

JSCNews

Jülich
Supercomputing
Centre

No. 227 • Dec. 2014

Third JUQUEEN Porting and Tuning Workshop

Following the success of the first two workshops, JSC will hold a third JUQUEEN Porting and Tuning Workshop from 2 to 4 February 2015. As before, the main focus will be on hands-on sessions for JUQUEEN users to port and tune their code while being closely supported by our experts. This will be accompanied by talks on general and also on highly specialized performance tips and tools. All JUQUEEN users are encouraged to attend this workshop.

Each event also has a focus group with dedicated talks and support. The 2015 workshop particularly targets users from earth system modelling and is backed by our Simulation Laboratories for Climate Science and Terrestrial Systems. The deadline for registration is 19 December 2014. More information can be found at <http://www.fz-juelich.de/ias/jsc/events/juqueenpt15>.

(Contact: Dr. Dirk Brömmel,
d.broemmel@fz-juelich.de)

POWER Acceleration and Design Center

JSC, IBM and NVIDIA have announced their decision to set up a new competence centre to support scientists and engineers using OpenPOWER technologies and architectures to address problems requiring supercomputing resources. At this lab – the POWER Acceleration and Design Center – experts from the IBM labs in Böblingen

and Rüschlikon as well as from JSC and NVIDIA will combine their efforts to pool know-how and experience on applications, mathematical methods and algorithms, performance analysis and engineering as well as computer architectures.

Last year, a number of companies, including IBM and NVIDIA, announced the establishment of the OpenPOWER Foundation, whose aim is to create an ecosystem for different technologies using the POWER processor architecture. This opened up new opportunities for access to and cooperation on future exascale architectures and technologies, which was one of the main reasons for Forschungszentrum Jülich to join the Foundation in March 2014.

The planned POWER Acceleration and Design Center will work on a set of key applications to push their scalability to new limits on the emerging OpenPOWER HPC architectures. Each graphics processing unit (GPU) features an extreme level of concurrency, which makes it possible to achieve a very high performance per node. With processors and GPUs becoming more closely integrated through a new high-performance bus technology, it is easier for applications to use both the GPU's high bandwidth memory as well as the large capacity memory attached to the processor.

The knowledge created at the new centre will be provided within the OpenPOWER Foundation to enhance future technologies. It will also be made available to application programmers to enable them to make the most efficient use of these technologies

Forschungszentrum Jülich GmbH
in der Helmholtz-Gemeinschaft
Jülich Supercomputing Centre
52425 Jülich | Germany

Phone +49 2461 61-6402

jsc@fz-juelich.de
www.fz-juelich.de/jsc

for solving their problems, e.g. through courses, training of young scientists, or workshops facilitating the exchange of experience between application developers.

(Contact: Prof. Dirk Pleiter, d.pleiter@fz-juelich.de)

Preparatory Experiments for Studying Smoke Dynamics

The first laboratory experiments of the fire simulation group at JSC have started with a preparatory setup. Supported by ZEA-1 and IEK-6 at Forschungszentrum Jülich, the experiments aim to study the spread of heat and smoke in a reduced scale geometry. Similar scale reduction (1:20) is often used in fire safety science to evaluate smoke exhaust systems and to dispense with costly real-scale experiments. As ventilation in complex buildings is crucial for smoke and fire dynamics, it also plays a central role in the experiment. The setup permits a large number of parameters and therefore the experimental implementation is based on orthogonal parameter space sampling.

As the expected flow will be turbulent, single point measurements of the flow properties are not sufficient. The PIV (particle image velocimetry) technique applied allows the flow to be measured in a plane. The basic principle is to seed the measurement volume with tracer particles and then illuminate the diagnostic area with a laser. A camera setup records the positions of the illuminated particles. This information is used to compute the particle displacements and therefore the gas flow that advects the tracer particles.

The preparatory setup currently in operation is used to characterize the energy source, an electrically heated block of copper, and to evaluate the diagnostics in a simple setup: a glass cube with the energy source on a stand at the bottom. Using PIV, the global flows in the cube and in the vicinity of the stand are captured. Additionally, the heterogeneous surface temperature of the heated block is monitored with a thermal camera.

Although the experimental results are of intrinsic interest, the data will be used to validate existing CFD codes and software developed in-house. Additionally, surrogate models based on the experimental and simulation data will be compared.

(Contact: Dr. Lukas Arnold, l.arnold@fz-juelich.de)

Awards for Bachelor's and Master's Students

On 14 November 2014, three students from Forschungszentrum Jülich received an award – the Ehrenplakette – from Aachen University of Applied Sciences (FH Aachen). In a ceremony at Aachen's historical town hall, Prof. Baumann, rector of FH Aachen, honoured Jennifer Groß (IEK-3) as the best graduate of the bachelor's course Scientific Programming, and Maya Kletzin (JSC) and Marina Weingartz (JSC) as the best graduates of the master's

course Technomathematics. Marina Weingartz's master's thesis has been published and is available at <http://juser.fz-juelich.de/record/155052>.

(Contact: Prof. Dr. Johannes Grotendorst, j.grotendorst@fz-juelich.de)

Second NIC Excellence Project 2014

During its October meeting at JSC, the NIC Peer Review Board awarded the title of NIC Excellence Project 2014 to a second outstanding simulation project. The goal of the project "Numerical modelling of lithospheric and crustal-scale deformation on geological timescales", submitted by Prof. Boris Kaus (Johannes Gutenberg-Universität Mainz), is to use three-dimensional deformation models to understand the dynamics of colliding tectonic plates, mountain belt formation, and salt tectonics. For more details, see <http://www.fz-juelich.de/nic/Projekte/exzellenz-2014.html>.

(Contact: Dr. Walter Nadler, w.nadler@fz-juelich.de)

End of Year Colloquium 2014

Date: Tuesday, 16 December 2014, 09:30-15:30

Venue: Jülich Supercomputing Centre, Hörsaal

Talks will be given in German.

Info: <http://www.fz-juelich.de/ias/jsc/events/eoy-2014>

09:30 Thomas Lippert: Welcome

09:45 Norbert Attig: Wo bitte geht's zur Rechenzeit? – Evolution der Rechenzeit-Vergabeverfahren am Jülich Supercomputing Centre

10:15 Klaus Görden: Entwicklungen hin zu einer regionalen vollgekoppelten Erdsystemmodellierung

11:15 Dirk Pleiter: OpenPOWER: Von Antreibern und Beschleunigern des HPC

11:45 Yury Zaytsev: Megaoptimierungen in Hyperräumen auf Supercomputern

14:00 Benjamin Schröder: Das (un)berechenbare Feuer

14:30 Kalman Szabo: Der Sieg der Masse über die Ladung

15:00 Thomas Lippert: Big Data: Vom Hype zum Heil?

Events

3rd JUQUEEN Porting and Tuning Workshop

Instructors: JSC staff members

Date: 2-4 February 2015, 09:00-17:00

Venue: Jülich Supercomputing Centre, Rotunda

Info: <http://www.fz-juelich.de/ias/jsc/juqueenpt15>

IAS School "Computational Trends in Solvation and Transport in Liquids"

Date: 23-27 March 2015

Venue: Jülich Supercomputing Centre, Rotunda

Info: <http://www.fz-juelich.de/stl-2015>

Editor: Dr. Sabine Höfler-Thierfeldt, ext. 6765