Dean Baskin

Curriculum Vitae

August 2022

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Education

2005 B.A. The University of Chicago
2010 Ph.D. Stanford University

Academic Appointments

2019– **Associate Professor**, Texas A&M University.
2022 **Research Member**, Mathematical Sciences Research Institute (MSRI).
2019 **Research Member**, MSRI.
2014–2019 **Assistant Professor**, Texas A&M University.
2013 **Research Member**, MSRI.
2010–2014 **Boas Assistant Professor**, Department of Mathematics, Northwestern University.
2011–2014 **NSF Postdoctoral Fellow**, Department of Mathematics, Northwestern University.

Honors and awards

2016 Departmental teaching award (Texas A&M University)
2013 AHP Birkhäuser Prize
2013 Departmental teaching award (Northwestern University)

Grants

2017–2023	PI, "CAREER: Wave evolution on singular spaces", NSF DMS-1654056.	$419,354
2015–2019	PI, "Scattering theory on singular spaces", NSF DMS–1500646.	$156,916
2018–2022	Co-PI, "Texas Geometry and Topology Conference (TGTC)", NSF DMS–1812040.	$90,000
2014	Co-PI, "73rd Midwest PDE Seminar, May 10-11, 2014", NSF DMS-1420160.	$9,000
2011–2014	PI, Postdoctoral research fellowship, NSF DMS-1103436.	$135,000

Professional Memberships

- Member, American Mathematical Society

Publications

PhD thesis

1. Dean Baskin. "Wave equations on asymptotically de Sitter spaces". PhD thesis. Stanford University, 2010.

Refereed research papers

1. Dean Baskin. A parametrix for the fundamental solution for the Klein-Gordon equation on asymptotically de Sitter spaces. *J. Funct. Anal.* **259**(7) (2010), 1673–1719.

2. Dean Baskin. "A Strichartz estimate for de Sitter space". In: *The AMSI-ANU Workshop on Spectral Theory and Harmonic Analysis*. Vol. 44. Proc. Centre Math. Appl. Austral. Nat. Univ. Austral. Nat. Univ., Canberra, 2010, pp.97–104.
3. Dean Baskin. Strichartz estimates on asymptotically de Sitter spaces. *Ann. Henri Poincaré* **14**(2) (2013), 221–252.
4. Dean Baskin and Jared Wunsch. Resolvent estimates and local decay of waves on conic manifolds. *J. Differential Geom.* **95**(2) (2013), 183–214.
5. Dean Baskin. Equipartition of energy in geometric scattering theory. *J. Anal. Math.* **123** (2014), 341–353.
6. Dean Baskin, Jeremy L. Marzuola, and Jared Wunsch. "Strichartz estimates on exterior polygonal domains". In: *Geometric and spectral analysis*. Vol. 630. Contemp. Math. Amer. Math. Soc., Providence, RI, 2014, pp.291–306.
7. Dean Baskin and Fang Wang. Radiation fields on Schwarzschild spacetime. *Comm. Math. Phys.* **331**(2) (2014), 477–506.
8. Dean Baskin and Antônio Sá Barreto. Radiation fields for semilinear wave equations. *Trans. Amer. Math. Soc.* **367**(6) (2015), 3873–3900.
9. Dean Baskin, András Vasy, and Jared Wunsch. Asymptotics of radiation fields in asymptotically Minkowski space. *Amer. J. Math.* **137**(5) (2015), 1293–1364.
10. Dean Baskin, Euan A. Spence, and Jared Wunsch. Sharp high-frequency estimates for the Helmholtz equation and applications to boundary integral equations. *SIAM J. Math. Anal.* **48**(1) (2016), 229–267.
11. Dean Baskin, András Vasy, and Jared Wunsch. Asymptotics of scalar waves on long-range asymptotically Minkowski spaces. *Adv. Math.* **328** (2018), 160–216.
12. Dean Baskin and Jeremy L. Marzuola. Locating the resonances on hyperbolic cones. *Math. Res. Lett.* **26**(2) (2019), 365–381.
13. Dean Baskin and Mengxuan Yang. Scattering resonances on truncated cones. *Pure Appl. Anal.* **2**(2) (2020), 385–396. ISSN: 2578-5885. DOI: 10.2140/paa.2020.2.385.
14. Dean Baskin, Jesse Gell-Redman, and Xiaolong Han. Riemann moduli spaces are quantum ergodic. *J. Diff. Geom. (to appear)* (2021).
15. Dean Baskin and Jeremy L. Marzuola. The radiation field on product cones. *Adv. Math. (to appear)* (2022).

