

# ZONGYUAN LI

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## Research Interests

Regularity theory of elliptic and parabolic PDEs.

## Employment

City University of Hong Kong, Assistant Professor (Tenure-Track)	2024 –
Rutgers University, Hill Assistant Professor (Non Tenure Track)	2020 – 2023

## Education

Brown University, Ph.D. in Applied Mathematics	2015 – 2020
Thesis: Elliptic boundary value problems on irregular domains.	
Advisor: Prof. Hongjie Dong.	
Fudan University, B.Sc. in Mathematics	2010 – 2015
Thesis: Birkhoff normal forms in some PDEs.	
Advisor: Prof. Xiaoping Yuan.	
University of Oxford, St. Hugh's College, Part C in Math	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 Asymptotic expansions for harmonic functions at conical boundary points. (With D. Kriventsov) **Rev. Mat. Iberoam.**, 41(3): 837–866, 2025.
- 2 Unique continuation for Robin problems with non-smooth potentials. **J. Funct. Anal.**, 288(6):Paper No. 110811, 2025.
- 3 On the uniqueness of variable coefficient Schrödinger equations. (With S. Federico and X. Yu) **Commun. Contemp. Math.**, 27(3), 2025.
- 4 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.
- 5 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.
- 6 The Dirichlet-conormal problem for the heat equation with inhomogeneous boundary conditions. (With H. Dong) **Adv. Math.**, 411: Paper No. 108777, 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 On the  $W_p^2$  estimate for oblique derivative problem in Lipschitz domains. (With H. Dong) **Int. Math. Res. Not. IMRN**, (5):3602–3635, 2022.
- 9 Norm inflation for the Boussinesq system. (With W. Wang) **Discrete Contin. Dyn. Syst. Ser. B**, 26(10):5449–5463, 2021.
- 10 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.
- 11 The Dirichlet-conormal problem with homogeneous and inhomogeneous boundary conditions. (With H. Dong) **Comm. Partial Differential Equations**, 46(3):470–497, 2021.
- 12 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.
- 13 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.

### 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

### Ph.D. student

Yuhong XU Expected in 2026 Fall

### Others

Yuhong XU, undergraduate final year project at CityUHK 2025 – 26  
 Cheng Shing CHUA, summer research internship student from NUS 2025 Summer  
 Ruixiu LYU, Ms.C. (Financial Mathematics and Statistics) dissertation at CityUHK 2024 – 25

## Teaching

### CityUHK Math

MA 4545 (Undergraduate Differential Geometry) 2025 Fall  
 MA 2185 (Discrete Math for Computer Sciences) 2025 Fall  
 MA 3512 (Undergraduate PDE) 2024 Fall  
 MA 3526 (Analysis) 2024, 2025, 2026 Spring

### Rutgers Math

Math 421 (Calculus for Engineer) 2022 Spring  
 Math 252 (ODE) 2021 Spring, 2022 Fall, 2023 Spring  
 Math 423 (Undergraduate PDE) 2020, 2021, 2022 Fall

### Brown Applied Math (TA)

AM 2640 (Graduate Probability II) 2020 Spring  
 AM 2550 (Graduate Numerical PDE I) 2019 Fall  
 AM 2110 (Graduate Real Analysis I) 2018 Fall  
 AM 33, 34 (ODE I, II) 2016 Fall, 2017 Spring

## Talks

Winter workshop on geometric PDEs, Central South University.	Dec. 2025
PDE seminar, Lanzhou University.	Dec. 2025
PDE seminar, Duke Kunshan University.	Oct. 2025
Symposium on elliptic and parabolic PDEs at Yanqi Lake, Beijing.	Oct. 2025
Short course at Beijing Normal University.	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.	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
PDE seminar, Hong Kong Polytechnic University.	Mar. and Apr. 2024
AMS sectional meeting, Creighton University.	Oct. 2023
PDE seminar, Brown University (online).	Sep. 2023
Analysis seminar, Temple University.	Sep. 2023
Analysis seminar, SUNY Binghamton.	Sep. 2023
Colloquium, University of Toronto Scarbrough (online).	Apr. 2023
Colloquium, City University of Hong Kong (online).	Apr. 2023
AMS sectional meeting, University of Cincinnati.	Apr. 2023
Colloquium, University of Nebraska Lincoln.	Dec. 2022
PDE seminar, Brown University.	Dec. 2022
Ghent Methusalem Junior Analysis and PDE Seminar, Ghent University (online).	Nov. 2022
Prairie Analysis Seminar, University of Kansas.	Oct. 2022
AMS sectional meeting, University of Tennessee at Chattanooga.	Oct. 2022
AMS sectional meeting, University of Texas at El Paso.	Sep. 2022
Analysis seminar, University of Arizona (online).	Mar. 2022
International Conference on Partial Differential Equations Related to Material Science, Beijing (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.	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 (scheduled)
- 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, UMass Amherst, USA Oct 2022
- Co-organizer of the special session *Regularity Theory for Linear and Nonlinear PDEs*, AMS Spring Western Sectional Meeting (online, formerly at San Francisco State University, USA) May 2021

### Reviewed journal articles

*Adv. Math.*, *Adv. Nonlinear Anal.*, *Ann. Appl. Math.*, *Appl. Math. Lett.*, *Calc. Var. Partial Differential Equations*, *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.*