JSC Guest Student Programme 2014 – Experience Scientific Computing

As one of Europe's leading HPC centres, Jülich Supercomputing Centre (JSC) provides HPC expertise for computational scientists at German and European universities, research institutions, and in industry. Training activities and educational programmes for scientific computing are hosted by JSC on a regular basis. One of these activities is the Guest Student Programme (GSP) lasting for ten weeks each summer.

The participants receive extensive training on cutting edge hardware as well as HPC-related software and algorithms. The acquired theoretical knowledge is turned into hands-on skills by coached work on current and challenging scientific projects. For many students the programme has been the foundation for a career in HPC and the basis of fruitful long-term collaborations with their advisors. Some students even return to JSC as PhD candidates focusing on highly parallel applications.

Since the start of the GSP in 2000, a total of 157 students had the opportunity to join scientists from JSC and other institutes at Forschungszentrum Jülich. Over the course of 15 years the GSP improved continuously. This year an online application procedure was introduced. This boosted the number of applications from around 50 in the previous year to about 100. Candidates from 28 countries, covering students from mathematics, physics, chemistry, biology, and computer science, competed for open GSP positions. There were eleven students invited to participate in the programme.

This year's GSP took place from August 4th to October 10th. It was supported by CECAM (Centre Europeen de Calcul Atomique at Moleculaire) and sponsored within the IBM University programme.

It the first two weeks, courses on parallel programming up to advanced level, were run. The lectured techniques range from GPGPU programming with CUDA to the usage of MPI on distributed-memory clusters and OpenMP on shared-memory systems. Equipped with this vital knowledge the participants were ready to focus on the scientific part of the GSP. The range of scientific projects was as diverse as the user community on the hosted supercomputers, covering atmospheric science, fluid and molecular dynamics, multipole methods and safety research. Also represented was fundamental research in elementary particle physics and mathematical algorithms. In addition, this year there were also two projects supervised by the lately established Simulation Laboratory Neuroscience. This aimed at encouraging the use of supercomputers in neuroscience.

The main platforms for code development and simulation were the multi-purpose cluster JUROPA, the GPU system JUDGE and the leadership Blue Gene/Q system JUQUEEN.

During the concluding two-day colloquium, the participants presented their achievements to domain experts and guests. The gained experiences were shared amongst the students, contributing to prolific discussions. Finally, as preparation for a future scientific career, the students summarized their contribution as an article.

Next year's GSP will start on August 3rd, 2015. It will be officially announced in January 2015 and is open to students from natural sciences, engineering, computer science, mathematics and the computer science related branches of neuroscience. For applicants it is mandatory, to have received the Bachelor but not yet the Master degree. The application deadline is April 24th, 2015. Additional information and the proceedings of the previous years are available online at www.fz-juelich.de/jsc/gsp.

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