Medical Physics Seminar
Monday, February 3, 2020
1325 HSLC ~ 4 PM

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Advances in Diffusion Weighted Magnetic Resonance Imaging: Quality Assurance, Biophysical Modeling, and Data Analysis Approaches

Diffusion weighted MRI (dMRI) offers the potential to extract information about tissue microstructure in vivo non-invasively. While the field has made great strides in improving quality and analysis of data, several limitations remain to be resolved. This presentation will focus on our contributions to addressing: 1) accuracy of diffusion measurements via development of a diffusion phantom, 2) diffusion signal model optimization, and 3) using multiple diffusion-related quantities for comparing one individual to a reference group.

High Pitch Helical CT Reconstruction Using Combined MBIR and Deep Learning Prior Networks

Since the introduction of spiral/helical computed tomography (CT) to the clinic in the early 1990's, there have been software and hardware developments to enable larger volume coverages per gantry rotation. Current state-of-the-art scanners are limited to helical pitches slightly larger than 1, meaning during each rotation the source traverses an axial distance equal to the detector collimation in the cone beam direction. We are proposing a reconstruction framework to enable higher pitch scans with the goal of achieving pitch of 2, 3, or even 4 detector collimations. The highly undersampled helical dataset is iteratively reconstructed and constrained in the image domain by a series of priors learned by deep learning networks.

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1325 Health Sciences Learning Center (HSLC) 4:00—5:00