Michael J. Giardino

Contact Information

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Research Interests

Heterogeneous compute and memory systems; microarchitectures for cloud computing; serverless computing models; hardware acceleration; power-aware computing; disaggregated computing; hardware-software co-design; scheduling and resource allocation; low power architectures; hardware protection mechanisms; ethical, political, and societal impacts of technology

Education

Georgia Institute of Technology, Atlanta, United States
Ph.D., Electrical and Computer Engineering, January 2019
Dissertation: *A Software Framework for Application-Guided Power-Aware Control Systems* (Advisor: Bonnie Ferri)
M.S., Electrical and Computer Engineering, August 2013
University of New Orleans, New Orleans, United States
B.S., Electrical Engineering (Minor: Computer Science), May 2011

Research Experience

Principal Researcher February 2023 - present
Huawei Technologies
Zürich Research Center – Computing Systems Laboratory

Research areas: Future memory systems, computer architecture, data center and cloud-native architectures, disaggregated systems, RISC-V for serverless

Postdoctoral Researcher August 2019 - January 2023
ETH Zürich
Department of Computer Science – Systems Group
Principal Investigator: Timothy Roscoe

Enzian (custom two-socket CPU-FPGA server platform): Planning of short and long-term goals of the project; developed firmware for board management controller; designed system for testing electrical properties of custom motherboard; modeling of system power and performance; research on mechanisms for resource management; development of FPGA-CPU coherence interconnect
Future Serverless Architectures: Novel microarchitectures for serverless (RISC-V based); (co)developed new software architecture for low-overhead serverless computing; CHERI hardware capability-based isolation mechanisms; allocation and scheduling of heterogeneous resources
System Power Management: advanced ML algorithms (Q(λ), SARSA(λ)) for power management; declarative programming of device drivers; provably correct power distribution management; power-aware scheduling/allocations
Strategy and Advising: Proposed and supervised long-term research goals for the group; defined new areas of research through funding and thesis proposals; (co)supervised 10 MSc and 9 BSc theses, PhD students, and semester projects; presented representative group work in industry, academia, and conferences; discovered and maintained internal and external research collaborations; broad responsibilities for student supervision, scheduling, and planning

Graduate Research Assistant August 2012–December 2018
Georgia Institute of Technology
Advisor: Bonnie Ferri
Projects: Researched power-aware systems, control systems, performance metrics and scheduling. Used machine learning (artificial neural networks and Q-Learning) to model and predict power-performance states.

Opportunity Research Scholar Mentor August 2015–May 2017
Georgia Institute of Technology
Project: Led a team of undergraduates in research into power-aware control systems using machine learning.

Research Intern May 2014–August 2015
Intel Corporation
Enterprise and Big Data - Software and Services Group
Supervisor: Kshitij Doshi

H-Store: Modified H-Store in-memory database to support heterogeneous memory
Soft2LM: Added region-based allocation and migration to Linux memory manager for heterogeneous memory

Published Research

Michael Giardino, Siddharth Gupta, Lukas Humbel, Rene Mueller, and Anirban Nag. "Move your code, not your data". In: *Proceedings of the 4th Workshop on Heterogeneous Composable and Disaggregated Systems*. HCDS '25. Rotterdam, NL: Association for Computing Machinery, Mar. 2025. ISBN: 979-8-4007-1470-2/25/03. DOI: 10.1145/3723851.3723856. URL: https://doi.org/10.1145/3723851.3723856.

Shashank Anand, Michal Friedman, **Michael Giardino**, and Gustavo Alonso. "Skip It: Take Control of Your Cache!" In: *Proceedings of the 29th ACM International Conference on Architectural Support for Programming Languages and Operating Systems*. ASPLOS 2024. La Jolla, United States: Association for Computing Machinery, Apr. 2024. ISBN: 9798400703850. DOI: 10.1145/3620665.3640407.

Roberto Starc, Tom Kuchler, **Michael Giardino**, and Ana Klimovic. "Serverless? RISC more!" In: *Proceedings of the 2nd Workshop on SErverless Systems, Applications and MEthodologies*. SESAME '24. Athens, Greece: Association for Computing Machinery, 2024, pp. 15–24. ISBN: 9798400705458. DOI: 10.1145/3642977.3652095. URL: https://doi.org/10.1145/3642977.3652095.

