



High Performance Computing Winter School 2018

2 – 7 July 2018, Durban

In 2018 the CHPC is running the online course [“Introduction to High Performance Computing”](#) for South African graduate students whose studies include HPC or research topics which would potentially rely on HPC techniques. This course is a broad introduction to this important topic aimed at all users of HPC.

The 6-day Winter School follows on from the introduction and covers the more advanced Parallel Programming portion of the course. It is a practical hands-on exploration of this challenging subject that will cover programming with OpenMP and MPI for parallel computers.

The Winter School is hosted by the University of KwaZulu-Natal (UKZN) and the Centre for High Performance Computing (CHPC) of the Council for Scientific and Industrial Research (CSIR) and funded by the Department of Science and Technology (DST).

The CHPC gratefully acknowledges Professor Thomas Sterling and Dr Matthew Anderson of Indiana University for permission to use lectures and teaching materials from their online course “Introduction to High Performance Computing”.

Overview

The Winter School is aimed at new M.Sc or Ph.D. students in the fields of computational chemistry, applied mathematics, physics, computational biology, bioinformatics, computer science, engineering or related subjects with a strong computing content. Students need to have second year mathematics or applied mathematics (or equivalent).

The course will cover programming for parallel systems with MPI and OpenMP, using the C programming language (some examples will be available in Fortran or python), thus all applicants must already be competent in programming in at least one of these languages, preferably C.

All Winter School candidates **must** participate in the [online](#) course "Introduction to High Performance Computing" and make satisfactory progress by 4 June 2018 as a prerequisite.

There are **no fees** for successful applicants.

The CHPC is able to offer accommodation during the HPC School as well as local return air/bus travel for qualifying students from outside the KZN province as needed.

Syllabus

The necessary background in HPC is provided by the [online course](#) that precedes the Winter School.

During the 6-day School interactive lectures and computer tutorials will introduce students to a range of key aspects of parallel programming and further illustrate how these tools are currently being applied to address research problems.

- Cluster Environment; Compilers, Shell Scripting and Job Submission.
- Introduction to Programming Shared Memory Multicore & SMP Systems with OpenMP.
- Parallel Programming Distributed Memory Systems with MPI; Introduction and Fundamentals.
- Advanced Parallel Programming with MPI; Topologies and Parallel I/O.
- Parallel program design.
- Evaluation: test and/or mini-project.

Application Procedure

Firstly, [sign up](#) for the online course. Then complete the [application](#) form.

Eligible applicants should be registered at a South African University in 2018 or be accepted for graduate study at a South African university in 2019 — **proof of registration or acceptance must be provided** — including a letter of recommendation from your supervisor.

Course content will assume a reasonable background in Mathematics (at least including multivariate calculus and linear algebra) and programming ability in a high level language (C or Fortran) as well as 2nd year in at least one of Physics, Applied Maths, Maths, Computer Science, Statistics, or Engineering. **A full academic transcript must be included with your application.**

Transport, accommodation, and full board will be provided. Owing to budgetary constraints, only limited places are available for suitably qualified students.

APPLICATIONS ARE NOW OPEN

Should you wish to become one of the participants, please complete the [application](#) form and register online before the closing date. Successful candidates will be notified from 7 June 2018.

The CHPC calls for all talented students to submit their applications. As a publicly funded institution, the CHPC supports the transformation of South Africa and thus the workshop organisers highly encourage students from previously disadvantaged backgrounds to submit their applications.

For general enquiries please email workshop@chpc.ac.za.

Applications will close at 12h00 on Monday 4 June 2018.