

LI CHEN

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Department of Mathematics, Louisiana State University – Baton Rouge, LA 70803

ACADEMIC POSITIONS

Tenure-track Assistant Professor

Department of Mathematics, Louisiana State University, August 2020 – Present

Assistant Research Professor

Department of Mathematics, University of Connecticut, August 2017 – August 2020

Postdoctoral Fellow at *Instituto de Ciencias Matemáticas*

Consejo Superior de Investigaciones Científicas, Madrid, January 2015 – August 2017

Mentor: José María Martell

EDUCATION

Ph.D. in Mathematics, Australian National University and Université Paris-Sud, 2014

Supervisors: Thierry Coulhon and Pascal Auscher

M.S. in Mathematics, Beijing Normal University, 2010

B.S. in Mathematics, Hunan University of Science and Technology, 2007

RESEARCH INTERESTS

Probability, Analysis and Partial Differential Equations

RESEARCH GRANTS

Jan. 2022 – Dec. 2022 PI for Faculty Research Grants - Emerging Research, ORED, LSU (co-PIs: Arnab Ganguly and Michael Malisoff), \$10,000.

Sep. 2021– Aug. 2026 Simons Foundation Collaboration Grant for Mathematicians, \$42,000, Award ID: 853249

PAPERS

Published or Accepted

- (with P. Auscher, J.M. Martell and C. Prisuelos-Arribas) *The regularity problem for degenerate elliptic operators in weighted spaces*, accepted by **Revista Matemática Iberoamericana**, DOI [10.4171/RMI/1357](https://doi.org/10.4171/RMI/1357).
- (with J.M. Martell and C. Prisuelos-Arribas) *The regularity problem for uniformly elliptic operators in weighted spaces*, accepted by **Potential Analysis** (2021), <https://doi.org/10.1007/s11118-021-09945-w>.
- (with F. Baudoin) *Sobolev spaces and Poincaré inequalities on the Vicsek fractal*, accepted by **Annales Fennici Mathematici**, 48(1), 3–26, 2023.
- (with F. Baudoin) *A note on second order Riesz transforms in 3-dimensional Lie groups*, **Archiv der Mathematik**, 118(3), 291–304, 2022.
- (with R. Bañuelos, F. Baudoin and Y. Sire) Multiplier theorems via martingale transforms, **Journal of Functional Analysis**, 281(9), 109188, 2021.

6. (with P. Alonso-Ruiz, F. Baudoin, L. Rogers, N. Shanmugalingam and A. Teplyaev) *Besov class via heat semigroup on Dirichlet spaces III: BV functions and sub-Gaussian heat kernel estimates*, **Calculus of Variations and Partial Differential Equations**, 60(5), 170, 2021.
7. (with P. Alonso-Ruiz, F. Baudoin, L. Rogers, N. Shanmugalingam and A. Teplyaev) *Besov class via heat semigroup on Dirichlet spaces II: BV functions and Gaussian heat kernel estimates*, **Calculus of Variations and Partial Differential Equations**, 59(3), 103, 2020.
8. (with P. Alonso-Ruiz, F. Baudoin, L. Rogers, N. Shanmugalingam and A. Teplyaev) *Besov class via heat semigroup on Dirichlet spaces I: Sobolev type inequalities*, **Journal of Functional Analysis**, 278(11), 108459, 2020.
9. (with R. Bañuelos, F. Baudoin) *Gundy-Varopoulos martingale transforms and their projection operators on manifolds and vector bundles*, **Mathematische Annalen**, 378(1-2): 359–388, 2020.
10. (with T. Coulhon and B. Hua) *Riesz transforms for bounded Laplacians on graphs*, **Mathematische Zeitschrift**, 294(1-2): 397–417, 2020.
11. (with J.M. Martell and C. Prisuelos-Arribas) *Conical square functions for degenerate elliptic operators*, **Advances in Calculus of Variations**, 13(1): 75–113, 2020.
12. *A note on Sobolev type inequalities on graphs with polynomial volume growth*, **Archiv der Mathematik**, 113(3): 313–323, 2019.
13. *Hardy spaces on metric measure spaces with generalized sub-Gaussian heat kernel estimates*, **Journal of the Australian Mathematical Society**, 104(2): 162–194, 2018.
14. (with T. Coulhon, J. Feneuil and E. Russ) *Riesz transform for $1 \leq p \leq 2$ without Gaussian heat kernel bound*, **Journal of Geometric Analysis**, 27(2): 1489–1514, 2017.
15. *Sub-Gaussian heat kernel estimates and quasi Riesz transforms for $1 \leq p \leq 2$* , **Publicacions Matemàtiques**, 59(2): 313–338, 2015.
16. *Quasi Riesz transforms, Hardy spaces and generalized sub-Gaussian heat kernel estimates*, Ph.D. thesis, the Australian National University and Université Paris-Sud, 2014, with the abstract in **Bulletin of the Australian Mathematical Society**, 92(3): 508–510, 2015.
17. (with J. Zhao) *Weyl transform and spectrogram associated with quaternion Heisenberg group*, **Bulletin des Sciences Mathématiques**, 136(2): 127–143, 2012.

