# Nuda **Zhang**

nudzhang@umich.edu

## Education

**University of Michigan** — *Ann Arbor, MI*
PhD Candidate in Computer Science — *Aug 2019 - Present*
Advised by Manos Kapritsos

**Cornell University** — *Ithaca, NY*
B.A. in Computer Science and Mathematics — *Aug 2015 - Dec 2018*

## Peer-Reviewed Publications

**PLDI'23** Performal: Formal Verification of Latency Properties for Distributed Systems. In *Proceedings of the 44th ACM SIGPLAN Conference on Programming Language Design and Implementation*,
***Tony Nuda Zhang**, Upamanyu Sharma, Manos Kapritsos*

**PODC'20** Brief Announcement: On the Significance of Consecutive Ballots in Paxos. In *Proceedings of the 39th Symposium on Principles of Distributed Computing*,
*Eli Goldweber, **Nuda Zhang**, Manos Kapritsos*

## Technical Reports

**Whitepaper** Cassandra Enhancement Proposal. CEP-15: General Purpose Transactions,
*Benedict Elliott Smith, **Nuda (Tony) Zhang**, Blake Eggleston, Scott Andreas*

**arXiv:2006.01885** On the Significance of Consecutive Ballots in Paxos,
*Eli Goldweber, **Nuda Zhang**, Manos Kapritsos*

## Work Experience

**Mysten Labs** — *Remote*
Research Intern — *May 2023 - Present*
- Designing and implementing a distributed execution engine for lazy blockchains

**University of Michigan at Ann Arbor** — *Ann Arbor, MI*
Graduate Researcher — *2019 - Present*
- Investigating novel techniques to reduce developer burden in the formal verification of software protocols and implementations
- Developed a set of techniques to verify performance properties of distributed systems, including a replicated state machine built on Paxos, and the boot process of Apache ZooKeeper (in submission)
- Proved that the decision condition of the Paxos consensus protocol is stronger than necessary (published PODC'20)

**VMware** — *Bellevue, WA*
Research Intern (Mentor: Jon Howell) — *Summer 2022*
- Building a high-performance, formally-verified key-value store, through state machine refinement
- Design and prove refinement layers, from an abstract specification to a concrete design involving rich data structures such as $B^\varepsilon$-trees, and optimizations such as garbage collection and caching
- Porting proof and implementation to Verus, a new verified Rust language
- Project is open-sourced at `https://github.com/vmware-labs/verified-betrfs`

**Apple** *Remote*

Software Engineering Intern *Summer 2021*

- Developed Accord, a multi-partition transaction protocol for Apache Cassandra based on Egalitarian Paxos, published as a Cassandra Enhancement Proposal whitepaper and incorporated as CEP-15
- Derived a formal proof of correctness for the protocol
- Implemented network partition simulations for prototype in Jepsen Maelstrom

**Oracle** *Redwood Shores, CA*

Software Engineer *2019*

- Worked in a 20-person team to develop and maintain TimesTen, a distributed in-memory database
- Upgraded TimesTen's consistent hashing algorithm to support larger cluster size
- Extended the front end and internal logic of TimesTen for its use as a cache for Oracle Database

**Cornell University** *Ithaca, NY*

Undergraduate Research Assistant *2018*

- Worked on state machine replication algorithms, supervised by Robbert van Renesse and Lorenzo Alvisi

## Teaching Experience

**EECS 591: Distributed Systems** *University of Michigan*

Graduate Student Instructor *2021*

**CS 4820: Introduction to Analysis of Algorithms** *Cornell University*

Teaching Assistant *2018*

**CS 2110: Object-Oriented Programming & Data Structures** *Cornell University*

Recitation Instructor *2017 - 2018*

## Activities

**Computer Science and Engineering Graduate student organization** *University of Michigan*

Social Chair *2020 - 2022*

**Association of Computer Science Undergraduates** *Cornell University*

Undergraduate Research Officer *2017-2018*