UCHPC 2010: Third Workshop on UnConventional High Performance Computing

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Foreword

As the word "UnConventional" in the title suggests, the UCHPC 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 or especially low cost. 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 building computational grids from game consoles. Other examples for "unconventional" hardware would be embedded, low-power processors, FPGAs or DSPs. Only imagination sets the limit for their usage 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 according programming models, compiler techniques, and tools.

It was the 3rd time the UCHPC workshop took part, with previous workshops held in 2008 in conjunction with the *International Conference on Computational Science and Its Applications 2008*, and in 2009 with the *ACM International Conference on Computing Frontiers 2009*. This year, the organizers were very pleased by a large number of high quality submissions. This made it possible to accept nine out of sixteen submitted papers. While there only was a half-day available, it was no problem for the speakers to stay in time, although a very tight schedule had to be met. We were able to group the talks into three topics. These formed the structure of the workshop sessions, and made up for a very exciting program:

- *Accelerator Usage for Applications* with four talks about applications from electromagnetics, medical image processing, molecular dynamics simulation, and object detection,
- *Accelerator Usage Infrastructure* with two talks on GPU/CPU callbacks and static GPU workgroups, and

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– *Speeding up Algorithms with Accelerators* with three talks on domain-independent irregular kernels, multi-coloring preconditioning, and custom precision arithmetics with FPGAs.

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

Finally, the organizers and program chairs 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 EuroPar 2010 conference. Last but not least, we especially appreciated the hard work of the members of our International Program Committee. They did a perfect job at reviewing the submissions. And we thank all attendees at the workshop, who contributed to a lively day, and we hope they too found something of interest in the workshop. Based on the very positive feedback, the program chairs and organizers plan to continue the UCHPC workshop in conjunction with EuroPar 2011.

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