

CV– Steve Hofmann

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Birthdate: January 20, 1958

Citizenship: USA

Professional organizations: American Mathematical Society

Research Interests: Harmonic Analysis / PDE

Current Position: Curators' Professor of Mathematics, University of Missouri, Columbia (Assoc. Prof. 9/1/94 - 9/1/98, Full Professor 9/1/98 - present)

Previous Positions:

- Assistant Prof. of Mathematics, Wright State University, 7/1/90 - 9/1/93, Associate Prof. 9/1/93 - 9/1/94;
- Post-Doctoral Fellow, Dept. of Mathematics and Statistics, McMaster University, Hamilton, Ontario, July 1988 - June 1990

Education

- B.A. Washington University (St. Louis), 1981, major in Mathematics
- Ph.D. in Mathematics, University of Minnesota, June 1988. Advisor: Max Jodeit, Jr.
- Post-doctoral fellowship at McMaster University, 1988-1990, supported in part by NSERC of Canada under the sponsorship of Eric Sawyer

External Support - NSF Grants

Supported as PI:

- NSF grant no. DMS 9203930 , Classical Analysis Program, Supported two years starting summer 1992. Amount: \$ 33,500. Status: completed.
- NSF grant no. DMS 9400782 (transferred to MU as DMS 9596112), Classical Analysis Program. Supported three years starting summer 1994. Amount: \$ 50,000. Status: completed.
- NSF grant no. DMS 9705784, Analysis and Applied Math Program. Supported three years starting summer 1997. Amount: \$ 49,932. Status: completed.
- NSF grant no. DMS 0088920, Analysis and Applied Math Program. Supported three years starting 6/30/00. Amount: \$ 76,560. Status: completed.
- NSF grant no. DMS 0245401, Analysis Program. 5 yrs beg. 7/01/03, on a continuing basis. Cumulative amount: \$ 300,616. Status: active, with no-cost extension.
- NSF grant no. DMS 0801079, Analysis Program. 3 yrs beg. 7/01/08, on a continuing basis. Cumulative amount: \$ 271,083. Status: active

Supported as Co-PI:

- NSF FRG grant no. DMS 0456306, supported 3 years beginning 7/01/05. Status: completed.

Other External Support

Visiting Research Professor, Dept. de Matematicas, Universidad Autonoma de Madrid, Spain, May 9 - June 6, 1993.

Invited participant, Workshop on Harmonic Analysis and PDE, Edinburgh, Scotland, summer 1994. Partial support provided by SERC of Great Britain.

Research Visitor, University of Edinburgh, June 14 - July 2, 1995, sponsored by SERC.

Research Visitor, Macquarie University, Oct., Nov., 1996.

Visiting Research Professor, Universidad Autonoma de Madrid, Feb., March 1997.

One month membership at MSRI, Oct-Nov 1997

Visiting Research Professor, Dept. du Mathematiques et Informatique, Universite de Picardie - Jules Verne, Amiens, France, May 14 - June 3, 1998.

Visiting Research Professor, Dept. du Mathematiques et Informatique, Universite de Picardie - Jules Verne, Amiens, France, Jan. 10 - Feb 5, 2001.

Visiting Research Professor, Centre for Mathematics and its Applications, ANU, Canberra, Nov 1-27, 2002.

Visiting Research Professor, University of Paris, Orsay, Feb 2003

Invited participant PCMI, June 2003.

Invited participant and lecturer, Workshop on Harmonic Analysis and PDE held at Centro de Giorgi, Pisa, Italy May 2004.

Invited participant and lecturer, IPAM Workshop on Mathematical Analysis and Multiscale Geometric Analysis, Institute for Pure and Applied Mathematics, UCLA, Nov 2004

Visiting Research Professor, University of Paris-Orsay, May 2005.

Invited participant, CRM Workshop on Harmonic Analysis and PDE, Universidad Autonoma de Madrid, May 2006.

Visiting Research Professor, Australian National University, Canberra, Oct-Nov 2006

Visiting Research Professor, Universite d' Aix-Marseille, Dec 2006 and Jan-Feb 2007.

