Special Guest Lectures

## Building Symbiotic Relationships Between Formal Verification and High Performance Computing

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**Abstract:**
Computational simulations for scientific and engineering applications are becoming more ubiquitous as part of the engineering design cycle. The application of simulation science to complex problems often requires complex models, sophisticated numerics and intricate implementations. Tremendous effort has been expended towards the development of systematic techniques for model validation and numerical method verification. As most researchers hesitantly admit, the amount of time spent debugging intricate high performance parallel implementations of their simulations consumes a large bulk of their time. In particular, many would argue that although this debugging time is necessarily, it distracts one from the science or engineering problem of interest. In this talk, we will present our continuing effort by the Utah Gauss Group to employ formal verification techniques to the debugging of parallel high performance computing codes using MPI. This synergistic combination of formal techniques with HPC is designed to infuse news ways of thinking about parallel code design through interaction of two normally disparate communities, with the goal of benefiting both communities.

**Speaker's Bio:**
Robert M. (Mike) Kirby is an Associate Professor of Computer Science, Adjunct Associate Professor of Mathematics and Adjunct Associate Professor of Bioengineering at the University of Utah. He is both a faculty member in the School of Computing and the Scientific Computing and Imaging Institute at Utah. He received the Sc.M. degree in Applied Mathematics, the Sc.M. degree in Computer Science, and the Ph.D. degree in Applied Mathematics from Brown University, Providence, RI, in 1999, 2001, and 2002, respectively. His research focus is on large-scale scientific computing and visualization, with an emphasis on the scientific cycle of mathematical modeling, computation, visualization, evaluation, and understanding. His primary research interests include: Computational Science and Engineering Applications, Algorithm Development and Application of High-Order Methods, Scientific Visualization, Verification and Application of Concurrent Programming, and High Performance Computing



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