

Nestor Guillen

Department of Mathematics
Texas State University
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[[Google Scholar link](#)]

Appoinments

Texas State University

Associate Professor
Assistant Professor

2022 - present
2019 - 2022

University of Massachusetts at Amherst

Associate Professor (on leave)
Assistant Professor

2019 - 2020
2014 - 2019

University of California at Los Angeles

E.R. Hedrick Assistant Adjunct Professor

2011 - 2014

Mathematical Sciences Research Institute, Berkeley

Postdoctoral Fellow

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
Advisor: Lázaro Recht

July 2006

Fellowships, grants and awards

NSF CAREER Grant DMS-2144232. Award: \$498,969.00
NSF Research Grant DMS-1700307. Award: \$135,000.00
NSF Research Grant DMS-1201413. Award: \$102,000.00
Visiting Researcher at the *Fields Institute* in Toronto, Canada.
Graduate School Continuing Fellowship.
Lefevre Fellowship.
Wall Memorial Fellowship.
Frank Sid Richardson Foundation Regents Fellowship.
Frank Gerth III Graduate Excellence Award.

2022-present.
2017-2020.
2012-2016.
Fall 2014.
2009-2010.
Spring 2009.
Spring 2009.
Spring 2007.
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).

Selected conference talks

- *ICERM workshop, Optimal Transport in Data Science*, May 2023.
- *V Escuela sobre Análisis Funcional y Geometría*, October 2023.
- *Midwest Geometry Conference*. Plenary speaker. Wichita State University. March 2022.
- *Congreso Latinoamericano de Matemáticos*. (Análisis Funcional y Geometría). September 2021.
- *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

- Colloquium. University of Texas at San Antonio, March 2024.
- Analysis Seminar. Courant Institute, March 2024.
- Colloquium. University of Arizona, February 2024.
- Partial Differential Equations Seminar. Arizona State University, February 2023.
- Analysis Seminar. UT Austin, January 2023.
- 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.
- Analysis seminar. Massachusetts Institute of Technology, March 2017, Boston.
- Analysis Seminar. University of Chicago. October 2016, Chicago.
- 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.
- Colloquium. Purdue University. December 2013, West Lafayette.
- Geometric PDE seminar. Princeton University. September 2013. Princeton.

Minicourses taught

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

Organization of scientific meetings and schools.

- (planned for Spring 2025, exact date TBD) AIM workshop on kinetic equations. Co-organized with Maria Gualdani, Russell Schwab, and Maja Taskovic.
- (planned for May 2024) [Texas State and UT Austin Summer School and Workshop on Algorithms and PDE](#). Co-organized with Maria Gualdani.
- [1st San Marcos Winter School](#), January 2024.
- [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).