Reese Levine

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https://reeselevine.github.io

Research

My research interests are in parallel and concurrent programming, specifically how multi-core and distributed systems are implemented. My work has focused on GPU memory models, designing and evaluating techniques to test the conformance of compilers and hardware to specifications. I am also working on ways to increase the performance of applications that rely on fine-grained synchronization, and to test and improve the safety properties of GPU programming models in the face of data races or other undefined behavior.

Education

- **University of California, Santa Cruz** — Santa Cruz, CA
  PhD in Computer Science; GPA: 4.0 — *September 2020 - Present*
  - **Selected Classes:** Compiler Design, Computer Architecture, Advanced Programming Languages, Distributed Systems, Formal Methods
- **University of California, Berkeley** — Berkeley, CA
  Bachelor of Arts in Computer Science; GPA: 3.6 — *August 2013 – May 2017*
  - **Selected Classes:** Operating Systems, Efficient Algorithms, Computer Security, Introduction to Databases

Publications

Conference

- **Reese Levine**, Ashley Lee, Neha Abbas, Kyle Little, and Tyler Sorensen. "Assessing and Addressing WebGPU Memory Safety in the Presence of Data Races". In *In Proceedings of the ACM on Programming Languages (OOPSLA)*. 2025.
- **Reese Levine**, Mingun Cho, Devon McKee, Andrew Quinn, and Tyler Sorensen. "GPUHarbor: Testing GPU Memory Consistency at Large (Experience Paper)". In *In International Symposium on Software Testing and Analysis (ISSTA)*. 2023. **Distinguished Artifact**.
- **Reese Levine**, Tianhao Guo, Mingun Cho, Alan Baker, Raph Levien, David Neto, Andrew Quinn, and Tyler Sorensen. "MC Mutants: Evaluating and Improving Testing for Memory Consistency Specifications". In *Architectural Support for Programming Languages and Operating Systems (ASPLOS)*. 2023. **Distinguished Paper, Distinguished Artifact**.

Workshop

- **Reese Levine**, and Tyler Sorensen. "Probabilistic Memory Consistency Specifications". In *Young Architect Workshop*. 2023

Talks

- "Testing the Vulkan Memory Model", Vulkanised 2024, Sunnyvale, CA, February 2024
- "Evolving Weak Memory Models for Evolving Architectures", Future of Weak Memory at POPL 2024, London, January 2024
- "Testing GPU Memory Consistency at Large", Imperial College London, University of Kent, Cambridge University, Bristol University, Stanford University, January-October 2024

- "MC Mutants: Evaluating and Improving Testing for Memory Consistency Specifications", Khronos F2F, Phoenix, AZ, October 2022
- "Testing Memory Models", Languages, Systems, and Data Seminar, UC Santa Cruz, January 2022

Awards and Grants

- **National Defense Science and Engineering Graduate (NDSEG) Fellowship**, 2023

Teaching

- **UC Santa Cruz** — Santa Cruz, CA
  Teaching Assistant — *Spring 2021/Winter 2022/Winter 2023*
  - TA for undergraduate class on parallel programming: homework development, office hours, grading homeworks/exams
- **UC Berkeley** — Berkeley, CA
  Teaching Assistant — *Summer/Fall 2016*
  - Taught students concepts in computer architecture, updated lab exercises, developed and graded exams

Industry

- **Apple** — Cupertino, CA
  Intern — *July 2022 - September 2022/June 2023 - September 2023*
  - Worked on Apple's GPU Platform Architecture team doing new feature design/testing and performance optimization
- **Qualtrics** — Seattle, WA
  Software Engineer — *August 2017 - September 2020*
  - Developed new method of storing data in Elasticsearch indexes to reduce hardware usage by 10x while maintaining customer latency SLAs
  - Designed and implemented an improved ingestion pipeline using Scala and Akka Streams that increased data indexing rates by 40 percent while reducing operational load and providing fairness and prioritization
  - Built application using Scala and the Play framework to perform background tasks for Qualtrics' Analytics Engine like garbage collection and defragmentation of data in Elasticsearch
  - Contributed to incident remediation and operational hardening, including presenting analysis of severe incidents to engineering leadership
  - Mentored intern in summer long project involving new data analysis feature requested by key customers
- **Munchery** — San Francisco, CA
  Software Engineering Intern — *May 2015 - July 2015*
  - Developed Ruby bot on Slack allowing customer care to communicate directly with delivery drivers through Twilio SMS.
  - Contributed to open-source Jenkins plugin allowing provisioning of Docker containers on Amazon EC2.
  - Wrote comprehensive QA tests for updated Munchery checkout page.

Service

- **2024/2025 PLDI Artifact Evaluation Committee**
- **2024 ASPLOS Artifact Evaluation Committee**
- **Advisory Committee for Campus Transportation and Parking** — Santa Cruz, CA
  Member — *September 2021 - June 2023*
- **SPLASH/OOPSLA** — Chicago, IL
  Student Volunteer — *October 2021*
- **TEALS** — Seattle, WA and Velva, ND
  Volunteer Teacher — *June 2018 - May 2020*
- **Computer Science Mentors** — Berkeley, CA
  Volunteer Teacher — *January 2015 - May 2016*
- **Vice Chancellor's Student Advisory Committee** — Berkeley, CA
  Member — *August 2014 - May 2015*