

Cardiovascular MR

CV-I *T1 map and more*
(3 speakers, 90 min)

CV-II *Flow and motion*
(4 speakers, 90 min)

CV-III *Cardiac: Ischemic Heart*
(3 speakers, 90 min)



Hsin-Jung Yang, PhD
楊欣融 博士

Time Table

Sunday, May 22, 2022
Room 202

Time	Topics	Speakers	Moderators
08:30-09:00 (30mins)	New Frontiers of Cardiac Oxygenation MRI	Randy Yang	Randy Yang Wen-Jeng Lee
09:00-09:30 (30mins)	CMR Multitasking for Ischemic Heart Disease	Anthony G. Christodoulou	Randy Yang Wen-Jeng Lee
09:30-10:00 (30mins)	Cardiac MRI Driving Innovation in Hemorrhagic Myocardial Infarction	Rohan Dharmakumar	Randy Yang Wen-Jeng Lee

Ischemic Heart Disease

Organizer: Hsin-Jung Yang

Overview:

Ischemic Heart Disease(IHD) is the number one killer in developed countries. In the past decade, cardiac MRI (CMR) has established its clinical value in IHD management through multiple milestone studies. Today, CMR is the modality of choice for evaluating function and blood supply under ischemia and characterizing myocardial injury post-myocardial infarction. In this section, we will introduce state of the art and future developments of CMR for myocardial characterization in ischemic heart disease. We will discuss the fundamentals of today' s clinical CMR protocols and introduce the recent advancements of CMR in quantitative biomarker development, new cardiac pathology discovery, and novel CMR contrasts that bring new physiological insights for IHD management.

Cardiac MRI Driving Innovation in Hemorrhagic Myocardial Infarction



Rohan Dharmakumar, PhD, USA

- Executive Director of the Krannert Cardiovascular Research Center
- Director for Cardiovascular Imaging Research, Indiana Institute for Biomedical Imaging Sciences
- Associate Director for Research, IU Cardiovascular Institute
- Charles Fisch Chair in Cardiology
- Professor of Medicine
- Professor of Radiology & Imaging Sciences
- Major interest / achievement: Medical sciences, Biomedical engineering, Cardiovascular imaging, translational imaging

Cardiac MRI Driving Innovation in Hemorrhagic Myocardial Infarction

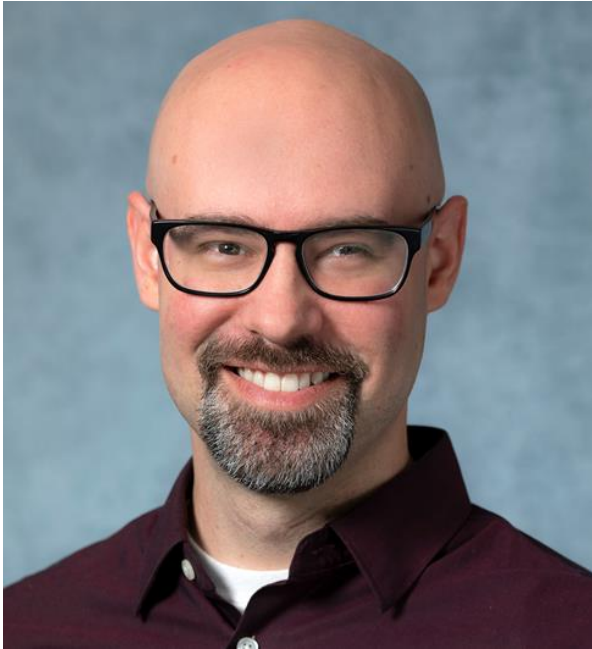
- **Synopsis:**

- Acute myocardial infarction (AMI) affects millions of people around the world, each year. While technical advancements have significantly reduced immediate death from AMI, the long-term prognosis for many of these patients remain bleak. CMR has been central to improving our understanding of the pathophysiological consequences associated with acute and chronic phases of myocardial infarction. In this presentation, I will review the major conceptual advances in acute myocardial infarction that has come about from the novel utilization of CMR. In addition, I will outline the central role CMR can play in advancing therapies to curb the post-infarction heart failure epidemic.

- **Key References:**

- T Liu, Journal of the American College of Cardiology 79 (1), 35-48(2022)
- Y Chen, Journal of Cardiovascular Magnetic Resonance 23 (1), 1-16 (2022)
- X Guan, Journal of Cardiovascular Magnetic Resonance 23 (1), 1-15 (2021)

CMR Multitasking for Ischemic Heart Disease



Anthony G. Christodoulou, PhD, USA

- Assistant Professor, Biomedical Imaging Research Institute, Cedars-Sinai Medical Center
- Assistant Professor, Medicine and Bioengineering, University of California, Los Angeles
- Major interest / achievement: Cardiovascular imaging, quantitative imaging, high-dimensional image reconstruction

CMR Multitasking for Ischemic Heart Disease

- **Synopsis:**

- Quantitative CMR (qCMR) provides many benefits over qualitative imaging: reproducible tissue characterization, diagnosis of diffuse disease, potential for earlier disease detection, and more. The standard approach to qMRI of the heart has been to “freeze” motion using a complicated mixture of ECG triggering and repeated breath holds. That approach is difficult, and unreliable in patients with irregular heartbeats or trouble breath-holding. This talk covers “CMR Multitasking”, a multidimensional imaging framework to capture motion alongside multiple quantifiable tissue processes, and its potential for non-ECG, free-breathing tissue characterization and perfusion quantification in ischemic heart disease.

- **Key References:**

- Christodoulou AG et al. *Nature Biomed Eng* 2:215–226 (2018)
- Shaw JL et al. *Magn Reson Med* 81:2450–2463 (2019).
- Mao X et al. *Front Cardiovasc Med* 9:833267 (2022).

New Frontiers of Cardiac Oxygenation

MRI



Hsin-Jung Yang, PhD, USA

- Assistant Professor, Biomedical Imaging Research Institute, Cedars-Sinai Medical Center
- Major interest / achievement: Cardiovascular imaging, Fast Imaging, Magnetic resonance engineering

New Frontiers of Cardiac Oxygenation MRI

- **Synopsis:**
 - Human heart is a highly oxidative organ, and the understanding of cardiac oxygen supply and demand is crucial for the diagnosis, prognosis, and management of a variety of cardiovascular diseases. Although the application of Blood-Oxygenation-Level-Dependent(BOLD) MRI in neuroscience has been greatly successful and established the recent advancement of our understanding of the human mind, the BOLD application in the heart has been more challenging. This talk will cover the recent developments in cardiac oxygenation imaging with CMR. It will cover the the innovative value of oxygenation MRI for different cardiovascular diseases, particularly for myocardial ischemia.
- **Key References:**
 - HJ Yang, et al. Science translational medicine 11 (494), eaat4407(2019)
 - HJ Yang, et al. Radiology 295 (1), 82-93(2020)