Theresa C. Anderson
The Gregg Zeitlin Associate Professor of Mathematical Sciences

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Contact information

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Citizenship: USA

Employment and Education

Carnegie Mellon University: Pittsburgh, PA, July 2022-present
- The Gregg Zeitlin Associate Professor of Mathematical Sciences, July 2024- present
- The Gregg Zeitlin Assistant Professor of Mathematical Sciences, October 2023- June 2024
- Assistant Professor, July 2022 - September 2023

Purdue University: West Lafayette, IN, August 2018-June 2022
- Assistant Professor (tenure-track)

University of Wisconsin-Madison: Madison, WI, 2015-2018
- NSF Mathematical Sciences Postdoctoral Research Fellow
- Van Vleck Visiting Assistant Professor

Brown University: Providence, Rhode Island, 2010-2015
- Ph.D. in Mathematics, May 2015
- M.A. in Mathematics, May 2012
- Advisor: Jill Pipher

University of Wisconsin-Madison: Madison, WI, 2006-2010
- B.S. with Honors: majors in Mathematics, Chemistry, and Spanish

Grants, Awards, and Honors

2023-2028	NSF CAREER DMS-2237937 jointly in Algebra, Number theory and Combinatorics and Analysis
2023	Invited Address of the AMS, Fall Southeastern Sectional Meeting
2023	Packard Fellowship nominee (top 100 in USA over all STEM disciplines, 20 chosen as fellows)
2023	NSF grant for PLANT (analysis, number theory conference): co-PI (PI: Wang-Erickson, co-PI: Schikorra)
2020-2025	NSF Grant DMS-1954407 funded jointly by Analysis DMS and Algebra and Number theory DMS
2020	Purdue College of Engineering/College of Science Violet B. Haas Memorial Fellowship Honoree
2015-2019	NSF Grant DMS-1502464: Mathematical Sciences Postdoctoral Research Fellow
2017	MSRI semester in Harmonic Analysis research member
2011-2015	NSF Graduate Research Fellowship in Mathematics (funded in Algebra and Number theory)
2011	Joint Mathematics Meetings poster session prize winner
2010	UW-Madison University Bookstore award for best Undergraduate Thesis
2009-2010	UW-Madison College of Letters and Science Scholarships: David H. Dura Scholarship, Summer Senior Honors Thesis Grant, Besozzi Scholarship
2009	American Chemical Society Excellence in Physical Chemistry Award
2009	Outstanding Junior Award - Wisconsin Alumni Association
2008, 2009	UW-Madison Mathematics Department Cady Scholarship
2008, 2009	UW-Madison Chemistry Department awards: Margaret Bender award, 2008 Hypercube Scholar, Eugene and Patrica Kreger Herscher award for summer research, Martha Gunhild Week award

2008	Hilldale Undergraduate research fellowship
2007-2008	Honor Societies: Phi Beta Kappa, Phi Kappa Phi
2006	U.S. Department of Education Presidential Scholar
2006	Coca Cola Scholar (out of 50,000 applicants, I was chosen to be a finalist with 250 others)

Research interests

My interests are broadly in number theory and analysis, including connecting these areas in new ways. Some recent work has been in discrete (number theoretic) variants of tools from harmonic analysis, lattice point counting on surfaces, structure theorems in harmonic analysis and relating these to number theory, and development of Fourier analytic methods in arithmetic statistics.

Publications and Preprints

The symbol * indicates a graduate student coauthor, ** indicates an undergraduate student coauthor. Most papers are available freely at https://arxiv.org.

38. Anderson, Theresa C. and Lemke Oliver, Robert J. Appendix to: Kim, Elena. Characterizing the support of semiclassical measures for higher-dimensional cat maps. Submitted. Preprint on arXiv.

37. Anderson, Theresa C., Philips, David**, Rudenko, Anastasiia**, and You, Kevin**. Infinite intersections of doubling measures, weights, and function classes. Submitted. Preprint on arXiv.

36. Anderson, Theresa C., Bertelli, Adam**, and O'Dorney, Evan M. Galois groups of reciprocal polynomials and the van der Waerden-Bhargava theorem. Submitted. Preprint on arXiv.

