

Zihui ZHAO

PERSONAL DATA

ADDRESS: University of Chicago, Chicago IL 60637, USA
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EMPLOYMENT

2019 - | NSF Postdoc and L.E. Dickson Instructor, **University of Chicago**
2018 - 2019 | Member, **Institute for Advanced Study**

EDUCATION

2013 - 2018 Ph.D. in Mathematics, **University of Washington**
Thesis: Analytic and geometric aspects of the elliptic measure on non-smooth domains
Advisor: Prof. Tatiana TORO
Spring 2017 Program associate at the Harmonic Analysis program, **MSRI Berkeley**
2011 - 2013 M.S. in Mathematics, **École Normale Supérieure/Université Paris-Sud XI**
Thesis: Minimal mass blow-up for the critical generalized Korteweg-de Vries Equation
Advisor: Prof. Yvan MARTEL
2007 - 2011 B.S. in Mathematics, **Peking University**

PUBLICATIONS & PREPRINTS

1. (with Steve Hofmann, José María Martell, Svitlana Mayboroda, Tatiana Toro) Uniform rectifiability and elliptic operators satisfying a Carleson measure condition. Part II: the large constant case. submitted arXiv:1908.03161
2. (with Simon Bortz, Max Engelstein, Max Goering, Tatiana Toro) Two phase free boundary problem for Poisson kernels, submitted. arXiv:1908.03033
3. (with Camillo De Lellis) Dirichlet energy-minimizers with analytic boundary, submitted. arXiv:1906.10097
4. (with Joseph Feneuil, Svitlana Mayboroda) Dirichlet problem in domains with lower dimensional boundaries, to appear in *Rev. Mat. Iberoam.*
5. (with Svitlana Mayboroda) Square function estimates, BMO Dirichlet problem, and absolute continuity of harmonic measure on lower-dimensional sets. *Anal. PDE* **12** (2019), no. 7, 1843-1890
6. (with Steve Hofmann, José María Martell, Svitlana Mayboroda, Tatiana Toro) Uniform rectifiability and elliptic operators satisfying a Carleson measure condition. Part I: the small constant case. submitted arXiv:1710.06157
7. (with Tatiana Toro) Boundary rectifiability and elliptic operators with $W^{1,1}$ coefficients, to appear in *Adv. Calc. Var.* doi:10.1515/acv-2017-0044
8. BMO solvability and the A_∞ condition of the elliptic measure in uniform domains. *J. Geom. Anal.* **28** (2018), no. 2, 866-908.

INVITED TALKS

- (upcoming) Minisymposium in *Harmonic Analysis and PDE*, 8th European Congress of Mathematics, Slovenia, Jun. 2021 (postponed due to COVID)
- (upcoming) Special session on *Analysis of Nonlinear PDEs and Applications*, AIMS Conference on Dynamical Systems, Differential Equations and Applications, Atlanta, Jun. 2021 (postponed due to COVID)
- (upcoming) Special session on *Elliptic PDEs and Geometric Variational Problems*, AIMS Conference as above
- (upcoming) Virtual Maxwell Analysis Seminar, University of Edinburgh and Heriot-Watt University, Oct. 2020
- Mid-Atlantic Analysis Meeting seminar, Sep. 2020
- Analysis & PDE summer seminar, University of Minnesota, Aug. 2020
- Calculus of Variations workshop, Oberwolfach, Aug. 2020
- Analysis and PDE online seminar, Jul. 2020
- PDE CDT Lunchtime seminar, Center for Doctoral Training in PDEs, University of Oxford, May. 2020
- PDE seminar, Purdue University, Jan. 2020
- Calderón-Zygmund analysis seminar, Nov. 2019
- 2019 Prairie analysis seminar, Nov. 2019
- Harmonic analysis and PDEs, University of Helsinki, Jun. 2019
- AMS special session on *Topics at the Interface of Analysis and Geometry*, Honolulu HI, Mar. 2019
- AMS special session on *Interactions between GMT, PDE and Harmonic Analysis*, Honolulu HI, Mar. 2019
- IAS analysis seminar, Feb. 2019
- IAS mathematical conversations, Feb. 2019
- Princeton/IAS GMT seminar, Dec. 2018
- Analysis seminar, University of Pennsylvania, Nov. 2018
- AMS special session on *Harmonic Analysis and Partial Differential Equations*, Nov. 2018
- Harmonic analysis and PDE's seminar, CUNY Graduate Center, Sep. 2018
- Research program seminar, PCMI Harmonic Analysis program, Jul. 2018
- Rainwater seminar, University of Washington, May. 2018
- AMS special session on *Regularity of PDEs on Rough Domains*, Boston MA, Apr. 2018
- AMS special session on *Geometric Measure Theory and Partial Differential Equations*, Portland OR, Apr. 2018
- Seminario de análisis y aplicaciones, ICMAT Madrid, Sep. 2017
- Graduate student seminar, University of Connecticut, Jun. 2017
- Analysis seminar, Nankai University, Jun. 2017
- Student harmonic analysis and PDE seminar, University of California, Berkeley, Mar. 2017