Invited Lectures

1. Special session on Harmonic Analysis, meeting of Ontario chapter of CMS, April 1990.
2. PDE Seminar, University of Kentucky, Sept. 1991.
3. Colloquium, Virginia Tech, Sept. 1991.
4. Conference on Harmonic Analysis and PDE, June 1992, Miraflores de la Sierra, Spain.
5. Analysis Seminar, Brown University, Nov. 1992.
6. Harmonic Analysis seminar, Washington University (St. Louis), April 1993.
7. Harmonic Analysis seminar, Indiana University, April 1993.
8. Analysis seminar, University of Sussex, Brighton, England, May 1993.
9. Harmonic Analysis seminar, Universidad Autonoma de Madrid, May 1993.
10. Analysis seminar, Universidad del Pais Vasco, Bilbao, Spain, June 1993.
11. AMS Special Session on Harmonic Analysis and PDE, Vancouver, Aug. 1993 (alternate speaker after cancellation by original speaker).
12. AMS Special Session on Harmonic Analysis and Applications, Oct. 1993, College Station, Texas.

13. Harmonic Analysis Seminar, Washington University (St. Louis), Dec. 1993.
14. PDE Seminar, Brown University, March 11, 1994.
15. AMS Special Session on PDE, Univ. of Kentucky, Lexington, March 1994.
16. Calderon-Zygmund seminar, University of Chicago, Dec. 5, 1994.
17. AMS Special Session on Harmonic Analysis, March, 1995 in Chicago.
18. Analysis Seminar, University of Edinburgh, June 1995.
19. PDE seminar, University of Minnesota Nov. 1995.
20. Analysis Seminar, Universidad de Madrid, June 1996.
21. Analysis Seminar, Macquarie University, Sydney, Australia, Oct. - Nov. 1996. (Series of 3 Lectures).
22. Analysis Seminar, Instituto de Matematicas, UNAM, Cuernavaca Mexico, January 1997 (Series of 3 Lectures).
23. AMS Special session on Analysis and Geometry, Detroit, May 1997
24. Midwest PDE, Lexington, Kentucky Sept. 1997
25. Workshop on Harmonic Analysis, Geometric Measure Theory and PDE, MSRI Oct. 1997
26. AMS special session on Harmonic Analysis, Albuquerque, N.M. Nov. 1997.
27. Minicourse (series of 4 lectures) on parabolic PDE in time varying domains, Universite de Picardie - Jules Verne, Amiens, France, May 1998.
28. Conference on PDE, St.-Jean-de-Monts, France, June 1998.
29. Plenary lecture, annual meeting of the Venezuelan Mathematical Society, March 1999.
30. Invited lecture, Spring Lecture Series in Mathematics, University of Arkansas (Fayetteville), March 2000.
31. Analysis Seminar, Brown Univ. May 2000

32. Minicourse (series of 5 lectures) on Harmonic Analysis and PDE, at the summer school in Mathematics in Cuernavaca, Mexico, June 12-17, 2000.
33. Invited lecture, Conference on Harmonic Analysis and PDE, at El Escorial, Spain, July 3-7, 2000.
34. Colloquium, U Mass, Oct 2000.
35. AMS special session on Harmonic Analysis San Fran. meeting, Oct 2000.
36. Harmonic Analysis Seminar, Wash U. St Louis, Nov 2000
37. Calderon-Zygmund Seminar U. Chicago, Nov 2000
38. Auburn Miniconference on Harmonic Analysis and related areas (series of two lectures), Nov 2000
39. New Mexico Analysis Seminar (series of three lectures), March 1-3, 2001
40. AMS Special Session in Harmonic Analysis, Lawrence KS, March 2001
41. Show-Me Seminar, University of Missouri, Columbia April 2001
42. Fabes-Riviere Symposium on harmonic analysis and PDE, April 2001
43. Summer Research Conference in Harmonic Analysis, Mt. Holyoke, June 2001
44. Colloquium, Georgia Tech, Oct 2001
45. Analysis Seminar, University of Illinois, Nov 1 2001
46. Colloquium, University of Wisconsin, Madison, Nov 28 2001
47. Conference on Harmonic Analysis and PDE in honor of Alan McIntosh's 60th birthday, Sydney, Australia, January 2002.
48. Midwest PDE, Lexington KY, March 2002
49. Arkansas Spring Lecture Series, Fayetteville, April 2002
50. Workshop on heat kernels, Paris, June 2002.
51. Colloquium, Math Dept., University of Kentucky, Oct 2002.

