Reilly Raab

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Education

University of California, Santa Cruz — Fall 2019 – Winter 2024*
PhD, Computer Science and Engineering

University of California, Santa Barbara — Fall 2011 – Spring 2015
BSc, Physics — College of Creative Studies
High Honors, Distinction in the Major
Fall 2013 at The University of Edinburgh

Expertise

Convex Optimization	Classical Mechanics	Dynamical Systems	GNU/Linux
Information Theory	JavaScript	Linear Algebra	Machine Learning
Python	Quantum Computing	Signal Processing	Scientific Visualization
Statistical Mechanics	Stochastic Calculus	Variational Calculus	Vector Calculus

Experience

Machine Learning Basics — Winter 2022
Course Design Consultant — UC Santa Cruz

- Designed autograding infrastructure providing instant assignment feedback for a class of ~ 100 students.
- Authored interactive (Jupyter notebook) assignments with automated tests.

Machine Learning Basic — Spring 2021
Course Design Consultant — UC Santa Cruz

- Authored interactive (Jupyter notebook) assignments, written assignments, and exams.
- Wrote scripts for distributing, validating, and testing interactive assignments for a class of ~ 50 students.
- Led grading team.

Machine Learning — Fall 2020
Teaching Assistant — UC Santa Cruz

- Authored and graded written assignments.
- Presented supplementary material in discussion sections.

Human-Centered Machine Learning — Sept 2019 – Present
Graduate Student Researcher — UC Santa Cruz

- Investigated the dynamical consequences of algorithmic fairness in multiagent systems.
- Published three conference (NeurIPS[†]) papers, with one Spotlight award.
- Contributed to evolutionary game theory, learning theory, and dynamical formulations of fairness.
- Discovered least-squares correspondence between replicator dynamics and natural gradient descent.

Breadware, Inc. — Oct 2016 – Aug 2018
Software Developer — Reno, NV

- Designed and implemented full-stack Internet-of-Things solutions.
- Engineered in-house tools for electronic design automation.

The Summer Science Program — Summer 2016 / Summer 2015
Teaching Assistant and Residential Mentor — Boulder, CO / Socorro, NM

- Mentored advanced high school students in a residential university environment.
- Graded assignments in celestial mechanics, programming, and mathematics.
- Supervised operations in observational astronomy.

*Anticipated
[†]Conference on Neural Information Processing Systems (NeurIPS)

Josephson Junction Quantum Computing Feb 2013 – Jun 2015
Undergraduate Intern UC Santa Barbara

- Investigated noise in a GHz qubit-control signal chain.
- Calculated the effect of IQ-mixing imperfections on single-qubit gate error.
- Wrote software to characterize the phase-noise stability of alternative GHz oscillators.
- Fabricated, assembled, and tested custom hardware.

Organic Electric Devices and Characterization Jan – Jul 2011
Undergraduate Intern UC Santa Barbara

- Investigated the role of small donor molecule structure on exciton diffusion length.
- Fabricated organic semiconductor devices isolated from oxygen, water, and light.
- Conducted surface morphology measurements via atomic force microscopy.
- Performed laser-induced photoluminescence decay measurements.

Fellowships & Awards

2024	Dissertation Year Fellowship (Winter)	UC Santa Cruz
2023	Dissertation Year Fellowship (Fall)	UC Santa Cruz
2023	Best Paper Runner-Up	ICLR[‡] (RMTL[§] Workshop)
2023	Highlighted Paper	ICLR (RMTL Workshop)
2022	Merit-Based Scholarship	ARCS Foundation, Inc. (Northern California Chapter)
2021	Advancement with Honors	UC Santa Cruz
2021	Spotlight Paper	NeurIPS
2019	Regents Fellowship	UC Santa Cruz
2019	Dean's Fellowship	UC Santa Cruz
2015	High Honors (BSc in Physics)	UC Santa Barbara
2015	Distinction in the Major (Physics)	UC Santa Barbara
2013	Education Abroad Scholarship	UC (All Campuses)
2013	Education Abroad Scholarship	UC Santa Barbara
2011	Undergraduate Research Fellowship	UC Santa Barbara

Publications

Long-Term Fairness with Unknown Dynamics.
Tongxin Yin, **Reilly Raab**, Mingyan Liu, and Yang Liu.
NeurIPS, 2023.

Fair Participation via Sequential Policies.
Reilly Raab, Ross Boczar, Maryam Fazel, and Yang Liu.
arXiv, To appear.

Conjugate Natural Selection.
Reilly Raab, Luca de Alfaro, and Yang Liu.
arXiv Preprint, 2023.

Fairness Transferability Subject to Bounded Distribution Shift.
Yatong Chen[¶], **Reilly Raab**[¶], and Yang Liu.
NeurIPS, 2022.

Unintended Selection: Persistent Qualification Rate Disparities and Interventions.
Reilly Raab and Yang Liu.
Neurips ***(Spotlight Paper Award)***, 2021.

Single-Gate Error for Superconducting Qubits Imposed by Sideband Products of IQ Mixing.
Reilly P. Raab.
UC Santa Barbara Physics Department Website, 2015.

Systematic Study of Exciton Diffusion Length in Organic Semiconductors by Six Experimental Methods.
Jason Lin **et al**.
Materials Horizons, 2014.

[‡] International Conference on Learning Representations (ICLR)
[§] Trustworthy and Reliable Large-Scale Machine Learning Models (RTML)
[¶] Equal contribution