Vita
Peter A. Perry

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Education

- A.B. (Physics), Princeton University, 1977
- M.S. (Physics), Princeton University, 1978
- Ph.D. (Physics), Princeton University, 1982

Fellowships

- N.S.F. Predoctoral Fellow, 1977-1980
- N.S.F. Postdoctoral Fellow, 1981-1982
- Bantrell Fellow in Mathematical Physics, Caltech, 1982-1985
- Fulbright Lecturing and Research Fellow, University of Oslo, Fall 1993

Professional Experience

- N.S.F. Postdoctoral Fellow, Courant Institute, 1981-1982
- Bantrell Research Fellow, Caltech, 1982-1985
- Assistant Professor, University of Kentucky, 1985-1988
- Associate Professor, University of Kentucky, 1988-1994
- Full Professor, University of Kentucky, 1994-present

Administrative Experience

- Co-Director, Research Experiences for Undergraduates Site Program, 1995-1998
- Chair, Department of Mathematics, July 1, 2000-June, 30 2004

Visiting Positions

- I.H.E.S., Bures-sur-Yvette, France, January-June 1981
- Mittag-Leffler Institute, Djursholm, Sweden, March-April 1982
- Centre de Physique Théorique, C.N.R.S.-Luminy, France, June 1983 and July 1981
- Department of Mathematics, Stanford University, Summers 1983-1987
- Department of Mathematics, University of Virginia, Fall 1987
- Mathematisches Institut, Universität Göttingen, Göttingen, Germany, February-June 1989
- Department of Mathematics, University of Oslo, Fall 1993
- Institute for Mathematics and its Applications, University of Minnesota, January-March 1995
- Visiting Member, Mathematical Sciences Research Institute, March and May 2001
- Mittag-Leffler Institute, Djursholm, Sweden, August 2002

Honors and Awards

- NSF Postdoctoral Fellowship, 1981-1982

- Fulbright Fellowship, Fall 1993
- University Research Professor, University of Kentucky, 1999-2000

Research Support

- NSF Grant DMS-860344 (two years), $26,000, June 1986
- NSF Grant DMS-8802668 (two years), $35,700, June 1988
- NSF Grant DMS-9006092 (two years), $42,592, June 1990
- NSF Grant DMS-9203529 (three years), $123,000, June 1992
- NSF Grant DMS-9508543 (SCREMS equipment grant, with Zhaojun Bai, Thomas Hayden, and Arnold Stromberg), $50,000, 1995
- NSF Grant DMS-9424012 (REU site grant, four years, with Suzanne Smith), $115,325, February 1992
- NSF Grant DMS-9707051 (three years), $90,000, June 1997
- NSF Grant DMS-0100829 (three years), $90,000, June 2001
- NSF Grant DMS-0100829, ROA (Research Opportunity Award) supplement, $13,074
- NSF Grant DMS-0100829, Supplement to support postdoctoral researcher Yilong Ni for one semester, $10,000
- NSF Grant DMS-0207125 (conference, with Carolyn Gordon), $16,048, June 2002
- NSF Grant DMS-0408419 (three years), $136,500, June 2004
- NSF Grant DMS-0408419, Supplement to support postdoctoral researcher Siu-Hung Tang, $16,816
- Co-PI on EPSCoR Component Project, 1986–1991
- Co-PI on EPSCoR Component Project, 1992–1996

- Co-PI on NATO Collaborative Research Grant, 1991-1992

Recent Invited Presentations

- Invited 30 minute lecture, "The Miura map, KdV, ad MdV", Conference on Inverse Quantum Scattering Theoryl, Lake Balaton Hungary, August, 2007
- Invited 50 minue lecture, "Scattering theory for complex manifolds and CR-invariants," Matematisches Forschungsinstitut Oberwolfch, August 2007
- Invited 50 minute lecture, "Scattering theory for complex manifolds," analysis seminar, University of Zürich, August 2007
- Invited 40 minute special session talk, Sectional Meeting of the American Mathematical Society, Fayetteville, Arkansas, November 2006
- Invited lecture (50 minutes), Spectral Theory and Mathematical Physics: A Conference in Honor of Barry Simon's 60th Birthday, March 27-31, 2006, California Institute of Technology
- Invited lecture (50 minutes), Workshop on Conformal Invariants: Geometric and analytic aspects, National Center for Theoretical Sciences, Hsinchu, Taiwan, June 2005
- Invited lecture (50 minutes), Conference on "Recent developments in spectral geometry", Berlin, November 1-5, 2004
- Invited lecture (45 minutes), Special Session on "Spectral Problems in Partial Differential Equations" Midwest sectional meeting of the AMS, October 2004
- Invited lecture, Workshop on Spectral Geometry, Centre de Récherches Mathématiques, Université de Montreal, March and May 2004
- Invited Lecture Series co-delivered with Carolyn Gordon, Dartmouth College, Conference on Geometry and Analysis in Inverse Problems, Helsinki, Finland, August 2003

