BME GIDP is proud to announce the Doctoral Defense of

TOMOE HAGIO
BME GIDP PhD Candidate

“Parametric Mapping and Image Analysis in Breast MRI”

Abstract: Breast cancer is the most common and the second most fatal cancer among women in the U.S. Current knowledge indicates that there is a relationship between high breast density (measured by mammography) and increased breast cancer risk. However, the biology behind this relationship is not well understood. This may be due to the limited information provided by mammography which only yields information on the relative amount of fibroglandular to adipose tissue in the breast. In our studies, breast density is assessed using quantitative MRI, in which MRI-based tissue-dependent parameters are derived voxel-wise by mathematically modeling the acquired MRI signals. Specifically, we use data from a radial gradient- and spin-echo imaging technique, previously developed in our group, to assess fat fraction and T2 of the water component in relation to breast density. In addition, we use diffusion-weighted imaging to obtain another parameter, ADC of the water component in the breast. Each parametric map provides a different type of information: fat fraction gives the amount of fat present in the voxel, T2 of water is sensitive to the type and the content of water in the tissue, and the ADC of water yields information on tissue cellularity. The challenge in deriving these parameters from breast MRI data is the presence of abundant fat in the breast, which can cause artifacts in the images and can also affect the parameter estimation. We approached this problem by modifying the imaging sequence (as in the case of diffusion-weighted imaging) and by exploring new signal models that describe the MRI signal accounting for the presence of fat. In this work, we present the improvements made in the imaging sequence and in the parametric mapping algorithms using simulation and phantom experiments. We also present preliminary results in vivo in the context of breast density-related tissue characterization.

Monday, November 14th, 2016
Keating 103
3:00 pm
Host: Maria Altbach, PhD
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Persons with a disability may request a reasonable accommodation by contacting the Disability Resource Center at 621-3268 (V/TTY).