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ve velké zasedačce (č. 318, 2. poschodí)  
Ústavu informatiky AV ČR, v.v.i.,  
Pod Vodárenskou věží 2, Praha 8 - Libeň  
konat seminář

## **Massive-Scale Graph Analytics**

**David A. Bader**

Georgia Institute of Technology  
<http://www.cc.gatech.edu/~bader>

Emerging real-world graph problems include detecting community structure in large social networks, improving the resilience of the electric power grid, and detecting and preventing disease in human populations. Unlike traditional applications in computational science and engineering, solving these problems at scale often raises new challenges because of sparsity and the lack of locality in the data, the need for additional research on scalable algorithms and development of frameworks for solving these problems on high performance computers, and the need for improved models that also capture the noise and bias inherent in the torrential data streams. In this talk, the speaker will discuss the opportunities and challenges in massive data-intensive computing for applications in computational biology, genomics, and security. The explosion of real-world graph data poses a substantial challenge: How can we analyze constantly changing graphs with billions of vertices? Our approach leverages fine-grained parallelism, lightweight synchronization, and shared memory, to scale to massive graphs.

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### Brief Biography:

David A. Bader is a Full Professor in the School of Computational Science and Engineering, College of Computing, at Georgia Institute of Technology, and Executive Director for High Performance Computing. He received his Ph.D. in 1996 from The University of Maryland, and his research is supported through highly-competitive research awards, primarily from NSF, NIH, DARPA, and DOE. Dr. Bader serves as a Board member of the Computing Research Association (CRA), and on the Steering Committees of the IPDPS and HiPC conferences. He is Program Chair for IPDPS 2014, and has served on the Research Advisory Council for Internet2, as the General Chair of IPDPS 2010 and Chair of SIAM PP12. He is an associate editor-in-chief of the Journal of Parallel and Distributed Computing (JPDC), and serves as an associate editor for several high impact publications including IEEE Transactions on Computers (TC), ACM Transactions on Parallel Computing (TOPC), ACM Journal of Experimental Algorithmics (JEA), IEEE DSONline, Parallel Computing, and Journal of Computational Science, and has been an associate editor for the IEEE Transactions on Parallel and Distributed Systems (TPDS). He was elected as chair of the IEEE Computer

Society Technical Committee on Parallel Processing (TCPP) and as chair of the SIAM Activity Group in Supercomputing (SIAG/SC). Dr. Bader's interests are at the intersection of high-performance computing and real-world applications, including computational biology and genomics and massive-scale data analytics. He has co-chaired a series of meetings, the IEEE International Workshop on High-Performance Computational Biology (HiCOMB), co-organized the NSF Workshop on Petascale Computing in the Biological Sciences, written several book chapters, and co-edited special issues of the Journal of Parallel and Distributed Computing (JPDC) and IEEE TPDS on high-performance computational biology. He is also a leading expert on multicore, manycore, and multithreaded computing for data-intensive applications such as those in massive-scale graph analytics. He has co-authored over 130 articles in peer-reviewed journals and conferences, and his main areas of research are in parallel algorithms, combinatorial optimization, massive-scale social networks, and computational biology and genomics. Prof. Bader is a Fellow of the IEEE and AAAS, a National Science Foundation CAREER Award recipient, and has received numerous industrial awards from IBM, NVIDIA, Intel, Cray, Oracle/Sun Microsystems, and Microsoft Research. Dr. Bader has served as a lead scientist in several DARPA programs including High Productivity Computing Systems (HPCS) with IBM PERCS, Ubiquitous High Performance Computing (UHPC) with NVIDIA ECHELON, and Anomaly Detection at Multiple Scales (ADAMS). He was a distinguished speaker in the IEEE Computer Society Distinguished Visitors Program, and has also served as Director of the Sony-Toshiba-IBM Center of Competence for the Cell Broadband Engine Processor. Bader is a co-founder of the Graph500 List for benchmarking "Big Data" computing platforms. Bader is recognized as a "RockStar" of High Performance Computing by InsideHPC and as HPCwire's People to Watch in 2012.