

XUWEN ZHU

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Employment:

2020 – Assistant Professor, Northeastern University
2020 Spring Lecturer, MIT
2019 Fall Uhlenbeck Postdoctoral Fellow, MSRI
2018 – 2019 Morrey Visiting Assistant Professor, UC Berkeley
2015 – 2018 Szegő Assistant Professor, Stanford University

Education:

2010 – 2015 Ph.D. Mathematics, Massachusetts Institute of Technology.
Thesis advisor: Richard Melrose
2006 – 2010 B.S. Mathematics, Peking University, China.

Papers:

1. *Fundamental gaps of spherical triangles*. Joint with Shoo Seto and Guofang Wei.
[arXiv:2009.00229](https://arxiv.org/abs/2009.00229)
2. *Spectral properties of reducible conical metrics*. Joint with Bin Xu.
[arXiv:1909.00546](https://arxiv.org/abs/1909.00546) Submitted.
3. *Conical metrics on Riemann surfaces, II: spherical metrics*. Joint with Rafe Mazzeo.
[arXiv:1906.09720](https://arxiv.org/abs/1906.09720) Submitted.
4. *Rigidity of a family of spherical conical metrics*. [arXiv:1902.02024](https://arxiv.org/abs/1902.02024)
New York Journal of Mathematics 26 (2020) 272–284.
5. *Spherical conic metrics and realizability of branched covers*. [arXiv:1805.03312](https://arxiv.org/abs/1805.03312)
Proceedings of the AMS, Volume 147, Number 4, April 2019, Pages 1805–1815.
6. *Conical metrics on Riemann surfaces, I: the compactified configuration space and regularity*. Joint with Rafe Mazzeo. [arXiv:1710.09781](https://arxiv.org/abs/1710.09781)
Geometry and Topology 24-1 (2020), 309–372.
7. *Boundary behaviour of Weil-Petersson and fiber metrics for Riemann moduli spaces*.
Joint with Richard Melrose. [arXiv:1606.01158](https://arxiv.org/abs/1606.01158)
International Mathematics Research Notices, Vol. 2017, No. 00, pp. 1–54.
8. *Eleven dimensional supergravity equations on edge manifolds*. [arXiv:1507.02322](https://arxiv.org/abs/1507.02322)
Annales Henri Poincaré, Volume 19, Issue 8 (2018), 2347–2400.
9. *Eigenvalue resolution of self-adjoint matrices*. [arXiv:1504.07581](https://arxiv.org/abs/1504.07581)
Pacific Journal of Mathematics, Vol. 288 (2017), No. 1, 241–255.
10. *Resolution of the canonical fiber metrics for a Lefschetz fibration*.
Joint with Richard Melrose. [arXiv:1501.04124](https://arxiv.org/abs/1501.04124)
Journal of Differential Geometry, Volume 108, Number 2 (2018), 295–317.

Honors and Awards:

- 2019 – 2022 NSF Geometric Analysis DMS-1905398 (DMS-2041823 after transfer)
“Moduli Spaces and Geometric Microlocal Analysis”
- 2019 AWM–NSF Travel Grant
- 2017 – 2019 AMS–Simons Travel Grant
- 2017 AWM–NSF Travel Grant
- 2014 – 2015 Graduate Student Appreciation Fellowship for excellent teaching, MIT
- 2010 – 2011 Presidential Fellowship, MIT
- 2006 – 2010 National Scholarship, Starlight Scholarship First Prize*2, Peking University

Talks:

