

CURRICULUM VITAE: JILL PIPHER

EDUCATION

B.A. in Mathematics, UCLA, 1979

PhD. in Mathematics, UCLA, 1985, Harmonic Analysis

PROFESSIONAL EXPERIENCE

1985 - 1987, L. E. Dickson Instructor, University of Chicago

1987 - 1990, Assistant Professor, University of Chicago

1989 - 1994, Associate Professor, Brown University

1994 - present, Professor, Brown University

AWARDS AND HONORS

NSF Postdoctoral Fellowship, 1987-90

Sloan Fellowship, 1989-93

Presidential Young Investigator Award, 1990-95

Mathematical Sciences Research Inst. Research Professor, 1997

]

RESEARCH AND PUBLICATIONS

1. Bounded double square functions, *Ann. Inst. Fourier* 2, (1986), p. 69-82.
2. Journé's covering lemma and its extension to higher dimensions, *Duke J. Math.* 53 (3) (1986), p. 683-690
3. Hardy spaces and the Dirichlet problem on Lipschitz domains, with C. Kenig, *Revista Iberoamericana* 3 (2) (1987), p. 191-247
4. Oblique derivative problems on Lipschitz domains with L^p data, with C. Kenig, *Amer. J. Math.* 110 (4) (1988), p. 715-738
5. Oblique derivative problems for the Laplacian in Lipschitz domains, *Revista Iberoamericana* 3 (3) (1988), p.455-471
6. The h-path distribution of the lifetime of conditioned Brownian motion for non-smooth domains, with C. Kenig, *Probab. Th. Rel. Fields* 82 (1989), p. 615-623
7. Area integral estimates for biharmonic functions, with G. Verchota, *TAMS* 327 (2) (1991), p. 903-918
8. The theory of weights and the Dirichlet problem for elliptic equations, with R. Fefferman and C. Kenig, *Annals of Math.* 134 (1991)p. 65-124
9. The Dirichlet problem in L^p for biharmonic functions on Lipschitz domains, with G. Verchota, *Amer. J. Math.* 114 (1992), p. 923-972

10. The maximum principle for biharmonic functions, with G. Verchota, *Comm. Math. Helv.* 68 (1993), p. 385-414
11. Co-editor, *Partial Differential Equations with Minimal smoothness and Applications*, IMA Vol 42, Springer-Verlag, 1992
12. A martingale inequality related to exponential square integrability, *PAMS* 118 (2) (1993)
13. Maximum principles for polyharmonic functions in Lipschitz and C^1 domains, with G. Verchota, *J. Potential Analysis* 4 (1995), p. 615-636
14. The Neumann problem for elliptic equations with non-smooth coefficients, with C. Kenig, *Inventiones Math.* 113 (1995), p.447-509
15. Boundary value problems for higher order operators, *Fourier Analysis and Partial Differential Equations: Proceedings of the El Escorial Conference*, edited by J. Garcia-Cuerva et al, Chapter 20 (1995), CRC Press.
16. Review of: *Harmonic Analysis Techniques in Second Order Elliptic PDE*, by Carlos Kenig, *Bulletin of the AMS* 33 (2) (1996), p. 229-236
17. Dilation invariant estimates and a boundary Garding inequality, with G. Verchota, *Annals of Math.* 14 (1995), p. 1-38
18. The Neumann and regularity problem for second order divergence form equations, Part II, with C. Kenig, *Duke J. Math.* 81 (1) Special volume in honor of J. Nash (1995), p. 227-250
18. Area integral estimates for higher order elliptic equations and systems, with B. Dahlberg, C. Kenig and G. Verchota, *Annals L'Inst. Fourier* 47 (1997), p.1425-1461
20. A convexity property of eigenvalues and applications, with W. Beckner and C. Kenig, manuscript
21. Littlewood-Paley estimates: some applications to elliptic boundary value problems, *CRM Proceedings and Lecture Notes* 12 (1997), p. 221-238.
22. Vector potential theory on non-smooth domains in \mathbf{R}^3 , and applications to electromagnetic scattering with D. Mitrea and M. Mitrea, *J. Fourier Analysis and Appl.* 3 (2) (1997), p. 131-192
23. Multiparameter operators and sharp weighted inequalities, with R. Fefferman, *American J. Math.* 119 (2) (1997), p. 337-370
24. The inhomogeneous Dirichlet problem for Δ^2 in Lipschitz domains, with V. Adolfsson, *J. Funct. Anal.* 159 (1998), p. 137-190
25. The absolute continuity of elliptic measure revisited, with C. Kenig, *J. of Fourier Analysis and Applications* (4) (1998), p. 463-468
26. NTRU: a ring based public key cryptosystem, with J. Hoffstein and J. Silverman, *Algorithmic Number Theory (ANTS III)*, J. Buhler (ed.), *Lecture Notes in Computer Science* 1423, Springer-Verlag (1998), p. 267-288
27. A new approach to the absolute continuity of elliptic measure, with applications to nonsymmetric equations, with H. Koch, C. Kenig and T. Toro, *Advances in Math.* 153 (2000), p.231-298.
28. NSS: An NTRU lattice-based signature scheme, with J. Hoffstein and J. Silverman, *Proceedings of Eurocrypt 2001*.