Submitted papers

1. Dean Baskin and Jared Wunsch. "Diffraction for the Dirac–Coulomb propagator". Preprint, arXiv:2011.08890. 2020.
2. Dean Baskin, Robert Booth, and Jesse Gell-Redman. "Asymptotics of the radiation field for the massless Dirac–Coulomb system". Preprint, arXiv:2112.06111. 2021.
3. Dean Baskin, Jesse Gell-Redman, and Jeremy L. Marzuola. "Price's law on Minkowski space in the presence of an inverse square potential". Preprint, arXiv:2207.06513. 2022.

Conference proceedings and short survey papers

1. Dean Baskin and Rafe Mazzeo. "Some global aspects of linear wave equations". In: *Evolution equations*. Vol. 17. Clay Math. Proc. Amer. Math. Soc., Providence, RI, 2013, pp.73–95.
2. Dean Baskin and Antônio Sá Barreto. "A support theorem for a nonlinear radiation field". In: *Microlocal methods in mathematical physics and global analysis*. Trends Math. Birkhäuser/Springer, Basel, 2013, pp.111–112.
3. Dean Baskin. An explicit description of the radiation field in 3 + 1-dimensions. In: *Spectral and scattering theory and related topics. Proceedings of a symposium held at the Research Iinstitute for Mathematical Sciences, Kyoto University, Kyoto, Japan, January 20–22, 2016*. Ed. by Tomoyuki Kakehi. Vol. 2023. RIMS Kôkyûroku. Kyoto, Japan: Kyoto University, 2017, pp.40–49.
4. Dean Baskin. "Mathematical Theory of Scattering Resonances" by S. Dyatlov and M. Zworski. *Bull. Amer. Math. Soc.* **58**(3) (2021), 475–477.
5. Dean Baskin and Kiril Datchev. "Propagation of singularities for the wave equation". Preprint, arxiv:2208.06725. 2022.

Advising

- Advisor: Mengxuan Yang, Master's degree, 2017. Siddharth Sabharwal, Ph.D. student (current).
- Committee member: Jimmy Corbin (Ph.D.), Luther Rinehart (Ph.D.), Rohan Kadakia (Ph.D., Northwestern University) (2015) and eight outside Master's committees.
- Postdoctoral mentoring: Robert Booth, 2019–present.
- Honors contract reading group for Math 689 (2015)

Teaching

- Math 151: Engineering mathematics I
- Math 171: Calculus I
- Math 221: Several variable calculus
- Math 304: Linear algebra
- Math 308: Differential equations
- Math 323: Linear algebra
- Math 460: Tensors and general relativity
- Math 622: Differential geometry I
- Math 623: Differential geometry II
- Math 689: Introduction to microlocal analysis
- Organizer of graduate writing groups (Spring 2018–present)
- Helped P. Kuchment develop Math 689: Professional Preparation: Teaching, writing, presenting, and careers in mathematics

Outreach

- SEE-MATH volunteer lecturer (2015–2021)
- Texas A&M University Math Circle (2017, 2019)
- Texas A&M Math club lecture (2017)
- Lecturer at undergraduate conference "Quantization and mathematics", Northwestern University (2012)

Seminar and conference organization

- Organizer (with J.M. Landsberg and I. Zelenko) of the *Texas Geometry and Topology Conference* at Texas A&M University (2019)
- Organizer (with R. Hora, G. Mendoza, W. Muniz, and A. Sá Barreto) of the *Third Symposium on Scattering and Spectral Theory* in Florianopolis, Brazil (2017)
- Organizer (with J.M. Landsberg and J. Pitts) of the *Texas Geometry and Topology Conference* at Texas A&M University (2016)
- Organizer (with L. Hillairet and J. Wunsch) of *Evolution equations on singular spaces* at CIRM in Luminy, France (2016)
- Organizer (with V.Tosatti, B. Weinkove, J. Wunsch, and S. Zelditch) of the *73rd midwest PDE seminar* at Northwestern University (2014)
- Organizer (with I. Rodnianski, G. Staffilani, and J. Wunsch) of *Evolution equations: a workshop in honor of Terence Tao* at Northwestern University (2012)
- Organizer (with E. Schenck, A. Vasy, J. Wunsch, and S. Zelditch) of *Microlocal methods in spectral and scattering theory* at Northwestern University (2011)

