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OESTERREICHISCHE COMPUTER GESELLSCHAFT
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GASTVORTRAG

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"On the Design and Support of OpenCL for Programming Heterogeneous Systems "

Abstract:

OpenCL is a framework for writing programs that execute across heterogeneous platforms consisting of CPUs, GPUs, and other processors. It includes a language, OpenCL C (based on C99), for writing kernels, plus APIs that are used to define and then control the heterogeneous platform. OpenCL is a key step in the right direction but in order for developers to be successful with OpenCL they need to be willing to work with all the detailed complex commands for managing the heterogeneous resources.

In this talk the design of OpenCL with respect to programmability and portability is investigated. It is considered as providing a common base line for a higher level language that targets OpenCL as a portable intermediate language to run on a very wide range of systems. We discuss some of OpenCL C's properties and its imposed restrictions to form a common subset with C99 and how these restrictions allow for some specific optimizations, but also how different cases of undefined behaviour limit the use of OpenCL C for advanced computional abstractions.

To complement this aspect, we discuss an approach for the additional integration of OpenCL's API as target of a high-level language. This may allow to even support high-level abstractions and exploit the full potential of the OpenCL framework.

Biography:

Markus Schordan is Deputy Program Director of Multimedia and Software Engineering as well as Game Engineering and Simulation at the University of Applied Sciences Technikum Wien. He previously held positions at University Klagenfurt (1997-2001), Lawrence Livermore National Laboratory (2001-2003), and TU Vienna (2003-2008). In 2009 he received an R&D 100 AWARD as member of Lawrence Livermore's ROSE development group. His research interests include program analysis, programming languages, high-performance computing, and software frameworks.

He received a Diploma Degree in computer science at TU Vienna in 1997, and a PhD degree from University Klagernfurt in 2001. He is author or co-author of 30+ refereed and invited papers of conferences and journals. He is a member of the IFIP Working group 2.4, the ACM, and IEEE. He has served as co-organizer of GPUScA 2010, Dagstuhl Seminar No. 08161, ISoLA'08 Track: Formal Methods for Analysing and Verifying Very Large Systems, and EuroPar'03 Topic 04: Compilers for High-Performance. He served as program committee member of several conferences, most recently CC 2011, GPUScA 2010, SYNASC 2010, SYNASC 2009, PACT 2009, SYNASC 2008, ISoLA 2008.

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