

Stefan Steinerberger

CONTACT INFORMATION	Department of Mathematics University of Washington, Seattle	steinerb@uw.edu faculty.washington.edu/steinerb/
RESEARCH INTERESTS	I am interested in Mathematical Analysis and Applications (broadly interpreted).	
EMPLOYMENT	2020 – present : Assistant Professor, University of Washington, Seattle 2017 – 2020 : Assistant Professor, Yale University 2014 - 2017 : Gibbs Instructor, Yale University 2013 - 2014 : Postdoc, Mathematical Institute, Universität Bonn	
EDUCATION	2010 -2013 : Ph.D., Mathematical Institute, Universität Bonn <i>Geometric Structures arising in Partial Differential Equations</i> with Herbert Koch 2009 - 2010 : M.Sc., Johannes Kepler Universität Linz, Austria Thesis in Number Theory with Fritz Pillichshammer 2006 - 2009 : B.Sc., Johannes Kepler Universität Linz, Austria	
AWARDS AND GRANTS	<ul style="list-style-type: none">• 2019 Poorvu Family Award [Prize for Excellence in Teaching, \$10.000]• 2018 Alfred P. Sloan Fellow• (2018 – 2021): NSF Grant DMS-1763179 [\$207.742]• Grant from INSTITUTE OF NEW ECONOMIC THINKING, joint with Jakob Kapeller (JKU Linz) and Carlo d’Ippoliti (Sapienza Rome), 2015–2017 [\$145.000]• AMS Travel Grant 2015–2017• 2015 Young Scientist Award, Governor of Upper Austria• 2014 Distinguished Paper Award, <i>Annales Henri Poincaré</i>• Oberwolfach Leibniz Graduate Student (twice in 2013, once in 2014)• Kapp Prize, European Association for Evolutionary Political Economy 2013• Felix Hausdorff Doctoral Scholarship (Bonn Intl. Graduate School), 2010–2013• Award of Excellence (awarded annually to 50 graduates of all Universities and Technical Colleges), Austrian Ministry of Science, 2010	
PUBLICATIONS	146. Max-Cut via Kuramoto-type Oscillators, arXiv:2102.04931 145. A Pointwise Inequality for Derivatives of Solutions of the Heat Equation in Bounded Domains, arXiv:2102.02736 144. (with Jianfeng Lu), Neural Collapse with Cross-Entropy Loss, arXiv:2012.08465 143. (with Dana G. Korssjoen, Biyao Li, Raghavendra Tripathi, Ruimin Zhang), Finding Structure in Sequences of Real Numbers via Graph Theory: a Problem List, arXiv:2012.04625 142. On the Logarithmic Energy of Points on S^2 , arXiv:2011.04630 141. (with Jianfeng Lu and Cody Murphey), Fast localization of eigenfunctions via smoothed potentials, arXiv:2010.15062 140. On a Kantorovich-Rubinstein Inequality, arXiv:2010.12946 139. (with Greengard, Liu, Tsyvinski), Factor Clustering with t-SNE, SSRN:3696027 138. Free Convolution of Measures via Roots of Polynomials, arXiv:2009.03869	

