

Sarah Morin

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🐙 [sarahmorin](https://github.com/sarahmorin)

Education

2025-Present **PhD Computer Science**, *University of California, Berkeley*, Berkeley, CA

Advised by Joe Hellerstein and Max Willsey.

2017–2021 **BS Computer Science**, *The George Washington University*, Washington, DC

Summa Cum Laude, Technical GPA: 3.97/4.0, GPA: 3.89/4.0

Minor in Mathematics

Academic Experience

2024-2025 **Independent Researcher**

Collaborating with Professor Gabe Parmer

- Developing a compiler for executable specifications for safety-critical real-time systems.
- Collaborating with Professor Parmer to develop oslog, a low-level systems-optimized Datalog variant and a compiler, written in Rust, to produce optimized, executable code.
- Designing a semi-naïve evaluation protocol stratified over time which allows an oslog program to run continuously as a real-time system.
- Investigating compiler optimizations to take a declarative specification of a real-time system in Datalog and produce an implementation as computationally efficient as one optimized by hand.

The George Washington University, Washington, DC

2019-2021 **Research Assistant**, *Department of Computer Science*

Professor Poorvi Vora

- Led development of R2B2 Risk-Limiting Audit Python library and CLI to execute both Bayesian and ATHENA audits.
- Built simulation engine and MongoDB database to store results. Simulated millions of trials to experimentally verify theoretical risk and stopping probabilities of ATHENA audits.
- Simulated Bayesian risk-limiting audits (BRLAs) on a variety of election cases.
- Explored adapting the 2-candidate BRLA (based on a bivariate distribution) to a multi-candidate BRLA based on the multivariate hypergeometric distribution capable of handling more complex election cases.
- Resulted in 4 publications and 1 research poster, listed below.

2019-2020 **Teaching Assistant**, *Department of Computer Science*

- Taught weekly lab/recitation section, held weekly office hours (5 hours/week), assisted professor with development of course materials.
- Developed Processor Design (Computer Architecture) and Embedded Systems Signal Processing and Analysis projects (Systems Programming)

CSCI 2461 Computer Architecture

Fall 2019, 2020

CSCI 3410 Systems Programming

Spring 2020

CSCI 1311 Discrete Structures I

Spring 2019

Publications

In Conference Proceedings

2022 *VOTING*

Oliver Broadrick, **Sarah Morin**, Grant McClearn, Neal McBurnett, Poorvi L. Vora, and Filip Zagórski. "Simulations of Ballot Polling Risk-Limiting Audits". In *Seventh Workshop on Advances in Secure Electronic Voting*. Financial Cryptography, 2022.

2021 *USENIX Security*

Filip Zagórski, Grant McClearn, **Sarah Morin**, Neal McBurnett, and Poorvi L. Vora. "Minerva—An Efficient Risk-Limiting Ballot Polling Audit". In *30th USENIX Security Symposium, USENIX Security 21*, pages 3059–3076. USENIX Association, August 2021.

2020 *VOTING*

Sarah Morin, Grant McClearn, Neal McBurnett, Poorvi L. Vora, and Filip Zagórski. "A Note on Risk-Limiting Bayesian Polling Audits for Two-Candidate Elections". In *Fifth Workshop on Advances in Secure Electronic Voting*. Financial Cryptography, 2020.

Technical Reports

2021 Filip Zagórski, Grant McClearn, **Sarah Morin**, Neal McBurnett, and Poorvi L. Vora. "The Athena Class of Risk-Limiting Ballot Polling Audits". The George Washington University, 2021.

Posters

2019 Grant McClearn, **Sarah Morin**, Neal McBurnett, Poorvi L. Vora, Filip Zagórski. "A New Statistical Audit for Real Elections", 2019.

- o Honorable mention, GWU SEAS R&D Showcase 2019.

- o Secure and Trustworthy Cyberspace biennial PI meeting 2019 in NSF Undergraduate Track.

Achievements

2021 **SEAS Distinguished Scholar**, *The George Washington University*

For outstanding achievement in the School of Engineering and Applied Sciences.

2019–2021 **Clare Boothe Luce Scholar**, *The George Washington University*

Awarded to undergraduate women in the School of Engineering and Applied Sciences pursuing research.

2019–2021 **Karlgard Scholarship in Computer Science**, *The George Washington University*

For excellence in computer science.

2019–2020 **SUPER**, *The George Washington University*

Summer Undergraduate Program for Engineering Research

2019 **Steve and Shelly Heller Prize**, *The George Washington University*

Awarded to sophomore women for excellence in computer science.

2018–2021 **Dean's List**, *The George Washington University*

Service

2024–Present **Senior Design Mentor**, *Department of Computer Science*, The George Washington University

- o Mentoring a team of 3 students as they develop an ASL translation app.

- o Providing feedback and guidance on software engineering practices such as leading weekly sprint meetings, reviewing design documentation, and practicing code reviews.

- o Presented a mini-lecture on writing effective design documentation to the entire cohort of senior design students during a weekly lab session.

Professional Experience

Oracle Cloud Infrastructure, Oracle

2023–2024 **Member of Technical Staff**, *File Storage Service*

- o Led development of data-plane implementation of user quota enforcement, including persistent metadata store, efficient scan and aggregation of usage data for all users across the filesystem B-tree, and synchronization between client servers and persistent store to rapidly detect and alert when a quota is exceeded.
- o Collaborated with control-plane, platform, and product management teams to design a user quota enforcement system that a) allows administrators to set space usage limits on users, and b) does not have any significant effect on throughput of requests within quota limits.
- o Architected lock-free algorithm for efficient garbage collection of ACLs without reference counting to minimize the performance impact on ACL-related operations. Guaranteed cleanup within 3 hours of becoming unreferenced. (C)
- o Collaborated with 3 developers to provide data-plane level support for SMB protocol. (C, Go)
- o Reformatted file-system direntries to support case-insensitive lookup and devised strategy to update existing direntries (including live, snapshotted, and replicated) to new format. (C, Go)
- o Increased flexibility of File Storage Service by introducing support for ARM hardware, served as lead data-plane developer. (C, x86, and ARM asm)

2021–2023 **Software Engineer**, *File Storage Service*

- o Designed and implemented a background thread to enforce a new expiration principle by cleaning server keyrings which enhanced file system security and helped to secure a contract for a new customer with extensive security standards. (C)
- o Refined IO time-out metrics and alarms to reflect an increase in scale; reduced unnecessary operations ticket load related to these alarms by 75%. (C, Python)
- o Automated weekly data plane KPI report generation, saving 10 hours per week of manual reporting work.
- o Improved service resiliency by developing internal tooling, improving documentation, and increasing integration test coverage. (Python)

Projects

2024 **Real-Estate Statistics App**

Python, SQLite

- o Designed and developed a real-estate statistics app to generate tables and graphs given listing data for quarterly reports.
- o SQLite database serves as a persistent store for MLS listing data. New data is uploaded as a .csv file, processed, and stored in the database through the app interface.
- o UI in Python (Pandas, Streamlit) for exploring data in database, computing summary statistics given a query, and generating charts/graphs.

2019 **Container Manager in xv6**

C, x86 Assembly

- o Developed a protected file system, shared memory regions, mutexes, and priority scheduling in xv6 operating system on 3 person team.
- o Implemented mutexes and futexes to protect shared memory regions and provide synchronization across the system.

2019 **Multivarhypergeom**

Python

- o Python library to simulate sampling from the multivariate hypergeometric distribution without replacement.