

BME SPECIAL SEMINAR SERIES

Monday, January 22, 2024
9:30 – 10:20am, MJIS 2001

“Innovations in translational cardiovascular MRI: Towards “intelligent MRI” with automatic data analysis enabling gold-standard diagnostic procedures”



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Abstract: The overall theme in my research laboratory is the development, validation, and clinical translation of new MRI-based technologies aimed at improving the state-of-the-art in diagnosis and imaging-guided therapy of cardiovascular (CV) disease with a focus on:

- (1) Reliable quantification of imaging biomarkers for assessment of microvascular health, including new “functional MRI” markers of tissue microcirculation by leveraging multi-disciplinary innovations in magnetic resonance physics, computational engineering, and machine learning;
- (2) Development and translation of minimally-invasive interventional MRI technologies enabling gold-standard diagnosis and monitoring of CV disease status without ionizing radiation.

In this talk, I will present our recent efforts devoted to developing artificial intelligence-enabled MRI strategies for automatic and reliable quantification of blood flow patterns in the myocardium. I will demonstrate the potential impact of these techniques by presenting preclinical and clinical results. Next, I will discuss how our ongoing collaborations with local medical device companies has led to the development of an accelerated interventional MRI paradigm for “gold standard” assessment of CV health status using a low-field, lower-cost MRI system. Once combined with deep learning-based real-time data analysis, this minimally invasive paradigm has the potential to change the current approach for clinical management of most CV patients, which is based on x-ray-based fluoroscopy and involves radiation exposure for patients and healthcare workers.

Biography: Behzad Sharif is an Associate Professor of Medicine, Radiology & Imaging Sciences at IU School of Medicine where he directs the Cardiovascular MRI research program. Dr. Sharif obtained his PhD degree in Electrical Engineering from UIUC in 2010 supervised by Yoram Bresler and trained as an American Heart Association (AHA) postdoctoral fellow with Debiao Li, PhD, and Daniel Berman, MD, at Cedars-Sinai Biomedical Imaging Research Institute and the David Geffen School of Medicine at UCLA. From 2015 until joining IU in 2021, he held joint faculty appointments at Cedars Sinai and UCLA with continuous NIH funding as PI. Dr. Sharif currently serves on committees and peer review panels for AHA, NIH, and the Society for Cardiovascular MRI (SCMR), and as the PI or co-investigator on four active federal grants. His earlier work has been recognized by the AHA National Scientist Development Award, a K99/R00 Pathway to Independence Award from the NIH, and the SCMR Early Career Award in Basic Science. In 2021, Dr. Sharif was recruited to IU as part of the INCITE biomedical scientist recruitment program funded by the Lilly Endowment. Since then, he has established academic-industry partnerships with local biotech companies to advance the emerging field of low-field & interventional MRI with the goal of enhancing the role of MRI-guided diagnostic and therapeutic technologies.

~ BME Host: Craig Goergen ~