Prof. Dr. Michel Steuwer

Chair of Compilers and
Programming Languages
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Professional Experience

since July 2023
Professor, Chair of Compilers and Programming Languages, Technische Universität Berlin, Germany.

2020–2023
Lecturer / Senior Lecturer, University of Edinburgh, UK.

2017–2020
Lecturer, University of Glasgow, UK.

2014–2017
Postdoctoral Research Associate, 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

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

Honours and Achievements

- As of October 2025, I am the **only researcher worldwide** to have **published in** *all major ACM SIGPLAN venues in programming language foundations (POPL, PLDI, ICFP, OOPSLA)* *and* **compilation (ASPLOS, CGO, CC).**

- Our **ICFP 2020** paper has been selected as a **ACM SIGPLAN Research Highlight** in September 2021 and has been published as a **Communications of the ACM Research Highlight** in March 2023.

- **Best Paper Award Winner** at **CGO 2018** and **SLE 2022**. **6 HiPEAC Paper Awards** for **ASPLOS 2018, 2023, 2024, POPL 2024 (2x)**, and **PLDI 2024** papers.

- **Most cited papers** at **ICFP 2015** and **CGO 2017** by October 2025.

- **One of the most downloaded research paper** of the *Proceedings of the ACM on Programming Languages (PACMPL)* with over **15,00 downloads from the ACM Digital Library** by October 2025 (see https://dl.acm.org/journal/pacmpl).

- **PhD thesis** honoured with the highest possible grade **Summa cum laude**. **Nominated** as one of 34 for the **prize for the best dissertation** of 2015 in Informatics from Germany, Austria, or Switzerland.

Research Projects and Grants

- Co-Investigator on the **EPSRC funded project** *Efficient Cross-Domain DSL Development for Exascale (EP/W007940/1)*, £1M, August 2021 - August 2024. Together with Tobias Grosser (PI), Nick Brown, Amy Krause at Edinburgh and Gerard Gorman and Paul Kelly at Imperial.

- **Google Faculty Award 2019**, *A functional Intermediate Representation for MLIR*, $50K, sponsored by Jacques Pienaar and Albert Cohen.

- Collaborator on a project funded as part of the **Software Defined Hardware (SDH) programme by DARPA**. Together with Michael O'Boyle and Murray Cole at Edinburgh and collaborators at the University of Michigan, Arizoina State in the US, and McGill in Canada.

Research Community Activities

Organization Committees

- **General Chair** of PPoPP 2024.
- **Steering Committee Chair** of CGO (since 2025).
- **Steering Committee Member** of CGO (since 2021) and PPoPP (since 2024).
- **Local Organization Co-Chair** of HiPEAC Computer Systems Week April 2019, Scottish Programming Language Seminar March 2018, October 2019 and UK Many-Core Developer Conference May 2016.

Program Committees

- **Program Committee Co-Chair** of CGO 2024.
- **Program Committee Member** of OOPSLA 2026, PLDI 2025, GPCE 2025, 2024, 2020, 2019, SLE 2024, Haskell 2023, Euro-Par 2023, CGO 2022, 2020, 2019, CC 2020, ICPP 2020, FHPNC 2021, 2020, HLPP 2020, 2019, 2018, 2017, 2016, LCTES 2019, 2018, DHPC++ Workshop 2019, 2018 and IEEE ScalCom 2016.

Artifact Evaluation Committees

- **Artifact Evaluation Co-Chair** of CGO 2021, 2020, 2019, 2018, CC 2021, 2020 and LCTES 2019, 2018.
- **Artifact Evaluation Committee Member** of ICFP 2017, CGO 2017 and PACT 2016.

Other Reviewing Activities

- **External reviewer for journals** of Communications of the ACM, ACM TODS, ACM TACO, ACM Computing Surveys, Science of Computer Programming Journal (Elsevier), The Journal of Supercomputing (Springer) and Software: Practice and Experience (Wiley).

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- **External reviewer for conferences** of MLSys, CC, CGO, Euro-Par, EuroMPI, CC-Grid and ParCo.
- **Reviewer for funding bodies** of German Research Foundation (DFG), German Federal Ministry of Education and Research (BMBF), UK Engineering and Physical Science Research Council (EPSRC), Netherlands Organisation for Scientific Research (NWO) and Natrual Sciences and Engieering Research Council of Canada (NSERC).

Memberships in Research Networks

- Member of **ACM**, the German Informatics Society (**GI**: Gesellschaft für Informatik), the European Network on High Performance and Embedded Architecture and Compilation (**HiPEAC**).

Local University Activities

- I am a member of the *selection commitee of the Deutschlandstipendium* at the Technische Universität Berlin.
- I was the *undergraduate year 1 organizer* coordinating the teaching of about 400 students at the School of Informatics in Edinburgh.
- I was the *research student committee convener* of the School of Computing Science at the University of Glasgow (2019-20). Overseeing the academic progression of over 100 PhD students.
- I organized seminar series and discussion groups at Glasgow and Edinburgh, including: *Upwards*, a seminar series discussing all aspects of research life to facilitate knowledge sharing among academics and providing career advice; the *Programming Language Research Programme* at Edinburgh with a popular seminar series; the *Humble C++ Programmer Group* discussing practical programming in C++ targeted at PhD students to improve their coding skills.

PhD Examinations

04/2025	Dr. Robert Szafarczyk, University of Glasgow, UK	External Examiner
10/2024	Dr. Dominik Scheinert, TU Berlin, Germany	Internal Examiner
12/2022	Dr. Nicolas Tollenaere, INRIA Grenoble, France	External Examiner
05/2022	Dr. Chris Perivolaropoulos, University of Edinburgh, UK	Internal Examiner
12/2021	Dr. Chris Vasiladiotis, University of Edinburgh, UK	Internal Examiner
08/2020	Dr. Bastian Hagedorn, University of Münster, Germany	External Examiner
09/2019	Dr. Sebastian Ertel, TU Dresden, Germany	External Examiner
09/2018	Dr. Blair Archibald, University of Glasgow, UK	Internal Examiner

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Supervised PhD Students

I currently supervise 5 PhD students as main supervisor. So far, *I have supervised 10 PhD students who sucessfully graduated*, 5 as main supervisor and 5 as second supervisor.

