

MRI systems operating at 3 Tesla are finding clinical acceptance. This exhibit introduces the viewer to technologies and imaging strategies for performing physiological and functional cardiac magnetic resonance (CMR) imaging studies on 3T MRI systems. High field whole-body CMR offers the possibilities of enhanced first-pass perfusion MRI, improved tissue-tagged functional CMR studies and high resolution depiction of cardiac structures. However, the transition from CMR at 1.5T to 3.0 T is not straight-forward. Issues inherent to high field MRI that must be addressed include greater radio frequency heating, increased T1 relaxation times and more prevalent magnetic susceptibility effects. The improved signal-to-noise ratio (SNR) available at 3T can be used to increase the spatial resolution of the CMR images or increase CMR temporal resolution depending on the type of study required. New, parallel imaging methods allow increasing the speed of imaging several times, but with a concurrent reduction in SNR and the possibility of generating significant artifacts. With a number of important factors in play, imaging protocols adopted for CMR at 3T require careful deliberation.

After studying this poster, the viewer shall:

- Be familiar with the key technologies available for 3T cardiac MRI; including parallel imaging, navigator echo triggering and real-time processing.
- Understand the signal-to-noise, imaging speed and SAR trade-offs involved in modifying cardiac imaging protocols from 1.5T to work at 3.0 T
- Recognize how imaging at 3T requires changes in pulse sequence parameters and exogenous contrast agent doses to account for field-dependent tissue relaxivity.