Ariel Uy

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Education

Carnegie Mellon University **Pittsburgh, PA**
B.S. Mathematical Sciences and Computer Science *May 2021*
Concentration in Discrete Math and Logic
University Honors and College Honors (GPA: 3.6/4.0)

Selected Coursework: Parallel Computer Architecture, Machine Learning, Programming Language Theory, Type Theory, Constructive Logic, Algorithm Design & Analysis, Computer Systems

Experience

Annapurna Labs, AWS **Cupertino, CA**
ML Compiler Software Engineer *July 2024 - present*

- Implemented new optimizations and hardware support for C++ backend of Neuron compiler for AWS Trainium
- Improved compiler allocation algorithm for Trainium2, resulting in 70% reduced DRAM usage for Llama3 model
- Designed and implemented autogeneration of codegen from Backend Intermediate Representation to custom ISA instructions
- Implemented barrier insertion algorithm to ensure correctness of shared-memory parallelism on Trainium2
- Debugged and fixed difficult floating point arithmetic, synchronization, and hardware nondeterminism errors

Pure Storage **Santa Clara, CA**
Software Engineer II *Sept 2021 - May 2024*

- Wrote highly reliable concurrent C++ code to manage data replication across all-flash storage arrays
- Designed and implemented backend support for Multitenancy, enabling multiple virtual storage arrays to exist on the same hardware array
- Implemented configurable eradication timer feature as part of Ransomware Protection project, allowing customers to set custom retention policies for sensitive data
- Mentored summer interns and new hires through onboarding process
- Won top 5 award for Single-Sign On SSH project in company-wide Hackathon 2023

Carnegie Mellon University **Pittsburgh, PA**
Teaching Assistant for Constructive Logic and Discrete Mathematics *Aug 2019 - May 2021*

- Taught weekly recitation sessions of 30 students, and held office hours to assist students with homework
- Helped students to develop problem solving skills and write mathematically valid proofs

Projects & Publications

Open Source Rust Contributions *May 2022 - present*

- Published a Rust crate `rayon-scan`, which implements a parallelized prefix scan algorithm for Rayon, a popular data parallelism library. `rayon-scan` has over 400k downloads.
- Contributed new lints and bug fixes to the Rust linter, `mismatching_type_param_order` and `obfuscated_if_else`

The first digit of the discriminant of Eisenstein polynomials as an invariant of totally ramified extensions of p-adic fields *2018 - 2020*

- Contributed the main results and proofs, co-authored with Chad Awtrey et al.
- Published in *Involve, a Journal of Mathematics* 13-5 (2020), 747–758. DOI 10.2140/involve.2020.13.747.

Parallel Tetrahedral Mesh Generation *Dec 2020*

- Added parallelism to the triangle insertion section of the fast Tetrahedral Meshing Algorithm, using shared-memory parallelism on high-core machines
- Experimentally tested various parallel partitioning schemes and wrote a research paper analyzing the results

Skills

- **Languages:** C++, C, Python, Rust, SML/Functional Programming, x86 Assembly, Prolog, C#
- **Tools & Technologies:** Git, Linux, NumPy, PyTorch, MPI, CUDA
- **Interests:** Programming Language Design, Compilers, Formal Verification, Algorithm Design