Roy Rinberg

Contact Information

Email: royrinberg+CV@gmail.com **Location:** New York, NY
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Education

Harvard University, Cambridge, MA 2023 - Present
PhD. Computer Science; Advised by Prof. Seth Neel and Prof. Salil Vadhan

Columbia University, New York, NY 2021 - 2023
M.S. Computer Science; Thesis Track: Advised by Prof. Rachel Cummings and Prof. Steven Bellovin

New York University, New York, NY 2014 - 2018
B.A. Computer Science, Physics, Minor: Math.

Thomas Jefferson High School for Science and Technology, Alexandria, VA 2010 - 2014

Selected CS Coursework: Neural Networks, Foundations of Blockchain, Policy for Privacy Tech, ML, Security, Theory of Computation, Algorithmic Problem Solving, Algorithms, Operating Systems, Computer Systems Organization
Selected Math Coursework: Honors Algebra, Analysis, Probability, Linear Algebra, Calculus I-III, Grad Probability and Statistics for Data Science
Selected Physics Coursework: Statistical Mechanics, Computational Physics, Mathematical Physics, Quantum Mechanics, Electricity & Magnetism, Dynamics

Software Skills

Programming Languages: Python, C, C++
Software: Linux, Pytorch, Tensorflow, Docker, Google Cloud Services, PySyft, ROS, ELK Stack, Pandas, Jenkins, Artifactory, SQL, Web-scraping

Research Experience

Columbia University, New York, NY August 2021 - Present
Memorization & Privacy in ML [Advisors: Prof. Rachel Cummings and Prof. Steven Bellovin]

- Memorization is a known attribute of modern machine learning; I research characterizing trade-offs of memorization, privacy, and accuracy, primarily focusing on differential privacy.

New York University, New York, NY February 2017 - May 2018
Evolution of Language Models within Social Networks [Advisor: Prof. Bud Mishra]
This research investigated the development of echo chambers within social networks.

- Developed theory and implemented pipeline to study the evolution of clusters of users in social networks over time, which applied topological data analysis to study distances between Word2Vec models trained on text.
- Publication on arXiv.

Work Experience

Ouster, San Francisco, CA September 2018 - June 2021
Software Engineer
Ouster is a startup developing lidar sensors and technologies. I worked on a lidar-based collision avoidance system for large vehicles.

- Developed and deployed C++ algorithms that make real-time predictions about dangerous driving behavior.
- Developed pipeline to evaluate algorithms on 100s of hours of historical lidar data.
- Created automatic data-pulling service for IoT devices, saving >3hr/day across team.
- Improved logging and alerting (ELK stack) and continuous integration (Jenkins) frameworks.
- Developed and packaged python SDKs for cross-team developers and processes for visualization, management, and deterministic playback of data. Used ubiquitously across team.
- *Internship Project:* Produced open-source C++ lidar point-cloud data visualizer (Github link).

Career Copilots, San Francisco CA May 2020 - August 2020
Software Engineer Contractor
Career Copilots is a startup seeking to help individuals find jobs using data. In my spare time, I contracted as their first software engineer.

- Developed python web-scraper to scrape jobs-data to help users find roles catered to them.
- Developed pandas data-exploration pipeline for investigating LinkedIn user data.

Internships

Hong Kong University for Science and Technology, Hong Kong — Summer 2016
Research in Industrial Projects for Students (RIPS-HK) [Advisor: Dr. Avery Ching]
RIPS-HK is an REU with HKUST and an industrial sponsor.

- Developed protocol for robust, acoustic communication by underwater drones in noisy channels, combining information theoretic approach and physics modeling of acoustic channels in water.
- Team lead for team of 3 other students.

Janelia Research Campus, HHMI, Ashburn, VA — Summer 2015
Scientific Computing Group [Advisors: Dr. Khaled Khairy and Dr. Sean Murphy]
Janelia Research Campus is a neuroscience and imaging research center.

- Decreased stitching time from 13.7 sec/image-pair to 1.8 sec/image-pair, using OpenCV and OpenMP on GPU cluster, on the Stitching Multi-Terrabyte ssTEM Image Data project.

Weizmann Institute of Science, Rehovot, Israel — Summer 2014
International Summer Science Institute (ISSI) [Advisor: Prof. Roee Ozeri]
ISSI is an international internship for natural sciences and math. I worked in the Trapped Ions Lab.

- Developed data visualization to study ultra-cold atoms in a laser-cooled Magneto-Optical Trap.

Teaching

New York University — September 2017 - May 2018
General Physics I and II Tutor

- Tutored physics courses on classical mechanics and electricity & magnetism.

Awards and Memberships

Presidential Honors Scholar — 2015 - 2018
Dean's List — 2014 - 2018
Sigma Pi Sigma (Physics Honor Society) — Inducted 2018
HPC for Undergraduates Scholarship — Fall 2017

- Scholarship to attend International Conference for High Performance Computing, Networking, Storage, and Analysis (SC'17) in Denver, CO (32 out of 437 accepted)

Dean's Undergraduate Research Fund (DURF) and Research+ — Summer 2017

- Stipend and housing for research on computational linguistics.

University Leadership Honors Course — Spring 2017

Leadership

Project BEST (Building Excitement for Science and Technology) — 2011 - 2014
CFO and Co-founder
Project BEST is a non-profit which develops after-school STEM programs for middle school students.

- Fundraised and grew organization to 25 chapters across 3 states, reaching 3000+ students.
- Developed and led programs for two, full-day STEM events for over 100 students each, and co-led team of 20 volunteers.

Side-Projects and Service

Ouster Community Work — 2018-2020

- Advocated management to institute paid volunteer-day and donate $6k to 6 public-interest orgs.

Arxiv Connections — August 2020

- Wrote a tool to scrape Arxiv and display co-authoring connections as a graph. Github Link.

Publications

1. A. Tamaskar, R. Rinberg, S. Chakraborty, B. Mishra. *Creolizing the Web.* arXiv:2102.12382 . Research from my work at NYU with Professor Bud Mishra.

Articles

1. R. Rinberg and A. Nichani. *Improvements and Analysis of Private Ensemble-Based Federated Learning.* Pre-Print. 2021.
2. R. Rinberg and N. Agarwal. *Privacy when Everyone is Watching: Anonymity on the Blockchain. A ZK-SNARKs and Privacy Coins Primer.* Pre-Print. 2021.
3. R. Rinberg. *Resources for Public-Interest Technology.* Medium (self-published). 2020.
   Comprehensive list of resources for working in public-interest technology. Link.
4. R. Rinberg. *How to Use Docker to Learn Jenkins.* Medium (self-published). 2020.
   Educational article about how to learn new software tools. Link.
5. R. Rinberg. *Jell-O Brains and DNA: High School Students Launch Innovative STEM Program.* Scientific American. 2014.
   Invited article in 'Budding Scientist' series describing work leading Project BEST. Link.