Submitted

18. (with F. Baudoin) *Dirichlet fractional Gaussian fields on the Sierpinski gasket and their discrete graph approximations*, revision for **Stochastic Processes and their Applications**, <https://arxiv.org/abs/2201.03970>.
19. (with F. Baudoin) *L^p -Poincaré inequalities on nested fractals*, revision for **Potential Analysis**, <https://arxiv.org/abs/2012.03090>.

Preprint

20. (with P. Alonso-Ruiz, F. Baudoin, L. Rogers, N. Shanmugalingam and A. Teplyaev) *BV functions and fractional Laplacians on Dirichlet spaces*, submitted, <https://arxiv.org/abs/1910.13330>, 20pp.
21. (with F. Baudoin and M. Bonnefont) *Convergence to equilibrium for hypoelliptic non-symmetric Ornstein-Uhlenbeck type operators*, submitted, <https://arxiv.org/abs/1906.10828>, 20pp.

TALKS

Colloquium and Seminar talks

- Nov. 2022, Analysis on Metric Spaces Seminar, OIST, Japan (Zoom talk)
- Feb. 2022, Probability Seminar, Louisiana State University, USA (Zoom talk)
- Feb. 2022, Applied and Computational Mathematics Seminar, Tulane University, USA (Zoom talk)
- May 2021, Montreal Analysis Seminar, Canada (Zoom talk)
- March 2021, Analysis Seminar, Baylor University, USA (Zoom talk)
- Jan. 2021, Applied Analysis Seminar, Louisiana State University, USA (Zoom talk)
- Feb. 2020, Colloquium, New Mexico State University, USA
- Feb. 2020, Colloquium, Binghamton University, USA
- Feb. 2020, Colloquium, Louisiana State University, USA
- Oct. 2019, Harmonic Analysis and PDE's Seminar, CUNY, USA
- Oct. 2019, Geometric Analysis Seminar, University of Tennessee, USA
- Sep. 2019, Analysis Seminar, Brown University, USA
- July 2019, Seminar, Center for Applied Mathematics, Tianjin University, China
- May 2019, Colloquium, Bowling Green State University, USA
- Apr. 2019, Probability Seminar, Purdue University, USA
- Nov. 2018, Analysis and PDE Seminar, Worcester Polytechnic Institute, USA
- Oct. 2017, Analysis Learning Seminar, University of Connecticut, USA
- May 2016, Analyse Seminar, University of Missouri at Columbia, USA
- Oct. 2015, Séminaire Analyse Harmonique, Département de Mathématiques d'Orsay, France
- Oct. 2015, Séminaire d'Analyse Réelle, L'Institut de Mathématiques de Toulouse, France
- Aug. 2015, Seminar at School of Mathematical Sciences, Fudan University, China
- June 2015, Seminar of Research Term on Analysis and Geometry in Metric Spaces, ICMAT, Spain
- Dec. 2012/2013, Workshop in Harmonic Analysis and Geometry, Australian National University, Australia

Conference talks

- June 2022, the 7th Cornell Conference on Analysis, Probability, and Mathematical Physics on Fractals, Cornell University
- June 2022, Session *Stochastic Analysis and Applications*, the 2022 Union College Mathematics Conference, Union College
- April 2022, Special Session on *Analysis and Probability in Sub-Riemannian Geometry*, AMS Sectional Meeting (meeting virtually, formally at Purdue University)
- April 2021, Special Session on *Probabilistic and diffusion methods in analysis and geometry*, AMS Sectional Meeting (meeting virtually, formally at University of Cincinnati)
- April 2020, Workshop "AAH 2020" (Atelier d'Analyse Harmonique), Corsica, France (cancelled)