35. Anderson, Theresa C., Bellah, E., Markman, Z.**, Pollard, T.** and Zeitlin, J.** Arbitrary finite intersections of doubling measures and applications. *Journal of Functional Analysis* 287 (2024), no. 9, Paper No. 110573, 35 pp.

34. Anderson, Theresa C., Maldague, Dominique, Pierce, Lillian, and Yung, Po-Lam. On polynomial Carleson operators along quadratic hypersurfaces. *Journal of Geometric Analysis* 34 (2024), no. 10, Paper No. 321, 47 pp.

33. Anderson, Theresa C., Lehrback, Juha, Mudarra, Carlos, and Vahäkangas, Antti. Weakly porous sets and Muckenhoupt A_p distance functions. *Journal of Functional Analysis* 287 (2024), no. 8, Paper No. 110558, 34 pp.

32. Anderson, Theresa C. Having children at critical career stages and flourishing. *Notices of the AMS*, August 2024.

31. Anderson, Theresa C., Hughes, Kevin, Gafni, Ayla, Lemke Oliver, Robert, Lowry-Duda, David, Thorne, Frank, Wang, Jiuya, and Zhang, Ruixiang. Improved bounds on number fields of small degree. *Discrete Analysis* 2024, Paper No. 19, 24 pp.

30. Anderson, Theresa C., Kumchev, A.V. and Palsson, E,A. A framework for discrete bilinear spherical averages and applications to ℓ^p-improvng. *Colloq. Math* 175 (2024), no. 1, 55–76..

29. Anderson, Theresa C., Hu, Bingyang, Liu, Yu-Ru, and Talmage, Alan. Bounds on tenth moments of (x, x^3) for ellipsephic sets. *Contemporary Mathematics* Volume: 792; 2024; pages 125-132.

28. Anderson, Theresa C. Discrete multilinear maximal functions and number theory. *Illinois J. Math.* 67 (2023), no. 3, 443–456..

27. Anderson, Theresa C. and Hu, Bingyang. On the general dyadic grids in $\mathbb{R}^d$. *Canad. J. Math.* 75(2023), no. 4, 1147–1175.

26. Anderson, Theresa C. and Hu, Bingyang. A structure theorem on intersections of general doubling measures and its applications. *Int. Math. Res. Not. IMRN* (2023), no.9, 7423–7485.

25. Anderson, Theresa C., Travesset, Chiara** and Veltri, Joey**. A structure theorem for weight and function classes with coprime bases. *Q. J. Math.* 74(2023), no.2, 459–470.

24. Anderson, Theresa C., Gafni, Ayla, Lemke Oliver, Robert, Lowry-Duda, David, Shakan, George, and Zhang, Ruixiang. Quantitative Hilbert Irreducibility and almost prime values of polynomial discriminants. *Int. Math. Res. Not.* 2023, no. 3, 2188–2214.

23. Anderson, Theresa C., Kumchev, A. V. and Palsson, E.A. Discrete maximal functions over surfaces of higher codimension. *Matematica* 1 (2022), no. 2, 442–479.

22. Anderson, Theresa C., and Palsson, E. A.. Bounds for multilinear spherical maximal functions. *Collectanea Mathematica* 73 (2022), no. 1, 75–87.

21. Anderson, Theresa C., Cook, Brian, Hughes, Kevin and Kumchev, Angel. The Ergodic Goldbach-Waring problem. *Journal of Functional Analysis*, Volume 282, Issue 5, 1 March 2022.

20. Anderson, Theresa C. and Hu, Bingyang. A structure theorem on doubling measures: a number theoretic approach. *J. Math. Anal. Appl*, volume 505, issue 1, 1 January 2022,

19. Anderson, Theresa C. and Damián, Wendolín*. Calderón–Zygmund operators and commutators in spaces of homogeneous type: weighted inequalities. *Anal. Math.* 48 (2022), no. 4, 939–959.

18. Anderson, Theresa C. and Hu, Bingyang. Sharp Mei's lemma with different bases. *Results in Mathematics* 77 (2022), no. 2, Paper No. 69.

17. Anderson, Theresa C., Cladek, Laura, Pramanik, Malabika, and Seeger, Andreas. Spherical means on the Heisenberg group: stability of a maximal function estimate. *J. Anal. Math* 145 (2021), no. 1, 1–28..