Main Supervisor of Currently Active PhD Students

since 05/2024	Serkan Muhcu	Technische Universität Berlin
since 05/2024	Nicole Heinimann	Technische Universität Berlin
since 02/2024	Rudi Schneider	Technische Universität Berlin
since 10/2019	Johannes Lenfers	supervised with Sergei Gorlatch, University of Münster
since 10/2018	Bastian Köpcke	supervised with Sergei Gorlatch, University of Münster

Main Supervisor of Graduated PhD Students

2019-2025   Dr. Martin Lücke   University of Edinburgh
Now Research Scientist at Brium

2019-2024   Dr. Xueying Qin   University of Edinburgh
Now Postdoctoral Researcher at the University of South Denmark

2019-2024   Dr. Rongxiao Fu   University of Edinburgh
Now Researcher at Huawei Research, China

2018-2022   Dr. Thomas Kœhler   University of Glasgow
Now Researcher at CNRS, Strasbourg, France

2016-2019   Dr. Bastian Hagedorn   supervised with Sergei Gorlatch, University of Münster
Only European receipient of the NVIDIA Graduate Fellowship 2019 worth $50K.
Selected as participant of the Heidelberg Laureate Forum 2019.
Winner of the disseration award 2021 at the University of Münster.
Now Senior Compiler Engineer at NVIDIA, Germany

Second Supervisor of Graduate PhD Students

2017-2022   Dr. Federico Pizzuti   main supervisor Christophe Dubach, University of Edinburgh
Now Senior Software Engineer at Huawei Research, Edinburgh, UK

2016-2021   Dr. Larisa Stolzfus   main supervisor Christophe Dubach, University of Edinburgh
Now HPC Benchmark Specialist at Eviden, UK

2015-2019   Dr. Toomas Remmelg   main supervisor Christophe Dubach, University of Edinburgh
Winner of the Estonian national contest for university students for his doctoral thesis.
Now Senior Compiler Engineer at ARM, Norway

2013-2018   Dr. Michael Haidl   main supervisor Sergei Gorlatch, University of Münster
Now Senior Systems Software Manager at NVIDIA, Germany

2014-2017   Dr. Juan Jose Fumero   main supervisor Christophe Dubach, University of Edinburgh
Now Research Fellow at the University of Manchester, UK

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Publications

In my research communities publications in highly regarded conferences are much higher valued than journal publications.

Publication Statistics

I have published **85 papers**: *42 Journal and Conference Papers*, *25 Workshop Papers*, *16 Technical Reports*, and, *2 Book Chapters*.

Citations: 1842, **h-index: 22**, **i10-index: 36** (Google Scholar 12.11.2025)

Journal and Conference Papers

2026 [42]

Towards Pen-and-Paper-Style Equational Reasoning in Interactive Theorem Provers by Equaity Saturation

Marcus Rossel, Rudi Schneider, Thomas Kœhler, **Michel Steuwer** and Andrés Goens

*Prcoeedings of the 53st ACM SIGPLAN Symposium on Principles of Programming Languages, **POPL** 2026, Rennes, France, January 11-17, 2026.* In Proceedings of the ACM on Programming Languages (**PACMPL**) 10.

(accepted for publication)

2025 [41]

Multiple Resumptions and Local Mutable State, Directly

Serkan Muhcu, Philipp Schuster, **Michel Steuwer** and Jonathan Immanuel Brachthäuser

*Proceedings of the 30th ACM SIGPLAN International Conference on Functional Programming, **ICFP** 2025, Singapore, October 12-18, 2025.* In Proceedings of the ACM on Programming Languages (**PACMPL**) 9.

[40]

Slotted E-Graphs - First-Class Support for (Bound) Variables in E-Graphs

Rudi Schneider, Marcus Rossel, Amir Shaikhha, Andrés Goens, Thomas Kœhler and **Michel Steuwer**

***PLDI'** 25: 45th ACM SIGPLAN International Conference on Programming Language Design and Implementation, Seoul, South Korea, June 16-20, 2025.* In Proceedings of the ACM on Programming Languages (**PACMPL**) 9.

[39]

xDSL: Sidekick compilation for SSA-Based Compilers

Mathieu Fehr, Michel Weber, Christian Ulmann, Alexandre Lopoukhine, Martin Lücke, Théo Degioanni, Christos Vasiladiotis, **Michel Steuwer** and Tobias Grosser

***CGO** '25: ACM/IEEE International Symposium on Code Generation and Optimization, Las Vegas, USA, March 1-5, 2025.* ACM.

[38]

The MLIR Transform Dialect - Your compiler is more powerful than you think

Martin Lücke, **Michel Steuwer**, Albert Cohen, William Moses and Alex Zinenko

CGO '25: ACM/IEEE International Symposium on Code Generation and Optimization, Las Vegas, USA, March 1-5, 2025. ACM.

11 citations on Google Scholar.

2024 [37]

Descend: A Safe GPU Systems Programming Language

Bastian Köpcke, Sergei Gorlatch and **Michel Steuwer**

PLDI' 24: 45th ACM SIGPLAN International Conference on Programming Language Design and Implementation, Copenhagen, Denmark, June 24-28, 2024. In Proceedings of the ACM on Programming Languages (**PACMPL**) 8.

[36]

A shared compilation stack for distributed-memory parallelism in stencil DSLs

George Bisbas, Anton Lydike, Emilien Bauer, Nick Brown, Mathieu Fehr, Lawrence Mitchell, Gabriel Rodriguez-Canal, Maurice Jamieson, Paul H.J. Kelly, **Michel Steuwer** and Tobias Grosser

Proceedings of the 29th ACM International Conference on Architectural Support for Programming Languages and Operating Systems, ASPLOS 2024, San Diego, CA, USA, April 27 - May 1, 2024. ACM.

13 citations on Google Scholar.

[35]

Guided Equality Saturation

Thomas Kœhler, Andrés Goens, Siddharth Bhat, Tobias Grosser, Phil Trinder and **Michel Steuwer**

Prcoeedings of the 51st ACM SIGPLAN Symposium on Principles of Programming Languages, POPL 2024, London, UK, January 14-20, 2024. In Proceedings of the ACM on Programming Languages (**PACMPL**) 8.

Selected for the MIT Programming Languages Review. **33 citations** on Google Scholar.

[34]

Shoggoth - A Formal Foundation for Strategic Rewriting

Xueying Qin, Liam O'Connor, Rob van Glabbeek, Peter Hoefner, Ohad Kammar and **Michel Steuwer**

Prcoeedings of the 51st ACM SIGPLAN Symposium on Principles of Programming Languages, POPL 2024, London, UK, January 14-20, 2024. In Proceedings of the ACM on Programming Languages (**PACMPL**) 8.

[33]

Collection skeletons: Declarative abstractions for data collections

Björn Franke, Zhibo Li, Magnus Morton and **Michel Steuwer**

Journal of Systems and Software 2024 (2024).

