

Software vs Reality – Bridging the Gap

Wednesday, April 30, 2014

2:00 p.m.–3:00 p.m.

Building 5100, JICS Auditorium



Abstract

The United States contains 4.4% of the world's population but consumed 19% of the world's primary energy in 2010. The nation's 118.6 million residential and commercial buildings consume 41% of US primary energy (73% of the electrical energy). Optimal building retrofits, incentives, national policies, and other multi-scale problems can be addressed with advanced software simulation and optimization techniques. However, in multiple scientific domains, there is often a lack of trust in software models because of uncertain inputs, algorithmic approximations, or difficult analytical interpretation. This seminar discusses many of the scientific techniques developed to address these concerns. Topics will include visualization, software simulation for actualized energy savings, and the Autotune calibration of software models to measured data. These include use of Titan for quantifying dynamics of 8 million buildings (200+ TB dataset), a high-performance computer (HPC)-enabled suite of machine learning algorithms for big data analysis, domain-agnostic techniques for robustly speeding up multi-objective optimization tasks, and modern deployment methods for intuitively transferring advanced computation into actualized energy savings.

Dr. Joshua New

joined ORNL in 2009, after completing his PhD in Computer Science from The University of Tennessee. He currently serves as subprogram manager for software tools in the Building Technologies Research and Integration Center. He has lead more than 30 competitively-awarded projects focused on software systems to facilitate energy-efficient buildings, including web-based simulation tools, web service integration with large companies, and advanced software calibration. The science behind these projects includes software scalability on HPC resources, generation of open scientific data sets, and extending capabilities for big data mining. His research experience includes human/computer interaction, artificial intelligence, visualization, automation, HPC, energy-efficient building simulations, computer vision, and robotics. He is an active member of IEEE, ASHRAE, and has more than 50 peer-reviewed publications.