University of Glasgow

Michel Steuwer

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Professional Experience

since Aug. 2017 **Lecturer (Assistant Professor)**, *University of Glasgow*, UK.

2014–2017 **Postdoctoral Research Associate**, *The University of Edinburgh*, UK.

2010–2014 **Research Associate**, *University of Münster*, Germany.

University Education

2010–2015 **PhD degree in computer science**, *University of Münster*, Germany.
Supervisor: Prof. Sergei Gorlatch

Thesis: *Improving Programmability and Performance Portability on Many-Core Processors*

Awarded with the highest possible grade: **Summa Cum Laude** (*with highest honor*)

Nominated as one of 34 candidates from all German, Austrian, and Swiss Universities for the **prize for best dissertation** awarded by the German Informatics Society.

2005–2010 **Diploma degree in computer science with a minor in mathematics**,
(equivalent to a combined MSc and UG degree) University of Münster, Germany.

Thesis: *SkelCL — A Portable Multi-GPU Skeleton Library*

Overall grade in computer science: *very good (85 %)*

Honours and Achievements

- **Best Paper Award Winner** at the International Symposium on Code Generation and Optimization **CGO 2018**.
- **HiPEAC Paper Award Winner** for our paper at the International Conference on Architectural Support for Programming Languages and Operating Systems **ASPLOS 2018**.
- **Most cited papers** of the International Conference on Functional Programming **ICFP 2015** and the International Symposium on Code Generation and Optimization **CGO 2017** & **2018**.
- PhD thesis honoured with the highest possible grade **Summa cum laude**
- **Nominated** as one of 34 candidates for the **prize for best dissertation** completed in 2015 in Informatics at a German, Austrian, or Swiss University. This highly prestigious prize is awarded annually by the German Informatics Society (GI).

Awarded Grants

- Nvidia GPU Grant Program (2011, 2016, and 2017) in total of approx. £13.500.
- HiPEAC collaboration grants (2016 and 2013) and HPC-Europa2 visitor grant (2012) in total of approx. €15.000.
- Intel Hardware Accelerator Research Program (2016) for privileged access to Intel's upcoming CPU+FPGA hardware.

Research Community Activities

Memberships and Participation in Research Networks

- Member of ACM and the German Informatics Society (GI: Gesellschaft für Informatik)
- Member of the UK Manycore Research, Innovation and Opportunities Network (MaRIONet)
- Academic member of the European Network on High Performance and Embedded Architecture and Compilation (HiPEAC)
- Regular participant of the Scottish Programming Language Seminar (SPLS)

Organisation Committees

- **Artifact Evaluation Chair and Co-Chair** of CGO 2020, 2019, 2018
- **Artifact Evaluation Chair** of CC 2020
- **Artifact Evaluation Chair and Co-Chair** of LCTES 2019 and 2018
- **Local Organisation Co-Chair** of the HiPEAC Computer Systems Week in April 2019
- **Local Organisation Co-Chair** of SPLS, the Scottish Programming Language Seminar, 03/2018
- **Web & Publicity Chair** of CC 2018
- **Local Organisation Chair** of UKMAC 2017, the 7th UK Many-Core Developer Conference

Program Committees

- **CGO 2020 and 2019**: SIGMICRO/SIGPLAN Intl. Symp. on Code Generation and Optimization
- **GPCE 2019**: SIGPLAN Intl. Conference on Generative Programming: Concepts & Experiences
- **CC 2020**: International Conference on Compiler Construction
- **LCTES 2019 and 2018**: SIGPLAN/SIGBED Conference on Languages, Compilers, Tools and Theory for Embedded Systems
- **HLPP 2019, 2018, 2017, and 2016**: Intl. Symp. on High-Level Parallel Programming and Apps.
- **OMASE 2019**: Optimization, Modeling, Analysis and Space Exploration Workshop
- **DHPCC++ 2019 and 2018**: Workshop on Distr. and Heterogeneous Programming in C/C++
- **ScalCom 2016**: IEEE Intl. Conference on Scalable Computing and Communications

