



Events

[Current Events](#)[Lectures ▾](#)[Events Archive ▾](#)

Special Guest Lectures

Sierra Computational Mechanics Framework: Managing Complexity for Massively Parallel Adaptive Multiphysics Applications**H. Carter Edwards**

Sandia National Laboratories

Johnston Hall 338

July 10, 2006 - 10:00 am

Abstract:

Requirements for modeling and simulation capabilities are increasing in breadth of physics, fidelity of models, complexity of the systems to be simulated, and problem size (e.g. degrees of freedom). Advanced technologies and algorithms, such as massively parallel computing and automatically adaptive discretizations, are being successfully applied to handle large problems and reduce the time to solution - at the cost of further increasing the complexity of these codes. Managing this complexity is a significant challenge, requiring the integration of expertise from many disciplines. Sandia National Laboratories has developed the Sierra Framework to support a large, diverse set of complex, massively parallel, multiphysics application codes. The Sierra Framework is responsible for consolidating complex physics-independent capabilities into a single software infrastructure that is shared by these application codes. These capabilities include management of distributed mesh and field data structures, interfacing to parallel linear solvers, dynamic load balancing, transfer of fields between dissimilar meshes, and parallel adaptivity for distributed, unstructured meshes. An overview of Sierra's capabilities and design abstractions of Sierra's distributed dynamic object-oriented mesh data structure and parallel algorithms will be presented.

Speaker's Bio:

Carter earned his PhD in Computational and Applied Mathematics from the University of Texas in May 1997. Concepts introduced in his dissertation, "A Parallel Infrastructure for Scalable Adaptive Finite Element Methods and its Application to Least Squares C² Collocation," have been further developed and incorporated into the Sierra Framework. Carter is currently the primary architect and project manager for the Sierra Framework at Sandia National Laboratories.

