

Nestor Guillen

Department of Mathematics
Texas State University
San Marcos, Texas 01003

nestor@txstate.edu
www.ndguillen.com
[\[Google Scholar link\]](#)

Appoinments

Associate Professor Texas State University	2022 - present
Assistant Professor Texas State University	2019 - 2022
Associate Professor (on leave) University of Massachusetts at Amherst	2019 - 2020
Visiting Associate Research Scientist Columbia University	2018-2019
Assistant Professor University of Massachusetts at Amherst	2014 - 2019
E.R. Hedrick Assistant Adjunct Professor University of California at Los Angeles	2011 - 2014
Postdoctoral Fellow Mathematical Sciences Research Institute, Berkeley	Spring 2011

Education

Ph.D. in Mathematics University of Texas at Austin Advisor: Luis Caffarelli	December 2010
Licenciado en Matemáticas Universidad Simón Bolívar. Sartenejas, Venezuela Tutor: Lázaro Recht	July 2006

Fellowships, grants and awards

NSF CAREER Grant DMS-2144232. Award: \$498,969.00	2022-present.
NSF Research Grant DMS-1700307. Award: \$135,000.00	2017-2020.
NSF Research Grant DMS-1201413. Award: \$102,000.00	2012-2016.
Visiting Researcher at the <i>Fields Institute</i> in Toronto, Canada.	Fall 2014.
Graduate School Continuing Fellowship.	2009-2010.
Lefevre Fellowship.	Spring 2009.
Wall Memorial Fellowship.	Spring 2009.
Frank Sid Richardson Foundation Regents Fellowship.	Spring 2007.
Frank Gerth III Graduate Excellence Award.	2007.

Editorial

Electronic Journal of Differential Equations (2022-present)

Doctoral students

René Cabrera (PhD 2022).

Michaael Boratko (PhD 2018, co-advised with Andrea Nahmod).

UT Austin postdoc

Google Deepmind

Publications (short list)

1. **The Landau equation does not blow up**, with L. Silvestre. arXiv preprint 2311.09420.
2. **A Convex Optimization Framework for Regularized Geodesic Distances**, with M. Edelstein, J. Solomon, and M. Ben-Chen. SIGGRAPH Conference (2023).
3. **Pointwise estimates and regularity in geometric optics and other Generated Jacobian Equations**, with J. Kitagawa. Communications on Pure and Applied Mathematics (2017).
4. **Estimates for radial solutions of the homogeneous Landau equation with Coulomb potential**, with M. Gualdani. Analysis and PDE (2016).
5. **Aleksandrov-Bakelman-Pucci Type Estimates For Integro-Differential Equations**, with R. Schwab. Archive for Rational Mechanics and Analysis (2012).

Publications (full list)

Note: Links to preprints and journal articles can be found in my homepage www.ndguillen.com.

26. **The Landau equation does not blow up**
N. Guillen and L. Silvestre.
arXiv preprint 2311.09420.
25. **Regularization estimates of the Landau diffusion operator.**
R. Cabrera, M. Gualdani, and N. Guillen.
arXiv preprint 2310.16012.
24. **A Convex Optimization Framework for Regularized Geodesic Distances**
M. Edelstein, N. Guillen, J. Solomon, and M. Ben-Chen.
SIGGRAPH Conference (2023).
23. **Hardy's inequality and the isotropic Landau equation.**
M. Gualdani and N. Guillen.
Journal of Functional Analysis, (2022).
22. **A Hele-Shaw limit without monotonicity.**
N. Guillen, I. Kim, and A. Mellet.
Archive for Rational Mechanics and Analysis (2022).
21. **Optimal transport and the Gauss curvature equation.**
N. Guillen and J. Kitagawa.
Methods and Applications of Analysis (2020).

