Università della Svizzera italiana

Facoltà di scienze informatiche

Institute of Computational Science ICS

CSCS
Centro Svizzero di Calcolo Scientifico
Swiss National Supercomputing Centre

FoM ICS

CSCS-USI Summer School on Computer Simulations in Science and Engineering

The Swiss Graduate Program FoMICS "Foundations in Mathematics and Informatics for Computer Simulations in Science and Engineering" offers the following summer school for graduate/PhD students whose research involves Computational Science, Numerical Mathematics, or computer simulation on high-performance computers:

This simulation shows the temporal evolution of a tsunami wave:

Lecturers:
Themis Athanassiadou (CSCS)
Michael Bader (TU München)
Benjamin Cumming (CSCS)
Jean Favre (CSCS)
David Ham (Imperial College London)
Will Sawyer (CSCS)
Olaf Schenk (USI)
Brian Wylie (Jülich Supercomputing Centre)
+ further lecturers t.b.a.

Registration deadline:
2. June, 2013

Registration fee:
400 CHF
For lunches, coffee break, social event.

Venue:
CSCS - Institute of Computational Science - Università della Svizzera italiana (USI)

Room:
A32, Red building - Via Giuseppe Buffi 13, Università della Svizzera italiana (USI), Lugano

Maximum number of partipiciants:
30 persons

Prerequisites:
Participants are expected to bring a knowledge in the programming languages C or C++ and a laptop for hands-on training.

Accommodation:
Participants are kindly requested to make their own arrangements for accommodation.

Organizers:
Themis Athanassiadou, Will Sawyer, Olaf Schenk, Roberto Croce

For registration please visit:
http://ics.usi.ch/summerschool2013

CSCS-USI Summer School in Lugano

08.07.2013 - 19.07.2013

- CSCS-USI will be hosting a two-week summer school on parallel programming aimed at graduate/PhD students who are new to the world of high performance computing and who wish to learn the basic skills required to write, develop and maintain parallel applications in scientific computing.
- The school will cover topics such as the principles of parallel programming, distributed memory programming with MPI, shared memory programming using OpenMP, hybrid programming with MPI/OpenMP, as well as some advanced topics.
- Applications and visualizations are motivated through a simple Finite Volume solver for the 2D shallow water equations (with application to tsunami simulations).

Course content

The course will consist of four intertwined components: software engineering best practices for non-engineers, high performance computing and parallel programming techniques, profiling and debugging, and finally a hands-on case study, namely a tsunami simulation.

The software engineering best practices component is targeted toward graduate students from non-engineering fields who are confronted with a big and possibly poorly-written or documented code which they have to extend/refactor/fix for their research. The emphasis will be on tools for software control management (i.e. repositories) for team development, code documentation and refactoring, software validation, software build systems and integrated development environments. Students are expected to have some programming experience, say with C or C++.

The parallel programming component is aimed at graduate students who are new to the world of high performance computing. They will learn the basic skills required to write, develop and maintain parallel applications in scientific computing. The component will cover topics such as the principles of parallel programming, distributed memory programming with the Message-Passing Interface (MPI), shared memory programming using OpenMP, hybrid programming with MPI/OpenMP, as well as other more advanced topics.
The performance analysis and debugging component introduces performance analysis tools to analyze application executions on massively parallel processing (MPP) systems. Two tools will be treated in detail: the Scalasca toolset and the VAMPIR analysis framework.

The tsunami simulation case study introduces a simple Finite-Volume solver for the two-dimensional shallow water equations, thus focusing on an algorithmic pattern that is applicable in many fields of numerical simulation.
The goal of this component is to apply the skills learned in other course components, and perform the necessary steps to move from a "numerics code" towards efficient simulation software that can simulate tsunamis on a real geographic domain, implementing a state-of-the-art Finite-Volume method on an MPP computer.
The program will be heavily oriented towards practical application of the course material, with large amount of time dedicated to lab sessions throughout the two-week course.

Finally, as Lugano is a scenic location, an optional one-day hiking tour is planned during the intervening weekend (July 13-14).