Elton Pinto

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https://eltonpinto.me

Education

M.S. in Computer Science August 2022 - May 2023
Georgia Institute of Technology, Atlanta, GA
Concentration: Computing Systems

B.S. in Computer Science August 2018 - May 2022
Georgia Institute of Technology, Atlanta, GA
Concentration: Systems/Architecture and Theory
GPA: 4.0

Research Experience

Collaborator *with Daan Leijen* July 2022 - present
Replacing OCaml's garbage collector with the Perceus reference counting system.

Independent project, TINKER Lab August 2022 - present
Developing Neko, a quantum map-filter-reduce programming language that leverages superposition and interference for large-scale data processing. Submitted a proposal for funding the project through NSF GRFP. Pending submission to POPL'23 SRC.

Collaborator, SAIL Lab *with Alexey Tumanov* August 2022 - present
Prototyping Mudos, a micro device operating systems structure for making the kernel more aware of other compute devices (like GPUs, TPUs, and post-Moore systems) and provide abstractions like virtualization, multi-tenancy, and scheduling.

Research Assistant, Habanero Lab *advised by Vivek Sarkar* August 2022 - present
Automatically parallelizing Python programs to run on single-node systems using OpenMP, the ATL language, and the egg rewrite system.

Research Assistant, TINKER Lab *advised by Tom Conte* August 2020 - May 2022
Wrote a space-efficient implementation of the Quantum Verification of Matrix Products algorithm and benchmarked its resource usage, simulation time, and transpilation time. Programmed a Grover-search based Sudoku solver in QCOR which was used to test and evaluate a compiler backend for the GTRI ion-trap quantum computer.

Work Experience

Software Engineering Intern, Meta May 2022 - August 2022
Privacy Language Experience (PLeX) team

- Developed a distributed callgraph artifact generation system that feeds into a Hack typed-AST static analyzer for detecting privacy-centric data leaks through global variables
- Built a pipeline for incrementally ingesting over 100M records of dynamic Hack callgraph data into stacked Glean databases
- Optimized Glean query using derived predicates, resulted in 280x speedup
- Incrementally ported system from Python to Rust employing data-level parallelism, resulted in 4.5x speedup

Software Engineering Intern, Meta May 2021 - August 2021
PyTorch Dev Infra team

- Setup infrastructure to build, test, and deploy a fork of clang-tidy in PyTorch CI using Docker and GitHub Actions
- Added support for the `max-tokens` pragma in clang-tidy which alerts users when the number of clang tokens exceeds a specified amount
- Authored a clang-tidy check that detects infinite loops caused by integer/floating-point overflow

Software Engineering Intern, NCR May 2020 - August 2020
Innovation Lab

- Developed a subscription recommendation model using backtesting
- Expanded the consumer profile API to manage and isolate profiles across merchants

Software Engineering Intern, NCR May 2019 - August 2019
Emerald POS Testing team

- Worked with a global team to certify the Emerald POS product release for Northgate
- Sped up the test suite by 75% using profile-guided optimization

Teaching Experience

CS 3210: Design of Operating Systems Spring 2021, Fall 2021, Spring 2022
Head TA (Spring 2022)

CS 2110: Computer Architecture and Organization Spring 2020, Fall 2020
CS 1301: Intro to Computing Fall 2019

Professional Service

- Student volunteer (virtual) at ICFP'22
- Student volunteer (virtual) at PLDI'22
- Mentor at Catalyst 2019, a CS outreach program catered towards serving high-school students in Atlanta

Involvements

dependently-typed, Founder August 2021 - present
Programming languages and compilers club at Georgia Tech

HexLabs, Co-director, event lead, software developer December 2018 - November 2021
Student-led non-profit that focusses on STEM outreach by organizing large-scale hackathons and mentorship programs

Awards

- Third place (Explore category), Georgia Tech Undergraduate Research Symposium, 2022

Miscellaneous

- Student at the Oregon Programming Languages Summer School (OPLSS) 2022

Publications

[1] Elton Pinto, Jeffrey Young, Thomas Conte, Austin Adams, and Eugene Dumitrescu. "An Implementation of the Quantum Verification of Matrix Products Algorithm". In: *4th International Workshop on Quantum Resource Estimation, QRE 2022. Proceedings of the 49th Annual International Symposium on Computer Architecture*. ISCA '22. 2022.

[2] Elton Pinto. "An Implementation of the Quantum Verification of Matrix Products Algorithm". B.S. Thesis. Georgia Institute of Technology, 2022. URL: https://arxiv.org/abs/2208.09914.

[3] Austin Adams, Elton Pinto, Jeffrey Young, Creston Herold, Alex McCaskey, Eugene Dumitrescu, and Thomas M. Conte. "Enabling a Programming Environment for an Experimental Ion Trap Quantum Testbed". In: *2021 International Conference on Rebooting Computing (ICRC)*. 2021, pp. 14–23. DOI: 10.1109/ICRC53822.2021.00014.