- Invited lecture, Conference on Scattering and Inverse Scattering, Banff International Mathematics Research Station, March 2003
- Colloquium, Purdue University, Fall 2002
- Workshop on Partial Differential Equations and Spectral Theory, Mittag-Leffler Institute, August 2002
- Colloquium, University of Uppsala, August 2002
- Invited Lecture, Texas Geometry and Topology Conference, April 2002
- Invited lecture series on scattering theory, Conference on Spectral Geometry, Dartmouth College, June 2001
- Worskhop on Geometric Scattering Theory and Elliptic Theory on non-compact spaces, Mathematical Sciences Research Institute, May 2001
- Invited lecture, Annual Meeting of the Canadian Mathematical Society, Vancouver, BC, December 2000
- Invited 20-minute talk, Southeastern Sectional Meeting of the AMS, November 2000
- Workshop on Spectral Geometry, University of Kentucky, June 2000
- Colloquium lecture, University of Göttingen, May 2000, in connection with Workshop on Dynamical Zeta Functions
- PDE Seminar, University of Indiana, February 2000
- Workshop on Dirac Operators and Analysis on non-compact manifolds, Stefan Banach Institute, Warsaw, Poland, August 1999
- Workshop on Spectral Geometry, Technion-Israel Institute of Technology, June 1999

Conferences Organized

- Special Session on Scattering and Spectral Problems in Geometry, AMS Sectional Meeting, Lincoln, Nebraska, October 2005
- Special Session on Inverse Spectral Geometry, AMS-MAA Joint Meeting, January 2005
- (co-organized with Carolyn Gordon, Dartmouth College) Workshop on Inverse Spectral Geometry, Dartmouth College, November 2003
- (co-organized with Carolyn Gordon, Dartmouth College) First Kentucky-Dartmouth Workshop on Inverse Spectral Geometry, June 2002
- Workshop on Inverse Spectral Theory, University of Kentucky, June 2000

Graduated Masters' and Doctoral Students

- Kirk Jason Yenerall, M.A., May 1992. Masters' Thesis: An Eigenvalue Minimization problem on S^2.
- Albert F. Schueller, Ph.D., August 1996. Ph. D. Thesis: Eigenvalue Asymptotics for Self-Adjoint, Fourth-Order, Differential Operators.
- Wu Zhiqiang, Ph. D., August 1997. Ph. D. Thesis: Scattering Theory on Domains with Fractal Boundaries.
- Douglas Riley, Ph. D. July 1999. Ph. D. Thesis: Global Existence for the Three-Dimensional Navier Stokes Equations in Domains with Special Geometry. Three Dimensions.
- Yuho Shin, Ph. D. December 2006. Thesis: Geodesics of a two-step nilpotent Lie group.

Postdoctoral Research Associates

- Edward Taylor, NSF Postdoctoral Fellow, 1997-1998.

- Albert Schueller, CCS Postdoctoral Research Associate (co-funded with my NSF grant and the Center for Computational Sciences), Fall 1998.
- Ruth Gornet, NSF POWRE Postdoctoral Research Associate, January 1998-August 1999.
- Jeffrey McGowan, NSF ROA Summer Fellow, Summer 2001
- Yilong Ni, Postdoctoral Research Associate (funded by my NSF grant), Spring 2003
- Siu-Hung Tang, Research Associate, 2006-2007 (co-funded by Perry's and Hislop's NSF grants together with departmental support)

Reviews

- Featured review (in *Mathematical Reviews*) of L. Guillope, M. Zworski, Scattering asymptotics for Riemann surfaces, *Ann. of Math.* **145** (1997), 597–660.

Books

1. *Scattering Theory by the Enss Method.* Reports in Mathematics, vol. 1, no. 1, ed. J. Dieudonne and Barry Simon. New York: Harwood Academic Publishers, 1983.

2. (co-edited with R. Brooks, C. Gordon). *Geometry of the Spectrum.* (Proceedings of a Conference on Spectral Geometry, Seattle, Washington, August 1993). American Mathematical Society, 1994.

3. (co-edited with F. Gesztezy, et. al.) Festschrift in Honor of Barry Simon's Sixtieth Birthday. To appear in *Contemporary Mathematics*, **2007**.

Articles

1. Mellin transforms and scattering theory, I. Short–range potentials. *Duke Math. J.* **47** (1980), 187–194.

2. (with Israel Sigal and Barry Simon) Absence of singular continuous spectrum in N–body quantum systems. *Bull. Amer. Math. Soc.* **3** (1980), 1019–1023.

