

Curriculum Vitae
Anthony Quas

Full Name Anthony Nicholas Quas
Nationality British and American
Present Position C.R.C. Professor (Tier 2) and Professor, University of Victoria (2008–)
Previous Positions Associate Professor, University of Victoria (2005–2008)
Associate Professor, University of Memphis (2001–2004)
Assistant Professor, University of Memphis (1997–2001)
Research Fellow of King’s College working in the Statistical Laboratory, Cambridge University (1993–1997)
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Education

1986–1989 B.A. in Mathematics (first class) at Cambridge University
1989–1990 Certificate of Advanced Study in Mathematics (with distinction) at Cambridge University
1990–1994 PhD in Mathematics at the University of Warwick under the supervision of Peter Walters

Academic Distinctions

1990 Tyson Medal for performance in Certificate of Advanced study in Mathematics
1992 Cambridge University ‘Smith Prize’ for a research essay
2002 Maître de Conférences invité for 1 month, Université de Tours
2002–2005 NSF Individual Research Grant
2006–2011 NSERC Individual Research Grant
2007–2009 NSERC Grant Selection Committee Member
2008 NSF Grant Committee Member
2008– Editor, Dynamical Systems: An International Journal
2008 Organizer, MSRI program on Additive Combinatorics and Ergodic Theory

Teaching Experience

I have taught a wide variety of courses at the Universities of Victoria, Memphis and Cambridge at a number of levels; from Freshman classes to classes for Doctoral students. These have included Ergodic Theory, Probability, Complex Analysis, Foundations of Mathematics, Abstract Algebra, Calculus, Analytic Geometry in three dimensions, Differential Equations and Linear Algebra. I have used the Maple package as an educational tool in teaching Calculus.

Administrative Experience

I have served on the Department ARPT committee in Victoria. While in Memphis, I served as Colloquium Organizer and was a member of the College Graduate Council, the Technology Committee. At King's College, I oversaw the connection of the College to a wide area network, established the position of Computer Officer, and made an appointment to this position.

Professional Service

I write reviews of papers for *Mathematical Reviews* and *Zentralblatt für Mathematik*, and have refereed papers for a number of journals, including *International Mathematical Research Notices*, *Journal of Theoretical Probability*, *Indagationes Mathematicae*, *American Mathematical Monthly*, *Nonlinearity*, *Annales de l'Institut Fourier*, *Ergodic Theory and Dynamical Systems*, *Combinatorics Probability and Computing*, *Mathematical Proceedings of the Cambridge Philosophical Society*, *Illinois Journal of Mathematics*, *Random Structures and Algorithms*, *Probability Theory and Related Fields*, *Discrete and Continuous Dynamical Systems*, *Bulletin of the London Mathematical Society*, *IEEE Transactions on Information Theory*, *Israel Journal of Mathematics*, *Journal of the London Mathematical Society*, *Theoretical Computer Science*, *Mathematics Research Letters*, *Discrete Optimization*, *Dynamical Systems: An International Journal*.

I have also been an internal examiner for a Cambridge PhD and an external examiner for a PhD from the University of Western Australia. While in Memphis, I have been on six PhD committees and am on four committees in Victoria. I currently have one Masters student and two PhD students.

I have organized conferences at BIRS, MSRI and the University of Victoria.

I am an Editor of the research journal, *Dynamical Systems: An International Journal*.

Outreach

I have founded the Victoria Math Circle, a venue for gifted High School students to work on Mathematics problems. I have also volunteered frequently at Math Mania, an event for introducing Elementary school children to mathematics in a fun setting.

I gave a talk at a Memphis High School on fractals.

I have given undergraduate colloquia at DePaul University and Swarthmore College.

I am the editor of an outreach journal, *Pi in the Sky*, aimed at High School students

Research Interests

My research interests cover a range of topics in ergodic theory and dynamical systems. In particular, my work has included work on symbolic dynamics and the ergodic theory of differentiable dynamical systems, and their connections with stochastic processes. I have recently been applying ideas of ergodic theory to some problems in percolation theory, where the interplay between the disciplines appears to be particularly fruitful. I have been collaborating with computer scientists and statisticians on projects involving evolutionary algorithms and perfect sampling.

I am familiar with the C Programming language and have written a number of programs as tools in my research as well as interactive graphical demonstration programs which relate to my research work. In addition, I have experience of Mathematica, which I have used in my research.

Seminars and Conferences

I have given colloquia and seminars at Berkeley, Brest, CalTech, Cambridge, CWI (Amsterdam), DePaul University (Chicago), University of East Anglia (Norwich), Liverpool, Maryland, Ludwig-Maximilians-Universität (Munich), McGill (Montreal), University of Maryland, Marseille, Memphis, University of New South Wales, University of North Texas, North Dakota State University, Oxford, Paris VI, Porto, Queen Mary Westfield College (London), Rouen (France), University of Southern California, Stanford, Tours, Victoria, Waikato (New Zealand), Warwick and Washington.

