Ting Zhou

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Education

- Ph.D. in Mathematics, December 2010.
  Department of Mathematics, University of Washington, Seattle WA.
  Thesis Title: Electromagnetic Inverse Problems and Cloaking
  Advisor: Gunther Uhlmann
- M.Sc. in Mathematics, August 2006.
  Department of Mathematics and Statistics, University of Victoria, Canada.
- B.Sc. in Mathematics, June 2004.
  Department of Mathematics, Nanjing University, China.

Professional Appointments

- Associate Professor, Department of Mathematics, Northeastern University, Boston MA, September 2014 – present.
- C.L.E. Moore Instructor, Department of Mathematics, Massachusetts Institute of Technology, Boston MA, September 2011 - August 2014.
- Postdoctoral Position, Department of Mathematics, University of California Irvine, Irvine CA, February 2011 – August 2011.

Publications

- **Reviewed articles**

1. Y. Assylbekov and T. Zhou, *Inverse problems for nonlinear Maxwell's equations with second harmonic generation*, submitted, arXiv:2009.03467.
2. R.-Y. Lai and T. Zhou, *Partial data inverse problems for nonlinear magnetica Schrödinger equation*, submitted, arXiv:2007.02475.
3. P. Caro, R.-Y. Lai, Y.-H. Lin and T. Zhou, *Boundary determination of electromagnetic and Lamé parameters with corrupted data*, accepted by Inverse Problems & Immaging.
4. Y. Assylbekov and T. Zhou, *Direct and Inverse problems for the nonlinear time-harmonic Maxwell equations in Kerr-type media*, Journal of Spectral Theory (to appear).
5. Y. Wang and T. Zhou, *Inverse problems for quadratic derivative nonlinear wave equations*, Communications in Partial Differential Equations, **44** (11) (2019), pp 1140–1158.
6. R.-Y. Lai and T. Zhou, *Nonparaxial Near-nondiffracting Accelerating Optical Beams*, Communications in Mathematical Physics, **353** (2) (2017), pp 771–790 DOI: 10.1007/s00220-017-2838-5.

7. I. Kocyigit, R.-Y. Lai, L. Qiu, Y. Yang and T. Zhou, *Applications of CGO Solutions on Inverse Problems of Coupled-Physics Imaging Methods*, Inverse Problems and Imaging, **11** (2017), pp 277–304. DOI: 10.3934/ipi.2017014.
8. M. Lassas and T. Zhou, *The Blow-Up Of Electromagnetic Fields In 3-Dimensional Invisibility Cloaking*, SIAM Journal on Applied Mathematics, **76** (2) (2016), pp 457–478.
9. G. Bal and T. Zhou, *Hybrid Inverse Problems for a System of Maxwell's Equations*, Inverse Problems, **30** (5) (2014), 055013.
10. P. Caro and T. Zhou, *On Global Uniqueness for an IBVP for the Time-harmonic Maxwell's Equations*, *Analysis & PDE*, **7** (2) (2014), pp 375–405.
11. M. Lassas and T. Zhou, *Two Dimensional invisibility Cloaking for Helmholtz Equation and Non-local Boundary Conditions*, Mathematical Research Letters, **18** (3) (2011), pp 473–488.
12. G. Bal, K. Ren, G. Uhlmann and T. Zhou, *Quantitative Thermo-acoustics and Related Problems*, Inverse Problems, **27** (5) (2011), 055007.
13. H. Y. Liu and T. Zhou, *On Approximate Electromagnetic Cloaking by Transformation Media*, SIAM Journal on Applied Mathematics, **71** (1) (2011), pp 218–241.
14. H. Y. Liu and T. Zhou, *Two Dimensional Invisibility Cloaking via Transformation Optics*, Discrete and Continuous Dynamical Systems Series A, **31** (2) (2011), pp 525–543.
15. T. Zhou, *Reconstructing Electromagnetic Obstacles by the Enclosure method*, Inverse Problems and Imaging, **4**(3) (2010), pp 547–569.

- **Book Chapters**

1. G. Uhlmann and T. Zhou, *Inverse Boundary Problems for Electromagnetic Waves*, A Chapter in Encyclopedia of Applied and Computational Mathematics, (2015) Springer Verlag, editor: Björn Engquist,
   `https://link.springer.com/referenceworkentry/10.1007%2F978-3-540-70529-1_24`
2. J.-N. Wang and T. Zhou, *Enclosure methods for Helmholtz-type equations*, inside out. II, 249–270, Mathematical Sciences Research Institute Publications, **60**, Cambridge University Press, Cambridge, 2013.