52. Analysis Seminar, Princeton University, Oct 2002
53. Analysis Seminar, ANU, Canberra, Nov 2002.
54. Analysis Seminar, Univ. Paris-Orsay, Feb. 2003
55. Invited participant and speaker at the workshop on harmonic analysis held at the Schrodinger Institute, Vienna, Feb 2003.
56. Plenary Lecture, Conference in Honor of R. Coifman and Y. Meyer, June 18-21, 2003, University of Paris-Orsay.
57. Analysis Seminar, Georgia Tech, Oct 2003
58. Analysis Seminar, UCLA, Nov 2003
59. Colloquium, Kansas State University, March 2004
60. Centro De Giorgi, Pisa, Italy (series of two lectures), May 2004
61. Colloquium, University of Kansas, Sept 2004
62. AMS special session, Albuquerque, NM, Oct 2004
63. Workshop on Math Analysis and Multiscale Geometric Analysis, Institute for Pure and Applied Mathematics, UCLA, Nov 2004
64. Georgia Tech FRG Seminar Nov 2005
65. Plenary Address, AMS Sectional meeting Notre Dame April 8-9, 2006
66. Invited Address, ICM Analysis Section, Madrid August 2006
67. Keynote Address, Session on Harmonic Analysis, 50th Anniversary meeting of the Australian Mathematical Society, Macquarie University, Sydney, Sept. 2006.
68. Colloquium, Australian National University, Canberra, October 2006.
69. Invited Lecture, Analysis Seminar du Provence, University d' Aix-Marseille I, January 2007.
70. Keynote address, Analysis Section of joint meeting of American and Mexican Mathematical Societies, Zacatecas, Mexico, May 2007.

71. Colloquium, Indiana University Oct 2007.
72. Invited address at the Second Workshop of Harmonic Analysis and Partial Differential Equations (WHAPDE), Merida, Yucatan, Mexico, February 4-8, 2008.
73. Invited address at Workshop on Harmonic Analysis, Fields Institute, Toronto, Ontario, Canada, Feb. 19-23, 2008.
74. Invited address at the “Recent Advances in Geometric Function Theory” conference, Syracuse University, May 19-21, 2008.
75. Rubio de Francia Memorial Lecture, Universidad Autonoma de Madrid, June 2008.
76. Mini-course (series of 3 lectures) on “Local Tb Theorems and applications in PDE” at the conference of Harmonic Analysis and PDE held at El Escorial, Spain, June 2008.
77. Colloquium, Cornell University, Sept. 2008.
78. Analysis Seminar, Michigan State University, November 2008.
79. Conference on Geometric Aspects of PDE, Luminy, Marseilles, France, March 2-6, 2009.
80. Colloquium, Univ. North Carolina, March 26, 2009.
81. Calderón-Zygmund seminar, University of Chicago, April 20, 2009.
82. Univ. of Virginia, May 2009
83. Purdue University, May 26-29.

Publication List

Ten selected papers, published:

1. (with J. L. Lewis) L^2 Solvability and representation by caloric layer potentials in time-varying domains, **Annals of Math.** **144** (1996), 349-420.
2. Parabolic singular integrals of Calderon-type, rough operators, and caloric layer potentials, **Duke Math. J.**, **Vol. 90** (1997), pp 209-259.
3. (with J.L. Lewis) The Dirichlet problem for parabolic operators with singular drift terms, **Memoirs of the Amer. Math. Soc.** Vol. 151, No. 719, May 2001.
4. (with P. Auscher, M.Lacey, John L. Lewis, A. McIntosh, and P. Tchamitchian, The solution of Kato's conjectures, **C. R. Acad. Sci. Paris Sr. I Math.** **332** (2001), no. 7, 601–606.
5. (with P. Auscher, J. L. Lewis, and P. Tchamitchian) Extrapolation of Carleson measures and the analyticity of Kato's square root operators, **Acta Math.** **187** (2001), pp 161-190.
6. (with A. McIntosh) The solution of the Kato problem in two dimensions, Proceedings of the Conference on Harmonic Analysis and PDE held in El Escorial, Spain in July 2000, **Publ. Mat.** Vol. extra, 2002 pp. 143-160.
7. (with M. Lacey and A. McIntosh) The solution of the Kato problem for divergence form elliptic operators with Gaussian heat kernel bounds, **Annals of Math.** **156** (2002), pp 623-631.
8. (with P. Auscher, M. Lacey, A. McIntosh and P. Tchamitchian) The solution of the Kato square root problem for second order elliptic operators on \mathbf{R}^n , **Annals of Math.** **156** (2002), pp 633-654.
9. (with L. Brandolini, A. Iosevich) Sharp rate of decay of the Fourier transform of a bounded set, **GAF** **13** (2003), 671-680.
10. (with J. L. Lewis and K. Nystrom) Caloric Measure in Parabolic Flat Domains, **Duke Math. J.** **122.** (2004), no. 2, 281–346.

