Philip T. Gressman
Short Curriculum Vitae
(last updated March 11, 2024)

Contact Information

Department of Mathematics
David Rittenhouse Lab
209 South 33rd Street
Philadelphia, PA 19104-6395

3E5C David Rittenhouse Lab
215-898-7845 (office)
215-573-4063 (fax)
gressman@math.upenn.edu

Citizenship: US

Research Interests: harmonic analysis and PDEs, geometric combinatorics, geometric analysis

Employment History

July 2014 - present	Professor	University of Pennsylvania
July 2011 - June 2014	Associate Professor	University of Pennsylvania
July 2008 - June 2011	Assistant Professor	University of Pennsylvania
July 2005 - June 2008	J. W. Gibbs Assistant Professor Postdoctoral advisor: Peter W. Jones	Yale University

Educational History

Ph.D.	Princeton University Thesis title: "$L^p - L^q$ estimates for Radon-like operators" Thesis advisor: Elias M. Stein	August 2001 - May 2005
A.B.	Washington University in St. Louis *Summa cum laude* with majors in mathematics and physics	August 1997 - June 2001

Manuscripts and Publications

1. "A Local curvature characterization of maximally-nondegenerate Radon-like transforms," *submitted*. Available at arXiv:2303.03325.

2. "A new type of superorthogonality," with L. B. Pierce, J. Roos, and P.-L. Yung, *to appear in Proc. AMS*. Available at arXiv:2212.08956.

3. "On frames of smooth, compactly-supported wave packets adapted to tilings of frequency space," *submitted*. Available at arXiv:2208.02937.

4. "Testing conditions for multilinear Radon-Brascamp-Lieb inequalities," *submitted*. Available at arXiv:2201.12201.

5. "On the strict majorant property in arbitrary dimensions," with S. Guo, L. B. Pierce, J. Roos, and P.-L. Yung, *to appear in Quarterly. J. Math.* Available at arXiv:2106.12538.

6. "L^p-improving estimates for Radon-like operators and the Kakeya-Brascamp-Lieb inequality," *Adv. Math* **387** (2021), Paper No. 107831. Available at arXiv:2008.01886.

7. "Multilinear oscillatory integral operators and geometric stability," with E. Urheim, *J. Geom. Analysis*, **31** (2021), no. 9, 8710–8734. Available at arXiv:1912:08737.

8. "Reversing a philosophy: from counting to square functions and decoupling," with S. Guo, L. B. Pierce, J. Roos, and P.-L. Yung,*J. Geom. Analysis*, **31** (2021), no. 7, 7075–7095. Available at arXiv:1906.05877.

9. "Geometric averaging operators and nonconcentration inequalities," *Analysis and PDE*, **15** (2022), no. 1, 85–122. Available at arXiv:1906.04599.

10. "Simulating COVID-19 in a University Environment," with J. Peck, *Mathematical Biosciences*, **328** (2020) 108436, 16 pages. Available at arXiv:2006.03175.

11. "On the Oberlin affine curvature condition," *Duke Math J.*, **168** (2019), no. 11, 2075–2126.

12. "Generalized curvature for certain Radon-like operators of intermediate dimension," *Indiana U. Math. J.*, **68** (2019), no. 1, 201–246.

13. "Higher decay inequalities for multilinear oscillatory integrals," with M. Gilula and L. Xiao, *Math. Res. Lett.* **25** (2018), no. 3, 819–842.

14. "Averages over submanifolds of intermediate dimension and the Oberlin condition," *Oberwolfach Reports*, **14** (2017), no. 3, 2119–2021.

15. "Maximal decay inequalities for trilinear oscillatory integrals of convolution type," with L. Xiao, *J. Func. Anal.* **271** (2016), no. 12, 3695–3726.

16. "On a trilinear singular integral form with determinantal kernel," with D. He, V. Kovač, B. Street, C. Thiele, and P.-L. Yung, *Proc. AMS.,* **144** (2016), no. 8, 3465–3477.

17. "Damping oscillatory integrals by the Hessian determinant via Schrödinger," *Math. Res. Lett.*, **23** (2016), no. 2, 405–430.

18. "An operator van der Corput estimate arising from oscillatory Riemann-Hilbert problems," with Y. Do, *J. Func. Anal.* **267** (2014), no. 12, 4775–4805.

19. "Coordinate-independent approaches to uniform oscillatory integral estimates," *Oberwolfach Reports*, **11** (2014), no. 3, 1879–1882.

20. "L^p-nondegenerate Radon-like operators with vanishing rotational curvature," *Proc. Amer. Math. Soc.* **143** (2015), no. 4, 1595–1604.

