Zongyuan Li

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Research Interests

Regularity theories of elliptic and parabolic PDEs.

Employment

Assistant Professor (Tenure-Track), City University of Hong Kong 2024 –

Hill Assistant Professor (Non Tenure Track), Rutgers University 2020 – 2023

Mentor: Prof. Yanyan Li and Prof. Zheng-Chao Han.

Education

Ph.D. in Applied Mathematics, Brown University, USA 2015 – 2020

Thesis: Elliptic boundary value problems on irregular domains.
Advisor: Prof. Hongjie Dong.

B.A. in Mathematics, Fudan University, China 2010 – 2015

Thesis: Birkhoff normal forms in some PDEs. Advisor: Prof. Xiaoping Yuan.

Part C in Math, St. Hugh's College, University of Oxford, UK 2013 – 2014

Disseratation: Study of Keldysh Equation and Related PDEs
Thesis supervisor: Prof. Gui-Qiang G. Chen and Dr. Wei Xiang. College Tutor: Dr. Tom Sanders.

Visits

Institute for Advanced Study (summer collaboration program), Princeton, NJ, USA Jun 2024

American Institute of Mathematics (SQuaREs), Pasadena, CA, USA Apr 2024, May 2025

SUNY Binghamton (Visiting assistant professor), Vestal, NY, USA Aug – Dec 2023

Grants, Honors & Awards

Grants

CityU Start-up Grant for New Faculty (internal, HKD 300,000). 2024 – 2026.

AMS–Simons Travel Grants (USD 5000). 2021 – 2023.

Honors & awards

Sigma Xi Award, Brown Applied Math. 2020

Scholarship (from Fudan University) for enrollment of Part C in Math, University of Oxford. 2013-14

Two Bronze Medals in Probability and Statistics, S.-T. Yau College Student Math Contests. 2013, 14

One Bronze Medal in team competition, S.-T. Yau College Student Math Contests. 2013

First Prize in China National College Student Math Contest (final round at Tongji University). 2012

First Prize in China National High School Math League, Shandong Province. 2009

Publications

Published/Accepted Papers

1 On the W^2_p estimate for oblique derivative problem in Lipschitz domains. (With H. Dong) **Int. Math. Res. Not. IMRN**, (5):3602-3635, 2022.
2 Optimal regularity for a Dirichlet-conormal problem in Reifenberg flat domain. (With J. Choi and H. Dong) **Appl. Math. Optim.**, 83(3):1547-1583, 2021.
3 Classical solutions of oblique derivative problem in nonsmooth domains with mean Dini coefficients. (With H. Dong) **Trans. Amer. Math. Soc.**, 373(7) : 4975-4997, 2020.
4 Norm inflation for the Boussinesq system. (With W. Wang) **Discrete Contin. Dyn. Syst. Ser. B**, 26(10):5449-5463, 2021.
5 The Dirichlet-conormal problem with homogeneous and inhomogeneous boundary conditions. (With H. Dong) **Comm. Partial Differential Equations**, 46(3):470–497, 2021.
6 The conormal and Robin boundary value problems in nonsmooth domains satisfying a measure condition. (With H. Dong) **J. Funct. Anal.**, 281(9):Paper No. 109167, 32, 2021.
7 Optimal regularity of mixed Dirichlet-conormal boundary value problems for parabolic operators. (With J. Choi and H. Dong) **SIAM J. Math. Anal.**, 54(2):1393-1427, 2022.
8 Quantitative unique continuation for Robin boundary value problems on $C^{1,1}$ domains. (With W. Wang) **Indiana Univ. Math. J.**, 72(4):1429–1460, 2023.
9 Mixed boundary value problems for parabolic equations in Sobolev spaces with mixed-norms. (With J. Choi and H. Dong) **Calc. Var. Partial Differential Equations.**, 62(1): Paper No. 5, 2023.
10 The Dirichlet-conormal problem for the heat equation with inhomogeneous boundary conditions. (With H. Dong) **Adv. Math.**, 411: Paper No. 108777, 2022.
11 On the uniqueness of variable coefficient Schrödinger equations. (With S. Federico and X. Yu) To appear in **Commun. Contemp. Math.** arXiv:2211.03740.
12 Asymptotic expansions for harmonic functions at conical boundary points. (With D. Kriventsov) To appear in **Rev. Mat. Iberoam.** arXiv:2307.10517.
13 Unique continuation on Robin problems with measurable potentials. To appear in **J. Funct. Anal.**, arXiv:2304.04342.

Conference Proceedings/Book Chapters

1 Asymptotics of harmonic functions in the absence of monotonicity formulas. In *Extended Abstracts 2021/2022*, Trends in Mathematics, vol 3, pages 125 – 131. Birkhäuser, 2024.

