

**THURSDAY
SEPTEMBER 20,
2007**

**Scaife Hall Auditorium
Room 125**

4:30 p.m.
Refreshments—4:00 p.m.

DR. JEFF ORCHARD

ASSISTANT PROFESSOR,
UNIVERSITY OF WATERLOO



Jeff Orchard received his B.Math degree in applied mathematics from the University of Waterloo, Canada, in 1994, and his M.Sc. degree in applied mathematics from the University of British Columbia, Canada, in 1996. He received his Ph.D. degree in computing science from Simon Fraser University, Canada, in 2003.

Since 2003, Prof. Orchard has been an Assistant Professor in the David R. Cheriton School of Computer Science at the University of Waterloo, Canada. His research interests revolve around applying mathematics and computation to visual data. He has worked on projects in image registration, motion compensation for medical imaging, functional MRI, medical image reconstruction, and image mosaicking. At the University of Waterloo, he is affiliated with the Scientific Computing Research Group, the Waterloo Institute for Health Informatics Research, and the Centre for Computational Mathematics in Industry and Commerce.

ECE Seminar Hosts:
Radu Marculescu,
radum@ece.cmu.edu
Yi Luo,
y1827@andrew.cmu.edu
Bruno Sinopoli,
brunos@andrew.cmu.edu

Mental Gymnastics in Medical Image Processing

In this two-part talk, I will discuss recent advances in image registration, as well as a newly proposed CT device.

Part 1: Image registration is the process of aligning two different images of the same object or scene. It can be quite challenging to get a computer to automatically align an MRI to a CT scan because the pixel intensities do not directly correspond; this is called “multimodal registration”. I will present two such methods that I have developed, each with their own specialized abilities.

Part 2: Carbon nanotubes have recently been used to generate x-rays at room temperature. Based on these x-ray emitters, I will present a design for a portable and flexible CT scanner that could be deployed around a victim to acquire tomographic images at the scene of an accident. The device itself does not exist yet, but I will address the challenges of reconstructing tomographic images from the irregular geometry.

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