I was twice invited to visit Tony Dooley of the University of New South Wales and spent November 1995 and July 2003 there. In May 1998, I was invited to visit Mike Keane in Amsterdam and have been invited to visit Chris Bose at the University of Victoria in March 1999. In January 2000, I visited CalTech for one week and in May 2000, I visited North Dakota State University and DePaul University. For the month of June 2002, I was a Maître de conférences invité at the Université de Tours and I spent 10 days visiting the Université de la Méditerranée in Marseille. I also spent a month in May 2004 in Marseille. I gave a colloquium at the University of South Florida in November 2000. I have recently given talks at conferences in Amiens, Banff, Sydney, Victoria, Warsaw, Cambridge, Delft, Salt Lake City, Denton, Washington, Phoenix, Marseille and Berlin.

Publications

- [1] A. N. Quas, ‘Ratio derivatives’, *Math. Spectrum* **19**(1987), 72–75.
- [2] A. N. Quas, ‘On representations of Markov chains by random smooth maps’, *Bull. London Math. Soc.* **23**(1991), 487–492.
- [3] A. N. Quas, ‘Invariant measures for families of circle maps’, *Math. Proc. Camb. Phil. Soc.* **111**(1992), 585–597.
- [4] A. N. Quas, ‘Representations of Markov chains on tori’, *Random and Computational Dynamics* **1**(1993), 261–276.
- [5] A. N. Quas, ‘Non-ergodicity for C^1 expanding maps and g -measures’, *Ergodic Theory Dynamical Systems* **16**(1996), 531–543.
- [6] A. N. Quas, ‘A C^1 expanding map of the circle which is not weak-mixing’, *Israel J. Math.* **93**(1995), 359–372.
- [7] A. N. Quas, ‘An entropy estimator for a class of infinite alphabet processes’, *Theor. Probab. Appl.* **43**(1998), 610–621.
- [8] Z. Coelho and A. N. Quas, ‘Criteria for \bar{d} -continuity’, *Trans. Amer. Math. Soc.* **350**(1998), 3257–3268.
- [9] A. N. Quas, ‘Invariant densities for C^1 maps’, *Stud. Math.* **120**(1996), 83–88.
- [10] A. N. Quas, ‘Rigidity of continuous coboundaries’, *Bull. London Math. Soc.* **29**(1997), 595–600.
- [11] A. H. Dooley, I. Klemeš and A. N. Quas, ‘Product and Markov measures of type III’, *J. Austr. Math. Soc. (Series A)*, **65**(1998), 84–110.
- [12] A. N. Quas, ‘Infinite paths in a Lorentz lattice gas model’, *Probab. Theory Rel. Fields*, **114**(1999) 229–244.
- [13] G. Cui, Y. Jiang and A. N. Quas, ‘Scaling functions, g -measures and Teichmüller spaces of circle endomorphisms’, *Discrete Continuous Dynamical Systems*, **5**(1999), 535–552.
- [14] A. N. Quas and P. B. Trow, ‘Subshifts of multidimensional shifts of finite type’, *Ergodic Theory Dynamical Systems* **20**(2000) 859–874.
- [15] A. N. Quas, ‘Most expanding maps have no absolutely continuous invariant measure’, *Stud. Math.* **134**(1999) 69–78.
- [16] A. N. Quas and P. B. Trow, ‘Mappings of group shifts’, *Isr. J. Math.* **124**(2001), 333–365.
- [17] G. Hernandez, F. Niño and A. N. Quas, ‘Ergodicity of evolutionary systems’, in *Proceedings of the 5th International Conference on Information Systems, Analysis and Synthesis*(1999), 148–155.
- [18] F. Niño, G. Hernandez, F. Botelho and A. Quas, ‘Random iterated neural networks: Asymptotic behavior’, in *Smart Engineering Systems: Neural Networks, Fuzzy Logic, Evolutionary Programming and Rough Sets*(1999)
- [19] G. Hernandez, F. Niño, A. Quas and D. Dasgupta, ‘Equilibrium states of iterated random maps arising in evolutionary algorithms’, in *Proceedings of the Third International Workshop on Frontiers in Evolutionary Algorithms, Atlantic City, NJ*(2000).

