

# Xiaodan Zhou

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CONTACT INFORMATION	Analysis on Metric Spaces Unit Okinawa Institute of Science and Technology Graduate University 1919-1, Onna, Onna-son, Okinawa 904-0495, Japan	<a href="mailto:xiaodan.zhou@oist.jp">xiaodan.zhou@oist.jp</a> <a href="https://groups.oist.jp/aoms/xiaodan-zhou">https://groups.oist.jp/aoms/xiaodan-zhou</a>
RESEARCH INTERESTS	Nonlinear partial differential equations, nonsmooth analysis, analysis on metric spaces, PDEs on sub-Riemannian manifolds, differential games	
EMPLOYMENT	Assistant Professor, OIST, 2020-Present  Post-Doctoral Scholar, Worcester Polytechnic Institute, 2016-2020  Teaching and Research Assistant, University of Pittsburgh, 2011-2016	
EDUCATION	<b>Department of Mathematics, University of Pittsburgh</b> Ph.D. in Mathematics, 2016 Advisors: Piotr Hajłasz and Juan Manfredi Thesis: Analysis and PDE on metric measure spaces: Sobolev functions and viscosity solutions.  <b>School of Mathematical Sciences, Beijing Normal University</b> B.S. in Mathematics, 2011	
HONORS	Thomas C. Hales Distinguished Research Award 2016, University of Pittsburgh	
AWARDS & GRANTS	JSPS Grant-in-Aid for Early-Career Scientists, April 2022-March 2025  Rita R. Colwell Impact Fund, OIST, 2021  JSPS Grant-in-Aid for Research Activity start-up, September 2020-March 2023  AMS-Simons Travel Grant, 2017-2019  WPI Women's Impact Network Grant for organizing 2018 Advancing Women's Impact in Mathematics Symposium, 2017	
PUBLICATIONS IN JOURNALS	<ol style="list-style-type: none"><li>[1] <i>A game-theoretic proof of convexity preserving properties for motion by curvature</i>, (with Q. Liu and A. Schikorra), <i>Indiana Univ. Math. J.</i> 65 (2016), 171–197.</li><li>[2] <i>Sobolev homeomorphism on a sphere containing an arbitrary Cantor set in the image</i>, (with P. Hajłasz), <i>Geom. Dedicata.</i> 184 (2016), 159–173.</li><li>[3] <i>Lipschitz continuity and convexity preserving for solutions of semilinear evolution equations in the Heisenberg group</i>, (with Q. Liu and J. J. Manfredi), <i>Calc. Var. Partial Differential Equations</i> 55 (2016), no.4, Art. 80, 25pp.</li><li>[4] <i>Sobolev functions in the critical case are uniformly continuous in <math>s</math>-Ahlfors regular metric spaces when <math>s \leq 1</math></i>, <i>Proc. Amer. Math. Soc.</i> 145 (2017), no. 1, 267-272.</li></ol>	

- [5] *Weakly Coupled Systems of Fully Nonlinear Parabolic Equations in the Heisenberg Group*, (with Q. Liu), *Nonlinear Anal.* 174 (2018), 54-78.
- [6] *Strong comparison principle for  $p$ -harmonic functions in Carnot-Carathéodory spaces*, (with L. Capogna), *Proc. Amer. Math. Soc.* 146 (2018), no. 10, 4265-4274.
- [7] *Absolutely continuous functions on compact and connected one-dimensional metric spaces*, *Ann. Acad. Sci. Fenn. Math.*, Volumen 44, 2019, 281-291.
- [8] *Equivalence of solutions of eikonal equation in metric spaces*, (with Q. Liu and N. Shanmugalingam), *J. Differential Equations* 272 (2021), 979-1014.
- [9] *Functions of bounded variation on complete and connected one-dimensional metric spaces*, (with P. Lahti), *Int. Math. Res. Not. IMRN* 2021, no. 20, 15412-15443.
- [10] *Horizontal convex envelope in the Heisenberg group and applications to sub-elliptic equations*, (with Q. Liu) *Ann. Sc. Norm. Super. Pisa Cl. Sci. (5)* 22 (2021), no. 4, 2039-2076.
- [11] *Differential games and Hamilton-Jacobi-Isaacs equations in metric spaces*, (with Q. Liu), to appear in *Minimax Theory and its Applications*.

PREPRINT

- [1] *Quasiconformal and Sobolev mappings in non-Ahlfors regular metric spaces*, (with P. Lahti), submitted.
- [2] *Quasiconformal and Sobolev mappings in non-Ahlfors regular metric spaces when  $p > 1$* , (with P. Lahti), submitted.
- [3] *Absolutely continuous mappings on doubling metric measure spaces*, (with P. Lahti), submitted.
- [4] *A characterization of BV and Sobolev functions via nonlocal functionals in metric spaces*, (with Panu Lahti and Andrea Pinamonti), submitted.
- [6] *Horizontally quasiconvex envelope in the Heisenberg group*, (ith A. Kijowski and Q. Liu), submitted.

