Gavin R. Brown **Curriculum Vitae**

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Education

PhD in Computer Science, January 2024
Boston University, Boston, Massachusetts
Advisor: Adam Smith
Dissertation: *Memorization and Privacy in Learning: Fundamental Limits and New Algorithms*

Bachelor of Science in Mathematics, May 2015
Case Western Reserve University, Cleveland, Ohio
Cumulative GPA: 3.36 / 4.0

Research Experience

Postdoctoral Scholar, advised by Sewoong Oh September 2023 - Present
Paul G. Allen School of Computer Science and Engineering, University of Washington

Graduate Research Assistant, advised by Adam Smith September 2019 - Septermber 2023
Computer Science Department, Boston University

Graduate Research Assistant, advised by Peter Chin September 2017 – December 2019
Computer Science Department, Boston University

Undergraduate Researcher, advised by David Gurarie December 2014 – May 2015
Mathematics Department, CWRU

Undergraduate Researcher, advised by Philip Taylor May 2012 – May 2013
Physics Department, CWRU

Professional Experience

Instructor October 2016 – August 2017
Kaplan Test Prep; Boston, Massachusetts

- Taught GRE, SAT, and ACT preparatory classes.

Junior Associate June 2015 – May 2016
Mu Sigma; Bangalore, India, and Wallingford, Connecticut

- Used statistics and machine learning techniques on large-scale marketing problems.

Awards

- COLT Best Student Paper Award, 2023
- Research Excellence Award 2022-2023, Boston University Department of Computer Science.
- Teaching Fellow Excellence Award, 2019-2020, Boston University Department of Computer Science.

Publications

- Maryam Aliakbarpour, Konstantina Bairaktari, **Gavin Brown**, Adam Smith, Nathan Srebro, and Jonathan Ullman. "Metalearning with Very Few Samples Per Task." *COLT 2024*. https://arxiv.org/abs/2312.13978

- **Gavin Brown**, Jonathan Hayase, Samuel B. Hopkins, Weihao Kong, Xiyang Liu, Sewoong Oh, Juan C. Perdomo, and Adam Smith. "Insufficient Statistics Perturbation: Stable Estimators for Private Least Squares." *COLT 2024*. https://arxiv.org/abs/2404.15409
- **Gavin Brown**, Krishnamurthy (Dj) Dvijotham, Georgina Evans, Daogao Liu, Adam Smith, and Abhradeep Thakurta. "Private Gradient Descent for Linear Regression: Tighter Error Bounds and Instance-Specific Uncertainty Estimation." *ICML 2024*. https://arxiv.org/abs/2402.13531
- **Gavin Brown**, Samuel B. Hopkins, and Adam Smith. "Fast, Sample-Efficient, Affine-Invariant Private Mean and Covariance Estimation for Subgaussian Distributions." *COLT 2023*. https://arxiv.org/abs/2301.12250
  Best Student Paper.
- **Gavin Brown**, Mark Bun, and Adam Smith. "Strong Memory Lower Bounds for Learning Natural Models." *COLT 2022.* https://arxiv.org/abs/2206.04743
- **Gavin Brown**, Shlomi Hod, and Iden Kalemaj. "Performative Prediction in a Stateful World." *AISTATS 2022.* https://arxiv.org/abs/2011.03885
- **Gavin Brown**, Marco Gaboardi, Adam Smith, Jonathan Ullman, and Lydia Zakynthinou. "Covariance-Aware Private Mean Estimation Without Private Covariance Estimation." *NeurIPS 2021 Spotlight*. https://arxiv.org/abs/2106.13329
- **Gavin Brown**, Mark Bun, Vitaly Feldman, Adam Smith, and Kunal Talwar. "When is Memorization of Irrelevant Training Data Necessary for High-Accuracy Learning?" *STOC 2021.* https://arxiv.org/abs/2012.06421
- Louis Jensen, **Gavin Brown**, Xiao Wang, Jacob Harer, and Sang Chin. "Deep Learning for Minimal-context Block Tracking through Side-channel Analysis." *ICASSP 2019.* IEEE, 2019.
- Xiao Wang, Quan Zhou, Jacob Harer, **Gavin Brown**, Shangran Qiu, Zhi Dou, John Wang, Alan Hinton, Carlos A. Gonzalez, and Peter Chin. "Deep learning-based classification and anomaly detection of side-channel signals." *Cyber Sensing 2018*. Vol. 10630. International Society for Optics and Photonics, 2018.
- Sang Chin, Jonathan Cohen, Alison Albin, Mykola Hayvanovych, Elizabeth Reilly, **Gavin Brown,** and Jacob Harer. "A Mathematical Analysis of Network Controllability Through Driver Nodes." *IEEE Transactions on Computational Social Systems* 4, no. 2 (2017): 40-51.
- Jiayuan Miao, **Gavin Brown**, and Philip Taylor. "Theoretically guided design of efficient polymer dielectrics." *Journal of Applied Physics* 115.9 (2014): 094104.