137. Surrounding the solution of a Linear System of Equations from all sides, *Quart. Appl. Math.*, accepted.
136. Using Expander Graphs to test whether samples are iid, arXiv:2008.01153
135. On the Regularization Effect of Stochastic Gradient Descent applied to Least Squares, arXiv:2007.13288
134. (with Noah Kravitz) The Smoothest Average: Dirichlet, Fejer and Chebychev, arXiv:2007.13700
133. A Weighted Randomized Kaczmarz Method for Solving Linear Systems, *Mathematics of Computation*, accepted.
132. Randomized Kaczmarz converges along small singular vectors, *SIAM J. Matrix Anal. Appl.*, accepted.
131. Polynomials with Roots on the Unit Circle: Regularity of Leja sequences, *Mathematika*, accepted.
130. (with Jeremy Hoskins) A Semicircle Law for Derivatives of Random Polynomials, *IMRN*, accepted.
129. Fourier Uncertainty Principles, Scale Space Theory and the Smoothest Average, arXiv:2005.01665
128. On the Stability of Fourier Phase Retrieval, arXiv:2004.06671
127. (with Aleh Tsyvinski) On Vickrey's Income Averaging, arXiv:2004.06289
126. A Spectral Approach to the Shortest Path Problem, arXiv:2004.01163
125. (with Adela DePavia), Spectral Clustering Revisited: Information Hidden in the Fiedler Vector, arXiv:2003.09969
124. (with Ofir Lindenbaum), Randomly Aggregated Least Squares for Support Recovery, *Signal Processing*, accepted.
123. Regularized Potentials of Schrodinger Operators and a Local Landscape Function, *Comm. PDE*, accepted.
122. (with Ariel Jaffe, Ofir Lindenbaum, Jon Patsenker, Erez Peterfreund), The Spectral Underpinning of word2vec, arXiv:2002.12317
121. (with Shahar Kovalsky, Noam Aigerman, Ingrid Daubechies, Michael Kazhdan, Jianfeng Lu) Non-Convex Planar Harmonic Maps, *Frontiers in Applied Mathematics and Statistics*, accepted.
120. (with Jeremy Hoskins), Towards Optimal Gradient Bounds for the Torsion Function in the Plane, *Journal of Geometric Analysis*, accepted.
119. (with Roy Lederman), Extreme Values of the Fiedler Vector on Trees, arXiv:1912.08327
118. (with Jianfeng Lu), Synchronization of Kuramoto Oscillators in Dense Networks, *Nonlinearity*, accepted.
117. (with Sean O'Rourke), A Nonlocal Transport Equation Modeling Complex Roots of Polynomials under Differentiation, *Proc. Amer. Math. Soc.*, accepted.
116. (with Louis Brown), On the Wasserstein Distance between Classical Sequences and the Lebesgue Measure, *Trans. Amer. Math. Soc.*, accepted.
115. (with Louis Brown), Positive-definite Functions, Exponential Sums and the Greedy Algorithm: a curious Phenomenon, *Journal of Complexity*, accepted.
114. (with Jianfeng Lu), Optimal Trapping of Brownian Motion: A Nonlinear Analogue of the Torsion Function, *Potential Analysis*, accepted.
113. Hot Spots in Convex Domains are in the Tips (up to an Inradius), *Comm. PDE*, accepted.

112. A Wasserstein Inequality and Minimal Green Energy on Compact Manifolds, arXiv:1907.09023
111. (with T. Beck, B. Brandolini, K. Burdzy, A. Henrot, J. Langford, S. Larson, R. Smits), Improved Bounds for Hermite-Hadamard Inequalities in Higher Dimensions, *The Journal of Geometric Analysis*, accepted.
110. On Sublevel Set Estimates and the Laplacian, *Potential Analysis*, accepted.
109. (with Amir Sagiv) Transport and Interface: an Uncertainty Principle for the Wasserstein distance, *SIAM J. Math. Anal.*, accepted.
108. (with Jianfeng Lu), A Dimension-Free Hermite-Hadamard Inequality via Gradient Estimates for the Torsion Function, *Proc. Amer. Math. Soc.*, accepted.
107. (with Aleh Tsyvinski) Tax Mechanisms and Gradient Flows, arXiv:1904.13276
106. (with R. Alaifari, X. Cheng, L. Pierce), On Matrix Rearrangement Inequalities, *Proc. Amer. Math. Soc.*, accepted.
105. Roots of trigonometric polynomials and the Erdős-Turán theorem, *Mathematika*, accepted.
104. (with Rick Barnard) Three Convolution Inequalities on the Real Line with Connections to Additive Combinatorics, *Journal of Number Theory*, accepted.
103. (with Markus Faulhuber) An Extremal Property of the Hexagonal Lattice, *Journal of Statistical Physics*, accepted.
102. (with Felipe Goncalves and Diogo Oliveira e Silva), A Universality Law For Sign Correlations of Eigenfunctions of Differential Operators, *Journal of Spectral Theory*, accepted.
101. (with Dmitry Kobak, George Linderman, Yuval Kluger, Philipp Berens) Heavy-tailed kernels reveal a finer cluster structure in t-SNE visualisations, ECML PKDD 2019
100. Dynamically Defined Sequences with Small Discrepancy, *Monatshefte fur Mathematik*, accepted.
99. A Nonlocal Functional Promoting Low-Discrepancy Point Sets, *Journal of Complexity*, accepted.
98. A forgotten Theorem of Schönberg on one-sided integral averages, *American Mathematical Monthly*, accepted.
97. Poissonian Pair Correlation in Higher Dimensions, *Journal of Number Theory*, accepted.
96. (with Jianfeng Lu and Chris Sogge) Approximating Pointwise Products of Laplacian Eigenfunctions, *Journal of Functional Analysis*, **373** (2019): 3271–3282.
95. A Nonlocal Transport Equation Describing Roots of Polynomials Under Differentiation, *Proc. Amer. Math. Soc.*, accepted.
94. Quantitative Homogenization and Convergence of Moving Averages, arXiv:1810.13190
93. (with Raphy Coifman), A Remark on the Arcsine Distribution and the Hilbert transform, *Journal of Fourier Analysis and Applications*, accepted.
92. (with Trevor Richards) Leaky Roots and Stable Gauss-Lucas Theorems, *Complex Variables and Elliptic Equations*, accepted.
91. (with Peter W. Jones) Localization of Neumann eigenfunctions near irregular boundaries, *Nonlinearity* **32** (2019): 1898–1904.
90. A metric Sturm-Liouville theory in two dimensions, *Calc. Var. Ell. Equations*, accepted.