Artifact Evaluation Committees

- **ICFP 2017**: ACM SIGPLAN International Conference on Functional Programming
- **CGO 2017**: ACM SIGMICRO/SIGPLAN Intl. Symposium on Code Generation and Optimization
- **PACT 2016**: Intl. Conference on Parallel Architectures and Compilation Techniques

Local Community Activities

- I organise *Upwards*, a seminar series discussing all aspects of research life to facilitate knowledge sharing among academics and providing career advices.
- I co-organised the *Programming Language Research Programme* at the School of Informatics in Edinburgh together with James Cheney, including a seminar series covering a broad range of topics related to programming languages.
- I organised the *Humble C++ Programmer Group*, a group discussing practical programming topics in C++ targeted at PhD students to improve their coding skills.

External reviewer

I regularly act as reviewer for journals, funding agencies and external reviewer for conferences.

I have reviewed for the following journals: ACM TODS, ACM TACO, ACM Computing Surveys, Elsevier's Science of Computer Programming Journal, Springer's The Journal of Supercomputing, Wiley's Software: Practice and Experience.

I have been external reviewer for: CC, CGO, Euro-Par, EuroMPI, CCGrid, and ParCo.

Research Visits

2019 **Hosting of a visiting researcher (2 Month)**, *From the University of Münster*, Germany.
Funded by the HPC-Europa3 project

2018 **Hosting of a visiting researcher (2 Month)**, *From the University of Münster*, Germany.
Funded by the HPC-Europa3 project

2017 **Hosting of a visiting researcher (2 Month)**, *From the University of Münster*, Germany.
Funded by the HiPEAC Network of Excellence

2017 **Hosting of a visiting researcher (2 Month)**, *From the University of Münster*, Germany.
Funded by the EuroLab-4-HPC project

2016 **Research Collaboration (3 Month)**, *dividiti Ltd.*, UK.
Funded by the HiPEAC Network of Excellence

2016 **Hosting of a visiting researcher (2 Month)**, *From the University of Münster*, Germany.
Funded by the EuroLab-4-HPC project

2014 **Visiting researcher (3 Month)**, *The University of Edinburgh*, UK.

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

2012 **Visiting researcher (3 Month)**, *The University of Edinburgh/EPCC*, UK.
Funded by the HPC-Europa2 project

Research Collaborations

- Sam Lindley, LFCS, University of Edinburgh
- Robert Atkey, University of Strathclyde
- Ryan Newton, University of Indiana Bloomington
- Sergei Gorlatch, University of Münster
- Nina Dethlefs, University of Hull
- Alastair Murray, Codeplay
- Grigori Fursin and Anton Lokhmotov, dividiti Ltd.
- Robert Hundt and Jacques Pienaar, Google
- Aaron Smith, Microsoft Research

Publications

In my research communities publications in highly regarded conferences are much higher valued than journal publications. I list – where known to me – the acceptance rate of the conferences and their ranking using the well established CORE 2018 ranking of computer science conferences.

Citation Statistics

Overall citations: 553, h-index: 12, i-index: 18

(from Google Scholar accessed on the 13th of June 2019)

Journal Articles

2014 [J1] **M. Steuwer**, M. Haidl, S. Breuer, and S. Gorlatch. "High-Level Programming of Stencil Computations on Multi-GPU Systems Using the SkelCL Library". In: *Parallel Processing Letters* 24.3 (2014). SJR Ranking: Q3, 14 citations on Google Scholar.

[J2] M. Olejnik, **M. Steuwer**, J. N. Dybowski, S. Gorlatch, and D. Heider. "gCUP: Rapid GPU-based HIV-1 Coreceptor Usage Prediction for Next-Generation Sequencing". In: *Bioinformatics* 30.22 (2014). SJR **Ranking: Q1**.

[J3] **M. Steuwer** and S. Gorlatch. "SkelCL: A High-Level Extension of OpenCL for Multi-GPU Systems". In: *The Journal of Supercomputing* 69.1 (2014). SJR Ranking: Q3, 12 citations on Google Scholar.

[J4] **M. Steuwer**, M. Friese, S. Albers, and S. Gorlatch. "Introducing and Implementing the Allpairs Skeleton for GPU Systems". In: *Int. Journal of Parallel Programming* 42.4 (2014). SJR Ranking: Q3, 10 citations on Google Scholar.

