

Curriculum Vitae

Luis E. Silvestre

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Personal Information

Citizenship: Argentina and USA.

Education

Ph.D. Mathematics	May 2005
University of Texas, Austin, TX Advisor: Prof. Luis Caffarelli	
Licenciado en Matematica	December 2000
Universidad Nacional de La Plata, Argentina.	

Positions

Full Professor	September 2018 - present
University of Chicago. Chicago, IL.	
Associate Professor	September 2013 - August 2018
University of Chicago. Chicago, IL.	
Assistant Professor	September 2008 - August 2013
University of Chicago. Chicago, IL.	
Courant Instructor	Fall 2005 - August 31st 2008
Courant Institute. New York University. New York, NY.	

Fellowships and Awards

- First Prize in the Paenza Mathematical Contest 1995, 1997, 1998 and 1999
- Liftoff Fellowship from the Clay Mathematics Institute. Summer 2005
- NSF grant DMS-0701016 June 2007 - May 2010
- Sloan Research Fellowship 2009 - 2011
- NSF grant DMS-1001629 June 2010 - May 2013
- NSF FRG Project DMS-1065971 - with Luis Caffarelli, Yanyan Li, Fanghua Lin and Henri Berestycki 2011 - 2014
- NSF CAREER grant DMS-1254332 June 2013 - May 2018
- Invited speaker for the ICM 2014 in Seoul, South Korea August 2014
- NSF grant DMS-1764285 July 2018 - June 2021

Publications

1. *Coercivity estimates for integro-differential operators*. Jamil Chaker and Luis Silvestre. Submitted.
2. *Gaussian lower bounds for the Boltzmann equation without cut-off*. Cyril Imbert, Clement Mouhot and Luis Silvestre. Submitted.
3. *The Schauder estimate for kinetic integral equations*. Cyril Imbert and Luis Silvestre. Submitted.
4. *Multi-dimensional Burgers equation with unbounded initial data: well-posedness and dispersive estimates*. Denis Serre and Luis Silvestre. Archive of Rational Mechanics and Analysis. Accepted for publication.
5. *Decay estimates for large velocities in the Boltzmann equation without cut-off*. Cyril Imbert, Clement Mouhot and Luis Silvestre. Submitted.
6. *Oscillation properties of scalar conservation laws*. Luis Silvestre. *Communications on Pure and Applied Mathematics*. 72 (2019), no. 6, 13211348.
7. *Global a priori estimates for the inhomogeneous Landau equation with moderately soft potentials*. Stephen Cameron, Stanley Snelson and Luis Silvestre. *Annales de l'Institut Henri Poincaré (C) Anal. Non Linéaire*. 35 (2018), no. 3,
8. *The Weak Harnack inequality for the Boltzmann equation without cut-off*. Cyril Imbert and Luis Silvestre. *Journal of the European Mathematical Society*. Accepted for publication.
9. *Hölder gradient estimates for a class of singular or degenerate parabolic equations*. Cyril Imbert, Tianling Jin and Luis Silvestre. *Advances in Nonlinear Analysis*. 8 (2019), no. 1, 845867.
10. *Upper bounds for parabolic equations and the Landau equation*. Luis Silvestre. *Journal of Differential Equations* 262 (2017), no. 3, 3034-3055.
11. *An integro-differential equation without continuous solutions*. Luis Silvestre and Stanley Snelson. *Mathematical Research letters* 23 (2016), no. 4, 1157-1166.
12. *Hlder gradient estimates for parabolic homogeneous p -Laplacian equations*. Tianling Jin and Luis Silvestre. *Journal de Mathématiques Pures et Appliquées*. (9) 108 (2017), no. 1.
13. *Regularity estimates for fully non linear elliptic equations which are asymptotically convex*. Luis Silvestre and Eduardo Teixeira. *Progress in Nonlinear Differential Equations and their Applications*, 86, Birkhäuser/Springer, Cham, 2015.
14. *A new regularization mechanism for the Boltzmann equation without cut-off*. Luis Silvestre. *Communications in Mathematical Physics* 348 (2016), no. 1, 69-100.
15. *Regularity for parabolic integro-differential equations with very irregular kernels*. Russell Schwab and Luis Silvestre. *Analysis and PDE* 9 (2016), no. 3, 727-772.
16. *Propagation in a non local reaction diffusion equation with spatial and genetic trait structure*. Henri Berestycki, Tianling Jin and Luis Silvestre. *Nonlinearity* 29 (2016), no. 4, 1434-1466.
17. *Regularity estimates for parabolic integro- differential equations and applications*. Luis Silvestre. *Proceedings of the ICM 2014*.
18. *On a transport equation with nonlocal drift*. Luis Silvestre and Vlad Vicol. *Transactions of the American Mathematical Society* 368 (2016), no. 9, 6159-6188.
19. *A non local Monge-Ampere equation*. Luis Caffarelli and Luis Silvestre. *Communications in Analysis and Geometry* 24 (2016), no. 2, 307-335.
20. *On Landis' conjecture in the plane* Carlos Kenig, Luis Silvestre and Jenn-Nan Wang. *Communications in Partial Differential Equations*. 40 (2015), no. 4, 766-789.
21. *Overdetermined problems for fully nonlinear elliptic equations*. L. Silvestre and B. Sirakov. *Calculus of Variations and PDE*. 54 (2015), no. 1, 989-1007.
22. *Boundary regularity for viscosity solutions of fully nonlinear elliptic equations*. L. Silvestre and Boyan Sirakov. *Communications in Partial Differential Equations*. 39 (2014), no. 9, 1694-1717.