89. The Hermite-Hadamard inequality in higher dimensions, *Journal of Geometric Analysis*, accepted.
88. (with Hau-tieng Wu) On Zeroes of Random Polynomials and Applications to Unwinding, *IMRN*, accepted.
87. (with Eric Chi) Recovering Trees with Convex Clustering, *SIAM J. Math Data Science*, **1** (2019): 383–407.
86. A Stability Version of the Gauss-Lucas Theorem and Applications, *J. Aust. Math. Soc.*, accepted.
85. A Compactness Principle for Maximizing Smooth Functions over Toroidal Geodesics, *Bull. Aust. Math. Soc.* **100** (2019): 148–154.
84. (with Jakob Kapeller and Matthias Aistleitner) Citation Patterns in Economics and Beyond: Assessing the Peculiarities of Economics from Two Scientometric Perspectives, *Science in Context*, accepted.
83. (with Alex Cloninger) On the Dual Geometry of Laplacian Eigenfunctions, *Experimental Mathematics*, accepted.
82. Electrostatic Interpretation of Zeros of Orthogonal Polynomials, *Proc. Amer. Math. Soc.* **146** (2018): 5323–5331.
81. An Endpoint Alexandrov Bakelman Pucci Estimate in the Plane, *Canad. Math. Bull.* **62** (2019): 643–651.
80. Quantitative Projections in the Sturm Oscillation Theorem, *J. Math. Pure Appl.*, accepted.
79. (with Jianfeng Lu and Matthias Sachs) Quadrature Points via Heat Kernel Repulsion, *Constructive Approximation*, accepted.
78. Wasserstein Distance, Fourier Series and Applications, *Monatshefte Math.*, accepted.
77. (with George Linderman) Numerical Integration on Graphs: where to sample and how to weigh, *Mathematics of Computation*, accepted
76. Generalized Designs on Graphs: Sampling, Spectra, Symmetries, *Journal of Graph Theory*, accepted
75. Refined Heinz-Kato-Löwner inequalities, *Journal of Spectral Theory*, accepted.
74. (with Dmitriy Bilyk and Feng Dai), General and Refined Montgomery Lemmata, *Math. Ann.* **373** (2019): 1283–1297.
73. A Sharp Estimate for Probability Distributions, *Stat. Prob. Lett.*, **155** (2019), 108584.
72. (with G. Linderman, M. Rachh, J. Hoskins, Y. Kluger), Efficient Algorithms for t-distributed Stochastic Neighborhood Embedding, *Nature Methods*, **16** (2019): 243–245.
71. On the Spectral Resolution of Products of Laplacian Eigenfunctions, *Journal of Spectral Theory*, **9**, p. 1367–1384, 2019
70. (with S. Johnson), Intuitions about mathematical beauty: A case study in the aesthetic experience of ideas, *Cognition*, **189** (2019): 242–259.
69. (with S. Johnson), The Universal Aesthetics of Mathematics, *Math. Intelligencer* **41** (2019): 67–70.
68. (with J. Lierl) A Local Faber-Krahn inequality and Applications to Schrödinger's Equation, *Comm. PDE*, **43** (2018): 66–81.
67. Varadhan Asymptotics for the Heat Kernel on Finite Graphs, arXiv:1801.02183

