Rishabh Iyer rishabh.iyer@berkeley.edu

Research Interests

I am a computer systems researcher (broadly construed), and most of my work lies at the intersection of systems, networking, hardware and formal verification. My current research focuses on developing techniques that enable developers to reason precisely about the expected performance of their systems *before* they are deployed in production. My dissertation work introduced the notion of latency interfaces: simple, succinct programs that summarize a system's latency behaviour just like semantic interfaces such as code documentation and specifications summarize functionality.

Education

Ecole Polytechnique Federale de Lausanne (EPFL) *2017-2023*

Doctor of Philosophy (PhD), Computer Science
Thesis: Latency Interfaces for Systems Code
Advisors: Prof. George Candea & Prof. Katerina Argyraki

Indian Institute of Technology Bombay (IITB) *2013-2017*

Bachelor of Technology with Honours, Electrical Engineering
Thesis: Performance Modelling and Dynamic Scheduling for Heteregeneous ISA Processors
Advisor: Prof. Virendra Singh

Professional Experience

Postdoctoral Scholar at UC Berkeley *March 2024 - Present*
Supervisor: Prof. Sylvia Ratnasamy and Prof. Scott Shenker
Working on verifying performance properties of wide-area networks.

Postdoctoral Scholar at EPFL *Sep 2023 - Feb 2024*
Supervisor: Prof. George Candea
Worked on a wide range of topics centred around on building systems with predictable performance behavior

Visiting Researcher at UC Berkeley *Sep 2022 - Feb 2023*
Supervisor: Prof. Sylvia Ratnasamy
Worked on Performance Interfaces for Hardware Accelerators

Summer Intern at EPFL *May - July 2016*
Supervisor: Prof. Babak Falsafi
Ported the QFlex Trace Simulator from QEMU 2.3 to QEMU 2.6

Honors & Awards

- Eurosys Roger Needham Dissertation Award *2024*
- ACM SIGOPS Dennis M. Ritchie Doctoral Dissertation Award *2023*
- Thesis nominated by EPFL for ACM Doctoral Dissertation Award *2023*
- Best Paper Award *VDAT 2019*
- EPFL Doctoral Fellowship *2017*

Publications

- **KFlex: Fast, Flexible, and Practical Kernel Extensions**
  Kumar Kartikeya Dwivedi, Rishabh Iyer, Sanidhya Kashyap.
  Symposium on Operating Systems Principles (SOSP), 2024. Acceptance rate: 17.3%
  Also accepted to the Linux Plumbers Conference (LPC) 2024.
- **Automatically Reasoning About How Systems Code Uses the CPU Cache**
  Rishabh Iyer, Katerina Argyraki, George Candea.
  Symposium on Operating Systems Design and Implementation (OSDI), 2024. Acceptance rate: 15.6%
  Also accepted to the Linux Plumbers Conference (LPC) 2024.
- **Performance Interfaces for Hardware Accelerators**
  Jiacheng Ma, Rishabh Iyer, Sahand Kashani, Mahyar Emami, Thomas Bourgeat, George Candea.
  Symposium on Operating Systems Design and Implementation (OSDI), 2024. Acceptance rate: 15.6%

- **Achieving Microsecond-Scale Tail Latency Efficiently with Approximate Optimal Scheduling**
  Rishabh Iyer, Musa Unal, Marios Kogias, George Candea.
  Symposium on Operating Systems Principles (SOSP), 2023. Acceptance rate: 18.7%
- **The Case for Performance Interfaces for Hardware Accelerators**
  Rishabh Iyer, Jiacheng Ma, Katerina Argyraki, George Candea, Sylvia Ratnasamy.
  Hot Topics in Operating Systems (HotOS), 2023. Acceptance rate: 26.4%
- **Performance Interfaces for Network Functions**
  Rishabh Iyer, Katerina Argyraki, George Candea.
  Symposium on Networked Systems Design and Implementation (NSDI), 2022. Acceptance rate: 19.7%
- **Bypassing the Load Balancer Without Regrets.**
  Marios Kogias, Rishabh Iyer, Edouard Bugnion.
  Symposium on Cloud Computing (SoCC), 2020. Acceptance rate: 24.4%
- **Classification-Based Scheduling in Heterogeneous-ISA Architectures**
  Nirmal Boran, Dinesh Yadav, Rishabh Iyer.
  Symposium on VLSI Design and Test (VDAT), 2020. Acceptance rate: 28.7%
- **Verifying Software Network Functions with No Verification Expertise**
  Arseniy Zaostrovnykh, Solal Pirelli, Rishabh Iyer, Luis Pedrosa, Matteo Rizzo, Katerina Argyraki, George Candea.
  Symposium on Operating Systems Principles (SOSP), 2019. Acceptance rate: 13.7%
- **Performance Modelling and Dynamic Scheduling on Heterogeneous-ISA Architectures**
  Nirmal Boran, Dinesh Yadav, Rishabh Iyer
  Symposium on VLSI Design and Test (VDAT), 2019. Acceptance rate: 27.3%
  Awarded Best Paper
- **Performance Contracts for Software Network Functions**
  Rishabh Iyer, Luis Pedrosa, Arseniy Zaostrovnykh, Solal Pirelli, Katerina Argyraki, George Candea.
  Symposium on Networked Systems Design and Implementation (NSDI), 2019. Acceptance rate: 14.7%
- **Automated Synthesis of Adversarial Workloads for Network Functions**
  Luis Pedrosa, Rishabh Iyer, Arseniy Zaostrovnykh, Jonas Fietz, Katerina Argyraki.
  ACM SIGCOMM Conference (SIGCOMM), 2018. Acceptance rate: 18%

Teaching Assistantships

CS 522: Principles of Computer Systems (EPFL)	*Fall 2019, 2020, 2021, 2022*
CS 305: Software Engineering (EPFL)	*Fall 2018*
MA 207: Analysis 4 - Vector Calculus (EPFL)	*Spring 2018, 2019*
PH 107: Quantum Physics (IITB)	*Fall 2014*

Research Mentorship

- Jiacheng Ma (PhD student at EPFL) *Fall 2022 - Present*
  Performance interfaces for hardware accelerators
  Second author on publication at HotOS'23, lead author on publication at OSDI'24.
- Musa Unal (PhD student at EPFL) *Summer 2022 - Fall 2023*
  Cooperative scheduling for microsecond-scale datacenter applications
  Second author on publication at SOSP'23.
- Kumar Kartikeya Dwivedi (PhD student at EPFL) *Summer 2023 - Present*
  Fast, flexible, and practical kernel extensions
  Lead author on publication at SOSP'24
- Ayoub Chouak (summer intern at EPFL) *Summer 2021*
  Leveraging performance interfaces to identify constant-time violations in cryptographic code
  Significant contributor to publication at NSDI'22.
- Yugesh Kothari (PhD student at EPFL) *Fall 2022*
  Performance interfaces for eBPF offloads in the Linux kernel
  Significant contributor to the PIX open source tool.

- Alexander Krenstsel (PhD student at UC Berkeley) *Spring 2024 - Present*
  Input Validation for Software-Defined Wide Area Networks
  Lead author on submission to HotNets 2024.
- Ziming Mao (PhD student at UC Berkeley) *Spring 2024 - Present*
  Revisiting cache freshness for emerging real-time applications
  Lead author on submission to HotNets 2024.
- Rathin Singla (PhD student at UCLA) *Fall 2022 - Present*
  A verified, extensible transport stack
  Lead author on submission to HotNets 2024.
- Narek Galstyan (PhD student at UC Berkeley) *Fall 2022 - Spring 2023*
  Application-integrated record and replay for distributed systems