AbstractID: 9970 Title: Small Animal Magnetic Resonance Imaging: Current Trends, Challenges and Perspectives for Pathological Imaging

The utilization of magnetic resonance imaging (MRI) in the study of animal models of human pathology began more than 30 years ago. The continual advancement of imaging technology along with the increasing demand for tools to non-invasively and serially assess disease progression and/or regression in small animals has driven this field forward since its inception. Standard clinical MRI scans primarily focus on disease detection and are based on anatomical and morphological abnormalities, whereas small animal MRI studies center on the serial characterization of the morphological, functional and molecular properties of diseased tissue. Small animal MRI studies often employ novel contrast mechanisms and exogenous chemical reagents, higher magnetic field strengths, higher spatial resolution and multi-modality imaging but are complicated by issues such as low signal-to-noise ratios, enhanced sensitivity to respiratory and susceptibility artifacts, anesthesia-induced alterations of disease physiology and demanding data processing requirements.

This lecture will provide an overview of the role of small animal MRI in studying human disease, the technical and experimental challenges of such studies and how it could be used in the future to impact clinical treatment planning.

Educational Objectives:

1. Understand the role small animal MRI plays in understanding human disease and its impact on the development and validation of novel therapeutic strategies.
2. Understand the issues and challenges related to a small animal MRI experiment including design, data acquisition and processing.
3. Understand the future directions and potential advancements currently being pursued in small animal MRI.