Preprints

1 Liouville theorems for conformally invariant fully nonlinear equations. I (With B. Z. Chu and Y. Y. Li) **Submitted.** arXiv:2311.07542.
2 On the fully nonlinear Yamabe problem with constant boundary mean curvature. I (With B. Z. Chu and Y. Y. Li) **Submitted.** arXiv:2410.09683.
3 Liouville Theorem with Boundary Conditions from Chern-Gauss-Bonnet Formula. (With B.Z. Chu and Y.Y. Li) **Submitted.** arXiv:2410.16384.

Mentorship

Ruixiu Lyu, 2024-25 (Ms.C. at CityU).

Teaching

Instructor for MA 3526 (Analysis), CityU Math 2024 Spring, 2025 Spring

Instructor for MA 3512 (undergrad PDE), CityU Math	2024 Fall
Instructor for Math 224/225 (Calculus 1), Binghamton Math	2023 Fall
Instructor for Math 421 (undergrad engineer calculus), Rutgers Math	2022 Spring
Instructor for MATH 252 (undergrad ODE), Rutgers Math	2021 Spring, 2022 Fall, 2023 Spring
Instructor for Math 423 (undergrad PDE), Rutgers Math	2020 Fall, 2021 Fall, 2022 Fall
TA for AM 2640 (graduate probability II), Brown Applied Math	2020 Spring
TA for AM 2550 (graduate numerical PDE I), Brown Applied Math	2019 Fall
TA for AM 2110 (graduate real analysis I), Brown Applied Math	2018 Fall
TA for AM 33, 34 (undergrad ODE I, II), Brown Applied Math	2016 Fall, 2017 Spring

Talks

PDE seminar, Beijing Normal University. Jan. 2025

Joint meeting of the NZMS, AustMS and AMS, New Zealand. Dec. 2024.

Modern Methods in Nonlinear Elliptic and Parabolic PDE, Bulgaria. May. 2024.

International Conference on Elliptic and Parabolic Problems: GAETA 2024, Italy. May. 2024.

Poly U PDE seminar, Hong Kong Polytechnic University. Mar and Apr. 2024.

AMS sectional meeting, Creighton University, Omaha, NE. Oct. 2023.

PDE seminar, Brown University (online). Sep. 2023.

Analysis seminar, Temple University. Sep. 2023.

Analysis seminar, SUNY Binghamton. Sep. 2023.

Job colloquium talk, University of Toronto Scarbourough, Apr. 2023.

Job colloquium talk, City University of Hong Kong, Apr. 2023.

AMS sectional meeting, University of Cincinnati, OH. Apr. 2023.

Job colloquium talk, University of Nebraska Lincoln, Dec. 2022.

PDE seminar, Brown University. Dec. 2022.

Ghent Methusalem Junior Analysis and PDE Seminar (online), Belgium. Nov. 2022.

Prairie Analysis Seminar, University of Kansas, KS. Oct. 2022.

AMS sectional meeting, University of Tennessee at Chattanooga, Chattanooga, TN. Oct. 2022.

AMS sectional meeting, El Paso, TX. Sep. 2022.

Analysis seminar, University of Arizona (online). Mar. 2022.

International Conference on Partial Differential Equations Related to Material Science (online). May. 2021.

Learning Seminar on PDE and Applications, Rutgers University (online). Mar. and Apr. 2021.

Virtual Analysis and PDE Seminar (VAPS), hosted by Purdue University (online). Jan. 2021.

New postdoc special colloquium, Rutgers University (online). Oct. 2020.

Learning Seminar on PDE and Applications, Rutgers University (online). Aug. 2020.

AMS sectional meeting, Tufts University. 21–22 Mar. 2020 (canceled due to COVID-19).

Brown-BU-UMassAmherst PDE and Dynamics seminar, Brown University. Nov. 2019.

PDE seminar, Brown University. Nov. 2019.

2019 Northeast Analysis Network Conference, University of Connecticut. Sep. 2019.

PDE seminar, Brown University. Oct. 2018.

Services

Conferences organized

Co-organizer of the special session *Recent Developments in PDEs and Related Areas*, JMM 2025, Seattle, USA 2025

Co-organizer of the special session *New trends in elliptic and parabolic PDEs*, The 14th AIMS Conference, Abu Dhabi, UAE 2024

Co-organizer of the special session *Dynamics and Regularity of PDEs*, JMM 2024, San Francisco, USA 2024

Co-organizer of the special session *Topics in PDEs and harmonic analysis*, AMS Fall Eastern Sectional Meeting at UMass Amherst, USA 2022

Co-organizer of the special session *Regularity Theory for Linear and Nonlinear PDEs*, AMS Spring Western Sectional Meeting (formerly at San Francisco State University, USA), online 2021

Reviewed journal articles

Adv. Math., *Ann. Appl. Math.*, *Appl. Math. Lett.*, *Commun. Pure Appl. Anal.*, *Discrete Contin. Dyn. Syst. Ser. B*, *J. Differential Equations*, *J. Math. Pures Appl.*, *Trans. Amer. Math. Soc.*, *Nonlinearity*, *Nonlinear Anal.*.