CardioMRI Symposium

From MR Physics and Novel Hardware to Artificial Intelligence: making CMR a more Accessible and Affordable Imaging Modality

Organised by CardioMRI group of the Institute for Advanced Study and the Institute of Radiology at TUM

Location: Klinikum rechts der Isar, Hörsaal B, Ismaninger Str. 22, 81675 München, Germany
Time: Thursday, 20.7.2023, 8:30-18:00

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Background: Currently, cardiac MR (CMR) is considered a highly complex and rather expensive imaging exam that requires highly trained MR technicians and clinicians, and which is mainly performed in very specialised settings in tertiary academic hospitals. The proposed workshop will discuss how latest developments in artificial intelligence (AI), MR acquisition/reconstruction and low-field MRI in combination with knowledge gained from large CMR clinical trials/biobanks could turn CMR into an easy-to-use and affordable mainstream imaging modality like computed tomography. More specifically we will discuss how latest developments in MR physics, motion correction and image reconstruction can be harnessed to enable a self-driving CMR examination (no planning, no breath holds) that provides comprehensive disease characterisation in a short, less than 10 minutes scan. We will then discuss how AI can enable automated image acquisition, reconstruction, processing, and analysis and create automated diagnosis and treatment planning. To get a better understanding where CMR could play an increasing role in the patient pathway we will discuss lessons learned from large clinical trials/biobanks. Finally, we discuss the potential of AI in replacing the use of gadolinium.

Learning Outcomes

1. To understand how novel more intelligent MR sequences, including quantitative multi-parametric MRI can provide a comprehensive diagnosis with minimal user input.
2. To understand how latest developments in AI can facilitate automated processing and analysis of complex and multi-contrast MR datasets.
3. To understand the value of clinical trials/biobanks in identifying new biomarkers and the economic value of CMR in comparison with other imaging modalities.

8:30-8:50 Registration

8:50 - 9:00 Welcome: René Botnar (KCL/UC) and Marcus Makowski (TUM)

9:00 – 10:30 Session 1: ***Clinical MRI: What is needed to make CMR the preferred cardiac imaging modality?***

9:00-9:30 From research to clinical guidelines: Jeanette Schulz-Menger, Charité Berlin
9:30-9:50 Opportunities & challenges of CMR in congenital heart disease: Anastasia Fotaki, Royal Brompton Hospital, London, UK
9:50-10:10 The UK experience of CMR. Reza Hajhosseiny, King's College London, UK
10:10-10:30 AI to replace contrast-enhanced MRI: Qiang Zhang, University of Oxford, UK

10:30-11:00 Coffee break

11:00-12:30 Session 2: ***Smart MRI: Towards all-in-one self-driving CMR***

11:00-11:30 From research to product – Karl Kunze, Siemens Healthineers, London, UK
11:30-11:50 Model based image reconstruction: Mariya Doneva, Philips Research Hamburg
11:50-12:10 Motion and multi-parametric cardiac MRI: Claudia Prieto, UC/KCL, Chile/UK
12:10-12:30 The promise of low-field cardiac MRI: Adrienne Campbell-Washburn, NIH, USA

12:30-14:00 Lunch

14:00-15:30 Session 3: ***Rapid fire talks***
9 trainee rapid fire talks (5 + 5 minutes)

15:30-16:00 coffee break

16:00-17:30 Session 4: ***Intelligent MRI: Exploiting artificial intelligence along the entire*** **imaging pipeline**

16:00-16:30 Intelligent Imaging, Diagnosis and Prognosis – Daniel Rückert, TU Munich
16:30-16:50 AI-enabled Image reconstruction: Florian Knoll, University of Erlangen
16:50-17:10 AI-based Image processing: Julia Schnabel, TU Munich
17:10-17:30 The role of AI in diagnosis and prognosis of CVD: Declan O´Regan, Imperial College London, UK