66. (with G. Linderman, G. Mishne, Y. Kluger), Randomized Near Neighbor Graphs, Giant Components, and Applications in Data Science, *Advances in Applied Probability*, accepted.
65. Poissonian Pair Correlation and Discrepancy, *Indag. Math.*, **29** (2018): 1167–1178.
64. (with Jianfeng Lu), Detecting localized eigenstates of linear operators, *Res. Math. Sci.*, **5** (2018): no. 34.
63. Spectral Limitations of Quadrature Rules and Generalized Spherical Designs, *IMRN*, accepted.
62. Oscillatory functions vanish on a large set, *Asian J. Math* **24** (2020), pp. 177-190.
61. Exponential Sums and Riesz Energies, *Journal of Number Theory*, **182** (2018): 37–56.
60. (with Nick Marshall) Triangles capturing many lattice points, *Mathematika*, **64** (2018): 551-582.
59. (with George Linderman) Clustering with t-SNE, provably, *SIAM J. Math. Data Science*, **1** (2019): 313–332.
58. (with Xiuyuan Cheng and Gal Mishne) The Geometry of Nodal Sets and Outlier Detection, *Journal of Number Theory*, **185** (2018): 48–64.
57. Topological Bounds for Fourier coefficients and Applications to Torsion, *Journal of Functional Analysis*, **274** (2018): 1611–1630.
56. (with Noah Kravitz) Ulam Sequences and Ulam Sets, *Integers*, **18** (2018): A80.
55. (with Florian Pausinger and Manas Rachh) Optimal Jittered Sampling for two points in the unit square, *Stat.Prob. Lett.*, **132** (2018): 55-61.
54. (with Uri Shaham) Stochastic Neighbor Embedding separates well-separated clusters, arXiv:1702.02670
53. (with Bogdan Georgiev and Mayukh Mukherjee), A Spectral Gap Estimate and Applications, *Potential Analysis*, **49** (2018): 635–645.
52. (with Xiuyuan Cheng and Manas Rachh), On the Diffusion Geometry of Graph Laplacians and Applications, *Applied and Computational Harmonic Analysis*, **46** (2019): 674–688.
51. (with SMALL 2016), On algorithms to calculate integer complexity, *Integers*, **19** (2019): A12.
50. Well-distributed great circles on \mathbb{S}^2 , *Discrete & Computational Geometry*, **60** (2018): 40-56.
49. Fast Escape in Incompressible Vector Fields, *Monatshefte Math.*, **186** (2018): 525–537.
48. (with Jakob Kapeller and Matthias Aistleitner) The Power of Scientometrics and the Development of Economics, *Journal of Economics Issues*, **52** (2018): 816–834.
47. (with Jianfeng Lu), A Variation on the Donsker-Varadhan Inequality for the Principal Eigenvalue, *Proceedings of the Royal Society A*, **473** (2017).
46. (with Jakob Kapeller) Stability, Fairness and Random Walks in the Bargaining Problem, *Physica A*, **488** (2017): 60–71.
45. Localized Quantitative Criteria for Equidistribution, *Acta Arithmetica*, **180** (2017): 183–199.
44. (with Manas Rachh), On the location of maxima of solutions of Schrödinger’s equation, *Comm. Pure Appl. Math.* **71** (2018): 1109–1122.

