

# Xiumin Du

*Curriculum Vitae (Prepared Sep 2023)*

✉ [xdu@northwestern.edu](mailto:xdu@northwestern.edu)  
📄 [sites.northwestern.edu/xiumindu/](https://sites.northwestern.edu/xiumindu/)

## Research Interests

Harmonic analysis and its interactions with partial differential equations and geometric measure theory

## Employment

- 2020– **Northwestern University**, *Evanston, IL, USA.*  
Assistant Professor (Tenure-track)
- 2018–2020 **University of Maryland**, *College Park, MD, USA.*  
Serguei Novikov Postdoctoral Fellow
- 2017–2018 **Institute for Advanced Study**, *Princeton, NJ, USA.*  
Shiing-Shen Chern Member

## Education

- 2011–2017 **University of Illinois at Urbana-Champaign**, *Urbana, IL, USA.*  
Ph.D. in Mathematics (2017)  
Advisor: Xiaochun Li  
Dissertation: A Sharp Schrödinger Maximal Estimate in  $\mathbb{R}^2$   
M.Sc. in Mathematics (2013)
- 2007–2011 **Zhejiang University**, *Hangzhou, Zhejiang, China.*  
B.Sc.(Hons.) in Mathematics (2011)  
Advisors: Shiu-Chun Wong and Zhixiang Wu  
Thesis: A Survey on Sheaf Cohomology

## Honors and Awards

- 2023 **Faculty Early Career Development (CAREER) Award**, *National Science Foundation.*
- 2023 **Frontiers of Science Awards (Mathematics)**, *The first International Congress of Basic Science*, Beijing.
- 2022 **Invited speaker at International Congress of Mathematicians (ICM 2022).**
- 2021 **Sloan Research Fellow**, *Alfred P. Sloan Foundation.*
- 2019 **ICCM Best Paper Award** (declined due to travel constraint), *International Consortium of Chinese Mathematicians.*
- 2018 **ICCM Distinguished Paper Award**, *International Consortium of Chinese Mathematicians.*

## Research Support

- 2023–2028 **National Science Foundation (CAREER)**, \$498,420, “Weighted Fourier extension estimates and interactions with PDEs and geometric measure theory” (award number: DMS-2237349).
- 2021–2023 **Sloan Research Fellowship**, \$75,000.
- 2019–2023 **National Science Foundation Grant**, \$126,331, “Fractal Fourier Extension Estimates” (award number: DMS-2107729, formerly DMS-1856475).
- 2018–2020 **AMS–Simons Travel Grant**, \$4,000.

## Publications

15. *Weighted refined decoupling estimates and application to Falconer distance set problem* (with Y. Ou, K. Ren and R. Zhang), arXiv preprint, 2023.
14. *New improvement to Falconer distance set problem in higher dimensions* (with Y. Ou, K. Ren and R. Zhang), arXiv:2309.04103.
13. *On a free Schrödinger solution studied by Barceló–Bennett–Carbery–Ruiz–Vilela* (with Y. Ou, H. Wang and R. Zhang), **Contemporary Mathematics**, accepted.
12. *Weighted Fourier extension estimates and applications*, **Proceedings of the International Congress of Mathematicians 2022**, in press.
11. *On the multiparameter Falconer distance problem* (with Y. Ou and R. Zhang), **Transactions of the American Mathematical Society**, 375 (2022), 4979–5010.
10. *An improved result for Falconer’s distance set problem in even dimensions* (with A. Iosevich, Y. Ou, H. Wang and R. Zhang), **Mathematische Annalen**, 380 (2021), no. 3-4, 1215–1231.
9. *Counterexamples to  $L^p$  collapsing estimates* (with M. Machedon), **Illinois Journal of Mathematics**, 65 (2021), no. 1, 191–200.
8. *Weighted restriction estimates and application to Falconer distance set problem* (with L. Guth, Y. Ou, H. Wang, B. Wilson and R. Zhang), **American Journal of Mathematics**, 143 (2021), no. 1, 175–211.
7. *Recent progress on pointwise convergence for the Schrödinger equation in  $\mathbb{R}^2$*  (with X. Li), **Proceedings of the International Consortium of Chinese Mathematicians 2018**, 613–626, Int. Press, Boston, MA, 2020
6. *Lower bounds for estimates of the Schrödinger maximal function* (with J. Kim, H. Wang, R. Zhang), **Mathematical Research Letters**, 27 (2020), no. 3, 687–692.
5. *Upper bounds for Fourier decay rates of fractal measures*, **Journal of the London Mathematical Society** (2) 102 (2020), no. 3, 1318–1336.
4.  *$L^p$  decoupling for restricted  $k$ -broadness* (with X. Li), **Mathematische Zeitschrift**, 292 (2019), no. 1-2, 725–737.
3. *Sharp  $L^2$  estimates of the Schrödinger maximal function in higher dimensions* (with R. Zhang), **Annals of Mathematics**, (2) 189 (2019), no. 3, 837–861.
2. *Pointwise convergence of Schrödinger solutions and multilinear refined Strichartz estimates* (with L. Guth, X. Li and R. Zhang), **Forum of Mathematics. Sigma**, 6 (2018), e14, 18 pp.
1. *A sharp Schrödinger maximal estimate in  $\mathbb{R}^2$*  (with L. Guth and X. Li), **Annals of Mathematics**, (2) 186 (2017), no. 2, 607–640.

