Computer Science Spring 2009 Course Offering

CSCE 569—Parallel Computing
Instructor: Dr. Jianjun Hu   Time: MWF 11:15AM-12:05PM
Course website: http://mleg.cse.sc.edu/edu/csce569/

The Department of Computer Science and Engineering is offering CSCE 569, a course in parallel computing, in the Spring semester of 2009. This is intended as a course in the high-level architecture and programming of parallel computers, with target applications taken from problems in science and engineering.

Students outside Computer Science and Engineering and outside the College of Engineering and Computing (CEC) are encouraged. This course is part of the Department of Computer Science and Engineering’s contribution to the interdisciplinary efforts in computational science at USC since computational physics, computational chemistry, computational mathematics, computational biology, engineering simulation, and large-scale information services such as search engines all increasingly depend on parallel computing to achieve their goals. The students will have access to CEC’s two Linux cluster computers with 291 and 256 CPUs and also to a 128-CPU shared memory supercomputer. Contact Dr. Hu if registration complications or questions exist.

Prerequisites: Knowledge of programming in a high-level language; mathematics at least through calculus, with linear algebra or some further mathematics helpful.

Topics to be covered include:
- Parallel computer architectures: Linux clusters, shared memory computer
- Introduction to message-passing parallel programming MPI
- Models of parallel communication, broadcast/reduce, scatter/gather
- Load balancing and measuring the efficiency of a parallel computation
- Introduction to shared memory parallel programming models (OpenMP)
- Standard parallelization methods for computational problems
- Introduction to latest supercomputing paradigms such as grid computing, cloud computing, and Hadoop for distributed massive data computing

The use of the major programming models/tools for parallel programming will form the basis for much of the course content; students will be expected to emerge from the course with some experience in at least the two different programming environments (MPI and OpenMP) and with hands-on experience on large-scale computing on Linux cluster and shared memory supercomputers. The emphasis on applications will be on the issues involved in parallelizing the standard algorithms. Programming will be done in C/C++.

Do you know that parallel computing and supercomputers are the backbones of the following companies’ services? Google, Yahoo, IBM, Facebook, Microsoft, Powerset, Amazon….