

Curriculum Vitae for Mark Pollicott

DATE OF BIRTH: 24 September 1959

PLACE OF BIRTH: Nottingham, England

NATIONALITY: British (and portuguese)

UNIVERSITY EDUCATION:

B.Sc. (First Class, Mathematics and Physics), Warwick University, 1981

M.Sc. (Distinction, Mathematics), Warwick University, 1982

Ph.D. (Mathematics), Warwick University, 1984.

PERMANENT POSITIONS:

“New Blood” lecturer, Edinburgh University, 1985-1988

Investigador Auxiliar in I.N.I.C. (Porto, Portugal), 1988-92

Lecturer, Warwick University, 1992-95

Reader, Warwick University, 1995

Fielden Professor of Pure Mathematics, Manchester University 1996 - 2005

Professor, Warwick University, 2005 -

VISITING POSITIONS AND FELLOWSHIPS:

Visiting Member, I.H.E.S. (Bures s/Yvette), 1984-1985

Visiting Member, I.A.S. (Princeton), 1987-1988

Visiting Member, M.S.R.I. (Berkeley), Apr.-Aug. 1988

Assoc. Prof., CalTech, Apr.-June 1990

C.N.R.S. researcher (Institut Fourier), Feb.-Mar., 1992

Royal Society University Research Fellow, 1992-97

Leverhulme Trust Senior Research Fellow, 1998-99

EU Marie Curie Professorship, 2005

EDITORIAL BOARDS

Executive Editor, *Ergodic Theory and Dynamical Systems* 1994-97 and 2005- (Editor, 1997- to date)

Editor, *Discrete and Continuous Dynamical Systems* 1995-to date

ADMINISTRATION

Head of Pure Mathematics, Manchester University, 1997-98 and 2001-2004

Chair of Departmental Board, Manchester University, 2004-2005

Director of Postgraduate Studies, Warwick University, 2005-

Member of the EPSRC Mathematics College, 1997 -

(Advisor to NSF, CNRS, RAE panels)

Principal Organizor, Newton Institute Programme, 2000

Professorial appointment committees (Leicester, Loughborough, Manchester, UEA, Warwick)

Publications

ARTICLES

- [1] An analogue of the prime number theorem for closed orbits of Axiom A flows (with W. Parry), *Annals of Mathematics*, 118 (1983) 573-591
- [2] A complex Ruelle-Perron-Frobenius theorem and two counterexamples, *Ergodic Theory and Dynamical Systems*, 4 (1984) 135-146 On the rate of mixing of Axiom A flows, *Inventiones Mathematicae*, 81 (1985) 413-426
- [3] Asymptotic distribution of closed geodesics, *Israel Journal of Mathematics*, 52 (1985) 209-224
- [4] On the rate of mixing of Axiom A flows, *Inventiones Mathematicae*, 81 (1985) 413-426
- [5] The Chebotarov theorem for Galois coverings of Axiom A flows (with W. Parry), *Ergodic Theory and Dynamical Systems*, 6 (1986)
- [6] Meromorphic extensions of generalised zeta functions, *Inventiones Mathematicae*, 85 (1986) 147-164
- [7] A note on the uniform distribution of primes and closed orbits, *Israel Journal of Mathematics*, 55 (1986) 199-212
- [8] Distributions of closed geodesics on the modular surface and quadratic irrationals, *Bulletin Societe Mathematique de France*, 14 (1986) 431-446
- [9] Linking numbers for hyperbolic flows, *Journal of the London Mathematical Society*, 34 (1986) 185-192
- [10] Symbolic dynamics for Smale flows, *American Journal of Mathematics*, 109 (1987) 183-200
- [11] Margulis distributions for Anosov flows, *Communications in Mathematical Physics*, 113 (1987) 137-154
- [12] C^r rigidity theorems for hyperbolic flows, *Israel Journal of Mathematics*, 61 (1988) 14-28
- [13] Analytic extensions of the zeta function for surfaces of variable negative curvature, *Journal of Differential Geometry*, 29 (1989) 699-709
- [14] A thermodynamic approach to locally symmetric manifolds of higher rank, *Portugalia Mathematicae*, 46 (1989) 283-304
- [15] Differentiability and analyticity of topological entropy for Anosov and geodesic flows (with A. Katok, G. Knieper and H. Weiss), *Inventiones Mathematicae*, 98 (1989) 581-597
- [16] Differentiability and analyticity of topological entropy for Anosov and geodesic flows (with A. Katok, G. Knieper and H. Weiss), *Bulletin of the American Mathematical Society*, 22 (1990) 285-293
- [17] C^k - rigidity for hyperbolic flows II, *Israel Journal of Mathematics*, 69 (1990) 351-360.
- [18] Error terms in "Prime Orbit Theorems" for locally constant suspended flows, *Quarterly Journal of Mathematics*, 41 (1990) 313-323.
- [19] The differential zeta-function for Axiom A attractors, *Annals of Mathematics*, 131 (1990) 331-354
- [20] Kleinian groups, Laplacian on forms and currents at infinity, *Proceedings of the American Mathematical Society*, 110 (1990) 269-279
- [21] Some applications of thermodynamic formalism to manifolds of constant negative curvature, *Advances in Mathematics*, 85 (1991) 161-192
- [22] A note on the Artuso-Aurell-Cvitanovic approach to the Feigenbaum tangent operator, *Journal of Statistical Physics*, 62 (1991) 257-267
- [23] Homology and closed geodesics in a compact negatively curved surface, *American Journal of Mathematics*, 113 (1991) 379-385
- [24] Zeta functions and analyticity of metric entropy for Anosov systems *Israel Journal of Mathematics*, 76 (1991) 257-264
- [25] Agmon's tauberian theorem and an analogue of Merten's theorem, *Proceedings of the American Mathematical Society*, 114 (1992) 1105-1105

