Dear Colleagues:

We welcome you to our 2008 Corporate Affiliates Meeting. Each year, this meeting provides the department and its corporate contacts an opportunity to continue a conversation on some of the long-term, fundamental needs of the United States in science and engineering. The Department of Computer Science at Rice University is one of the premier computer science departments in the United States, at the forefront of educating information technology leaders and creating new technology. Our research relies on input from industry, government, and other sectors, and in turn, our work provides insights and early access to the latest information in science and technology to those entities. This relationship is the driving force for the collaboration between academia and industry.

We have always valued our collaboration with industry, and we count our successes in technology transfer among our most important accomplishments. Our Corporate Affiliates Program has always been the cornerstone of our long-term relationship with industry, and we hope, through this meeting, to reenergize and renew that relationship through conversation and interaction.

Thank you for your participation, and please let us know if there is anything we can do to make this meeting and our Affiliates Program more productive.

Sincerely,

Vivek Sarkar
Chair, CS Corporate Affiliates Program

THE COMPUTER SCIENCE DEPARTMENT AT RICE WELCOMES REPRESENTATIVES FROM THE FOLLOWING COMPANIES AND INSTITUTIONS:

Advanced Micro Devices
Baylor College of Medicine
BHP Billiton Petroleum
Catalytic, Inc.
Chevron Corporation
Complete Solutions, Inc.
Cray, Inc.
ExxonMobil
First Genesis Inc
FrogPad, Inc.
Google
Hewlett-Packard Company
IBM Corporation
Intel
JP Morgan Chase
LogicBlox
Merrill Lynch
Microsoft Corporation
National Instruments
Numerical Algorithms Group
Patterson & Sheridan
PSI Technology
R7 Solutions
SAS Institute
Schlumberger
SnapStream
Sternhill Partners
Sun Microsystems, Inc.
Texas Institute for Genomic Medicine
Texas Instruments
University of Houston - Clear Lake
Velostor Technologies
Viasat
Visual Numerics, Inc.

WELCOME TO THE 2008 COMPUTER SCIENCE DEPARTMENT AFFILIATES CONFERENCE

Meeting Agenda

Wednesday, October 15, 2008

OSHMAN ENGINEERING DESIGN KITCHEN

Joint CSE/ECE Cocktail Hour

COHEN HOUSE

Corporate Affiliates Dinner

By Invitation only

DH MARTEL HALL

Intimacy with Machines

Tony Gurny and Dessert

Meeting Agenda

Thursday, October 16, 2008

8:30AM BREAKFAST AND REGISTRATION DH 3092

DH MARTEL HALL

Welcome and School of Engineering Overview

DH MARTEL HALL

CS Department Overview and New Chair Introduction

DH MARTEL HALL

From Robots to Biomolecules: Computing meets the physical world

Lydia Kavraki
Like it or not, parallelism is unavoidable in today’s computing platforms. In low-end systems, multi-core processors have become ubiquitous. At the high end, clusters now contain as many as tens of thousands of nodes, each with one or more processors. Being competitive in today’s parallel world means learning how to harness parallelism effectively. This talk will describe challenges facing application developers as they struggle to remap existing applications to exploit exploitable parallelism and a new generation of software tools under development at Rice that is designed to help people get the most out of parallel platforms at any scale. Specifically, this talk will introduce HPCToolkit—a suite of tools that supports measurement, analysis, application, and presentation of application performance for parallel programs—and describe novel strategies used by HPCToolkit to quantify, and pinpoint performance losses and scalability bottlenecks in parallel programs. Tools such as HPCToolkit can help focus development efforts where they are needed the most and where success is most likely, thus maximizing return on investment.

Taming Parallelism
Speaker: John Mellor-Crummey
11:00 AM
ROOM: McMURPHY AUDITORIUM

Building a More Appealing Computer Science Curriculum
Speaker: Joe Warren
3:30 PM
ROOM: McMURPHY AUDITORIUM

In the late 1990’s, CS enrollments boomed with the realization that information technology was fundamentally changing society. However, the dot-com crash, worries about oversized outsourcing of IT jobs, and the emergence of exciting new disciplines like biology have sapped CS enrollments nationwide. Rice’s previous curriculum, developed in the late 1990’s during the CS enrollment boom, focused on a highly rigorous introduction to the mathematical science of programming. While very successful in training CS majors, the previous curriculum left the fundamental question “Why major in CS?” unanswered until late in an undergraduate student’s career. In this talk, I will give an overview of Rice’s current efforts to revise its undergraduate curriculum in CS so that it is more appealing to Engineering students, many of whom currently major in Electrical Engineering or Bioengineering. In the first part of the talk, I will discuss the key to this revision, the development of a new introductory classes that focus of exciting application areas of CS such as robotics, AI, games and bioinformatics. One question raised by this revision is how the upper-level portion of the curriculum should evolve in reaction. Part of the process of answering this question is to identify key set of skills that all CS majors should have upon graduation. In second part of the talk, I will share my own thoughts on what some of these skills are and invite feedback from the audience on their own thoughts as to what are the essential skills for a CS major.
JOHN MELLOR-CRUMMEY
John Mellor-Crummey's research focuses on software technology for high performance parallel computing. His ongoing research includes work on tools for measurement and analysis of application performance, compiler and run-time technology for parallel and scientific computing, application performance modeling, and compiler technology for domain-specific languages.

PAST WORK HAS INCLUDED DEVELOPING TECHNIQUES FOR EXECUTION REPLAY OF PARALLEL PROGRAMS, EFFICIENT SYNCHRONIZATION ALGORITHMS FOR SHARED-MEMORY MULTIPROCESSORS, AND A SYSTEM FOR EFFICIENTLY DETECTING DATA RACES IN EXECUTIONS OF SHARED-MEMORY PROGRAMS USING A COMBINATION OF COMPLETE-TIME AND RUN-TIME SUPPORT.

JOE WARREN
Joe Warren's research interests focus on the application of computers to geometrical problems and are centered around the general problem of representing geometrical shapes. His specific areas of interest include computer modeling, the construction and manipulation of data structures for representing geometrical objects, and computational geometry, or using algorithms to solve geometrical problems. He is particularly interested in algorithms for solving and manipulating systems of polynomial equations. His approach is to develop interesting mathematical methods for representing shape that can be used in practical applications. Topics he has worked on include modeling with piecewise algebraic surfaces, methods for finite-element mesh generation, properties of rational surfaces with base points, and visualization of multivariate data. Warren's current research focuses on two related topics: subdivision, a method for concisely representing shape, and wavelets, a method for building an associated hierarchy of shapes. He is particularly interested in extending the theory associated with both to handle irregular geometry.

One of the principal areas in which computing has changed the today's world is computer graphics and geometric modeling. In entertainment, computer-animated movies such as “Finding Nemo” and advanced 3D computer games such as “Halo 2” make heavy use of computer graphics. In medicine, computer graphics allows physicians to visualize and simulate disease processes and potential treatments in ways that were never available until now. In manufacturing, geometric modeling allows engineers to design and test goods without the need to build costly physical prototypes. All of these advances are based on algorithms and data structures developed by computer scientists for representing, simulating and visualizing geometrical objects. At the core of these advances is an exciting synthesis that arises from combination of new computational techniques with existing mathematical disciplines such as algebraic geometry and differential geometry. Professor Warren’s research lies at exactly this boundary. His goal is to apply advanced mathematics to real world problems and develop new methods in computer graphics and geometric modeling for solving these problems.

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