Nuda **Zhang**

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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

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

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   *Summer 2022*
- Building a high-performance, formally-verified key-value store based on SplinterDB, through state machine refinement proofs in Dafny
- Design and prove refinement layers, from an abstract map specification to a concrete design involving rich data structures such as B^ε-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*
OFFICER   *2017-2018*