

Personal Details

Date of Birth

30th Jan. 1978

Nationality

British

Academic Positions

April 2008 – present	On leave of absence from postdoc for health reasons	
Jan. 2007 – April 2008	IQC/Dept. of Applied Math, Univ. Waterloo Postdoctoral Fellow in Quantum Information Theory	Waterloo, ON, Canada
Jan. 2007 – April 2008	Perimeter Institute for Theoretical Physics Associate Postdoctoral Fellow in Quantum Foundations	Waterloo, ON, Canada
Oct. 2006 – Jan. 2007	Centre for Quantum Computing, DAMTP, Univ. Cambridge Research Associate in Quantum Information Theory and Quantum Foundations	Cambridge, UK
Jan. 2004 – Sep. 2006	Perimeter Institute for Theoretical Physics Postdoctoral Fellow in Quantum Information Theory and Quantum Foundations	Waterloo, ON, Canada
Nov. 2003 – Dec. 2003	School of Mathematics, Univ. Bristol Research Assistant in Quantum Information Theory	Bristol, UK

Education

Oct. 2000 – Oct. 2003	University of Bristol Ph.D. Mathematics Advisor: Prof. Noah Linden Thesis title: Entangled Quantum Dynamics http://mattleifer.info/wp-content/uploads/2008/11/mleiferthesis.pdf	Bristol, UK
Sept. 1999 – July 2000	University of Cambridge Cert. of Advanced Studies in Mathematics Passed with distinction	Cambridge, UK
Sept. 1996 – July 1999	University of Manchester B.Sc. Physics with Theoretical Physics Passed with 1st class hon.	Manchester, UK

Competitive Research Grants

2008	7,500 USD FQXi mini-grant (Foundational Questions Institute http://www.fqxi.org) for APS Invited Session: Quantum Information Meets Gravitation — Role: Principal Investigator.
2007 – 2008	70,000 USD FQXi award (Foundational Questions Institute http://www.fqxi.org) for project on Abstract Quantum Probability — Role: Principal Investigator.

Scholarships and Awards

2000	Mary Higgins Postgraduate Scholarship and C. B. West Postgraduate Prize in Mathematics, Girton College, Cambridge
1999	Platt Prize in Physics, University of Manchester
1997	Heginbottom Exhibition for best performance in 1st year exams in Physics, University of Manchester

Teaching

Graduate Lecturing

Oct. 2005	Introduction to Bayesian Networks (three lectures), University of Queensland, Australia
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Graduate Tutoring

Aug. 2007	Quantum Foundations Summer School (led a tutorial group for daily 1 hour sessions for a week), Perimeter Institute, Canada
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Undergraduate Lecturing

Sept. 2007 –
Dec. 2007 Lecturer for MATH137, Introductory Calculus for Math Hons., University of Waterloo, Canada

Sept. 2006 Advanced Quantum Mechanics (two lectures covering for lecturers absence), University of Waterloo, Canada

March 2005 Interpretations of Quantum Mechanics: Current Status and Future Directions (guest lecture on quantum logic), University of Waterloo, Canada

Undergraduate Tutoring

Oct. 2000 –
June 2003 Mathematics 1A (Math for 1st year Physics, Chemistry and Economics students), University of Bristol, UK

Undergraduate Computer Lab Demonstrating

Oct. 2001 –
June 2003 Mathematics 1A (Maple and Matlab), University of Bristol, UK

Research Student Supervision

Visiting Graduate Students

Jan. 2008 –
April 2008 T. Waterhouse, visiting from University of British Columbia — Project: Temporal joint measurements

July 2007 –
Sept. 2007 O. Dahlsten, visiting from Imperial College — Project: Unentangled bit commitment in generic probabilistic models

Undergraduate Research Students

June 2007 –
Aug. 2007 R. Morris, University of Waterloo Undergraduate Research Assistant — Project: Distinguishability as a resource theory

Academic Service

Committees

Nov. 2004 –
June 2005 Postdoc representative on postdoc hiring committee, Perimeter Institute, Canada

Jan. 2004 –
June 2005 Postdoc representative on quantum information faculty hiring committee, Perimeter Institute, Canada

Refereeing for International Journals

Foundations of Physics, Journal of Physics A, New Journal of Physics, Philosophy of Science, Physical Review A, Physical Review Letters, Quantum Information and Computation, Studies in the History and Philosophy of Modern Physics

Editorial Work

Jan. 2008 –
Dec. 2009 Member of the editorial board of "The Quantum Times", newsletter of the APS Topical Group on Quantum Information.

Conference, Workshop and Summer School Organization

March 2008 Invited Session on Quantum Information Meets Gravitation, APS March Meeting, New Orleans, USA (co-organized with L. Viola)

Aug. 2007 Quantum Foundations Summer School, Perimeter Institute, Canada (co-organized with H. Burton and L. Hardy)

July 2005 Workshop on Quantum Information, Computation and Logic: Exploring New Connections, Perimeter Institute, Canada (co-organized with H. Barnum)

Discussion Group Organization

2004 – 2005 Workgroup on Contextuality in Quantum Information, Perimeter Institute, Canada

2002 – 2003 Quantum Information Journal Club, University of Bristol, UK

Published Articles in Refereed Journals

J. Barrett and M. Leifer. 2009. The de Finetti Theorem for Test Spaces. New J. Phys. 11: 033024. eprint arXiv:0712.2265.

M. S. Leifer and D. Poulin. 2008. Quantum Graphical Models and Belief Propagation. Ann. Phys. 323: 1899. eprint arXiv:0708.1337.

