

# Daniel Barter

- Date of Birth: November 27, 1989
- Place of Birth: Melbourne, Australia
- Citizenship: Australia

## Education

- B.Sc with First Class Honours and University Medal, Pure Mathematics, University of Sydney, 2008-2011.
- PhD, Pure Mathematics, University of Michigan, 2012 - 2017. Specialized in category theory and representation theory.
- I spend a lot of time thinking about:
  - Pure Mathematics: differential geometry, representation theory and category theory. I am particularly interested in the interaction between these subjects and physics. Recently, I have been thinking about the relationship between modular tensor categories, 3 dimensional topological quantum field theories and topological quantum computing.
  - Statistical Inference: discriminative and generative models, inference algorithms (MAP estimation, MCMC, variational methods). Machine learning is pretty popular right now. I have been spending some time learning about the mathematical foundations of the subject. I don't know all the folklore that goes into building effective non linear classifiers, but I understand the meaning of words like neural network, autoencoder, generative model and KL-divergence.
  - Computer Science: programming language semantics, categorical design patterns for functional programming. A few years ago, I started writing Haskell scripts to automate boring things. Because of this, I am pretty good at functional programming. More recently, I have been thinking about programming language semantics. This is useful for reading and writing code in unfamiliar languages.

## Papers

- Noetherianity and rooted trees. arXiv:1509.04228

## Invited Talks

- Michigan theoretical computer science seminar, *Tensor rank and stability in representation theory*
- Berkeley combinatorics seminar, *Combinatorial categories, configuration spaces and tensorial species*

## Teaching

- Tutor, MATH1001 (Differential Calculus), Sem 1, 2011, University of Sydney
- Tutor, MATH1003 (Integral Calculus and Modeling), Sem 2, 2011, University of Sydney
- Tutor, MATH1901 (Differential Calculus - Advanced), Sem 1, 2012, University of Sydney
- Graduate Student Instructor, Math 115 (Calculus 1), Fall 2012, University of Michigan
- Graduate Student Instructor, Math 115 (Calculus 1), Winter 2013, University of Michigan
- Graduate Student Instructor, Math 215 (Calculus 3), Fall 2013, University of Michigan
- Graduate Student Instructor, Math 116 (Calculus 2), Winter 2014, University of Michigan
- Graduate Student Instructor, Math 116 (Calculus 2), Fall 2014, University of Michigan
- Graduate Student Instructor, Math 215 (Calculus 3), Winter 2015, University of Michigan