- Organizer of the mathematical physics, harmonic analysis and PDE (MPHADE) seminar, Texas A&M University, Spring 2017
- Organizer of the analysis seminar, Northwestern University, 2010–2014

Referee service

- Referee for journals including: American Journal of Mathematics, Analysis and PDE, Commentarii Mathematici Helvetici, Communications in Mathematical Physics, Communications in PDE, Duke Mathematical Journal, Discrete and Continuous Dynamical Systems, Electronic Research Announcements in Mathematical Sciences, Journal of Differential Equations, Journal of Differential Geometry, Journal de l'École Polytechnique, Journal of the European Mathematical Society, Journal of Functional Analysis, Journal of Geometric Analysis, Journal of Mathematical Physics, Journal of Spectral Theory, Mathematische Nachrichten, Probability and Mathematical Physics, Proceedings of the AMS, Pure and Applied Analysis, SIAM Journal of Mathematical Analysis.

Departmental and University Service

- Member, Departmental Executive Committee, 2020–present.
- Member, Departmental Teaching Committee, 2019–2020.
- Member, University Task Force for Math Learning Center, 2019–2020.

Invited talks

- Session on "Classical and quantum Fields on Lorentzian manifolds" at the joint AMS–EMS–SMF international meeting (2022).
- University of Kentucky analysis seminar (virtual) (2022).
- MATRIX workshop on "Hyperbolic Differential Equations in Geometry and Physics", Creswick, Victoria, Australia (2022).
- Session on "Partial differential equations on curved space-times" at 13th ISAAC conference in Ghent, Netherlands (virtual) (2021).
- Paris Quantum Field Theory seminar (virtual), (2021)
- London Analysis Seminar (virtual) (2021)
- Session (virtual) on "Spectral Theory and Mathematical Physics" at TX–LA SIAM sectional meeting (2020)
- Seminar Monza (virtual microlocal analysis seminar) (2020)
- Stanford analysis and PDE seminar (virtual) (2020)
- Paris/Berkeley/Bonn/Zürich Analysis Seminar, Berkeley, CA (2019)
- MSRI seminar, Berkeley, CA (2019)
- UC Berkeley Analysis Seminar, Berkeley, CA (2019)
- Session on "Partial differential equations on curved spacetimes" at the 12th ISAAC conference in Aveiro, Portugal (2019)
- Conference on "Mircolocal Analysis and Applications" at the Shanghai Center for Mathematical Sciences at Fudan University, Shanghai, China (2019)
- Two-lecture minicourse on semiclassical analysis at Fudan University, Shanghai, China (2019)
- Workshop on "Microlocal methods in analysis and geometry", Luminy, France (2019)

