

Kolloquiumsvorträge Green IT

Die Vorträge finden digital über Vidyo statt. Bei Interesse wenden Sie sich bitte an das Dekanat unter dekanat@fb12.uni-frankfurt.de.

Freitag, den 15.05.2020:

1. 13:00 – 15:30 Uhr

Jun.-Prof. Dr. Andreas Vogel:

Efficient Parallel and Adaptive Multigrid for Continuum Models and Numerical Optimization

Multigrid methods allow for highly-scalable implementations on largest supercomputers by balancing the mesh hierarchy among the involved processes. In addition, geometric multigrid excellently interplays with adaptive mesh refinement to account for highly-localized features and to speed up the computation by saving non-required degrees of freedom. An overview about the implementation in the massively-parallel simulation framework UG4 is presented together with studies on frequency adaption for energy saving and fine-grained scalability investigations. The applicability on state-of-the-art high-performance computing clusters with quasi-optimal scalability is demonstrated on a variety of problems from computational biology, subsurface flow and engineering including PDE continuum model simulations and numerical optimization.

2. 15:30 – 18:00 Uhr

Dr. habil. Sascha Uhrig:

Back to Advanced Roots

Processor development was mainly driven by structure miniaturization and frequency increase until the beginning of this millennium, when increasing the processing frequency got more and more challenging because the so-called power-wall has been hit. Further developments focused on parallel architectures assuming sufficiently large parallel workloads. As long as such workloads exist, performance improvements are restricted by communication overhead and data transportation cost. Moreover, the maximum application performance is limited by sequential parts of software and algorithms. Another step of processor development focuses on problem related accelerators that improve mainly such sequential application fractions, either on the main program path or within the innermost loop.

This talk presents two contrary approaches for improving future processing performance: the first one relies on excessive online data-path reconstruction and resource allocation while the second approach provides a globally static, locally dynamic processing array.

Both are based on two-dimensional arrays of functional units and target energy-optimized and more flexible high-performance processing architectures. Flexibility means orthogonally to acceleration-based processors, back to the original idea of general purpose computers.

Freitag, den 29.05.2020:

3. 13:00 – 15:30 Uhr **Nachholtermin**

Der Vortrag wird digital stattfinden und per live stream übertragen.

Den Link erhalten Sie über dekanat@fb12.uni-frankfurt.de.

Dr. Thorsten Kollegger:

“ Green IT in Scientific Computing “

Currently many science disciplines are undergoing a disruptive transformation towards digital workflows which dramatically increases their scientific computing requirements. Data volumes are exponentially increasing and in turn the need for large scale computing systems for analytics and. At the same time, it has been widely recognized that IT has a substantial environmental impact and efforts to minimize its energy consumption are mandatory.

In this presentation I will discuss the various approaches to reduce the energy consumption of computing systems used for scientific computing, with a particular focus on the areas of High Performance Computing (HPC), High Performance Data Analytics (HPDA) and "Big Data".