Curriculum Vitae

Michael J. Goldberg

Personal

Office Address:	Department of Mathematics
	University of Cincinnati
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Mathematical Interests: Fourier analysis, especially in the context of dispersive PDEs such as the Schrödinger and wave equations. Singular and oscillatory integral operators.

Education

Ph.D., Mathematics, University of California, Berkeley   May 2002
    Advisor: F. Michael Christ

A.B., Mathematics, *summa cum laude*, Princeton University   June 1997

Academic Employment

University of Cincinnati

Department Head	Aug. 2020 – present
Professor	Aug. 2018 – present
Associate Professor	Sept. 2011 – Aug. 2018
Assistant Professor	Sept. 2009 – Aug. 2011

Johns Hopkins University

Assistant Professor	July 2005 – June 2009

California Institute of Technology

Bateman Research Instructor	Sept. 2002 – June 2005

University of California, Berkeley

Graduate Student Researcher	Sept. 2001 – Aug. 2002
Graduate Student Instructor	Sept. 2000 – Aug. 2001

Fellowships and Awards

NSF Conferences/Workshops in the Mathematical Sciences, Award #2000161	Feb. 2020 – Jan. 2023
Simons Foundation Collaboration Grant #635369	Sept. 2019 – Aug. 2024
NSF Conferences/Workshops in the Mathematical Sciences, Award #1700077	Feb. 2017 – Jan. 2021
Simons Foundation Collaboration Grant #281057	Sept. 2013 – Aug. 2019
NSF Conferences/Workshops in the Mathematical Sciences, Award #1412170	Feb. 2014 – Jan. 2017
NSF Conferences/Workshops in the Mathematical Sciences, Award #1305523	Feb. 2013 – Jan. 2014
NSF Division of Mathematical Sciences, Analysis Program, Award #0901063 transferred to Award #1002515	Aug. 2009 – Aug. 2013
NSF Division of Mathematical Sciences, Analysis Program, Award #0600925	July 2006 – July 2009
Johns Hopkins Mathematics Excellence in Teaching Award	May 2008

Fellowships and Awards (continued)

NSF Graduate Research Fellowship	Sept. 1997 – Aug. 2000
George B. Covington Prize, Princeton University	June 1997
Andrew H. Brown Prize, Princeton University	June 1996

Publications

1. *Vector A_2 Weights and a Hardy-Littlewood Maximal Function* (with M. Christ), Trans. Amer. Math. Soc. **353** (2001), 1995–2002.

2. *Asymptotic Properties of the Vector Carleson Embedding Theorem*, Proc. Amer. Math. Soc. **130** (2002), 529–531.

3. *Matrix A_p Weights via Maximal Functions*, Pacific J. Math. **211** (2003), 201–220.

4. *Dispersive Estimates for Schrödinger Operators in Dimensions One and Three* (with W. Schlag), Comm. Math. Phys. **251** (2004), no. 1, 157–178.

5. *A Limiting Absorption Principle for the Three-Dimensional Schrödinger Equation with L^p Potentials* (with W. Schlag), Intl. Math. Res. Not. **2004:75** (2004), 4049–4071.

6. *Dispersive Estimates for the Three-Dimensional Schrödinger Equation with Rough Potentials*, Amer. J. Math. **128** (2006), 731–750.

7. *Dispersive Bounds for the Three-Dimensional Schrödinger Equation with Almost Critical Potentials*, Geom. and Funct. Anal. **16** (2006), no. 3, 517–536.

8. *A Counterexample to Dispersive Estimates for Schrödinger Operators in Higher Dimensions* (with M. Visan), Comm. Math. Phys. **266** (2006), no. 1, 211–238.

9. *Counterexamples of Strichartz Inequalities for Schrödinger Equations with Repulsive Potentials* (with L. Vega and N. Visciglia), Intl. Math. Res. Not. **2006** (2006), Article ID 13927, 16pp.

10. *Transport in the One-Dimensional Schrödinger Equation*, Proc. Amer. Math. Soc. **135** (2007), 3171–3179.

11. *Strichartz and Smoothing Estimates for Schrödinger Operators with Large Magnetic Potentials in $\mathbf{R}^3$* (with M. B. Erdogan and W. Schlag), J. Eur. Math. Soc. **10** (2008), 507–531.

