

Matthew Burke

Mathematics and Statistics, 612 Campus Place NW
University of Calgary, 2500 University Drive NW
Calgary, AB, Canada, T2N 1N4

Email: matthew.burke1@ucalgary.ca
Telephone: +14036049368
Website: <https://mwpb.uk>

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. |

Talks and Conferences

- 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.