2013 [J5] P. Kegel, **M. Steuwer**, and S. Gorlatch. "dOpenCL: Towards uniform programming of distributed heterogeneous multi-/many-core systems". In: *Journal of Parallel and Distributed Computing* 73.12 (2013). SJR Ranking: Q2, 11 citations on Google Scholar.

Conference Proceedings

2018 [C1] P. Ginsbach, T. Remmelg, **M. Steuwer**, B. Bodin, C. Dubach, and M. F. P. O'Boyle. "Automatic matching of legacy code to heterogeneous APIs: An idiomatic approach". In: *Proceedings of the Twenty-Third International Conference on Architectural Support for Programming Languages and Operating Systems, ASPLOS 2018, Williamsburg, VA, USA, March 24-28, 2018*. CORE 2018 **Ranking: A***, **Acceptance Rate 17.5%**, **HiPEAC Paper Award**. Williamsburg, VA, USA: ACM, 2018.

[C2] B. Hagedorn, L. Stoltzfus, **M. Steuwer**, S. Gorlatch, and C. Dubach. "High Performance Stencil Code Generation with LIFT". In: *Proceedings of the 2018 International Symposium on Code Generation and Optimization, CGO 2018, Vienna, Austria, February 24-28, 2018*. CORE 2018 **Ranking: A**, **Acceptance Rate 29%**, **Best Paper Award Winner**, 17 citations on Google Scholar. Vienna, Austria: ACM, 2018.

2017 [C3] B. Hagedorn, **M. Steuwer**, and S. Gorlatch. "A Transformation-Based Approach to Developing High-Performance GPU Programs". In: *Perspectives of System Informatics - 11th International Ershov Informatics Conference, PSI 2017, Moscow, Russia, June 26-29, 2017.* Ed. by A. Voronkov and A. K. Petrenko. CORE 2018 Ranking: B. 2017.

[C4] J. Fumero, **M. Steuwer**, L. Stadler, and C. Dubach. "Just-In-Time GPU Compilation for Interpreted Languages with Partial Evaluation". In: *Proceedings of the 13th ACM SIGPLAN/SIGOPS International Conference on Virtual Execution Environments, VEE 2017, Xi'an, China, April 8-9, 2017*. CORE 2018 **Ranking: A**, 14 citations on Google Scholar. Xi'an, China: ACM, 2017.

[C5] **M. Steuwer**, T. Remmelg, and C. Dubach. "LIFT: A Functional Data-Parallel IR for High-Performance GPU Code Generation". In: *Proceedings of the 2017 International Symposium on Code Generation and Optimization, CGO 2017, Austin, TX, USA, February 4-8, 2017*. CORE 2018 **Ranking: A**, **Acceptance Rate 22%**, **46 citations** on Google Scholar, **most cited paper of CGO 2017**. Austin, USA: IEEE, 2017.

2016 [C6] **M. Steuwer**, T. Remmelg, and C. Dubach. "Matrix Multiplication Beyond Auto-Tuning: Rewrite-based GPU Code Generation". In: *Proceedings of the 2016 International Conference on Compilers, Architecture, and Synthesis of Embedded Systems, CASES*. CORE 2018 **Ranking: A**, 10 citations on Google Scholar. Pittsburgh, USA, 2016.

2015 [C7] **M. Steuwer**, C. Fensch, S. Lindley, and C. Dubach. "Generating Performance Portable Code using Rewrite Rules: From High-Level Functional Expressions to High-Performance OpenCL Code". In: *Proceedings of the 20th ACM SIGPLAN International Conference on Functional Programming, ICFP 2015*. CORE 2018 **Ranking: A***, **Acceptance Rate 29%**, **76 citations** on Google Scholar, **most cited paper of ICFP 2015**. Vancouver, Canada, 2015.

[C8] J. J. Fumero, T. Remmelg, **M. Steuwer**, and C. Dubach. "Runtime Code Generation and Data Management for Heterogeneous Computing in Java". In: *Proceedings of the Principles and Practices of Programming on the Java Platform, PPPJ 2015*. CORE 2018 Ranking: C, 12 citations on Google Scholar. Melbourne, USA, 2015.