- 2021 Jun Workshop “Spherical surfaces and related topics”, Cortona, Italy (upcoming)
- 2021 May Annual Geometric Analysis Conference, Rutgers University (upcoming)
- 2020 Jun “Spectral Geometry in the Clouds”
- 2020 Feb PDE/Analysis Seminar, MIT
- 2020 Jan Frontier of Analysis and Geometry of Teichmuller Spaces, TSIMF, China
- 2019 Dec Geometry-Topology Seminar, University of Maryland
- 2019 Dec Special Seminar, Brandeis University
- 2019 Dec Special Seminar, Northeastern University
- 2019 Nov Mathematical Colloquium, UC San Diego
- 2019 Nov Iterated structures on manifolds seminar, MSRI
- 2019 Oct “Recent Developments in Microlocal Analysis”, MSRI
- 2019 Sep Microlocal Analysis Regular Seminar, MSRI
- 2019 Aug “Connections for Women: Microlocal Analysis”, MSRI
- 2019 Aug “Connections for Women: Holomorphic Differentials in Mathematics and Physics”, MSRI
- 2019 July Differentialgeometrie im Grossen, Oberwolfach, Germany
- 2019 June Geometry Seminar, Tsinghua University, China
- 2019 June Microlocal Analysis and Applications, SCMS, China
- 2019 May Microlocal Methods in Analysis and Geometry, CIRM, France
- 2019 Apr Harmonic Analysis and Differential Equations Student Seminar, UC Berkeley
- 2019 Apr 34th Geometry Festival, University of Maryland
- 2019 Apr Topology Seminar, UC Berkeley
- 2019 Mar Graduate Student Conference in Geometry and Topology, UIUC
- 2019 Mar Department Colloquium, UIUC
- 2018 Oct Riverside Mathematics Workshop for Excellence and Diversity, UC Riverside
- 2018 May Informal Geometry & Topology Seminar, Stanford University
- 2018 Mar Bay Area Microlocal Analysis Seminar, UC Berkeley
- 2017 Dec Differential Geometry Seminar, UC Santa Barbara
- 2017 Oct Informal Complex Analysis & PDE Seminar, Columbia University
- 2017 Oct Differential Geometry & Geometric Analysis Seminar, Princeton University
- 2017 Oct Geometry/Topology Seminar, Rutgers University
- 2017 Sep PDE/Analysis Seminar, MIT

- 2017 Aug Workshop “The Analysis of Gauge-Theoretic Moduli Spaces”, BIRS, Canada
 2017 Aug SURIM, Stanford University
 2017 July Third Symposium on Spectral and Scattering Theory, Florianópolis, Brazil
 2017 June Workshop “Analysis and Topology in Interaction”, Cortona, Italy
 2017 June Workshop “Sen Conjecture and Beyond”, UCL, UK
 2017 June Geometric Analysis Seminar, Peking University, China
 2017 June Geometry and Physics Seminar, Tsinghua University, China
 2017 June Geometric Analysis Seminar, Shanghai Jiaotong University, China
 2017 May Differential Geometry/PDE Seminar, University of Washington
 2017 May May Midwestern Microlocal Meeting, Purdue University
 2017 May Geometry and Analysis Seminar, UC Santa Cruz
 2017 Apr PDE/Analysis Seminar, MIT
 2017 Mar PDE/Analysis Seminar, ANU, Australia
 2017 Feb Moduli Space Learning Seminar, Stanford University
 2016 Dec Workshop on “Geometric and Spectral Methods in Partial Differential Equations”, CMO, Mexico
 2016 Jul Analysis Seminar, Shanghai Jiaotong University, China
 2016 May Paris/Berkeley/Bonn/Zurich Analysis Seminar, UC Berkeley
 2015 Dec Geometry and Analysis Seminar, UC Santa Cruz
 2015 Nov Departmental Colloquium, HKUST, Hong Kong
 2015 Oct Analysis & PDE Seminar, Stanford University
 2015 Aug Workshop on “Semi-classical Analysis: Spectral Theory and Resonances”, Erwin Schrödinger Institute, Austria
 2015 Jul Workshop on Metric and Analytic Aspects of Moduli Spaces, Isaac Newton Institute, UK
 2015 Apr Student Harmonic Analysis and Differential Equations Seminar, UC Berkeley
 2015 Apr Bay Area Microlocal Analysis Seminar, Stanford University
 2015 Feb Mathematical Physics and Harmonic Analysis Seminar, Texas A&M University
 2015 Jan Mini-workshop on Semiclassical and Microlocal Analysis, USTC, China
 2014 Nov Geometric Analysis Reading Seminar, UCL, UK
 2014 Nov Geometric Scattering Theory and Applications Workshop, BIRS, Canada
 2014 Nov Students Analysis Seminar, MIT
 2014 Oct Analysis and Geometry Seminar, Northeastern University
 2014 Oct Scattering and Spectral Theory Seminar, Purdue University
 2014 Oct PDE/Analysis Seminar, MIT
 2014 Oct Student Differential Geometry Seminar, Harvard University
 2013 Mar Pure Math Graduate Student Seminar, MIT