12. *Strichartz and Smoothing Estimates for Schrödinger Operators with Almost Critical Magnetic Potentials in Three and Higher Dimensions* (with M. B. Erdogan and W. Schlag), Forum Math. **21** (2009), 687–722.

13. *Strichartz Estimates for the Schrödinger Equation with Time-Periodic $L^{n/2}$ Potentials*, J. Funct. Anal. **256** (2009), 718–746.

14. *A Dispersive Bound for Three-Dimensional Schrödinger Operators with Zero-Energy Eigenvalues*, Comm. Partial Differential Equations **35** (2010), 1610–1634.

15. *Strichartz Estimates for Schrödinger Operators with a Non-Smooth Magnetic Potential*, Discrete Contin. Dyn. Syst. **31** (2011), no. 1, 109–118.

16. *Schrödinger Dispersive Estimates for a Scaling-Critical Class of Potentials* (With M. Beceanu), Comm. Math. Phys. **314** (2012), no. 2, 471–481.

17. *Dispersive Estimates for Schrödinger Operators with Measure-Valued Potentials in $\mathbf{R}^3$*, Indiana Univ. Math. J. **61** (2012), no. 6, 2123–2141.

18. *Strichartz Estimates and Maximal Operators for the Wave Equation in $\mathbf{R}^3$* (with M. Beceanu), J. Funct. Anal. **266** (2014), no. 3, 1476–1510.

19. *The Klein-Gordon Equation on $\mathbf{Z}^2$ and the Quantum Harmonic Lattice* (with V. Borovyk), J. Math. Pures Appl. (9) **107** (2017), no. 6, 667–696.

20. *Dispersive Estimates for Four Dimensional Schrödinger and Wave Equations with Obstructions at Zero Energy* (with M. B. Erdogan and W. Green), Comm. Partial Differential Equations **39** (2014), no. 10, 1936–1964.

Publications (continued)

21. *Dispersive Estimates for Higher Dimensional Schrödinger Operators with a Threshold Eigenvalue I: The Odd Dimensional Case* (with W. Green), J. Funct. Anal. **269** (2015), no. 3, 633–682.

22. *Dispersive Estimates for Higher Dimensional Schrödinger Operators with a Threshold Eigenvalue II: The Even Dimensional Case* (with W. Green.), J. Spectr. Theory **7** (2017), no. 1, 33–86.

23. *The Helmholtz Equation with L^p Data and Bochner-Riesz Multipliers*, Math. Res. Lett. **23** (2016), no. 6, 1665–1679.

24. *The L^p Boundedness of Wave Operators for Schrödinger Operators with Threshold Singularities* (with W. Green), Adv. Math. **303** (2016), 360–389.

25. *On the L^p Boundedness of Wave Operators for Four-Dimensional Schrödinger Operators with a Threshold Eigenvalue* (with W. Green), Ann. Henri Poincaré **18** (2017), no. 4, 1269–1288.

26. *On the L^p Boundedness of Wave Operators for Two-Dimensional Schrödinger Operators with a Threshold Obstruction* (with M. B. Erdogan and W. Green), J. Funct. Anal. **274** (2018), no. 7, 2139–2161.

27. *Limiting Absorption Principle and Strichartz Estimates for Dirac Operators in Two and Higher Dimensions* (with M. B. Erdogan and W. Green). Comm. Math. Phys. **367** (2019), no. 1, 241–263.

28. *The Massless Dirac Equation in Two Dimensions: Zero-Energy Obstructions and Dispersive Estimates* (with M. B. Erdogan and W. Green). J. Spectr. Theory. **11** (2021), no. 3, 935–979.

29. *Restrictions of Higher Derivatives of the Fourier Transform* (with D. Stolyarov). Trans. Amer. Math. Soc. Ser. B **7** (2020), 46–96.

30. *Strichartz Estimates for the Schrödinger Equation with a Measure-Valued Potential* (with M. B. Erdogan and W. Green). Proc. Amer. Math. Soc. Ser. B **8** (2021), 336–348.

31. *Time Integrable Weighted Dispersive Estimates for the Fourth Order Schrödinger Equation in Three Dimensions* (with W. Green). Bull. London Math. Soc. **54** (2022), no. 2, 428–448.

32. *On the L^p Boundedness of the Wave Operators for Fourth Order Schrödinger Operators* (with W. Green). Trans. Amer. Math. Soc. **374** (2021), 4075–4092.

