

Pinhan Zhao

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EDUCATION

New York University

B.S. in Computer Science

- Fall 2021 - Spring 2022 Dean's List

New York, NY

Expected May 2023

RESEARCH EXPERIENCE

EECS Department, University of Michigan

Research Intern (via NSF REU)

Advisor: Prof. Xinyu Wang and Prof. Yuepeng Wang

- Build algorithms for SQL queries equivalence verification that encode the semantics of the query at the symbolic tuple level and leverage an SMT solver for bounded model checking to prove equivalence under bag semantics.
- Build a constraint language for approximate weakest precondition generation of SQL operators and generating databases for online SQL query testing based on SMT models.

June 2022 - Present

National Science Foundation

Undergraduate Research Fellow

Advisor: Prof. Jin Kim Montclare

- Design and develop multiple interactive learning modules tailored to New York City public K-12 schools (e.g., Brooklyn Tech) for improving classroom and lab learning outcomes for students in STEM curriculum.
- Analyzed students pre-quiz and post-quiz activities feedback data.
- Presented work at the Tandon Research Excellence Exhibit.

March 2022 - Present

Congestion Control Research Group, WPI

Undergraduate Researcher

Advisor: Prof. Mark Claypool

- Evaluated the performance of TCP HyStart during different states over a ViaSat-2 satellite internet link and investigated the cause of Hystart's throughput degradation during start-up state.
- Proposed a fix to TCP HyStart using packet-pair bandwidth estimation to avoid premature slow start exiting while entering congestion avoidance at a safe point.
- Performed experiments measured performance and fairness of simultaneous flows where different common TCP congestion control algorithms competes with each other over the satellite network.
- Published work in NetDev and CCNC.

March 2021 - August 2022

PROJECTS

The Lambda Calculator

2022

- Working in the team of NYU Semantics Group, contributed to and maintain the the Lambda Calculator project, an educational tool for teaching and learning formal semantics in natural languages.

Programming Language Interpreters

2022

- Created an experimental imperative language from scratch in Haskell, by writing a parser and parser combinators using Monad, parsing the language defined in Backus-Naur Form into AST, and evaluating AST.
- Implemented a Forth interpreter in Prolog, by tokenizing the source file, precompiling control words, and evaluating tokens.

- Developed a polymorphic type inference system for customized data types in Haskell using Martelli-Montanari unification algorithm.

PUBLICATIONS

1. **Pinhan Zhao**, Benjamin Peters, Jae Won Chung, and Mark Claypool. Competing TCP Congestion Control Algorithms over a Satellite Network. In *Proceedings of the 2022 IEEE Consumer Communications and Networking Conference (CCNC)*, January 2022.
2. Benjamin Peters, **Pinhan Zhao**, Jae Won Chung, and Mark Claypool. TCP HyStart Performance over a Satellite Network. In *Proceedings of NetDev 0x15, The Technical Conference on Linux Networking*, July 2021.

PRESENTATIONS

1. Industrial Ethernet Penetration Testing: Exploring the Weak Points of Industrial Control Systems Security. 2015 Knownsec KCon Cybersecurity Conference (over 1,000 attendees). August 2015.

HONORS AND AWARDS

- NASA Student Launch 2nd Place Overall Winner (Design Division)** 2022
- NASA Student Launch AIAA Vehicle Design Award** 2022
- NASA Student Launch Project Review Award** 2022
- NSF Science Outreach and Research Teaching Fellowship** 2022-2023
Awards to two students per academic year. Fellows work on NYC Department of Education research program.

TEACHING EXPERIENCE

- New York University** 2021
Teaching Assistant
- Selected to be the teaching assistant for Introduction to Programming for Games.
 - Mentored students in program design in Processing and GameMaker Language during the lab section, offered detailed explanation of programming concepts.
 - Graded homework assignments and provided constructive feedback.

ACTIVITIES

- Rogue Aerospace, New York University** January 2022 - Present
- Collaborate in the EECS team, design, and engineer a payload for the team's rocket.
 - Competed in the 2022 NASA University Student Launch Initiative against more than 40 teams nationwide and won three awards.

SKILLS

- **Programming Languages:** Proficient in Python, JavaScript, C, Prolog. Familiar with Haskell, Go, C++, SQL, Java, TypeScript, Forth, C#, Rust, PHP.
- **Databases:** MySQL, MongoDB.
- **Tools:** Unity, GameMaker Studio 2.