23. *Estimates on elliptic equations that hold only where the gradient is large.* C. Imbert and L. Silvestre. *Journal of the European Mathematical Society* 18 (2016), no. 6, 1321-1338.
24. *Uniqueness of radial solutions for the fractional Laplacian.* R. L. Frank, E. Lenzmann and L. Silvestre. *Communications on Pure and Applied Mathematics* 69 (2016), no. 9, 1671-1726.
25. *Holder regularity for generalized master equations with rough kernels.* L. Caffarelli and L. Silvestre. *Advances in Analysis: The Legacy of Elias M. Stein.* Princeton University Press, 2014.
26. *On the loss of continuity for super-critical drift-diffusion equations.* L. Silvestre, V. Vicol, A. Zlatos. *Archive of Rational Mechanics and Analysis.* 207 (2013), no. 3, 845-877.
27. *Global well-posedness of slightly supercritical active scalar equations.* M. Dabkowski, A. Kiselev, L. Silvestre and V. Vicol. *Analysis and PDE.* 7 (2014), no. 1, 43-72.
28. *$C^{1,\alpha}$ regularity of solutions of degenerate fully non-linear elliptic equations.* C. Imbert and L. Silvestre. *Advances in Mathematics.* 233 (2013), 196-206.
29. *Holder continuity to Hamilton-Jacobi equations with superquadratic growth in the gradient and unbounded right-hand side.* P. Cardaliaguet and L. Silvestre. *Communications in Partial Differential Equations.* 37 (2012), no. 9, 1668–1688.
30. *Partial regularity of solutions of fully nonlinear uniformly elliptic equations.* S. Armstrong, L. Silvestre and C. Smart. *Communications on Pure and Applied Mathematics.* 65 (2012), no. 8, 1169-1184.
31. *Holder continuity for a drift-diffusion equation with pressure.* V. Vicol and L. Silvestre. *Annales de l'Institut Henri Poincaré (C) Anal. Non Linéaire.* 29 (2012), no. 4, 637-652.
32. *Unique continuation for fully nonlinear elliptic equations.* S. Armstrong and L. Silvestre. *Mathematical Research Letters.* Volume 18, Issue 5, September 2011 pp. 921-926.
33. *On the differentiability of the solution to an equation with drift and fractional diffusion.* L. Silvestre. *Indiana University Mathematical Journal.* 61 (2012), no. 2, 557-584.
34. *On divergence free drifts.* G. Seregin, L. Silvestre, V. Sverak and A. Zlatos. *Journal of Differential Equations* 252 (2012), no. 1, 505-540.
35. *Holder estimates for advection fractional-diffusion equations.* L. Silvestre. *Annali della Scuola Normale Superiore di Pisa. Classe di Scienze* (5) 11 (2012), no. 4, 843-855.
36. *Full regularity of a free boundary problem with two phases.* H. Jiang, C. Larsen and L. Silvestre. *Calculus of Variations and PDE* 42 (2011), no. 3-4, 301-321.
37. *Holder continuity for integro-differential parabolic equations with polynomial growth respect to the gradient.* L. Silvestre. *Discrete and Continuous Dynamical Systems* Volume: 28, Number: 3, November 2010. A special issue Dedicated to Louis Nirenberg on the Occasion of his 85th Birthday Part II
38. *Eventual regularization of the slightly supercritical fractional Burgers equation.* C. H. Chan, M. Czubak and L. Silvestre. *Discrete and Continuous Dynamical Systems* Volume: 27, Number: 2, June 2010. A special issue Trends and Developments in DE/Dynamics Part I.
39. *On the differentiability of the solution to the Hamilton-Jacobi equation with critical fractional diffusion.* L. Silvestre. *Advances in Mathematics.* 226 (2011), no. 2, 2020-2039
40. *Smooth approximations to solutions of nonconvex fully nonlinear elliptic equations.* L. Caffarelli and L. Silvestre. *American Mathematical Society Translations–Series 2 Advances in the Mathematical Sciences* 2010; Volume: 229. *Nonlinear Partial Differential Equations and Related Topics: Dedicated to Nina N. Uraltseva.*
41. *On the Evans-Krylov theorem.* L. Caffarelli and L. Silvestre. *Proceedings of the AMS.* 138 (2010), 263-265.
42. *The Evans-Krylov theorem for non local fully non linear equations.* L. Caffarelli and L. Silvestre. *Annals of Mathematics.* 174 (2011), no. 2, 1163-1187.