2023 [32] **BaCO: A Fast and Portable Bayesian Compiler Optimization Framework**

Erik Hellsten, Artur L. F. Souza, Johannes Lenfers, Rubens Lacouture, Olivia Hsu, Adel Ejjeh, Fredrik Kjolstad, **Michel Steuwer**, Kunle Olukotun and Luigi Nardi

Proceedings of the 28th ACM International Conference on Architectural Support for Programming Languages and Operating Systems, Volume 4, ASPLOS 2023, Vancouver, BC, Canada, March 25-29, 2023. ACM.

Presented at **ASPLOS** 2024. **30 citations** on Google Scholar.

[31] **Structural Subtyping as Parametric Polymorphism**

Wenhao Tang, Daniel Hillerström, James McKinna, **Michel Steuwer**, Ornela Dardha, Rongxiao Fu and Sam Lindley

Proceedings of OOPSLA 2023, Cascais, Portugal, October 22-27, 2023. In Proceedings of the ACM on Programming Languages (**PACMPL**) 7.

[30] **Achieving High Performance the Functional Way: Expressing High-Performance Optimizations as Rewrite Strategies**

Bastian Hagedorn, Johannes Lenfers, Thomas Kœhler, Xueying Qin, Sergei Gorlatch and **Michel Steuwer**

Communications of the ACM (CACM) 66.3 (2023).

[29] **Primrose: Selecting Container Data Types by Their Properties**

Xueying Qin, Liam O'Connor and **Michel Steuwer**

Art, Science, and Engineering of Programming (<Programming>) 7.3 (2023).

2022 [28] **Collection Skeletons: Declarative Abstractions for Data Collections**

Björn Franke, Zhibo Li, Magnus Morton and **Michel Steuwer**

Proceedings of the 15th ACM SIGPLAN International Conference on Software Language Engineering, SLE 2022, Auckland, New Zealand, December 6-7, 2022. ACM.

Best Research Paper Award

[27] **Investigating magic numbers: improving the inlining heuristic in the Glasgow Compiler**

Celeste Hollenbeck, Michael F. P. O'Boyle and **Michel Steuwer**

Haskell '22: 15th ACM SIGPLAN International Haskell Symposium, Ljubljana, Slovenia, September 15 - 16, 2022. ACM.

[26] **Generating Work Efficient Scan Implementations for GPUs the Functional Way**

Federico Pizzuti, **Michel Steuwer** and Christophe Dubach

Euro-Par 2022: Parallel Processing - 28th International Conference on Parallel and Distributed Computing, Glasgow, UK, August 22-26, 2022, Proceedings. In Lecture Notes in Computer Science 13440. Springer.

2021 **[25]** **Code Generation for Room Acoustics Simulations with Complex Boundary Conditions**

Larisa Stoltzfus, Brian Hamilton, **Michel Steuwer**, Lu Li and Christophe Dubach

*35th IEEE International Parallel and Distributed Processing Symposium, **IPDPS** 2021, Portland, OR, USA, May 17-21, 2021*. IEEE.

[24] **Integrating a functional pattern-based IR into MLIR**

Martin Lücke, **Michel Steuwer** and Aaron Smith

CC '21: 30th ACM SIGPLAN International Conference on Compiler Construction, Virtual Event, Republic of Korea, March 2-3, 2021. ACM.

20 citations on Google Scholar.

[23] **Towards a Domain-Extensible Compiler: Optimizing an Image Processing Pipeline on Mobile CPUs**

Thomas Kœhler and **Michel Steuwer**

*IEEE/ACM International Symposium on Code Generation and Optimization, **CGO** 2021, Seoul, South Korea, February 27 - March 3, 2021*. IEEE.

12 citations on Google Scholar.

[22] **Efficient Auto-Tuning of Parallel Programs with Interdependent Tuning Parameters via Auto-Tuning Framework (ATF)**

Ari Rasch, Richard Schulze, **Michel Steuwer** and Sergei Gorlatch

*ACM Transactions on Architecture and Code Optimization (**TACO**) 18.1 (2021)*.

43 citations on Google Scholar.

2020 **[21]** **DelayRepay: delayed execution for kernel fusion in Python**

John Magnus Morton, Kuba Kaszyk, Lu Li, Jiawen Sun, Christophe Dubach, **Michel Steuwer**, Murray Cole and Michael F. P. O'Boyle

DLS 2020: Proceedings of the 16th ACM SIGPLAN International Symposium on Dynamic Languages, Virtual Event, USA, November 17, 2020. ACM.

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[20] Achieving high-performance the functional way: a functional pearl on expressing high-performance optimizations as rewrite strategies

Bastian Hagedorn, Johannes Lenfers, Thomas Kœhler, Xueying Qin, Sergei Gorlatch and **Michel Steuwer**

*Proceedings of the 25th ACM SIGPLAN International Conference on Functional Programming, **ICFP** 2020, Virtual Event, USA, August 23-26, 2020.* In Proceedings of the ACM on Programming Languages (**PACMPL**) 4.

91 citations on Google Scholar, **selected as only 1 of 4 ACM SIGPLAN Research Highlights from 2020**, *HiPEAC Paper Award*, **selected for publication as a Communications of the ACM Research Highlight**.

[19] Tiling Optimizations for Stencil Computations Using Rewrite Rules in Lift

Larisa Stoltzfus, Bastian Hagedorn, **Michel Steuwer**, Sergei Gorlatch and Christophe Dubach

ACM Transactions on Architecture and Code Optimization (TACO) 16.4 (2020).

15 citations on Google Scholar

[18] Generating fast sparse matrix vector multiplication from a high level generic functional IR

Federico Pizzuti, **Michel Steuwer** and Christophe Dubach

CC '20: 29th International Conference on Compiler Construction, San Diego, CA, USA, February 22-23, 2020. ACM.

10 citations on Google Scholar.

2018 [17] Automatic Matching of Legacy Code to Heterogeneous APIs: An Idiomatic Approach

Philip Ginsbach, Toomas Remmelg, **Michel Steuwer**, Bruno Bodin, Christophe Dubach and Michael F. P. O'Boyle

*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.* ACM.

HiPEAC Paper Award. **52 citations** on Google Scholar.

[16] High performance stencil code generation with Lift

Bastian Hagedorn, Larisa Stoltzfus, **Michel Steuwer**, Sergei Gorlatch and Christophe Dubach

*Proceedings of the 2018 International Symposium on Code Generation and Optimization, **CGO** 2018, Vösendorf / Vienna, Austria, February 24-28, 2018.* ACM.

Best Paper Award Winner. **145 citations** on Google Scholar.

2017 [15] **A Transformation-Based Approach to Developing High-Performance GPU Programs**

Bastian Hagedorn, **Michel Steuwer** and Sergei Gorlatch

Perspectives of System Informatics - 11th International Andrei P. Ershov Informatics Conference, PSI 2017, Moscow, Russia, June 27-29, 2017, Revised Selected Papers. In Lecture Notes in Computer Science 10742. Springer.

