MARCIN COPIK | Curriculum Vitae

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Summary

PhD student working on serverless programming models to bridge the gap between high-performance computing systems and cloud data centers.

Education

ETH ZÜRICH
2018–
PhD in Computer Science
Zürich, Switzerland
Supervisor: Prof. Torsten Hoefler

RWTH AACHEN
2014–2017
MSc in Simulation Sciences
Aachen, Germany
Grade: 1.5. Interdisciplinary program. Major subject: High-Performance Computing

UNIVERSITY OF PERUGIA
VIII 2014
Scuola Matematica Interuniversitaria
Italy
Summer school in mathematics. Courses: Stochastic Processes, Functional Analysis

SILESIAN UNIVERSITY OF TECHNOLOGY
2012–2014
B.Sc. in Mathematics
Gliwice, Poland
GPA: 4.6/5.0. Finished two of three years program.

SILESIAN UNIVERSITY OF TECHNOLOGY
2010–2014
B.Sc. in Computer Science
Gliwice, Poland
Grade 5(A). An engineering degree. Major subject: Software Engineering

Experience

RESEARCH INTERN
VII-XI 2019
Microsoft
Redmond, WA, USA
Analyzing microarchitectural implications of serverless workloads. Supervisor: Bobbie Manne.

MENTOR
2017, 2018
Google Summer of Code
Organization: The STE||AR Group
Mentoring students working on HPX.

STUDENT ASSISTANT
2016 – 2017
RWTH Aachen, High-Performance and Automaton Computing
Aachen, Germany
Benchmarking linear algebra frameworks. Supervisor: Prof. Paolo Bientinesi.

RESEARCH ASSISTANT
IV–VIII 2016
Louisiana State University, STE||AR Group
Baton Rouge, LA, USA
Integrating single-source GPU programming in HPX. Supervisor: Dr Hartmut Kaiser.

STUDENT ASSISTANT
2014 – 2016
Jülich Supercomputing Centre
Jülich, Germany
Develop tools for performance analysis of parallel applications at Scalasca. Supervisor: Dr Pavel Saviankou.

SOFTWARE ENGINEER
2015
Google Summer of Code
Organization: The STE||AR Group
Integrating single-source GPU programming in HPX. Supervisor: Dr Hartmut Kaiser.

SOFTWARE ENGINEER — 2014
Google Summer of Code — Organization: PRISM model checker
Improve statistical model checking. Supervisors: Dr Vojtěch Forejt, Dr Dave Parker.

STUDENT ASSISTANT — 2012–2013
The Institute of Theoretical and Applied Informatics — Gliwice, Poland
Implementing GPU simulator of Markov Chains, Supervisors: Dr Mateusz Nowak, Dr Artur Rataj.

STUDENT ASSISTANT — 2012–2014
Silesian University of Technology — Gliwice, Poland
Implementing algorithms for registration of respiratory motion. Supervisor: Dr Dominik Spinczyk.

Skills

PROGRAMMING LANGUAGE	**Experienced:** C++ | Python | Java **Familiar:** Matlab | Julia | Mathematica | R | Pascal | x86 ASM
TECHNOLOGIES	MPI | OpenMP | LLVM | OpenCL | SYCL | C++AMP | Docker | Kubernetes
TOOLS	Git | SVN | Mercurial | CMake | autotools | SLURM
EXPERIENCE	serverless computing | parallel programming | cloud computing | performance modeling | GPU programming | CPU branch prediction | model checking

Honors & Awards

AWS CLOUD CREDIT FOR RESEARCH APPLICATION — 2022
Awarded $4,000 for research into high-performance serverless.

GOOGLE CLOUD RESEARCH CREDITS — 2022
Awarded $1,000 (maximum for a graduate student) for research into high-performance serverless.

MICROSOFT RESEARCH PHD FELLOWSHIP — 2021
Awarded for the 2021/2022 academic year.

GOLD MEDAL AT THE ACM STUDENT RESEARCH COMPETITION — 2019
ACM/IEEE Supercomputing 2019
1st place at the graduate students category.

Professional Activities

REVIEWER
ISC 2019, LLVM-HPC 2020, International Journal of High Performance Computing Applications

TEACHING
Parallel Programming, Numerical Methods for Computational Science and Engineering, Design of Parallel and High-Performance Computing, Compiler Design, Information Systems for Engineers

Presentations and Talks

Copik M., Calotoiu A., Grosser T., Wicki N., Wolf F., Hoefler T. "Extracting Clean Performance Models from Tainted Programs", SIAM Conference on Parallel Processing for Scientific Computing (PP22) minisymposium.

