Introduction to High-Performance Computing

PDC Center for
High Performance Computing

Monday, August 16, 2010 - Friday, August 27, 2010

KTH main campus

Course Topics

Programming Environments at PDC

A presentation of the hardware and software at PDC. Topics like file systems, security and queuing systems will be discussed. An overview of compilers, programming libraries and debuggers at PDC will also be given. Non-obligatory open labs occur at the end of every day for further experimentation in areas of your choosing.

Parallel Programming

The emphasis is on teaching skills in using MPI, the message passing interface, and OpenMP, shared-memory parallel programming. A disciplined approach to methods of measuring program performance is also highlighted.

Modern Computer Architectures

A survey of the aspects of processors, memory hierarchies, switch and networking technologies relevant for programming of HPC applications.

Parallel Algorithms

Basic ideas in parallel algorithms will be covered in the framework of numerical linear algebra. The potential for parallelization and parallelization techniques in different fields of applications will be discussed.

Efficient Programming

Code optimizations for distributed- and shared-memory machines.

Case Studies

Real-world examples from a variety of areas; Grid Computing, Computational aspects of brain function, graphics-programming-unit (GPU) programming and others that show the entire process of designing a parallel solution to a scientific problem.