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## Other Articles

2.  *$L^p$ -estimates of maximal function related to Schrödinger Equation in  $\mathbb{R}^2$*  (with X. Li), arXiv:1508.05437, not for publication.
1. *A sharp Schrödinger maximal estimate in  $\mathbb{R}^2$* , Dissertation, <http://hdl.handle.net/2142/98116>

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## Talks

- Aug 2023 The 10th East Asian Conference on Harmonic Analysis and Applications
- Apr 2023 Riviere-Fabes Symposium on Analysis and PDE (plenary speaker), University of Minnesota
- Mar 2023 The Harmonic Analysis and Fractal Sets conference (plenary speaker), Ohio State University
- Dec 2022 Smith Colloquium, University of Kansas
- Nov 2022 Mathematics Colloquium, University of Houston
- Nov 2022 Virtual Workshop on Harmonic Analysis
- Oct 2022 Calderón-Zygmund analysis seminar, University of Chicago
- Sep 2022 RTG workshop in harmonic analysis, University of Wisconsin, Madison
- Jul 2022 International Congress of Mathematicians (ICM) 2022
- Apr 2022 Caltech-UCLA-USC analysis seminar
- Mar 2022 Special session on harmonic analysis, AMS Spring Central Sectional Meeting
- May 2021 Analysis seminar, Zhejiang University
- May 2021 Analysis seminar, Northwestern Polytechnical University
- May 2021 School colloquium, Peking University
- Mar 2021 Analysis seminar, University of Wisconsin, Madison
- Mar 2021 Online analysis research seminar
- Mar 2021 Virtual harmonic analysis seminar
- Oct 2020 Analysis seminar, Northwestern University
- Dec 2019 Colloquium, Rice University
- Dec 2019 Colloquium, Stony Brook University
- Dec 2019 Special colloquium, Purdue University
- Dec 2019 Analysis seminar, Northwestern University
- Nov 2019 Colloquium, University of Minnesota
- Nov 2019 PDE-Applied Math Seminar, University of Maryland
- Nov 2019 Analysis Special Lecture, University of Pennsylvania
- Oct 2019 Analysis and Partial Differential Equations Seminar, Johns Hopkins University
- Jun 2019 Barcelona Analysis Conference 2019 (plenary speaker), Barcelona, Spain
- Jun 2019 The 8th International Congress of Chinese Mathematicians, Beijing, China
- Jun 2019 Workshop on Bourgain-Demeter decoupling method, Chern Institute of Mathematics, China
- May 2019 Madison Lectures in Fourier Analysis-Postdoctoral Symposium, UWisc-Madison
- Apr 2019 Analysis seminar, Cornell University
- Jan 2019 Analysis seminar, University of Pennsylvania

- Nov 2018 Analysis seminar, Northwestern University
- Nov 2018 Analysis Commons, University of Virginia
- Sep 2018 The Norbert Wiener Center seminar, University of Maryland
- May 2018 RTG Workshop in Fourier Analysis, UWisc-Madison
- Mar 2018 Analysis seminar, Princeton University
- Feb 2018 Analysis seminar, Georgia Institute of Technology
- Oct 2017 Decoupling and Polynomial Methods in Analysis, University of Bonn
- Feb 2016 Student analysis seminar, Massachusetts Institute of Technology