16. Anderson, Theresa C., Hu, Bingyang*, and Roos, Joris. Sparse bounds for discrete singular Radon transforms. *Colloq. Math.* 165 (2021), no. 2, 199–217.

15. Anderson, Theresa C., and Palsson, E. A.. Bounds for multilinear spherical maximal functions in higher dimensions. *Bull. Lond. Math. Soc.* 53 (2021), no. 3, 855–860.

14. Anderson, Theresa C., Hughes, Kevin, Roos, Joris, and Seeger, Andreas. $L^p \to L^q$ bounds for spherical maximal operators. *Mathematische Zeitschrift* 297 (2021), no. 3-4, 1057–1074.

13. Anderson, Theresa C. Quantitative l^p improving for discrete spherical averages along the primes. *J. Fourier Anal. Appl.* 26 (2020), no. 2, Paper No. 32, 12 pp.

12. Anderson, Theresa C., Hu, Bingyang*, Jiang, Liwei**, Olson, Connor**, and Wei, Zeyu**. On the translates of general dyadic systems on $\mathbb{R}$. *Mathematische Annalen*, 377(3), 911-933 (2020).

11. Anderson, Theresa C. and Hu, Bingyang*. A unified method for maximal truncated Calderón-Zygmund operators in general function spaces by sparse domination. *Proc. Edinburgh Math Soc.* (2) 63 (2020), no. 1, 229–247.

10. Anderson, Theresa C., Cook, Brian, Hughes, Kevin and Kumchev, Angel. Improved l^p boundedness for integral k-spherical maximal functions. *Discrete Analysis*, May 29, 2018.

9. Anderson, Theresa C. and Weirich, David E.* A Dyadic Gehring Inequality on spaces of homogeneous type and applications. *New York Journal of Math*, Volume 24, 2018.

8. Anderson, Theresa C., Cruz-Uribe OFS, David, and Moen, Kabe. Extrapolation in the scale of generalized reverse Hölder weights. *Rev. Math Complutense* 31 (2018), 2, 263–286.

7. Anderson, Theresa C., Hytönen, Tuomas, and Tapiola, Olli*. Weak A-infinity weights and weak reverse Hölder property in a space of homogeneous type. *J. Geom. Anal. 27 (2017), no. 1, 95–119*.

6. Anderson, Theresa C. A new sufficient two-weighted bump assumption for L^p boundedness of Calderon-Zygmund operators. *Proceedings of the AMS* Volume 143, Number 8, August 2015, Pages 3573-3586.

5. Anderson, Theresa C. A Framework for Calderón-Zygmund operators on Spaces of Homogeneous Type. PhD thesis, Brown University, 2015. See my website for a copy.

4. Anderson, Theresa C., Cruz-Uribe, David, SFO and Moen, Kabe. Logarithmic bump conditions for Calderón-Zygmund Operators on spaces of homogeneous type. *Publicacions Mathematiques* 59(1), 2015.

3. Anderson, Theresa C. and Vagharshakyan, Armen. A simple proof of the sharp weighted estimate for Calderon-Zygmund operators on homogeneous spaces. *Journal of Geometric Analysis*. July 2014, Volume 24, Issue 3, pp 1276-1297.

2. Anderson, Theresa C. and Mari-Beffa, Gloria. A completely integrable flow of star-shaped curves on the light cone in Lorenzian R^4. *J. Phys. A: Math. Theor.* 44 (2011) 445203. *Featured in IOP Select http://Select.iop.org.

1. Anderson, Theresa C., Rolen, Larry**, and Stoehr, Ruth E.** Benford's Law for coefficients of modular forms and partition functions. *Proceedings of the American Mathematical Society* 139 (2011) 1533-1541.

Press

My joint article "Quantitative Hilbert Irreducibility and almost prime values of polynomial discriminants" (IMRN) was featured in an article on Bhargava's proof of van der Waerden's conjecture entitled "New proof illuminates the hidden structure of common equations" in Quanta Magazine. We were also interviewed by the French daily newspaper *Le Monde* about the same work.
I was featured in the arbicle: Hershberger, S. "Dedicated Parents, Successful Mathematicians: Child Care Grant Recipients Share Their Stories." Notices of the AMS, Volume 69, No. 10, pages 1819-1821.