- [26] Rotation sets for homeomorphisms and homology, *Transactions of the American Mathematical Society*, 331 (1992) 881-894
- [27] Exponential Mixing for the geodesic flow on hyperbolic three manifolds, *Journal of Statistical Physics* 67 (1992) 667-673
- [28] A note on asymptotics of perturbed expanding maps, *Portugalia Mathematicae*, 51 (1994)395-404
- [29] Rates of recurrence for Z^q and R^q extensions of subshifts of finite type (with R. Sharp), *Journal London Mathematical Soc.* 49 (1994) 401-416
- [30] Factorisation of the Lefschetz zeta functions and twisted periodic orbits, *Mathematische Zeitschrift* 217 (1994) 109-120
- [31] Derivatives of topological entropy for Anosov and geodesic flows, *Journal of Differential Geometry*, 39 (1994) 457-489
- [32] The Picard group, closed geodesics and zeta functions, *Transactions of the American Mathematical Society*, 344 (1994) 857-872
- [33] Orbit counting for some discrete groups acting on simply connected manifolds with neagative curvature (with R. Sharp), *Inventiones Mathematicae*, 117 (1994) 275-302
- [34] A new proof of a theorem of Margulis on geodesic arcs on negatively curved manifolds, *American Journal of Mathematics*, 117 (1995) 289-305
- [35] The dimensions of some self affine limit sets in the plane (with H. Weiss), *Journal of Statistical Physics*, 77 (1994) 841-866
- [36] The Hausdorff dimension of λ -expansions with deleted digits (with K. Simon), *Transactions of the American Mathematical Society*, 347 (1995) 967 - 983
- [37] One dimensional maps via complex analysis in several variables, *Israel Journal of Mathematics*, 91 (1995) 317-339
- [38] Large deviations, Gibbs measures, and closed orbits for hyperbolic flows, *Mathematische Zeitschrift*, 220 (1995) 219-230
- [39] Distribution of closed geodesics for manifolds of non-positive curvature, *Discrete and Continuous Dynamical Systems* 2 (1996) 153-161
- [40] Large deviations and the distribution of pre-images of rational maps (with R. Sharp), *Communications in Mathematical Physics* 181 (1996) 733 - 739
- [41] Growth series for the commutator subgroup (with R. Sharp), *Proceedings of the American Mathematical Society* 124 (1996) 1329-1335
- [42] Growth of periodic points and rotation vectors on surfaces (with R. Sharp), *Topology* 36 (1997) 765-774
- [43] The circle problem for co-compact surfaces of variable negative curvature (with R. Sharp), *Monatschrifte Mathematica* 123 (1997) 61-70
- [44] A remarkable formula for the determinant of the Laplacian (with A.C. Rocha) *Inventiones Mathematicae*, 130 (1997) 399-414
- [45] Poincaré series and zeta functions for surface group actions on R -trees (with R. Sharp), *Mathematische Zeitschrift*, 226 (1997) 335-347
- [46] The Livsic cocycle equation for compact Lie group extensions of hyperbolic systems (with W. Parry) *Journal of the London Mathematical Society* , 56 (1997) 405-416
- [47] Asymptotic auto-correlation for closed geodesics *Communications in Mathematical Physics*, 187 (1997) 341 - 355
- [48] Generalized equilibrium states and behavior of average operators (with A. Fan) CRAS 327, Serie I (1998) 547-552
- [49] Exponential error terms for growth functions on negatively curved surfaces, (with R. Sharp) *American Journal of Mathematics*, 120 (1998) 1019-1042

