The Information Science & Technology Center

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Colorado State University's
Information Science and Technology Center (ISTeC)
presents <u>two</u> lectures by

Dr. Craig Stunkel

Deep Computing Software & Applications
IBM T. J. Watson Research

ISTeC Distinguished Lecture

in conjunction with the
Electrical and Computer Engineering Department and Computer Science Department Seminar Series

"Toward Exascale Computing"

Monday, March 23, 2009
Reception: 10:30 a.m.
Lecture: 11:00 a.m. – 12:00 noon
Location: Lory Student Center Grey Rock Room

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Special Electrical and Computer Engineering Seminar

sponsored by ISTeC

"High Performance Computing: Heterogeneous Nodes and Hybrid Systems"

Tuesday, March 24, 2009
Lecture: 11:00 a.m.– 12:00 noon
Location: Lory Student Center 211

ABSTRACTS

"Toward Exascale Computing"

Supercomputers have recently reached peak Petaflop (10^{15}) performance, and scientists and governments are already eagerly anticipating Exascale (10^{18}) capabilities. Over the last 20 years, "Top500" computing systems have doubled in performance every year on average. However, a number of technology constraints are threatening to slow this torrid rate of growth. Power and cooling concerns have reduced frequency improvements to a crawl. Each new semiconductor generation is more susceptible to failure. Off-chip bandwidth is not keeping pace with compute performance. The most powerful systems will soon have one million cores, creating a scaling challenge for applications. We will discuss innovations in computer technology, architecture, and software that attack these trends, with the goal of enabling an Exascale system within ten years.

"High Performance Computing: Heterogeneous Nodes and Hybrid Systems"

Computer systems are moving toward more heterogeneous architectures. This trend is a response to several factors, particularly power efficiency, the leveling of processor frequency, and time to solution. Accelerators in various forms are becoming widely used, resulting in nodes with heterogeneous compute cores and special-purpose hardwired or programmable units. At the system level we are predicting similar "hybrid system" trends driven by future applications that combine streaming data, heavy analytic requirements, and database transactions. The trend toward more heterogeneous systems creates challenges for system designers, for programming models, and for the entire software development ecosystem. We will examine recent directions in programming models for such systems for the high-performance computing space.

SPEAKER BIOGRAPHY

Craig Stunkel is a senior manager at IBM's T. J. Watson Research Center in Yorktown Heights, NY. He received the B.S. and M.S. degrees from Oklahoma State University in 1982 and 1983, and the Ph.D. degree in electrical engineering from the University of Illinois, Urbana in 1990. After joining IBM Research in 1990, he made extensive contributions to the switching networks of several generations of IBM supercomputing systems. Dr. Stunkel currently directs the Deep Computing Software and Applications department, which includes the system software for IBM Blue Gene line of supercomputers. His current research interests include parallel architectures, applications, algorithms, and performance analysis.

To arrange a meeting with the speaker, please contact MaryAnn Stroub at (970) 491-2708 or mstroub@engr.colostate.edu.

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