DEXTER BARROWS

CURRICULUM VITAE

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 – 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 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 `WFP, CUDA`

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 / Sciance Tutor The Math Guru 2010–2014

Awards

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

Merit-based scholarship for students in a research master's or doctoral program in a science and technology discipline.

Publications

A Software Ecosystem for Stochastic Biochemical Network Simulation in R (proposal submitted) 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 hemodynamics 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/code/R-Packages/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/code/R-Packages/mountie

bondr — R / C++ — 2020
Provides utilities and classes for working with reaction networks in R.
Link https://dexter.barrows.io/code/R-Packages/bondr

emplot — R — 2020
A clean theme for ggplot2 with matching geom defaults.
Link https://dexter.barrows.io/code/R-Packages/emplot

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