Matthew Burke

+14036049368 | matthew.burke@cantab.net | https://mwpb.uk

Education

Macquarie University, Sydney
Doctor of Philosophy in Mathematics 2011-2015

Christ's College, University of Cambridge
Part III Mathematics (MMATH) 2010-2011
Bachelor's Degree in Mathematics (BA) 2007-2010

Selected Work Experience

University of Calgary Sep 2018 - Present
Sessional instructor & Sep 2017 - Dec 2017

- Lectured 4 classes of around 230 students for the MATH211 and MATH249 courses.
- Used Jupyter notebooks for interactive visualisations and showing intermediate steps.

University of Calgary Sep 2017 - Present
Postdoctoral scholar

- Initiated a cross-discipline collaboration between the departments of mathematics and computer science with my supervisors. Published in a respected peer-reviewed journal.
- Provided mentoring support for two PhD students.
- Reviewed papers for two mathematics journals. Organised the University of Calgary Peripatetic Seminar and chaired a session of the Alberta Mathematics Dialogue 2018.

MathSpire Ltd. Nov 2016 - Aug 2017
Chief technology officer

- Developed a functional reactive cross-platform mobile and desktop application to teach A-level mathematics using interactive graphs, videos and integrated testing.
- Created a web front-end and API for teachers to track student progress.
- Showcased application at the BETT eduction technology conference.

Debate Chamber Ltd. Jul 2016 - Aug 2016
Summer school tutor

- Guided classes of around 14 A-level students through university level material using a combination of presentations, exercises and group work.

MathSpire Ltd. Jun 2016 - Nov 2016
Software developer and content creator

- Created a database of mathematics videos, tests and interactive graphics.

Masaryk University, Brno Oct 2015 - Nov 2015
Visiting postdoctoral researcher

- Plenary speaker at the multi-disciplinary Eduard Cech Institute Workshop.
- Collaborated with researchers in algebra, geometry and theoretical physics.

Macquarie University, Sydney Jan 2013 - Jun 2014
Tutor

- Demonstrated solutions on the whiteboard for three undergraduate mathematics courses.

Macquarie University Numeracy Centre Jan 2012 - Dec 2013
Tutor

- Guided and motivated first year students at the drop-in centre.

Blue Tutors JUN 2010
GCSE Tutor

PROFESSIONAL DEVELOPMENT AND PRIZES

2018 Mitacs online workshop: Managing Project Timelines
2016 University of Michigan on Coursera: Using Python to Access Web Data
2016 University of Michigan on Coursera: Using Databases with Python
2008 Christ's College Whelan Prize for First Class Examination Performance

SKILLS

Over 1 year experience: F#, .NET, WebSharper & Xamarin Frameworks, Git, LaTeX.

Some experience: C#, JavaScript, HTML, CSS, Python, Jupyter Notebook, Coq.

PUBLICATIONS

- A Synthetic Version of Lie's Second Theorem, *Applied Categorical Structures*, 2018.02.06. Available at https://doi.org/10.1007/s10485-018-9518-2.
- Connected Lie Groupoids are Internally Connected and Integral Complete in Synthetic Differential Geometry, *Symmetry, Integrability and Geometry: Methods and Applications*, 2016.06.29. Available at http://www.emis.de/journals/SIGMA/2017/007/.

SELECTED CONFERENCE PRESENTATIONS

- Canadian Mathematical Society, Summer Meeting, *The Calculus of Infinity Functors and Tangent Categories*, University of New Brunswick, 2018.06.04.
- 26th Foundational Methods in Computer Science Workshop, *Tangent Bundles of Groupoids, Pre-groupoids and Torsoids*, Mount Allison University, 2018.06.02.
- Seminaire de geometrie et physique mathematique, *Multi-object Lie theory using synthetic differential geometry*, Universite Paris Diderot, Paris 7, 2015.12.04.
- Category Theory Seminar, *A Synthetic Version of Lie's Second Theorem*, University of Cambridge, 2015.11.17.
- Plenary Speaker at Eduard Cech Institute Workshop, *Synthetic Lie Theory*, Trest, Czech Republic, 2015.10.10.
- Category Theory 2014, *Synthetic Lie Theory*, University of Cambridge, 2014.07.04.