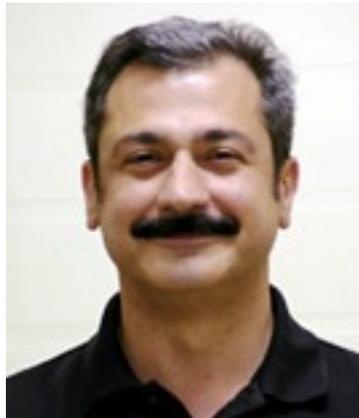# Abell Endowment Distinguished Lecture in Computer Engineering

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

Dr. Hamid R. Arabnia

Professor of Computer Science
University of Georgia

"Bio-Inspired Supercomputing"

Monday, February 4, 2013
Reception: 10:30 a.m.
Lecture: 11:00 – 12:00 noon
Location: Computer Science Building Room 130

ABSTRACT

The two major issues in the formulation and design of parallel multiprocessor systems are algorithm design and architecture design. The parallel multiprocessor systems should be so designed so as to facilitate the design and implementation of the efficient parallel algorithms that exploit optimally the capabilities of the system. From an architectural point of view, the system should have low hardware complexity, be capable of being built of components that can be easily replicated, should exhibit desirable cost-performance characteristics, be cost effective and exhibit good scalability in terms of hardware complexity and cost with increasing problem size. In distributed memory systems, the processing elements can be considered to be nodes that are connected together via an interconnection network. In order to facilitate algorithm and architecture design, we require that the interconnection network have a low diameter, the system be symmetric and each node in the system have low degree of connectivity. For most symmetric network topologies, however, the requirements of low degree of connectivity for each node and low network diameter are often conflicting. Low network diameter often entails that each node in the network have a high degree of connectivity resulting in a drastic increase in the number of inter-processor connection links. A low degree of connectivity on the other hand, results in a high network diameter which in turn results in high inter-processor communication overhead and reduced efficiency of parallelism. Reconfigurable networks attempt to address this tradeoff. In this presentation, we discuss our design of a reconfigurable network topology that is targeted at medical applications; however, others have found a number of interesting properties about the network that makes it ideal for applications in computational biology as well as information engineering. The design that will be presented in this talk is a bio-inspired reconfigurable interconnection topology (the work is based on an ongoing project).

SPEAKER BIOGRAPHY

Hamid R. Arabnia received a Ph.D. degree in Computer Science from the University of Kent (Canterbury, England) in 1987. Arabnia is currently a Professor of Computer Science at University of Georgia (Georgia, USA), where he has been since October 1987. His research interests include Parallel and distributed processing techniques and algorithms, supercomputing, interconnection networks, and applications (in particular, in image processing, medical imaging, bioinformatics, knowledge engineering, and other computational intensive problems). Dr. Arabnia is Editor-in-Chief of The Journal of Supercomputing published by Springer; Co-Editor of Journal of Computational Science published by Elsevier; and serves on advisory/editorial boards of 35 other journals. Arabnia has been Associate Editor of IEEE Transactions on Information Technology in Biomedicine (2008-2011). He has received a number of awards – most recently (2007), he received an "Outstanding Achievement Award in Recognition of His Leadership and Outstanding Research Contributions to the Field of Supercomputing". This award was presented to him at Harvard University Medical School (signatories: Lawrence O. Hall, President of IEEE/SMC). Arabnia is an elected Fellow, Int'l Society of Intelligent Biological Medicine (ISIBM); he has been on the Advisory Board of IEEE Technical Committee on Scalable Computing (TCSC, 2006-2012). He is the founder of PDPTA annual conferences. Arabnia has published extensively in journals and conference proceedings. He has about 150 research publications and about 100 edited books in his areas of interest. He has been a PI/Co-PI on $7,139,525 externally funded projects/initiatives and on $103,453 internally funded projects (correct as of January 2009). He has also contributed projects for justification for equipment purchase ($4 Million - awarded). During his tenure as Graduate Coordinator of Computer Science (August 2002 - January 2009), Dr. Arabnia secured the largest level of funding in the history of the department for supporting the research and education of graduate students (PhD, MS). Arabnia has delivered a number of keynote and plenary lectures at conferences; most recently at (since September 2008): The 14th IEEE Int'l Conf. on Parallel & Distributed Systems (ICPADS'08); Int'l Conf. on Future Generation Communication & Networking (FGCN 2008 / IEEE CS); The 10th IEEE Int'l Conf. on High Performance Computing & Communications (HPCC-08), …

To meet with the speaker, please contact Prof. H.J. Siegel at HJ@ColoState.edu.