33. *Counterexamples to L^p boundedness of wave operators for classical and higher order Schrödinger operators* (with M. B. Erdogan and W. Green), J. Funct. Anal. **285** (2023), no. 5, Article 110008

34. *Spectral multipliers and wave propagation for Hamiltonians with a scalar potential* (With M. Beceanu), J. Funct. Anal. **286** (2024), no. 6, Article 110300.

35. *Dispersive estimates for higher order Schrödinger operators with scaling-critical potentials* (with M. B. Erdogan and W. Green), preprint 2023, arXiv:2308.11745

Seminars and Conferences Organized

UC-UKY conference "13$^{\text{th}}$ Ohio River Analysis Meeting," University of Kentucky, March 16-17, 2024.

AMS Central Section Meeting, University of Cincinnati, April 15-16, 2023.

UC-UKY conference "12$^{\text{th}}$ Ohio River Analysis Meeting," University of Cincinnati, March 18-19, 2023.

UC-UKY conference "11$^{\text{th}}$ Ohio River Analysis Meeting," University of Kentucky, April 2-3, 2022.

UC-UKY conference "10$^{\text{th}}$ Ohio River Analysis Meeting," hosted virtually, March 20-21, 2021.

UC-UKY conferences "Ohio River Analysis Meetings I-IX," hosted by University of Cincinnati and University of Kentucky in alternate years, 2011-2019.

AMS special session "Harmonic Analysis and PDEs," East Lansing, MI, March 14-15, 2015.

AMS special session "Analysis and Control of Dispersive PDEs," Lexington, KY, March 27-28, 2010.

JAMI conference "Nonlinear Dispersive Equations," Johns Hopkins Univeristy, March 14-18, 2007.

Johns Hopkins University Analysis/PDE seminar, 2005–2009.

Invited Conference/Workshop Talks

2023 — AMS Central Sectional Meeting, Omaha.
AMS Central Sectional Meeting, Cincinnati.

2021 — AMS Central Sectional Meeting, online.

2019 — AMS Southeastern Sectional Meeting, Gainesville.

2018 — AMS Central Sectional Meeting, Columbus.
AMS Southeastern Sectional Meeting, Nashville.

Pre-2018 — AMS Southeastern Sectional Meeting, Charleston.
AMS Central Sectional Meeting, Bloomington.
AMS National Meeting, Seattle.
Conference in Harmonic Analysis (in honor of Michael Christ), Madison, WI.
44$^{\text{th}}$ Annual Conference: Diff. Eqns. and Dynamical Systems, Miami University, Oxford, OH.
SIAM Conference on Analysis of Partial Differential Equations, Scottsdale.
AMS National Meeting, Baltimore.
AMS Southeastern Sectional Meeting, Knoxville.
AMS Western Regional Meeting, San Francicso.
IMACS Conference on Nonlinear Evolution Equations and Wave Phenomena, Athens, GA.
22$^{\text{nd}}$ St. Petersburg Summer Meeting in Mathematical Analysis, St. Petersburg, Russia.
SIAM Conference on Analysis of Partial Differential Equations, Orlando.
AMS Northeastern Setional Meeting, Washington DC.
AMS Central Sectional Meeting, Lawrence.
AMS Southeastern Sectional Meeting, Statesboro.
AMS Southeastern Sectional Meeting, Winston-Salem.
SIAM Conference on Analysis of Partial Differential Equations, San Diego.
AMS Southeastern Sectional Meeting, Lexington.
AMS Western Sectional Meeting, Albuquerque.
AMS Western Sectional Meeting, San Francisco.
Workshop on Harmonic Analysis, Fields Institute, Toronto.
AMS Southeastern Sectional Meeting, Baton Rouge.
6$^{\text{th}}$ International Conference on Differential Equations and Dynamical Systems, Baltimore.
AMS Western Sectional Meeting, Vancouver.
Workshop on Nonlinear Waves and Dispersive Equations, Oberwolfach Mathematical Institute.
AMS Western Sectional Meeting, Albuquerque.
FRG Workshop on Global Harmonic Analysis and its Applications, Johns Hopkins.
Prairie Analysis Seminar, Lawrence, Kansas.
ICM Satellite Conference "Harmonic and Geometric Analysis with Applications to PDEs," Seville.
AMS Western Sectional Meeting, Los Angeles.
Western States Mathematical Physics Meeting, Caltech.
IAS/Park City Mathematical Institute.

