

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 / Science 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

<i>A Software Ecosystem for Stochastic Biochemical Network Simulation in R (proposal submitted)</i>	SIAM / CAIMS Annual Meeting	2020
Authors	D Barrows, K Rohlf, S Ilie	
<i>Optical coherence tomography for dynamic axial correction of an optical end-effector for robot-guided surgical laser ablation</i>	Optical Engineering	2019
Authors	J Jivraj, C Chen, D Barrows, VXD Yang	
Link	https://doi.org/10.1117/1.OE.58.5.054106	
<i>Optimization of laser osteotomy at 1064 nm using a graphite topical absorber and a nitrogen assist gas jet</i>	Biomedical Optics Express	2019
Authors	J Jivraj, D Barrows, X Gu, VXD Yang	
Link	https://doi.org/10.1364/BOE.10.003114	
<i>Graphics processor unit acceleration enables realtime endovascular Doppler optical coherence tomography imaging</i>	SPIE Photonics West	2017
Authors	D Barrows, B Vuong, K Lee, J Jivraj, VXD Yang	
Link	https://doi.org/10.1117/12.2254930	
<i>Graphics processor unit acceleration enables realtime endovascular Doppler optical coherence tomography imaging: development and validation</i>	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	
<i>Assessment of hemodynamics of intracranial aneurysms using Doppler optical coherence tomography in patient specific phantoms: preliminary results</i>	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	