20. **Geometry of graph partitions via optimal transport.**
T. Abrishami, N. Guillen, P. Rule, Z. Schutzman, J. Solomon , T. Weighill, and S. Wu.
SIAM Journal on Scientific Computing (2020).
19. **A primer on Generated Jacobian Equations: Geometry, optics, economics.**
N. Guillen.
Notices of the American Mathematical Society 66.9 (2019).
18. **Some free boundary problems recast as nonlocal parabolic equations.**
H. Chang-Lara, N. Guillen, and R. Schwab.
Journal of Nonlinear Analysis (2019).
17. **Coupling Levy measures and comparison principles for viscosity solutions.**
N. Guillen, C. Mou, and A. Swiech.
Transactions of the American Mathematical Society (2019).
16. **Estimates for Dirichlet-to-Neumann maps as integro-differential operators.**
N. Guillen, J. Kitagawa, and R. Schwab.
Potential Analysis (2019).
15. **On A_p weights and the Landau equation.**
M. Gualdani and N. Guillen.
Calculus of Variations and Partial Differential Equations (2019).
14. **Min-max formulas for nonlocal elliptic operators on Euclidean space.**
N. Guillen and R. Schwab.
Journal of Nonlinear Analysis (2019).
13. **Min-max formulas for nonlocal elliptic operators.**
N. Guillen and R. Schwab.
Calculus of Variations and Partial Differential Equations (2019).
12. **From the free boundary condition for Hele-Shaw to a fractional parabolic equation.**
H. Chang-Lara and N. Guillen.
Preprint.
11. **Neumann Homogenization via Integro-Differential Operators, Part 2: singular gradient dependence.**
N. Guillen and R. Schwab.
SIAM Journal on Mathematical Analysis (2018).
10. **Estimates for radial solutions of the homogeneous Landau equation with Coulomb potential.**
M. Gualdani and N. Guillen.
Analysis and PDE (2016).

9. **Pointwise estimates and regularity in geometric optics and other Generated Jacobian Equations.**
N. Guillen and J. Kitagawa.
Communications on Pure and Applied Mathematics (2017).
8. **Neumann Homogenization via Integro-Differential Operators.**
N. Guillen and R. Schwab.
Discrete and Continuous Dynamical Systems (2016).
7. **Mean curvature, diffusion generated motion, and phase field theory on finite graphs.**
A. Bertozzi, Y. van Gennip, N. Guillen, and B. Osting
Milan Journal of Mathematics (2014).
6. **Quasistatic droplets in randomly perforated domains.**
N. Guillen and Inwon Kim.
Archive for Rational Mechanics and Analysis (2015).
5. **On the local geometry of maps with c -convex potentials.**
N. Guillen and J. Kitagawa.
Calculus of Variations and Partial Differential Equations (2015).
4. **Aleksandrov-Bakelman-Pucci Type Estimates For Integro-Differential Equations.**
N. Guillen and R. Schwab.
Archive for Rational Mechanics and Analysis (2012).
3. **Five lectures on optimal transportation: geometry, regularity and applications.**
N. Guillen and R. McCann.
Lecture Notes of the Seminaire de Mathematiques Superieure (2011).
2. **Regularity for non-local almost minimal boundaries and applications.**
N. Guillen and C. Caputo.
Unpublished preprint.
1. **Optimal regularity for the Signorini problem.**
N. Guillen.
Calculus of Variations and Partial Differential Equations (2009).

Conference talks

- *ICERM workshop, Optimal Transport in Data Science*, May 2023.
- *V Escuela sobre Análisis Funcional y Geometría*, Octubre 2023.
- *Midwest Geometry Conference*. Plenary speaker. Wichita State University. March 2022.
- *Congreso Latinoamericano de Matemáticos*. (Análisis Funcional y Geometría). September 2021.
- *Gerrymandering workshop*. Duke University, October 2018.
- *Voting Rights Data Institute*. Tufts-MIT, June 2018.

- *BIRS Workshop: Advanced Developments for Surface and Interface Dynamics - Analysis and Computation*. Banff International Research Station. June 2018.
- *Geometry of Redistricting Workshop*. Session on Optimal Transport. Boston. August 2017.
- *Mathematical Congress of the Americas*. Session on Nonlocal variational problems. Montreal. July 2017.
- *BIRS Workshop: Generated Jacobian Equations: from geometric optics to economics*. Banff International Research Station. April 2017.
- *SIAM Conference on Nonlinear Waves and Coherent Structures*. Session on Nonlocal dynamics in mechanics, transport, and electromagnetics. Philadelphia. August 2016.
- *3rd Conference on Nonlocal Operators and Partial Differential Equations*. Stefan Banach International Mathematical Center, Bedlewo. June 2016.
- *Conference on Recent Trends on Elliptic Nonlocal Equations*. Fields Institute, Toronto. June 2016
- *Nonlocal PDEs Workshop*. IPAM, Los Angeles. February 2012.

