DEPARTMENT OF COMPUTER SCIENCE
UNIVERSITY OF HOUSTON

FACULTY CANDIDATE SEMINAR 2012

WHEN: **WEDNESDAY, MARCH 28, 2012**
WHERE: **PGH 232**
TIME: **11:00 AM**

SPEAKER: Dr. Hongfeng Yu, Sandia National Laboratories, California

Host: Dr. Zhigang Deng

TITLE: High-Performance Visualization of Large Data

ABSTRACT:
We are generating digital data routinely from many areas of science and engineering in unprecedented scales and details. This calls for new techniques and tools to reveal the essential information inherent in these large and complex data at high interactivity and fidelity. Visualization, which transforms data into informative images, has proven to be an effective tool to explore important aspects of data by employing human vision capabilities. Unlike a traditional visualization task, visualizing a large data set requires the storage space and processing power in a high-performance computing environment. The design of a deployable visualization system must address the issues in every stage of the visualization pipeline. Optimal efficiency can only be achieved with a careful coordination of I/O, processing, rendering, and user interaction. In this talk, I will discuss the background and challenges for large data visualization. I will present our recent works in scalar field and particle data visualization for large-scale turbulent combustion simulations, and demonstrate our efforts to address large scientific data visualization problems by removing several key bottlenecks. Our solutions enable scientists to study their large data at the resolution and interactivity previously unavailable to them. While some of the techniques presented in this talk are devised for the combustion simulations, the design principles and the overall software architecture are applicable to a wider class of scientific and engineering applications.

BIO: Hongfeng Yu is a postdoctoral researcher at the Combustion Research Facility at Sandia National Laboratories. He received the BS and MS degrees in computer science and engineering from Zhejiang University, China, and the PhD degree in computer science from the University of California-Davis. His research interests include scientific visualization, high-performance computing, and user interfaces and interaction. He has designed, implemented, and evaluated a number of algorithms and techniques to visualize large data from scientific simulations. These new algorithms and systems have been deployed by the US Department of Energy SciDAC program and helped the scientists from Carnegie Mellon University, Stanford Linear Accelerator Center, Oak Ridge National Laboratory, Princeton Plasma Physics Laboratory, and Sandia National Laboratories effectively visualize phenomena ranging from earthquake, supernova evolution, to fusion and combustion reaction. He was the technical lead of the team that won the ACM/IEEE SC06 HPC Analytics Challenge. He received the DOE SciDAC OASCR Award for Outstanding Achievement in Scientific Visualization in 2009.