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COMPUTER SCIENCE AND ENGINEERING

Presents

Kamesh Madduri, Pennsylvania State University

High-performance Graph Analytics

Graph-theoretic abstractions are at the core of data-intensive problems arising in social and technological network analysis (e.g., identification of implicit online communities, viral marketing strategies, quantifying centrality and influence in interaction networks, web algorithms), systems biology (for instance, interactome analysis, epidemiological studies, disease modeling), and security applications (e.g., detecting trends and anomalous patterns from socio-economic interactions and communication data). Due to their large memory footprint, fine-grained computational granularity, and low degrees of spatial locality, massive graph problems pose serious challenges on current parallel machines. In this talk, I will present our research group's recent work on enabling large-scale and high-performance graph analysis. Our parallel implementations on multicore servers and leading supercomputers achieve significant parallel speedup for traversal, connectivity, and centrality problems on graph instances in the order of billions of vertices and edges. I will also describe the parallel algorithms and implementation of two software tools that our group has developed: FASCIA for approximately counting and enumerating network motifs, and PULP for multi-objective graph partitioning.

Bio: Kamesh Madduri is an assistant professor in the Computer Science and Engineering department at The Pennsylvania State University. He received his PhD in Computer Science from Georgia Institute of Technology's College of Computing in 2008, and was previously a Luis W. Alvarez postdoctoral fellow at Lawrence Berkeley National Laboratory. His research interests include high-performance computing, parallel graph algorithms, and massive scientific data analysis. He is a recipient of the NSF CAREER award (2013), a co-recipient of the best paper award at the 42nd International Conference on Parallel Processing (2013), and was awarded the first Junior Scientist prize from the SIAM Activity group on Supercomputing (2010). He is a member of ACM and SIAM.

Thursday, November 5, 2015

3:30 – 4:30 pm

University at Buffalo – North Campus – Davis 113A

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