Selected university colloquia and seminar talks

- Partial Differential Equations Seminar. Arizona State University, February 2023.
- Analysis Seminar. UT Austin, January 2023.
- Online Analysis and PDE Seminar¹. Universidad de Sevilla. March 2021, Sevilla.
- Applied Mathematics Seminar. Brown University. February 2019, Providence.
- Colloquium. Texas State University. January 2019, San Marcos.
- Colloquium. Tulane University, April 2018, New Orleans.
- Metric Geometry Group Seminar. Tufts University, May 2017, Boston.
- PDE-Applied Math Seminar. University of Maryland, May 2017, College Park.
- Analysis seminar. Massachusetts Institute of Technology, March 2017, Boston.
- Analysis and PDE Seminar. Johns Hopkins University. November 2016, Baltimore.
- Analysis Seminar. University of Chicago. October 2016, Chicago.
- Applied Mathematics Seminar. Michigan State University. March 2016, Lansing.
- Geometric PDE. University of Wisconsin. March 2016, Madison.
- PDE Seminar. Georgia Inst. of Technology, October 2015, Atlanta.
- UCLA-Caltech Analysis Seminar. California Inst. of Technology, May 2015, Pasadena.
- PDE Seminar. Brown University, January 2015, Providence.
- Analysis Seminar. Columbia University, September 2014, New York.
- Colloquium. Drexel University, January 2014, Philadelphia.
- Colloquium. George Washington University. January 2014, Washington, D.C.
- Colloquium. University of Maryland. December 2013, College Park.
- Colloquium. University of Massachusetts. December 2013, Amherst.

¹<https://sites.google.com/view/analysis-pde-seminar/main-page>

- Colloquium. Purdue University. December 2013, West Lafayette.
- Geometric PDE seminar. Princeton University. September 2013. Princeton.
- Analysis seminar. California Inst. of Technology. March 2012, Pasadena.
- PDE seminar. UC Berkeley. March 2011, Berkeley.

Minicourses taught

- (planned for January 2024) 1st San Marcos Winter School at Texas State University.
- Minicourse on Stochastic Homogenization. 2016 Gene Golub Summer School, Philadelphia, July 2016.

Organization of scientific meetings

- (planned for Spring 2025, date TBD) AIM workshop on kinetic equations. Co-organized with Maria Gualdani, Russell Schwab, and Maja Taskovic.
- (planned for May 2024) Joint Texas State and UT Austin Summer School and Workshop on Algorithms and PDE. Co-organized with Maria Gualdani.
- [Recent Progress in Kinetic and Integro-Differential Equations](#), November 2022, Banff International Research Station. Co-organized with Maria Gualdani, Russell Schwab, and Maja Taskovic.
- [Workshop on Free Boundary Problems](#), May 2019, Columbia University. Co-organized with Daniela De Silva, Ovidiu Savin, and Hui Yu.
- [Workshop on Nonlinear PDEs](#), December 2018, Columbia University. Co-organized with Daniela De Silva, Ovidiu Savin, and Hui Yu.
- [Generated Jacobian Equations: from Geometric Optics to Economics](#), April 2017, Banff International Research Station. Co-organized with Jun Kitagawa and Robert McCann.
- [Optimal Transport School, Lake Arrowhead \(October 2013\)](#). Co-organized with Dima Shlyakhtenko and Christoph Thiele.
- SIAM Conference on Analysis of PDE 2011. *Non-local equations: perspectives from Probability and PDEs*. Co-organized with Russell Schwab.
- SIAM Conference on Analysis of PDE 2009. *Topics in fractional and geometric PDE*. Co-organized with Luis Caffarelli.

Selected Departmental Service

- Head writer, proposal for a new mathematics PhD at Texas State (currently submitted to the Texas Higher Education Coordinating Board), this was a multiple year effort involving job market analysis, obtaining letters of support from academia and industry, and coordinating curriculum.
- New PhD Proposal Committee, Chair.
- (at Texas State) Member of: Hiring Committee, Graduate Program Committee, the COVID 2019 pandemic Student Listening Committee, and Committee on Committees.
- (at UMass Amherst) Hiring Committee member (3 searches total between 2014 and 2019), Colloquium committee co-chair, Graduate admissions committee (3 years).