43. (with Raphy Coifman and Hau-tieng Wu), Carrier frequencies, holomorphy and unwinding, *SIAM J. Math. Anal.* **49** (2017): 4838–4864.
42. (with Roy Lederman) Stability Estimates for Truncated Fourier and Laplace Transforms *Integral Equations and Operator Theory*, **87** (2017): 529–543.
41. An amusing sequence of functions, *Mathematics Magazine*, **91** (2019): 262–266.
40. (with Alex Cloninger) On Suprema of Autoconvolutions with an Application to Sidon sets, *Proc. Amer Math. Soc.*, **145** (2017): 3191–3200.
39. (with Alex Cloninger), Spectral Echolocation via the Wave Embedding, *Applied and Computational Harmonic Analysis* **43** (2017): 577–590.
38. (with Florian Pausinger) Heating a Room with Number Theory, to appear in *Mathematics Magazine*
37. Localization of Quantum States and Landscape Functions, *Proceeding of the American Mathematical Society*, **145** (2017): 2895–2907.
36. A Hidden Signal in the Ulam Sequence, *Experimental Mathematics*, **23** (2017): 460–467.
35. (with Raphy Coifman), Nonlinear phase unwinding of functions, *Journal of Fourier Analysis and Applications*, **23** (2017): 778–809.
34. (with Diogo Oliveira e Silva) Hermite polynomials, linear flows on the torus, and an uncertainty principle for roots, *Journal of Mathematical Analysis and Applications*, **451** (2017): 678–711.
33. (with Markus Faulhuber) Optimal Gabor frame bounds for separable lattices and estimates for Jacobi theta functions, *Journal of Mathematical Analysis and Applications*, **445** (2017): 407–422.
32. (with Yuke Li, Tianhao Wu and Nicholas Marshall) Extracting Geography from Trade Data, *Physica A*, **473** (2017): 205–212.
31. (with Jakob Kapeller) Emergent phenomena in scientific publishing: a simulation exercise, *Research Policy*, **45** (2016): 1945–1952.
30. (with Alberto Enciso and Daniel Peralta-Salas) Prescribing the nodal set of the first eigenfunction in each conformal class, *IMRN* **11** (2016): 3322–3349.
29. Directional Poincaré inequalities along mixing flows, *Arkiv foer Matematik*, **54** (2016): 555–569.
28. A Filtering Technique for Markov Chains with Applications to Spectral Embedding, *Applied and Computational Harmonic Analysis* **40** (2016), 575–587.
27. (with Florian Pausinger) On the Discrepancy of Jittered Sampling, *Journal of Complexity* **33** (2016), 199–216.
26. (with Rima Al-Aifari and Lillian Pierce) Lower bounds for the truncated Hilbert transform, *Revista Matematica Iberobamericana*, **32** (2016), 23–56.
25. A Rigidity Phenomenon for the Hardy-Littlewood maximal function, *Studia Mathematica*, **229** (2015): 263–278.
24. An Uncertainty Principle on Compact Manifolds, *The Journal of Fourier Analysis and Applications*, **21** (2015), 575–599.
23. (with Herbert Koch) Convolution Estimates for Singular Measures and some Global Nonlinear Brascamp-Lieb inequalities, *Proceedings of the Royal Society of Edinburgh*, **145** (2015), 1223–123..
22. Sharp L^1 -Poincaré inequalities correspond to optimal hypersurface cuts, *Archiv der Mathematik* **105** (2015), 179–188.

