MRI in mouse models of heart disease: methods and discoveries

Abstract: Mice are widely used to study biological mechanisms of heart disease. Magnetic resonance imaging (MRI) is a modality that can accurately and reproducibly measure cardiovascular anatomy, function, perfusion, infarction, and certain cellular and molecular events. Our research involves the development and optimization of cardiovascular MRI methods for mice as well as their application in hypothesis-driven research. This seminar will present an overview of MRI methods that we have developed to image various aspects of cardiovascular physiology in mice, with a focus on quantification of function, blood flow, and tissue properties. The application of these methods to discovering mechanisms of and therapies for left ventricular remodeling after myocardial infarction and coronary microvascular disease will be presented.

Biography: Frederick H. Epstein, PhD, is the Mac Wade Professor of Biomedical Engineering and Chair of the Biomedical Engineering Department at the University of Virginia. He is recognized for contributions to the development and application of MRI myocardial strain imaging and the use of cardiac MRI in small animal models of heart disease. Dr. Epstein has published over 130 peer-reviewed articles, was an Established Investigator of the American Heart Association, and has served as Chair of the Society for Cardiovascular Magnetic Resonance (SCMR) Science Committee and Chair of the International Society for Magnetic Resonance in Medicine (ISMRM) Cardiac Study Group. He has recently served on the Board of Trustees of the SCMR and as a standing member of NIH study section Biomedical Imaging Technology-A. He was a Deputy Editor for Magnetic Resonance in Medicine, the leading journal for the field of MRI research, and currently serves as co-Chair of the SCMR artificial intelligence special interest group.