NICOLE DUMONT

Graduate Student

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EDUCATION

Computer Science (PhD)

University of Waterloo

Sept 2019 – Present Waterloo, Canada

- Studying computational neuroscience, focusing on modelling grid cells and spatial navigation

Computational Mathematics (Masters of Mathematics)

University of Waterloo

Sept 2017 – April 2019 Waterloo, Canada

- Cumulative average of 90.57 %
- Completed a masters research paper on robust optimization of an asset pricing model used to price carbon emissions.
- Courses on optimization, computational statistics, numerical analysis, PDEs, and computational neuroscience.

Honors Mathematics and Physics (Bachelors of Science)

McMaster University

Sept 2012 – April 2017 Hamilton, Canada

- Cumulative average of 10.5/12.0 (GPA 3.8)
- Graduated with distinction
- Courses on stochastic processes, statistical mechanics, dynamical systems, cryptography, quantum computing, quantum mechanics, and scientific computation.

WORK

Research Associate

Cayuga Research

May 2018 – Present Waterloo, Canada

- Worked as a part of a team for consulting work focused on the development and implementation of advanced optimization methods and data driven solutions to industrial problems.
- Built prototype flight path optimization software able to plan flights that save up to 5% in fuel costs compared to real commercial flights.
- Worked on a chiller plant optimization problem, developing data-driven models of the plant components and an optimization method that produced 4% energy savings.

Summer Research Assistant

Ayers Research Group, Department of Chemistry & Chemical Biology, McMaster University

May 2015 – Aug 2015 Hamilton, Canada

- Constructed equations constraining a two-electron reduced density matrix (2-RDM) to represent a many-electron quantum system.
- Implemented a semi-definite optimization algorithm for constraining the density matrix.

HONORS & AWARDS

- University of Waterloo Graduate Scholarship (2018)
- The Emanuel Williams Scholarship in Physics (2014)
- Deans' Honour List (2013)

COURSE PROJECTS

Constructing Textual Artificial Conversational Entities using Deep Learning

STAT 841: Statistical Learning - Classification

- Built a chatbot using a sequence-to-sequence model with long short-term memory (LSTM) units and an attention mechanism.

Dirichlet Mixture Model Library

STAT 840: Computational Inference

- Developed a library in Julia (and an R package wrapper) using Dirichlet process mixture models to perform unsupervised, non-parametric clustering.

Spatial Memory with Semantic Pointers

SYDE 750: Simulating Neurobiological Systems

- Implemented a method for encoding continuous variables with spiking neurons using the Semantic Pointer Architecture and the Nengo library.

Spatial Epidemics Dynamics and Synchronization

Math 4MB3: Mathematical Biology

- Implemented a stochastic model of infectious disease spread and investigated the conditions required for spatial synchronization of disease outbreaks.

SKILLS

Python, Matlab, R, Keras, Nengo