Training «Massively parallel computations, architecture and CUDA programming model + OpenACC»

Munich, April 16-18

April 16 (Tue)

	Introduction Event (9:00-14:00)
9:00-9:30	Registration and hardware exhibition
9:30-9:35	Opening
9:35-9:45	Tesla hardware Nvidia/sysGen
9:45-11:15	Cuda introduction
11:15-12:00	Break and hardware exhibition
12:00-13:15	OpenACC
13:15-14:00	Lunch and hardware exhibition
14:00-15:00	Architecture and programming of massively parallel systems: performance and parallelism. GPU evolution. SIMD and SIMT. CUDA programming model: CUDA 'Hello world' example. Main principles. Blocks and threads. Data exchange between GPU and host. Error handling
15:00-16:00	Hands-on: configuring the system, introduction to CUDA programming, vector addition, device properties
16:00-16:15	Break
16:15-17:15	GPU-accelerated libraries: CURAND, CUBLAS, CUSPARSE, CUFFT, MAGMA
17:15-18:30	Hands-on: libraries

April 17 (Wen)

10:00-11:30	Overview of memory hierarchy in CUDA. Register file, constant memory. Global memory. Shared memory. Texture memory. Standard algorithm implementation on CUDA: matrix multiplication, reduce
11:30-12:00	Coffee break

12:00-13:30	Thrust library: Linear transformations and functors. Placeholders and tuples. Performance. CUDA/C interoperation.
13:30-14:30	Lunch break
14.30-16.00	Hands-on: memory hierarchy, Thrust
16:00-17:00	Q&A

April 18 (Thu)

10:00-11:30	Multi-GPU systems: programming and debugging. Hybrid systems, NUMA-systems.Device context. MPI. POSIX-threads. OpenMP. CUDA Events
11:30-12:00	Coffee break
12:00-13:30	Fast development on GPU using directives. OpenACC and PGI compiler. Basic directives and examples, data localization. Kernel configuration and parallelization of loops. Profiler and collecting of execution characteristics
13:30-14:30	Lunch break
14.30-16.00	Hands-on: Multi-GPU, OpenACC
16:00-17:00	Q&A, Summing up