imaging; lung endoscopy
- Detail of the Proteus Project; Lighting up the Lung, Detecting Disease
 - Develop a revolutionary technology that will provide quick in situ, in vivo diagnoses and management of lung diseases in the clinic
- Professor Kev Dhaliwal**, Honorary Consultant in Respiratory Medicine, **Royal Infirmary of Edinburgh**
- 14:10 What unmet radiological needs could be addressed by PET/MR?
- Innovative applications for PET/MR in clinical routine
 - Logistical / economical challenges for PET/MR
 - PET/MR for „virtual biopsy”: multiparametric multimodal imaging as a prognostic and predictive biomarker
- Professor Dr Ambros J. Beer**, Radiologist and Nuclear Medicine Physician, Chair Department of Nuclear Medicine, **Ulm University**
- 14:35 Recent Developments in Photon-Counting Computed Tomography
- Use of photon-counting X-ray detectors proposed to further improve the diagnostic value of this modality
 - Advantages in contrast enhancement and a considerable reduction in patient dose, material-identification and K-edge imaging
 - Presentation of results from two research prototype scanners with photon-counting detector, installed in near-clinical environments
 - Demonstration of the clinical benefits of this new technology
- Dr Steffen Kappler**, Global Technology Manager CT, **Siemens Healthineers**
- 15:00 CMOS-based mammography detector
- Latest results
 - Discussion of ideas to use the strength of this technology for future diagnosis
- Inge Peters**, Program Manager Research, **Teledyne DALSA**
- 15:25 *Networking refreshment break*

AI and Deep Learning and imaging

- 16:10 NHSE diagnostic perspective on AI and machine learning, wider issues and unmet needs
- Dr Tony Newman-Sanders**, Clinical Director, Diagnostic Imaging, **Surrey and Sussex Healthcare**, National Clinical Director for Diagnostics, **NHS England**
- 16:35 The role of PET image reconstruction in diagnosis and treatment of cancer
- Elucidating the role of PET imaging in the new era of radiomics and speculating the obstacles towards this direction
 - Exploring dynamic PET and image reconstruction techniques to make PET imaging a more accurate and precise molecular imaging modality



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- Understanding the most recent advancements in PET physics which have been or expected to be translated in the clinic
- Discussion on the pioneering research activities that aim at revolutionising the field of clinical molecular imaging

Dr Charalampos Tsoumpas, Lead of Enterprise & Innovation, **Leeds Institute of Cardiovascular and Metabolic Medicine**

17:05 Advances in computer-aided cancer detection and machine learning; how should radiologists and oncologists embrace this technology?

- New developments in the affordability and reliability of CAD and automated image analysis
- Current use cases in the assessment of colorectal polyps on CT virtual colonography, lung nodule analysis and MRI for breast, prostate and many other cancers
- Further potential uses include quantification of metastatic disease and more objective follow-up.
- Exploring wide variation in sensitivity and PPV of commercially available software and usefulness limitations
- Tips for the practical use of CAD

Professor Dr Sanjay Gandhi, Professor of Radiology, Research and Innovation Lead, Core Clinical Services, **North Bristol NHS Trust**

17:35 Closing remarks

17:45 Depart for networking drinks reception at nearby London venue



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Tuesday 27th February

8:15 Registration and refreshments

Imaging in Cancer Treatment and Therapy Monitoring

8:50 Opening remarks

9:00 Image-guided radiotherapy keynote

Professor Uwe Oelfke, Deputy Head of the Division of Radiotherapy and Imaging, Head of the Joint Department of Physics, **ICR and RMH**

9:30 Precision imaging requirements for proton therapy

Professor Dr Tony Lomax, Chief Medical Physicist, **Paul Scherrer Institute (PSI)**

9:55 Clinical panel; challenges in imaging for treatment

- Radiography and clinical wish-list for image quality
- Unmet needs in imaging for treatment
- Bridging the gap between clinical and technical metrics in device evaluation

Dr Colin Baker, Head of Radiotherapy Physics, **Royal Berkshire NHS Foundation Trust**

Professor Christopher Nutting, Professor in Clinical Oncology, **Royal Marsden Hospital and The Institute of Cancer Research**

Gregory Perkins, Clinical Specialist – Radiation Oncology, Philips Radiation Oncology Systems (PROS), **Philips Healthcare**

10:30 *Networking refreshment break*

11:10 CT texture analysis in Non-Small Cell Lung Cancer

- Can a standard CT scan give greater information for the management of patients with lung cancer?
- Using texture analysis to analyse a small region of interest of lung tissue to see if it could predict fitness for radical radiotherapy

Dr Iain Philipps, Registrar, **Royal Surrey County Hospital**

11:35 Personalised medicine and the role of imaging

- Introduction of the current potential of a range of imaging techniques
- Discussion of the scientific, technical and healthcare challenges facing the widespread use of imaging in personalised medicine

Dr Mike Partridge, Group Leader, Radiotherapy Research, **University of Oxford**

12:00 The need for standardisation and optimisation of imaging and dosimetry in molecular radiotherapy

- A review of common and emerging MRT treatments
- Discussion of their clinical and metrological challenges

Dr Ana M Denis-Bacelar, Chemical, Medical and Environmental Science Division, **National Physical Laboratory**



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- 12:25 Developments in contrast media and the impact on imaging technology
- Contrast agent, why do we need them? General definition
 - Diffuse contrast agent (examples for ultrasound, MRI, DNP-MRI and PET)
 - Targeted contrast agent; focused on the antibody linked contrast agent (example of PSMA for multi-modalities)
 - Nanoparticles (examples for ultrasound, MRI and PET)
- Dr Alexia Daoust**, Project leader, **CortecNet SAS**

12:50 *Networking lunch break*

Disruptive technology and its impact on imaging
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- 14:05 Be inspired by optical technologies for new X-ray imaging modalities
- Time-of-flight X-ray imaging enabled by carbon-nanotube based cold-cathode X-ray sources
 - Direct X-ray photon detection with high energy resolution through semiconductors and perovskites
 - Dark-field X-ray imaging based on phase contrast techniques
 - X-ray spectroscopy for element-sensitive X-ray radiography and CT imaging
 - Triboluminescence for X-ray photon generation
- Dr Peter Seitz**, Senior Technologist, **Hamamatsu Photonics Europe**
- 14:35 How will sensor technology impact the medical robots of the future?
- Introduction of the technologies behind the different types of medical robots (surgical robots, exoskeleton, micro-robots...),
 - Detailing the current technologies limits and main challenges and how it might evolve in the future
- Dr Marjorie Villien**, Market and Technology Analyst, Medical Technologies, **Yole Developpement**
- 15:00 Closing keynote address: Latest advances in image-guided surgery and intervention
- Professor David Hawkes**, Member, **Centre for Medical Image Computing**

15:30 Closing remarks