

### **JSCNews**

Jülich Supercomputing Centre

### Wei-Min Wang Awarded Humboldt Fellowship to Visit JSC

JSC is pleased to welcome a new visitor from the Institute of Physics, Chinese Academy of Sciences in Beijing, Dr. Wei-Min Wang, who has come to Jülich for two years as a Humboldt fellow. Dr. Wang developed his numerical modelling expertise while based in the group of Prof. Z.-M. Sheng, where he worked on laser plasma physics.

He was attracted to JSC by the possibilities offered by its supercomputing facilities for performing large-scale, high-resolution simulations essential for studying advanced laser-based x-ray sources. These resources, combined with the active scientific environment within the Plasma Simulation Lab, will provide an ideal setting for his stay. Dr. Wang's timely arrival coincides with a recent initiative on the Jülich campus to develop a multi-user x-ray and particle beam centre based on high-power laser technology (JuSPARC project, http://www.fz*juelich.de/jusparc*). This facility will rely heavily on the multi-dimensional particlein-cell simulations of complex laser-plasma processes behind these future sources, perhaps even using interactive supercomputing as an integrated optimization tool. (Contact: Prof. Paul Gibbon, p.gibbon@fzjuelich.de)

# Smart Data Innovation Lab Launched

The Smart Data Innovation Lab (SDIL) was launched by key industry organizations and

leading scientific institutions in Germany on 8 January 2014 at KIT. It offers a unique platform for close collaboration in order to investigate innovative smart data analytics enabling the extraction of new insights from big data.

The initial four strategic research areas are Industry 4.0, Energy, Smart Cities, and Personalized Medicine. Each area is driven by data innovation communities with selected members from academia and industry who offer datasets for analysis and share their experience in applying new analytical methods.

JSC, together with Bayer AG, will lead the research activities foreseen in the area of Personalized Medicine, and will also explore possibilities for participation in other relevant areas or complementary SDIL working groups such as data curation and tools & techniques. More information can be found at *http://www.sdil.de*.

(Contact: Prof. Morris Riedel, *m.riedel@fz-juelich.de*)

### New Professor at JSC: Kalman Szabo

Theoretical physicist Kalman Szabo was recently appointed professor at JSC and the University of Wuppertal ("Jülicher Modell"). The professorship is funded by the recruit initiative of the Helmholtz Association. His field of expertise is numerical simulations in elementary particle physics. With the development of teraflop computers about ten years ago, a new era started in this field. It has now become possible to No. 219 • March 2014

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

Phone +49 2461 61-6402

jsc@fz-juelich.de www.fz-juelich.de/jsc answer previously inaccessible questions about the strong interaction. For example, Szabo and his collaborators calculated the temperature, at which ordinary matter consisting of protons and neutrons disintegrates into its elementary constituents, and they also computed the order of this transition. They were the first research group to show that the currently accepted theory of the strong interaction properly accounts for the mass of the proton. This was a precision calculation, where percent level accuracy was required. With increasing computational capacity, it is now possible to tackle problems requiring per-mill level precision, which is Szabo's current research focus. His appointment will strengthen the link between JSC and the University of Wuppertal and help in recruiting talented young people for fundamental physics research. Further information about Szabo's research group: http://www.bmw.uni-wuppertal.de

## Square Kilometre Array: Workshop at JSC to Design the Science Data Processor

The Square Kilometre Array (SKA) is a radio telescope under development which will have a total collecting area of approximately one square kilometre. The pre-construction and design phase started in November 2013 and construction of the SKA receiving stations is scheduled to begin in early 2017 in Australia and South Africa. Initial observations are expected by 2019.

Analysing the data from a vast number of antennas will require significant HPC resources. The Science Data Processor (SDP) is an important component and Jülich Supercomputing Centre has been asked to support the design of the system hardware architecture, software, and algorithms. The SDP will have to provide several hundred petaflops of compute performance to process data arriving at rates of 1 TByte/s. Data processing will involve a set of complex pipelines which are still under development.

The workshop on 23 and 24 January 2014 at JSC brought together SKA experts from all over the world to define prototyping work on large-scale HPC systems thus successfully launching the project.

(Contact: Willi Homberg, w.homberg@fz-juelich.de)

#### Looking Back at BrainScaleS CodeJam 2014

The 6th BrainScaleS CodeJam Workshop was held from 27 to 29 January at JSC with a focus on high-performance computing. To catalyse open-source collaborative software development in computational neuroscience and neuroinformatics, the CodeJam gathered researchers, students and engineers from seven countries (France, Germany, the United Kingdom, Sweden, Switzerland, USA, and the Netherlands) to share ideas, present their work, and write code together.

With a total of 70 participants, the CodeJam #6 was the largest workshop in the series of BrainScaleS CodeJams. The workshop introduced the opportunities provided by JSC's supercomputers to an international audience from the computational neuroscience and neuroinformatics community. HPC hardware solutions for neuroscience such as the SpiNNaker architecture for modelling neural networks, massively parallel Blue Gene/Q architecture, and the Hybrid Multiscale Facility for neuromorphic computing were discussed, as well as HPC software solutions for neuroscientific applications (e.g., Pandas, Numba and others).

CodeJam #6 also covered other topics relevant to HPC, such as using Blue Gene Active Storage for neuroscience applications, HPC-capable neural simulators (e.g., NEST and NEURON), as well as neural modelling and simulation workflows. The workshop mornings were dedicated to talks on diverse HPC topics, leaving the afternoons for tutorials of choice (SpiNNaker, Python, C/C++, and PyPy) and code sprints, in which several smaller groups were spontaneously set up and got their hands dirty with code.

(Contact: Dr. Anne Do Lam, a.dolam@fz-juelich.de)

### **3rd Workshop on Parallel-in-Time Integration**

Time-parallel methods have recently been shown to provide a promising way to extend prevailing strong-scaling limits of numerical codes for the numerical solution of timedependent partial differential equations. The 3rd Workshop on Parallel-in-Time Integration with a special focus on "Parallel Multi-level Methods in Space and Time" will bring together scientists from the fields of multigrid methods and parallel-in-time integration in order to discuss similarities between multilevel algorithms in space and time, their applications and their combination. The central goal of this event is to encourage participants to combine their expertise and techniques for mutual benefit. The workshop will take place from 26 to 28 May 2014 at JSC. It is being jointly organized by Jülich Supercomputing Centre, the Institute of Computational Science at Universita della Svizzera italiana, and Bergische Universität Wuppertal within the DFG Priority Programme SPPEXA. To learn more about the workshop and to register up to 21 March 2014, visit http://www.fzjuelich.de/ias/jsc/pintws2014.

(Contact: Dr. Robert Speck, r.speck@fz-juelich.de)

#### Events

#### GPU Programming

Instructors: Dr. Jan Meinke, Jochen Kreutz, Peter Philippen, Dr. Andrew Adinets, Anke Zitz, JSC; Jiri Kraus, NVIDIA Date: 7-9 April 2014, 09:00-16:30 Venue: Jülich Supercomputing Centre, Ausbildungsraum 1 Info: *http://www.fz-juelich.de/ias/jsc/events/gpu*