- April 2020, Special Session on *Analysis and Probability in Sub-Riemannian Geometry*, AMS Sectional Meeting, Purdue University (switched to virtual)
- Nov. 2019, Heat Kernels, Stochastic Processes and Functional Inequalities, MFO, Oberwolfach, Germany
- Sept. 2019, Special Session on *Analysis and Probability on Metric Spaces and Fractals*, AMS Sectional Meeting, University of Wisconsin-Madison
- April 2019, Special Sessions on *Analysis, geometry and PDEs in non-smooth metric spaces* and on *Stochastic Analysis and Related Fields*, AMS Sectional Meeting, University of Connecticut, Hartford
- Mar. 2019, The Ninth Ohio River Analysis Meeting (participant talk), University of Cincinnati
- Sept. 2018, Theoretical and Applied Stochastic Analysis workshop, CMO, Oaxaca, Mexico
- April 2018, Conference on Harmonic Analysis of Elliptic and Parabolic Partial Differential Equations, CIRM-Luminy, France
- Aug. 2017, International Conference on Analysis and Geometry on Graphs and Manifolds (participant talk), University of Potsdam, Germany
- Jan. 2017, Youth Geometric Analysts' Forum 2017 (participant talk), TSIMF, Sanya, China
- Nov. 2016, Workshop on Heat Kernels, Stochastic Processes and Functional Inequalities (participant talk), MFO, Oberwolfach, Germany
- June 2016, The 10th International Conference on Harmonic Analysis and Partial Differential Equations (participant talk), El Escorial, Spain
- Jan. 2015, Workshop on Harmonic Analysis, Partial Differential Equations and Geometric Measure Theory, ICMAT, Spain
- Dec. 2014, The 8th Australian New Zealand Mathematics Convention, special session in Harmonic Analysis and PDE (participant talk), The University of Melbourne, Australia
- July 2014, The AMSI/AustMS 2014 Workshop in Harmonic Analysis and its Applications (participant talk), Macquarie University, Australia
- May 2013, Workshop on Harmonic Analysis, PDEs and Geometry (participant talk), ICMAT, Madrid, Spain

ACADEMIC VISITS

- July 2021, Department of Mathematics, University of Connecticut, USA
- May 2018, Research Term on Real Harmonic Analysis and its Applications to Partial Differential Equations and Geometric Measure Theory, ICMAT, Madrid, Spain
- March-May 2016, Department of Mathematics, University of Missouri at Columbia, USA
- Nov. 2015, Institut Fourier, Grenoble Alpes University, Grenoble, France
- Oct. 2015 and Dec. 2016, Département de Mathématiques, Université Paris-Sud, Orsay, France
- Aug. 2015, School of Mathematical Sciences, Fudan University, Shanghai, China
- Sept. 2014, Instituto de Ciencias Matemáticas, Madrid, Spain

TEACHING

Instructor at Louisiana State University

- 2022 Fall, MATH 3355 *Probability*
- 2021 Fall, MATH 2065 *Elementary Differential Equations*
- 2021 Fall, MATH 7360 *Probability Theory* (graduate course)
- 2021 Spring, MATH 4027 *Differential Equations*
- 2020 Fall, MATH 1550 *Differential and Integral Calculus*, Science Residential College

Instructor at University of Connecticut

- 2020 Spring, MATH 3170 *Elementary Stochastic Processes*, two sections
- 2019 Fall, MATH 3160 *Probability*, two sections
- 2019 Spring, MATH 3170 *Elementary Stochastic Processes*, two sections
- 2018 Fall, MATH 2410Q *Elementary Differential Equations*, two sections
- 2018 Spring, MATH 3160 *Probability*, two sections
- 2017 Fall, MATH 2410Q *Elementary Differential Equations*, two sections

Tutor at the Australian National University

- 2014 Semester 1, MATH 1014 *Mathematics and Applications 2*
- 2013 Semester 2, MATH 1113 *Mathematical Foundations for Actuarial Studies*
- 2013 Semester 1, MATH2320/MATH3116/MATH6110 *Analysis 1 Honours: Metric Spaces and Applications*

PROFESSIONAL ACTIVITIES

Organization

Spring 2022 –, *Probability Seminar*, Louisiana State University.

March 2022, Special Session on *Probabilistic methods in Analysis and Geometry*, AMS Spring South-eastern Sectional Meeting, University of Virginia (co-organizer F. Baudoin, canceled due to Covid-19).

Committee member

General exam of Ph.D. students at LSU: Jinpu Zhou (2021), Aurora Wallace (2022).

Referee

Journal referee for *Advances in Mathematics*, *Communications on Pure & Applied Analysis*, *Complex Analysis and Operator Theory*, *Electronic Journal of Probability*, *Forum Mathematicum*, *Journal of Differential Equations*, *Journal of Fourier Analysis and Applications*, *Journal of the Australian Mathematical Society*, *La Matematica*, *Nonlinear Analysis*, *Proceedings of the American Mathematical Society*, *Publicacions Matemàtiques*, *Revista Matemàtiques Complutense*, *Statistics & Probability Letters*, *Stochastic Processes and their Applications*.

Referee for the PhD thesis of Cruz Prisuelos-Arribas (Universidad Autónoma de Madrid), Spring 2017.

Reviewer

Simons Collaboration Grants for Mathematicians program, 2022

MathSciNet Mathematical Reviews, since 2019.