Intel MIC Programming Workshop @ IT4I
Plenum session, Wednesday, February 8, 2017

Session A: 13:00-15:00 (Chairman: Volker Weinberg)

13:00-13:45   Jan Zapletal (IT4Innovations): Boundary element quadrature schemes for multi- and many-core architectures

Jan Zapletal is a researcher at IT4Innovations National Supercomputing Center and a Ph.D. student at the Department of Applied Mathematics His (submitted) thesis aims at a multiresolution shape optimization technique based on the Loop subdivision surfaces and the boundary element method (BEM) for solving the underlying boundary value problems.

He is mainly interested in an efficient implementation of BEM on modern architectures. With Michal Merta he is the main developer of the in-house library BEM4I that aims at parallel solution of problems arising from heat transfer, linear elasticity, wave scattering, or shape optimization. The library includes several layers of parallelism including explicit vectorization by OpenMP pragmas, shared and distributed memory parallelization by OpenMP and MPI, or offload to MIC coprocessors. The quadratic complexity of the standard BEM approach is treated by the adaptive cross approximation (ACA) technique and its distributed version based on graph decompositions. Moreover, the connection with the Espreso library allows for large-scale simulations using the boundary element tearing and interconnecting (BETI) method.

13:45-14:15   Jiri Jaros (VUT Brno): Acceleration of the k-Wave toolbox on Xeon Phi

Jiri Jaros is the head of the Supercomputing Technologies Research Group at the Faculty of Information Technologies, Brno University of Technology. He received his PhD in Computer Science at Brno University of Technology in 2010. He worked as a Post-doc at Australian National University and University College London from 2011 to 2013. He is a core developer of the k-Wave acoustic toolbox being responsible for the development of high-performance simulation codes.

14:15-15:00   Lukasz Szustak (speaker), Roman Wyrzykowski (TU Czestochowa): Exploring the impact of Intel MIC and Intel CPU architectures on accelerating scientific applications

Lukasz Szustak received his Ph.D. in Computer Science from the Czestochowa University of Technology, Poland, in September of 2012 and his masters in September of 2008.
During this period, his doctoral research focused on adaptation of high performance computing to modern parallel architectures including hybrid platforms. Since 2012, Dr. Szustak is employed as an Assistant Professor at Czestochowa University of Technology. His current work is associated with the development of efficient methods of scheduling, load balancing, and adaptations of algorithms and applications to emerging HPC computing systems. His main research interests include multi- and many-core architectures, performance models and performance tuning, parallel algorithms, programming HPC systems, as well as innovative methods and tools for adapting applications to novel computing platforms.

15:00-15:30   Coffee break (group picture / start of PRACE evaluation: https://goo.gl/PkupqH **)**

Session B: 15:30-17:00 (Chairman: Momme Allalen)

15:30-16:15   Michal Merta (IT4Innovations): Acceleration of the ESPRESO domain decomposition library

Michal Merta is a researcher at IT4Innovations National Supercomputing Center. He obtained his Ph.D. degree in applied mathematics.

He is mainly interested in the parallel boundary element method (BEM). He is a co-founder of the library BEM4I that aims at parallel solution of problems from linear elasticity to sound scattering using BEM. The library leverages the techniques of matrix sparsification (ACA, FMM), is parallelised in shared and distributed memory, and features explicit vectorization. Its acceleration using Intel® Xeon Phi™ coprocessors is currently implemented.

Michal Merta was awarded the Joseph Fourier Prize 2015 by Bull s.r.o. and the Babuska Prize 2011 by Czech Society for Mechanics for his research.

In addition to that he also works on the IPCC project at IT4I, namely on the acceleration of the FETI domain decomposition solver Espreso using the Intel Xeon Phi coprocessors.

16:15-17:00   Milan Jaros (IT4Innovations): Acceleration of Blender Cycles Render Engine using Intel® Xeon Phi™

Milan is a PhD student of the Computational Sciences Doctoral Study Program (VSB-TUO) and he works as a research assistant in IT4I. He is a member of the Visualization and Virtual Reality team.

17:00-17:10 Volker: Overview future courses @ LRZ, Conclusion