Elton Pinto

epinto6@gatech.edu

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 (Microsoft Research Redmond)* July 2022 - present

Replacing OCaml's garbage collector with the Perceus reference counting system.

Independent project, TINKER Lab August 2022 - present

Developing Neko, a high-level quantum programming language that exposes a map-filter-reduce interface for exploiting quantum parallelism through the notion of first-class superpositions. Submitted a proposal for funding the project through NSF GRFP.

Collaborator, SAIL Lab *with Alexey Tumanov* August 2022 - present

Prototyping Mudos, a novel device-driver model that gives the kernel more control over the virtualization and scheduling of compute devices like GPUs, TPUs, and custom accelerators.

Research Assistant, Habanero Lab *advised by Vivek Sarkar* August 2022 - present

Extending the AutoMPHC project to handle intra-node automatic parallelization of Python programs using OpenMP/CUDA.

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. Implemented the Linq tape scheduling algorithm which is being used in a hybrid MaxSAT-based approach to qubit mapping and routing for TILT architectures.

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. "Neko: A quantum map-filter-reduce programming language". In: *Student Research Competition (SRC). Proceedings of the 50th ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages.* POPL '23. 2023.

[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] 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.

[4] 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.