

JINGYUAN CHEN

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EDUCATION

Princeton University

2022 - 2027 (expected)

Master & PhD in Computer Science

Princeton, US

- Advisor: Amit Levy
- Research Interest: Program Analysis, Debugging, Agentic Testing

University of North Carolina at Chapel Hill

2018 - 2022

Bachelor of Science in Computer Science, Bachelor of Science in Mathematics

Chapel Hill, US

- Graduated with highest honor, GPA: 3.99/4.0

WORK EXPERIENCES

Google

May 2026 - Aug 2026

Ph.D. Software Engineer Intern

Kirkland, US

Team: Persistent Disk Dataplane

Developed agentic debugging assistant equipped with program analysis skills and tools to pinpoint root causes of real production system bugs.

RESEARCH EXPERIENCES

Princeton University

Princeton, NJ

Research Assistant (advised by Amit Levy)

Lightweight Provenance-Guided Automatic Online Debugging

Sep 2022 - Present

Built an *online* debugger that dynamically instruments tracepoints to record data-flow provenances for latent bugs in deployed distributed systems. Designed library-bypassed static analysis algorithms for identifying bug-relevant variables that overcame the *fundamental* precision-scalability trade-off of traditional approaches. Engineered a lightweight, synchronization-free tracing runtime for recording shared-state provenances utilizing the coarse-interleaving hypothesis. Evaluated the system on complex bugs in a realistic distributed system (HDFS) and demonstrated its capability to minimize diagnosis latencies while incurring *practical* runtime overheads ($\leq 10\%$ throughput reduction).

Semantic-Aware Testing for Transpilation via LLM Agents

Nov 2025 - Present

Developed a framework for semantics-aware test generation to check the correctness of C-to-Rust library transpilation using LLM agents. Designed an LLM-based semantic summarization layer to reconcile interface-level semantic mismatches between source and target libraries. Employed the extracted semantics to synthesize correct test harnesses and test cases for automated transpilation validation.

Auditing Resource Interference-Freedom of Cloud Platforms

Nov 2024 - Present

Identified a new class of threat in cloud platforms where providers violate resource-isolation guarantees. Designed a mechanism to detect shared-resource side-channel interference using compiler-instrumented auditing operations. Currently developing a *program enhancer* that automatically injects lightweight auditing operations to make victim cloud workloads interference-awareness.

Critical Path Analysis for Distributed Tracing under Asynchrony

Oct 2025 - Present

Developed extensions to OpenTelemetry Java enabling context propagation and span linkage across asynchronous tasks. Implemented enhanced critical-path analysis algorithms that capture dependencies across async invocations. Evaluated the system on real-world trace datasets (CRISP, Tale of Errors) and the TrainTicket benchmark, demonstrating both the prevalence of inaccuracies in asynchrony-unaware analyses and the effectiveness of our approach in correctly identifying performance bottlenecks.

Making Powerful Enemies on NVIDIA GPUs

Aug 2021 - Aug 2022

Empirically evaluated the sensitivity of common GPU workloads to a wide range of interference channels in NVIDIA GPUs. Engineered “enemy” GPU kernels that maximize contention over hardware resources for approximating the worst-case execution times of real-time GPU kernels. Evaluated the enemies against real-world kernels and showed the effectiveness of the enemies in maximizing resource contention.

PREPRINTS

1. **Jingyuan Chen**, Lei Zhang, Leon Schuermann, Gongqi Huang, Ravi Netravali, Amit Levy. *Wherefore Art Thou? Provenance-Guided Automatic Online Debugging with Lumos*. **arXiv preprint, 2026**

PUBLICATIONS

1. Anonymous Authors. *Critical Path Analysis for Distributed Tracing under Asynchrony*. **Under review**
2. **Jingyuan Chen**, Amit Levy. *Progress-Guided Test Generation for C-to-Rust Transpilation: Effectiveness and Limitations*. **IEEE Security & Privacy Magazine**, Special Issue on Language Translation for Security, 2026
3. **Jingyuan Chen**, Gongqi Huang, Amit Levy. *Towards Agentic Performance Management*. **AgenticOS '26**
4. Natalie Popescu, Shai Caspin, Leon Schuermann, **Jingyuan Chen**, Amit Levy. *End-to-End Encrypted Applications with Strong Consistency Under Byzantine Actors*. **ACSAC '25**
5. Gongqi Huang, **Jingyuan Chen**, Amit Levy *Incentivizing Side-Channel Freedom with Leakage-Aware Computation*. **WACI '25**
6. Tyler Yandrofski, **Jingyuan Chen**, Nathan Otterness, James H. Anderson and F. Donelson Smith. *Making Powerful Enemies on NVIDIA GPUs*. **IEEE RTSS'22**
7. Sims Hill Osborne, Joshua Bakita, **Jingyuan Chen**, Tyler Yandrofski, and James H. Anderson. *Minimizing DAG Utilization by Exploiting SMT*. **IEEE RTAS'22**
8. Joshua Bakita, Shareef Ahmed, Sims Hill Osborne, Stephen Tang, **Jingyuan Chen**, F. Donelson Smith, and James H. Anderson. *Simultaneous Multithreading in Mixed-Criticality Real-Time Systems*. **IEEE RTAS'21**

TECHNICAL SKILLS

Programming Languages | Proficient: Java, C, Python, Go, Javascript, Datalog; Prior Experience: C++, Rust, Haskell, CLisp, Ocaml, Prolog

Tools | Proficient: Linux, bash, Git, Vim, Spring, Docker, Distributed Tracing (Jaeger, OpenTelemetry), Soot, Doop, Tensorflow, PyTorch, CUDA; Prior Experience: Coq, Dafny