- [50] An entropy for Z^2 -actions with finite entropy generators (with W. Geller), *Fundamenta Mathematica*, 157 (1998) 209-220
- [51] Large Deviations for maps with indifferent fixed points (with R. Sharp and M. Yuri) *Nonlinearity*, 11 (1998), no. 4, 1173–1184
- [52] Comparison theorems in hyperbolic geometry (with R. Sharp), *Transactions of the American Mathematical Society* 350 (1998) 473–499.
- [53] Multifractal analysis for the continued fraction Manneville-Pomeau transformations and applications to diophantine approximation (with H. Weiss), *Communications in Mathematical Physics* 207 (1999) 145–171
- [54] Measurable cocycle rigidity for some noncompact groups (with M. Nicol), *Bull. London Mathematical Society* 31 (1999), no. 5, 592–600.
- [55] Closed orbits and homology for C^2 -flows, *Discrete Contin. Dynam. Systems* 5 (1999) 529–534
- [56] On the rate of mixing of Axiom A attracting flows and a conjecture of Ruelle, *Ergodic Theory and Dynamical Systems* 19 (1999) 535–548.
- [57] Regularity of solutions to the measurable Livsic equation (with M. Yuri), *Transactions of the American Mathematical Society*, 351 (1999), 559-568.
- [58] Ergodic properties of the Bolyai-Rnyi expansion (with O. Jenkinson) *Indag. Math.* 11 (2000) 399–418.
- [59] Computing invariant densities and metric entropy (with O. Jenkinson) *Comm. Math. Phys.* 211 (2000) 687–703.
- [60] Mark Non-homogeneous equilibrium states and convergence speeds of averaging operators (with Ai Fan), *Math. Proc. Cambridge Philos. Soc.* 129 (2000) 99–115.
- [61] Z^d -covers of horosphere foliations, *Discrete Contin. Dynam. Systems* 6 (2000) 147–154.
- [62] Rates of mixing for potentials of summable variation, *Transactions of the American Mathematical Society* 352 (2000) no. 2, 843–853.
- [63] Livsic theorems for connected Lie groups (with C. Walkden), *Trans. Amer. Math. Soc.* 353 (2001) 2879-2895
- [64] Error terms for closed orbits of hyperbolic flows (with R. Sharp), *Ergod. Th. and Dynam. Sys.*, 21 (2001) 545-562
- [65] Linear actions of free groups (with R. Sharp), *Ann. Inst. Fourier (Grenoble)*, 51 (2001) 131-150
- [66] Poincare series and comparison theorems for variable negative curvature (with R. Sharp), *Amer. Math. Soc. Transl.* 202 (2001) 229–240
- [67] Contraction in mean and transfer operators., *Dyn. Syst.* 16 (2001) 97–106
- [68] Statistical properties of maps with indifferent periodic points (with M. Yuri), *Comm. Math. Phys.* 217 (2001) 503–520
- [69] Zeta functions for certain multi-dimensional non-hyperbolic maps (with M. Yuri), *Nonlinearity* 14 (2001) 1265-1278
- [70] Livsic’s theorem for semi-simple Lie groups (with M. Nicol), *Ergod. Th. and Dynam. Sys.* 21 (2001) 1501-1509
- [71] Asymptotic expansions for closed orbits in homology classes (with R. Sharp) *Geometriae Dedicata* 87 (2001) 123-160
- [72] Computing the dimension of dynamically defined sets (with O. Jenkinson), *Ergod. Th. and Dynam. Sys.*, 21 (2001) 1429-1445
- [73] Dynamical zeta functions , *Proc. Symp. Pure Math.* 69 (2001) 409-427
- [74] The dynamics of Schelling-type segregation models and a nonlinear graph Laplacian variational problem (with H. Weiss) *Adv. in Appl. Math.* 27 (2001) 17–40
- [75] Ergodicity of stable manifolds for nilpotent extensions of Anosov flows, *Disc. Cont. Dynam. Sys.*, 8 (2002) 599-604