21. On the number of legal positions in chess without promotion, *International Journal of Game Theory* **44**, 761-767.
20. (with Florian Pausinger) Local Extrema in Quantum Chaos, *Physics Letters A* **379** (2015), 535–541.
19. Lower bounds on nodal sets of eigenfunctions via the heat flow, *Communications in Partial Differential Equations*, **39** (2014).
18. New Bounds for the Traveling Salesman Constant, *Advances in Applied Probability*, **47** (2015).
17. A Remark on Disk Packings and Numerical Integration of Harmonic Functions, *Journal of Complexity* **31** (2015), 486–493.
16. Dispersion dynamics for the generalized Korteweg-de Vries equation, *Proceedings of the AMS*, **143** (2015), 486-493.
15. A Geometric Uncertainty Principle with an Application to Pleijel’s Estimate, *Annales Henri Poincaré*, **15** (2014), 2299-2319.
14. (with Michaela A. C. Nieuwenhuis and James C. Robinson), Minimal Periods for Ordinary Differential Equations in Strictly Convex Banach Spaces and Explicit Bounds for some L^p -Spaces, *Journal of Differential Equations*, **256** (2014), 2846 - 2857.
13. (with Jakob Kapeller) Modeling the evolution of preferences: an answer to Schubert and Cordes, *Journal of Institutional Economics*, **10** (2014), 337-347.
12. (with Jakob Kapeller and B. Schuetz) The Impossibility of Rational Consumer Choice—A Problem and its Solution. *Journal of Evolutionary Economics* **23** (2013): 29–60.
11. (with Jakob Kapeller) How Formalism shapes Perception: An Experiment on Mathematics as a Language, *International Journal of Pluralism and Economics Education* **4** (2013): 138–156.
10. Random restricted matching and lower bounds for combinatorial optimization. *Journal of Combinatorial Optimization* **24** (2012), no. 3, 280–298.
9. (with Erhard Aichinger) A proof of a Theorem by Fried and MacRae and applications to the composition of polynomial functions, *Archiv der Mathematik* **97** (2011), 115–124.
8. On the optimal interpoint distance sum inequality, *Archiv der Mathematik* **97** (2011) no.3, 289-298.
7. Extremal uniform distribution and random chord lengths. *Acta Mathematica Hungarica* **130** (2011), 321–339.
6. A note on implicitly defined sets in uniform distribution theory. *Uniform Distribution Theory* **6** (2011), no. 2, 85–94.
5. The asymptotic behavior of the average L^1 –discrepancies and a randomized discrepancy, *The Electronic Journal of Combinatorics*, **17** (2010), R106
4. A New Lower Bound for the Geometric Traveling Salesman Problem in Terms of Discrepancy, *Operations Research Letters*, **38** (2010), 318–319.
3. A Note on the number of different inner products generated by a finite set of vectors, *Discrete Mathematics* **310** (2010), 1112–1117.
2. Uniform distribution preserving mappings and variational problems. *Uniform Distribution Theory* **4** (2009), 117–145.
1. (with Fritz Pillichshammer) Average distance between consecutive points of uniformly distributed sequences, *Uniform Distribution Theory* **4** (2009), 51–67.