- **Proceedings**

1. M. Lassas and T. Zhou, *Singular Partial Differential Operators and Pseudo-differential Boundary Conditions in Invisibility Cloaking*, Fourier analysis, 263–284, Trends in Mathematics, Birkhäuser/Springer, Cham, 2014.
2. H. Y. Liu and T. Zhou, *Transformation Optics and Approximate Cloaking*, 65–83, Contemporary Mathematics, **559**, American Mathematical Society, Providence, RI, 2011.

- **Abstracts**

1. M. Lassas, T. Liimatainen, P. Ola and T. Zhou, *Cloaking a Nonlinear Component*, (preprint). **Abstract:** We consider a non-linear component coated with an approximate cloaking device. The quality of the the cloak is described by the convergence rate with respect to the regularization parameter $\rho > 0$. The aim is to tune the parameters of the non-linearity in such a way that the device scatters strongly an incident time-harmonic plane wave $u^0(x)$ with frequency ω when the amplitude $u^0(0)$ is close to a given value, and scatters weakly otherwise.
2. R.-Y. Lai and T. Zhou, *Inverse Problems for the Non-linear Fractional Magnetic Schrödinger Equation* (preprint).
3. R.-Y. Lai, K. Ren and T. Zhou, *Inverse transport and diffusion problems in photoacoustic imaging with nonlinear absorption* (preprint).

Presentations

- **Organizing Conferences/Workshops**
  - ◇ Organizer of *Minisymposium on Inverse Problems for Linear and Nonlinear PDEs*, Applied Inverse Problems (AIP) 2019 conference at Grenoble, France, July 2019.
  - ◇ Organizer of *AMS Special Session on New Developments in Inverse Problems and Imaging*, AMS 2018 Sectional Meeting at Northeastern University, Boston, April 2018.
  - ◇ Mentor of *Summer Theme Period on the Mathematics of Medical Imaging*, Thematic Program on Inverse Problems and Imaging, Fields Institute, Toronto, July 2012.
  - ◇ Organizer of *Minisymposium on Transformation Optics and Cloaking*, Conference on Inverse Problems in honor of Gunther Uhlmann, UC Irvine, June 2012.
  - ◇ Organizer of *AMS Special Session on Control Theory and Inverse Problems for PDEs*, Joint Mathematics Meetings 2012, Boston, January 2012.
  - ◇ Organizer of *Minisymposium on Invisibility and Cloaking*, Applied Inverse Problems Conference (AIP) 2011, Texas A&M, May 2011.
- **Conference Presentations**
  - ◇ Conference in Honor of Allan Greenleaf, originally planned to take place at the University of Rochester, August 2020 (postponed).
  - ◇ Workshop on Mathematical Trends in Medical Imaging, originally planned to take place at the University of Chicago, June 23-26, 2020 (postponed).
  - ◇ MSRI semester program on Microlocal Analysis seminar, Berkeley, November 2019.
  - ◇ Forward and Inverse Problems in Kinetic Theory, University of Wisconsin Madison, October 25-27, 2019.
  - ◇ Workshop on PDE Modeling and Analysis in Bioscience and Complex Media, Tsinghua Sanya International Mathematics Forum, Sanya, China, July 29 - August 2, 2019
  - ◇ Young Talents Workshop Of Mathematics Discipline, Zhejiang University, Hangzhou, China, June 9-11, 2019
  - ◇ 6th International Conference on Interdisciplinary Applied and Computational Mathematics, Zhejiang University, Hangzhou, China, June 8-9, 2019
  - ◇ HKUST IAS Workshop on Inverse Problems, Imaging and Partial Differential Equations, HKUST, Hong Kong China, May 20-24, 2019
  - ◇ CMS-AMS joint meeting, Special Session on Inverse Problems (SS 13), Shanghai, China, June 11-14, 2018
  - ◇ The Ninth International Conference "Inverse Problems: Modeling & Simulation", Malta, May 21-26, 2018
  - ◇ HKUST IAS Workshop on Inverse Problems, Imaging and Partial Differential Equations, HKUST, Hong Kong China, 12-16 March 2018
  - ◇ IMA semester program “Mathematics and Optics" seminar, Minneapolis, April 2017
  - ◇ 2016 Joint Mathematics Meeting, SIAM session: Inverse Problems and Applications, Seattle, January 2016.
  - ◇ ICERM semester program topic workshop “Computational and Analytical Aspects of Image Reconstruction", Program “Computational and Analytical Aspects of Image Reconstruction", Providence, July, 2015.