## Professional Service

- Referee for journals American Journal of Mathematics, Advances in Mathematics, Analysis & PDE, Mathematische Annalen, Transactions of the American Mathematical Society, International Mathematics Research Notices, Revista Matemática Iberoamericana, Forum of Mathematics. Sigma, Mathematical Proceedings of the Cambridge Philosophical Society, Canadian Journal of Mathematics, Proceedings of the Edinburgh Mathematical Society, Proceedings of the American Mathematical Society, Journal of Geometric Analysis, Journal of Fourier Analysis and Applications, Mathematische Nachrichten, Rocky Mountain Journal of Mathematics, Advances in Mathematics (China), Acta Mathematica Scientia, Mathematical Notes, Journal of Function Spaces
- Grant reviewer Invited reviewer for the National Science Foundation, European Research Council, Hong Kong Research Grants Council, Banff International Research Station (Canada)
- Co-organizer Special Session on Harmonic Analysis, 2019 Joint Mathematics Meetings at Baltimore

## Teaching and Advising

### Northwestern University

#### Advising

- 2023-present Mentoring a postdoctoral student
- Summer 2023 Supervising an undergraduate student for an independent study

#### Teaching

- Winter 2024 Topics in Analysis (Math511-1)
  - Fall 2023 Single-Variable Integral Calculus (Math220-2); Measure and Integration (Math410-1)
- Winter 2023 Single-Variable Integral Calculus (Math220-2)
- Spring 2022 Single-Variable Integral Calculus (Math220-2)
- Winter 2021 Topics in Analysis (Math511-1)
  - Fall 2020 Fourier Analysis (Math429-1), Single-Variable Integral Calculus (Math220-2)

### University of Maryland, College Park

- Spring 2020 Advanced Calculus I (Math410)
  - Fall 2019 Calculus I (Math140H)
- Spring 2019 Calculus II (Math141H)
  - Fall 2018 Calculus I (Math140H)

## University of Illinois at Urbana-Champaign

- Fall 2016 General Topology (grad-level, Math535), Complex Variables (grad-level, Math542), Elementary Real Analysis (Math444), Fundamental Mathematics (Math347): grader
- Spring 2016 Calculus II (Math231): discussion section TA
- Fall 2015 Harmonic Analysis (grad-level, Math545), Partial Differential Equations (Math442), Dynamics and Differential Equations (Math489): grader
- Spring 2015 Differential Equations (Math285), Partial Differential Equations (Math442), Abstract Algebra II (Math418): grader
- Fall 2014 Homological Algebra (grad-level, Math505), Complex Variables (grad-level, Math542), Differential Equations (Math285): grader
- Summer 2014 Calculus II (Math231): Netmath mentor
- Spring 2014 Calculus II (Math231): Netmath mentor
- Fall 2013 Calculus I (Math221): discussion section TA
- Spring 2013 Complex Variables (grad-level, Math542), Complex Variables (Math448), Applied Complex Variables (Math446), Fundamental Mathematics (Math347): grader
- Fall 2012 Real Variables (Math447), Fundamental Mathematics (Math347, Math348): grader
- Spring 2012 Elementary Real Analysis (Math444), Basic Discrete Mathematics (Math213): grader
- Fall 2011 Differential Equations (Math285, Math286), Preparation for Calculus (Math115): grader

## Teaching Recognition

- 2018–2020 Average teaching effectiveness rating at UMD: 3.78/4.00
- Spring 2016 *Teachers Ranked as Excellent* at UIUC, (**highest 10% campus-wide**)

## Department, College, and University Service

- 2023-2024 Graduate admissions committee of Department of Mathematics
- 2022-2023 Boas (postdoc) committee of Department of Mathematics
- 2022-2023 Tenure-line search committee of Department of Statistics and Data Science (external member)
- 2022 Spring Pinsky lecture series committee of Department of Mathematics
- 2020-2021 Boas (postdoc) committee of Department of Mathematics