[14] **Just-In-Time GPU Compilation for Interpreted Languages with Partial Evaluation**

Juan José Fumero, **Michel Steuwer**, Lukas Stadler and Christophe Dubach

Proceedings of the 13th ACM SIGPLAN/SIGOPS International Conference on Virtual Execution Environments, VEE 2017, Xi'an, China, April 8-9, 2017. ACM.

42 citations on Google Scholar.

[13] **Lift: a functional data-parallel IR for high-performance GPU code generation**

Michel Steuwer, Toomas Remmelg and Christophe Dubach

Proceedings of the 2017 International Symposium on Code Generation and Optimization, CGO 2017, Austin, TX, USA, February 4-8, 2017. ACM.

248 citations on Google Scholar, **most cited paper of CGO 2017**.

2016 [12] **Matrix multiplication beyond auto-tuning: rewrite-based GPU code generation**

Michel Steuwer, Toomas Remmelg and Christophe Dubach

2016 International Conference on Compilers, Architectures and Synthesis for Embedded Systems, CASES 2016, Pittsburgh, Pennsylvania, USA, October 1-7, 2016. ACM.

38 citations on Google Scholar.

2015 [11] **Generating performance portable code using rewrite rules: from high-level functional expressions to high-performance OpenCL code**

Michel Steuwer, Christian Fensch, Sam Lindley and Christophe Dubach

Proceedings of the 20th ACM SIGPLAN International Conference on Functional Programming, ICFP 2015, Vancouver, BC, Canada, September 1-3, 2015. ACM.

201 citations on Google Scholar, **most cited paper of ICFP 2015**.

[10] **Runtime Code Generation and Data Management for Heterogeneous Computing in Java**

Juan José Fumero, Toomas Remmelg, **Michel Steuwer** and Christophe Dubach

Proceedings of the Principles and Practices of Programming on The Java Platform, PPPJ 2015, Melbourne, FL, USA, September 8-11, 2015. ACM.

33 citations on Google Scholar.

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2014 [9] **High-Level Programming of Stencil Computations on Multi-GPU Systems Using the SkelCL Library**

Michel Steuwer, Michael Haidl, Stefan Breuer and Sergei Gorlatch

Parallel Processing Letters 24.3 (2014).

25 citations on Google Scholar.

[8] **gCUP: Rapid GPU-based HIV-1 Coreceptor Usage Prediction for Next-Generation Sequencing**

Michael Olejnik, **Michel Steuwer**, Sergei Gorlatch and Dominik Heider

Bioinformatics 30.22 (2014).

11 citations on Google Scholar.

[7] **SkelCL: A High-Level Extension of OpenCL for Multi-GPU Systems**

Michel Steuwer and Sergei Gorlatch

The *Journal of Supercomputing* 69.1 (2014).

36 citations on Google Scholar.

[6] **Introducing and Implementing the Allpairs Skeleton for Programming Multi-GPU Systems**

Michel Steuwer, Malte Friese, Sebastian Albers and Sergei Gorlatch

International Journal on Parallel Programming 42.4 (2014).

16 citations on Google Scholar.

[5] **Towards High-Level Programming for Systems with Many Cores**

Sergei Gorlatch and **Michel Steuwer**

Perspectives of System Informatics - 9th International Ershov Informatics Conference, PSI 2014, St. Petersburg, Russia, June 24-27, 2014. Revised Selected Papers. In Lecture Notes in Computer Science 8974. Springer.

2013 [4] **dOpenCL: Towards uniform programming of distributed heterogeneous multi-/many-core systems**

Philipp Kegel, **Michel Steuwer** and Sergei Gorlatch

Journal on Parallel and Distributed Computing 73.12 (2013).

17 citations on Google Scholar.

[3] High-Level Programming for Medical Imaging on Multi-GPU Systems Using the SkelCL Library

Michel Steuwer and Sergei Gorlatch

Proceedings of the International Conference on Computational Science, ICCS 2013, Barcelona, Spain, 5-7 June, 2013. In Procedia Computer Science 18. Elsevier.

[2] SkelCL: Enhancing OpenCL for High-Level Programming of Multi-GPU Systems

Michel Steuwer and Sergei Gorlatch

Parallel Computing Technologies - 12th International Conference, PaCT 2013, St. Petersburg, Russia, September 30 - October 4, 2013. Proceedings. In Lecture Notes in Computer Science 7979. Springer.

41 citations on Google Scholar.

2012 [1] A High-Level Programming Approach for Distributed Systems with Accelerators

Michel Steuwer, Philipp Kegel and Sergei Gorlatch

New Trends in Software Methodologies, Tools and Techniques - Proceedings of the Eleventh SoMeT '12, Genoa, Italy, September 26 - 28, 2012. In Frontiers in Artificial Intelligence and Applications 246. IOS Press.

Workshop Papers

2022 [W25] Systematically extending a high-level code generator with support for tensor cores

Lukas Siefke, Bastian Köpcke, Sergei Gorlatch and **Michel Steuwer**

GPGPU@PPoPP 2022: Proceedings of the 14th Workshop on General Purpose Processing Using GPU, Virtual Event, Seoul, Republic of Korea, 3 April 2022. ACM.

2021 [W24] Generating high performance code for irregular data structures using dependent types

Federico Pizzuti, **Michel Steuwer** and Christophe Dubach

FHPNC 2021: Proceedings of the 9th ACM SIGPLAN International Workshop on Functional High-Performance and Numerical Computing, FHPNC@ICFP 2021, Virtual Event, Korea, August 22, 2021. ACM.

2020 [W23] High-level hardware feature extraction for GPU performance prediction of stencils

Toomas Remmelg, Bastian Hagedorn, Lu Li, **Michel Steuwer**, Sergei Gorlatch and Christophe Dubach

GPGPU@PPoPP '20: 13th Annual Workshop on General Purpose Processing using Graphics Processing Unit colocated with 25th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming, San Diego, California, USA, February 23, 2020. ACM.

[W22] **A functional pattern-based language in MLIR**

Martin Lücke, **Michel Steuwer** and Aaron Smith

AccML@HiPEAC 2020: Proceeding of the workshop on Accelerated Machine Learning, Bologna, Italy, January 20, 2020.

2019 **[W21]** **Generating efficient FFT GPU code with Lift**

Bastian Köppcke, **Michel Steuwer** and Sergei Gorlatch

Proceedings of the 8th ACM SIGPLAN International Workshop on Functional High-Performance and Numerical Computing, FHPNC@ICFP 2019, Berlin, Germany, August 18, 2019. ACM.