43. *Regularity results for nonlocal equations by approximation.* L. Caffarelli and L. Silvestre. *Archive of Rational Mechanics and Analysis*. Volume 200, Issue 1 (2011), Page 59.
44. *Eventual regularization in the slightly supercritical quasi-geostrophic equation.* L. Silvestre. *Annales de l'Institut Henri Poincaré (C) Non Linear Analysis* 27 (2010), Issue 2, Pages 693-704.
45. *The Dirichlet Problem for the Convex Envelope* A. Oberman and L. Silvestre. *Transactions of the AMS* 363 (2011), no. 11, 5871-5886.
46. *Regularity theory for fully nonlinear integro-differential equations.* L. Caffarelli and L. Silvestre. *Communications on Pure and Applied Mathematics*. 62 (2009) Issue 5, 597–638.
47. *A characterization of optimal two-phase multifunctional composite designs.* L. Silvestre. *Proc. of the Royal Soc. of London A* 463, Number 2086 (2007).
48. *Regularity estimates for the solution and the free boundary to the obstacle problem for the fractional Laplacian.* L. Caffarelli, S. Salsa and L. Silvestre. *Inventiones Mathematicae*. 171, Number 2 (2008).
49. *Regularity for the nonlinear Signorini problem.* E. Milakis and L. E. Silvestre. *Advances in Mathematics*. 217, Issue 3 (2008).
50. *An extension problem related to the fractional laplacian.* L. A. Caffarelli and L. E. Silvestre. *Communications in Partial Differential Equations*, 32 (2007) 8, 1245.
51. *Regularity of the obstacle problem for a fractional power of the laplace operator.* L. E. Silvestre. *Communications on Pure and Applied Mathematics*. 60 (2007), no. 1, 67–112.
52. *Issues in homogenization for problems with nondivergence structure.* L. A. Caffarelli and L. E. Silvestre. *Calculus of variations and nonlinear partial differential equations*, 43–74, *Lecture Notes in Math.*, 1927, Springer, Berlin, 2008.
53. *Hölder estimates for solutions of integro differential equations like the fractional laplace.* L. E. Silvestre. *Indiana University Mathematical Journal* 55 (2006), 1155-1174.
54. *Regularity for fully nonlinear elliptic equations with Neumann boundary data.* E. Milakis and L. E. Silvestre. *Communications in Partial Differential Equations* 31 (2006), No. 8
55. *The two membranes problem.* L. E. Silvestre. *Communications in Partial Differential Equations* 30 (2005), no. 1-3, 245–257
56. *Weak Matrix Majorization.* F. D. Martínez Pería, P. Massey and L. E. Silvestre. *Linear Algebra Appl.* 403 (2005), 343–368.

