



## Fall 2017 Colloquium Department of Computer and Information Sciences

### *Enabling Big-data Computing Workflows in High-performance Networks*

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**Abstract:** Many applications in various science, business, and industry domains are producing colossal amounts of data, now frequently termed as “big data”, on the order of terabyte at present and petabyte or even exabyte in the predictable future. No matter which type of data is considered, an end-to-end computing solution that facilitates data transfer, processing, visualization, and analytics would be essential for scientific research, knowledge discovery, or business intelligence. Such computing solutions are typically built upon data- and network-intensive workflows comprised of computing modules with complex dependencies. The goal of our research is to develop an integrated and automated workflow solution to support big-data applications in high-performance networks. Together with science collaborators at national laboratories within U.S. Department of Energy, we design a three-layer workflow architecture where the workflow performance is optimized through the co-scheduling of computing and networking resources based on resource abstraction, bandwidth reservation, and workflow mapping. This talk provides a brief tutorial on big-data scientific applications and shares our research results on various enabling technologies based on rigorous algorithm design, theoretical dynamics analysis, and real network implementation, deployment, and evaluation.

**Bio:** Chase Q. Wu is currently an Associate Professor in the Department of Computer Science and the Director of the Center for Big Data at New Jersey Institute of Technology (NJIT). He joined NJIT in fall 2015 from the University of Memphis, where he was an Associate Professor in the Department of Computer Science. His research interests include big data, high-performance networking, parallel and distributed computing, sensor networks, scientific visualization, and cyber security. His research in networking develops fast and reliable data transfer solutions to help users in a wide spectrum of scientific domains move big data over long distances for collaborative data analytics. His research in computing develops high-performance workflow solutions to manage the execution of and optimize the performance of large-scale scientific workflows in heterogeneous computing environments. Dr. Wu’s work has been supported by various funding agencies, including the U.S. National Science Foundation, Department of Energy, Department of Homeland Security, Office of Naval Research, and Oak Ridge National Laboratory, where he is a research staff and works on a number of high-performance networking projects and big-data computational science projects. He has published over 200 research articles in highly reputed conference proceedings, journals, and books, and won best paper awards at many conferences.