

**e-Research Seminar - Professor Ian Foster,  
From the Heroic to the Logistical:  
Programming Model Implications of New Supercomputing Applications**

**Date: Tuesday, 9<sup>th</sup> December**

**Time: 10.00am – 11.00am (Tea/coffee from 9.45am)**

**Where: Room 135, Bldg 26, Clayton campus**

High-performance computers such as the petascale systems being installed at DOE and NSF centers in the US are conventionally focused on “heroic” computations in which many processors are applied to a single task. Yet a growing number of science applications are equally concerned with “logistical” issues: that is, with the high-performance and reliable execution of many tasks that operate on large shared data and/or are linked by communication-intensive producer-consumer relations. Such applications may require the extreme computational capacity and specialized communication fabrics of petascale computers, but are not easily expressed using conventional parallel programming models such as MPI.

To enable the use of high-performance computers for these applications, we need new methods for the efficient dispatch, coupling, and management of large numbers of communication-intensive tasks. I discuss how work on scripting languages, high-throughput computing, and parallel I/O can be combined to build new tools that enable the efficient and reliable execution of applications involving from hundreds to millions of uniprocessor and multiprocessor tasks, with aggregate communication requirements of tens of gigabytes per second. I illustrate my presentation by referring to our experiences adapting the Swift parallel programming system ( <http://www.ci.uchicago.edu/swift>) for efficient execution in both large-scale grid and petascale cluster environments.

**Biography: Professor Ian Foster**

Ian Foster is Director of the Computation Institute, a joint institute of the University of Chicago and Argonne National Laboratory, where he is also the Arthur Holly Compton Distinguished Service Professor of Computer Science and an Argonne Distinguished Fellow. He received a BSc (Hons I) degree from the University of Canterbury, New Zealand, and a PhD from Imperial College, United Kingdom, both in computer science. His research deals with distributed, parallel, and data-intensive computing technologies, and innovative applications of those technologies to scientific problems. Methods and software he has developed underpin many large national and international cyberinfrastructures. Dr. Foster is a fellow of the American Association for the Advancement of Science and the British Computer Society. His awards include the British Computer Society's award for technical innovation, the Global Information Infrastructure (GII) Next Generation award, the British Computer Society's Lovelace Medal, R&D Magazine's Innovator of the Year, and an honorary doctorate from the University of Canterbury.