

# Roy Rinberg

---

## CONTACT INFORMATION

**Email:** royrinberg+CV@gmail.com  
**Website:** www.royrinberg.com

**Location:** New York, NY

## EDUCATION

---

**Columbia University, New York, NY** 2021 - PRESENT  
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

## SOFTWARE SKILLS

---

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

## RESEARCH EXPERIENCE

---

**Columbia University, New York, NY** AUGUST 2021 - PRESENT  
**Privacy in ML** [Advisors: Prof. Rachel Cummings and Prof. Steven Bellovin]

- Modern machine learning algorithms memorize training data. I study trade-offs of memorization, privacy, and accuracy, primarily focusing on differential privacy.
- Other research focuses on on improvements in privacy consideration when considering heterogeneous data distributions.

**University of Toronto, Toronto, Ontario** MAY 2022 - SEPTEMBER 2022  
**Privacy in Machine Learning** [Advisor: Prof. Nicolas Papernot]

- Research on Individualization of PATE. Paper accepted to PoPETs 2023. [Paper link](#).
- Extensions of Gaussian & Laplacian DP primitives, and their application to ML. *On-going*.
- Research on Catered PATE - PATE in the presence of heterogeneous data ([link](#)). *On-going*.

**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 pipeline to study the evolution of clusters of users in social networks over time, using topological data analysis to study distances between Word2Vec models trained on text.
- Scraped Reddit to supplement a dataset of Reddit text from multiple years (~1TB).
- Helped with mathematical proofs and ran simulations. Publication on arXiv.

## WORK EXPERIENCE

---

**Ouster, San Francisco, CA** JUNE 2018 - JULY 2021  
**Software Engineer**  
*Ouster is a startup developing lidar sensors. I worked on lidar-based collision-avoidance systems*

- Led development of on-edge computing for live predictions about dangerous driving.
- Developed and deployed platform for evaluating algorithms on historical lidar data, and for monitoring live data.
- *Internship Project:* Produced open-source C++ lidar point-cloud data visualizer ([Github link](#)).

**Career Copilots, San Francisco CA** MAY 2020 - AUGUST 2020  
**Software Engineer**  
*Career Copilots is a startup seeking to help individuals find jobs using data.*

- 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

**Knight First Amendment Institute, NYC** SEPTEMBER 2022 - PRESENT  
**Algorithmic Amplification in Society [Advisor: Professor Arvind Narayanan]**  
*Knight First Amendment Institute works to protect digital freedoms through strategic litigation, research, and education.*

- Work with Professor Arvind Narayanan to develop essays, videos, and interactives for explaining how algorithmic amplification can affect speech online.

**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.
- 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. Roe 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.

PUBLICATIONS

1. F. Boenisch, C Mühl, **R. Rinberg**, J. Ihrig, A. Dziedzic. Individualized PATE: Differentially Private Machine Learning with Individual Privacy Guarantees. Accepted to PoPETs 2023.
2. **R. Rinberg**, N. Agarwal. *Privacy when Everyone is Watching: An SOK on Anonymity on the Blockchain.* ePrint.
3. 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 AND PRE-PRINTS

1. **R. Rinberg** and A. Nichani. *Improvements and Analysis of Private Ensemble-Based Federated Learning.* Pre-Print. 2021.
2. **R. Rinberg.** *Resources for Public-Interest Technology.* [Medium](#) (self-published). 2020.  
 Comprehensive list of resources for working in Public-Interest Technology. [Link](#).
3. **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](#).

TEACHING

**NYU - General Physics I and II Tutor** SEPTEMBER 2017 - MAY 2018  

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

AWARDS, MEMBERSHIPS, CONFERENCES

**Advanced Master's Research Specialization** 2022-2023  
**Workshop on DP and Statistical Data Analysis** (Toronto, ON) SUMMER 2022  
**Differential Privacy Summer School** (Boston, MA) SUMMER 2022  
**Presidential Honors Scholar** (NYU) 2015 - 2018  
**Dean's List** (NYU) 2014 - 2018  
**Sigma Pi Sigma (Physics Honor Society)** (NYU) INDUCTED 2018  
**HPC for Undergraduates - Conference Scholarship** for SC'17 FALL 2017  
**DURF & Research+** for Housing and Stipend (NYU) SUMMER 2017  
**University Leadership Honors Course** (NYU) 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.
- Led two full-day STEM programs for 100+ students, 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.