Matthew Burke

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Academic Employment

- **University of Calgary, Canada**
  Postdoctoral Scholar in the Department of Mathematics and Statistics, 2017.09-Present.
  Supervisor: Kristine Bauer.

- **Masaryk University, Brno, Czech Republic**
  Visiting Postdoctoral Researcher in the Department of Mathematics and Statistics, 2015.10-11.

Education

- **Macquarie University, Sydney**
  PhD Mathematics, 2011-2015.
  Thesis: Synthetic Lie Theory.
  Supervisor: Richard Garner. Co-supervisor: Dominic Verity.

- **Christ's College, University of Cambridge**
  Part III Mathematics (MMath), 2010-2011.
  Pass with Merit.
  Part III Essay scored 95/100.

- **Christ's College, University of Cambridge**
  Bachelor's Degree in Mathematics (BA), 2007-2010.
  Upper Second Class Honours.
  Christ's College Whelan Prize in 2008 for First Class Examination Performance.
  Completed seven optional computational projects all of which gained alpha quality marks.

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/`.

Teaching and Work Experience

2017.09-2017.12	**Sessional Instructor at the University of Calgary**
	Lectured Mathematics 249 in the Department of Mathematics and Statistics.
2016.11-2017.08	**Chief Technology Officer at MathSpire Ltd.**
	Extended existing course structure and developed new courses, interactive mathematics lessons and tests for A-level mathematics students. Used F#, C#, SQL, JavaScript, ASP.NET and the Xamarin Framework to create cross platform mobile applications, desktop applications and an integrated web API.
2016.07-08	**Tutor at Debate Chamber Mathematics Summer School**
	Guided A-level students through undergraduate level mathematics topics including Linear Algebra, Analysis, Differential Equations, Turing Machines, Infinity and Cryptography.
2016.06-2016.11	**Software Developer and Content Creator at MathSpire Ltd.**
	Created database of mathematics videos, tests and graphics using F# and SQL.
2013-2014	**Tutor for Macquarie University**
	Demonstrated solutions on the whiteboard for three undergraduate mathematics courses and provided additional individual assistance.
2012	**Tutor at Macquarie University Numeracy Centre**
	Guided and motivated first year students individually and in small groups at the drop-in centre.
2010.06	**GCSE Tutor for Blue Tutors**

Academic Service

2018.01-Present	**Seminar Organiser**
	Peripatetic Seminar in Category Theory and Logic at the University of Calgary.
2018.05	**Session Chair**
	Category Theory and Logic, Alberta Mathematics Dialogue 2018.
2017.12	**Article Referee**
	Advances in Mathematics.

Professional Development

2018	**Mitacs Online Workshops**
	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

Talks and Conferences

- Calgary Peripatetic Seminar in Logic and Category Theory, *Introduction to univalence in Coq II*, University of Calgary, 2018.10.01.

- Calgary Peripatetic Seminar in Logic and Category Theory, *Introduction to univalence in Coq*, University of Calgary, 2018.09.24.

- Calgary Peripatetic Seminar in Logic and Category Theory, *Linearisation of infinity categories*, University of Calgary, 2018.08.29.

- Calgary Peripatetic Seminar in Logic and Category Theory, *More Elements of the Theory of Quasi-categories*, University of Calgary, 2018.07.03.

- Calgary Peripatetic Seminar in Logic and Category Theory, *Elements of the Theory of Quasi-categories*, University of Calgary, 2018.06.27.

- 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.

- Calgary Peripatetic Seminar in Logic and Category Theory, *A Two Dimensional Setting for the Calculus of Infinity Functors: Part II*, University of Calgary, 2018.05.14.

- Calgary Peripatetic Seminar in Logic and Category Theory, *A Two Dimensional Setting for the Calculus of Infinity Functors*, University of Calgary, 2018.04.30.

- Calgary Peripatetic Seminar in Logic and Category Theory, *Free co-completion, presheaves and sheaves*, University of Calgary, 2018.03.26.

- Calgary Peripatetic Seminar in Logic and Category Theory, *Localisation of Simplicial Presheaf Categories*, University of Calgary, 2018.02.26.

- Calgary Peripatetic Seminar in Logic and Category Theory, *The Calculus of Functors using Sheafification*, University of Calgary, 2018.01.22.

- Calgary Peripatetic Seminar in Logic and Category Theory, *Sites of Smooth Affine Schemes: Part III*, University of Calgary, 2017.10.13.

- Calgary Peripatetic Seminar in Logic and Category Theory, *Sites of Smooth Affine Schemes: Part II*, University of Calgary, 2017.10.06.

- Calgary Peripatetic Seminar in Logic and Category Theory, *Sites of Smooth Affine Schemes*, University of Calgary, 2017.09.22.

- Calgary Peripatetic Seminar in Logic and Category Theory, *Lie's Third Theorem using an Intuitionistic Double Negation*, University of Calgary, 2017.09.06.

- Category Theory Seminar, *Lie's Third Theorem in Synthetic Differential Geometry*, University of Cambridge, 2017.04.02.

- Calgary Mathematics Department Colloquium, *Infinitesimals in Lie Theory*, University of Calgary, 2016.10.07.

- Calgary Peripatetic Seminar in Logic and Category Theory, *Lie Theory for Categories using Infinitesimals*, University of Calgary, 2016.09.30.

- 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.

- Algebra Seminar, *Lie's Second Theorem*, Masaryk University, Brno, 2015.11.05.

- Algebra Seminar, *Jet Part of a Category*, Masaryk University, Brno, 2015.10.28.

- Differential Geometry Seminar, *An Introduction to Synthetic Differential Geometry*, Masaryk University, Brno, 2015.10.26.

- Plenary Speaker at Eduard Cech Institute Workshop, *Synthetic Lie Theory*, Trest, Czech Republic, 2015.10.10.

- Centre of Australian Category Theory, *Jet Categories in the Cahiers Topos (2 talks)*, Macquarie University, 2015.05.13ff.

- Category Theory 2014, *Synthetic Lie Theory*, University of Cambridge, 2014.07.04.

- MCDC 2014, *A Synthetic Perspective on the Integrability of Lie Algebroids*, Macquarie University, 2014.06.19.

- Centre of Australian Category Theory, *A Synthetic Perspective on the Integrability of Lie Algebroids (3 talks)*, Macquarie University, 2014.05.21ff.

- MCDC 2013, *Cohomology from the Perspective of Restriction Categories and Atlases*, Macquarie University, 2013.07.04.

- MCDC 2012, *Applications of Logic in Differential Geometry*, Macquarie University, 2012.06.15.

- Part III talk, *Synthetic Differential Geometry*, University of Cambridge, 2011.