2014 [C9] S. Gorlatch and **M. Steuwer**. "Towards High-Level Programming for Systems with Many Cores". In: *Perspectives of Systems Informatics 9th International Andrei Ershov Memorial Conference (PSI 2014)*. CORE 2018 Ranking: B. St. Petersburg, Russia, 2014.

2013 [C10] **M. Steuwer** and S. Gorlatch. "High-Level Programming for Medical Imaging on Multi-GPU Systems using the SkelCL Library". In: *Proc. of the Int. Conference on Computational Science, (ICCS)*. Vol. 18. Procedia Computer Science. CORE 2018 **Ranking: A**. Barcelona, Spain, 2013.

[C11] **M. Steuwer** and S. Gorlatch. "SkelCL: Enhancing OpenCL for High-Level Programming of Multi-GPU Systems". In: *Parallel Computing Technologies 2013*. Lecture Notes in Computer Science. **31 citations** on Google Scholar. St. Petersburg, Russia, 2013.

2012 [C12] **M. Steuwer**, P. Kegel, and S. Gorlatch. "A High-Level Programming Approach for Distributed Systems with Accelerators". In: *New Trends in Software Methodologies, Tools and Techniques – Proceedings of the 11th SoMeT'12*. CORE 2018 Ranking: B. 2012.

Workshop Proceedings

2019 [W1] B. Köpke, **M. Steuwer**, and S. Gorlatch. "Generating Fast FFT Code for GPU from High-Level, Pattern-Based Abstractions". In: *Proceedings of the International Symposium on High-Level Parallel Programming and Applications, HLPP 2019, Linköping, Sweden, July 3–5, 2019*. 2019.

[W2] N. Mogers, A. Smith, D. Vytiniotis, **M. Steuwer**, C. Dubach, and R. Tomioka. "Towards Mapping Lift to Deep Neural Network Accelerators". In: *Proceedings of the Workshop on Emerging Deep Learning Accelerators, EDLA 2019, Valencia, Spain, January 21, 2019*. 2019.

2018 [W3] G. Brown, C. D. Bella, M. Haidl, T. Remmelg, R. Reyes, and **M. Steuwer**. "Introducing Parallelism to the Ranges TS". In: *Proceedings of the International Workshop on OpenCL, IWOCL 2018, Oxford, United Kingdom, May 14-16, 2018*. 10 citations on Google Scholar. 2018.

2017 [W4] L. Stoltzfus, C. Dubach, **M. Steuwer**, A. Gray, and S. Bilbao. "A Modular Approach to Performance, Portability and Productivity for 3D Wave Models". In: *Proceedings of WOLFHPC 2017, the Seventh International Workshop on Domain-Specific Languages and High-Level Frameworks for High Performance Computing*. 2017.

[W5] J. Fumero, **M. Steuwer**, L. Stadler, and C. Dubach. "OpenCL JIT Compilation for Dynamic Programming Languages". In: *Proceedings of the 2017 Workshop on Modern Language Runtimes, Ecosystems, and VMs, MoreVMs@<Programming> 2017, Brussels, Belgium, April 3, 2017*. 2017.

[W6] M. Haidl, **M. Steuwer**, H. Dirks, T. Hummernbrum, and S. Gorlatch. "Towards Composable GPU Programming: Programming GPUs with Eager Actions and Lazy Views". In: *PMAM'17: Proceedings of the 8th International Workshop on Programming Models and Applications for Multicores and Manycores*. Austin, USA: ACM, 2017.

2016 [W7] T. Remmelg, T. Lutz, **M. Steuwer**, and C. Dubach. "Performance Portable GPU Code Generation for Matrix Multiplication". In: *GPGPU'16: Proceedings of the 9th ACM Workshop on General Purpose Processing using GPUs*. 15 citations on Google Scholar. Barcelona, Spain, 2016.

[W8] M. Haidl, **M. Steuwer**, T. Humernbrum, and S. Gorlatch. "Multi-Stage Programming for GPUs in Modern C++ using PACXX". In: *GPGPU'16: Proceedings of the 9th ACM Workshop on General Purpose Processing using GPUs*. Barcelona, Spain, 2016.

