

## **Title: Computing - An Intellectual Lever for Multidisciplinary Discovery**

**Presenter: Dr. Daniel A. Reed, Director, Renaissance Computing Institute Duke, UNC and NCSU**

### **Abstract:**

Legend says that Archimedes remarked, on the discovery of the lever, "Give me a place to stand, and I can move the world." Today, computing pervades all aspects of science and engineering. "Science" and "computational science" have become largely synonymous, and high-performance computing is the intellectual lever that opens the pathway to discovery.

One aspect of high-performance computing distinguishes it from other scientific instruments – its universality as an intellectual amplifier. Powerful new telescopes advance astronomy, but not materials science. Powerful new particle accelerators advance high energy physics, but not genetics. In contrast, high-performance computing advances all of science and engineering, because all disciplines benefit from high-resolution model predictions, theoretical validations and experimental data analysis.

As new scientific discoveries increasingly lie at the interstices of traditional disciplines, computing is also the enabler for a scholarship in the arts, humanities, creative practice and public policy. The term *Renaissance Computing*, coined by my friend and colleague Donna Cox, is intended to both evoke and capture the breadth of such intellectual activities enriching and empowering human potential, as well as creating intellectual communities that span the sciences and engineering, the arts, the humanities and commerce. This talk will describe emerging opportunities in the arts, humanities, science and engineering where interdisciplinary Renaissance approaches can have profound impact on discovery and creative expression.

### **Biography:**

Professor Daniel A. Reed is Vice-Chancellor for Information Technology and Chief Information Officer for the University of North Carolina at Chapel Hill. He is also Director of the Renaissance Computing Institute (RENCI), an interdisciplinary center spanning the University of North Carolina at Chapel Hill, Duke University and North Carolina State University. RENCI is exploring the interactions of computing technology with the sciences, arts and humanities. A "Renaissance team" approach is bringing scientists, engineers, artists and institute staff together to explore interdisciplinary approaches to scholarship, discovery and education. The institute is also partnering with business leaders to enhance the competitiveness of North Carolina industries. He holds the Chancellor's Eminent Professorship at the University of North Carolina at Chapel Hill, where he conducts interdisciplinary research in high-performance computing.

Dr. Reed was previously Director of the National Center for Supercomputing Applications (NCSA) at the University of Illinois at Urbana-Champaign, where he also

led National Computational Science Alliance, a consortium of roughly fifty academic institutions and national laboratories that is developing next-generation software infrastructure of scientific computing. He was also one of the principal investigators and the chief architect for the NSF TeraGrid. Professor Reed is also the former head of the Department of Computer Science at the University of Illinois, spearheaded more than \$100 million in construction to create a new information technology quadrangle on the Illinois campus.

Dr. Reed is a member of President George W. Bush's Information Technology Advisory Committee, charged with providing advice on information technology issues and challenges to the president, a member of the Biomedical Informatics Expert Panel for the National Institute of Health's National Center for Research Resources and serves on the board of directors of the Computing Research Association, which represents the interests of the major academic departments and industrial research laboratories