

UCHPC 2011: Fourth Workshop on UnConventional High Performance Computing

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Foreword

As the word “UnConventional” in the title suggests, the workshop focuses on hardware or platforms used for HPC, which were not intended for HPC in the first place. Reasons could be raw computing power, good performance per watt, or low cost in general. Thus, UCHPC tries to capture solutions for HPC which are unconventional today but perhaps conventional tomorrow. For example, the computing power of platforms for games recently raised rapidly. This motivated the use of GPUs for computing (GPGPU), or even building computational grids from game consoles. The recent trend of integrating GPUs on processor chips seems to be very beneficial for use of both parts for HPC. Other examples for “unconventional” hardware are embedded, low-power processors, upcoming many-core architectures, FPGAs or DSPs. Thus, interesting devices for research in unconventional HPC are not only standard server or desktop systems, but also relative cheap devices due to being mass market products, such as smartphones, netbooks, tablets and small NAS servers. For example, smartphones seem to become more performance hungry every day. Only imagination sets the limit for use of the mentioned devices for HPC. The goal of the workshop is to present latest research in how hardware and software (yet) unconventional for HPC is or can be used to reach goals such as best performance per watt. UCHPC also covers corresponding programming models, compiler techniques, and tools.

It was the 4th time the UCHPC workshop took place, with previous workshops held in 2008 in conjunction with the *International Conference on Computational Science and Its Applications 2008*, in 2009 with the *ACM International Conference on Computing Frontiers 2009*, and in 2010 with *Euro-Par 2010*. This year, the organizers were able to accept five submissions (out of ten). In addition, we were proud to present speakers for two invited talks. Both the invited talks and papers were grouped around three topics which also formed the structure of the workshop sessions, and made up for a very exciting half-day program:

- *Heterogeneous Systems*, starting with an invited talk by Raymond Namyst about “Programming Heterogeneous, Accelerator-based Multicore Machines: a Runtime System’s Perspective”, followed by two regular talks on efficient processor allocation and workload balancing on heterogeneous systems,

- *Accelerator Usage for Applications*, again starting with an invited talk by Bertil Schmid about "Algorithms and Tools for Bioinformatics on GPUs", followed by a regular talk on a study porting a solver for electromagnetics to a multi-GPU system, and
- *Upcoming Architectures*, with two regular talks on a study using a Network-on-Chip architecture, and on porting a data mining algorithm to the Intel Many Integrated Core Architecture.

This post-workshop proceedings include the final versions of the presented UCHPC papers, taking the feedback from reviewers and workshop audience into account.

The organizers of the UCHPC workshop want to thank the authors of the papers. Without them, the workshop would not have been able to come up with the interesting topics for discussion. But also, we sincerely thank the EuroPar organization for providing the opportunity to arrange the workshop in conjunction with the Euro-Par 2011 conference, and would like to thank them for a very nice environment. And as in the last years, we especially appreciated the hard work of the members of our International Program Committee. They did a perfect job at reviewing the submissions. Last but not least, we thank the large number of attendees this year. They contributed to a lively day, and we hope that they found something of interest in the workshop. Based on the very positive feedback, the organizers and the steering committee plan to continue the UCHPC workshop in conjunction with EuroPar 2012.

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