- [76] Calculating Hausdorff dimension of Julia sets and Kleinian limit sets (with O. Jenkinson), *Amer. J. Math.* 124(2002)495-545
- [77] Invariance principles for interval maps with an indifferent fixed point (with R. Sharp), *Commun. Math. Phys.*, 229 (2002) 337-346
- [78] Ergodic properties of linear actions by (2×2) -matrices (with F. Ledrappier), *Duke Math. J.*, 116 (2003) 353-388
- [79] Stability of mixing rates for Axiom A attractors, *Nonlinearity*, 16 (2003) 567-578
- [80] Hausdorff dimension and asymptotic cycles, *Trans. Amer. Math. Soc.*, 355 (2003) 3241-3252.
- [81] Time delay coordinates and polynomial mappings, *Advances in Math.*, 177 (2003) 280-296
- [82] Stable ergodicity and frame flows (with K. Burns), *Geom Dedicata* 98 (2003) 189-210
- [83] Free energy as a dynamical and geometric invariant (with H. Weiss), *Commun. Math. Phys.* 240 (2003) 457-482
- [84] Livsic theorems, maximizing measures and the stable norm (with R. Sharp), *Dyn. Sys.* 19 (2004) 75-88
- [85] Some remarks on the dynamics of the mixmaster universe (with H. Weiss) *Qual. Theory Dyn. Sys.* 4 (2004) 425-438
- [86] Orthonormal expansions of invariant densities for expanding maps (with O. Jenkinson), *Advances in Math.*, 192 (2005)1-34
- [87] Transitivity of Euclidean extensions of Anosov diffeomorphisms (with V. Nitica), *Ergodic Theory and Dyn. Sys.*, 25 (2005) 257-269
- [88] Local Hölder regularity of densities and Livsic theorems for non-uniformly hyperbolic diffeomorphisms, *Discrete Contin. Dyn. Syst.*, 13 (2005) 1247-1256
- [89] Distribution results for lattices in $SL(2, Q_p)$ (with F. Ledrappier), *Bull. Braz. Math. Soc.*, 36 (2005) 143-176
- [90] Free energy as a geometric invariant (with H. Weiss) *Comm. Math. Phys.* 260 (2005), no. 2, 445-454
- [91] Angular self-intersections for closed geodesics on surfaces *Proc. Amer. Math. Soc.* (with R. Sharp) 134 (2006) 419-426
- [92] Correlations for pairs of closed geodesics (with R. Sharp), *Invent. Math.*, 163 (2006),1-24
- [93] Properties of measures supported on flat Sierpinski carpet (with T. Jordan), *Ergod. Th. and Dynam. Sys.*, 26 (2006) 739-754: [including Addendum: Positive-measure self-similar sets without interior (with M. Csornyei, T. Jordan, D.Preiss and B. Solomyak) *Ergod. Th. and Dynam. Sys.*, 26 (2006) 755-758]
- [94] Skew products and Lie theory (with W. Parry), *Translations Amer. Math. Soc.*, 217 (2006) 139-165
- [95] Distribution of ergodic sums for hyperbolic maps (with R. Sharp), *Translations Amer. Math. Soc.* 167-183
- [96] Hausdorff dimension for randomly perturbed self affine attractors (with T. Jordan and K. Simon), *Comm. Math. Phys.* 270 (2007) 519-544

