Theresa C. Anderson

CONTACT INFORMATION

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EMPLOYMENT AND EDUCATION

Purdue University: August 2018-present
- 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

CURRENT FUNDING

I am currently funded by NSF DMS 1954407, funded jointly by Analysis DMS and by Algebra and Number Theory DMS (50 percent funding by each group) (2020-2023).

GRANTS, AWARDS, AND HONORS

2020-2023	NSF Grant DMS-1954407 funded jointly by Analysis DMS and Algebra and Number theory DMS (50 percent Analysis and 50 percent Algebra and Number Theory)
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 in both harmonic analysis and number theory and particularly their interplay. Some recent work has been in discrete variants of objects and tools from harmonic analysis, lattice point counting including distribution of prime vectors on surfaces, structure theorems in harmonic analysis, and development of Fourier analytic methods in arithmetic statistics.

PUBLICATIONS AND PREPRINTS

The symbol * indicates a graduate student coauthor, ** indicates an undergraduate student coauthor. All papers are available freely at https://arxiv.org or on my website.

30. Anderson, Theresa C., Bhargava, Manjul, and Thorne, Frank. Field counting via Fourier Analysis. Preprint.

29. Anderson, Theresa C., Gafni, Ayla, Lemke Oliver, Robert, Lowry-Duda, David, Shakan, George, and Zhang, Ruixiang. Quantitative Hilbert Irreducility and almost prime values of polynomial discriminants. To appear in *Int. Math. Res. Not. IMRN*.

28. Anderson, Theresa C., Travesset, Chiara** and Veltri, Joey**. A structure theorem for weight and function classes with coprime bases. Submitted. Preprint on arXiv.

27. Anderson, Theresa C. Discrete multilinear maximal functions and number theory. Submitted. Preprint on arXiv. Under minor revision at Michigan Math. J.

26. 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, 125620.

25. Anderson, Theresa C. and Hu, Bingyang. Sharp Mei's lemma with different bases. To appear in *Results in Mathematics*.

24. Anderson, Theresa C. and Hu, Bingyang. Dyadic analysis meets number theory. Submitted. Preprint on arXiv.

23. Anderson, Theresa C., Kumchev, A. V. and Palsson, E.A. Discrete maximal functions over surfaces of higher codimension. To appear in *La Matematica (Journal of the AWM)*.

22. Anderson, Theresa C. and Hu, Bingyang. On the general dyadic grids in $\mathbb{R}^d$ Submitted. Preprint on arXiv.

21. Anderson, Theresa C. and Madrid, José. New bounds for discrete spherical lacunary averages. Preprint on arXiv.

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

19. 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.

18. Anderson, Theresa C., and Palsson, E. A.. Bounds for multilinear spherical maximal functions. To appear in *Collectanea Mathematica*.

17. 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.

16. 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.

15. 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).

14. 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.

13. Anderson, Theresa C., Cladek, Laura, Pramanik, Malabika, and Seeger, Andreas. Spherical means on the Heisenberg group: stability of a maximal function estimate. To appear in *J. D'Analyse Math*.

12. 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.

11. 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, 109334.

10. 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.

9. 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.

8. 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*.

7. Anderson, Theresa C. and Damián, Wendolín*. Calderón–Zygmund operators and commutators in spaces of homogeneous type: weighted inequalities. To appear in *Analysis Matematica*.

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.

Conferences and Workshops Organized

2023 Mar.	(co)-organizer, AIM SQuaRE (topics in Arithmetic Statistics)	
2022 tba	Organizer, AIM workshop (topic tba) with Frank Thorne and Trevor Wooley	
2021 Feb.	Organizer, AIM workshop on Arithmetic statistics, Discrete restriction, and Fourier analysis	
2020 Dec.	Organizer (Invited), CMS meeting special session on Discrete Analysis	

2020 Apr.	Organizer, Special Session on Interface of Harmonic Analysis and Analytic Number Theory, AMS Spring central sectional meeting (postponed)
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

SELECTED INVITED TALKS AND LECTURE SERIES

2022 Mar.	AMS sectional meeting, Analytic methods in arithmetic statistics, Tufts University
2022 Feb.	Colloquium, Loyola University Chicago
2022 Jan.	Colloquium, NC State
2021 Dec.	Colloquium, UNC
2021 Oct	AMS sectional meeting (originally Albuquerque, NM), invited special session speaker
2021 Oct	Plenary speaker: Maine-Quebec Number Theory Conference
2021 Sept	Online Analysis Research Seminar, invited speaker
2021 Sept	Colloquium, UMass Lowell
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 (postponed 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 May	Madison Lectures in Fourier Analysis, invited speaker
2019 April	Number Theory seminar, Tufts University
2019 Mar.	Ohio River Analysis Conference
2018 Nov.	Colloquium, University of Cincinnati
2018 May	RTG Fourier Analysis Workshop, UW-Madison
2018 May	AWM seminar (Colloquium-style talk), UW-Milwaukee
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 Nov.	Colloquium, Temple University
2017 Nov.	Colloquium, Purdue
2017 Sept.	Colloquium, UW-Madison
2017 Mar.	Joint Harmonic Analysis/Analytic Number Theory seminar, MSRI
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 Dec.	MIT Analysis seminar (Guth group)
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.	Harmonic Analysis, PDEs and Geometry: A joint Workshop of the ANR-Harmonic Analysis at its boundaries and the ICMAT-Severo Ochoa
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.

2021-present	Johnny Houston Distinguished Colloquium series - creator and organizer
2021	Basic Skills Seminar (Purdue) - invited: "Combating racism and sexism in mathematics"
2021	Twin Lakes High School: Discussion leader on "Careers in STEM"
2021-2022	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 and future	Co-founder, organizer: Purdue Analytic Number Theory and Harmonic Analysis seminar (PANTHA)
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.

2020- present	Official postdoctoral mentor for Dr. Bingyang Hu
2020- present	Official graduate mentor for Anna Natalie Chlopecki
2021	Topics exam committee for Kiseok Yeon
2020-2021	Led 2 undergraduate students in research project, resulting in submitted paper
2021	Reading course on Dyadic Harmonic Analysis with Nikos Villareal Styles
2018	Led 3 undergraduates in research project, resulting in joint paper in *Math Annalen*

ADDITIONAL CONFERENCE INVITATIONS

These are additional to workshops organized and invited talks listed earlier.

2022	AIM Workshop on the Hamming cube (planned)
2021	Workshop in Arithmetic (and) Discrete Analysis (Mittag-Leffler - virtual)
2021	Research Trimester at Hausdorff Institute in Bonn (harmonic analysis and analytic number theory), virtual
2018	PCMI trimester program invited research member (declined)
2018	Women in Mathematical Sciences invited speaker (declined)
2017	AIM Workshop on sparse domination (declined)
2015	AIM Workshop on Carleson operators

TEACHING

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. My materials are still being used; the course has been running since 2006.

Languages and other background

Spanish-near native level, Hmong-fluent, Japanese-basic, past research areas include physical chemistry with Fleming Crim (UW-Madison, current position is chief operating officer (COO) of the NSF) and molecular biology with Shigeki Miyamoto (UW-Madison).