JONATHAN MASON

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EDUCATION

PhD, Doctor of Philosophy in mathematics, School of Mathematical Sciences, University of Nottingham, 2007 - March 2012, submitted September 2011

Thesis title: Uniform Algebras Over Complete Valued Fields.

Research supervisor: Dr. J. F. Feinstein.

MMath (Hons), Master in mathematics with honors in mathematics, School of Mathematical Sciences, University of Nottingham, 2003 - 2007

Classification: First Class.

Dissertation title: Analysis and Applications of Planar Swiss Cheese Sets in $\mathbb{C}$.

Module choice bias: Analysis pathway/Algebra/Pure.

RESEARCH

Research interests

PhD thesis title: Uniform Algebras Over Complete Valued Fields.

Research supervisor: Dr. J. F. Feinstein.

Brief synopsis of research and research interests: I am interested in questions concerning the extent of the fundamental significance of mathematical structures. The question of whether there is a class of mathematical structures that have the property of consciousness may seem bizarre and yet on reflection important. It has received little attention from pure mathematicians probably because mathematics cannot be introduced in the absence of concrete definitions. Whilst it is sensible to approach such questions with caution it is also reasonable for scientists to work in this area. In this area I have developed a relationship content theory of consciousness which involves expected float entropy (EFE) minimisation. EFE is a type conditional entropy where the conditions involved are adjacency matrices of relationship parameters that can be applied to network structures such as the brain.

In the area of my PhD, Uniform algebras have been extensively investigated because of their importance in the theory of uniform approximation and complex Banach algebras. As enquiry broadens one may ask whether analogous algebras exist when a complete valued field other than the complex numbers is used as the underlying field over which the

algebra is a vector space. Accordingly, during the 1980's Kulkarni and Limaye introduced the now familiar theory of real function algebras which provides the appropriate real analogy of uniform algebras. My PhD research takes the theory of Kulkarni and Limaye to a higher level of abstraction which now accommodates any complete valued field as the underlying field by involving Galois automorphisms. This generalisation then restricts to three distinct cases: complex uniform algebras, real function algebras and a new family of function algebras in the nonarchimedean setting defined on Stone spaces. I established some local results for these new function algebras and considered what had been inherited from the global architecture. The study of function algebras involves the spaces used as domains. For uniform algebras these include Swiss cheese sets. My PhD research produced an inductive proof of the Feinstein-Heath Swiss cheese "classicalisation" theorem.

Publications

- J. W. Mason, *From Learning to Consciousness: An Example Using Expected Float Entropy Minimisation*, Entropy, doi: 10.3390/e21010060, (2019).
  See https://www.mdpi.com/1099-4300/21/1/60.
- J. W. Mason, *Quasi-conscious multivariate systems*, Complexity, doi: 10.1002/cplx.21720, (2015). See http://onlinelibrary.wiley.com/doi/10.1002/cplx.21720/epdf.
- J. W. Mason, *Consciousness and the structuring property of typical data*, Complexity, doi: 10.1002/cplx.21431, (2012).
- J. W. Mason, *A survey of non-complex analogs of uniform algebras*, Function spaces, volume 547 of Contemp. Math. Amer. Math. Soc. (2011).
- J. W. Mason, *An inductive proof of the Feinstein-Heath swiss cheese "classicalisation" theorem*, Proc. Amer. Math. Soc. **138** (2010), no. 12, 4423–4432.

Conference participation

- **Models of Consciousness 2019 at the Mathematical Institute Oxford, UK**

  Participation: Invited Talk, *EFE minimisation: A relationship content theory of consciousness.*

- **The Nineteenth Annual Conference of the ASSC, Paris France 2015**

  Participation: Poster, *Quasi-Conscious Multivariate Systems.*

- **Function Spaces 2010 at SIUE, USA**

  Participation: Talk, *Generalising uniform algebras over complete valued fields.*

- **Banach Algebras 2009 at the Stefan Banach Mathematical Center, Poland**

  Participation: Poster, *Generalising uniform algebras over complete valued fields.*

- **British Mathematical Colloquium 2008 at the University of York, UK**

  Participation: Talk, *An intuitive proof of Heath's Theorem on Swiss cheese sets.*

Grants and prizes

- Grant of £140k from the Foundational Questions Institute and Fetzer Franklin Fund, a donor advised fund of the Silicon Valley Community Foundation, in support of the Oxford Mathematics of Consciousness and Applications Network (OMCAN). Grant number FQXi-RFP-CPW-2013. Grant jointly applied for with Prof. Yakov Kremnitzer in 2020.
- Grant of £10k from the University of Oxford, Networking and Interdisciplinary Fund, internal grant, in support of the Oxford Mathematics of Consciousness and Applications Network (OMCAN). Grant jointly applied for with Prof. Yakov Kremnitzer in 2018.
- University of Nottingham, Graduate School travel prize 2009. The prize was £200 with 40% of applicants receiving a prize.
- PhD grant for 3.5 years starting October 2007 from the EPSRC, UK.

Professional memberships

- **LMS,** Associate member of the London Mathematical Society.
- **IMA,** Associate member of the Institute of Mathematics and its Applications.
- **AMCS,** Founding member of the Association for Mathematical Consciousness Science.

EMPLOYMENT

Mathematical Institute, University of Oxford, UK, April 2020 -

Position: Administrator & Research Coordinator – Centre for Mathematical Approaches to Consciousness.

Sector: Fundamental and applied research.

Position: Network Champion for the Oxford Mathematics of Consciousness and Applications Network (OMCAN, https://omcan.web.ox.ac.uk/).

Mathematical Institute, University of Oxford, UK, September 2014 - April 2020

Position: InFoMM CDT Industry Facilitator.

Sector: Mathematical doctoral training, (https://www.maths.ox.ac.uk/infomm/).

Position: Network Champion for the Oxford Mathematics of Consciousness and Applications Network (OMCAN, https://omcan.web.ox.ac.uk/).

Applied Probability Trust, School of Mathematics and Statistics, University of Sheffield, UK, October 2013 - July 2014

Position: Production Editor.

Sector: Mathematics research publishing, (http://www.appliedprobability.org/).

Knowledge Transmission Ltd, UK, March 2013 - July 2013

Position: Software Developer.

Sector: EdTech software development, (http://www.knowledgetransmission.com/).

JDS Uniphase Corporation, UK, 1997 - 2001

Position: Assembly equipment developer and fabricator.

Sector: ICT, advanced fibre optic products, (http://www.jdsu.com/).

Exitech Ltd (now Oerlikon Optics UK Ltd), 1991 - 1996

Position: Laboratory technician and machine fabricator.

Sector: Optical micro-machining and advanced laser research, (http://exitech.org/).