




# Dr. rer. nat. Alexander Pöppel

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 <https://apoeppel.github.io>  
 <https://github.com/apoeppel>    <https://bitbucket.com/apoeppel>

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## SUMMARY

Researcher with 6 years of experience and 8 peer-reviewed publications in the field of HPC in both research and teaching. Made the case for the actor model as a parallelization technique for distributed HPC applications, and created libraries for it in X10 and modern C++. Enthusiastic about enabling and accelerating novel applications through hardware-software co-design.

## EDUCATION

**Dr. rer. nat.**, Informatics

Technical University of Munich (TUM), Munich, Germany, 2021

Supervisor: Prof. Dr. Michael Bader

Title: *Evaluation of the Actor Model for the Parallelization of Block-Structured Adaptive HPC Applications*

**M.Sc.**, 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*

**B.Sc.**, Informatics

Technical University of Munich, Munich, Germany, 2011

Minor: Business Studies

Thesis: *Code Generation for Data Parallel Programs Using Restricted Polyhedron Array Domains*

## PROFESSIONAL EXPERIENCE

**HPC Application Engineer**

08.2021 - now

Intel Corporation, Munich, Germany

- Modernizing and optimizing HPC applications for upcoming hardware architectures
- Contact point for application developers at the LRZ and the MPCDF in Garching

**Referent, Big Data Services**

02.2021 - 07.2021

ZITiS – Zentrale Stelle für Informationstechnik im Sicherheitsbereich, Munich, Germany

**Research Associate**

12.2014 - 11.2020

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.
- Organized and planned the chair's yearly retreat.

<b>Affiliate (Research Stay)</b> Lawrence Berkeley National Laboratory (LBNL), Berkeley, California, USA	08.2018 - 10.2018
<ul style="list-style-type: none"> <li>Implemented an actor library for large-scale HPC applications using the UPC++ communication library developed at LBNL.</li> </ul>	
<b>System Analyst, System Developer</b> Rivent GmbH, Munich, Germany	04.2013 - 09.2014
<b>Student Tutor</b> Technical University of Munich, Munich, Germany	10.2010 - 03.2013

## SKILLS

- *HPC*: Implemented HPC software using a wide variety of languages and parallel runtime systems, such as X10, UPC++, MPI, OpenMP, Charm++ and HPX. Published work on GPGPU accelerators (OpenCL and CUDA) and taught courses on using them effectively.
- *iOS*: Implemented a library for recognition of German car license plates for iOS using OpenCV, Objective-C, C++ and Objective-C++. Worked on the iPad dashboard prototype for the Audi F12 research vehicle.
- *Misc*: Java, C++, Standard ML (programming language), Python, UML
- *Languages*: English, German

## REFERENCES

References are provided upon request.

## PUBLICATIONS

- [1] M. Bogusz, P. Samfass, A. Pöpl, J. Klinkenberg, and M. Bader, "Evaluation of multiple hpc parallelization frameworks in a shallow water proxy application with multi-rate local time stepping", in *2020 IEEE/ACM 3rd Annual Parallel Applications Workshop: Alternatives To MPI+X (PAW-ATM)*, Nov. 2020, pp. 27–39. DOI: 10.1109/PAWATM51920.2020.00008.
- [2] A. Pöpl, M. Bader, and S. Baden, "A upc++ actor library and its evaluation on a shallow water proxy application", 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. Pöpl, 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*, Cham: Springer International Publishing, Feb. 2018, pp. 676–687. DOI: 10.1007/978-3-319-75178-8\_54.
- [4] A. Pöpl 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. Pöpl, 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. Pöpl, 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. Pöpl, 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. Pöpl and A. Herz, "A cache-aware performance prediction framework for gpgpu computations", in *Euro-Par 2015: Parallel Processing Workshops*, Cham: Springer International Publishing, Dec. 2015, pp. 749–760. DOI: 10.1007/978-3-319-27308-2\_60.