3. Propagation of states in dilation–analytic potentials and asymptotic completeness. *Comm. Math. Phys.* **81** (1981), 243–259.

4. (with Israel Sigal and Barry Simon) Spectral analysis of N–body Schrödinger operators. *Ann. Math.* **114** (1981), 519–567.

5. (with George Hagedorn) Asymptotic completeness for certain three–body Schrödinger operators. *Comm. Pure Appl. Math.* **36** (1983), 213–232.

6. (with Arne Jensen and Éric Mourre) Multiple commutator estimates and resolvent smoothness in quantum scattering theory. *Ann. Inst. H. Poincare Phys. Théorique* **41** (1984), 207–225.

7. (with Hans Cycon) Local time–decay of high-energy scattering states for the Schrödinger equation. *Math. Zeits.* **188** (1984), 125–142.

8. Exponential bounds and semi–finiteness of point spectrum for N–body Schrödinger operators. *Comm. Math. Phys.* **92** (1984), 481–483.

9. A remark on continuum eigenfunctions of N–body Schrödinger operators. In *Differential Equations, Proceedings of the International Conference on Differential Equations,* Birmingham, Alabama, I. W. Knowles and R. T. Lewis, eds.

10. (with George Hagedorn) Asymptotic completeness for classes of three– and four-body Schrödinger operators. In *Differential Equations, Proceedings of the International Conference on Differential Equations,* Birmingham, Alabama, I. W. Knowles and R. T. Lewis, eds. North–Holland, 1984.

11. (with George Hagedorn) Asymptotic completeness for four–body Schrödinger operators. *J. Funct. Anal.* **65** (1986), 172–203.

12. (with Arne Jensen) Commutator methods and Besov space estimates for Schrödinger operators. *J. Operator Theory* **14** (1985), 181–188.

13. The Laplace operator on a hyperbolic manifold, I. Spectral and scattering theory. *J. Funct. Anal.* **75** (1987), 161–187 (1987).

14. The Laplace operator on a hyperbolic manifold, II. Eisenstein series and the scattering matrix. *J. reine angew. Math.* **398** (1987), 67–91.

15. Isospectral metrics on Riemannian manifolds. In *Proceedings of the Nordic Summer School of Mathematics, Sonderborg, Denmark, August 1988* (Lecture Notes in Physics, No. 345). Berlin, Heidelberg, New York: Springer–Verlag, 1989.

16. (with Robert Brooks, P. Yang) Isospectral sets of conformally equivalent metrics. *Duke Math. J.* **58** (1989), 131–150.

17. (with R. Froese, P. Hislop) The Mourre estimate for manifolds with cusps of non–maximal rank. *J. Funct. Anal.* **98** (1991), 292–310.

18. The Selberg zeta function and a local trace formula for Kleinian groups. *J. reine angew. Math.* **410** (1990), 116–152.

19. The Selberg zeta function and scattering poles for Kleinian groups. *Bull. Amer. Math. Soc.* **24** (1991), 327–333.

20. (with Richard Froese and Peter Hislop) The Laplace operator on hyperbolic three–manifolds with cusps of non–maximal rank. *Inventiones Math.* **106** (1991), 295–333.

21. Some spectral problems in Riemannian Geometry. In *Inverse Problems in Mathematical Physics: Proceedings of the Lapland Conference on Inverse Problems, Saariselka, Finland, 14–20 June 1992.* Berlin, Heidelberg, New York: Springer–Verlag, 1993.

22. (with Robert Brooks and Peter Petersen V) Compactness and finiteness theorems for isospectral manifolds, *J. Reine angew. Math.* **426** (1992), 67–89.

23. (with Robert Brooks and Peter Petersen V) On Cheeger's inequality. *Comment. Math. Helv.* **68** (1993), 599–621.

24. (with Robert Brooks and Peter Petersen V) Finiteness of diffeomorphism types of isospectral manifolds. In *Proc. Symp. Pure Math.* **54** (1993), Part 3, 89–93.

25. (with Robert Brooks and Peter Petersen V) Some examples in L^p spectral geometry. *J. Geom. Anal.* **3** (1993), 293–313.

26. The Selberg zeta function and scattering poles for Kleinian groups. In *Mathematical Quantum Theory, I. Schrödinger Operators* (Vancouver, B.C. 1993), 243–251.

27. Divisor of the Selberg zeta function for Kleinian groups. *Journées "Équations aux Dérivées Partielles" (Saint-Jean-de-Monts, 1994)*, Exp. No. VIII, 9 pp., École Polytech., Palaiseau, 1994.

28. (with Robert Brooks and Peter Petersen V) Spectral geometry in dimension 3. *Acta Mathematica* **173** (1994), 283–305.