Talks

- Google Privacy Seminar. "Example Memorization in Learning: Batch and Streaming." August 17, 2022.
- Fields Workshop on Differential Privacy and Statistical Data Analysis. "Covariance-Aware Private Mean Estimation Without Private Covariance Estimation." July 26, 2022.
- COLT 22. "Strong Lower Bounds for Learning Natural Models." July 2, 2022.
- NeurIPS 21. "Covariance-Aware Private Mean Estimation Without Private Covariance Estimation." January 9, 2021. Prerecorded.
- University of Washington Theory Lunch. "Covariance-Aware Private Mean Estimation Without Private Covariance Estimation." October 29, 2021.
- Boston University AI Research Initiative Seminar. "When Is Memorization of Irrelevant Training Data Necessary for High-Accuracy Learning?" October 25, 2021.
- STOC 21. "When Is Memorization of Irrelevant Training Data Necessary for High-Accuracy Learning?" June 21, 2021.
- Penn State University Statistical Data Privacy Seminar. "When Is Memorization of Entire Examples Necessary for High-Accuracy Learning?" May 6, 2021.

- Hebrew University Theory Seminar. "When Is Memorization of Entire Examples Necessary for High-Accuracy Learning?" May 5, 2021.
- Workshop on the Theory of Overparameterized Machine Learning. "When Is Memorization of Irrelevant Training Data Necessary for High-Accuracy Learning?" April 20, 2021.
- Boston University Probability and Statistics Seminar. "When Is Memorization of Entire Examples Necessary for High-Accuracy Learning?" April 11, 2021.

Program Committees Service and Reviewing

COLT 2024; ICML 2024; ICLR 2024; NeurIPS 2023; AISTATS 2023; FAccT 2022, 2023; TPDP 2022, 2024.

Teaching Experience

Boston University Teaching Fellow

- CS 537 – Randomness in Computing, Spring 2020, with Sofya Raskhodnikova
- CS 330 – Introduction to Algorithms, Fall 2019, with Adam Smith
- CS 542 – Machine Learning, Summer I 2019, with Peter Chin
- CS 112 – Introduction to Computer Science II, Fall 2018, with Christine Papadakis-Kanaris
- CS 542 – Machine Learning, Spring 2018, with Peter Chin

GRE, SAT, and ACT Instructor, Kaplan Test Prep

Technical Skills

Machine learning, differential privacy, algorithm design, data analysis, Bayesian computation, information theory, linear algebra, Python, written communication, oral communication.

Key Graduate Coursework

- CS 591 – Adaptive Data Analysis
- MA 882 – Large-Scale Bayesian Methods
- CS 537 – Randomness in Computing
- CS 511 – Formal Methods
- MA 717 – Functional Analysis
- CS 640 – Artificial Intelligence
- CS 591 – Introduction to Natural Language Processing
- CS 535 - Computational Complexity