- ◇ HKUST IAS Workshop on Inverse Problems, Imaging and PDEs, HKUST, Hong Kong, October 2015.
- ◇ Conference of Spectral and Analytic Inverse Problems, IHP, Paris, France, May 2015.
- ◇ Summer Pre-School on Inverse Problems, CIRM, Marseille, France, April 2015.
- ◇ NSF-CBMS Conferences on Mathematical Foundations of Transformation Optics, Howard University, Washington DC, June 2014.
- ◇ Minisymposium on Inverse Problems, The Second Pacific Rim Mathematical Association (PRIMA) Congress 2013, Shanghai, June 2013
- ◇ SIAM Minisymposium on Hybrid Inverse Problems in Medical Imaging, 2013 Joint Mathematics Meetings, San Diego, Jan 2013
- ◇ Thematic Program on Inverse Problems and Imaging, Summer Theme Period on the Mathematics of Medical Imaging, Fields Institute, Toronto, July 2012
- ◇ Conference on Inverse Problems in honor of Gunther Uhlmann, plenary talk, UC Irvine, June 2012
- ◇ Minitutorial: Harry Potter's Cloak via Transformation Optics, SIAM Conference on Imaging Science, Philadelphia, May 2012.
- ◇ PASI-CIPPDE 2012, Inverse Problems and PDE Control workshop lecture and planetary talk, Santiago, Chile, January 2012
- ◇ The workshop on Geometric Analysis on Euclidean and Homogeneous Spaces, Tufts University, Medford, January 2012
- ◇ Inverse Problems in Analysis and Geometry Workshop, plenary talk, INV programme, Isaac Newton Institute for Mathematical Sciences, Cambridge, UK, August 2011
- ◇ ICIAM 2011 Symposium on Inverse Problems, Vancouver, July 2011
- ◇ Applied Inverse Problems Conference (AIP) 2011: Minisymposium on Shape reconstruction in impedance tomography and inverse scattering, Texas A&M, May 2011
- ◇ International Conference on Inverse Problems (ICIP), City University of Hong Kong (CUHK), Hong Kong, December 2010
- ◇ MSRI Inverse Problems: Theory and Applications, Berkeley, November 2010
- ◇ 5th Pacific Rim Conference on Mathematics (PRCM), Stanford University, June 2010
- ◇ AMS-SMM Joint Meeting, Special Session on Harmonic Analysis, Microlocal Analysis and Partial Differential equations, UC Berkeley, June 2010
- ◇ BIRS Workshop on Inverse Transport Theory and Tomography, plenary talk, Banff, May 2010
- ◇ International Conference on Inverse Problems, Wuhan University, Wuhan, April 2010
- ◇ Research Experiences for Undergraduates (REU) program, University of Washington, Seattle, August 2009
- ◇ MRC 2009 Conference on Inverse Problems, Snowbird (Utah), June, 2009
- ◇ Summer School in Control Theory and Inverse Problems, Sichuan University, Chengdu, July 2008

- **Other Seminar and Colloquium Talks**
  - ◇ Department of Mathematics, Colloquium, Tufts University, April 2019.
  - ◇ Applied and Computational Math Seminar, University of Wisconsin, Madison Wisconsin, September 2018.

- ◇ Seminar in School of Mathematical Science, Zhejiang University, Hangzhou China, August 2018.
- ◇ Seminar in the Department of Mathematics, Southern University of Science and Technology, Shenzhen China, July 2018.
- ◇ Department of Mathematics, Applied and Computational Mathematics Seminar, Dartmouth College, October 2017
- ◇ Department of Mathematics, Inverse Problems Seminar, University of Washington, April 2017
- ◇ Department of Mathematics, Analysis Seminar, University of Kentucky, April 2017
- ◇ Department of Mathematics, Analysis and PDE Seminar, Purdue University, March 2017
- ◇ Department of Mathematics, Research seminar (2 hours), Northeastern University, October 2015
- ◇ Department of Mathematics, Analysis seminar, Northeastern University, February 2015
- ◇ Department of Mathematics Colloquium, University of Utah, January 2014
- ◇ Department of Mathematics Colloquium, Drexel University, January 2014
- ◇ Department of Mathematics Colloquium, University of Delaware, January 2014
- ◇ Department of Mathematics Colloquium, University of Miami, January 2014
- ◇ Department of Mathematics Colloquium, University of Toronto, January 2014
- ◇ Department of Mathematics Colloquium, University of North Carolina Chapel Hill, January 2014
- ◇ Department of Mathematics Colloquium, Northeastern University, January 2014
- ◇ Department of Mathematics Colloquium, Florida State University, January 2014
- ◇ Department of Mathematics Colloquium, University of Kentucky, January 2014
- ◇ Department of Mathematics Colloquium, University of Massachusetts Amherst, December 2013
- ◇ Department of Mathematics Colloquium, Vanderbilt University, December 2013
- ◇ Department of Mathematics Colloquium, Rensselaer Polytechnic Institute, November 2013
- ◇ Inverse Problems and Analysis seminar, Department of Mathematical Science, University of Delaware, November 2013
- ◇ Geometry/Topology seminar, Department of Mathematics, Dartmouth, November 2013
- ◇ PDE/Analysis Seminar, Department of Mathematics, Massachusetts Institute of Technology, October 2013
- ◇ PDE Seminar, Division of Applied Mathematics, Brown University, September 2013
- ◇ Applied and Interdisciplinary Mathematics (AIM) Seminar, Department of Mathematics, Northeastern University, September 2013
- ◇ University of Minnesota School of Mathematics Colloquium, Department of Mathematics, University of Minnesota, November 2012
- ◇ MIT PDE/Analysis Seminar, Department of Mathematics, Massachusetts Institute of Technology, April 2012
- ◇ Geo-Mathematical Imaging Seminar, Department of Mathematics, Purdue University, February 2012
- ◇ Inverse Problems Seminar, Department of Mathematics, National Taiwan University, Taipei, April 2010

