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Michel Steuwer

Personal Details

Birthday	21 May 1985
Birthplace	Duisburg, Germany
Nationality	German

University Education

2010–2014 (expected) **Ph. D. studies**, *University of Münster*, Münster, Germany.
Supervisor: Prof. Sergei Gorlatch

Main research interests: High-level abstractions for parallel programming using patterns, Exploiting modern parallel processors, including multi-core CPUs and GPUs.

2005–2010 **Diploma degree in computer science with a minor in mathematics**, *(equivalent to a M. Sc. degree) University of Münster*, Münster, Germany.
Final grade in computer science: very good (85 %)

Research Projects

since 2010 **SkelCL**, *A high-level programming library for heterogeneous systems*.
Ongoing research. Preliminary results published in: [J1, J2, C2–C8].

I am the lead developer of SkelCL, a novel high-level C++ library for programming heterogeneous systems. It uniquely combines parallel patterns, container data types and data (re)distribution mechanisms to greatly simplify the programming of heterogeneous systems comprising of multiple parallel processors. SkelCL is open source software and can be found online at: http://skelcl.uni-muenster.de.

since 2011 **dOpenCL**, *An implementation of the OpenCL standard targeting distributed systems*.
Ongoing research. Preliminary results published in: [J3, C9].

The dOpenCL library is an OpenCL implementation targeting distributed systems. It allows to program all parallel processors (e.g., CPUs or GPUs) of a distributed Systems using OpenCL as the single programming model. dOpenCL is open source software and can be found online at: http://dopencl.uni-muenster.de.

01/2010 – 09/2010 **Diploma project**, *Developing a Portable Multi-GPU Skeleton Library*.
Results published in [C10].

As my diploma project I developed the predecessor to SkelCL, an innovative high-level programming library for simplified programming of GPUs. We published the results of my diploma project in [C10] and showed, that we can greatly simplify the programming of GPU systems without scarifying performance.

Research Visits

02/2014 **Visiting researcher (1 Month)**, *Edinburgh University*, Edinburgh, UK.

07/2013 – 11/2013 **Visiting researcher (4 Month)**, *Edinburgh University*, Edinburgh, UK.
Funded by the HiPEAC Network of Excellence

07/2012 – 10/2012 **Visiting researcher (3 Month)**, *EPCC (Edinburgh Parallel Computing Centre)*, Edinburgh, UK.
Funded by the HPC-Europa2 project

Publications

Journal Articles

2014 [J1] **M. Steuwer**, S. Gorlatch. "SkelCL: A High-Level Extension of OpenCL for Multi-GPU Systems". In: *Journal of Supercomputing* (2014). (in press).

[J2] **M. Steuwer**, M. Friese, S. Albers, S. Gorlatch. "Introducing and Implementing the Allpairs Skeleton for GPU Systems". In: *Intl. Journal of Parallel Programming* 42.4 (2014), pp. 601–618.

2013 [J3] P. Kegel, **M. Steuwer**, S. Gorlatch. "dOpenCL: Towards uniform programming of distributed heterogeneous multi-/many-core systems". In: *Journal of Parallel and Distributed Computing* 73.12 (2013), pp. 1639–1648.

Conference Proceedings

2014 [C1] J. J. Fumero, **M. Steuwer**, C. Dubach. "A Composable Array Function Interface for Heterogeneous Computing in Java". In: *ACM SIGPLAN International Workshop on Libraries, Languages and Compilers for Array Programming*. (to appear). Edinburgh, UK, 2014.

[C2] S. Gorlatch, **M. Steuwer**. "Towards High-Level Programming for Systems with Many Cores". In: *Perspectives of Systems Informatics 9th International Andrei Ershov Memorial Conference (PSI 2014)*. (to appear). St. Petersburg, Russia, 2014.

[C3] S. Breuer, **M. Steuwer**, S. Gorlatch. "Extending the SkelCL Skeleton Library for Stencil Computations on Multi-GPU Systems". In: *Proc. of the 1st International Workshop on High-Performance Stencil Computations*. Ed. by A. Größlinger and H. Köstler. Vienna, Austria, 2014, pp. 749–758.

2013 [C4] **M. Steuwer**, S. Gorlatch. "High-Level Programming for Medical Imaging on Multi-GPU Systems using the SkelCL Library". In: *Proceedings of the International Conference on Computational Science, (ICCS)*. Vol. 18. Procedia Computer Science. Barcelona, Spain, 2013, pp. 749–758.

[C5] **M. Steuwer**, S. Gorlatch. "SkelCL: Enhancing OpenCL for High-Level Programming of Multi-GPU Systems". In: *Parallel Computing Technologies 2013*. Ed. by V. Malyskin. Vol. 7979. Lecture Notes in Computer Science. St. Petersburg, Russia: Springer Berlin Heidelberg, 2013, pp. 258–272.

2012 [C6] **M. Steuwer**, P. Kegel, S. Gorlatch. "A High-Level Programming Approach for Distributed Systems with Accelerators". In: *New Trends in Software Methodologies, Tools and Techniques (SoMeT'12)*. Ed. by F. Hamido and R. Roberto. Genoa, Italy, 2012, pp. 430–441.

[C7] **M. Steuwer**, P. Kegel, S. Gorlatch. "Towards High-Level Programming of Multi-GPU Systems Using the SkelCL Library". In: *2012 IEEE Intl. Symposium on Parallel and Distributed Processing Workshops (IPDPSW)*. Shanghai, China, 2012, pp. 1858–1865.

[C8] **M. Steuwer**, S. Gorlatch, M. Buß, S. Breuer. "Using the SkelCL Library for High-Level GPU Programming of 2D Applications". In: *Euro-Par 2012: Parallel Processing Workshops*. Ed. by C. Ioannis, A. Michael, B. Rosa, C. Mario, C. Alexandru, M. Danelutto, F. Desprez, B. Krammer, J. Sahuquillo, S. Scott, and J. Weidendorfer. Lecture Notes in Computer Science. Rhodes Island, Greece: Springer, 2012, pp. 370–380.

[C9] P. Kegel, **M. Steuwer**, S. Gorlatch. "dOpenCL: Towards a Uniform Programming Approach for Distributed Heterogeneous Multi-/Many-Core Systems". In: *2012 IEEE Intl. Symposium on Parallel and Distributed Processing Workshops (IPDPSW)*. Shanghai, China, 2012, pp. 174–186.

2011 [C10] **M. Steuwer**, P. Kegel, S. Gorlatch. "SkelCL - A Portable Skeleton Library for High-Level GPU Programming". In: *2011 IEEE International Symposium on Parallel and Distributed Processing Workshops and Phd Forums (IPDPSW)*. Anchorage, USA, 2011, pp. 1176–1182.