[W9] A. Harries, **M. Steuwer**, M. Cole, A. Gray, and C. Dubach. "Compositional Compilation for Sparse, Irregular Data Parallelism". In: *HLPGPGPU'16: Workshop on High-Level Prog. for Heterogeneous and Hierarchical Parallel Systems*. Prague, Czech Republic, 2016.

[W10] C. Cummins, P. Petoumenos, **M. Steuwer**, and H. Leather. "Towards Collaborative Performance Tuning of Algorithmic Skeletons". In: *HLPGPGPU'16: Workshop on High-Level Prog. for Heterogeneous and Hierarchical Parallel Systems*. Prague, Czech Republic, 2016.

[W11] C. Cummins, P. Petoumenos, **M. Steuwer**, and H. Leather. "Autotuning OpenCL Workgroup Size for Stencil Patterns". In: *ADAPT'16: Proceedings of the 2016 International Workshop on Adaptive Self-tuning Computing Systems*. 17 citations on Google Scholar. Prague, Czech Republic, 2016.

2014 [W12] J. J. Fumero, **M. Steuwer**, and C. Dubach. "A Composable Array Function Interface for Heterogeneous Computing in Java". In: *ARRAY'14: Proceedings of the 2014 ACM SIGPLAN International Workshop on Libraries, Languages, and Compilers for Array Programming*. 16 citations on Google Scholar. Edinburgh, Scotland, 2014.

[W13] S. Breuer, **M. Steuwer**, and S. Gorlatch. "Extending the SkelCL Skeleton Library for Stencil Computations on Multi-GPU Systems". In: *Proceedings of the 1st International Workshop on High-Performance Stencil Computations*. 12 citations on Google Scholar. Vienna, Austria, 2014.

2012 [W14] **M. Steuwer**, P. Kegel, and S. Gorlatch. "Towards High-Level Programming of Multi-GPU Systems Using the SkelCL Library". In: *IEEE International Symposium on Parallel and Distributed Processing Workshops*. 18 citations on Google Scholar. 2012.

[W15] **M. Steuwer**, S. Gorlatch, M. Buß, and S. Breuer. "Using the SkelCL Library for High-Level GPU Programming of 2D Applications". In: *Euro-Par 2012: Parallel Processing Workshops*. Lecture Notes in Computer Science. Rhodes Island, Greece, 2012.

[W16] P. Kegel, **M. Steuwer**, and S. Gorlatch. "dOpenCL: Towards a Uniform Programming Approach for Distributed Heterogeneous Multi-/Many-Core Systems". In: *IEEE International Symposium on Parallel and Distributed Processing Workshops*. **37 citations** on Google Scholar. 2012.

2011 [W17] **M. Steuwer**, P. Kegel, and S. Gorlatch. “SkelCL - A Portable Skeleton Library for High-Level GPU Programming”. In: *IEEE International Symposium on Parallel and Distributed Processing Workshops*. **136 citations** on Google Scholar. 2011.

Thesis

2015 [T1] **M. Steuwer**. “Improving Programmability and Performance Portability on Many-Core Processors”. Grade: *Summa Cum Laude*, Supervied by Prof. Sergei Gorlatch, **Nominated** for the **prize for best dissertation** awarded by the German Informatics Society. PhD thesis. University of Münster, 2015.

Book Chapter

2016 [B1] **M. Steuwer**. “Verbesserung der Programmierbarkeit und Performance-Portabilität von Manycore-Prozessoren (Improving Programmability and Performance Portability on Many-Core Processors)”. In: *Ausgezeichnete Informatikdissertationen 2015 (Distinguished Dissertations in Informatics 2015)*. Ed. by S. Hölldobler. Lecture Notes in Informatics. German Informatics Society, 2016.

2014 [B2] C. Kessler, S. Gorlatch, J. Emmyren, U. Dastgeer, **M. Steuwer**, and P. Kegel. “Skeleton Programming for Portable Many-Core Computing”. In: *Programming Multi-core and Many-core Computing Systems*. Wiley, 2014.

2013 [B3] P. Kegel, **M. Steuwer**, and S. Gorlatch. “Uniform High-Level Programming of Many-Core and Multi-GPU Systems”. In: *Transition of HPC Towards Exascale Computing*. Vol. 24. Advances in Parallel Computing. IOS Press, 2013.