21. "On the uniqueness of solutions to the periodic 3D Gross-Pitaevskii hierarchy," with V. Sohinger and G. Staffilani, *J. Func. Anal* **266** (2014), no. 7, 4705–4764.

22. "Scalar oscillatory integrals in smooth spaces of homogeneous type," *Rev. Mat. Iberoam.* **31** (2015), no. 1, 215–244.

23. "A non-local inequality and global existence," with R. M. Strain and J. Krieger, *Adv. Math.* **230** (2012) 642–648.

24. "Fractional Poincaré and logarithmic Sobolev inequalities for measure spaces," *J. Func. Anal.* **265** (2013), no. 6, 867–889.

25. "Uniform sublevel Radon-like inequalities," *J. Geom. Anal.* **23** (2013), no. 2, 611–652.

26. "Sharp anisotropic estimates for the Boltzmann collision operator and its entropy production," with R. M. Strain, *Adv. Math.* **227** (2011), no. 6, 2349–2384.

27. "Global classical solutions of the Boltzmann equation without angular cut-off," with R. M. Strain, *J. Amer. Math. Soc.* **24** (2011), 709–769.

28. "Global classical solutions of the Boltzmann equation with long-range interactions," with R. M. Strain, *PNAS*, **107** (2010), no. 13, 5744–5749.

29. "On multilinear determinant functionals," *Proc. AMS*, **139** (2011), 2473–2484.

30. "Uniform geometric estimates for sublevel sets," *J. d'Analyse Math.*, **115** (2011), 251–272.

31. "L^p-improving properties of averages on polynomial curves and related integral estimates," *Math. Res. Lett.*, **16** (2009), no. 6, 971–989.

32. "Rank and regularity for averages over submanifolds," *J. Func. Anal.*, **257** (2009), no. 5, 1396–1428.

33. "Radon-like operators and rank conditions," *Oberwolfach Reports*, **32** (2008), no. 3, 1813–1817.

34. "Uniform estimates for cubic oscillatory integrals," *Indiana U. Math. J.*, **57** (2008), 3419–3442.

35. "Sharp $L^p - L^q$ estimates for generalized k-plane transforms," *Adv. Math.*, **214** (2007), no. 1, 344–365.

36. "L^p-improving properties of X-ray like transforms," *Math. Res. Lett.*, **13** (2006), no. 5-6, 787–803.

37. "Regularity of the Fourier transform on spaces of homogeneous distributions," with E. M. Stein, *J. d'Analyse Math.*, **100** (2006), 211–222.

38. "Convolution and fractional integration along homogeneous curves in $\mathbf{R}^n$," *Math. Res. Lett.* **11** (2004), no. 5-6, 869–881.

39. "Affine, quasi-affine, and co-affine wavelets," with D. Labate, G. Weiss, and E. Wilson, *Beyond Wavelets*, G. Welland, ed. (2003).

40. "Wavelets on the integers," *Collect. Math.* **52** (2001), no. 3, 257–288.

41. "Towards a realistic neutron star binary inspiral: Initial data and multiple orbit evolution in full general relativity," with M. Miller and W.-M. Suen, *Phys. Rev. D* **69** (2004), 064026.

42. "Head-on/near head-on collisions of neutron stars with a realistic equation of state," with E. Evans, A. Gopakumar, S. Iyer, M. Miller, W.-M. Suen, and H.-M. Zhang, *Phys. Rev. D* **67** (2003), 104001.

43. "Nonlinear r-modes in neutron stars: Instability of an unstable mode," with L.-M. Lin, W.-M. Suen, N. Stergioulas, and J. L. Friedman, *Phys. Rev. D* **66** (2002), 041303.

Selected Grants, Fellowships, etc.

2021 Visiting Fellow in Assessment, AP Calculus

NSF Grant DMS-2054602, 2021–2024

University of Pennsylvania, University Research Foundation Conference Support Grant, Fall 2019

University of Pennsylvania, School of Arts and Sciences Conference Support Grant Fall 2019

NSF Grant DMS-1764143, 2018–21

Alfred P. Sloan Research Fellowship, 2011–2013 (extended 2013–2015)

Other Prizes and Awards

UPenn College of Arts and Sciences Dennis M. DeTurck Award for Innovation in Teaching, 2020

UPenn Departmental Teaching Award: Fall 2008, Fall 2011, Spring 2012, Fall 2013, Spring 2014, Spring 2016, Spring 2018, Spring 2019, Fall 2019, Spring 2020, Fall 2020, Fall 2021, Spring 2022

National Science Foundation Postdoctoral Fellowship, 2005 (declined)