Conferences and Workshops Organized

2024 Mar.	(co)-organizer, PLANT conference (analysis and number theory - NSF funded)
2023 Oct.	(co)-organizer, AMS special session on Number theory and friends
2023 Mar.	(co)-organizer, AIM SQuaRE (topics in Arithmetic Statistics)
2022 Apr.	Organizer, Special Session on Interface of Harmonic Analysis and Analytic Number Theory, AMS Spring central sectional meeting
2021 Feb.	Organizer, AIM workshop on Arithmetic statistics, Discrete restriction, and Fourier analysis
2020 Dec.	Organizer (Invited), CMS meeting special session on Discrete Analysis
2019 Sept.	Organizer, Special Session on Recent Developments in Harmonic Analysis, AMS fall central sectional meeting
2019 Feb.	Organizer, A Kaleidoscope of Mathematics: A conference celebrating our diversity (held at Purdue)
2013 Jan.	Organizer, Special Session on Harmonic Analysis, Geometric Measure Theory and Partial Differential Equations at the Joint Math Meetings

Plenary lectures, large invited addresses and colloquia

2024 June Plenary: Harmonic Analysis and Differential Equations - In Honour of Professor Jill Pipher
2023 Oct. Invited Address of the AMS: Southeastern Sectional Meeting
2023 July Plenary speaker, Modern trends in harmonic analysis, Tata Institute/ICTS
2022 Sept. Plenary speaker, PANTS
2022 Apr. Colloquium, CMU Math Club
2022 Feb. Colloquium, Loyola University Chicago
2022 Feb. Colloquium, Carnegie Mellon
2022 Jan. Colloquium, UT-Austin
2022 Jan. Colloquium, NC State
2021 Dec. Colloquium, UNC
2021 Oct Plenary speaker: Maine-Quebec Number Theory Conference
2021 Sept Colloquium, UMass Lowell
2019 May Madison Lectures in Fourier Analysis
2018 Nov. Colloquium, University of Cincinnati
2018 May AWM seminar (Colloquium-style talk), UW-Milwaukee
2017 Nov. Colloquium, Temple University
2017 Nov. Colloquium, Purdue
2017 Sept. Colloquium, UW-Madison
2017 Mar. Joint Harmonic Analysis/Analytic Number Theory seminar, MSRI

Other selected Invited Talks and lecture series

2024 Oct. Algebra and Number Theory Seminar, Penn State
2024 Apr. Number Theory Web Seminar
2024 Feb. Quebec-Vermont Number Theory Seminar
2023 Aug. Number theory seminar, University of Georgia
2023 Mar. Combinatorics seminar, University of Rochester
2023 Feb. IAS Workshop on Dynamics, Discrete Analysis and Multiplicative Number Theory
2023 Jan. Joint Math Meetings, special session on Arithmetic Statistics
2023 Jan. Joint Math Meetings, special session on Celebrating the Mathematical Contributions of the AWM
2022 Oct. Nonlinear Analysis Seminar, NTNU (Taiwan)
2022 July Analysis and PDE seminar, University of Bonn
2022 June Number theory seminar, Warwick University
2022 Apr. HAPPY Director's Cuts (flagship series for the HAPPY channel)
2022 Mar. AMS sectional meeting, Analytic methods in arithmetic statistics, Tufts University
2022 Mar. Additive Combinatorics Webinar
2021 Oct AMS sectional meeting (originally Albuquerque, NM), invited special session speaker
2021 Sept Online Analysis Research Seminar, invited speaker
2021 Aug MAGNTS, panelist (algebraic geometry and number theory)
2021 July Mathematical Congress of America, invited speaker
2021 July Workshop on Arithmetic Statistics Problems (WASP), invited discussion leader
2021 Apr Analysis seminar, UW-Madison
2021 Apr Probability and Analysis Webinar (PAW), invited seminar speaker
2021 Mar Analysis seminar, University of Alabama
2021 Mar Analysis seminar, NC State
2021 Mar Analysis and Geometry seminar, Bristol University
2021 Feb Analysis and PDE seminar, University of New Mexico
2021 Jan Joint Math Meetings, Special session of the AWM
2020 Oct Invited lecture series, Mid-Atlantic analysis seminar
2020 Oct Number theory seminar, University of Mississippi

