William Schultz

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🖥 *will62794.github.io*

Education

2020 - Present	**PhD Student**, *Northeastern University*, Boston, MA, *Computer Science.* Working on automated verification of distributed protocols, advised by Stavros Tripakis. GPA: 4.0/4.0
2012 – 2016	**Bachelor of Arts**, *Cornell University*, Ithaca, NY, *Computer Science & Mathematics.*

Industry Experience

Summer 2022	**Applied Scientist Intern**, *Amazon Web Services*, New York, NY. Worked on symbolic, model-based test generation in the S3 Automated Reasoning Group.
Summer 2021	**Research Intern**, *NASA Langley Research Center*, Cambridge, MA (Remote). Developed a parametric verification tool for a real-time, distributed merging protocol for autonomous aircraft as an intern in the Safety Critical Avionics Systems Branch.
2016 - 2020	**Senior Software Engineer**, *MongoDB*, New York, NY. ○ Worked on design, maintenance, and verification of MongoDB's distributed database replication system, which is based on the Raft consensus protocol. ○ Designed and formally specified a novel dynamic reconfiguration protocol in TLA+ and led its implementation in the MongoDB replication system. ○ Implemented a new read consistency level that allows for committed reads without the need to maintain historical snapshots. ○ Extended the Jepsen library to verify read-committed guarantees in MongoDB replica sets.
Summer 2015	**Research Assistant**, *Cornell University*, Ithaca, NY. Profiled memory usage of the Freeze Frame File System, an adaptation to the Hadoop Distributed File System that allows for real-time distributed snapshots.

Publications

2022 📄	**Plain and Simple Inductive Invariant Inference for Distributed Protocols in TLA+**, *FMCAD 2022*, William Schultz, Ian Dardik, and Stavros Tripakis.
2022 📄	**Formal Verification of a Distributed Dynamic Reconfiguration Protocol**, *CPP 2022*, William Schultz, Ian Dardik, and Stavros Tripakis.
2021 📄	**Design and Analysis of a Logless Dynamic Reconfiguration Protocol**, *OPODIS 2021*, William Schultz, Siyuan Zhou, Ian Dardik, and Stavros Tripakis.
2019 📄	**Tunable Consistency in MongoDB**, *VLDB 2019*, William Schultz, Tess Avitabile, and Alyson Cabral.

Talks

2019 ▶	**A Bug's Life: Fixing a MongoDB Replication Protocol Bug with TLA+**, *Talk at TLA+ Conference 2019*, William Schultz and Siyuan Zhou.
2018 ▶	**An Animation Module for TLA+**, *Talk at TLA+ Community Event 2018*, Oxford, UK.

Skills

Programming	C/C++, Java, Python, Git, GDB
Verification	TLA+, TLAPS, Z3, Dafny