HiPS2021 Keynote Speaker

Title: The Internet of Things: Multi-scale High-performance Computing

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Abstract: The Internet of Things (IoT) is a rapidly approaching technological change that envisions ubiquitous and network-accessible digital instrumentation and actuation of literally every "thing" we encounter in everyday life. Like the World Wide Web (now simply called The Internet) before it, IoT will likely represent another societal sea change as objects in the physical world become network-enabled so that they can communicate and interact with people and, autonomously, with each other.

To become a digital extension of human perception, IoT applications must fuse sensory and actuation activities with computational models in a way that meets performance, reliability, and security requirements comprehensively end-to-end. As a result, the current Internet architecture, which is evolving to enhance the benefits that accrue to cloud computing, will require substantial additional innovation and augmentation before IoT will come to complete fruition.

In this talk, we will discuss some of the computer science research questions that have grown from early experiences in architecting and deploying working IoT systems and infrastructure. In particular, the talk will describe a potential new approach to software infrastructure that is designed to meet many of the current and future IoT challenges, particularly with respect to fusing computations conducted at multiple resource scales. We will outline our experiences in building and deploying IoT systems using this new approach and the myriad of new research opportunities that arise as a result.

About the Speaker: Dr. Rich Wolski is a Professor of Computer Science at the University of California, Santa Barbara (UCSB) where he holds the Duval Presidential Chair in Energy Efficiency. Having received his M.S. and Ph.D. degrees from the University of California at Davis (while a research scientist at Lawrence Livermore National Laboratory) he has also held positions at the University of California, San Diego, and the University of Tennessee, the San Diego Supercomputer Center, and Lawrence Berkeley National Laboratory. Rich has led several national scale research efforts in the area of distributed systems and is the progenitor of the Eucalyptus open source cloud project.