12 citations on Google Scholar.

[W20] **Position-dependent arrays and their application for high performance code generation**

Federico Pizzuti, **Michel Steuwer** and Christophe Dubach

Proceedings of the 8th ACM SIGPLAN International Workshop on Functional High-Performance and Numerical Computing, FHPNC@ICFP 2019, Berlin, Germany, August 18, 2019. ACM.

[W19] **Generating Fast FFT Code for GPU from High-Level Pattern-Based Abstractions**

Bastian Köpke, **Michel Steuwer** and Sergei Gorlatch

Proceedings of the International Symposium on High-Level Parallel Programming and Applications, HLPP 2019, Linköping, Sweden, July 3-5, 2019.

[W18] **High-level synthesis of functional patterns with Lift**

Martin Kristien, Bruno Bodin, **Michel Steuwer** and Christophe Dubach

Proceedings of the 6th ACM SIGPLAN International Workshop on Libraries, Languages and Compilers for Array Programming, ARRAY@PLDI 2019, Phoenix, AZ, USA, June 22, 2019. ACM.

30 citations on Google Scholar.

[W17] **Towards Mapping Lift to Deep Neural Network Accelerators**

Naums Mogers, Aaron Smith, Dimitrios Vytiniotis, **Michel Steuwer**, Christophe Dubach and Ryota Tomioka

Proceedings of the Workshop on Emerging Deep Learning Accelerators, EDLA@HiPEAC 2019, Valencia, Spain, January 21, 2019.

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2018 [W16] **Introducing Parallelism to the Ranges TS**

Gordon Brown, Christopher Di Bella, Michael Haidl, Toomas Remmelg, Ruymán Reyes and **Michel Steuwer**

Proceedings of the International Workshop on OpenCL, IWOCL 2018, Oxford, United Kingdom, May 14-16, 2018. ACM.

2017 [W15] **A Modular Approach to Performance, Portability and Productivity for 3D Wave Models**

Larisa Stoltzfus, Christophe Dubach, **Michel Steuwer**, Alan Gray and Stefan Bilbao

Proceedings of the Seventh International Workshop on Domain-Specific Languages and High-Level Frameworks for High Performance Computing, WOLFHPC@SC 2017, Denver, CO, USA, November 17, 2017.

[W14] **OpenCL JIT Compilation for Dynamic Programming Languages**

Juan José Fumero, **Michel Steuwer**, Lukas Stadler and Christophe Dubach

Proceedings of the 2017 Workshop on Modern Language Runtimes, Ecosystems, and VMs, MoreVMs@<Programming> 2017, Brussels, Belgium, April 3, 2017.

[W13] **Towards Composable GPU Programming: Programming GPUs with Eager Actions and Lazy Views**

Michael Haidl, **Michel Steuwer**, Hendrik Dirks, Tim Humernbrum and Sergei Gorlatch

*Proceedings of the 8th International Workshop on Programming Models and Applications for Multicores and Manycores, PMAM@**PPoPP** 2017, Austin, TX, USA, February 5, 2017. ACM.*

2016 [W12] **Performance portable GPU code generation for matrix multiplication**

Toomas Remmelg, Thibaut Lutz, **Michel Steuwer** and Christophe Dubach

*Proceedings of the 9th Annual Workshop on General Purpose Processing using Graphics Processing Unit, GPGPU@**PPoPP** 2016, Barcelona, Spain, March 12 - 16, 2016. ACM.*

41 citations on Google Scholar.

[W11] **Multi-stage programming for GPUs in C++ using PACXX**

Michael Haidl, **Michel Steuwer**, Tim Humernbrum and Sergei Gorlatch

*Proceedings of the 9th Annual Workshop on General Purpose Processing using Graphics Processing Unit, GPGPU@**PPoPP** 2016, Barcelona, Spain, March 12 - 16, 2016. ACM.*

12 citations on Google Scholar.

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[W10] **Compositional Compilation for Sparse, Irregular Data Parallelism**

Adam Harries, **Michel Steuwer**, Murray Cole, Alan Gray and Christophe Dubach

Proceedings of the Workshop on High-Level Programming for Heterogeneous and Hierarchical Parallel Systems, HLPGPGPU@HiPEAC 2016, Prague, Czech Republic, January 19, 2016.

[W9] **Towards Collaborative Performance Tuning of Algorithmic Skeletons**

Chris Cummins, Pavlos Petoumenos, **Michel Steuwer** and Hugh Leather

Proceedings of the Workshop on High-Level Programming for Heterogeneous and Hierarchical Parallel Systems, HLPGPGPU@HiPEAC 2016, Prague, Czech Republic, January 19, 2016.

[W8] **Autotuning OpenCL Workgroup Size for Stencil Patterns**

Chris Cummins, Pavlos Petoumenos, **Michel Steuwer** and Hugh Leather

Proceedings of the 2016 International Workshop on Adaptive Self-tuning Computing Systems, ADAPT@HiPEAC 2016, Prague, Czech Republic, January 18, 2016.

37 citations on Google Scholar.

2014 **[W7]** **A Composable Array Function Interface for Heterogeneous Computing in Java**

Juan José Fumero, **Michel Steuwer** and Christophe Dubach

ARRAY'14: Proceedings of the 2014 ACM SIGPLAN International Workshop on Libraries, Languages, and Compilers for Array Programming, Edinburgh, United Kingdom, June 12-13, 2014. ACM.

26 citations on Google Scholar.

[W6] **Extending the SkelCL Skeleton Library for Stencil Computations on Multi-GPU Systems**

Stefan Breuer, **Michel Steuwer** and Sergei Gorlatch

Proceedings of the 1st International Workshop on High-Performance Stencil Computations, HiStencils@HiPEAC 2014, Vienna, Austria, January 22, 2014.

22 citations on Google Scholar.

2012 **[W5]** **Using the SkelCL Library for High-Level GPU Programming of 2D Applications**

Michel Steuwer, Sergei Gorlatch, Matthias Buß and Stefan Breuer

Euro-Par 2012: Parallel Processing Workshops - BDMC, CGWS, HeteroPar, HiBB, OMHI, Paraphrase, PROPER, Resilience, UCHPC, VHPC, Rhodes Islands, Greece, August 27-31, 2012. Revised Selected Papers. In Lecture Notes in Computer Science 7640. Springer.

[W4] **Uniform High-Level Programming of Many-Core and Multi-GPU Systems**

Philipp Kegel, **Michel Steuwer** and Sergei Gorlatch

Transition of HPC Towards Exascale Computing - Selected Papers from the High Performance Computing Workshop, Cetraro, Italy, June 25-29, 2012. In Advances in Parallel Computing 24. IOS Press.

