Newton Ni

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Education

The University of Texas at Austin - College of Natural Sciences August 2022 — Current

- Researching partial-fault-tolerant concurrent data structures for CXL shared memory under Emmett Witchel
- Leading project on lock-free Rust memory allocator with non-blocking failure and recovery

Cornell University - College of Engineering May 2019

- B.S. in Computer Science — 3.93 GPA
- Selected Coursework — Compilers, Programming Languages, Functional Programming, Formal Verification, Algorithms, Computer Systems, Operating Systems, Distributed Systems

Experience

Software Engineer - Commure August 2019 — March 2022

- Introduced Rust procedural macro for strongly-typed metrics
- Implemented healthcare data format (HL7v2) lexer with copy-on-write escape sequence support and fuzzing
- Worked on data transformation language with support for CSV, JSON, FHIR, XML

Research Assistant - Nate Foster, Cornell Engineering May 2018 — May 2019

- Designed type system for the P4 network programming language
- Translated informal P4–16 specification into OCaml code
- Discovered bugs in p4c compiler and wrote minimal test cases

Teaching Assistant - Functional Programming and Data Structures Jan 2018 — May 2019

- Lead semiweekly lecture and exercise-based recitation of 30 students
- Created review exercises on concepts like monads, interpreters, and streams
- Received average rating of 4.7/5.0 across 19 metrics and 21 student evaluations

Teaching Assistant - Honors Object-Oriented Programming Aug 2017 — Dec 2017

- Held office hours for 10–20 students, one and a half hours per week
- Taught lab with four other consultants for 25–35 students, one hour per week
- Set up automated submission directory layout checker

Projects

xic-rs - Xi Programming Language Compiler Jun 2018 — Aug 2018

- Compiles object-oriented Xi language to x86-64 assembly using Rust
- Implements linear scan register allocation and dataflow optimizations (e.g. partial redundancy elimination)
- Establishes correctness through snapshot and behavior equivalence tests

paxos - Paxos Distributed Consensus Protocol Nov 2018 — Dec 2018

- Implements a generic replicated state machine library backed by Multi-Paxos
- Verifies correctness with a JSON DSL-based test harness and extensive logging
- Includes an example chatroom state machine with runnable server and client

Skills

- **Languages:** Rust, Python, C, OCaml, Coq, Java
- **Software:** Git, LaTeX, bash, unix, vim, tmux, nix
- **Interests:** Violin, guitar, bouldering, volleyball, cooking, reading