SEMINAR NOTICE

Preston M. Green Department of Electrical and Systems Engineering

QUANTITATIVE ANALYSIS OF TUMOR BURDEN IN MOUSE LUNG VIA MRI

DISSERTATION DEFENSE

by

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Abstract: Lung cancer is the leading cause of cancer death in the United States. Despite recent advances in screening protocols, the majority of patients still present with advanced or disseminated disease. Preclinical rodent models provide a unique opportunity to test novel therapeutic drugs for targeting lung cancer. Respiratory-gated MRI is a key tool for quantitatively measuring lung-tumor burden and monitoring the time-course progression of individual tumors in mouse models of primary and metastatic lung cancer. However, quantitative analysis of lung-tumor burden in mice by MRI presents significant challenges. In this presentation, a method for measuring tumor burden based upon average lung-image intensity is described and validated. The method requires accurate lung segmentation; its efficiency and throughput would be greatly aided by the ability to automatically segment the lungs. A technique for automated lung segmentation in the presence of varying tumor burden levels is presented. The method includes development of a new, two-dimensional parametric model of the mouse lungs and a multi-faceted cost function to optimally fit the model parameters to each image. Results are presented demonstrating a strong correlation (0.93), comparable with that of fully manual expert segmentation, between the automated method's tumor-burden metric and the tumor burden measured by lung weight. In addition, automatic MRI segmentation techniques for spinal cord injury and brain tumor are briefly introduced.

DATE:	Friday, August 30, 2013
TIME:	1:00 p.m.
PLACE:	Green Hall, Room 0120

Dissertation advisor:
Dr. Arye Nehorai

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SCHOOL OF ENGINEERING & APPLIED SCIENCE