- ◇ Inverse Problem Seminar, Department of Mathematics, University of Washington, Seattle, April 2010
- ◇ Inverse Problem Seminar, Department of Mathematics, Helsinki University (joint with Helsinki University of Technology), Helsinki, October 2009

Awards and Honors

- **Fellowships**
  - ◇ **Simons Fellowship**, 2020-2021. (Announced in the "Science Times" section of the New York Times, appearing in the February 25 edition. Also announced on the Simons Foundation's website.)
  - ◇ **Sloan Research Fellowship**, 2015-2017, $50,000.
  - ◇ Tanzi-Egerton Fellowship Award, Department of Mathematics, University of Washington, 2010 – 2011.
  - ◇ Top Scholar Awards, Department of Mathematics, University of Washington, 2006.
  - ◇ Uvic Fellowships, Department of Mathematics and Statistics, University of Victoria, 2004 – 2006.
  - ◇ Outstanding Students Scholarship, Department of Mathematics, Nanjing University, 2000 – 2002.
- **Travel Awards**
  - ◇ AMS Simons Travel Grant, 2011-2013.
  - ◇ AWM-NSF Travel Grant, 2011.

Grants

- **External**
  - ◇ Sole PI: NSF-DMS-1501049, *Inverse Problems: Visibility and Invisibility*, National Science Foundation, Division of Mathematical Science, 2015 – 2019, $200,852.
  - ◇ Sole PI: NSF-DMS-1161129, *Electromagnetic Inverse Problems: Visibility and Invisibility*, National Science Foundation, Division of Mathematical Science, 2012 – 2018, $155,416.
  - ◇ Sole PI: Simons Fellow proposal *Inverse Problems: Visibility and Invisibility*, Simons Foundation, 2020-2021, $108,851.
- **Internal**
  - ◇ Co-PI: Prof. Ting Zhou, Dept. Mathematics, College of Science, **2019 Northeastern University Tier 1 Seed Grant Program**, *Physics-encoded Sparsity-promoted Deep Learning for Data-driven Discovery of Nonlinear Governing Laws*, Northeastern University, $50,000. Co-PI: Prof. Hao Sun, Dept. Civil and Environmental Engineering, College of Engineering. (Funded.)