29. The Dirichlet problem for elliptic equations with drift terms, with C. Kenig, *Publicaciones Matemáticas* 45 (2001), 199-217.
30. Five lectures on NTRU encryption and digital signatures, L'Institut Fourier, Grenoble, 2002 Summer School in Cryptology
31. NTRUSign: Digital Signatures using the NTRU lattice, with N. Howgrave-Graham, J. Hoffstein, J. Silverman, W. Whyte, *CT-RSA 2003 Proceedings*.
31. Biparameter paraproducts, with C. Muscalu, T. Thiele, T. Tao, *Acta Mathematica* 193 (2004), p. 269-296.
32. Multiparameter paraproducts, with C. Muscalu, T. Thiele, T. Tao, to appear *Revista Math. Ibero*.
33. A covering lemma for rectangles in \mathbb{R}^n , with R. Fefferman, *Proc. AMS* 133, No.11 (2005), p.3235-3241.
34. Variations on the theme of Journé's lemma, with C. Cabrillo, M. Lacey, and U. Molter, to appear *Houston J. Math*.
35. On estimating the lattice security of NTRU, with N. Howgrave-Graham and J. Hoffstein, submitted
36. BMO from Dyadic BMO on the bidisc, with L. Ward, *Journal London Math. Soc.*, Vol. 77 No. 2, 2008, p. 524-544.
37. The L^p Dirichlet Problem for second order elliptic operators and a p-adapted square function, with M. Dindos and S. Petermichl, *J. Funct. Anal.* Vol. 249, issue 2, 2007. pl 372-392.
38. Multiparamater Commutators, with M. Lacey, S. Petermichl, and B. Wick, to appear *Amer. J. Math*.
39. Introduction to Mathematical Cryptography, by J. Hoffstein, J. Silverman, J. Pipher, Book, 500 pages, Springer Undergraduate Texts in Mathematics, available 2008.
40. Iterated Riesz Commutators: a simple proof of boundedness, with M. Lacey, S. Petermichl, B. Wick, *Proceedings of Analysis at El Escorial*, 2008.
41. Geometric-arithmetic averaging of dyadic weights with L. Ward and X. Xiao, submitted.
42. Weak-star convergence in multiparameter Hardy spaces, with S. Treil, available on Arxiv, submitted.
43. BMO solvability and the A^∞ for elliptic operators, with M. Dindos, C. Kenig, to appear in *J. Geometric Analysis*.
44. Directional discrepancy in two dimensions with D. Bilyk, X. Ma, and C. Spencer, submitted.

SELECTED INVITED LECTURES (2000-07)

1. Invited Speaker, El Escorial Conference in Harmonic Analysis, Spain, 2000.
2. Invited Speaker, Conference in Harmonic Analysis and PDE in memory of Bjorn Dahlberg, Chalmers University, Goteborg, Sweden, June 2001
3. Invited Speaker, Conference in Harmonic Analysis, NSF and AMS sponsored, Mt. Holyoke MA, June 2001

