

Sophia Coldren

Software Engineer | sophiacorvids@gmail.com | 970-646-3451

Skills

Compilers, optimization

Languages: c++, java, golang, SQL, python (before Google)

Tools / technologies: version control, CI/CD, packaging/containerization, bazel

Databases: cloud spanner, memcached

Work Experience

Software Engineer, Google

2019 - present

Cloud Billing

2023 - present

The stateless metering team processes 800 M qps, converting services' usage logs into aggregated billable usage

- Built a tool to re-process customers' usage data, in order to recover from outages, and fix errors
- Optimized memory usage of one component of a data-processing pipeline (read and filter) by 12x, and CPU usage by 40%
- Reduced memory usage of a different component of a data-processing pipeline (ip address to region mapping) by 10 TB

AppReduce

2019 - 2023

AppReduce is an (internal) optimizing compiler for java bytecode, to shrink and speed-up android apps

- Built compiler optimizations to improve code size and runtime speed of android apps including:
 - Object unboxing saved up to 300 KB of dex size, and up to 1.46% of apk size on certain first-party apps, such as YouTube and the Google search app
 - Redundant interface remover saved up to 850 KB of dex size, and up to 4% of apk size on certain first-party apps
 - Improved runtime of for-loops by 3x in certain cases
- All optimizations I built collectively saved users ≈ 4 PB of storage space, worth $\approx \$2$ M¹
- Built a diagnostic tool for cleaning up after buggy compiler releases by rebuilding all affected released apps with an instrumented compiler. The goal was to clean up after bugs where the buggy behavior was very subtly different and only occurred in extremely narrow circumstances

¹ Based on 2023 pixel phones

Software Engineer Intern, Google

Summer 2018

AppReduce

Summer 2018

- Implemented a tool that allows sniffing and manipulation of the java debug protocol

Education

Colorado State University, BS

2015 - 2019

Computer Science, Mathematics, Physics
Honors, GPA 3.98

Cornell University, Research Experience

Summer 2017

University of Michigan, Research Experience

Summer 2016

Publications / Talks

Adams, H., **Coldren, S.**, & Willmot, S. (2022). The persistent homology of cyclic graphs.

International Journal of Computational Geometry & Applications, 32(01n02), 1-37.

Sarkis, C. L., Tarne, M. J., Neilson, J. R., Cao, H. B., **Coldren, S.**, Gelfand, M. P., & Ross, K. A.

(2020). Partial antiferromagnetic helical order in single-crystal Fe₃PO₄O₃. *Physical Review B*, 101(18), 184417.

Aslam, J., Chen, S., **Coldren, S.**, Frick, F., & Setiabrata, L. (2019). On the generalized

Erdős–Kneser conjecture: Proofs and reductions. *Journal of Combinatorial Theory, Series B*, 135, 227-237.

Coldren, S. (2018). A Quadratic-time Algorithm for Persistent Homology in the Number of

Points on a Circle. *Southwestern Undergraduate Mathematics Research Conference*.

Albuquerque; University of New Mexico.

Nair, H., Brown, J., **Coldren, S.**, Hester, G., Gelfand, M., Podlesnyak, A., & Ross, K. (2018).

Short range order in the quantum XXZ honeycomb lattice material γ -BaCo₂(PO₄)₂. In *APS March Meeting Abstracts* (Vol. 2018, pp. H24-003).

Coldren, S., Gelfand, M., & Ross, K. (2017). Luttinger-Tisza method applied to frustrated magnetic systems. *Bulletin of the American Physical Society*, 62.

Interests

Compilers, Computer security, Combinatorics, Materials science, Figure skating