Raghav Gupta

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Website | GitHub | LinkedIn

EDUCATION

UNIVERSITY OF CALIFORNIA, BERKELEY

PhD in Computer Science
Aug 2023 - Present
Advisor: Prof. Borivoje Nikolic

Coursework:
Architectures and Systems for Warehouse-Scale Computers (A)

BS in Electrical Engineering and Computer Science
Aug 2019 - May 2023 | GPA: 3.95/4.0
High Honors | Dean's List

Coursework:
Computer Architecture and Engineering (A) • Operating Systems and System Programming (A) • Introduction to Digital Design and Integrated Circuits (A+) • 22nm SoC for IoT (A) • Advanced Topics in Computer Systems (A-) • Programming Languages and Compilers (A)

RESEARCH INTERESTS

COMPUTER ARCHITECTURE
Hyperscale Architecture and Systems
Hardware/Software Co-design
Profile-Guided Methods

TEACHING EXPERIENCE

EE290C - 22nm SoC for IoT • EECS 151/251A - Introduction to Digital Design and Integrated Circuits • CS61C - Great Ideas in Computer Architecture • EECS16A - Designing Information Devices and Systems I

SKILLS

Python • C/C++ • Git • Linux/Bash • Verilog • Chisel • Go • RISC-V • CUDA • Java • Vivado • Docker • Kubernetes • ROS

AWARDS

EECS Oustanding TA Award (2020-21)
CS61C Project - RISCV CPU in Logisim - Apple Design Award (Fall 2020)
EECS151 Project - RISCV Core on FPGA - Apple Design Award (Fall 2021)
Edward Frank Kraft Award (Fall 2019)
Times of India - Spark Scholarship (2018)

RESEARCH EXPERIENCE

SLICE LAB AT UC BERKELEY | Student Researcher

Jan 2021 – Present | Berkeley, CA | Website

Multi-level Simulation | In-progress

- Building a multi-level simulator that trades-off speed and fidelity in a hierarchy of simulators to enable DSE on large workloads
- Using program analysis to identify critical portions of an execution trace to execute at high fidelity
- Investigating warm-up strategies to approximate cache state

Accelerating Hyperscale RPCs | In-progress

- Investigating orchestration to offload RPCs to a collection of accelerators
- Working on porting the RPC software stack to RISC-V

Extending FirePerf to Userspace | Original Paper | Poster | Userspace Paper

- An FPGA-accelerated full-system hardware/software performance profiling utility that provides high-fidelity out-of-band introspection with call stack reconstruction and Flame Graph generation
- Extended FirePerf to support userspace profiling by instrumenting the Rocket Chip trace port, obtaining DWARF + hex information, constructing a user binary search space and matching traces to it

FireMarshal Networking | Original Paper

- FireMarshal is an open-source software workload management tool that automates bootable workload image generation and evaluation
- Implemented concurrent execution of multi-node workloads in QEMU and a network interface using Virtual Distributed Etherne

WORK EXPERIENCE

OMNISTRATE | Software Engineering Intern

May 2023 – July 2023 | Remote

Monitoring for Stateful Containerized Cloud Applications

- Implemented support for application-specific probes and process metadata checks in a sidecar to trigger alerts and fail-over
- Improved reliability at scale for a public database provider's DBaaS offering

NVIDIA | Power Architect Intern

May 2022 – Aug 2022 | Santa Clara, CA

CPU Power Modeling for Gaming Workloads

- Developed a strategy for application-specific CPU power modeling on production silicon
- Targeted characteristics of gaming workloads and isolated static and dynamic power costs

PUBLICATIONS/PRESENTATIONS

- <Anonymized> x5, **Raghav Gupta,** <Anonymized>, et al. **"Partitioning Large-Scale Monolithic Hardware Designs for FireSim."** (Under submission)
- Chi, Yufeng, Franklin Huang, **Raghav Gupta,** Ella Schwarz, Jennifer Zhou, Reza Sajadiany, Animesh Agrawal, et al. **"A Heterogeneous RISC-V SoC for ML Applications in Intel 16 Technology."** Poster presented at HotChips 2023, Stanford, CA, August 27-28, 2023.