Cameron Martin

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EDUCATION

Master of Science in Mathematics September 2020 - August 2021
University of Toronto

Honours Bachelor of Science with High Distinction September 2015 - December 2019
University of Toronto
Applied Mathematics specialist, Physics major, History and Philosophy of Science minor
cGPA: 3.73

RESEARCH EXPERIENCE

Natural Sciences and Engineering Research Council (NSERC) of Canada Award May 2020 – August 2020
Supervisor: Israel Michael Sigal

Learned general theory of open quantum systems and quantum information channels. Investigated models of the quantum measurement process and their approximate semi-classical treatment.

Fields Undergraduate Summer Research Program (FUSRP) July 2019 – August 2019
Supervisors: Adam Stinchcombe and Mihai Nica

Investigated machine learning methods for numerical solutions of partial differential equations. Wrote Python code collaboratively using Bitbucket and used PyTorch for machine learning.

Research Assistant May 2019 – June 2019
Department of Mathematics, University of Toronto
Supervisor: Adam Stinchcombe

Developed a model of oscillatory behaviour in the reward pathway of the mammalian brain. Learned and applied theoretical tools for analyzing dynamical systems. Used MATLAB to solve differential equations, implement data-fitting methods such as simulated annealing, and create useful visuals such as bifurcation diagrams.

Research Assistant September 2018 – February 2019
Department of Astronomy & Astrophysics, University of Toronto
Supervisor: Diana Valencia

Assisted with various coding, data gathering, and mathematical tasks such as: finding and plotting elemental ratios in stars, planets, and meteorites; fitting probability distributions to histograms of star element data.

Math Research Intern June 2018 – August 2018
Department of Mathematics, University of Toronto
Supervisor: Adam Stinchcombe

Assisted in research involving mathematical modeling of the reward system and circadian rhythms of mice.

Research Student September 2017 - April 2018
Institute for the History and Philosophy of Science and Technology, University of Toronto
Supervisor: Hakob Barseghyan

Conducted independent research in the history and structure of scientific change as part of U of T's Research Opportunity Program.

TEACHING EXPERIENCE

Math & Physics Tutor September 2019 – December 2019
MSES Tutoring

Teaching Assistant September 2020 - December 2020
MAT292H - Ordinary Differential Equations

Teaching Assistant September 2020 - April 2021
MAT235Y - Calculus II

EMPLOYMENT EXPERIENCE

Corporate Actuarial Analyst January 2020 - August 2020
Economical Insurance

Math & Physics Tutor September 2019 – December 2019
MSES Tutoring

Offseason Instructor November 2016 - March 2018 (winter & spring)
North Toronto Baseball Association

TALKS

Characterization of Physically Realizable Superoperators December 2018

As part of APM421 - Mathematical Foundations of Quantum Mechanics. Main resource: section 11.1 ("Physically realizable superoperators: characterization") in *Classical and Quantum Computation* by Kitaev, Shen, and Vyalyi.

The Rotating Heavy String April 2019

As part of APM446 - Applied Nonlinear Equations. Main resource: section 6.1 ("The rotating heavy string") in *A Primer of Nonlinear Analysis* by Ambrosetti and Prodi.

Machine Learning Methods for Numerical Solutions to PDEs August 2019

Final presentation at the FUSRP. See slides and recording at http://cameronmartin.ca/FUSRP.

Brownian Motion, Itô Integrals, and the Feynman-Kac Formula December 2019

As part of a reading course on Brownian motion. Main resources: course notes, *Brownian Motion* by Mörters and Peres.

The Mathematics of Card Shuffling December 2020

University of Toronto Math Graduate Student Seminar. See slides and recording at http://cameronmartin.ca/shuffling.

ACADEMIC HONOURS

Regents Admission Scholarship	2015
Mrs. F N G Starr Scholarship	2016
T-Holder's Academic Excellence Award	2016
The Isabel Bader In-Course Scholarship	2017
Dean's List Scholar	2016, 2017, 2018, 2019

TECHNICAL SKILLS

Computer Languages & Software

Python, MATLAB, R, LaTeX, Microsoft Excel, XPP AUTO

PREPRINTS

Solving Elliptic Equations with Brownian Motion: Bias Reduction and Temporal Difference Learning
Cameron Martin, Hongyuan Zhang, Julia Costacurta, Mihai Nica, Adam R. Stinchcombe

IN PREPARATION

A Model of the Dopamine Regulated Circadian Oscillator (DARCO)
Adam R. Stinchcombe, Martin Ralph, Cameron Martin, Benjamin Fattori

EXTRA-CURRICULAR INVOLVEMENT

Varsity Athlete Fall 2015, Fall 2017

Baseball player for the U of T Varsity Blues.

Student Union Executive May 2017 - April 2019

Elected in two consecutive years to the executive team of the U of T Physics Student Union as Vice President Communications.

Volunteer Notetaker September 2017 - April 2018

Volunteer notetaker for upper-level math courses.

Baseball Analytics May 2017 - April 2019

Contributed articles to Fangraphs (baseball analytics website) Community Research.