

Sabrina Reis

CSE PhD Student in Programming Languages

University of California, Santa Cruz

[GitHub](#) | [Email](#) | [ORCiD](#)

EDUCATION

University of California, Santa Cruz

PhD, Computer Science and Engineering

Fall 2025 — Present

Advisor: Lindsey Kuper

University of Oregon, Clark Honors College

B.S. Mathematics & Computer Science, B.S. Data Science

Spring 2023

Thesis: Using Deep Q-Learning to Lower Type II Diabetes Risk

Capstone: Covariance Changepoint Detection for Time Series Data

GPA: 4.10

PAPERS

Workshops

- Yan Tong, **Sabrina Reis**, Lindsey Kuper. Ironwright: A Rusty Bridge from Bounded Model Checking to Full Verification. HATRA Workshop at SPLASH 2026.
- **Sabrina Reis**, Matthew Sottile. [EGSTRA: E-graph-based structures for test suite reduction and abstraction](#). EGRAPHS Workshop at PLDI 2024.
- Taylor Dinkins, Sharmodeep Bhattacharyya, Shirshendu Chatterjee, **Sabrina Reis**, and Weng-Keen Wong. [Towards Explainable Precision Changepoint Detection through Linear Decomposition](#). ANDEA Workshop at SIGKDD 2022.

Technical Reports

- Samuel Pollard, John M. Aytac, Ariel Kellison, Srinivas Nedunuri, **Sabrina Reis**, Matthew Sottile, Heidi Thornquist. The first tri-lab workshop on formal verification: Capabilities, challenges, research opportunities, and exemplars. Technical report, Sandia National Laboratories, 2024. [SAND2024-02142](#).

PRESENTATIONS

- **Sabrina Reis**. [EGSTRA: E-graph-based structures for test suite reduction and abstraction](#). Oral presentation at EGRAPHS Workshop at PLDI in Copenhagen, Denmark. June 2024.

- **Sabrina Reis.** Burn Notice: Developing Changepoint Detection Algorithms for Air Sensor Data to Improve Wildfire Tracking and Detection. Oral presentation at UMBC McNair Scholars Research Conference in Baltimore, MD. September 2021.

FUNDED FELLOWSHIPS

National Science Foundation Graduate Research Fellow 2025 — 2028
Awarded in the first round to 1,000 applicants out of approximately 15,000 (7%).

Eugene Cota-Robles Research Fellow 2028 — 2030
Nominated by CSE department and awarded by UCSC for potential to excel in research.

UO Vice President for Research and Innovation Fellowship June 2022 — October 2022
Funded AI for social good research under Dr. Thanh H. Nguyen.

Clark Honors College Mentored Research Program March 2022 — March 2023
Funded AI for social good thesis work under Dr. Thanh H. Nguyen.

McNair Scholars Program Summer Research Fellowship June 2021 — October 2021
Funded covariance changepoint detection research under Weng-Keen Wong.

HONORS & AWARDS

Oregon Six, <i>Highest Institutional Honors awarded to 6/5000 graduates.</i>	June 2023
Phi Beta Kappa	June 2023
Summa Cum Laude	June 2023
Dr. Streisenger Scholarship, <i>Departmental</i>	2022 — 2023
Dunbar Scholarship, <i>Statewide</i>	2022 — 2023
Ida M. Crawford Scholarship, <i>Statewide</i>	2022 — 2023
Madison-Waldo Scholarship, <i>Statewide</i>	2022 — 2023
Oregon Spirit Scholarship, <i>Statewide</i>	2022 — 2023
J. Donald Hubbard Scholarship, <i>Departmental</i>	2021 — 2023
Ronald E. McNair Scholar, <i>Institutional</i>	2021 — 2023
Ira & Eleanor Wong Scholarship, <i>Departmental</i>	2021 — 2022
Joy Poust Scholarship, <i>Departmental</i>	2020 — 2021
Andy Aitkenhead Award, <i>Statewide</i>	2019 — 2021
J.B. Steinbach Award for STEM Students, <i>Statewide</i>	2019 — 2021
Presidential Scholarship, <i>Institutional</i>	2018 — 2022
Summit Scholarship, <i>Institutional</i>	2018 — 2022

RESEARCH EXPERIENCE

University of California, Santa Cruz

Graduate Student Researcher - Fellow

September 2025 — Present

Supervisor: Lindsey Kuper

Integrating techniques from multi-tier programming, choreographic programming, and multiparty session types to assist programmers in reasoning about and programming distributed systems.

Lawrence Livermore National Laboratories, Proof Technologies Team

Academic Graduate Appointee

November 2023 — July 2025

Supervisor: Matthew Sottile

Applying formal methods and programming language concepts to the ROSE source-to-source compiler and similar tools in the Center for Applied Scientific Computing.

- Developed a language translation tool to automatically extract and convert Excel spreadsheets to Julia code.
- Developed and formalized a performant e-graph-based tool that employs destructive rewrites for use in solvers and test suite deduplication.
- Prototyped a type system for e-graphs and other software with simultaneous data structures to specify and verify expected data structure usage.
- Authored a technical report on behalf of the Proof Technologies team responding to the White House's call for memory safe software. This report presents strategies to increase the safety of the organization's codebase based on current research and industry reports.
- Specified and verified programs using SAW/Cryptol and ACSL/Frama-C to increase the assurance of the ROSE source-to-source compiler.

Sandia National Laboratories, Formal Methods Team

Research Intern

June 2023 — October 2023

Supervisor: Samuel Pollard

Tested the [Q Framework](#) project workflow.

- Implemented an embedded system in C, then verified correctness of C program using ACSL and Frama-C.
- Simulated the same embedded system using a Simulink state machine, then cross-verified the system using NuSMV.
- Delivered a 45-minute oral presentation on bottlenecks and bugs in the workflow to the formal methods group. This work was also presented at the Tri-Lab Workshop on Formal Verification.