Tom Kuchler, **Michael Giardino**, Timothy Roscoe, and Ana Klimovic. "Function-as-a-Function". In: *Proceedings of the 14th Symposium on Cloud Computing*. SoCC '23. Santa Cruz, CA, USA: Association for Computing Machinery, 2023. DOI: 10.1145/3620678.3624648.

David Cock, Abishek Ramdas, Daniel Schwyn, **Michael Giardino**, Adam Turowski, Zhenhao He, Nora Hossle, Dario Korolija, Melissa Licciardello, Kristina Martsenko, Reto Achermann, Gustavo Alonso, and Timothy Roscoe. "Enzian: An Open, General, CPU/FPGA Platform for Systems Software Research". In: *Proceedings of the 27th ACM International Conference on Architectural Support for Programming Languages and Operating Systems*. ASPLOS 2022. Lausanne, Switzerland: Association for Computing Machinery, 2022, pp. 434–451. ISBN: 978-1-4503-9205-1. DOI: 10.1145/3503222.3507742.

Michael Giardino, Daniel Schwyn, Bonnie Ferri, and Aldo Ferri. "Low-Overhead Reinforcement Learning-Based Power Management Using 2QoSM". In: *Journal of Low Power Electronics and Applications* 12.2 (2022). ISSN: 2079-9268. DOI: 10.3390/jlpea12020029. URL: https://www.mdpi.com/2079-9268/12/2/29.

Michael Giardino, Daniel Schwyn, Aldo Ferri, and Bonnie Ferri. "2QoSM: A Q-Learner QoS Manager for Application-Guided Power-Aware Systems". In: *14th International Symposium on Embedded Multicore/Manycore SoCs (MCSoC-2021) (IEEE MCSoC-2021)*. Singapore, Singapore, Dec. 2021, pp. 218–225. DOI: 10.1109/MCSoC51149.2021.00040.

Lukas Humbel, Daniel Schwyn, Nora Hossle, Roni Haecki, Melissa Licciardello, Jan Schaer, David Cock, **Michael Giardino**, and Timothy Roscoe. "A Model-Checked I^2C Specification". In: *International Symposium on Model Checking Software*. Springer. Aug. 2021, pp. 177–193. ISBN: 978-3-030-84629-9. DOI: 10.1007/978-3-030-84629-9_10.

Jasmin Schult, Daniel Schwyn, **Michael Giardino**, David Cock, Reto Achermann, and Timothy Roscoe. "Declarative Power Sequencing". In: *ACM Trans. Embed. Comput. Syst.* 20.5s (Sept. 2021). ISSN: 1539-9087. DOI: 10.1145/3477039.

Michael J. Giardino, Eric Klawitter, Bonnie Ferri, and Aldo Ferri. "A Power- and Performance-Aware Software Framework for Control System Applications". In: *IEEE Transactions on Computers* 69.10 (Oct. 2020), pp. 1544–1555. ISSN: 1557-9956. DOI: 10.1109/TC.2020.2978468.

Michael J. Giardino. "A Software Framework for Application-Guided Power-Aware Control Systems". PhD thesis. Georgia Institute of Technology, Jan. 2019. URL: http://hdl.handle.net/1853/61212.

Michael J. Giardino, Wayne Maxwell, Bonnie Ferri, and Aldo Ferri. "Speculative Thread Framework for Transient Management and Bumpless Transfer in Reconfigurable Digital Filters". In: *2018 Annual American Control Conference (ACC)*. June 2018, pp. 3786–3791. DOI: 10.23919/ACC.2018.8431860.

M. Giardino, K. Doshi, and B. Ferri. "Soft2LM: Application Guided Heterogeneous Memory Management". In: *2016 IEEE International Conference on Networking, Architecture and Storage (NAS)*. Aug. 2016, pp. 1–10. DOI: 10.1109/NAS.2016.7549421.

M. Giardino and B. Ferri. "Correlating Hardware Performance Events to CPU and DRAM Power Consumption". In: *2016 IEEE International Conference on Networking, Architecture and Storage (NAS)*. Aug. 2016, pp. 1–2. DOI: 10.1109/NAS.2016.7549395.

