Roy Rinberg

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Github: RoyRin

EDUCATION

Harvard University, Cambridge, MA — 2023 - PRESENT
PhD. Computer Science. Advisors: Prof. Seth Neel and Prof. Salil Vadhan

Columbia University, New York, NY — 2021 - 2023
MS in Computer Science [Thesis Track]. Advisors: 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

RESEARCH EXPERIENCE

Harvard University, Cambridge, MA — AUG. 2023 - PRESENT
Trustworthy Machine Learning [**Advisors: Prof. Seth Neel and Prof. Salil Vadhan**]
- Research on foundations of machine learning and fundamentals of Differential Privacy (DP).
- Research on Machine Unlearning .

Columbia University, New York, NY — AUG. 2021 - AUG. 2023
Privacy in ML [**Advisors: Prof. Rachel Cummings and Prof. Steven Bellovin**]
- Extensions of Gaussian & Laplace DP primitives, and their application to ML. *In Submission.*
- Research on Catered PATE - PATE in the presence of heterogenous data (link). *On-going.*
- Research on how ML algorithms memorize training data.

Vector Institute, Toronto, ON — MAY 2022 - SEP. 2022
Privacy in Machine Learning [**Advisor: Prof. Nicolas Papernot**]
- Research on Individualization of PATE (accepted to PoPETs 2023) and individualization of DP-SGD (accepted to Neurips 2024).
- Research on reducing distributional and user-preference-level assumptions in private ML.

New York University, New York, NY — FEB. 2017 - MAY 2018
Evolution of Language Models within Social Networks [**Advisor: Prof. Bud Mishra**]
- Studied the development of echo chambers within social networks using TDA to study distances between Word2Vec models trained on Reddit text. Preprint on arXiv.

SELECTED WORK EXPERIENCE

Shelton AI, New York, NY — JAN. 2022 - JUN. 2022
Lead Software Engineer
Shelton AI leverages machine learning to help pension funds manage investments in private equity.
- Worked with CEO to develop fintech product to manage 10s of millions of dollars.
- Developed core AWS infrastructure for NLP document processing pipeline.

Ouster, San Francisco, CA — JUN. 2018 - JUL. 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 platforms for evaluating algorithms on historical lidar data and monitoring live data.
- *Internship Project:* Produced open-source C++ lidar point-cloud data visualizer (Github link).

Career Copilots, San Francisco, CA — MAY 2020 - AUG. 2020
Software Engineer
Career Copilots is a startup seeking to help individuals find jobs using Linkedin data.
- Developed web-scraping data-exploration pipeline of jobs-data to help users find relevant roles.

Knight First Amendment Institute, New York, NY — SEPT. 2022 - MAY 2023
Algorithmic Amplification in Society [Advisor: Professor Arvind Narayaran]
KFAI works to protect digital freedoms through strategic litigation, research, and education.
- Work with Professor Arvind Narayaran to develop essays, videos, and interactives for explaining how algorithmic amplification can affect speech online.

PAPERS	1. F. Boenisch, C Mühl, A. Dziedzic, **R. Rinberg**, N. Papernot. Have it your way: Individualized Privacy Assignment for DP-SGD. <u>Accepted to Neurips 2023</u>.
	2. F. Boenisch, C Mühl, **R. Rinberg**, J. Ihrig, A. Dziedzic. Individualized PATE: Differentially Private Machine Learning with Individual Privacy Guarantees. <u>Accepted to PoPETs 2023</u>.
	3. A. Tamaskar, **R. Rinberg**, S. Chakraborty, B. Mishra. *Creolizing the Web*. arXiv:2102.12382 .

PRE-PRINTS

1. **R. Rinberg** and A. Nichani. *Improvements and Analysis of Private Ensemble-Based Federated Learning.* Pre-Print. 2021.
2. **R. Rinberg**, N. Agarwal. *Privacy when Everyone is Watching: An SOK on Anonymity on the Blockchain.* ePrint.

ARTICLES

1. **R. Rinberg**. *Resources for Public-Interest Technology.* <u>Medium</u> (self-published). 2020.
   Comprehensive list of resources for working in Public-Interest Technology. <u>Link</u>.
2. **R. Rinberg**. *Jell-O Brains and DNA: High School Students Launch Innovative STEM Program.* <u>Scientific American</u>. 2014.
   Invited article in 'Budding Scientist' series describing work leading Project BEST. <u>Link</u>.

TEACHING

NYU - General Physics I and II Tutor   SEP. 2017 - MAY 2018
- Tutored physics courses on classical mechanics and electricity & magnetism.

AWARDS, MEMBERSHIPS, CONFERENCES

Columbia 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

COMMUNITY ENGAGEMENT

Technically Private   2021 - PRESENT
Organizer and Founder
Technically Private is a group of graduate students that work in privacy and security spaces
- Organize group of inter-university graduate students in the privacy and security spaces, across legal, policy, and technical domains.

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.

Ouster Community Work   2018-2020
- Advocated management to institute paid volunteer-day and donate $6k to 6 public-interest orgs.

COURSES AND SOFTWARE SKILS

Selected CS Coursework: Neural Networks, Cryptography, ML, Computational Learning Theory, Foundations of Blockchain, Security, Theory of Computation, Operating Systems, Computer Systems Organization
Selected Interdisciplinary Coursework: Anonymity and Privacy, Policy for Privacy Technology
Selected Math Coursework: Honors Algebra, Analysis, Probability, Linear Algebra, Statistics

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Software and Programming Languages: Python, C, C++, Go, Linux, Pytorch, Tensorflow, Docker, AWS, Google Cloud Services, ROS, ELK Stack, Pandas, Jenkins, Artifactory, SQL, Webscraping, Opacus