WIHIR
WATERLOO INSTITUTE FOR HEALTH INFORMATICS RESEARCH

RESEARCH SEMINARS

Date: **Mon. Mar. 5, 2007**

Time: 3:30 pm—4:30 pm

Room: Davis Centre 1304
University of Waterloo

For more information:
Maher Shinouda
519-888-4567 Ext. 5942

A Joint Seminar with The Centre for Computational Mathematics in Industry and Commerce

Real-Time Non-Rigid Registration for IGNS:
Mesh Generation

Image Guided Neurosurgery (IGNS) is an important tool for neurosurgical resection which is a common therapeutic intervention in the treatment of cerebral gliomas (tumours). However, during the course of intervention the areas of interest may dislocate due to brain shift/deformation, making rigid body registration inadequate. Research underway at Brigham and Women's Hospital (Boston) and the College of William and Mary, attempts to use intra-operative MRI to track brain deformation and align (register) preoperative data accordingly. The challenges of the non-rigid registration methods and software for IGNS are: (1) accuracy, (2) validation, (3) speed (4) fault-tolerance, and (5) ease-of-use. In this talk, we will present a FEM-based method for non-rigid registration in order to motivate our work on real-time mesh generation which we believe can improve the accuracy of the intra-operative imaging where it matters most, i.e., near by the tumour.

Existing parallel mesh generation codes are based on the parallelization of well known sequential mesh generation methods. In this seminar, we will discuss performance of COTS (commercial of-the-shelf) based approaches to real-time (parallel) mesh generation. We will discuss our experience from different parallel meshing methods that are using state-of-the-art sequential software. In addition, we will present research on extensions to meet our new requirements like conforming the mesh to the boundary between different tissues.

About the Speaker

Nikos Chrisochoides is the Alumni Memorial Distinguished Associate Professor of Computer Science at the College of William and Mary. His research interests are in parallel and distributed scientific computing and computational geometry, specifically, parallel mesh generation both theoretical and implementation aspects. His research is application-driven. Currently, he is working on real-time mesh generation for biomedical applications like non-rigid registration for Image Guided Neurosurgery.

Chrisochoides received his B.Sc. in Mathematics from Aristotle University, Greece and his M.Sc. (Mathematics) and Ph.D. (Computer Science) degrees from Purdue University. Then he moved to Northeast Parallel Architectures Center (NPAC) at Syracuse University as the Alex Nason Postdoctoral Fellow in Computational Sciences. After NPAC, he worked in the Advanced Computing Research Institute at Cornell University. He joined (as an Assistant Professor in January 1997) the Department of Computer Science and Engineering at the University of Notre Dame. In the Fall of 2000, he moved to the College of William and Mary as an Associate Professor. Chrisochoides has more than 100 technical publications in parallel scientific computing. He has held visiting positions at Harvard Medical School (Spring 2005), MIT (Spring 2005), Brown (Fall 2004) and NASA/Langley (Summer 1994).

ABOUT THE WIHIR RESEARCH SEMINARS

This is a seminar series for those interested in Health Informatics. Its purpose is to provide an opportunity for Institute members, their invitees, students, interested faculty members, and industry partners to present their research, learn about the research of others, and engage in discussion on topics of interest.

Guest Speaker:

Nikos P. Chrisochoides, Ph.D.
Alumni Memorial Distinguished Associate Professor
Computer Science Department
College of William and Mary