Lin Ma, Joy Arulraj, Sam Zhao, Andrew Pavlo, Subramanya R. Dulloor, **Michael J. Giardino**, Jeff Parkhurst, Jason L. Gardner, Kshitij Doshi, and Stanley Zdonik. "Larger-than-Memory Data Management on Modern Storage Hardware for in-Memory OLTP Database Systems". In: *Proceedings of the 12th International Workshop on Data Management on New Hardware*. DaMoN '16. San Francisco, California: Association for Computing Machinery, June 2016. ISBN: 978-1-4503-4319-0. DOI: 10.1145/2933349.2933358.

A. Lanterman, **M. J. Giardino**, B. Ferri, J. E. Michaels, W. Hunt, and A. Ferri. "Embedding low-cost, portable experiments into a lecture-based signals and systems course". In: *2014 American Control Conference*. June 2014, pp. 2543–2549. DOI: 10.1109/ACC.2014.6859406.

B. Muldrey, S. Deyati, **M. J. Giardino**, and A. Chatterjee. "RAVAGE: Post-silicon validation of mixed signal systems using genetic stimulus evolution and model tuning". In: *2013 IEEE 31st VLSI Test Symposium (VTS)*. Apr. 2013, pp. 1–6. DOI: 10.1109/VTS.2013.6548917.

Michael Giardino, Brandon Samuels, and Dimitrios Charalampidis. "Multiple Vehicle Detection and Tracking Using an Adaptive System". In: *Intelligent Engineering Systems through Artificial Neural Networks, Volume 20*. ASME Press, Jan. 2010. ISBN: 978-0-7918-5959-9. DOI: 10.1115/1.859599.paper49.

Awards

Professional Awards

Huawei Future Star	2023

Student Awards

President's Fellowship	2011-2016
ECE Outstanding Graduate Teaching Assistant Award	Spring 2014
1st place team - IEEE Region 5 Robotics Competition	2011
Dean's List	2008-2011
Outstanding Sophomore in the College of Engineering	2008-2009
ISA Donald Iverson Scholarship	2009

Invited Talks

Future Heterogeneous Cloud Systems — September 2023
University of New Orleans, USA

Enzian: A Heterogeneous Platform for a Heterogeneous World — July 2022
VMware Research, Palo Alto, USA
Enzian: An Open Heterogeneous Research Computer — December 2021
National University of Singapore, Singapore

Service

Program Committee, HDCS — 2025
Journal Reviewer, IEEE Transactions on Computers — 2019, 2021-22, 2024-5
Journal Reviewer, IEEE Transactions on Cloud Computing — 2024
Shadow PC, Eurosys — 2023, 2024
Artifact Evaluation Board, Journal of Systems Research — 2021-4
Artifact Evaluation Committee, HPCA — 2024
Artifact Evaluation Committee, OSDI/ATC — 2023
Journal Reviewer, ACM Trans. on Embedded Comp. Sys. (TECS) — 2022
Artifact Evaluation Committee, SOSP — 2021
Artifact Evaluation Committee, EuroSys — 2021

Affiliations

ACM Europe Technology Policy Committee (ETPC) — 2023-present
ACM Member
IEEE Member
USENIX Member
Postdoc+ Board, Assn. of Sci. Staff at ETH (AVETH) — 2021-22
President, University of New Orleans IEEE-HKN Chapter — 2010-2011

Teaching Experience

Co-instructor/co-developer — Spring 2025
Green Computing Seminar
D-INFK – ETH Zürich

Lead Instructor/Developer — Spring 2022, 2023, 2024, 2025
Heterogeneous Systems Seminar
D-INFK - ETH Zürich

Co-instructor — Fall 2023, 2024
Hardware Acceleration for Data Processing
D-INFK – ETH Zürich

Co-instructor — Spring 2020, 2021, 2022, 2023, 2024
Computing Platforms Seminar
D-INFK - ETH Zürich

Substitute Teacher — December 2019–June 2020
Substitute Middle and High School Teacher
American School of Milan
Milan, Italy

Tutor — October 2016–December 2018
SAT, ACT, AP Tutor for High School Students
Within Reach Educational Consultants
Atlanta, GA

Lead Teaching Assistant — Fall 2012–Spring 2014
Teaching Enhancement via Small-Scale Affordable Labs (TESSAL) Center
School of Electrical and Computer Engineering,
Georgia Institute of Technology

Technical Writing Consultant — Fall 2011–Summer 2012
Undergraduate Professional Writing Program
Instructor: Christina Bourgeois
School of Electrical and Computer Engineering,
Georgia Institute of Technology

Languages

English – Native
Italiano – Conversational
Deutsch – A2 (fide) 2024