

# Christopher Waites

Department of Computer Science  
School of Engineering  
Stanford University

Email: waites@stanford.edu  
Phone: +1 678 994 6546  
Web: chriswaites.com  
GitHub: github.com/ChrisWaites

## EDUCATION

- 2019– M.S. in Computer Science and M.A. in Public Policy, Stanford University
- Specialization in Artificial Intelligence
  - Cumulative GPA: 3.96
  - Organizations: Stanford Artificial Intelligence & Law Society (SAILS)
- 2015–19 B.S. in Computer Science, *summa cum laude*, Georgia Institute of Technology
- Thesis: *Towards Practical Differentially Private Deep Learning*
  - Advised by Rachel Cummings
  - Cumulative GPA: 3.97, Major GPA: 4.0
  - Organizations: Tau Beta Pi

## WORKSHOPS AND PUBLICATIONS

- 2021 Varun Gupta, Christopher Jung, Seth Neel, Aaron Roth, Saeed, Sharifi-Malvajerdi, and Chris Waites. Adaptive data deletion from machine learning models. 2021 **(In submission)**
- 2020 Chris Waites\* and Rachel Cummings. Differentially private normalizing flows for privacy-preserving density estimation. In *International Conference on Machine Learning Workshop in Invertible Neural Networks, Normalizing Flows, and Explicit Likelihood Models*, 2020
- 2019 Uthaipon Tantipongpipat\*, Chris Waites\*, Digvijay Boob, Amaresh Ankit Siva, and Rachel Cummings. Differentially private mixed-type data generation for unsupervised learning. 2019. URL <http://arxiv.org/abs/1912.03250> **(In submission)**
- 2018 Digvijay Boob, Rachel Cummings, Dhamma Kimpara, Uthaipon Tantipongpipat, Chris Waites, and Kyle Zimmerman. Differentially private synthetic data generation via gans. In *ACM CCS Workshop on the Theory and Practice of Differential Privacy*, 2018

## RESEARCH EXPERIENCE

- 2020– Independent Research, advised by Aaron Roth & Seth Neel
- Augmenting machine learning methods to allow for efficient data deletion to protect against arbitrary adversaries, using statistical similarity notions from differential privacy. Applications to recent legislation (GDPR, CCPA). Publication in progress.
- 2018–20 Differential Privacy Lab, advised by Rachel Cummings  
*Research Assistant*
- Lead investigator of novel approach to differentially private density estimation using normalizing flow models, enabling privacy-preserving likelihood evaluation and synthetic data generation. Resulted in two papers, an two open-source libraries, and two workshop poster presentations.
- 2020 Nuro AI, advised by Wei Liu (author of Single Shot Detector, GoogLeNet)  
*Research Intern*

- Reinforcement learning research for an autonomous vehicle startup. Investigating distributional reinforcement learning methods to allow for risk-adjustable decision making for local planning and control.
- 2019 UnifyID, advised by John Whaley & Vinay Prabhu  
*Research Fellow*
- Part-time research internship for local startup. Improved upon existing approaches to biometric authentication (GMM-UBM) from time-series data (e.g. accelerometric data corresponding to gait cycles) using normalizing flow models.
- 2017–18 BrainLab, advised by Melody Jackson  
*Research Assistant*
- Investigated signal processing and time series analysis techniques for human activity recognition from EEG data. Conducted a series of controlled human subject trials requiring IRB approval.

## ACADEMIC SERVICE

- 2021 Subreviewer, FORC 2021
- 2021 Program Committee, ICLR 2021 Workshop on Synthetic Data Generation: Quality, Privacy, Bias
- 2020 Reviewer, AISTATS 2021

## AWARDS

- 2019 Full-Tuition Guaranteed TAsip (Selectively awarded to top program applicants)  
*Stanford University, Stanford, California*
- 2019 \$20,000 First Prize Winner and People's Choice Award, Privacy Engineering Challenge  
*National Institute of Standards and Technology, Public Safety Communications Research Division*
- 32 competing teams, including those from UCLA, Johns Hopkins, Purdue, and other institutions.
- 2018 \$2,000 President's Undergraduate Research Award  
*Georgia Institute of Technology, Atlanta, Georgia*
- 2015 Full-Tuition Zell Miller Academic Scholarship  
*Georgia Institute of Technology, Atlanta, Georgia*

## TALKS AND PRESENTATIONS

- 2020 Differentially Private Normalizing Flows for Privacy-Preserving Density Estimation  
*Poster at the ACM CCS'20 Workshop on the Theory and Practice of Differential Privacy*
- 2020 Differentially Private Normalizing Flows for Privacy-Preserving Density Estimation  
*Poster at the 2<sup>nd</sup> ICML Workshop on Invertible Neural Networks, Normalizing Flows, and Explicit Likelihood Models*
- 2019 Privacy-Preserving Deep Learning for Healthcare  
*Guest Lecture for CS271: AI in Healthcare, Stanford University*
- 2019 Deep Generative Models for Accelerometric Gait Classification  
*UnifyID*
- 2018 Differentially Private Synthetic Data Generation  
*Two Sigma Investments*
- 2018 Differentially Private Synthetic Data Generation via GANs  
*Poster at the ACM CCS'18 Workshop on the Theory and Practice of Differential Privacy*
- 2017 Introductory Topics in Theoretical Computer Science  
*Facebook Inc.*

## TEACHING

- 2021 CS224n: Natural Language Processing with Deep Learning, Stanford University  
*Teaching Assistant under Chris Manning*
- 2020 CS229: Machine Learning, Stanford University  
*Teaching Assistant under Tengyu Ma, Chris Ré, & Andrew Ng*
- 2020 CS231n: Convolutional Neural Networks for Visual Recognition, Stanford University  
*Teaching Assistant under Fei-Fei Li*
- 2020 CS230: Deep Learning, Stanford University  
*Teaching Assistant under Andrew Ng*
- 2019 CS221: Artificial Intelligence, Stanford University  
*Teaching Assistant under Percy Liang & Dorsa Sadigh*
- 2018 CS7646: Machine Learning for Trading, Georgia Institute of Technology  
*Teaching Assistant under Tucker Balch*
- 2017 CS3600: Artificial Intelligence, Georgia Institute of Technology  
*Teaching Assistant under Mark Riedl*
- 2016 CS1331: Object-Oriented Programming, Georgia Institute of Technology  
*Head Teaching Assistant under Chris Simpkins*

## OPEN SOURCE

- 2020 JaxFlows (135 ★): Normalizing flows library for the JAX deep learning framework.
- 2018 PyVacy (112 ★): Differentially private optimization in PyTorch.

## ENGINEERING EXPERIENCE

- 2019 Two Sigma Investments  
*Intern, Options Market Making*
- 2018 Airbnb Inc.  
*Intern, Payments Team*
- 2018 Facebook Inc.  
*Intern, Probability Team*
- 2017 Bloomberg L.P.  
*Intern, Derivatives Pricing Team*

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