- [20] F. Niño, G. Hernandez, F. Botelho and A. Quas, ‘Random iterated neural networks as universal approximators of dynamical systems’, in *Proceedings of the Fifth International Symposium on Artificial Life and Robotics, Oita, Japan(2000)*.
- [21] M. Boshernitzan, G. Kolesnik, A. Quas and M. Wierdl, ‘Ergodic averaging sequences’ *J. d’Analyse Math.* **95**(2005), 63–103.
- [22] J. Campbell and A. Quas, ‘A generic expanding map has a singular SRB measure’, *Comm. Math. Phys.* **221**(2001), 335–349.
- [23] A. Quas, G. Narasimhan and E. George, ‘A perfect Gibbs sampling procedure and applications’ (in preparation).
- [24] A. Quas and A. Şahin, ‘Entropy gaps and locally maximal entropy in \mathbb{Z}^d subshifts’, *Ergodic Theory Dynamical Systems* **23**(2003), 1227–1245.
- [25] P. Balister, B. Bollobás and A. Quas, ‘Convexity, random tilings and shifts of finite type’, *Illinois J. Math* **46**(2003), 781–795.
- [26] E. Lesigne, A. Quas, T. de la Rue, and B. Rittaud, ‘Weak disjointness in ergodic theory’, *Proceedings of the Conference on Ergodic Theory and Dynamical Systems, Toruń 2000*.
- [27] E. George, G. Narasimhan and A. Quas, ‘Exact sampling of sequence alignments’ (submitted).
- [28] K. Petersen, A. Quas and S. Shin, ‘Measures of maximal relative entropy’, *Ergodic Theory Dynamical Systems* **23**(2003), 207–223.
- [29] E. Lesigne, A. Quas and M. Wierdl, ‘Generic points in the Cartesian powers of the Morse dynamical system’, *Bull. Soc. Math. France* **131**(2003), 435–464.
- [30] P. Balister, B. Bollobás and A. Quas, ‘Percolation in Voronoi tilings’ *Random Structures and Algorithms* **26**(2005) 310–318.
- [31] A. Quas, ‘Anomalous election outcomes’ *Stochastics and Dynamics* **4**(2004) 95–105.
- [32] A. Quas and L. Zamboni, ‘Periodicity and local complexity’, *Theor. Comp. Sci.* **319**(2004), 229–240.
- [33] A. Dooley and A. Quas, ‘Approximate transitivity for zero entropy systems’, *Ergodic Theory Dynamical Systems* **25**(2005), 443–453.
- [34] C. Demeter and A. Quas, ‘Weak- L^1 estimates and ergodic theorems’, *New York J. Math.* **10**(2004), 169–174.
- [35] W. Bahsoun, C. Bose and A. Quas, ‘Deterministic representation for position dependent random maps’, *Discrete Cont. Dyn. Systems* **22**(2008), 529–540.
- [36] R. McCutcheon and A. Quas, ‘Generalized polynomials and mild mixing systems’, *Canad. J. Math.* **61**(2009), 656–673.
- [37] X. Bressaud and A. Quas, ‘Rate of approximation of minimizing measures’, *Nonlinearity* **20**(2007), 845–853.
- [38] A. Quas and M. Wierdl, Appendix to ‘Combinatorial and Diophantine applications of ergodic theory’ in *Handbook of dynamical systems*, Volume 1B, Elsevier (2006).
- [39] A. Quas and M. Wierdl, ‘Rates of convergence of non-conventional averages’, *Ergodic Theory Dynamical Systems* **30**(2010), 233–262.
- [40] A. Goetz and A. Quas, ‘Global properties of piecewise isometries’, *Ergodic Theory Dynamical Systems* **29**(2009), 545–568.
- [41] A. Quas, ‘Distance in positive density sets’, *J. Comb. Th. A* **116**(2009), 979–987.
- [42] A. Quas and Y. Peres, ‘Entropy rate for hidden Markov chains with rare transitions’, *Entropy of Hidden Markov Processes and Connections to Dynamical Systems*, Cambridge Univ. Press (2011).
- [43] Z. Nedeved and A. Quas, ‘Balanced sets and the vector game’, *International J. Number Th.* **4**(2008), 339–347.
- [44] G. Froyland, S. Lloyd and A. Quas, ‘Coherent structures and isolated spectrum for Perron–Frobenius cocycles’, *Ergodic Theory Dynamical Systems* **30**(2010), 729–756.
- [45] A. Quas, ‘Ergodicity and Mixing Properties’, chapter in *Encyclopedia of Complexity and Systems Science*, Springer 2009.
- [46] G. Froyland, S. Lloyd and A. Quas, ‘A semi-invertible Oseledets theorem with application to transfer operator cocycles’ (submitted).
- [47] A. Quas and J. Siefken, ‘Ergodic optimization of super-continuous functions’, *Ergodic Theory Dynamical Systems* (to appear).
- [48] Y. Cheung, A. Goetz and A. Quas, ‘Piecewise Isometries, Uniform Distribution and $3 \log 2 - \pi^2/8$ ’, *Ergodic Theory Dynamical Systems*(to appear).

- [49] M. Allahbakhshi and A. Quas, ‘Measures of Relative Maximal Entropy’, *Trans. Amer. Math. Soc.* (to appear).