Other published or accepted papers:

11. Weak (1,1) boundedness of singular integrals with non- smooth kernel, **Proc. Amer. Math. Soc.** **103** (1988), 260-264.
12. Weighted weak-type (1,1) inequalities for rough operators, **Proc. Amer. Math. Soc.** **107** (1989), 423-435.
13. On singular integrals with power weights, **Proc. Amer. Math. Soc.** **110** (1990), 343-353.
14. Weighted inequalities for commutators of rough singular integrals, **Indiana Univ. Math. J.** **39** (1990), 1275-1304.
15. (with Y.S. Han) T1 theorems for Besov and Triebel-Lizorkin spaces, **Trans. Amer. Math. Soc.** **337** (1993), 839-853.
16. A weak molecule condition for certain Triebel-Lizorkin spaces, **Studia Math.** **101** (1992), 113-122.
17. A note on weighted Sobolev spaces and regularity of commutators and layer potentials associated to the heat equation, **Proc Amer. Math. Soc.** **118** (1993), 1087 - 1096.
18. On certain non-standard Calderon-Zygmund operators, **Studia Math** **109** (1994), 105-131.
19. Weighted norm inequalities and vector-valued inequalities for certain rough operators, **Indiana Univ. Math. J.** **42** (1993), 1-14.
20. Singular integrals of Calderon type in R^n , and BMO, **Revista Mat. Iberoamericana** **10**, (1994), pp. 467-505.
21. (with C. Carton-Lebrun and H.P. Heinig) Integral operators on weighted amalgams, **Studia Math** **109** (1994), pp. 133-157.
22. Boundedness criteria for rough singular integrals, **Proc. Lond. Math. Soc.** **70** (1995), 386-410.

23. A characterization of commutators of parabolic singular integrals, Proceedings of conference on Harmonic Analysis and PDE, held at Miraflores de la Sierra, Spain, 1992, J. Garcia-Cuerva, E. Hernandez, F.Soria, editors, CRC press, Boca Raton (1995), pp. 195-210.
24. Commutators of parabolic singular integrals, Proceedings of the conference on Harmonic Analysis and operator theory held in Caracas, Venezuela in January 1994, in honor of the 80th birthday of Mischa Cotlar, Contemporary Mathematics 189 (1995), 251-285.
25. (with X. Li and D. Yang) A generalized characterization of commutators of parabolic singular integrals, **Can. Math. Bull.** **42** (1999), pp 463-477.
26. (with A. Carbery and J. Wright) The Calderon Commutator along a parabola, **Math. Proc. of the Cambridge Philosophical Soc.** **126** (1999) pp 543-553.
27. An off-diagonal T1 Theorem, and applications, **Journal of Functional Analysis** **160** (1998), pp 581-622.
28. (with J.L. Lewis) The L^p regularity problem for the heat equation in noncylindrical domains, **Illinois Journal of Math.** **43** (1999), pp 752-769.
29. (with J.L. Lewis) The L^p Neumann and regularity problems for the heat equation in non-cylindrical domains. Journes "equations aux Drives Partielles" (Saint-Jean-de-Monts, 1998), Exp. No. VI, 7 pp., Univ. Nantes, Nantes, 1998.
30. (with J. L. Lewis) On parabolic and elliptic measure. Complex analysis and differential equations (Uppsala, 1997), 179–186, Acta Univ. Upsalien-sis Skr. Uppsala Univ. C Organ. Hist., 64, Uppsala Univ., Uppsala, 1999.
31. (with J.L. Lewis) Square functions of Calderon type, and applications, **Rev. Math. Ibero.** Vol 17 (2001), pp 1-20.
32. (with K. Nystrom) Dirichlet problems for a nonstationary linearized system of Navier-Stokes equations in non-cylindrical domains, to appear, **Jour. Math. Analysis and Applications.**

