Activities GPGPU community building project

From July 2018 onwards, when the funding for the GPGPU community building project was extended, we organised the three activities. Two of these were workshops given in the NIRICT GPGPU Reconnaissance workshop series. In this workshop series, researchers, mostly working in the Netherlands, who use general purpose graphics processing units (GPGPUs) to accelerate computations relevant for their research, gather and discuss how they use GPGPUs, or, alternatively, how their research helps in developing high-quality GPGPU software.

December 4, 2018: Fifth workshop in the NIRICT GPGPU Reconnaissance workshop series
Vergadercentrum Vredenburg, Utrecht

A number of interesting talks were given by researchers from various fields, namely:

- Trevor McDonell (University of Utrecht) - A Functional Programming Language for GPUs
- Valeriu Codreanu (SURFSara) - Design and Performance Evaluation of a Commodity GPU Cluster for HPC and Deep Learning Workloads
- Henk Dreuning (University of Amsterdam) - A Beginner's Guide to Estimating and Improving Performance Portability
- Pieter Hijma (VU University Amsterdam) - Optimization Effectiveness: A Case-Study in Relating Performance to Programming Effort
- Sagar Dolas (SURFsara) - Exploring the Potential of the ROCm Software Stack for High Performance Computing and Deep Learning on AMD GPUs
- Maxwell Cai (Leiden University) - GPU-accelerated Research in Astrophysics
- Ehsan Sharifi Esfahani (University of Amsterdam) - A survey on Energy Efficiency in GPUs
- Merijn Verstraaten (Netherlands eScience Center) - Mix-and-Match: A Model-driven Runtime Optimisation Strategy for BFS on GPUs

About 35 people attended this workshop. For more information on the talks, see the website of the GPGPU Community Funding project: https://fmt.ewi.utwente.nl/NIRICT_GPGPU.

December 9, 2019: Multi-GPGPU Tutorial
Vergadercentrum Vredenburg, Utrecht

On December 9, 2019, we organised a special tutorial event for GPGPU programmers, targeting both beginners and experienced GPGPU programmers. For this, we had invited an expert in multi-GPGPU programming from NVIDIA, dr. Christian Hundt. Christian is an experienced teacher having presented several lectures on CUDA programming and Deep Learning as professor (locum) at the Johannes Gutenberg University in Mainz, Germany, and is further a coauthor of an undergraduate text book on parallel programming and massively parallel computation.

The tutorial was attended by approximately 20 people. In the tutorial, the participants learned how to efficiently program multi-GPU applications, on both single and multiple GPU-enabled nodes. Using a running example, extracted from the Jacobi method, they started from single-GPU CUDA code, and further learned how to overlap communication and computation, how to extend the code to run on multiple GPUs on the same node, and how to extend that code to

run on multiple GPUs and potentially many nodes using CUDA-aware MPI. They practiced all these concepts, hands-on, on the Jacobi iteration code.

December 16, 2019: Sixth workshop in the NIRICT GPGPU Reconnaissance workshop series
Vergadercentrum Vredenburg, Utrecht

A number of interesting talks were given by researchers from various fields, namely:

- Hanno Spreeuw (Netherlands eScience Center) - Calibration of observations from LOFAR and SKA on an NVIDIA Jetson Nano
- Jelle van Dijk (University of Amsterdam) - Porting CUDA code to AMD GPU's using HIP
- Mohsen Safari (University of Twente) - Formal Verification of Parallel Prefix Sum
- Muhammad Osama (Eindhoven University of Technology) - SIGmA: GPU Accelerated Simplification of SAT Formulas
- Lars van den Haak (Eindhoven University of Technology) - Accelerating Nested Data Parallelism: Preserving Regularity
- Bram Veenboer (ASTRON) - Radio-astronomical imaging: FPGAs vs. GPUs
- Ben van Werkhoven (Netherlands eScience Center) - Preliminary results of auto-tuning GPU applications for energy efficiency using Kernel Tuner and PowerSensor

About 25 people attended this workshop. For more information on the talks, see the website of the GPGPU Community Funding project: https://fmt.ewi.utwente.nl/NIRICT_GPGPU.