KEYNOTE TALK
Tuesday, December 2, 2008
8:30 AM - 9:30 AM / Ballroom 4-5

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Visualizing Science at the Petascale: Issues, Impediments and
Strategies Going Forward

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Abstract

Scientific visualization is a fundamental data analysis technique for simulation-based research. Through 2-D and 3-D images, scientific visualization helps scientists explore, make sense of, and communicate data -- whether it is modeling a hurricane, tracing the arterial blood flow of a heart, or exploring a super massive black hole. High performance computing (HPC) systems capabilities are racing far ahead of users' abilities to effectively visualize the data they produce. As petaflop systems produce simulation output of unprecedented scale, it is becoming unfeasible to move these data sets over wide area networks to visualization systems, and to use special-purpose visualization systems to interact with them. High-end visualization requires aggregating commodity technologies effectively, as HPC systems do now, and such systems need to be "close" to the data, sharing the same file systems. To fully achieve the scientific impact of these tera- and petascale systems, we need to improve the visualization capabilities for high end users. As with HPC, this requires scalable visualization tools that aggregate the capabilities of many compute nodes, while rendering the data close to the source to eliminate costly network transfers. In this presentation, I will outline issues and impediments to visualizing data at the petascale and will present strategies for solving them.

Speaker Bio-Sketch: Kelly Gaither, Associate Director for Data and Information Analysis for the Texas Advanced Computing Center, leads research, development and support activities in both the Scientific Visualization and Data and Information Services areas while conducting research in scientific visualization and data analysis. Gaither, a research scientist, serves as an area director for visualization and data analysis in the NSF funded TeraGrid project. Gaither received her doctoral degree in Computational Engineering from Mississippi State University in May, 2000, and received her masters and bachelors degree in Computer Science from Texas A&M University in 1992 and 1988 respectively. Gaither has a number of refereed publications in fields ranging from Computatational Mechanics to Supercomputing Applications to Scientific Visualization. Over the past ten years, she has actively participated in the IEEE Visualization conference, and served as the IEEE Visualization conference general chair in 2004. She is currently serving on the IEEE Visualization and Graphics Technical Committee.