INVITED TALKS

- 2021: Erlangen, UW (Probability), Kickoff Event Pacific Interdisciplinary Hub on Optimal Transport, planned: Uniform Distribution Theory (7UDT), Trends in Mathematical Modelling, Simulation and Optimisation: Theory and Applications (Erlangen), 33th Brazilian Mathematical Colloquium
- 2020: U Toronto, UW Seattle, U Minnesota, Localization of Waves Annual Meeting (Simons Foundation), Spectral Geometry in the Clouds (Webinar), Corona Seminar: Inequalities on Function Spaces of Smooth Functions (Webinar), UC Berkeley (Applied Math, Webinar), Northwestern (Analysis, Webinar), 2nd Mid-Atlantic Analysis Seminar (webinar), Rutgers (Number Theory, webinar), Point Distribution Webinar (2 talks), Joint UCLA/Caltech Analysis Seminar, Syracuse (Colloquium), IIT Delhi (Math Seminar), Fernuni Hagen
- 2019: University of Rochester (Colloquium + Seminar), University of Connecticut (Colloquium), University of Michigan, UWisc-Madison, Duke, UMass Amherst, ETH-UZurich Colloquium, WIFO Vienna, American Institute of Mathematics, US-Vietnam Joint Meeting, Dagstuhl Seminar 12391, Princeton (PACM Colloquium), UW Seattle (Rainwater Seminar), UConn (Clustering Seminar), CUNY, BIRS Oaxaca (Applied Harmonic Analysis and Data Science), Cornell (Colloquium), Duke (Frontiers of Mathematics)
- 2018: Western Washington University, CUNY, University of Maryland College Park, Park City Mathematical Institute, Harmonic Analysis and Applications (Strobl, Austria, Plenary Speaker), NTNU Trondheim, U Oregon (Seminar + Colloquium), UC San Diego, Memorial Conference in Honor of Alan McIntosh (ANU), Meeting in Harmonic Analysis (Basque Center of Applied Mathematics), Bristol
- 2017: JKU Linz, Conference on Monte Carlo Methods (samsi), Special Session on Graph Laplacians (SIAM PDE 2017), Discrepancy Theory and Applications (Erwin Schrodinger Institute), Oberwolfach: Real and Harmonic Analysis; Analysis, Geometry and Probability: Conference in Honor of Peter W. Jones (KIAS, Seoul), AMS Sectional Meeting at Indiana University: Special Session on Laplacian Eigenfunctions, Stanford (Seminar + Colloquium)
- 2016: JKU Linz, Stony Brook (Colloquium), USC (Colloquium), Institute for Mathematics and Applications Minneapolis, U Minnesota, Princeton, Toronto, Waterloo (Colloquium), Cornell, University of Wisconsin-Madison (Colloquium), Conference on Discrepancy Theory (Varenna, Italy), Conference on Modern Topics in Time-Frequency Analysis (Strobl, Austria), University of Vienna, Harmonic Analysis Conference in Honor of Michael Christ's 60th birthday (University of Wisconsin-Madison), Duke, Brown, TU Munich, Indiana University, UIUC (Colloquium), Princeton
- 2015: JKU Linz, New Trends in Elliptic and Partial Differential Equations (SIAM PDE 2015), Williams College, U Virginia (Colloquium), Yale Economics Micro Theory Lunch Seminar, Oberwolfach Workshop: Applied Harmonic Analysis and Sparse Representations, Bonn, Oxford, AMS Sectional Meeting in Porto, NYU, Rutgers,
- 2014: ICERM Workshop on Discrepancy Theory, AMS Fall Western Sectional Meeting in San Francisco, Brown, 10th AIMS Conference on Dynamical Systems, Differential Equations and Applications (2 talks, Madrid), Workshop: Harmonic Analysis Methods in Dispersive PDEs, ICMAT Madrid
- 2013: U Cologne, U Basel, Oberwolfach Workshop: Uniform Distribution Theory and Applications, Rome 3 (Tor Vergata), IST Austria, Meeting on Spectral Theory of Laplace and Schroedinger Operators (Banff), Workshop on Nonlinear Waves (Bielefeld)