Talks and Presentations

02/2019 **Invited Talk**: *Lift: Generating High Performance Code with Rewrite Rules*
Programming Languages and Software Engineering Group, University of Washington in Seattle, US.

02/2019 **Invited Talk**: *Lift: Generating High Performance Code with Rewrite Rules*
Microsoft Research in Redmond, US.

12/2018 Talk: *Implementing lambda calculus in Python and C++*
Programming Languages at Glasgow (PLUG), University of Glasgow, UK.

11/2018 Talk: *High-level Features – Low-level Performance: GPU Performance Prediction of Stencils*
System Seminar, University of Glasgow, UK.

09/2018 **Invited Talk**:
Generating Performance Portable Code with Lift
Shonan Meeting No.134: Advances in Heterogeneous Computing from Hardware to Software, Japan.

03/2018 **Invited Talk**:
Lift: Code Generation by Rewriting Algorithmic Skeletons
Dagstuhl Seminar 18111 on Loop Optimizations, Schloss Dagstuhl, Germany.

02/2018 **Invited Talk**:
Programming GPUs with Eager Actions and Lazy Views
Compiler and Architecture Design Group Seminar, University of Edinburgh, UK.

02/2018 Talk:*The Lift Project: Performance Portable Parallel Code Generation via Rewrite Rules*
Formal Analysis, Theory and Algorithms Seminar, University of Glasgow, UK.

11/2017 Talk:*Programming GPUs with Eager Actions and Lazy Views*
System Seminar, University of Glasgow, UK.

10/2017 Talk:*The Lift Project: Performance Portable Parallel Code Generation via Rewrite Rules*
System Seminar, University of Glasgow, UK.

10/2017 **Invited Talk**:
The Lift Project: Performance Portable Parallel Code Generation via Rewrite Rules
Microsoft Research Labs in Cambridge, UK.

09/2017 **Invited Talk**:
The Lift Project: Performance Portable Parallel Code Generation via Rewrite Rules
University of Hull HPC Symposium 2017 at the University of Hull, UK.

07/2017 **Invited Talk**:
The Lift Project: Performance Portable Parallel Code Generation via Rewrite Rules
University of Münster, Germany.

06/2017 Talk: *Programming GPUs with Eager Actions and Lazy Views*
Scottish Programming Languages Seminar at the University of the West of Scotland in Paisley, UK.

04/2017 Talk: *Programming GPUs with Eager Actions and Lazy Views*
C++ Edinburgh Meetup in Edinburgh, UK.

02/2017 Talk: *Lift: A Functional Data-Parallel IR for High-Performance GPU Code Generation*
International Symposium on Code Generation and Optimization (CGO) 2017 in Austin, USA.

02/2017 Talk: *Programming GPUs with Eager Actions and Lazy Views*
International Workshop on Programming Models and Applications for Multicores and Manycores (PMAM) 2017 in Austin, USA.

12/2016 **Invited Talk**:
The Lift Project: Performance Portable GPU Code Generation via Rewrite Rules
Computer Laboratory Systems Research Group Seminar, University of Cambridge, UK.

08/2016 **Invited Talk**:
Structured Parallel Programming — From High-Level Functional Expressions to High-Performance OpenCL Code
Center for Advanced Electornics Dresden, Dresden University of Technology, Germany.

05/2016 **Invited Talk**:
Improving Programmability and Performance Portability on Many-Core Processors
Colloquium of candidates nominated for the *prize for best dissertation* awarded by the German Informatics Society, Schloss Dagstuhl, Germany.

04/2016 **Invited Talk**: *The lift Project: Performance Portability via Rewrite Rules*
Saarland University, Germany.

01/2016 **Invited Talk**: *Performance Portable GPU Code Generation*
Imperial College London, UK.

12/2015 Talk: *Functional Programming in C++*
Programming Language Interest Group at Edinburgh University, UK.

10/2015 **Invited Talk**: *Generating Performance Portable Code using Rewrite Rules*
PENCIL Developer Meeting at Imperial College London, UK.

