DEPARTMENT OF COMPUTER SCIENCE
UNIVERSITY OF HOUSTON

FACULTY CANDIDATE SEMINAR 2012

WHEN: WEDNESDAY, MARCH 21, 2012
WHERE: PGH 232
TIME: 11:00 AM

SPEAKER: Dr. Barry Rountree, Lawrence Livermore National Laboratory

Host: Dr. Edgar Gabriel

TITLE: Slowing CPUs To Run Faster: The Strange World of High-Performance Computing Under a Power Bound

Abstract: Most problems that arise from contemplating exascale computing are familiar ones, albeit scaled up 1000x. Computing under a power, however, is a problem that users and system administrators have not had to address before. Default power scheduling on exascale machines will certainly run Linpack benchmarks well, but optimizing performance of more realistic applications will require scheduling power in order to direct it to where it will have the greatest impact on performance.

In this talk I will be discussing my work in energy optimization for high performance computing. I will be focusing on a linear programming solution that provides an upper bound on potential energy savings, a runtime solution (Adagio) that realizes most of these savings. I will then show how this energy optimization work provides a direct path to power optimization and discuss some of our recent work on hardware-enforced power bounds on the LLNL TLCC2 clusters Zinfandel (#15 top500.org) and Merlot.

Biography: Barry Rountree has a BA in Theater (Ohio University), MS in System and Network Administration (Florida State University) and a Ph.D. in Computer Science (University of Arizona). He is currently a postdoctoral researcher at Lawrence Livermore National Laboratory where he focuses on power and debugging issues at exascale. He is a Co-PI on a newly-awarded ARPA-E grant to study application of HPC capabilities to electrical grid optimization problems. Recent work includes an order-of-magnitude speedup of a memory validation tool similar to Valgrind's memcheck and what may be the first published paper on Intel's Runtime Average Power Limit (RAPL) technology.