University of Oregon, CIS Department, Nguyen Lab*Undergraduate Researcher*

October 2021 — March 2023

Advisor: Dr. Thanh Nguyen

Refined and analyzed a text messaging campaign that used AI to target messages promoting the adoption of healthy behaviors to individuals.

- Cleaned and converted raw response data from study participants into feature vectors for neural network training.
- Applied techniques from deep knowledge tracing used to model students' knowledge states to improve modeling of participants' health behaviors by accounting for response relevancy and imbalanced class data.
- Investigated the use of subsequence changepoint detection methods to determine which users had disengaged with behavior reporting.
- Performed extensive data analysis of participant responses to assess the study's outcomes along the lines of sex, age, and education level.

Oregon State University, EECS Department, Wong Lab*Undergraduate Researcher*

March 2021 — March 2023

Advisor: Dr. Weng-Keen Wong

Conducted anomaly detection research for mean and covariance by investigating univariate and multivariate changepoint detection algorithms.

- Implemented 4 changepoint detection algorithms from statistical papers as Python scripts.
- Collected, cleaned, and visualized case study data from Purple Air AQI sensors, earthquake data, and stock data using Python and MATLAB.
- Assessed the accuracy, runtime, and resilience to noise of implemented algorithms using case study data. One algorithm performed as well as state-of-the-art methods and served as the baseline in our workshop paper.

University of Oregon, CS Department, Lowd Lab*Undergraduate Researcher*

March 2021 — June 2021

Advisors: Dr. Daniel Lowd, Dr. Sameer Singh (UC Irvine)

Assisted with DARPA-funded research conducted in conjunction with UC Irvine investigating text attack detection and classification using 12 adversarial attacks targeting three classifiers.

- Tested the abuse detection classifier with perturbed data from IMDB.
- Generated performance reports on the accuracy with which the classifier detected the presence of an attack and determined the attack type.

University of Oregon, Mathematics Department, Directed Reading Program*Undergraduate Reader*

January 2021 — April 2021

Advisor: Max Vargas

Conducted a self-directed reading of quantum calculus for partition counting as part of the Directed Reading Program for undergraduate students in mathematics.

- Reviewed and wrote up summaries on readings from partition counting textbooks and research papers for weekly meetings.
- Compiled covered material into a 12-minute lecture on partition counting and presented lecture to the Directed Reading Program cohort.

University of Oregon, Institute of Neuroscience, Perception and Action Lab

Research Assistant

November 2019 — March 2020

Advisors: Dr. Paul Dassonville, Scott Wallner

Supported computational approaches to project examining how neural responses to various sensory cues and phenomena affect the creation of mental representations of reality.

- Configured TrajTracker Python code package to alter presentation of control and test stimuli for use in human subject research tracking participant eye movement and response time to accurate and misleading visual cues.
- Led participants through eye tracking experiments in accordance with Institutional Review Board standards.
- Cleaned and visualized data gathered from eye tracking experiments using R and MATLAB.

LEADERSHIP

Languages, Systems, and Data Lab

Seminar Co-Organizer

2026—2027

- Facilitated a weekly seminar by inviting speakers, handling talk and travel logistics, maintaining the seminar website, and advertising talks to the local research community.

University of Oregon Women in Computer Science

Executive Board Member

2018 — 2019, 2021 — 2023

Vice President

2020 — 2021

Director of Outreach

2019 — 2020

- Recruited new members, with a focus on self-identified women, LGBTQ+ folks, students of color, nontraditional students, and community allies.
- Planned events and professional development workshops focusing on topics such as imposter syndrome, tech ethics, resume-writing, coding interviews, and creating a personal website.

- Held peer advising sessions during enrollment weeks and at the beginning of the academic year for students new to the major or minor.

University of Oregon, Computer Science Diversity Committee

Undergraduate Student Representative

September 2020 — June 2021

- Proposed successful changes to major requirements and course content aimed at raising students' awareness of potential bias in computer science. Accepted proposals include a mandatory data ethics course for data science majors, additional options to satisfy the technical writing requirement, inclusion of relevant ethical issues in course lectures, and greater compatibility of major requirements with relevant social science minors such as philosophy and psychology.
- Examined annual departmental diversity metrics and worked with entities across campus to identify areas of inaccessibility and devise solutions.

TEACHING

University of Oregon, CIS 122: Intro. to Python Programming

Graduate Teaching Assistant

March 2023 — June 2023

Supervisor: Dr. Kathleen Freeman

- Led three weekly 50-minute labs that enabled students to practice core course concepts.
- Assessed student work by assigning grades and providing individual feedback.

University of Oregon, CIS 211: Intro. to Computer Science II

Learning Assistant

January 2020 — June 2021

Supervisor: Dr. Michal Young

- Held office hours in which students received help debugging their code and understanding course content.
- Assisted a graduate instructor in weekly labs by working through exercises with students and identifying concepts that needed more attention in lecture.

PARTICIPATION

Student Volunteer at SPLASH 2026	October 2026
ACSL and Frama-C Training with CEA-List	February 2024
First Tri-Lab Workshop on Formal Verification	December 2023
Oregon Programming Languages Summer School	June 2023
PLMW @ PLDI 2024	June 2024

TOOLS

Programming Languages: Python, Swift, Julia, C/C++, Haskell, SML, OCaml, R, SQL

Verification: Frama-C, SAW/Cryptol, Lean

ML/Data Science: TensorFlow, PyTorch, Scikit-learn, NumPy, Matplotlib, Pandas, Seaborn, Polars, Datascience

Software Engineering: Git, Docker