2020 Oct	Fall Eastern AMS Sectional Meeting (held virtually) special session in Analytic Number Theory
2020 June	Analysis and PDE seminar, CUNY
2020 May	Combinatorial and Additvie Number Theory (CANT), invited speaker
2020 May	Number theory and Combinatorics seminar, Towson University
2020 March	Spring Southeastern AMS Sectional Meeting, invited special session speaker (cancelled due to COVID)
2020 Feb.	Joint Caltech/UCLA analysis seminar
2020 Jan.	Joint Math Meetings, invited special session speaker
2019 Oct.	Midwestern Workshop on Asymptotic Analysis, invited speaker
2019 July	SUMIRFAS conference, invited speaker (at TAMU)
2019 April	Number Theory seminar, Tufts University
2019 Mar.	Ohio River Analysis Conference
2018 May	RTG Fourier Analysis Workshop, UW-Madison
2018 Apr.	The Ergodic Theory Workshop, UNC, invited speaker
2018 Feb.	Applied Math and Analysis seminar, Virginia Tech
2017 Dec.	Analysis seminar, UC-Davis
2017 Nov.	Analysis seminar, University of Illinois Urbana-Champaign
2017 Feb.	Postdoc Seminar, MSRI (Colloquium-style talk)
2016 Oct.	Fall Central AMS Sectional Meeting, invited special session speaker
2016 Sept.	Fall Eastern AMS Sectional Meeting, invited special session speaker
2016 May	Conference in honor of Michael Christ (invited short talk)
2016 May	Analysis seminar, University of Wisconsin-Milwaukee
2016 Apr.	Analysis seminar, University of Missouri
2016 Feb.	New Mexico Analysis seminar
2015 Nov.	Indiana University Analysis seminar
2015 Mar.	Yale Analysis seminar
2015 Feb.	Royal Spanish Mathematical Society, invited special session speaker
2014 Dec.	UCLA Analysis seminar
2014 Nov.	University of Rochester Analysis seminar
2014 Sept.	University of Pennsylvania Analysis seminar
2014 Sept.	University of Wisconsin-Madison Analysis seminar
2014 July	University of Alabama Analysis Seminar
2014 Apr.	AMS Sectional Meeting, Special Session on "Weighted Norm Inequalities"
2013 Dec.	University of Helsinki, Harmonic Analysis Seminar
2013 May.	Universidad de Sevilla (University of Seville, Spain) Analysis seminar
2013 Mar.	Lecture series in Harmonic Analysis, University of New Mexico Analysis Seminar
2013 Mar.	AWM Research Symposium, Santa Clara, California, invited special session speaker
2013 Feb.	Georgia Tech, Analysis Seminar
2010 Apr.	AMS Sectional Meeting, Special Session on Differential Geometry, Minneapolis, invited speaker

Leadership, service, and DEI

I am extensively and actively involved in diversity, equity and inclusion (DEI) efforts. Some of these are listed below, but further information and activities available upon request.

2024	AWM Policy and Advocacy Committee, member
2023-present	Pittsburgh Number Theory Day (a semesterly event), (co)-founder and organizer
2023-present	Department Colloquium committee, CMU
2023-present	ASCEND mentor (associated with NSF ASCEND)
2023	SUAMI REU (at CMU) - organizer
2023	CMU Women in Science faculty advisor