Mini-courses:

- 2019 Sep MSRI Introductory Workshop: Microlocal Analysis
 2016 Jul Analysis Minicourse, YMSC, Tsinghua University, China

Teaching Experience:Northeastern:

- 2020 Fall Math 1342 Calculus II for Science and Engineering
- 2020 Fall Math 5101 Graduate Analysis I: Functions of One Variable

UC Berkeley:

- 2019 Spring Math 104 Introduction to Analysis Section 2 & 3, lecturer
- 2018 Fall Math 104 Introduction to Analysis Section 6, lecturer

Stanford:

- 2018 Spring MATH 205C Graduate Real Analysis, lecturer
- 2018 Spring MATH 171 Fundamental Concepts of Analysis, lecturer
- 2017 Winter MATH 20 Introductory Calculus, lecturer
- 2017 Winter MATH 131P Partial Differential Equations I, lecturer
- 2016 Winter MATH 20 Introductory Calculus, lecturer
- 2016 Fall MATH 171 Fundamental Concepts of Analysis, lecturer
- 2015 Winter MATH 131P Partial Differential Equations I, lecturer
- 2015 Fall MATH 131P Partial Differential Equations I, lecturer
- 2015 Fall MATH 175 Functional Analysis, lecturer

MIT:

- 2020 Spring 18.03 Differential Equations, recitation instructor and course administrator
- 2015 Summer 18.089 Review of Mathematics, lecturer
- 2014 Spring 18.06 Linear Algebra, recitation instructor and course administrator
- 2013 Fall 18.01 Calculus, recitation instructor and course administrator
- 2013 Spring 18.100C Real Analysis, course assistant
- 2012 Fall 18.01A/02A Calculus, recitation instructor

Mentoring Experience:

- 2014 Winter Directed Reading Program (DRP)
- 2014 Summer Summer Program in Undergraduate Research (SPUR), MIT, preprints available
- 2013 Winter Directed Reading Program (DRP)
- 2012 Summer Summer Program in Undergraduate Research (SPUR), MIT, project results available at <http://math.mit.edu/research/undergraduate/spur>

Other Conferences Attended:

- 2019 Nov “Holomorphic Differentials in Mathematics and Physics” Workshop, MSRI
- 2019 Aug MSRI Introductory Workshop: Holomorphic Differentials in Mathematics and Physics
- 2017 July Analytical aspects of hyperbolic flows, Nantes, France
- 2016 June “Analysis, Geometry and Topology of Stratified Spaces” Workshop, CIRM, France
- 2015 May May Midwest Microlocal Meeting, Northwestern University
- 2012 Sep “Weyl Law at 100” Workshop, Fields Institute, Canada
- 2012 Jul Workshop on Spectral Invariants on Singular Spaces, CRM, Canada
- 2012 Jun Inverse Problems Conference in honor of Gunther Uhlmann, UC Irvine
- 2011 Oct Microlocal Methods in Scattering and Spectral Theory, Northwestern University

Miscellaneous Experience:

- 2020 Member, Department of Mathematics Graduate Committee
- 2020 – Faculty advisor, Northeastern University MathEMA (Mathematics Engagement and Mentorship Association)
- 2020 Panelist, NSF-DMS
- 2019 Fall Panelist, MSRI Connection for Women Workshop
- 2016 – 2017 Organizer, Stanford Women in Math
- 2014 – 2015 Organizer, Graduate Student Analysis Seminar
- 2013 – 2015 Organizer, MIT Friends of the Arts
- 2011 – 2013 Chair, Graduate Women of MIT Mentoring Program
- 2009 Summer Undergraduate Researcher, Oakland University, paper “Numerical Investigation of the Heat Partition Factor During Bolt Tightening”, joint with L. Guessous and Gary C. Barber, Tribology Transactions, Volume 54, Issue 1, 2010