33. (with P. Auscher, A. McIntosh, and P. Tchamitchian), The Kato square root problem for higher order elliptic operators and systems on \mathbf{R}^n , *J. Evol. Equ.* 1 (2001) no. 4 pp. 361-385.
34. (with P. Auscher, C. Muscalu, T. Tao, C. Thiele), Carleson Measures, Trees, Extrapolation, and Tb Theorems, **Publ. Mat.** 46 (2002), 257-325.
35. (with J.M. Martell) L^p bounds for Riesz transforms associated to second order elliptic operators, **Pub. Mat.** 47 (2003) 497-515.
36. (with J. L. Lewis and K. Nystrom) Existence of big pieces of graphs for parabolic problems, **Ann. Acad. Sci. Fenn. Math.** 28 (2003), 355–384.
37. (with J. Lewis and M. Mitrea) Spectral properties of parabolic layer potentials and transmission boundary value problems in nonsmooth domains **Ill. J. Math.** 47 (2003), no. 4, 1345–1361.
38. (with A. Iosevich and D. Weidinger) Lattice points inside random ellipsoids, **Mich. Math. J.** 52 (2004), pp. 13-21.
39. (with Seick Kim) Gaussian estimates for fundamental solutions to certain parabolic systems, **Pub. Mat.** 48 (2004), pp.481-496.
40. (with A. Iosevich) Circular averages and Falconer/Erdos distance conjecture in the plane for random metrics, **Proc. Amer. Math. Soc.** 133 (2005), pp 133-143.
41. (with P. Auscher, T. Coulhon and X. Duong) Riesz transform on manifolds and heat kernel regularity, **Annales Scientifiques de L'ENS** 37 (2004) 911-957.
42. (with J.L. Lewis) The L^p Neumann problem for the heat equation in noncylindrical domains, **J. Functional Analysis** Vol 220 (2005), pp. 1-54.
43. Heat Kernels and Riesz Transforms, **Contemp. Math.** Vol. 398 (2006), pp 257-264.

44. Local Tb Theorems and applications in PDE, **Proceedings of the ICM Madrid 2006**.
45. (with S. Kim) The Green function estimates for strongly elliptic systems of second order, to appear, **Manuscripta Math.**
46. (with S. Mayboroda) Hardy and BMO spaces associated to divergence form elliptic operators, to appear, **Math. Ann.**
47. (with M. Mitrea and M. Taylor) Geometric and Transformational Properties of Lipschitz Domains, Semmes-Kenig-Toro Domains, and Other Classes of Finite Perimeter Domains, **J. Geom. Analysis** 17 (2007), pp 593-647.
48. Dahlberg's bilinear estimate for solutions of divergence form complex elliptic equations, to appear, **Proc. Amer. Math. Soc.**
49. (with A. Axelsson and P. Auscher) Functional calculus of Dirac operators and complex perturbations of Neumann and regularity problems, to appear **J. Functional Analysis**.
50. A local Tb Theorem for square functions, to appear **Proc. Symp. Pure Math.**, special volume in honor of the 70th birthday of V. Maz'ya.

Preprints and work in preparation:

51. (with M. Alfonseca, P. Auscher, A. Axelsson, S. Kim) Analyticity of layer potentials and L^2 Solvability of boundary value problems for divergence form elliptic equations with complex L^∞ coefficients, submitted.
52. (with M. Mitrea and M. Taylor) Singular integrals and elliptic boundary problems on regular Semmes-Kenig-Toro domains, submitted.
53. (with J.M. Martell) Carleson measures, reverse Holder inequalities and elliptic PDE, in preparation.