Computational & Life Sciences/
Center for Comprehensive Informatics
Fall 2008 Seminar Series
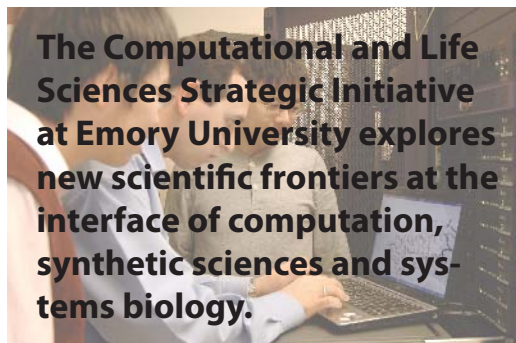
12/10/2008
3:00pm

Dr. David Bader

Executive Director of High-Performance Computing, Georgia Institute of Technology
Location: Mathematics and Science Center, Room N304

"Petascale Computing for Computational Biology and Genomics"

Abstract:
Graph theoretic problems are representative of fundamental kernels in traditional and emerging computational sciences such as chemistry, biology, and medicine, as well as applications in national security. Yet they pose serious challenges for parallel machines due to non-contiguous, concurrent accesses to global data structures with low degrees of locality. Few parallel graph algorithms outperform their best sequential implementation due to long memory latencies and high synchronization costs. In this talk, we consider several graph theoretic kernels for connectivity and centrality and discuss how the features of petascale architectures will affect algorithm development, ease of programming, performance, and scalability. Our large-scale graph algorithms are applied to real-world problems in phylogenetic reconstruction of evolutionary histories, inference of gene function in protein interaction networks, and cancer research.

The Computational and Life Sciences Strategic Initiative at Emory University explores new scientific frontiers at the interface of computation, synthetic sciences and systems biology.

Computational Science & Informatics

Synthetic Sciences

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