[W3] **Towards High-Level Programming of Multi-GPU Systems Using the SkelCL Library**

Michel Steuwer, Philipp Kegel and Sergei Gorlatch

*26th IEEE International Parallel and Distributed Processing Symposium Workshops & PhD Forum, **IPDPS** 2012, Shanghai, China, May 21-25, 2012*. IEEE Computer Society.

28 citations on Google Scholar.

[W2] **dOpenCL: Towards a Uniform Programming Approach for Distributed Heterogeneous Multi-/Many-Core Systems**

Philipp Kegel, **Michel Steuwer** and Sergei Gorlatch

*26th IEEE International Parallel and Distributed Processing Symposium Workshops & PhD Forum, **IPDPS** 2012, Shanghai, China, May 21-25, 2012*. IEEE Computer Society.

58 citations on Google Scholar.

2011 **[W1]** **SkelCL - A Portable Skeleton Library for High-Level GPU Programming**

Michel Steuwer, Philipp Kegel and Sergei Gorlatch

*25th IEEE International Symposium on Parallel and Distributed Processing, **IPDPS** 2011, Anchorage, Alaska, USA, 16-20 May 2011 - Workshop Proceedings*. IEEE.

217 citations on Google Scholar.

Technical Reports and Preprints

2024 **[T16]** **A shared compilation stack for distributed-memory parallelism in stencil DSLs**

George Bisbas, Anton Lydike, Emilien Bauer, Nick Brown, Mathieu Fehr, Lawrence Mitchell, Gabriel Rodriguez-Canal, Maurice Jamieson, Paul H. J. Kelly, **Michel Steuwer** and Tobias Grosser

arXiv abs/2404.02218 (2024).

[T15] **The MLIR Transform Dialect. Your compiler is more powerful than you think**

Martin Paul Lücke, Oleksandr Zinenko, William S. Moses, **Michel Steuwer** and Albert Cohen

arXiv abs/2409.03864 (2024).

2023 [T14]

Sidekick compilation with xDSL

Mathieu Fehr, Michel Weber, Christian Ulmann, Alexandre Lopoukhine, Martin Lücke, Théo Degioanni, **Michel Steuwer** and Tobias Grosser

arXiv abs/2311.07422 (2023).

[T13]

Descend: A Safe GPU Systems Programming Language

Bastian Köpcke, Sergei Gorlatch and **Michel Steuwer**

arXiv abs/2305.03448 (2023).

[T12]

Traced Types for Safe Strategic Rewriting

Rongxiao Fu, Ornela Dardha and **Michel Steuwer**

arXiv abs/2304.14154 (2023).

[T11]

Structural Subtyping as Parametric Polymorphism

Wenhao Tang, Daniel Hillerström, James McKinna, **Michel Steuwer**, Ornela Dardha, Rongxiao Fu and Sam Lindley

arXiv abs/2304.08267 (2023).

2022 [T10]

BaCO: A Fast and Portable Bayesian Compiler Optimization Framework

Erik Hellsten, Artur L. F. Souza, Johannes Lenfers, Rubens Lacouture, Olivia Hsu, Adel Ejjeh, Fredrik Kjolstad, **Michel Steuwer**, Kunle Olukotun and Luigi Nardi

arXiv abs/2212.11142 (2022).

[T9]

Primrose: Selecting Container Data Types by their Properties

Xueying Qin, Liam O'Connor and **Michel Steuwer**

arXiv abs/2205.09655 (2022).

[T8]

RISE & Shine: Language-Oriented Compiler Design

Michel Steuwer, Thomas Kœhler, Bastian Köpcke and Federico Pizzuti

arXiv abs/2201.03611 (2022).

18 citations on Google Scholar.

2021 [T7]

Sketch-Guided Equality Saturation: Scaling Equality Saturation to Complex Optimizations in Languages with Bindings

Thomas Kœhler, Phil Trinder and **Michel Steuwer**

arXiv abs/2111.13040 (2021).

[T6] **Row-Polymorphic Types for Strategic Rewriting**

Rongxiao Fu, Xueying Qin, Ornela Dardha and **Michel Steuwer**

arXiv abs/2103.13390 (2021).

2020 **[T5]** **A Language for Describing Optimization Strategies**

Bastian Hagedorn, Johannes Lenfers, Thomas Kœhler, Sergei Gorlatch and **Michel Steuwer**

arXiv abs/2002.02268 (2020).

2018 **[T4]** **P0836R0 Introduce Parallelism to the Ranges TS**

Gordon Brown, Christopher Di Bella, Michael Haidl, Toomas Remmelg, Ruyman Reyes, **Michel Steuwer** and Michael Wong

C++ Standards Committee Papers.

2017 **[T3]** **Strategy Preserving Compilation for Parallel Functional Code**

Robert Atkey, **Michel Steuwer**, Sam Lindley and Christophe Dubach

arXiv abs/1710.08332 (2017).

16 citations on Google Scholar.

2015 **[T2]** **Patterns and Rewrite Rules for Systematic Code Generation (From High-Level Functional Patterns to High-Performance OpenCL Code)**

Michel Steuwer, Christian Fensch and Christophe Dubach

arXiv abs/1502.02389 (2015).

[T1] **Autotuning OpenCL Workgroup Size for Stencil Patterns**

Chris Cummins, Pavlos Petoumenos, **Michel Steuwer** and Hugh Leather

arXiv abs/1511.02490 (2015).

Book Chapter

2015 **[B2]** **Verbesserung der Programmierbarkeit und Performance-Portabilität von Many-core-Prozessoren (Improving Programmability and Performance Portability on Many-Core Processors)**

Michel Steuwer

Ausgezeichnete Informatikdissertationen 2015 (Distinguished Dissertations in Informatics 2015). In LNI D-16. GI.

2014 [B1]

Skeleton Programming for Portable Many-Core Computing

Christopher Kessler, Sergei Gorlatch, Johan Emmyren, Usman Dastgeer, **Michel Steuwer** and Philipp Kegel

Programming Multi-core and Many-core Computing Systems. Wiley.

Thesis

2015 [TH1]

Improving Programmability and Performance Portability on Many-Core Processors

Michel Steuwer

University of Münster.

Grade: **Summa Cum Laude**, **Nominated** for the **prize for best dissertation** awarded by the German Informatics Society. 14 citations on Google Scholar.

Talks and Presentations

I have given *over 50 talks*, of which over 30 were invited talks at leading institutions worldwide including at **MIT CSAIL**, **University of Washington**, **University of Cambridge**, **Imperial College** London, **Google DeepMind**, **Microsoft Research**, and at a **Shonan Meeting** and a **Dagstuhl Seminar**.

