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

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

American Institute of Mathematics, Pasadena, CA, USA Apr 2024, May 2025, Aug 2026

Institute for Advanced Study, Princeton, NJ, USA Jun 2024

SUNY Binghamton, Vestal, NY, USA Aug – Dec 2023

Grants, Honors & Awards

Grants

NSFC Young Scientists Fund, #12501275 (RMB 300,000). 2026 – 2028

RGC Early Career Scheme (ECS), # 21307225 (HKD 868,287). 2025 – 2028

CityU Start-up Grant, # 7200810 (internal, HKD 300,000). 2024 – 2026

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

Honors & awards

Sigma Xi Award, Brown Applied Math. 2020

Outstanding Graduate (ranked 1st in math major), Fudan University. 2015

Bronze Medals in Probability and Statistics, S.-T. Yau College Student Math Contests.	2013, 14
Bronze Medal in team competition, S.-T. Yau College Student Math Contests.	2013
First Prize, 3rd Chinese Mathematics Competition (Final Round at Tongji University).	2012
First Prize, China National High School Math League.	2009

Publications

Papers

1 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.

2 The Dirichlet-conormal problem with homogeneous and inhomogeneous boundary conditions. (With H. Dong) **Comm. Partial Differential Equations**, 46(3):470–497, 2021.

3 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.

4 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.

5 Norm inflation for the Boussinesq system. (With W. Wang) **Discrete Contin. Dyn. Syst. Ser. B**, 26(10):5449-5463, 2021.

6 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.

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 The Dirichlet-conormal problem for the heat equation with inhomogeneous boundary conditions. (With H. Dong) **Adv. Math.**, 411: Paper No. 108777, 2022.

9 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.

10 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.

11 On the uniqueness of variable coefficient Schrödinger equations. (With S. Federico and X. Yu) **Commun. Contemp. Math.**, 27 (3), 2025.

12 Unique continuation for Robin problems with non-smooth potentials. **J. Funct. Anal.**, 288 (6):Paper No. 110811, 2025.

13 Asymptotic expansions for harmonic functions at conical boundary points. (With D. Kriventsov) **Rev. Mat. Iberoam.**, 41(3): 837–866, 2025.

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

Yuhong XU, 2025-26 (undergraduate final year project at CityU).
Cheng Shing CHUA, 2025 Summer (undergrad at NUS, research internship at CityU).
Ruixiu LYU, 2024 – 25 (Ms.C. at CityU).

Teaching

Instructor for MA 4545 (Differential Geometry), CityU Math	2025 Fall
Instructor for MA 2185 (Direcrete Math), CityU Math	2025 Fall
Instructor for MA 3526 (Analysis), CityU Math	2024, 2025, 2026 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, 2021, 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, Duke Kunshan University, Suzhou, China.	Oct. 2025 (scheduled)
Symposium on elliptic and parabolic PDEs at Yanqi Lake, Beijing, China.	Oct. 2025
Short course at Beijing Normal University, China.	Aug. 2025
Conformal and CR geometry and their geometric flows, Sanya, China.	Jul. 2025
Recent Advances in Potential Theory and Partial Differential Equations, OIST, Japan.	Jul. 2025
International Workshop on Fully Nonlinear Partial Differential Equations, Fudan University, Shanghai, China.	Jun. 2025
First Math Workshop of CityU and the University of Edinburgh , Hong Kong.	May 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 (canceled due to COVID-19). Mar. 2020
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 Regularity Theory for PDEs*, The 15th AIMS conference, Athens, Greek Jul 2026
Co-organizer of the special session *Recent Advances in Elliptic PDEs and Their Applications*. JMM 2026, Washington, DC., USA Jan 2026
Co-organizer of the special session *Recent Developments in PDEs and Related Areas*, JMM 2025, Seattle, USA Jan 2025
Co-organizer of the special session *New trends in elliptic and parabolic PDEs*, The 14th AIMS Conference, Abu Dhabi, UAE Dec 2024
Co-organizer of the special session *Dynamics and Regularity of PDEs*, JMM 2024, San Francisco, USA Jan 2024
Co-organizer of the special session *Topics in PDEs and harmonic analysis*, AMS Fall Eastern Sectional Meeting at UMass Amherst, USA Oct 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 May 2021

Reviewed journal articles

Adv. Math., *Adv. Nonlinear Anal.* *Ann. Appl. Math.*, *Appl. Math. Lett.*. *Commun. Pure Appl. Anal.*, *Discrete Contin. Dyn. Syst. Ser. B*, *J. Differential Equations*, *J. Math. Pures Appl.*, *Int. Math. Res. Not. IMRN*, *NoDEA Nonlinear Differential Equations Appl.*, *Nonlinearity*, *Nonlinear Anal.*, *Trans. Amer. Math. Soc.*