Teaching

- ◇ MATH 3150, Real Analysis, Northeastern University, Spring 2020, 30 students.
- ◇ MATH 1342, Calculus 2 for Science and Engineering, Northeastern University, Spring 2020, 62 students (2 sessions).
- ◇ MATH 7350, Pseudo Differential Equations, co-organizing the Microlocal Analysis Student Seminar, Spring 2019, 5 students.
- ◇ (NEW developed graduate course) MATH 7206, Inverse Problems: Radon and X-ray Transforms, Northeastern University, Spring 2019, 8 students.
- ◇ MATH 3150, Real Analysis, Northeastern University, Fall 2018, 34 students.
- ◇ MATH 1342, Calculus 2 for Science and Engineering, Northeastern University, Fall 2018, 36 students.
- ◇ (NEW developed graduate course) MATH 7206, Inverse Problems: Radon and X-ray Transform, Northeastern University, Spring 2018, 6 students.
- ◇ MATH 1341, Calculus 1 for Engineering and Science (Honors), Northeastern University, Fall 2017, 15 students.
- ◇ MATH 3150, Real Analysis (S02), Northeastern University, Fall 2016, 17 students.
- ◇ MATH 1342, Calculus 2 for Engineering and Science, Northeastern University, Fall 2016, 28 students.
- ◇ MATH 1231, Calculus for Business and Economics, Northeastern University, Spring 2016, 10 students.
- ◇ MATH 1341, Calculus 1 for Science and Engineering (two sections), Northeastern University, Fall 2014, 26 students.
- ◇ MATH 7751, Readings Analysis, Fall 2014 & Fall 2016, 2 students.
- ◇ 18.821 Instructor, Project Laboratory in Mathematics, Massachusetts Institute of Technology, Spring 2014.
- ◇ 18.100C Lecturer, Real Analysis, Massachusetts Institute of Technology, Fall 2013.
- ◇ 18.03 Course Administrator & Recitation leader, Differential Equations, Massachusetts Institute of Technology, Spring 2013.
- ◇ 18.100C Communication intensive recitation leader, Massachusetts Institute of Technology, Fall 2012.
- ◇ 18.03 Recitation leader, Differential Equations, Massachusetts Institute of Technology, Spring 2012.
- ◇ 18.02 Recitation leader, Multivariable Calculus, Massachusetts Institute of Technology, Fall 2011.
- ◇ MATH124 recitation leader, Single Variable Calculus, University of Washington, Winter quarter 2007, Winter quarter 2008.
- ◇ MATH126 recitation leader, Multivariable Calculus, Fall quater 2008.

- ◇ MATH125 recitation leader, Single Variable Calculus, University of Washington, Spring quarter 2007.
- ◇ Math Study Center Tutor, University of Washington, Summer quarter 2007, Fall quarter 2007, Spring quarter 2008, Winter quarter 2009.

PhD Students

- ◇ Monika Pichler, completion in 2019; thesis: *Inverse Boundary Value Problems for Maxwell's Equations*.
- ◇ Changchang Liu, current PhD student.
- ◇ Xuezhu Lu, current PhD student.
- ◇ Xin Shen, current PhD student.

Undergraduate Student Mentored

- ◇ Zachary Crowell (current supervisee).
- ◇ Annie Dai, completion in 2015; thesis: *Quantitative Thermo-Acoustic Tomography*.

Outreach Teaching

- ◇ The 2018 Tianyuan Mathematical Center in Northeast China, Summer School on Inverse Problems, Mini-course on the Calderón problem and Electromagnetic Inverse Problems, July 2018, Jilin University, Changchun China.
- ◇ The 2017 Tsinghua Yau's summer Mathcamp for outstanding high school students, August 2017, Tsinghua University, Beijing China.

Services to the Institution

- **Department Service**
  - ◇ 2019 Merit and Load Committee, workload mainly in spring 2020.
  - ◇ 2020 Zelevinsky Research Instructor Hiring Committee (Chair).
  - ◇ 2019 Zelevinsky Research Instructor Hiring Committee (Chair), 2018-2019;
  - ◇ Graduate Committee member & First-Year Graduate Student Advisor, 2018-2020;
  - ◇ 2018 Tenure-track/Tenure Position Hiring Committee member, 2017-2018;
  - ◇ Graduate Committee member (Graduate Student Admission subcommittee member), 2016-2017;
  - ◇ 2016 Tenure-track/Tenure Position Hiring Committee member, 2015-2016;
  - ◇ 2015 Research Instructor Hiring Committee, 2014-2015.
  - ◇ Brandeis-Harvard-MIT-Northeastern Joint Mathematics Colloquium Committee (`http://www.northeastern.edu/tzhou/bhmn/colloquium.html`), since 2017.
- **College Service**
  - ◇ Department of Mathematics Chair Search Committee member, 2017.

Service to the Discipline

- **Journals Refereed**
  - ◇ Analysis & PDE (2019)
  - ◇ Inverse Problems and Imaging (5 times in 2013 – 2018)
  - ◇ Journal of Differential Equations (twice 2011 – 2018)
  - ◇ SIAM Journal on Applied Mathematics (2017)
  - ◇ Progress in Applied Mathematics (2015)
  - ◇ Inverse Problems (3 times in 2012 – 2015)
  - ◇ SIAM Journal on Mathematical Analysis (3 times 2011 – 2020)
  - ◇ Proceeding of the American Mathematical Society (2014)
  - ◇ Journal of Ill-posed and Inverse Problems (2013)
  - ◇ Proceedings of Helgason session and Geometric Analysis Conference at Tufts University (2012)
  - ◇ Journal of Mathematical Analysis and Applications (2010)