National Science Foundation Graduate Research Fellowship, 2001

Barry M. Goldwater Fellowship, 2000

Astronaut Foundation Scholarship, 2000

Upcoming Talks or Other

AMS Spring Central Sectional Meeting, Special Session on Harmonic Analysis and Incidence Geometry, April 2024

Madison Lectures in Fourier Analysis, May 2024

Hausdorff Institute Summer School "Uniformity and Stability of Oscillatory Integrals," (co-organizer) July 2024

Recent Invited Talks, Workshops, Minicourses

Elias M. Stein Memorial Conference, June 2023

Philadelphia Undergraduate Mathematics Conference, April 2023

AMS SE Sectional Meeting, Special Session on Harmonic Analysis, Georgia Tech, March 2023

MIT PDE/Analysis Seminar, November 2022

Guido Weiss Memorial Conference, Washington University in St. Louis, October 2022

University of Wisconsin Madison Analysis Seminar, October 2022

University of New Mexico Analysis Seminar (virtual), September 2022

Conference in Honor of Allan Greenleaf, University of Rochester, August 2022

Oberwolfach Workshop "Real Analysis, Harmonic Analysis and Applications," July 2022

ICMS Edinburgh "Fourier Analysis @ 200" Workshop, July 2022

El Escorial Meeting: "11th International Conference on Harmonic Analysis and PDEs," Madrid, June 2022

University of California at Berkeley Analysis and PDE Seminar (virtual), April 2022

Penn Undergraduate Math Society (PUMS) Seminar, March 2022

Australian National University Analysis Seminar (virtual), March 2022

OSU Math Department Colloquium (virtual), January 2021

Virtual Harmonic Analysis Seminar, Universities of Edinburgh, Kent, and Birmingham, January 2021

Caltech / UCLA Joint Analysis Seminar (virtual), January 2021

Recent Workshops Organized, Grant Panels, Other Activities

Interviewee, Center for Teaching and Learning Active Learning Workshop Video Compilation, August 2023

Co-organizer, Study Guide Writing Workshop, University of Pennsylvania, August 2023

Penn Math Graduate Open House Speaker, February 2023

Co-organizer, Harmonic Analysis People's Presentations on YouTube (HAPPY) Channel, July 2021 to present

Online Seminar On Undergraduate Mathematics Education (OLSUME) Speaker, March 2022

Hausdorff Institute Dual Trimester "Harmonic Analysis and Analytic Number Theory," May–August 2021 (virtual, co-organizer)

Mid-Atlantic Analysis Meeting 2, with Mahya Ghandehari, Benjamin Jaye, Yumeng Ou, Eyvindur Ari Palsson, and Krystal Taylor, Fall 2020 (seminar) and October 2020 (Virtual Conference)

Selected Outreach and Media

Penn Arts & Sciences Knowledge by the Slice "Rethinking Electoral Maps," October 2023

Penn Parents Magazine "Set SAIL for Success" Spring 2023

Penn Omnia "When Something Clicks" (SAIL Calculus)
`https://omnia.sas.upenn.edu/story/when-something-clicks`

Media coverage of Pennsylvania redistricting lawsuit, 2022, NBC Philadelphia, Daily Pennsylvanian Omnia

Penn Today "Understand This..." Podcast Episode "Understanding the Pandemic Classroom" Penn Today

Selected Department and University Service

Math Department Undergraduate Chair: Fall 2021 to present

Math Department Bridge to PhD Program: Fall 2016 to present

Penn First Plus Working Group on Academic Transitions: Fall 2019 to Spring 2020

SAS Curriculum Committee: Fall 2017 to Spring 2019

SAS NSF Outreach Committee: 2008–2009

SAS NSM Panel: Fall 2021 to present

SAS Teaching Awards Committee: 2016, 2017 (chair)

SAS Undergraduate Academic Advising: Fall 2009–Spring 2021

SAS Undergraduate Council: Fall 2021 to present

UPenn Middle States Accreditation Working Group 3: "Supporting Academic Development": Fall 2021 to Fall 2023

UPenn Central Pool Classroom Committee, Spring 2023 to present

UPenn University Graduate Council of the Faculties, Spring 2024 to present

Other Activities and Service

Editorial Adviser for the London Mathematical Society: Proceedings, Journal, Bulletin, and Transactions of the LMS, May 2016 to May 2019

Associate Editor for Journal of Geometric Analysis, November 2019 to present

Editor for Research in the Mathematical Sciences (RIMS), March 2022 to present

Member of AMS Liaison Committee with AAAS (Liawaaas), 2016–2018

Member of AMS Elias M. Stein Prize Selection Committee, February 2023 to January 2026

Member, AMS Committee on the Profession (COPROF), February 2024 to January 2027