4. Faculty Forum, Inauguration of Ruth Simmons, Brown, October 2001
5. Invited Speaker, Conference in Complex and Harmonic Analysis, Los Angeles, CA, December 2001.
6. Invited Speaker, Grenoble Summer School in Cryptology: 5 lectures on NTRU encryption and digital signatures, June 2002
7. Berkeley Analysis Seminar, November 2003
8. Main speaker at NSF supported 6th annual New Mexico Analysis Conference, lectures in elliptic pde, March 2003
9. Invited speaker, joint AMS-RSME meeting, Seville, Spain, June 2003
10. Invited Speaker, Fabes-Chiarenza International Conference, Siracusa, Italy, December 2003.
11. Invited Speaker, Fabes-Riviere International Conference, Minneapolis, Minnesota, April 2004
12. Invited Lecturer, Women's Program at IAS : 5 lectures on analysis for the graduate course, one research lecture, May 2004.
13. UCLA Analysis Seminar, November 2004
14. University of North Carolina, Colloquium and Special Seminar, 2005
15. University of Edinburgh, The Maxwell Institute Analysis Seminar, October 2005.
16. University of Virginia, Colloquium and Special Seminar, 2006
17. University of Edinburgh, Analysis Seminar, 2006.
18. The Inaugural Virginia Chatelain Distinguished Lecture, Kansas State University, 2006.
19. Special Session of the Canadian Math. Society, Toronto, 2006.
20. Invited Speaker, Conference in Harmonic Analysis and PDE, Beijing, June 2007
- 21..Plenary Speaker, Lars Ahlfors Centenary Celebration, Helsinki, Finland, August 2007..
22. Special Colloquium, The Martha Davenport Heard Lecture at Wellesley College, October 2007.
- 23.Jean Ryan Memorial Lecture, Purdue University, October 2008.
24. Colloquium, Nanyang Technical University, Singapore, December 2008.
25. Coxeter Lectures at the Fields Institute in Toronto, Feb. 2008.
26. CRM European Math Institute, Barcelona, Conference Lecture, June 2009.

RESEARCH IN PROGRESS

The boundary behavior of solutions to elliptic equations, with Martin Dindos, David Rule, U. of Edinburgh

Multiparameter commutators and div curl, with M. Lacey, Stefanie Petermichl and Brett Wick.

Geometric Discrepancy Theory, w. D. Bilyk, W. Chen, Macquarie University, Sydney Australia.

Analysis on chord-arc domains, w. T. Toro, U. of Washington.

BROWN UNIVERSITY SERVICE

Freshman advising, 2002, 2003, 2005.
 WISE faculty advisor/mentor, 2000-present
 Nominations Committee, 2000-01.
 Inaugural Committee - Faculty forums, Inaugural Weekend, spring 2001
 Provost Search Committee, fall 2000
 Sophomore advising, fall 2003.
 APC member, fall 2003, spring 2004.
 Dean of the College Search Committee, spring 2005.
 Undergraduate Task Force, Fall 2007.

PROFESSIONAL SERVICE

Organizer, American Inst. Mathematics Workshop, December 2008.
 NSF Panelist, Individual Research Grants in Harmonic Analysis, PDE, and Focused Research Grants.
 Co-organizer, International Conference in Analysis and PDE in honor of Carlos Kenig, Chicago, IL, September 17-19 2004.
 AMS Eastern Division Plenary Speaker Committee Member, 2004 - 2007.
 Co-organizer, Conference in Analysis in honor J. B. Garnett, Decemeber 2001.
 Invited participant, Park City Summer Program in Analysis, 2003.
 Invited participant, IPAM semester in Multidimensional Analysis, November 2004.
 Editor, Potential Analysis.
 Member, Maxwell Institute Advisory Board, chaired by Sir John Ball, Edinburgh, UK.

DEPARTMENTAL SERVICE

Brown SUMS faculty coordinator. (Faculty advisor for the annual Mathematics undergraduate conference.)
 Acting Department Graduate Advisor (some but not all tasks), Jan. 2009 - June 2009.
 Department Chair, Jan. 2005 - June 2008.
 Senior search committee, 2000, 2002, 2003, 2004.
 Tamarkin search committee, 2001, 2004.
 Member, Department systems administrator hiring committee, 2000
 Mathematics/Applied Mathematics WISE affinity group activities and weekly meetings, 2000-present.
 Chair of Departmental Curriculum Review Committee, 2001
 Executive Officer, Fall 2003 - 2004.
 Reading member of thesis committee: Rafe Johnson (2005), Brett Wick (2005), Minh Ha Quang (2006), Juhi Jang (2007)
 PhD Students: Nancy Lim, Sanja Hukovic, Danielle Jamison, Camil Muscalu.
 Department Chair, January 2004 - present
 Thesis advisor to: Xiao Xiao, graduating May 2010, and Xiaomin Ma, expected graduation May 2011.