

Yixuan Chen

curriculum vitae

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Summary

- Proven researcher skilled in building high-performance, correctness-guaranteed concurrency libraries
- Accomplished programmer with extensive expertise in algorithms, operating systems, and systems programming
- Collaborative team player with strong coordination and communication skills

Education

- 2019 – **Ph.D.**, *Computer Science*, Yale University
present Selected Courses: Operating Systems, Compilers, Distributed Systems, Artificial Intelligence, Big Data Systems, Economics and Computation
- 2017 – 2019 **B.S.E.**, *Computer Science Engineering*, University of Michigan
- 2015 – 2019 **B.E.**, *Electrical and Computer Engineering*, Shanghai Jiaotong University
Attended the dual-degree program between SJTU and University of Michigan

Research Papers

- 2024 *Compositionality and Observational Refinement for Linearizability with Crashes*, by Arthur Oliveira Vale, Zhongye Wang, Yixuan Chen, Peixin You, Zhong Shao, OOP-SLA'24, Pasadena CA, USA
- 2024 *A Compositional Theory of Linearizability*, by Arthur Oliveira Vale, Zhong Shao, Yixuan Chen, JACM
- 2023 *A Compositional Theory of Linearizability*, by Arthur Oliveira Vale, Zhong Shao, Yixuan Chen, POPL'23, Boston MA, USA
- 2022 *Armada: Automated Verification of Concurrent Code with Sound Semantic Extensibility*, by Jacob R. Lorch, Yixuan Chen, Manos Kapritsos, Bryan Parno, Shaz Qadeer, Upamanyu Sharma, James R. Wilcox, Xueyuan Zhao, ACM Transactions on Programming Languages and Systems
- 2020 *Armada: low-effort verification of high-performance concurrent programs*, by Jacob R. Lorch, Yixuan Chen, Manos Kapritsos, Bryan Parno, Shaz Qadeer, Upamanyu Sharma, James R. Wilcox, Xueyuan Zhao, PLDI '20, London, United Kingdom
- 2019 *Verification of a Cache-optimized Data Structure*, by Yixuan Chen, Aurèle Barrière, Lennart Beringer, and Andrew W. Appel, POPL '19 SRC, Lisbon, Portugal

Research and Work Experience

- 2019 – present **Graduate Researcher**, *Yale University*, New Haven, CT
- Designing formal models and building program logics for low-level concurrency
 - Applying this framework to concurrency libraries like pthread, ensuring correctness and performance
- 2021 **Research Intern**, *MPI-SWS*, Saarbrücken, Germany
- Analyzed libraries and usage patterns of non-volatile memory devices
 - Developed and applied a novel separation logic to validate crash-resilient concurrency libraries
- 2017 – 2019 **Research Assistant**, *University of Michigan*, Ann Arbor, MI
- Developed the first automatic verification toolchain for weak memory concurrent programs
 - Improved the toolchain's scalability by combining certified static analyzers with SMT solvers
 - Received Distinguished Paper Award in PLDI 2020
- 2018 **Research Intern**, *Princeton University*, Princeton, NJ
- Formally verified functional correctness of multi-byte trie data structure implemented in C using VST
 - Proposed deep specification of KV-map data structure suitable for modular verification
 - Received first place award in POPL'19 student research competition
- 2016 - 2017 **Hardware Testing Intern**, *Apple*, Shanghai
- Developed efficient software systems for aggregated auditing and version control of test stations
 - Coordinated with teams across Asia-Pacific region to maintain and update system capabilities

Teaching Experience

- 2024 Fall **Teaching Fellow**, *CPSC 421 Compilers and Interpreters*, Yale University
- 2024 Spring **Teaching Fellow**, *CPSC 428 Language-Based Security*, Yale University
- 2022 Spring **Teaching Fellow**, *CPSC 421 Compilers and Interpreters*, Yale University
- 2021 Fall **Teaching Fellow**, *CPSC 422 Operating Systems*, Yale University
- 2021 Spring **Teaching Fellow**, *CPSC 421 Compilers and Interpreters*, Yale University
- 2020 Fall **Teaching Fellow**, *CPSC 422 Operating Systems*, Yale University
- 2020 Spring **Teaching Fellow**, *CPSC 421 Compilers and Interpreters*, Yale University
- 2019 Winter **Instruction Aide**, *EECS 482 Operating Systems*, University of Michigan
- 2018 Fall **Instruction Aide**, *EECS 482 Operating Systems*, University of Michigan
- Conducted weekly TA sessions to undergraduate and graduate students
 - Mentored students on advanced operating systems and compiler concepts

Academic Services

- 2024 **Subreviewer**, *VMCAI 2024*, London, UK
- 2023 **Student Volunteer**, *POPL 2023*, Boston, MA
- Assisted in running conference sessions, ensuring smooth logistics for speakers and attendees
 - Supported attendees with navigating online platforms and on-site venues

- 2022 **Artifact Reviewer**, *PLDI 2022*, San Diego, CA
 - Evaluated research artifacts for reproducibility and functionality
 - Provided detailed feedback to authors, verifying claims in the paper against their code
- 2022 **Artifact Reviewer**, *POPL 2022*, Philadelphia, PA
- 2021 **Artifact Reviewer**, *SOSP 2021*, Internet
- 2024 **Subreviewer**, *ESOP 2021*, Internet
- 2021 **Student Volunteer**, *PLDI 2021*, Internet
- 2020 **Student Volunteer**, *PLDI 2020*, Internet
- 2018 **Student Volunteer**, *DSSS 2018*, Princeton, NJ
 - DeepSpec Summer School 2018
 - Assisted participants on Coq proofs with Verified Software Toolchain

Coding Projects

- 2018 Winter **Course Project**, *Fault-tolerant distributed chat server*, EECS591 Distributed Systems
Implemented chat server with Paxos-based replication that mitigates benign failures and unreliable channels
- 2018 Winter **Course Project**, *Compiler for COOL*, EECS 483 Compilers
Developed a compiler in OCaml for COOL (a subset of Java), generating x86-64 assembly with simple static-analysis enabled optimizations.

Honors and Awards

- 2020 **Distinguished Paper Award**, PLDI 2020
Armada: low-effort verification of high-performance concurrent programs
- 2019 **First Place Award**, POPL 2019 SRC
Verification of a Cache-optimized Data Structure
- 2017-2019 **Undergraduate awards**, University of Michigan
 - **James B. Angell Scholar**, 2019: two terms of A record
 - **University Honors** and **Dean's Honor List**, 2017 and 2018: GPA 3.5 or higher
- 2014 **Silver Medal**, National Olympiad in Informatics (NOI), China

Skills and Interests

- Programming Languages C, C++, C#, Python, JavaScript, Bash, OCaml, Rocq (Coq), FStar, Dafny, Verilog
- Areas of Expertise Operating Systems, Concurrency, Weak Memory Models, Non-volatile Memory, Distributed Systems, Compilers
- Tools Linux, Docker, AWS, Git, LaTeX
- Interests AI-assisted proof generation, provably-correct agentic AI
- Language Chinese (native), English (proficient)