- Graduate student seminar at MSRI, Berkeley, Mar. 2017
- AMS special session on *Geometric Aspects of Harmonic Analysis*, Brunswick ME, Sep. 2016

PROFESSIONAL ACTIVITIES & SERVICE

- Taught a mini-course at the University of Chicago summer REU, Jul. 2020
- Co-organizer of JMM session on *Interfaces between PDEs and geometric measure theory*, Denver CO, Jan. 2020
- Held the review sessions alongside the Terng lectures at the Women and Mathematics program *Topics in geometric analysis*, May. 2019
- Co-organizer of AMS special session on *Regularity Theory of PDEs and Calculus of Variations on Domains with Rough Boundaries*, Hartford CT, Apr. 2019
- TA for PCMI Graduate Summer School, Jul. 2018
- Referred papers for multiple journals, including Int. Math. Res. Notices, Potential Anal. etc.
- Co-organizer of preparatory sessions for the real analysis prelim exam, University of Washington, summer of 2018
- Co-organizer of Graduate Student Analysis Seminar, University of Washington, Sep. 2015 - Dec. 2016
- Student analysis seminar, École Normale Supérieure, 2012

HONORS & AWARDS

- NSF Postdoctoral Fellowship, 2019-2022
- College of Arts and Sciences Graduate Medalist in Natural Sciences, University of Washington, Jun. 2018
- Tanzi-Egerton Fellowship, University of Washington, Sep. 2017
- Academic Excellence Award, University of Washington, Sep. 2015
- Microsoft Scholar Award, University of Washington, 2013-2016
- Sophie Germain International Master scholarship, Jacques Mathematics Foundation (FMJH), 2011-2013
- Academic Innovation Award, Peking University, 2010

CONFERENCES & WORKSHOPS

- Geometric measure theory and applications: from geometric analysis to free boundary problems, Cetraro (Italy), Sep. 2-6, 2019
- Nonlinear PDEs discussion group at Courant Institute, Apr. 19, 2019
- Workshop on Variational methods in geometry, IAS, Nov. 5-9, Mar. 4-8, 2019
- Allen-Cahn/Ginzburg-Landau reading group, IAS, Sep.-Dec. 2019
- PCMI summer session on harmonic analysis, Jul. 1-21, 2018
- *Harmonic analysis and geometric measure theory*, in honor of Guy David, CIRM Marseille, Oct. 2-6, 2017

- Recent developments in harmonic analysis, MSRI, May. 15-19, 2017
- *Harmonic analysis and elliptic equations on real Euclidean spaces and on rough sets*, MSRI summer graduate school, Jun. 13-24, 2016
- Introductory workshop: *Randomness and long-time dynamics in nonlinear evolution differential equations*, MSRI, Aug. 24-28, 2015
- *Reflectionless measures, Wolff's potentials and rectifiability*, NSF-CBMS Regional Conference in the Mathematical Sciences, North Dakota State University, Jul. 27-31, 2015
- Workshop for women in analysis and PDE, Institute for Mathematics and its Applications, May. 28-31, 2015
- The eighteenth Rivière-Fabes symposium on Analysis and PDE & Spring 2015 Midwest PDE conference, University of Minnesota, Apr. 17-19, 2015
- *Uniqueness in analysis and geometry*, Massachusetts Institute of Technology, Dec. 10-11, 2014
- *Harmonic analysis and PDEs recent developments and future directions*, in honor of Carlos Kenig, University of Chicago, Sep. 19-21, 2014
- *Dispersive partial differential equations*, MSRI summer graduate school, Jun. 16-27, 2014
- International conference on nonlinear PDEs and satellite workshop *Free surface & interface problems*, University of Oxford, Sep. 10-15, 2012
- Inverse problems and partial differential equations summer school, University of Washington, Jul. 2-20, 2012
- Hadamard lectures on *Error estimates in stochastic homogenization* by Prof. Felix Otto, University of Paris-Sud XI, Mar.-Apr. 2012
- Summer school on applied mathematics, Peking University, Jul. 19-Aug. 20, 2010

SELECTED TEACHING EXPERIENCES

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| • Instructor of Math 307 | <i>Introduction to Differential Equations</i> | Summer 2018 |
| • Instructor of Math 307 | <i>Introduction to Differential Equations</i> | Fall 2016 |
| • Grader of Math 424 | <i>Fundamental Concepts of Analysis</i> | Fall 2015 |
| • TA of Math 126 | <i>Calculus with Analytic Geometry III</i> | Spring 2015 |
| • TA of Math 112 | <i>Application of Calculus to Business and Economics</i> | Winter 2014 |
| • TA of Math 125 | <i>Calculus with Analytic Geometry II</i> | Spring 2014 |