



Press release

For release: **6 June 2014**

PRACE-ISC Award 2014 goes to sustained petascale seismic science on SuperMUC

On Monday 23 June 2014 at 13:15 during the Opening Session of the 2014 edition of the International Supercomputing Conference (ISC) in Leipzig, Germany, the PRACE-ISC Award will be presented to Alexander Breuer, TU München; Alexander Heinecke, TU München; Sebastian Rettenberger, TU München; Michael Bader, TU München; Alice-Agnes Gabriel, LMU München; Christian Pelties, LMU München for their paper entitled “Sustained Petascale Performance of Seismic Simulations with SeisSol on SuperMUC”

PRACE, the Partnership for Advanced Computing in Europe, awards a prize to the best paper submitted to the ISC Research Paper Sessions and the PRACE Scientific Conference in one of the following areas:

- a breakthrough in science achieved through high performance computing
- an algorithm or implementation that achieves a significant improvement in scalability or performance
- a novel approach to performance evaluation on a massively parallel architecture

The PRACE Scientific Steering Committee (SSC, see here: <http://www.prace-ri.eu/Organisation>) selects the paper to receive the Award, which will be presented at the ISC Opening Session on Monday 23 June 2014 at 13:15. The winner of the PRACE ISC Award will receive sponsorship for participation in a training event, or a conference relevant to petascale computing.

“Seismic simulations in realistic 3D Earth models require peta- or even exascale compute power to capture small-scale features of high relevance for scientific and industrial applications. In this paper, we present optimizations of SeisSol — a seismic wave propagation solver based on the Arbitrary high-order accurate DERivative (ADER) Discontinuous Galerkin method on fully adaptive, unstructured tetrahedral meshes — to run simulations under production conditions at petascale performance. Improvements cover the entire simulation chain: from an enhanced ADER time integration via highly scalable routines for mesh input up to hardware-aware optimization of the innermost sparse-/dense-matrix kernels. Strong and weak scaling studies on the SuperMUC machine demonstrated up to 90% parallel efficiency and 45% floating point peak efficiency on 147k cores. For a simulation under production conditions (10^8 grid cells, $4.8 \cdot 10^{10}$ degrees of freedom, 5 seconds simulated time), we achieved a sustained performance of 1.09 PFLOPS,” says Alexander Breuer.

This article was partially republished from <http://insidehpc.com/2014/05/06/isc14-announces-winning-papers-prace-isc-gauss-awards/>

More about PRACE @ ISC14 can be found here: <http://prace-ri.eu/PRACE-at-ISC14>

About PRACE

The Partnership for Advanced Computing in Europe (PRACE) is an international non-profit association with its seat in Brussels. The PRACE Research Infrastructure provides a persistent world-class high performance computing service for scientists and researchers from academia and industry in Europe. The computer systems and their operations accessible through PRACE are provided by 4 PRACE



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members (BSC representing Spain, CINECA representing Italy, GCS representing Germany and GENCI representing France). The Implementation Phase of PRACE receives funding from the EU's Seventh Framework Programme (FP7/2007-2013) under grant agreements RI-283493 and RI-312763. For more information, see www.prace-ri.eu

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