DEXTER BARROWS

CURRICULUM VITAE

About https://dexter.barrows.io
Contact dexter@barrows.io

Education

Doctor of Philosophy – Mathematics Ryerson University Present

Research Stochastic biochemical networks
Supervisors Dr. Silvana Ilie & Dr. Katrin Rohlf
Languages `R, C++`

Master of Science – Applied Mathematics McMaster University 2016

Thesis *A Comparative Study of Techniques for Estimation and Inference of Nonlinear Stochastic Time Series*
Supervisor Dr. Ben Bolker
Link https://github.com/dbarrows/epidemic-forecasting
Languages `R, C++`
Frameworks `CUDA`

Bachelor of Science – Mathematics / Computer Science Ryerson University 2014

Thesis *Software for Multi-level Monte-Carlo Simulation of Stochastic Biochemical Kinetics*
Supervisor Dr. Silvana Ilie
Link https://github.com/dbarrows/biochemical-kinetics
Languages `MATLAB`
Frameworks `CUDA`

Experience

Graduate Assistant Ryerson University 2019–Present

Run tutorials and labs, and invigilate and grade quizzes and tests.
Courses Numerical Analysis

Software Developer 7D Surgical 2017–2019

Developed software components for medical embedded systems, with a focus on algorithms for GPU-accelerated 3D image processing and UI design.
Languages `C#, C++`
Frameworks `CUDA, WPF`

Research Assistant Biophotonics and Bioengineering Laboratory (BBL) 2015–2017

Designed algorithms for GPU-accelerated medical image processing and semi-automated anatomical segmentation.
Languages `C++, MATLAB`
Frameworks `CUDA`

Teaching Assistant McMaster University 2014–2016

Ran tutorials and labs, and invigilated and graded tests and exams.

Courses Introduction to Scientific Computing, Calculus for Life Sciences

Languages `Python`

Data Analyst Canadian Society of Association Executives (CSAE) 2013

Performed data sourcing, verification, and analysis.

Math / Science Tutor The Math Guru 2010–2014

Taught mathematics up to 1st-year university courses, and physics up to 12th grade

Awards

Postgraduate Scholarship – Doctoral (PGS D) NSERC 2020–2023

National scholarship supporting high-calibre scholars who are engaged in doctoral programs in the natural sciences or engineering.

Queen Elizabeth II – Science and Technology (QEII-GSST) Ryerson University 2019–2020

Provincial merit-based scholarship for students in a graduate research-based programs in a science and technology discipline.

Publications

Inference of Stochastic Biochemical System Reaction Rates ISMB 2020

Authors **D Barrows**, S Ilie

A Software Ecosystem for Stochastic Biochemical Network Simulation in R SIAM/CAIMS Annual Meeting 2020

Authors **D Barrows**, K Rohlf, S Ilie

Optical coherence tomography for dynamic axial correction of an optical end-effector for robot-guided surgical laser ablation Optical Engineering 2019

Authors J Jivraj, C Chen, **D Barrows**, VXD Yang

Link `https://doi.org/10.1117/1.OE.58.5.054106`

Optimization of laser osteotomy at 1064 nm using a graphite topical absorber and a nitrogen assist gas jet Biomedical Optics Express 2019

Authors J Jivraj, **D Barrows**, X Gu, VXD Yang

Link `https://doi.org/10.1364/BOE.10.003114`

Graphics processor unit acceleration enables realtime endovascular Doppler optical coherence tomography imaging SPIE Photonics West 2017

Authors **D Barrows**, B Vuong, K Lee, J Jivraj, VXD Yang

Link `https://doi.org/10.1117/12.2254930`

Graphics processor unit acceleration enables realtime endovascular Doppler optical coherence tomography imaging: development and validation — SPIE Photonics West — 2017

Authors D Barrows, JM Ramjist, B Vuong, K Lee, J Jivraj, VXD Yang
Link https://doi.org/10.1117/12.2256623

Assessment of haemodynamics of intracranial aneurysms using Doppler optical coherence tomography in patient specific phantoms: preliminary results — SPIE Photonics West — 2017

Authors JM Ramjist, J Jivraj, D Barrows, B Vuong, R Wong, VXD Yang
Link https://doi.org/10.1117/12.2256532

Software

rendr — R, C++ — 2020

An R package for simulating reaction and reaction-diffusion systems.
Link https://dexter.barrows.io/rendr

mountie — R, C++ — 2020

An R package providing an efficient C++ implementation of the Reactive Multi-Particle Collisions (RMPC) algorithm.
Link https://dexter.barrows.io/mountie

bondr — R, C++ — 2020

Provides utilities and classes for working with reaction networks in R.
Link https://dexter.barrows.io/bondr

wplot — R — 2020

A clean theme for ggplot2 with matching geom defaults.
Link https://dexter.barrows.io/wplot

MARS — MATLAB — 2014

MATLAB code for simulating well-stirred biochemical systems.
Link https://github.com/dbarrows/biochemical-kinetics/tree/master/code

Certifications

Data Science — University of Toronto — 2018–Present

Modelling, visualisation, big data, and machine learning.
Languages Python
Frameworks scikit-learn

LBR iiwa – Commissioning and Programming — KUKA College — 2017

Operation and programming of the KUKA LBR iiwa personal robotic assistant, including safe interaction, manual operation, basic maintenance, authoring robotic applications, and debugging.
Languages Java

Leadership

President, Mathematics Course Union (MCU) Ryerson University 2013–2014

Acted as a liaison between students, the Department of Mathematics, and the Faculty of Science.

Committees Curriculum Advising Committee, By-law Revising Subcommittee, Ryerson Science Society (RSS) Steering Committee

Vice President – Financial, Ryerson Science Society (RSS) Ryerson University 2012-2013

Ensured transparent flow of financial resources for student events