

Marika SWANBERG
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Education

2015-2019 REED COLLEGE. BACHELOR OF ARTS IN COMPUTER SCIENCE AND MATHEMATICS.
GPA 3.8.

Papers, Research, and Talks

- 2019** *Improved Differentially Private Analysis of Variance.*
By Marika Swanberg, Ira Globush-Harris, Iris Griffith, Anna Ritz, Andrew Bray, and Adam Groce. Helped write a differentially private algorithm for computing the ANOVA statistic with a tenfold improvement in statistical power compared to previous best private ANOVA algorithm. In submission to the *Privacy Enhancing Technologies Symposium*.
- 2019** *Quantum Decoding Algorithms for Reed-Muller Codes.*
In preparation. Investigating the query complexity of quantum decoding algorithms for the Reed-Muller error-correcting code in collaboration with professor James Pommer-sheim.
- 2018** REED COLLEGE STUDENT MATHEMATICS COLLOQUIUM. IMPROVED DIFFERENTIALLY PRIVATE ANALYSIS OF VARIANCE.
Gave an hour-long colloquium talk about my research paper.
- 2016** *Maximum Density for Enteropathogenic E. coli Adherence to HEp-2 Cells.*
Research project investigating the adherence properties of two strains of enteropatho-genic E. coli on human epithelial cells.

Work Experience

- present**
(3 months) REED COLLEGE. REAL ANALYSIS COURSE ASSISTANT.
Tutoring focused on advanced proof writing techniques and graduate-level analysis to-pics.
- present**
(5 months) REED COLLEGE. RESEARCH ASSISTANT.
Worked on differential privacy research funded by the NSF and RCSRf (Reed's summer research grant). Wrote sensitivity proofs, code implementation, and manuscript. Cur-rently making journal revisions to our paper and writing sections on our new findings (see paper above).
- 2016-present**
(2.5 years) REED COLLEGE. TUTOR.
Selected by professors to be a tutor for the following courses:
— Computer Science: Computability and Complexity, Algorithms and Data Struc-tures, Computer Science 2, Computer Science 1
— Mathematics: Real Analysis, Vector Calculus, Linear Algebra, Discrete Struc-tures, Introduction to Analysis, Introduction to Probability and Statistics, Cal-culus
— Chemistry: Chemical Reactivity, Chemical Structures and Properties.
Worked in the mathematics help center as a drop-in tutor and a chemistry lab assistant. Also worked as course assistant for real analysis and introduction to analysis.
- 2016-17**
(6 months) REED COLLEGE SOFTWARE DESIGN STUDIO. SOFTWARE DEVELOPER.
Worked on a team of 4 students to develop a web application for online tutoring with video and IM-chat capabilities. See <https://github.com/reedcollege/paneity>.

Skills and Projects

LANGUAGES.

- Computer Languages: Python, C^{++} , MIPS Assembly, JavaScript, BASH, \LaTeX , Golang, HTML, CSS, R, Jinja2, Django Web Framework.
- Human Languages: English (native), Swedish (native)

PROJECTS.

- RESTful API: wrote a client and asynchronous server entirely in C-sockets and C^{++} .
- Software cache: wrote a key-value store in C^{++} .
- Differential privacy: wrote simulation implementation for our ANOVA algorithm in Python.
- Web application: wrote Python-based tutoring web application using Django web framework.
- Genetic Algorithm: Wrote a genetic algorithm in C^{++} for solving the traveling salesperson problem.

Awards

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| 2015-18 | REED COLLEGE. COMMENDATION FOR ACADEMIC EXCELLENCE.
All three years at Reed College. |
| 2018 | PRINCETON INSTITUTE FOR ADVANCED STUDY. WOMEN AND MATHEMATICS CONFERENCE FELLOWSHIP.
Competitive fellowship to attend conference on the Mathematics of Modern Cryptography and mentorship program at Princeton IAS. |
| 2018 | COMPUTING RESOURCES ASSOCIATION-WOMEN. GRACE HOPPER CONFERENCE RESEARCH SCHOLAR.
Selected by CRA-W to attend the Grace Hopper Conference and participate in their research scholars program. |
| 2018 | REED COLLEGE SCIENCE RESEARCH FELLOWSHIP AWARD.
Research stipend to conduct privacy research at Reed College. |
| 2018 | REED COLLEGE OPPORTUNITY GRANT.
Grant from Reed College to attend the 2018 ACM Conference on Computer and Communications Security (CCS) in Toronto, Canada. |
| 2017 | REED COLLEGE. FINANCIAL SERVICES FELLOWSHIP.
One of ten students selected for a week-long trip to New York City to meet with distinguished people working in the financial sector. |

Other Activities

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| 2016-18 | CONFERENCES ATTENDED.
2018 Computer and Communications Security, 2018 Grace Hopper Celebration Conference, Princeton IAS 2018 Conference on Mathematics of Modern Cryptography, 2016 Northwest Regional Women in Computing Conference, 2017 Homotopy in the Ecliptic Conference |
| 2016-18 | REED COLLEGE. STEMGeMs.
Mentor for and participant in STEMGeMs, a support group for gender minorities in STEM majors at Reed College. |
| 2015-16 | REED COLLEGE. SCIENCE OUTREACH VOLUNTEER.
Put together the course materials for the outreach teachers as a volunteer for Science Outreach. |
| 2015-17 | REED COLLEGE. ROWING TEAM.
Rowed stroke (i.e. the pacemaker) for the 2016 Portland Fall Classic and other races. |