29. A trace–class rigidity theorem for Kleinian groups. *Annales Acad. Sci. Finnicae* **20** (1995), 251–257.

30. (with D. W. Evans and Heinz Siedentop) The spectrum of relativistic one–electron atoms according to Bethe and Salpeter. *Comm. Math. Phys.* **178** (1996), no. 3, 733–746.

31. (with Albert W. Schueller and Lester F. Caudill) Isospectral sets for fourth–order differential operators. *SIAM J. Math. Analysis* **29** (1998), 935–966.

32. (with Russell Brown and Zhongwei Shen). The additive turbulent decomposition for the two–dimensional incompressible Navier–Stokes equations: convergence theorems and error estimates. *SIAM J. Appl. Math.* **59** (1999), 139–155.

33. (with Russell Brown and Zhongwei Shen). On the dimension of the attractor for the non–homogeneous Navier–Stokes equations in non-smooth domains. *Indiana University Math. J.* **49** (2000), 81–112.

34. (with S. J. Patterson) Divisor of the Selberg Zeta Function for Kleinian groups. Appendix A by Charles Epstein. Duke Math. J. **106** (2001), no. 2, 321–390.

35. (with Robert Brooks and Ruth Gornet) Isoscattering Schottky manifolds. *Geometric and Functional Analysis* **10** (2000), no. 2, 307–326.

36. Spectral theory, dynamics, and Selberg's zeta function for Kleinian groups. *Dynamical, spectral, and arithmetic zeta functions* (San Antonio, TX, 1999), 145–165,*Contemp. Math.*, **290**, Amer. Math. Soc., Providence, RI, 2001.

37. Asymptotics of the length spectrum for hyperbolic manifolds of infinite volume. *Geom. Funct. Anal.* **11** (2001), no. 1, 132–141.

38. (with Robert Brooks) Isophasal scattering manifolds in two dimensions. *Comm. Math. Phys.* **223** (2001), no. 3, 465–474.

39. (with David Borthwick) Scattering poles for asymptotically hyperbolic manifolds. *Trans. Amer. Math. Soc.* **354** (2002), no. 3, 1215–1231.

40. (with Jeffrey McGowan) Closed geodesics in homology classes for convex co–compact hyperbolic manifolds. Proceedings of the Euroconference on Partial Differential Equations and their Applications to Geometry and Physics (Castelvecchio Pascoli, 2000). *Geom. Dedicata* **91** (2002), 197–209.

41. (with David Borthwick and Christopher Judge) Determinants of Laplacians and isopolar metrics on surfaces of infinite area. *Duke Math. J.* **118** (2003), 61–102.

42. A Poisson summation formula and lower bounds for resonances in hyperbolic manifolds. *Int. Math. Res. Not.* **2003**, no. 34, 1837–1851

43. Carnot geometry and the resolvent of the sub–Laplacian. *Comm. P.D.E.* **28** (2003), 745–769.

44. (with Floyd Williams) Selberg zeta function and trace formula for the BTZ black hole. *Int. J. Pure Appl. Math.* **9** (2003), no. 1, 1–21.

45. (with David Borthwick and Christopher Judge) Selberg's zeta function and the spectral geometry of geometrically finite hyperbolic surfaces. *Commentari Math. Helv.* **80** (2005), no. 3, 483–515.

46. (with Carolyn Gordon and Dorothee Schueth) Isospectral and isoscattering manifolds: a survey of techniques and examples. In *Geometry, Spectral Theory, Groups, and Dynamics: Proceedings in Memory of Robert Brooks*, 157–180. Israel Math. Conf. Proc. **387** (2005), Amer. Math. Soc., Providence, Rhode Island, 2005.

47. (with Thomas Kappeler, Mikhail Shubin, Peter Topalov). The Miura Map on the Line. *Int. Math. Res. Not.* **2005** (2005) no. 50, 3091-3133.

48. (with Dorothee Schueth) Continuous families of isophasal scattering manifolds which are asymptotically hyperbolic. *Journal of Geometric Analysis* **16** (4) (2006), 661-677.

49. (with Carolyn Gordon) Continuous families of isophasal scattering manifolds. *Mathematical Research Letters* **13** (4) (2006), 631-651.

50. (with Peter Hislop, Siu-Hung Tang). CR-invariants and the scattering operator for complex manifolds with CR-boundary. *C. R. Acad. Sci Paris* Ser. I, **342** (2006), 651-654.

51. The spectral geometry of geometrically finite hyperbolic manifolds. Festschrift in Honor of Barry Simon's Sixtieth Birthday. *Proc. Symp. Pure Math.*, to appear, 2007.

Preprints

1. Kappeler, T., Perry, P.; Shubin, M.; Topalov, P. Solutions of mKdV in classes of functions unbounded at infinity. See `arXiv:math.AP/0601237`.