

# ***BIOMEDICAL ENGINEERING SEMINAR***

11:00 a.m.-12:00 noon, Friday, January 30, 2009  
Mann Hall, Medical Sciences Building

## **Title: Novel Methods to Address Data Truncation Artifacts and Streaking Artifacts in 4D Cone Beam Computed Tomography**

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Abstract: Cone-beam computed tomography (CBCT) using an 'on-board' x-ray imaging device integrated into a radiation therapy system has recently been made available for patient positioning, target localization and adaptive treatment planning. Due to the limited detector size, projection data are truncated which will generate truncation artifacts in images reconstructed with traditional algorithms like FDK. This issue will be addressed using a new image reconstruction scheme, filtering a backprojection image of differentiated projection data (FBPD). To tackle motion artifacts due to respiratory motion in lung patient scan, 4D CBCT has been proposed. While the poor image quality, strong streak artifacts and low CNR, limits its wide application in clinic. Two novel methods were proposed to reduce artifacts and improve image quality in 4D CBCT. A simple scheme will be presented to significantly reduce the streak artifacts. Another new scheme, Prior Image Constrained Compressed Sensing (PICCS), was explored to simultaneously reduce streak artifacts and increase CNR of 4D CBCT images.

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