Invited Seminar/Colloquium Talks

2023 — Institute of Mathematics, Würzburg University

2022 — University of New Mexico.

2019 — University of Virginia.

Invited Seminar/Colloquium Talks (continued)

Pre-2019 — University at Albany (SUNY), University of North Carolina, University of Illinois.
Drexel University, Indiana University. Binghamton University, University of Texas,
University of Kentucky, Johns Hopkins University, University of Pennsylvania, Georgia Tech,
University of Rochester, UC Santa Cruz, University of Iowa, University of Oregon,
University of Cincinnati, SUNY Stony Brook, Michigan State University, Morgan State University,
University of Kentucky, University of Virginia, University of North Carolina, University of Chicago,
Georgia Tech, MIT, University of Illinois, University of Wisconsin,
Washington University in St. Louis, University of British Columbia, Northwestern University,
University of Michigan, University of Chicago, University of Minnesota, Johns Hopkins University,
UCLA, Caltech, Michigan State University, UC Berkeley.

Professional Activities

Selected Service Roles:
Engineering Calculus coordination committee, 2011-12.
Mathematics Department academic re-organization committee, 2012.
Coordinator for Calculus II, fall 2012 and fall 2013.
A&S College faculty development committee, 2014-16.
Graduate Program Director, 2017-2020.
Faculty hiring committee (chair), 2018-19.
Department Head, 2020-present.
A&S College committee for administrative stipends, 2021-22.
Math placement review committee, 2023-24.
A&S College committee for staffing structure, 2024.

Reviewed articles for publication in the journals:
American Journal of Mathematics,
Analysis and PDEs,
Annales Henri Poincaré,
Colloquium Mathematicum,
Communications in Mathematical Physics,
Communications in PDE,
Discrete and Continuous Dynamical Systems (series A),
Dynamics of PDE,
Forum Mathematicum,
Illinois Journal of Mathematics,
Indiana University Mathematics Journal,
International Mathematics Research Notices,
Journal of Differential Equations,
Journal of Functional Analysis,
Journal of Mathematical Physics,
Journal of the Mathematical Society of Japan,
Journal of Spectral Theory,
Journal of Physics A: Mathematical and Theoretical,
London Mathematical Society journals
Mathematical Methods in the Applied Sciences,
Mathematical Research Letters,
Mathematical Physics, Analysis, and Geometry,
Monatschefte für Mathematik,
Nonlinearity,
Proceedings of the AMS,
SIAM Journal on Mathematical Analysis.

Professional Activities (continued)

Provided detailed reviews to assist the publisher's preparation of the following textbook editions:
  Linear Algebra with Applications, by Otto Bretscher, Prentice Hall, 4th edition, 2009.
  Real Analysis, by H. L. Royden and P. M. Fitzpatrick, Prentice Hall, 4th edition, 2010.

Contributor to *Mathematical Reviews*, reviewer #038947.

Courses Taught

University of Cincinnati

(Semesters)
Math 1062: Calculus II
Math 2063: Multivariable Calculus
Math 2073: Differential Equations
Math 2074: Dynamical Systems
Math 6003: Abstract Linear Algebra
Math 6007: Partial Differential Equations and Fourier Analysis
Math 7004: Topology (graduate)
Math 7005: Ordinary Differential Equations (graduate)
Math 7006: Partial Differential Equations (graduate)
Math 8003: Functional Analysis (graduate)

(Quarters)
Math 251–253: Calculus I, II, III
Math 627–629: Partial Differential Equations (graduate)

Johns Hopkins University

Math 113: Honors Calculus II
Math 201: Linear Algebra
Math 302: Differential Equations with Applications
Math 415 and 416: Honors Analysis I, II
Math 443: Fourier Analysis
Math 640: Spectral Theory (graduate)

California Institute of Technology

Math 4: Introduction to Mathematical Chaos
Math 108a, 108b, and 108c: Classical Analysis
Math 110a: Real and Complex Analysis (graduate)
Math 142a: Ordinary and Partial Differential Equations (graduate)
Math 191: Topics in Harmonic Analysis (graduate)

University of California, Berkeley

Teaching Assistant for Math 1A and Math 1B: Calculus
Summer Instructor for Math 16A: Analytic Geometry and Calculus