09/2015 Talk: *Generating Performance Portable Code using Rewrite Rules:*
From High-Level Functional Expressions to High-Performance OpenCL Code
International Conference on Functional Programming (ICFP) 2015 in Vancouver, Canada.

06/2015 Talk: *Generating Performance Portable Code using Rewrite Rules*
Scottish Programming Languages Seminar in St. Andrews, UK.

05/2014 **Invited Talk**: *SkelCL: High-Level Programming of Multi-GPU Systems*
Institute for Computational and Applied Mathematics, University of Münster, Germany.

05/2014 **Invited Talk**: *SkelCL: High-Level Programming of Multi-GPU Systems*
Workshop on Fast Data Processing on GPUs in Dresden, Germany.

01/2014 Talk: *Extending the SkelCL Library for Stencil Computations on Multi-GPU Systems*
HiStencils 2014 workshop in Vienna, Austria.

12/2013 **Invited Talk**: *SkelCL: High-Level Programming of Multi-GPU Systems*
Research group on elementary particle physics, University of Wuppertal, Germany.

07/2013 Talk: *Introducing and Implementing the Allpairs Skeleton for GPU Systems*
HLPP 2013 workshop in Paris, France.

06/2013 Talk:*High-Level Programming for Medical Imaging on Multi-GPU Systems using the SkelCL Library*
ICCS 2013 conference in Barcelona, Spain.

08/2012 Talk: *Using the SkelCL Library for High-Level GPU Programming of 2D Applications*
ParaPhrase 2012 workshop held in conjunction with Euro-Par 2012 in Rhodes, Greece.

06/2012 Talk: *High-Level Programming for Heterogeneous Systems with Accelerators*
PDESoft 2012 workshop in Münster, Germany.

05/2012 Talk:*Towards High-Level Programming of Multi-GPU Systems Using the SkelCL Library*
AsHES 2012 workshop held in conjunction with IPDPS 2012 in Shanghai, China.

04/2012 **Invited talk**: *A Skeleton Library for Heterogeneous Multi-/Many-Core Systems*
NAIS workshop in Edinburgh, UK.

01/2012 Talk: *Towards a High-Level Approach for Programming Distributed Systems with GPUs*
COST Action IC0805 ("ComplexHPC") meeting in Timisoara, Romania.

12/2011 **Invited talk**: *SkelCL — A High-Level Programming Library for GPU Programming*
Jülich Supercomputing Centre (JSC), Germany.

05/2011 Talk: *SkelCL — A Portable Skeleton Library for High-Level GPU Programming*
HIPS 2011 workshop held in conjunction with IPDPS 2011 in Anchorange, Alaska, USA.

09/2008 **Invited talk**: *Development of an Online Game as a Student Project*
ITSoftTEAM workshop in Chernihiv, Ukraine.

Teaching Experience

As a Lecturer at the University of Glasgow.

2018 - 2019
- *Systems Programming*, undergraduate course (Level H/M). About 180 students.
- *Professional Software Development Team Project*, undergraduate course (Level H/M), together with Tim Storer (Course Coordinator), Inah Omoronyia, and Jeff Dalton. About 180 students.

2017 - 2018
- *Operating Systems*, undergraduate course (Level H/M), together with Wim Vanderbauwhede. About 80 students.
- *Professional Software Development Team Project*, undergraduate course (Level H/M), together with Tim Storer (Course Coordinator), Inah Omoronyia, and Joemon Jose. About 160 students.
- *MSc CS+ Team Project*, topic: *Developing a visual tool for exploring rewriting*. 6 Students.

As a postdoctoral researcher at the University of Edinburgh.

2016 - 2017
- Guest Lecture on *DSLs and rewrite-based optimizations for performance-portable parallel programming* in the *Elements of Programming Languages* course given by James Cheney.
- Guest Lecture in the *Compiling Techniques* course given by Christophe Dubach.
- Assistance in the tutorials of the *Compiling Techniques* course given by Christophe Dubach.

2015 - 2016
- Organiser and Lecturer of the C++ programming course *The Humble C++ Programmer* aiming to improve PhD students coding skills.
- Guest Lecture on *DSLs and rewrite-based optimizations for performance-portable parallel programming* in the *Elements of Programming Languages* course given by James Cheney.
- Assistance in the tutorials of the *Compiling Techniques* course given by Christophe Dubach.