10/2025   **Invited Talk**: *Programming Language Design for GPU Systems*, SPLASH Sponsor Invited Talks 2025, Singapore, Singapore.

08/2025   **Keynote**: *Programming Language Design for Heterogeneous Systems*, HeteroPar 2025, Dresden, Germany.

04/2025   **Invited Talk**: *Slotted E-Graphs*, System Seminar at the University of Glasgow, Glasgow, UK.

01/2025   **Invited Talk**: *How to design the next 700 optimizing compilers*, Guest Lecture in the Compiler Construction Course of Sebastian Hack at Saarland University, Saarbrücken, Germany.

10/2024   **Invited Talk**: *Scaling Equality Saturation*, Shaghai Huawei Research Center, Shanghai, China.

08/2024   **Invited Talk**: *Descend: A Safe GPU Systems Programming Language*, Bayes Coffee House Tech Talk Series, Edinburgh, UK.

10/2023   **Invited Talk**: *Guided Equality Saturation*, Seminar of the Chair of Compiler Construction at TU Dresden, Desden, Germany.

03/2023   **Invited Talk**: *On bringing a functional pearl into practice: An MLIR-based implementation of the strategy language ELEVATE*, LAIV/DSG seminar at Heriot-Watt University, Edinburgh, UK.

01/2023   **Invited Talk**: *On bringing a functional pearl into practice: An MLIR-based implementation of the strategy language ELEVATE*, Programming Languages at Glasgow (PLUG) seminar at the University of Glasgow, Glasgow, UK.

11/2022   **Invited Talk**: *Modern DSL Compiler Development with MLIR*, Huawei TRC Innovation Summit 2022, Tel Aviv, Israel.

06/2022   **Invited Talk**: *How to Design the Next 700 Optimizing Compilers*, High-efficiency computer graphics group at **MIT CSAIL**, Cambridge, MA, USA.

06/2022   Talk: *Achieving High-Performance the Functional Way: Expressing High-Performance Optimizations as Rewrite Strategies*, SIGPLAN Track at the SIGPLAN Conference on Programming Language Design and Implementation (PLDI), San Diego, CA, USA.

06/2022   **Invited Talk**: *RISE & Shine: Language-Oriented Compiler Design*, Compiler Design Lab Seminar at Saarland University, Saarland, Germany.

04/2022   Talk: *Systematically Extending a High-Level Code Generator with Sup- port for Tensor Cores*, Workshop on General Purpose Processing using GPU (GPGPU), virtual.

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09/2021	Talk: *FHPNC Community Update*, Workshop on Functional High- Performance and Numerical Computing (FHPNC), virtual.
12/2020	**Invited Talk**: *Achieving High-Performance the Functional Way - Expressing High-Performance Optimizations as Rewrite Strategies*, Programming Languages and Systems Research Group (PLAS) group seminar at the University of Kent, virtual.
08/2020	**Invited Talk**: *Compiler Intermediate Representations*, Scottish Programming Languages and Verification Summer School 2020 (SPLV 2020), virtual.
17/2020	Talk: *Achieving High-Performance the Functional Way - Expressing High-Performance Optimizations as Rewrite Strategies*, Scottish Programming Languages Seminar (SPLS), virtual.
09/2019	**Invited Talk**: *ELEVATE: a language to write composable program optimizations*, **Google DeepMind**, London, UK.
02/2019	**Invited Talk**: *Lift: Generating High Performance Code with Rewrite Rules*, Programming Languages and Software Engineering Group seminar at the **University of Washington**, Seattle, WA, USA.
02/2019	**Invited Talk**: *Lift: Generating High Performance Code with Rewrite Rules*, **Microsoft Research**, Redmond, WA, USA.
12/2018	Talk: *Implementing lambda calculus in Python and C++*, Programming Languages at Glasgow (PLUG) seminar at the University of Glasgow, Glasgow, UK.
11/2018	Talk: *High-level Features - Low-level Performance: GPU Performance Pre- diction of Stencils*, System Seminar at the University of Glasgow, Glasgow, UK.
09/2018	**Invited Talk**: *Generating Performance Portable Code with Lift*, **Shonan Meeting** No.134: Advances in Heterogeneous Computing from Hardware to Software, Shōnan, Japan.
03/2018	**Invited Talk**: *Lift: Code Generation by Rewriting Algorithmic Skeletons*, **Dagstuhl Seminar** 18111 on Loop Optimizations, Schloss Dagstuhl, Germany.
03/2018	**Invited Talk**: *Programming GPUs with Eager Actions and Lazy Views*, Compiler and Architecture Design Group Seminar at the University of Edinburgh, Edinburgh, UK.
02/2018	Talk: *The Lift Project: Performance Portable Parallel Code Generation via Rewrite Rules*, Formal Analysis, Theory and Algorithms Seminar at the University of Glasgow, Glasgow, UK.
11/2017	Talk: *Programming GPUs with Eager Actions and Lazy Views*, System Seminar at the University of Glasgow, Glasgow, UK.
11/2017	Talk: *The Lift Project: Performance Portable Parallel Code Generation via Rewrite Rules*, System Seminar at the University of Glasgow, Glasgow, UK.
10/2017	**Invited Talk**: *The Lift Project: Performance Portable Parallel Code Generation via Rewrite Rules*, **Microsoft Research**, Cambridge, UK.

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

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

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

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

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

08/2016   **Invited Talk**: *Structured Parallel Programming - From High-Level Func- tional Expressions to High-Performance OpenCL Code*, Center for Advanced Electornics at TU Dresden, Dresden, 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, Scholss Dagstuhl, Germany.

04/2016   **Invited Talk**: *The Lift Project: Performance Portability via Rewrite Rules*, Compiler Design Lab Seminar at Saarland University, Saarland, Germany.

01/2016   **Invited Talk**: *Performance Portable GPU Code Generation*, Multicore Programming Group seminar at **Imperial College**, London, UK.

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

10/2015   **Invited Talk**: *Generating Performance Portable Code using Rewrite Rules*, Multicore Programming Group seminar 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, Vancouver, Canada.

06/2015   Talk: *Generating Performance Portable Code using Rewrite Rules*, Scottish Programming Languages Seminar (SPLS) at the University of St. Andrews, St. Andrews, UK.

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

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

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

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

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

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

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

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

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

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

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

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

05/2011   Talk: *SkelCL - A Portable Skeleton Library for High-Level GPU Programming*, HIPS 2011 workshop, Anchorage, AK, USA.

09/2008   **Invited Talk**: *Development of an Online Game as a Student Project*, ITSoft-TEAM workshop, Chernihiv, Ukraine.

