David Brandfonbrener

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Employment

2023-Present **Harvard University**, Research Fellow.
Kempner Institute for the Study of Natural & Artificial Intelligence

Education

2018-23 **New York University**, PhD, Computer Science Department, Courant Institute.
Advised by Joan Bruna in the CILVR group
Thesis: Bridging the Gap from Supervised Learning to Control

2014-18 **Yale University**, Bachelor of Arts in Mathematics (Intensive) with distinction and Bachelor of Arts in Computer Science with distinction, magna cum laude.

Internships

2022 **Google Brain Robotics (NYC)**, research internship, working on offline RL from teleoperated data for robotic manipulation with Jake Varley and Stephen Tu.

2021 **Microsoft Research (Montreal, virtual)**, research internship, worked on uncertainty quantification for offline RL with Romain Laroche and Remi Tachet des Combes.

2019 **Facebook AI Research (Paris)**, research internship, worked on regret bounds for randomized RL with function approximation with Alessandro Lazaric and Matteo Pirotta.

Awards and Grants

2022-23 **Google Research Collab Grant**.

2019-22 **National Defense Science and Engineering Graduate (NDSEG) Fellowship**.

Preprints

2024 **Repeat After Me: Transformers are Better than State Space Models at Copying**, S. Jelassi, D. Brandfonbrener, S. Kakade, E. Malach.
In Submission, `https://arxiv.org/abs/2402.01032`

2024 **Q-probe: A Lightweight Approach to Reward Maximization for Language Models**, K. Li, S. Jelassi, H. Zhang, S. Kakade, M. Wattenberg, D. Brandfonbrener.
In Submission, `https://arxiv.org/abs/2402.14688`

2024 **Verified Multi-Step Synthesis using Large Language Models and Monte Carlo Tree Search**, D. Brandfonbrener, S. Raja, T. Prasad, C. Loughridge, F. Cassano, J. Yang, S. Henniger, W. Byrd, R. Zinkov, N. Amin.
In Submission, `https://arxiv.org/abs/2402.08147`

Conference Papers

2023 **Inverse Dynamics Pretraining Learns Good Representations for Multitask Imitation**, D. Brandfonbrener, O. Nachum, J. Bruna.
Conference on Neural Information Processing Systems (NeurIPS) 2023,
https://arxiv.org/abs/2305.16985

2023 **Visual Backtracking Teleoperation: A Data Collection Protocol for Image-Based Offline RL**, D. Brandfonbrener, S. Tu, A. Singh, S. Welker, C. Boodoo, N. Matni, J. Varley.
The International Conference on Robotics and Automation (ICRA) 2023,
https://arxiv.org/abs/2210.02343

2022 **When Does Return-Conditioned Supervised Learning Work for Offline RL?**, D. Brandfonbrener, A. Bietti, J. Buckman, R. Laroche, J. Bruna.
Conference on Neural Information Processing Systems (NeurIPS) 2022,
https://arxiv.org/abs/2206.01079

2021 **Offline RL Without Off-Policy Evaluation**, D. Brandfonbrener, W. Whitney, R. Ranganath, J. Bruna.
Conference on Neural Information Processing Systems (NeurIPS) 2021 *(spotlight, top 3%)*,
https://arxiv.org/abs/2106.08909

2021 **Offline Contextual Bandits with Overparameterized Models**, D. Brandfonbrener, W. Whitney, R. Ranganath, J. Bruna.
International Conference on Machine Learning (ICML) 2021,
https://arxiv.org/abs/2006.15368

2020 **Frequentist Regret Bounds for Randomized Least-Squares Value Iteration**, A. Zanette*, D. Brandfonbrener*, E. Brunskill, M. Pirotta, A. Lazaric.
International Conference on Artificial Intelligence and Statistics (AISTATS) 2020,
https://arxiv.org/abs/1911.00567

2020 **Geometric Insights into the Convergence of Nonlinear TD Learning**, D. Brandfonbrener, J. Bruna.
International Conference on Learning Representations (ICLR) 2020,
https://arxiv.org/abs/1905.12185

Workshop Papers

2022 **Incorporating Explicit Uncertainty Estimates into Deep Offline Reinforcement Learning**, D. Brandfonbrener, R. Tachet des Combes, R. Laroche.
The 5th Multidisciplinary Conference on Reinforcement Learning and Decision Making (RLDM) 2022,
https://arxiv.org/abs/2206.01085

2022 **Don't Change the Algorithm, Change the Data: Exploratory Data for Offline Reinforcement Learning**, D. Yarats*, D. Brandfonbrener*, H. Liu, M. Laskin, P. Abbeel, A. Lazaric, L. Pinto.
The 5th Multidisciplinary Conference on Reinforcement Learning and Decision Making (RLDM) 2022,
https://arxiv.org/abs/2201.13425

2021 **Quantile Filtered Imitation Learning**, D. Brandfonbrener, W. Whitney, R. Ranganath, J. Bruna.
The Offline Reinforcement Learning Workshop at NeurIPS 2021,
https://arxiv.org/abs/2112.00950

2021 **Evaluating Representations by the Complexity of Learning Low-loss Predictors**, W. Whitney, M.J. Song, D. Brandfonbrener, J. Altosaar, K. Cho.
Neural Compression: From Information Theory to Applications Workshop at ICLR 2021,
https://arxiv.org/abs/2009.07368

Publications Outside of Computer Science

2021 **PsychRNN: An Accessible and Flexible Python Package for Training Recurrent Neural Network Models on Cognitive Tasks**, D. Ehrlich, J. Stone, D. Brandfonbrener, A. Atanasov, J. Murray.
ENeuro, Volume 8, Issue 1, Society for Neuroscience,
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7814477/

2018 **Two-vertex Generators of Jacobians of Graphs**, D. Brandfonbrener, P. Devlin, N. Friedenberg, Y. Ke, S. Marcus, H. Reichard, and E. Sciamma.
The Electronic Journal of Combinatorics, 25 (2018),
https://arxiv.org/abs/1708.03069

Teaching

2021 **Teaching assistant**, DS-GA-3001: Tools and Techniques for Machine Learning.

2020 **Teaching assistant**, CSCI-GA-3033-020: Mathematics of Deep Learning.

Service

Outstanding reviewer (or equivalent), ICLR 2021, ICLR 2022, ICML 2022, NeurIPS 2022.

Reviewer, NeurIPS 2019-23, ICML 2020-24, ICLR 2020-23, TMLR 2022-24, AISTATS 2021, CoRL 2023.

Organizer, ML in NYC speaker series 2022-present, CILVR lab seminar 2019-2021, NYU Reinforcement Learning reading group 2019-2021.

Talks

2024 **Repeat After Me, Transformers are Better than SSMs at Copying**.
Flatiron Institute

2023 **Bridging the Gaps: Supervised Learning to Control and Theory to Practice**.
Berkeley, Stanford, MIT, Microsoft, Harvard

2022 **Simplifying Deep Offline RL**.
FAIR RL Seminar

2022 **Tutorial: Foundations of Offline Reinforcement learning (with Romain Laroche)**.
Microsoft, https://www.youtube.com/watch?v=lH9DzugrejY

2021 **Offline RL without Off-Policy Evaluation**.
Microsoft RL Seminar