Kyle B. Fredrickson

E-mail: **kyfredri@ucsc.edu**
Phone: **(805) 908-2367**
Citizenship: **USA**

RESEARCH INTERESTS	cryptography, cryptographic protocols, anonymous messaging, post-quantum cryptography

EDUCATION

PhD, Computer Science, UC Santa Cruz — **Fall 2019–Present**

- Dr. Darrell Long is my advisor, and I am a member of the Secure Systems Lab (SSL) and Storage Systems Research Center (SSRC). My interests are in cryptographic protocols and, in particular, anonymous communication protocols.

Double B.S., Mathematics & Computer Science, Westmont College — **May 2018**

- Top Scorer from Westmont in the Putnam Mathematics Competition
- 4 year student-athlete in Cross Country and Track

SKILLS

Programming Languages:

- C, Python, Haskell, C#, Java, Lisp/Scheme, Bash, Rust

Tools and Software:

- macOS, Linux, Windows, git, *libgcrypt*, *scikit-learn*, *PyTorch*, MS SQL Server

EXPERIENCE

Doctoral Intern: HRL Laboratories — **June 2021–September 2021**

- During my internship I worked on two projects: a post-quantum cryptography project, and a safe reinforcement learning project.
- I produced a large survey of post-quantum cryptographic algorithms, including theory and hard problems underlying their security (e.g. SSI-T, LWE, RLWE, MLWE, SVP). My focus was on submissions to NIST's standardization effort, including Crystals-Kyber, SIKE, NTRU and Classic McEliece.
- I implemented and delivered reinforcement learning algorithms for self-driving vehicles and algorithms for certifying the safety of learned policies.

Teaching Assistant (Cryptography): UCSC, Baskin School of Engineering — **Winter 2021**

- I was a teaching assistant for Prof. Darrell Long's and James Hughes' graduate cryptography class. As a TA I produced solutions to homework, graded homework, and presented material on post-quantum cryptography to the class.

Teaching Assistant (Ethics & Algorithms): UCSC, Baskin School of Engineering — **Winter 2020**

- I was a teaching assistant for Prof. Lise Getoor's Ethics & Algorithms class, in which students became acquainted with the social ramifications of ML (unfairness, privacy issues, lack of robustness, etc.) and the technical solutions proposed to correct these issues. As a TA I wrote and graded class materials, held office hours, and held discussion sections.

Software Engineer: FLIR Systems — **June 2018–April 2019**

- At FLIR I worked closely with electrical engineers to design and implement tests for components of FLIR's line of cooled infrared cameras. I produced several pieces of software, including Windows desktop apps and hardware control libraries.

Teaching Assistant, Statistics: Westmont College, Mathematics Department — **Fall 2017**

- I was a teaching assistant for Prof. Russell Howell's introductory statistics course. I was responsible for hosting student help sessions and grading assignments.

Student Researcher: Search Algorithms   **Fall 2017**

- I worked with Prof. Wayne Iba, Westmont College, exploring the use of inadmissible heuristics in the External A* search algorithm to solve the previously unsolved *ClimbPro24* slide puzzle.

Private Tutor: Westmont College, Computer Science Department   **Fall 2015, Fall 2017**

- At the recommendation of Prof. Wayne Iba, I was a private tutor for an introductory computer science course and a programming language design course in which students implemented an interpreted, statically scoped, garbage-collected language.

PEER-REVIEWED PUBLICATIONS

Kyle Fredrickson, Austen Barker and Darrell D. E. Long. "A Multiple Snapshot Attack on Deniable Storage Systems," *Proceedings of the Twenty-ninth Internation Symposium on Modeling, Analysis and Simulation of Computer and Telecommunication Systems* (MASCOTS 2021), IEEE, November 3-5, 2021.

ACADEMIC AWARDS

Putnam Mathematics Competition: Mathematics Association of America   **Fall 2017**

- The Putnam is the premier math competition for undergrads in North America. It consists of 12 questions each graded from 0 to 10, and each year the median score on the test is consistently 0. I scored 10 points for one of my solutions, which gave me a national rank of 1274.5 of 4638 participants.

Regent's Fellowship: UC Santa Cruz, Computer Science and Engineering Dept.   **Fall 2019**

Grace Hopper Award: Westmont College, Computer Science Dept.   **Fall 2015**

- This award is given annually by Westmont's Computer Science Faculty to one underclassman who demonstrates excellence in the department.