

*Invited Presentation***BIOMEDICAL ENGINEERING SEMINAR**

11:00 a.m.-12:00 noon, Friday, February 20, 2009
Mann Hall, Medical Sciences Building

Title: Non-Contrast-Enhanced MRA

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Abstract: Both contrast-enhanced (CE-MRA) and nonenhanced MRA have been successfully applied to every vascular territory in the body. Due to the recent association of gadolinium contrast agents and Nephrogenic Systemic Fibrosis (NSF) disease, there has been increasing interest in using non-contrast MRA techniques as an alternative. Two main nonenhanced applications, peripheral run-off MRA and body MRA have recently undergone major technical advancements and have become a viable clinical option. In this presentation, two new techniques, ECG-gated partial Fourier fast spin echo (FSE) and balanced steady-state free precession (bSSFP) imaging will be discussed in detail. In peripheral run-off MRA, ECG-gated 3D partial Fourier FSE allows separation of arteries from veins by applying flow spoiler gradient pulses in the read-out (RO) direction. To find suitable ECG delay times for systole and diastole, an ECG-prep scan is applied to acquire single shot images with different ECG delay times. After finding the suitable systolic and diastolic triggering delay times, both systolic and diastolic 3D partial Fourier FSE images are acquired simultaneously and then subtracted to provide arterial images. Renal artery examinations using non-contrast MRA techniques are in high demand for patients with renal insufficiency and vascular disease. To depict the multi-directional vasculature of the renal arteries, either a navigator or a respiratory-gated technique is applied using 3D bSSFP with arterial spin labeling to gain an inflow effect using an axial or coronal orientation. Because the time-SLIP pulse saturates the background signals and the aortic blood travels into the acquisition plane with waiting the appropriate travel time, the bright blood of renal and branches is visualized by using a 3D bSSFP readout.

Reference:

- 1) Miyazaki M and Lee VS. Non-Contrast-Enhanced Magnetic Resonance Angiography: state-of-the-art. **Radiology** 248:20-43, 2008.

Host: Akira Kawashima, Ph.D.

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