'Devices: MRI Compatibility' Course

University College London, London, United Kingdom

10-12 April 2019

Programme

Course organisers: Louis Lemieux and Nick Donaldson (UCL)

Course committee: Louis Lemieux, Nick Donaldson, John Thornton (UCL), David Carmichael (KCL) and Xavier Golay (UCL)

Day 1: Wednesday 10.04.2019
Theme: Can I Put this Person with this Thing in the Scanner?

AM1.1 09:30-10:00 - **General introduction** (20 min) - *Louis Lemieux (UCL)*

AM1.2 10:00-11:30 - **Overview of MRI: how it works, its E/M fields and their bioeffects** (1.5h) - *John Thornton (UCLH and UCL) & Karin Shmueli (UCL)*

AM1.3 11:45-12:30 - **Introduction to devices and the MR compatibility problem** (45 min) - *Nick Donaldson (UCL)*

PM1.1 13:30-15:30 - **Current regulation, application and clinical management of devices in MRI used in clinical medicine and research, and of their relevant regulatory frameworks** (2h) - *Geoff Charles-Edwards (KCL) & John Spensley (Finetech Medical Ltd.)*

PM1.2 15:45-16:45 - **Clinical and research governance: principles and practice in clinical and research settings** (1h) - *Anastasia Papadaki (UCLH and UCL) and Andrea Hill (UCL and Epilepsy Society)*

Day 2: Thursday 11.04.2019
Theme: Physical Principles for Device Design and Applications

AM2.1 09:30-10:30 - **Basic theory of MR scanners** (1h) - *David Carmichael (KCL) and John Thornton (UCLH and UCL)*

AM2.2 10:45-12:45 – **E/M hazards associated with devices in the MR environment** (2h) - *Louis Lemieux & Nick Donaldson (UCL)*

PM2.1 13:45-15:15 - **MR and device performance: data quality and functional integrity** (1.5h)
Passive devices and MR data quality degradation - *David Carmichael (KCL)*
Active devices in the MR environment: practical challenges - *Joerg Magerkurth (UCL)*

PM2.2 15:30-17:00 - **Device characterisation case studies** (1.5h)
EEG recording inside the scanner: passive and active device, safety and data quality (0.5h) – *Louis Lemieux (UCL)*
Cardiac stimulation devices and their MRI conditional status (1h) - *Kruno Lopandic (Medtronic)*

Day 3: Friday 12.04.2019
Theme: Towards Getting a Device Approved: Standards and Regulations
AM3.1 09:30-11:00 - **Passive vs. Active devices in the MRI scanner and its environment** (1.5h) - *David Grainger (MHRA) / David Dunham (Medtronic)*

AM3.2 11:30-13:00 - **Formal evaluation of interactions** (1.5h)
The ASTM test methodology standard (1h) - *Aaron Oliver-Taylor (Gold Standard Phantoms)*
RF simulation / evaluation of active devices according to ISO TS 10974 (0.5h) – *Shaihan Malik (KCL)*

PM3.1 14:00-16:30 - **Implementation: reducing/mitigating interactions** (2.5h)
Case study: MRI of patients with neurostimulators at NHNN (0.3h) – *John Thornton (UCLH and UCL)*
Data quality / Device performance: In-depth look (2h)
  o   Intra-MRI EEG data quality - *Mario Bartolo (Brain Products UK)*
  o   MRI data quality - *Xavier Golay (UCL), A Oliver-Taylor (Gold Standard Phantoms)*

PM3.2 16:45-17:30 – **'Dessert'** (1h)
Funding opportunities - *Laura Fenner (UCL BEAMS team)*
Meet the speakers & special refreshments