Alexander Pöppl, M.Sc.

https://apoeppl.github.io
https://github.com/apoeppl https:bitbucket.com/apoeppl

EDUCATION

Dr. rer. nat., Informatics *(Thesis Submitted)*
Technical University of Munich, Munich, Germany, $\sim$ 2021
Title: *Evaluation of the Actor Model for the Parallelization of Block-Structured Adaptive HPC Applications*

Master of Science, Informatics
Technical University of Munich, Munich, Germany, 2014
Focus: Compiler Construction, Mobile Application Development (iOS)
Thesis: *Evaluation and Prediction of Execution Times for OpenCL-based Computations on GPGPU Systems*

Bachelor of Science, Informatics
Technical University of Munich, Munich, Germany, 2011
Minor: Business Studies
Thesis: *Code Generation for Data Parallel Programs Using Restricted Polyhedron Array Domains*

EXPERIENCE

Research Associate 12.2014 - 11.2019
Technical University of Munich, Munich, Germany

- Researched, implemented and successfully used the actor model for block-structured HPC applications. Implemented actor libraries for UPC++ and X10 and integrated them with a shallow water application. Evaluated the resulting performance benefits on a cluster of Many-Core CPUs.
- Collaborated in an interdisciplinary team comprising researchers from the field of integrated circuit design, operating systems, compiler construction, embedded software and HPC to demonstrate the benefits of hardware-software co-design proposed by the Invasive Computing transregional research project.
- Designed, organized and held seminar and lab courses on future trends in HPC.
- Taught courses on scientific computing with GPUs.
- Organized and planned the chair's yearly retreat.

Affiliate (Research Stay) 08.2018-10.2018
Lawrence Berkeley National Laboratory (LBNL), Berkeley, California, USA

- Implemented an actor library for large-scale HPC applications using the UPC++ communication library developed at LBNL.

System Analyst, System Developer 04.2013 - 09.2014
Rivent GmbH, Munich, Germany

- Specified, designer and implemented several components in an internal enterprise application developed for GEMA.

Student Tutor 10.2010 - 03.2013
Department of Informatics, Technical University of Munich

- Taught exercise classes on functional programming & formal verification, object-oriented programming, software engineering, operating systems and systems programming, and participated in the correction of assignments and exams.

PUBLICATIONS

[1] M. Bogusz, P. Samfass, A. Pöppl, J. Klinkenberg, and M. Bader, "Evaluation of Multiple HPC Parallelization Frameworks in a Shallow Water Proxy Application with Multi-Rate Local Time Stepping", in *PAW-ATM: Parallel Applications Workshop, Alternatives To MPI+X*, To Appear, IEEE, Nov. 2020.

[2] A. Pöppl, M. Bader, and S. Baden, "A UPC++ Actor Library and Its Evaluation on a Shallow Water Proxy Application", en, in *2019 IEEE/ACM Parallel Applications Workshop, Alternatives To MPI (PAW-ATM)*, IEEE, Denver, Colorado, United States of America: IEEE/ACM/SigArch, Nov. 2019, pp. 11–24. DOI: 10.1109/PAW-ATM49560.2019.00007.

[3] A. Pöppl, M. Damschen, F. Schmaus, A. Fried, M. Mohr, M. Blankertz, L. Bauer, J. Henkel, W. Schröder-Preikschat, and M. Bader, "Shallow Water Waves on a Deep Technology Stack: Accelerating a Finite Volume Tsunami Model Using Reconfigurable Hardware in Invasive Computing", in *Euro-Par 2017: Parallel Processing Workshops*, D. B. Heras, L. Bougé, G. Mencagli, E. Jeannot, R. Sakellariou, R. M. Badia, J. G. Barbosa, L. Ricci, S. L. Scott, S. Lankes, and J. Weidendorfer, Eds., Cham: Springer International Publishing, Feb. 2018, pp. 676–687, ISBN: 978-3-319-75178-8. DOI: 10.1007/978-3-319-75178-8_54.

[4] A. Pöppl and M. Bader, "SWE-X10: An Actor-based and Locally Coordinated Solver for the Shallow Water Equations", in *Proceedings of the Sixth ACM SIGPLAN X10 Workshop (X10)*, Extended Abstract, Santa Barbara, CA, USA: ACM, Jun. 2016. DOI: 10.1145/2931028.2931034.

[5] A. Pöppl, M. Bader, T. Schwarzer, and M. Glaß, "SWE-X10: Simulating Shallow Water Waves with Lazy Activation of Patches Using Actorx10", in *2016 Second International Workshop on Extreme Scale Programming Models and Middleware (ESPM2)*, Nov. 2016, pp. 32–39. DOI: 10.1109/ESPM2.2016.010.

[6] S. Roloff, A. Pöppl, T. Schwarzer, S. Wildermann, M. Bader, M. Glaß, F. Hannig, and J. Teich, "ActorX10: An Actor Library for X10", in *Proceedings of the Sixth ACM SIGPLAN X10 Workshop (X10)*, Santa Barbara, CA, USA: ACM, Jun. 2016. DOI: 10.1145/2931028.2931033.

[7] S. Wildermann, M. Bader, L. Bauer, M. Damschen, D. Gabriel, M. Gerndt, M. Glaß, J. Henkel, J. Paul, A. Pöppl, S. Roloff, T. Schwarzer, G. Snelting, W. Stechele, J. Teich, A. Weichslgartner, and A. Zwinkau, "Invasive computing for timing-predictable stream processing on MPSoCs", *it - Information Technology*, vol. 58, no. 6, pp. 267–280, Jun. 2016. DOI: 10.1515/itit-2016-0021.

[8] A. Pöppl and A. Herz, "A Cache-Aware Performance Prediction Framework for GPGPU Computations", in *Euro-Par 2015: Parallel Processing Workshops*, S. Hunold, A. Costan, D. Giménez, A. Iosup, L. Ricci, M. E. Gómez Requena, V. Scarano, A. L. Varbanescu, S. L. Scott, S. Lankes, J. Weidendorfer, and M. Alexander, Eds., Cham: Springer International Publishing, Dec. 2015, pp. 749–760, ISBN: 978-3-319-27308-2. DOI: 10.1007/978-3-319-27308-2_60.

SKILLS

- *HPC:* X10, UPC++, MPI, OpenMP, CUDA, Charm++, HPX
- *iOS:* Objective-C, UIKit, Swift
- *Misc:* Java, C++, Standard ML (programming language), UML, Python
- *Languages:* English, German