

HAEC-Seminar Wednesday, 01.02.2017, 09:20 – 10:50

Andreas-Pfitzmann-Bau, Beratungsraum 2101

Invited Talk by Holger Fröning

Titel: Don't trust anyone over thirty: GPUs as general-purpose processors in their teenage decade

Abstract: Driven by the end of Dennard scaling, GPUs are a prime example for many-core processors and are becoming increasingly pervasive in various computing domains. Reasons include a high computational power and memory bandwidth, but also an excellent performance-per-Watt ratio that helps overcoming hard power constraints. Their execution model, based on a bulk-synchronous parallel execution, allows the user to handle the complexity of 1.000s of parallel cores and 10.000s of concurrent threads. However, the GPU's beauty of simplicity restricts their use to certain application classes, and their design is driven by the conflict of a simple user view and a complex architecture behind. This talk will make some observations with a particular focus on multi-GPU systems about such massively threaded multi-processors, review our recent research results from this area and offer some opinions on anticipated research problems.

Bio: Holger Fröning is an associate professor at the Department of Mathematics and Computer Science at the Ruprecht-Karls University of Heidelberg (Germany), and leads the Computer Engineering Group at the Institute of Computer Engineering. His research interests include parallel computing, computer architecture, interconnection networks and hardware design with a recent focus on application-specific heterogeneous computing, data movement optimizations and associated power and energy aspects. In 2016, he spent 5 months at NVIDIA Research (Santa Clara) as visiting scientist, sponsored by Bill Dally. Early 2015 he was visiting professor at the Technical University of Graz, Austria, sponsored by Gernot Kubin. From 2008 to 2011 he was senior researcher at the Parallel Architectures Group at the Technical University of Valencia (Spain), led by Jose Duato. He has received his PhD and MSc degrees 2007 respectively 2001 from the University of Mannheim, Germany. His publications have been accepted at top-tier conferences, workshops and journals; in addition he contributed to several books. Parts of his research results have been commercialized. He regularly serves as program committee member for conferences and workshops, as reviewer for various journals, and leads the Nvidia GPU Research and Education Center at Heidelberg University. His recent sponsors include the DFG, German Excellence Initiative, Nvidia, SAP, Google, and the European Union. For more information, please visit his website: <http://www.ziti.uni-heidelberg.de/compeng>