H. Barnum, J. Barrett, M. Leifer and A. Wilce. 2007. Generalized No-Broadcasting Theorem. Phys. Rev. Lett. 99: 240501. eprint arXiv:0707.0620.

M. S. Leifer. 2006. Quantum Dynamics as an analog of Conditional Probability. Phys. Rev. A. 74: 042310. eprint arXiv:quant-ph/0606022.

J. Barrett, M. Leifer and R. Tumulka. 2005. Bell's Jump Process in Discrete Time. Europhys. Lett. 72: 685–690. eprint arXiv:quant-ph/0506066.

- M. S. Leifer and R. W. Spekkens. 2005. Logical Pre- and Post-Selection paradoxes, measurement-disturbance and contextuality. *Proceedings of Quantum Structures 2004*, *Int. J. Theor. Phys.* 44: 1977—1987. eprint arXiv:quant-ph/0412179.
- M. S. Leifer and R. W. Spekkens. 2005. Pre- and Post-Selection paradoxes and contextuality in quantum mechanics. *Phys. Rev. Lett.* 95: 200405. eprint arXiv:quant-ph/0412178.
- M. S. Leifer, N. Linden and A. Winter. 2004. Measuring polynomial invariants of multi-party quantum states. *Phys. Rev. A.* 69: 052304. eprint arXiv:quant-ph/0308008.
- M. S. Leifer, L. Henderson and N. Linden. 2003. Optimal entanglement generation from quantum operations. *Phys. Rev. A.* 67: 012306. eprint arXiv:quant-ph/0205055.
- C. H. Bennett, J. I. Cirac, M. S. Leifer, D. W. Leung, N. Linden, S. Popescu and G. Vidal. 2002. Optimal simulation of two-qubit Hamiltonians using general local operations. *Phys. Rev. A.* 66: 012305. eprint arXiv:quant-ph/0107035.

Articles in Conference Proceedings

- H. Barnum, O. Dahlsten, M. Leifer and B. Toner. 2008. Nonclassicality without entanglement enables bit commitment. *Proc. IEEE Information Theory Workshop 2008*. 386—390. eprint arXiv:0803.1264.
- M. S. Leifer. 2007. Conditional Density Operators and the Subjectivity of Quantum Operations. in G. Adenier, C. A. Fuchs and A. Yu. Khrenikov (eds.), *Foundations of Probability and Physics - 4*, AIP Conference Proceedings. 889: 172—186. eprint arXiv:quant-ph/0611233.

Preprints

- H. Barnum, J. Barrett, M. S. Leifer and A. Wilce. 2008. Teleportation in General Probabilistic Theories. eprint arXiv:0805.3553.
- H. Barnum, J. Barrett, M. S. Leifer and A. Wilce. 2006. Cloning and Broadcasting in Generic Probabilistic Models. eprint arXiv:quant-ph/0611295.
- M. S. Leifer. 2005. Nondeterministic testing of Sequential Quantum Logic propositions on a quantum computer. eprint arXiv:quant-ph/0509193.

Articles in Progress

- R. Morris and M. S. Leifer. Reverse Distinguishability.
- M. S. Leifer. Quantum Causal Networks.
- M. S. Leifer and R. W. Spekkens. Quantum analogues of Bayes' theorem, sufficient statistics and the pooling problem.

Conferences, Workshops and Summer Schools

Invited Talks at Conferences and Workshops

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| De. 2007 | Mini-workshop on Quantum Foils, Pavia, Italy |
| Dec. 2007 | Quantum Information Theory in Quantum Gravity, Perimeter Institute, Canada |
| July 2007 | Operational Probabilistic Theories as Foils to Quantum Theory, Cambridge, UK |
| June 2006 | Foundations of Physics and Probability - 4, Växjö, Sweden |
| Aug. 2005 | Being Bayesian In a Quantum World, Konstanz, Germany |
| July 2005 | Quantum Information, Computation and Logic, Perimeter Institute, Canada |
| July 2003 | QICT Network Meeting, Abingdon, UK |

Contributed Talks at Conferences, Workshops and Summer Schools

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| Feb. 2007 | Operator Structures in Quantum Information, Banff, Canada |
| July 2006 | Cats, Kets and Cloisters, Oxford, UK |
| July 2006 | Quantum Structures 2006, Malta |
| March 2006 | APS March Meeting, Baltimore, USA |
| Aug. 2005 | Summer School on Philosophy, Probability and Physics, Konstanz, Germany |
| July 2004 | Quantum Structures 2004, Denver, USA |
| July 2003 | 4th European QIPC Workshop, Oxford, UK |
| Sept. 2002 | Informal Quantum Information Gathering, Imperial College, London, UK |
| March 2001 | "QuEnt" Quantum Entanglement and Quantum Information Winter School, Les Houches, France |

Poster Presentations at Conferences and Workshops

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| July 2004 | The Seventh International Conference on Quantum Communication, Measurement and Computing, Glasgow, UK |
| July 2004 | |

- Workshop on Reference Frames and Superselection Rules in Quantum Information Theory, Perimeter Institute, Canada
- Aug. 2003 MaPhySto/QUANTOP Workshop on Quantum Measurements and Quantum Stochastics, Aarhus, Denmark
- July 2002 The Sixth International Conference on Quantum Communication, Measurement and Computing, MIT, Cambridge, USA
- July 2002 Quantum Information: Conceptual Foundations, Developments and Perspectives, Oviedo, Spain
- Summer Schools Attended**
- Aug. 2005 Philosophy, Probability and Physics, Konstanz, Germany
- July 2004 Foundations of Physical Theories, Urbino, Italy
- March 2001 "QuEnt" Quantum Entanglement and Quantum Information, Les Houches, France

References available on request