TEACHING

1. Supervision of Ph.D. Theses
 - Nicholas F. Marshall (2019, jointly with Raphy Coifman): 'Harmonic Analysis in Discrete Geometries'
 - George C. Linderman (2019, jointly with Raphy Coifman and Yuval Kluger): 'Efficient methods for imputation, dimensionality reduction, and visualization of biomedical datasets'
 - Louis Brown (expected 2021), in progress.
2. Supervision of M.Sc. Theses
 - Sina Koohbour: 'Spectral gaps on Graphs' (Bonn, 2014)
 - Kathrin Heim: 'Computer-aided investigations of solitons in Boson stars' (Bonn, 2014)
3. Supervision of Undergraduate Research and Honor Theses
 - Chris Shriver: Fractional Number Systems and Integer Complexity (2015)
 - Youkow Homma; Topological pre-processing for spectral partitioning (2016)
 - Tianjia Chen (M.Sc. Stats): Analysis of scientometric data (INET) (2016)
 - Tianhao Wu (M.Sc. Stats): Analysis of scientometric data (INET) (2016)
 - Chenglin Lu (M.Sc. Biostats): Scientometric Analysis (INET project) (2017)
 - Noah Kravitz: Additive Combinatorics (arXiv:1705.01883, *Integers*) (2017)
 - Noah Kravitz: Fourier Analysis (arXiv:1712.01206 *J. Fourier Anal.*) (2017)
 - Borys Kuca: Additive Combinatorics (arXiv:1804.09594, *Acta Arithm.*) (2018)
 - Elaine Hou: The Brun Sieve (Senior Honor Thesis) (2018)
 - Luke Peilen: Riesz Energy (Senior Honor Thesis) (2018)
 - Tessa Murthy: Fractal Functions (Senior Honor Thesis) (2019)
 - Noah Kravitz: Lonely Runner Conjecture (arXiv:1912.06034)
 - Emma Pierce-Hoffman and Isaac Robinson: tree-SNE (arXiv:2002.05687)
 - Alex Cohen: Higher Order Poissonian Correlation (arXiv:2003.05421)
 - Adela DePavia: Spectral Clustering, arXiv:2003.09969
 - Noah Kravitz: Convolution Inequalities (arXiv:2004.06611)
 - WXML Project Fall 2020 (arxiv:2012.04625)
4. Fall 2009/2010: Functional Analysis: taught supp. lecture at JKU
5. Spring term 2013/2014: Seminar (The Foundations of Game Theory)
6. Fall term 2014/2015: Math 246a (Ordinary Differential Equations)
7. Fall term 2014/2015: Math 320a/520a (Measure Theory & Integration)
8. Spring 2014/2015: Math 305 (Real Analysis)
9. Fall term 2015/2016: Math 120 (Multivariable Calculus)
10. Fall term 2015/2016: Math 260 (Basic Analysis in Function Spaces)
11. Spring 2015/2016: Math 300 (Topics in Analysis)
12. Fall 2016/2017: Math 230 (Linear Algebra and Introductory Analysis)
13. Spring 2016/2017: Math 231 (Linear Algebra and Introductory Analysis II)
14. Spring 2016/2017: Applied Math 160 (The Structure of Networks)
15. Fall 2017/2018: Math 310 (Introduction to Complex Analysis)

16. Fall 2017/2018: Graduate Class: Advanced Topics in Real and Harmonic Analysis
17. Spring 2017/2018: Math 247 (Partial Differential Equations)
18. Fall 2018/2019: Math 250 (Multivariable Calculus)
19. Spring 2019: Graduate Class: The Heat Kernel
20. Fall 2019: Math 421 (The Mathematics of Data Science)
21. Spring 2020: Math 240 (Advanced Linear Algebra)
22. Winter 2021: Math 300C/D (Introduction To Mathematical Reasoning)
23. Spring 2021: Math 425A (Fundamental Concepts of Analysis II)

COMMUNITY,
SERVICE AND
OUTREACH

1. Member of the American Mathematical Society
2. Reviewer for mathscinet (80+ reviews)
3. Referee for 60+ journals
4. *Getting the most out of circles*, Math Morning Lecture at Yale [public outreach program for elementary school students], 10/11/2015
5. Co-organized (with Eyvindur Palsson and Steven Miller) research group at the SMALL REU at Williams College (Summer 2016)
6. Co-organized (with Arseniy Sheydvasser) research group at the SUMRY REU, Yale (Summer 2017) resulting in Joshua Hinman, Borys Kuca, Alexander Schlesinger, Arseniy Sheydvasser, The Unreasonable Rigidity of Ulam Sets, *Journal of Number Theory* and same authors, Rigidity of Ulam sets and sequences, *Involve*
7. Organizer, SUMRY (Yale REU), Summer 2018
8. REU Project (jointly with Hau-tieng Wu, SUMRY 2018), resulting in the paper: M. Lukianchikov, V. Nazarchuk and C. Xue: Iterative Variable-Blaschke Factorization, arXiv:1810.01458, *Complex Analysis and Operator Theory*
9. Organizer, Analysis Seminar (2016 – present)
10. Graduate School Admissions Committee (2018, 2020)
11. Director of Undergraduate Studies (2018–2019)
12. Faculty Organizer, SUMRY (Yale REU), Summer 2019
13. Work with Samuel Johnson featured in *Scientific American* (Oct 2019), ‘Comparing Beauty in Math and Art’
14. NSF Reviewer 2020, 2021