



[Prospective Students](#) [Current Students](#) [Alumni](#) [Industry](#) [Media](#)
[About the College](#)
[Academics](#)
[Research](#)
[People](#)
[Student Life](#)
[Partnerships](#)
[News](#)
[Events](#)


<< APRIL 2007 >>						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

[View This Week's Events ▶](#)
[View This Month's Events ▶](#)

## CSE Leadership in Petascale Computing

### Parallel computing will be used from desktops to petaflops for science and engineering

**(April, 2007)** – David A. Bader, Executive Director of High-Performance Computing, and Associate Professor in the Computational Science and Engineering Division of the College of Computing at Georgia Tech, recently delivered a keynote talk on “Petascale Computing for Large-Scale Graph Problems” at the 8th IEEE International Workshop on Parallel and Distributed Scientific and Engineering Computing (PDSEC), on March 30 in Long Beach, CA, held in conjunction with the 21st IEEE International Parallel and Distributed Processing Symposium (IPDPS).

“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,” said Bader, “Yet they pose serious challenges for parallel machines due to non-contiguous, concurrent accesses to global data structures with low degrees of locality. 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.”

IPDPS is considered the premier academic conference in the areas of parallel and distributed computing. This year's symposium held from March 26-30 in Long Beach, CA, was met with record attendance with over 650 attendees and included 109 peer-reviewed papers in its highly-competitive main track, four keynote talks and over 20 workshops. Being highly regarded by the professional community as the annual meeting for top research results in the field, IPDPS had strong international participation with approximately equal attendance from the U.S., Europe and Asia.

The College of Computing had strong participation at the symposium, with 20 activities related to the College:

#### TECHNICAL PAPERS

International Parallel and Distributed Processing Symposium (IPDPS) 2007:

##### **Spam-Resilient Web Rankings via Influence Throttling**

James Caverlee, Steve Webb and Ling Liu

##### **RF2ID: A Reliable Middleware Framework for RFID Deployment**

Nova Ahmed, Rajnish Kumar, Robert Steven French and Umakishore Ramachandran

##### **On the Design and Analysis of Irregular Algorithms on the Cell Processor: A Case Study of List Ranking**

David A. Bader, Virat Agarwal and Kamesh Madduri

##### **Optimizing Multiple Distributed Stream Queries Using Hierarchical Network Partitions**

Sangeetha Seshadri, Vibhore Kumar, Brian F. Cooper and Ling Liu

The 6th High-Performance Computational Biology (HiCOMB) Workshop:

**A Graph-Theoretic Analysis of the Human Protein-Interaction Network Using Multicore Parallel Algorithms**

David A. Bader and Kamesh Madduri

The NSF Next Generation Software Workshop:

**DOSA: Design Optimizer for Scientific Applications**

David A. Bader and Viktor K. Prasanna

Security in Systems and Networks (SSN) Workshop:

**Improving Secure Communication Policy Agreements by Building Coalitions**

Srilaxmi Malladi, Sushil K. Prasad and Shamkant B. Navathe

Performance Optimization for High-Level Languages and Libraries (POHLL) Workshop

**Model-Guided Empirical Optimization for Multimedia Extension Architectures: A Case Study**

Chun Chen, Jaewook Shin, Shiva Kintali, Jacqueline Chame and Mary Hall

Multi-Threaded Architectures and Applications (MTAAP) Workshop:

**SWARM: A Parallel Programming Framework for Multicore Processors**David A. Bader, Varun Kanade and Kamesh Madduri **Advanced Shortest Paths Algorithms on a Massively-Multithreaded Architecture**

Joseph R. Crobak, Jonathan W. Berry, Kamesh Madduri and David A. Bader

**KEYNOTE TALK**

Parallel and Distributed Scientific and Engineering Computing (PDSEC) Workshop:

**Petascale Computing for Large-Scale Graph Problems**

David A. Bader

**CO-CHAIR**

David A. Bader, The 6th High-Performance Computational Biology (HiCOMB) Workshop

**PROGRAM COMMITTEE MEMBERSHIPS**

David A. Bader, IPDPS 2007

Sudhakar Yalamanchili, IPDPS 2007

David A. Bader, The 16th Heterogeneity in Computing Workshop (HCW)

Alberto Apostolico, The 6th High-Performance Computational Biology (HiCOMB) Workshop

David A. Bader, Multi-Threaded Architectures and Applications (MTAAP) Workshop

Jeff Vetter, Multi-Threaded Architectures and Applications (MTAAP) Workshop

David A. Bader, a faculty member in the Computational Science and Engineering Division, and Executive Director of High-Performance Computing at Georgia Tech, chairs the Institute of Electrical and Electronics Engineers' (IEEE) Technical Committee on Parallel Processing (TCPP), which sponsors IPDPS. Bader will also host the Monday evening general membership reception on behalf of TCPP.

For more information about IPDPS 2007, visit [www.ipdps.org](http://www.ipdps.org).

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