- Workshop on "Probing the Earth and the Universe with Microlocal Analysis", Banff, CA (2019)
- AMS special session on "Mathematical analysis of nonlinear phenomena", Honolulu, HI (2019)
- Colloquium, Emory University, Atlanta, GA (2019)
- Colloquium, University of Wisconsin, Madison, WI (2019)
- Workshop on "Geometric analysis and mathematical physics", Oldenburg, Germany (2018)
- Workshop on "Interfaces between geometric analysis and mathematical physics", Mittag-Leffler Institute, Sweden (2018)
- Analysis and PDE seminar, Northwestern University (2018)
- Workshop on ""Microlocal Analysis and its Applications in Spectral Theory, Dynamical Systems, Inverse Problems and PDE", Batemans Bay, Australia (2018)
- Breakout session at "Waves, Spectral Theory, and Applications – Part 2", Chapel Hill, NC (2017)
- AMS special session on "Analysis and PDEs in Geometry", Denton, TX (2017)
- Third Symposium on "Scattering and Spectral Theory", Florianopolis, Brazil (2017)
- AMS special session on "Microlocal analysis and spectral theory", Pullman, WA (2017)
- Analysis and PDE seminar, Stanford University (2017)
- AMS special session on "Harmonic analysis and dispersive PDE", Raleigh, NC (2016)
- AMS special session on "Applications of microlocal analysis: eigenfunctions and dispersive PDE", Fargo, ND (2016)
- Workshop on "Spectral and scattering theory and related topics", RIMS, Kyoto University, Japan (2016)
- PDE seminar, Kobe University, Japan (2016)
- Workshop on "Semiclassical analysis: spectral theory and resonances", Erwin Schrödinger Institute, Vienna, Austria (2015)
- International Congress of Mathematical Physics, Santiago, Chile (2015)
- Workshop titled "May Midwestern Microlocal Meeting", Northwestern University (2015)
- Analysis and PDE seminar, Johns Hopkins University (2015)
- Three-lecture series at conference on "Partial differential equations in complex geometry and singular spaces", American University Beirut, Beirut, Lebanon (2014)
- Workshop on "Geometric scattering theory and applications", BIRS, Banff, Canada (2014)
- Mathematical physics seminar, Texas A&M University (2014)
- Workshop on "Dynamics in geometric dispersive equations and the effects of trapping, scattering, and weak turbulence", BIRS, Banff, Canada (2014)
- AMS special session on "Harmonic analysis and dispersive equations", Albuquerque, NM (2014)
- Analysis seminar, University of Illinois at Urbana-Champaign (2014)
- Workshop on "Geometric and spectral analysis", Temple University (2013)
- PCMI 2013 Research Program, PCMI, Park City, UT (2013)
- 71st Midwest PDE seminar, Ann Arbor, MI (2013)

- Scattering theory seminar, Purdue University (2013)
- Analysis and PDE seminar, Stanford University (2013)
- Colloquium, Washington University in St. Louis (2013)
- Colloquium, Texas A&M University (2013)
- Colloquium, University of Massachusetts (2013)
- Colloquium, Vanderbilt University (2013)
- Colloquium, University of Illinois at Chicago (2012)
- Analysis seminar, Imperial College, London, UK (2012)
- Geometric analysis seminar, University of Cambridge, Cambridge, UK (2012)
- AMS special session on "Spectral, scattering, and inverse scattering theory", Akron, OH (2012)
- Workshop on "Spectral invariants on non-compact and singular spaces", CRM, Montreal, Canada (2012)
- Conference on "Partial differential equations: analytic and geometric aspects in honor of Michael Taylor's 65th birthday", Chapel Hill, NC (2012)
- Conference on "Inverse problems in honor of Gunther Uhlmann", Irvine, CA (2012)
- Analysis and PDE seminar, Stanford University (2012)
- Conference on "Higher codimensional elliptic boundary value problems", University of Arkansas (2012)
- Analysis seminar, University of Illinois at Urbana-Champaign (2012)
- PDE seminar, University of Kentucky (2012)
- Analysis seminar, University of Wisconsin (2011)
- Minisymposium on "Dispersive equations in mathematical physics", ICIAM, Vancouver, Canada (2011)
- Workshop on "Microlocal methods in mathematical physics and global analysis", Tuebingen, Germany (2011)
- PDE seminar, Brown University (2011)
- Workshop on "Analyse Géométrique", CIRM, Luminy, France (2011)
- PDE seminar, University of North Carolina (2010)
- AMS special session on "Harmonic analysis and PDE", Albuquerque, NM (2010)
- Spectral and scattering theory seminar, Purdue University (2010)
- AMS-SMM special session on "Harmonic analysis, microlocal analysis, and PDE", Berkeley, CA (2010)
- Workshop on "Geometric scattering theory and applications", BIRS, Banff, Canada (2010)
- Analysis and PDE seminar, MIT (2010)
- Joint meetings special session on "General relativity", San Francisco, CA (2010)
- PDE seminar, University of Washington (2009)
- AMS special session on "General relativity", Boca Raton, FL (2009)
- Workshop on "Hot topics: black holes", MSRI, (2009)
- Spectral and scattering theory seminar, Purdue University (2009)
- Southern California Analysis and PDE meeting, Los Angeles, CA (2009)
- Postdoctoral seminar, MSRI (2008)

- Geometry seminar, Stanford University (2008)
- Second Symposium on "Scattering and Spectral Theory", Recife, Brazil (2008)