

Curtis McDonald

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Education

Yale University, New Haven, CT

Ph.D. in Statistics and Data Science

Expecting May 2025

Thesis: “Stochastic Methods for Training of Neural Networks”

Queen’s University, Kingston, ON

M.A.Sc in Applied Mathematics and Engineering

GPA: 4.08/4.3

Conferred November 2019

Thesis: “Filter Stability, Observability and Robustness for
Partially Observed Stochastic Dynamical Systems”

Queen’s University, Kingston, ON

B.A.S in Applied Mathematics and Engineering,

Specialisation in Computing and Communications

GPA: 4.12/4.3

Conferred June 2017

Thesis: “Decentralized Learning for Power Grid Control”

Publications

Preprints

- **McDonald, C.**, Barron, A. “*Rapid Bayesian Computation and Estimation for Neural Networks via Mixture Distributions*”. November, 2024. 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. “*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]
- **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.).
- **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. (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]

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. *“Filter Stability, Observability and Robustness for Partially Observed Stochastic Dynamical Systems”*. Diss. Queen’s University (Canada), 2019. [Link]

Grants and Awards

NSERC Postgraduate Scholarships – Doctoral	Yale University	\$63,000	2019-2021
Alexander G. Bell Canada Graduate Scholarship	Queen’s University	\$17,500	2018
Frank E. Smith Fellowship	Queen’s University	\$2,800	2018
Queen Elizabeth II Scholarship Science Technology	Queen’s University	\$15,000	2017
NSERC Undergraduate Summer Research Award	Queen’s University	\$4,500	2016-2017
Wm. Roy Hardick Scholarship	Queen’s University	\$2,900	2016
Marion and Arthur Wonnacott Scholarship	Queen’s University	\$1,100	2015
Les Gulko Award	Queen’s University	\$675	2015
Nelie and Ralph Jeffrey Award	Queen’s University	\$300	2015-2016
President’s Scholarship	Queen’s University	\$8,000	2013-2014
Cenntenial Scholarship	State Farm Insurance	\$20,000	2013-2016

Teaching Experience

Yale University, New Haven, CT

Teaching Assistant, 2020-Present

Led office hours and graded assignments for variety of statistics courses: e.g. linear models, stochastic processes, introductory machine learning. Advised on course content and adapted to on-line instruction during changes to course structure. Received numerous compliments from students and faculty adviser that my ability to explain complex concepts with simplicity was very beneficial to students’ experience in the course.

Queen’s University, Kingston, ON

Teaching Assistant, 2015-2019

Taught first year calculus and linear algebra, third year signal processing and analysis. Responsibilities included leading weekly tutorial sessions, advising on course content, and marking assignments. Nominated by students for TA excellence award 2018. Over a two week period in 2019 when the professor was ill, I gave all lectures and guided most aspects of the 300 student calculus course.

Queen’s University, Kingston, ON

Douglas Tutor, 2014-2017

Led biweekly review sessions for first year engineering students. Fielded questions on a wide range of topics and adapted to changing conditions in each session. Drew upon past experience to guide students through analytically thinking and problem solving techniques.