Copik M., Hoefler T. "perf-taint: Taint Analysis for Automatic Many-Parameter Performance Modeling.", Supercomputing 2019 Poster, **Gold Medal at the ACM Student Research Competition.**

Copik M., Bientinesi P., Berkels B. "Parallel Prefix Algorithms for the Registration of Arbitrarily Long Electron Micrograph Series.", Supercomputing 2017 Poster, ACM Student Research Competition.

Copik M., "HPX and GPU-parallelized STL.", C++Now 2016. Aspen, USA

Peer-reviewed publications

Schmid L., **Copik M.**, Calotoiu A., Werle D., Reiter A., Selzer M., Koziolek A., Hoefler T. "Performance-Detective: Automatic Deduction of Cheap and Accurate Performance Models". ICS 2022, Acceptance Rate 24.2% (39/161), **DOI** 10.1145/3524059.3532391

Chelini L., Barthels H., Bientinesi P., **Copik M.**, Grosser T., Spaminato D. "MOM: Matrix Operations in MLIR.". 12th International Workshop on Polyhedral Compilation Techniques, **Paper**

Copik M., Grosser T., Hoefler T., Bientinesi P., Berkels B. "Work-stealing prefix scan: Addressing load imbalance in large-scale image registration". IEEE Transactions on Parallel and Distributed Systems (TPDS), **DOI** 10.1109/TPDS.2021.3095230

Copik M., Kwasniewski G., Besta M., Podstawski M., Hoefler T. "SeBS: A Serverless Benchmark Suite for Function-as-a-Service Computing", Middleware 2021, Acceptance Rate 31% (33/107), **DOI** 10.1145/3464298.3476133

Copik M., Calotoiu A., Grosser T., Wicki N., Wolf F., Hoefler T. "Extracting Clean Performance Models from Tainted Programs", PPoPP 2021, Acceptance Rate 21% (31/150), **DOI** 10.1145/3437801.3441613

Besta M. [and 18 others, including **Copik M.**] "GraphMineSuite: Enabling High-Performance and Programmable Graph Mining Algorithms with Set Algebra", VLDB 2021, **arXiv** 2103.03653

Besta M. [and 18 others, including **Copik M.**] "SISA: Set-Centric Instruction Set Architecture for Graph Mining on Processing-in-Memory Systems", MICRO 2021, **DOI** 10.1145/3466752.3480133

Barthels H., **Copik M.**, Bientinesi P. "The Generalized Matrix Chain Algorithm.", CGO 2018, Acceptance Rate 28.6% (30/105), **DOI** 10.1145/3168804

Copik M., Kaiser H. "Using SYCL as an Implementation Framework for HPX.Compute.", DHPCC++ Workshop at IWOCL 2017, **DOI** 10.1145/3078155.3078187

Copik M., Rataj A., Woźna-Szcześniak B. "A GPGPU-based Simulator for Prism: Statistical Verification of Results of PMC [extended abstract]." CS&P 2016

Spinczyk D., Karwan A., **Copik M.** "Methods for abdominal respiratory motion tracking.", Computer Aided Surgery 2014, **DOI** 10.3109/10929088.2014.891657

Preprints and reports

Copik M., Böhringer R., Calotoiu A., Hoefler T. "FMI: Fast and Cheap Message Passing for Serverless Functions", 2002, **Working copy**

Copik M., Chrapek M., Calotoiu A., Hoefler T. "Software Resource Disaggregation for HPC with Serverless Computing", 2022, **Working copy**

Copik M., Calotoiu A., Bruno R., Böhringer R., Hoefler T. "Process-as-a-Service: FaaSt Stateful Computing with Optimized Data Planes", 2022, **Working copy**

Copik M., Calotoiu A., Taranov K., Hoefler T. "FaaSKeeper: Scalable and Consistent Storage as a Serverless Service", **arXiv 2022** 2203.14859

Copik M., Taranov K., Calotoiu A., Hoefler T. "rFaaS: RDMA-Enabled FaaS Platform for Serverless High-Performance Computing", **arXiv 2021** 2106.13859