Curtis McDonald

3001 Telegraph Avenue
Berkeley, CA 94705

Email: c.mcdonald.simons@berkeley.edu
Website: https://cmcdonald-1.github.io/

Education

Yale University, New Haven, CT — May 2025
Ph.D. in Statistics and Data Science
Advisor: Andrew Barron
Francis J. Anscombe award for outstanding academic performance
Thesis: "Computation and Estimation for Neural Networks via Log-Concave Coupling"

Queen's University, Kingston, ON — November 2019
M.A.Sc. in Applied Mathematics and Engineering
Advisor: Serdar Yüksel
GPA: 4.08 / 4.3
Thesis: "Filter Stability, Observability and Robustness for Partially Observed Stochastic Dynamical Systems"

Queen's University, Kingston, ON — June 2017
B.A.Sc. in Applied Mathematics and Engineering
Specialisation in Computing and Communications
GPA: 4.12 / 4.3
Thesis: "Decentralized Learning for Power Grid Control"

Professional Positions

Simons Institute, UC Berkeley, Berkeley, CA — September 2025–
Machine Learning Pod
Postdoctoral Researcher
Hosted by Peter Bartlett

Research Interests

Sampling and optimization; statistical learning theory; foundations of neural networks; Bayesian computation; stochastic control and filtering; robustness and generalization.

Publications

Selected Publications

- **McDonald, C.**, Barron, A. *"Rapid Bayesian Computation and Estimation for Neural Networks via Log-Concave Coupling"*. November, 2024. [arXiv]
- **McDonald, C.**, Barron, A. (2022) *"Proposal of a Score Based Approach to Sampling Using Monte Carlo Estimation of Score and Oracle Access to Target Density"*. NeurIPS 2022 Conference Workshop on Score Based Methods. [Link]
- **McDonald, C.**, Yüksel, S. *"Robustness to incorrect priors and controlled filter stability in partially observed stochastic control"*. SIAM Journal on Control and Optimization. vol 60, issue 22 . April 2022. [Link] [arXiv]

Journal Articles

- **McDonald, C.**, Yuksel, S. *"Stochastic Observability and Filter Stability under Several Criteria"*. IEEE Trans. Automatic Control. vol. 69, no. 5, pp. 2931-2946, May 2024. [Link]
- **McDonald, C.**, Yüksel, S. *"Exponential filter stability via Dobrushin's coefficient"*. Electronic Communications in Probability. vol 20, no. 53. pp. 1-13. August 2020. [Link]
- **McDonald, C**., Alajaji, F., Yüksel, S. *"Two-Way Gaussian Networks with a Jammer and Decentralized Control"*. IEEE Transactions on Control of Network Systems. vol. 7, no. 1, pp. 446-457, March 2020. [Link]

Conference Papers

- **McDonald, C.**, Barron, A. (2024) *"Log-Concave Coupling for Sampling Neural Net Posteriors"*. 2024 IEEE International Symposium on Information Theory (ISIT). (Accepted May, 2024.)[Link]
- **McDonald, C**., Yüksel, S. (2019) *"Observability and Filter Stability for Partially Observed Markov Processes"*. 2019 IEEE 58th Conference on Decision and Control (CDC). pp. 1623-1628. [Link]
- **McDonald, C.**, Yüksel, S. (2018) *"Stability of Non-Linear Filters, Observability and Relative Entropy"*. 2018 56th Annual Allerton Conference on Communication, Control, and Computing (Allerton). pp 110 - 114. [Link]
- **McDonald, C.**, Alajaji, F., Yüksel, S. (2018) *"Two-Way Gaussian Channels with an Intelligent Jammer"*. 2018 Annual American Control Conference (ACC). pp. 1784- 1789. [Link]

Fellowships and Awards

NSERC Postgraduate Scholarships – Doctoral	Yale University	$63,000	2019-2021
Alexander G. Bell Canada Graduate Scholarship	Queen's University	$17,500	2018
Queen Elizabeth II Scholarship Science Technology	Queen's University	$15,000	2017

Teaching Experience

Yale University, New Haven, CT
Teaching Assistant 2020–2025

- Contributed to undergraduate and graduate instruction in statistics and data science, including linear models, stochastic processes, and introductory machine learning.
- Led office hours, graded coursework, and supported course design, including transitions to online and hybrid formats.
- Recognized by students and faculty for clear, accessible explanations of mathematically sophisticated material.

Queen's University, Kingston, ON
Teaching Assistant 2015–2019

- Led tutorials for first-year calculus and linear algebra and upper-year signal processing courses.
- Nominated for a Teaching Assistant Excellence Award (2018).
- Delivered all lectures and coordinated instruction for a 300-student calculus course during a two-week instructor leave of absence.

Prepared to Teach Independently: Probability, statistics, stochastic processes, machine learning, optimization, linear algebra.

Other Publications

Data Science Applications

- Sieberer J. M., Park N., Manafzadeh A. R., Desroches S. T., Brennan K., **McDonald C.**, Tommasini S. M., Wiznia D. H., Fulkerson J. P. *"Visualization of Trochlear Dysplasia Using 3-Dimensional Curvature Analysis in Patients With Patellar Instability Facilitates Understanding and Improves the Reliability of the Entry Point to Trochlea Groove Angle"*. Arthroscopy, Sports Medicine, and Rehabilitation. September, 2024. [Link]
- Sieberer J. M., Park N., Rancu A. L., Desroches S. T., **McDonald C.**, Manafzadeh A. R., Tommasini S. M., Wiznia D. H., Fulkerson J. P. *"Analyzing Alignment Error in Tibial Tuberosity–Trochlear Groove Distance in Clinical Scans Using 2D and 3D Methods"*. The American Journal of Sports Medicine. September, 2024. [Link]
- Beitler B. G., Sieberer J., Islam W., **McDonald C.**, Yu K., Tommasini S. M., Fulkerson J. P. *"The Morphologic Patella Entry Point Into The Proximal Trochlea Is More Lateral in Recurrent Dislocators Than Controls as Measured by Entry Point-Trochlear Groove Angle"*. Arthroscopy: The Journal of Arthroscopic and Related Surgery. May, 2024. [Link]
- Kim, J., **McDonald, C.**, Meosky, P., Katsaros, M., Tyler, T. *"Promoting Online Civility Through Platform Architecture"*. Journal of Online Trust and Safety. vol 1, issue 4. September 2022. [Link]
- Kumar N., Corpus I., Hans M., Harle N., Yang N., **McDonald C.**, Nakamura Sakai S., Janmohamed K., Chen K., Altice F. L., Tang W., Schwartz J. L., Jones-Jang S. M., Saha K., Memon S. A., Bauch C. T., Choudhury M. D., Papakyriakopoulos O., Tucker J. D., Goyal A., Tyagi A., Khoshnood K., Omer S. *"COVID-19 vaccine perceptions in the initial phases of US vaccine roll-out: an observational study on reddit"*. BMC Public Health. vol 22, issue 1, March 2022. [Link]

Dissertations

- McDonald, Curtis James. *"Computation and Estimation for Neural Networks via Log-Concave Coupling"*. Diss. Yale University (USA), 2025.[Link]
- Mcdonald, Curtis James. *"Filter Stability, Observability and Robustness for Partially Observed Stochastic Dynamical Systems"*. Diss. Queen's University (Canada), 2019. [Link]