Teaching Experience

I have been teaching *thousands of students* across my various roles at the University of Münster, University of Edinburgh, University of Glasgow, and now at Technische Universität Berlin.

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As a Professor at Technische Universität Berlin

Winter 2025/2026
- *GPU Computing*, postgraduate course. About 40 students.
- *Types and Programming Languages*, postgraduate course. About 25 students.
- *Seminar: Current Research Topics in Programming Languages and Compilers*, undergraduate course. About 10 students.

Summer 2025
- *Compiling Techniques*, undergraduate course. About 150 students.
- *Programmierpraktikum: Programming Language Design and Implementation*, undergraduate course. About 20 students.
- *Seminar: Current Research Topics in Programming Languages and Compilers*, undergraduate course. About 10 students.

Winter 2024/2025
- *GPU Computing*, postgraduate course. About 30 students.
- *Types and Programming Languages*, postgraduate course. About 25 students.
- *Seminar: Current Research Topics in Programming Languages and Compilers*, undergraduate course. About 10 students.

Summer 2024
- *Compiling Techniques*, undergraduate course. About 150 students.
- *Programmierpraktikum: Programming Language Design and Implementation*, undergraduate course. About 20 students.
- *Seminar: Current Research Topics in Programming Languages and Compilers*, undergraduate course. About 10 students.

As a Lecturer at the University of Edinburgh

2022–2023
- Lecturer for *Computer Systems*, undergraduate course, course lead by Vijay Nagarajan. About 250 students.
- Lecturer for *Compiling Techniques*, undergraduate course, course lead by Tobias Grosser. About 100 students.

2021–2022
- Lecturer for *Compiling Techniques*, undergraduate course, course lead by Tobias Grosser. About 100 students.
- Lecturer for *Operating Systems*, undergraduate course, course lead by Antonio Barbalace. About 150 students.

2020–2021
- Lecturer for *Operating Systems*, undergraduate course, course lead by Antonio Barbalace. About 150 students.

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As a Lecturer at the University of Glasgow

2019–2020
- Lecturer for *Systems Programming*, undergraduate course. About 200 students.
- Lecturer for *Professional Software Development Team Project*, undergraduate course, together with Tim Storer, Craig Macdonald, Iadh Ounis, and Lito Michala. About 200 students.

2018–2019
- Lecturer for *Systems Programming*, undergraduate course. About 180 students.
- Lecturer for *Professional Software Development Team Project*, undergraduate course, together with Tim Storer, Inah Omoronyia, and Jeff Dalton. About 180 students.

2017–2018
- Lecturer for *Operating Systems*, undergraduate course, together with Wim Vanderbauwhede. About 80 students.
- Lecturer for *Professional Software Development Team Project*, undergraduate course, together with Tim Storer, Inah Omoronyia, and Joemon Jose. About 160 students.
- Lecturer for *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 give 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 give 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 group projects: *Design and implementation of a high-level API for programming heterogeneous clusters* and *High-level programming of online games in future generation networks*.

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2012–2013
- Lecturer and Course Designer for *Introduction to progamming with C and C++*.
- Teaching assistant for *Multi-core and GPU: Parallel Programming*.
- Teaching assistant for *Operating Systems*.

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

2010–2011
- Supervised UG/MSc student group project: *Internet- and GPU-based Cloud Computing*.
- Supervised UG student group project: *High-level GPU programming*.
- Lecturer and Course Designer for *Multi-core and GPU: Parallel Programming*.

Supervised Undergraduate and Master Students

I have supervised 37 students during their Bachelor and Master projects across the University of Münster, University of Glasgow, University of Edinburg, and now Technische Universität Berlin.

As Professor at Technische Universität Berlin

09/2025
BSc project of Tobias Ax on
Implementing a minimal TCP Server in Idris 2

12/2024
MSc project of Lisa Barthel on
Solving Rewrite Problems with Slotted E-Graphs

As Lecturer at the University of Edinburgh

08/2022
MInf project of Limrod Liberman on
Applying the K Framework to specify the semantics of Domain-Specific Languages

08/2021
MSc project of Pingru Chen on
Templates for making correct graphs in research papers in the robotics domain

08/2021
MSc project of Zairan Xu on
Developing templates for better visualisation in machine learning research papers

08/2021
MSc project of Siqi Zong on
Templates for making correct graphs in research papers in the NLP domain

As Lecturer at the University of Glasgow

03/2020
Final year project of Xueying Qin on
Proving the correcness of rewrite rules in Agda

03/2020
Final year project of Sarah Ashworth on
Implementation of pattern-based computations on an FPGA

Michel Steuwer

03/2020   Final year project of Euan Mcgrevey on
Optimizing image processing applications by rewriting

03/2020   Final year project of Darius Darulis on
Predicting the performance of rewritten program variations

03/2020   Final year project of David Wood on
Optimizing the compilation time of the Rust compiler

09/2019   Final year project of Ryan Maloney on
UFC Fight Prediction Web App

09/2019   Final year project of Stuart Rawlinson on
Scansion: A Poetry Analysis Web Application

09/2019   Final year project of Junjie Shentu on
Development of Ordering Application in Restaurants

09/2019   Final year project of Liam James on
Developing an Android Food Rating Application for Armature Chefs

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

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

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

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

As research associate at the University of Münster

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

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

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

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

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

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

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

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06/2013   Bachelor project of Kai Kientopf on
Implementation of the Needleman-Wunsch Algorithm and the Breath-First-Search with SkelCL

06/2013   Master project of Florian Quinkert on
A Model for Predicting Work Distribution in Heterogeneous Systems and its Implementation in SkelCL

03/2013   Master project of Malte Friese on
Extending the Skeleton Library SkelCL with a Skeleton for Allpairs Computations

03/2013   Bachelor project of Sebastian Mißbach on
Implementing the LU-Decomposition and the Mersenne-Twister with the SkelCL Library

03/2013   Bachelor project of Patrick Schiffler on
Performance Analysis of SkelCL using B+ Tree Traversal and 3D Jacobi Stencil Computation

01/2013   Diploma project of Markus Blank-Burian on
Simulation and Analysis of Two-Dimensional Turbulences on Parallel Computer Architectures

06/2012   Diploma project of Matthias Buß, on
Adding Multidimensional Data Types to the Multi-GPU Skeleton Library SkelCL

09/2011   Bachelor project of Michael Olejnik on
Investigating the Use of GPUs for Radix Sort

09/2011   Bachelor project of Jan Gerd Tenberge on
Extending the SkelCL Library with Iterators

08/2011   Bachelor project of Stefan Breuer on
Enhancing SkelCL's MapOverlap Skeleton

08/2011   Bachelor project of Tobias Günnewig on
Developing a Library for Manipulating Source Code of C-based Languages