2023	Pittsburgh Women in math and computing, panelist
2022-2023	Postdoc committee, CMU
2021- 2023	Johnny Houston Distinguished Colloquium series - creator, organizer (University-wide, at Purdue)
2021	Basic Skills Seminar (Purdue) - invited: “Combating racism and sexism in mathematics"
2021	Twin Lakes High School: Discussion leader on “Careers in STEM"
2020-2021	University committee for COACHE implementation (recommend large-scale policy changes)
2020-2021	Purdue summer research school in number theory and analysis - founder and organizer
2020-2021	Invited Reviewer and Panelist for NSF
2020-2021	Diversity Committee (Purdue Mathematics)
2019-2020	Appointed to Mathematics Head Search Committee (Purdue)
2019-2022	Co-founder, co-organizer: Purdue Analytic Number Theory and Harmonic Analysis seminar
2019	Invited Panelist for faculty panel on postdoctal appointments (Purdue)
2018	Invited Panelist on “Career and Family Balance" for Graduate Women in Science (Purdue)
2018	UW Madison undergraduate summer school in Analysis (research based) - organizer
2017-2018	Wisconsin Science Festival and Junior Science Cafe - math presentations for students (grades K-12)
2015	Wisconsin Math Circle - presentation for middle school students
2015 and future	Referee for various journals, including LMS journals, J. Geo. Anal., Studia Math, etc.
2014	Invited attendee for Panel on Women in the Workforce with US Senator Jack Reed
2012-2015	Co-founder and organizer, Brown Informal Analysis seminar
2012-2015	Rose Whelan Society organizer (women in math group), Brown University
2013	Awarded “Volunteer of the Month" from State of Rhode Island
2012	Invited Panel Speaker, “Are we selling Mathematics as a Major?" Joint Math Meetings
2011-2015	English/Spanish interpreter for Rhode Island Free Clinic
2008-2010	President, Undergraduate Math Club, UW-Madison
2008-2010	Vice President (2009),Treasurer (2008), American Chemical Society Student Chapter (UW-Madison)

Student and researcher training

In addition to these activities, I am a mentor of several undergraduate and graduate students, both officially and unofficially.

2024	Led 5 undergraduates in research projects, preparing two manuscripts for professional journals
2024	Led 1 undergraduate in a research project, resulting in submitted paper (joint with O’Dorney)
2023-2025	postdoctoral mentor for Dr. Evan O’Dorney
2023-2024	Led 3 undergraduate students in research project, resulting in joint paper in *J. Func. Analysis*
2022	graduate mentor for Eliza Rodriguez
2020-2022	postdoctoral mentor for Dr. Bingyang Hu
2020-2022	graduate mentor for Anna Natalie Chlopecki
2021-2022	Topics exam committee for Kiseok Yeon, Daniel Flores, James Cumberbach
2020-2022	Led 2 undergraduate students in research project, resulting in joint paper in *QJM*
2021	Reading course on Dyadic Harmonic Analysis with Nikos Villareal Styles
2018-2019	Led 3 undergraduates in research project, resulting in joint paper in *Math Annalen*

Teaching

2024	Spring	CMU, Topics in Undergraduate Research
2023	Fall	CMU, Topics course on Arithmetic Statistics (Graduate)
2022	Fall	CMU, 21-355: Principles of real analysis
2021	Spring	Purdue, Math 265, linear algebra (online section)
2020	Fall	Purdue, Math 265, linear algebra (2 sections) - developed fully online teaching format

2020	Spring	Purdue, Advanced topics class: The Discrete Jungle (discrete harmonic analysis and number theory - self-developed)
2019	Fall	Purdue, Math 265, linear algebra (2 sections)
2019	Spring	Purdue, Math 162i, Impact Calculus II (flipped classroom format)
2018	Spring	UW-Madison, Math 521, Analysis I
2016	Fall	UW-Madison, Math 521, Analysis I (two sections)
2015	Spring	Lecture Series on the Hardy-Littlewood Circle Method (6 lectures), Brown University
2015	Fall	Teaching Assistant, Brown University, Math 0100 (second semester calculus)
2014	Spring	Teaching Fellow (instructor), Brown University, Math 0520 (Linear Algebra)
2013	Spring	Teaching Assistant, Brown University, Math 0100 (second semester calculus)
2008-2009		UW-Madison Mathematics Department WES program student assistant (Math 234)
2006		I designed and submitted a prospectus for an original class "Young Scientists" for the summer Youth Academy program at Carroll University; I organized, planned and taught it. As far as I am aware, this course is a yearly offering.

Languages and other background

Spanish-near native level, Hmong-fluent, Japanese-basic. Previous research as an undergraduate includes physical chemistry (Crim lab - UW-Madison) and molecular biology (Miyamoto lab - UW-Madison).