BOOKS

- [I] Zeta functions and closed orbits for hyperbolic systems (with W. Parry), *Asterisque* (Soc. Math. France), 187-188 (1990) 1-268
- [II] Lectures on Pesin Theory and ergodic theory on manifolds, *London Mathematical Society Lecture Notes Series* vol. 180, C.U.P., Cambridge, 1992
- [III] Dynamical Systems and Ergodic Theory (with M. Yuri), *London Mathematical Society Student Text Series*, vol. 40, C.U.P., Cambridge, 1998

SURVEYS AND ARTICLES IN CONFERENCE PROCEEDINGS

- [A] Distributions at infinity for Riemann surfaces, in Proc. Conf. “Dynamical Systems and Ergodic Theory”, Stefan Banach Center, vol. 23, 1989
- [B] Closed Geodesics and Zeta functions, in Proc. Conf. “Ergodic theory and Hyperbolic Geometry”, O.U.P., Oxford, 1990, pp. 153-173
- [C] Notes on thermodynamic formalism for Anosov flows, in “Rencontres de theorie spectrale et geometrie”, Grenoble, 1991, pp.123-128
- [D] Symbolic dynamics and geodesic flows, in “Seminaire de theorie spectrale et geometrie”, Chambéry-Grenoble, 1991-1992, pp.1-20
- [E] The story of the solution of the Feigenbaum conjectures, Proceedings of the conference in honour of the 50th anniversary of the Centro de Matematica do Porto, pp.75-85
- [F] On the Ruelle-Tangerman theorem for zeta functions, Proceedings of the European Conference on Iteration Theory, Lisbon, 1991, pp.201-209
- [G] Infinitesimal Rigidity of Group Actions with Hyperbolic Generators, in *Dynamical Systems and Applications* World Scientific Series In Applicable Analysis 4, pp.589-599
- [H] Entropy and geodesic arcs on surfaces, Proceedings of the International conference on dynamical systems *Pitman research Notes in Mathematics* 362, 1996.
- [I] Stability of mixing for toral extensions (with W. Parry) *Proceedings of the Steklov Institute*, vol. 216, 1997, pp. 350-359
- [J] Notes on thermodynamic formalism for Anosov flows. *Rencontres de Thorie Spectrale et Gomtrie* (Aussois, 1991), 123–128
- [K] Addendum to “Periodic orbits and dynamical spectra, by V. Baladi” (with D. Dolgopyat), *Ergodic Theory and Dynamical Systems*, 18 (1998), no. 2, 293–301.
- [L] Periodic orbits and zeta functions, in *Handbook of Dynamical Systems*, vol IA, Elsevier, (2002) 409-452
- [M] Entropy, exponents and invariant densities for hyperbolic systems: Dependence and computation (with O. Jenkinson), in *Modern Dynamical Systems and its Applications*(eds. M. Brin, B. Hasselblatt, Y. Pesin), C.U.P., Cambridge, 2004
- [N] Dynamical zeta functions and closed orbits for geodesic and hyperbolic flows. *Frontiers in number theory, physics, and geometry. I*, 379–398, Springer, Berlin, 2006.

CONFERENCE PROCEEDINGS (EDITOR)

Ergodic Theory of Z^d -actions, *London Mathematical Society Lecture Notes Series* vol. 228, C.U.P., Cambridge, 1996

PhD Students

Oliver Jenkinson, Warwick, 1997
 Charmaine Leech, Warwick, 1997
 Zainab Kazim, Manchester, 1999
 Vincent Evanno, Manchester, 2000
 Shrihari Shridan, Manchester, 2004
 Thomas Jordan, Manchester 2005

Research Assistants

Dr. Kit Nair, Edinburgh, 1995-98
 Dr. Charles Walkden, Manchester, 1997-99
 Dr. Patrick Verovic, Manchester, 1998
 Dr. Alistair Windsor, Manchester 2001-2004
 Dr. Thomas Jordan, Warwick 2005-2008
 TBA 2006-2009