TEACHING  
EXPERIENCE

At OIST: Fall 2021, 2022 Introduction to Real Analysis

At Worcester Polytechnic Institute and University of Pittsburgh: Calculus II, III, IV, Principles of Real Analysis, Basic Real Analysis, Vector and Tensor Calculus

PRESENTATIONS

**Conferences and Meetings**

RIMS Women in Mathematics, Kyoto, September 7-9, 2022

The 47th Sapporo Symposium on Partial Differential Equations, Sapporo, August 8-10, 2022

Himeji conference of Partial Differential Equation, Himeji (zoom), March 2-4, 2022

Riemann surfaces and Related topics, Osaka City University (zoom), Feb 13-15, 2022

The Mathematical Society of Japan Autumn Meeting (Geometry Section), Sep 14-17, 2021

Partial Differential Equations under Various Metrics Mini-symposium, OIST, December 8-11, 2020

The 4th Annual NEAM (Northeastern Analysis Meeting), Syracuse University, October 4-6, 2019

AMS Fall Central Sectional Meeting, University of Wisconsin Madison, September 14-15, 2019

Nonlinear Averaging and PDEs (On the occasion of the 60th birthday of J. Manfredi), Levico Terme June 19 - 22, 2019

AMS Spring Eastern Sectional Meeting, University of Connecticut Hartford, April 13-14, 2019

2018 Northeast Analysis Network Conference, University at Albany SUNY, September 14-15, 2018

AMS Spring Eastern Sectional Meeting, Northeastern University, April 21-22, 2018

Analysis on Metric Spaces Conference, University of Pittsburgh, March 10-11, 2017

2016 Joint Mathematics Meetings, Washington State Convention Center, January 6-9, 2016

AMS Central Spring Sectional Meeting, Michigan State University, March 14-15, 2015

The Fifth Ohio River Analysis Meeting, University of Cincinnati, February 28-March 1, 2015

### **Colloquiums and Seminars**

PDE seminar, HKUST (zoom), March 25, 2022

Geometric and functional inequalities and applications seminar, zoom, Feb 21, 2022

Differential Geometry and Geometric Analysis Seminar, Princeton University (zoom), November 10, 2021

Applied Analysis Seminar, The University of Tokyo (zoom), October 28, 2021

aculty Lunch Seminar, April 20, 2021

Academy of Mathematics and Systems Science, Chinese Academy of Sciences, September 23, 2020

Analysis Seminar, Brown University, October 28, 2019

Analysis Seminar, Fukuoka University, July 29, 2019

Analysis and PDE Seminar, University of Cincinnati, November 30, 2017

Analysis and Probability Seminar, University of Connecticut, March 3, 2017

Analysis and PDE Seminar, Worcester Polytechnic Institute, October 11, 2016

Mathematical Sciences Colloquium, Worcester Polytechnic Institute, October 7, 2016

Geometric Analysis Seminar, University of Pittsburgh, October 3, September 19, 2014

Geometric Analysis Seminar, University of Pittsburgh, November 28, 2012

SERVICE

Co-organizer (with Shihoko Ishii, Sylvie Paycha, Susanne Reffert Kasia Rejzner and Reiko Toriumi), Women at the Intersection of Mathematics and Theoretical Physics Meet in Okinawa, March 20-24, 2023

Co-organizer (with Qing Liu and Hiroyoshi Mitake), Geometric PDEs and Applications, OIST, January 16-18, 2023

Co-organizer (with Luca Capogna, Qing Liu, Shin-ichi Ohta and Nageswari Shanmugalingam), Analysis on metric spaces Workshop, May 23-27, 2022

Co-organizer (with Benoit Collins, Makiko Sasada, Asuka Takatsu and Tetsuji Taniguchi), Catch-All Mathematical Colloquium of Japan, Monthly Zoom Colloquium, 2021-2022

Co-organizer (with Yoshikazu Giga and Qing Liu), Partial Differential Equations under Various Metrics, Zoom conference, December 8-11, 2020

Assistant (with Sylvester Eriksson-Bique), AMS MRC Analysis on Metric Spaces, 2020-2021

Co-organizer (with Vyron Vellis and Scott Zimmerman), AMS Spring Eastern Sectional Meeting Special Session on Analysis, Geometry, and PDEs in Non-smooth Metric Spaces, University of Connecticut Hartford, April 13-14, 2019

Co-organizer (with Lucia Carichino and F. Patricia Medina), Advancing Women's Impact in Mathematics Symposium, New England (AWIMS), WPI, April 7, 2018 (68 participants)

Co-organizer (with Luca Capogna), Analysis and PDE seminar in Worcester Polytechnic Institute

Co-advisor (with Luca Capogna), Undergraduate senior capstone project (Major Qualification Project) in WPI ("Revisiting On Growth and Form via Quasiconformal Gradient Flows" of Weizhe Shen)