2014 - 2015
- Guest Lecture in the *Compiling Techniques* course given by Christophe Dubach.

As a research associate at the University of Münster.

2013 - 2014
- Supervised MSc student project: *Design and implementation of a high-level API for programming heterogeneous clusters*.
- Supervised MSc student project: *High-level programming of online games in future generation networks*.

2012 - 2013
- Course Design and Lecturer: *Introduction to programming with C and C++*.
- Teaching assistant: *Multi-core and GPU: Parallel Programming*.
- Teaching assistant: *Operating Systems*.

2011 - 2012
- Supervised MSc student project: *High-level programming of heterogeneous systems*.
- Teaching assistant: *Multi-core and GPU: Parallel Programming*.
- Teaching assistant: *Technical aspects of cloud computing* seminar.
- Teaching assistant: *Operating Systems*.

2010 - 2011
- Supervised UG/MSc student project: *Internet- and GPU-based Cloud Computing*.
- Course Design and teaching assistant: *Multi-core and GPU: Parallel Programming*.
- Supervised UG student project: *High-level GPU programming*.

Supervised PhD Students

since 11/2018 PhD studies of Thomas Koehler on
Practical development of efficient and portable image processing applications in Lift

The following students are co-supervised with Christophe Dubach at the University of Edinburgh.

since 09/2016 PhD studies of Federico Pizzuti on
Parallelizing non-associative sequential reductions

since 09/2015 PhD studies of Larisa Stoltzfus on
Stencil-based Acoustic Applications

since 10/2014 PhD studies of Toomas Remmelg on
Automatic Performance Optimisations via Provably Correct Rewrite Rules

12/2013 - 08/2017 PhD studies of Juan José Fumero on
High-Level Just In Time Compilers and Runtime Systems for Efficient Heterogeneous Computing

The following students are co-supervised with Sergei Gorlatch at the University of Münster.

since 10/2018 PhD studies of Bastian Köpcke on
Exploiting Specialised Hardware with Lift

since 10/2016 PhD studies of Bastian Hagedorn on
Efficient GPU Code Generation for Stencil Computations in Lift

06/2015 - 11/2018 PhD studies of Michael Haidl on
PACXX: A GPU programming model embedded in C++

Supervised Undergraduate and Master Students

09/2018 - 03/2019 Final year project of Hansheng Zhang on
Multi-Level Parallel Applications with the C++ Parallel STL

09/2018 - 03/2019 Final year project of Dimitar Borisov on
Exploiting specialised hardware for general purpose computing

09/2017 - 03/2018 Final year project of Domantas Jurkus on
Computer Vision Applications with the Parallel STL

09/2017 - 03/2018 Final year project of Matthew Cornetto on
Sorting Algorithms on GPUs

The following students have been co-supervised with Sergei Gorlatch at the University of Münster.

09/2016 MSc thesis of Bastian Hagedorn on
Efficient GPU Code Generation for Stencil Computations via Parallel Patterns

07/2014 Bachelor thesis of André Lüers on
Evaluation of the Skeleton Library FastFlow

07/2014 Bachelor thesis of Lars Klein on
A Parallel Implementation of the T-CUP Software using the SkelCL Library

01/2014 Master thesis of Michael Olejnik on
A GPU-based Classification Framework for HIV Resistance Prediction

01/2014 Master thesis of Stefan Breuer on
Extending the SkelCL Library for Stencil Computations

11/2013 Diploma thesis of Wadim Hamm on
Development of a Divide & Conquer Skeleton for SkelCL

07/2013 Bachelor thesis of Matthias Droste on
Evaluation of the Skeleton Library SkePU

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Implementation of the Needleman-Wunsch Algorithm and the Breath-First-Search with SkelCL

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A Model for Predicting Work Distribution in Heterogeneous Systems and its Implementation in SkelCL

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Extending the Skeleton Library SkelCL with a Skeleton for Allpairs Computations

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Implementing the LU-Decomposition and the Mersenne-Twister with the SkelCL Library

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Extending the SkelCL Library with Iterators

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