Talks in conferences

- Free Boundary Problems. Theory and Applications. Focus session on obstacle type problems. June 2005, Coimbra, Portugal.
- 2006 AMS Spring Southeastern Meeting. Special Session on Singular Integrals, Geometric Analysis, and Free Boundary Problems. April 1, 2006. Miami, FL.
- 2006 AMS Fall Eastern Section Meeting. Storrs, CT, October, 2006.
- International Conference on Partial Differential Equations and Applications. Beijing Normal University. June 2007, Beijing, China.
- Prairie Analysis Seminar. November 2nd, 2007. Manhattan, KS.
- Recent Trends in Nonlocal Operators and Applications. April 2008. Banff, Canada.
- Free Boundary Problems. Theory and Applications. Focus session on Regularity of free boundaries. June 2008. Stockholm, Sweden.
- Workshop on Geometric PDEs. Institute for Advance Studies. February 2009. Princeton, NJ.
- IV International Symposium on Nonlinear Equations and Free Boundary Problems. Mar del Plata, Argentina, March 2009.

- The 3D Euler and 2D Surface Quasi-geostrophic Equations Meeting. American Institute of Mathematics in Palo Alto, CA. April 2009.
- Workshop on Nonlocal equations. Leganes, Spain. July 2009.
- SIAM Conference on Analysis of Partial Differential Equations. Miami. December 2009.
- Conference on Nonlocal operators and partial differential equations. Bedlweo, Poland. June 2010.
- Past Themes and Current developments. A Special Workshop on Nonlinear Partial Differential Equations. Beijing, China, July 2010.
- Nonlinear PDEs. Valparaiso, Chile. January 2011.
- Free Boundary Problems, Theory and Applications. MSRI. Berkeley, CA. March 2011.
- Fronts and Nonlinear PDEs. A conference in honor of Henri Berestycki. Ecole normale suprieure. Paris. June 2011.
- Partial Differential Equations workshop. Oberwolfach. August 2011.
- Progress in Nonlinear Partial Differential Equations. Zhejiang University, Hangzhou, China. June, 2012.
- ERC Workshop on Geometric Partial Differential Equations. Pisa, Italy. September, 2012.
- Recent Advances in PDEs and Fluids. Stanford University. September, 2013.
- Kinetics, non standard diffusions and stochastics: emerging challenges in the sciences. Workshop. UT Austin. May 2014.
- International Congress of Mathematicians. Seoul, South Korea. August 2014.
- Calculus of Variations and Nonlinear Partial Differential Equations. Austin. May 2015.
- 6th Symposium on Analysis and PDEs. Purdue Univ. June 2015.
- Mostly Maximum Principles, Salerno, September 2015.
- Midwest PDE workshop. Michigan State University, November 2015
- Annual meeting of the Argentinian Mathematical Union. Plenary speaker. Argentina. September 2016.
- Rivière-Fabes symposium. University of Minnesota. Minneapolis, April 2017.
- CBMS Nonlocal Dynamics. Illinois Institute of Technology. June 2017.
- Interacting Particle Systems and Parabolic PDEs. Banff. August 2018.
- Workshop on Free Boundary Problems. Columbia University. May 2019.
- Mathematical Frontiers in the Analysis of Many-particle Systems. Cambridge, UK. July 2019.

Minicourses taught

- Minicourse at INdAM Intensive Period. Pavia, Italy, June 2009.
- Minicourse at Universidad Autonoma de Madrid. Madrid. July 2009.
- Minicourse at the University of Chicago. Concentration period on nonlinear elliptic PDEs. May 2012.
- Minicourse at Bielefeld University, Germany. Summer School 2012 on Nonlocal Operators. July, 2012.
- Recent advances in partial differential equations and applications. Universita degli Studi di Milano. June 2013.
- 11th Workshop on Interactions between Dynamical Systems and Partial Differential Equations (JISD2013). UPC - Barcelona. July 2013.
- Inaugural Chicago Summer School in Analysis. University of Chicago. June 2014.
- Second Chicago Summer School In Analysis. university of Chicago. June 2015

- INDAM - Nonlinear PDEs in Geometry and Physics. Cortona. June 2018.

Talks in university seminars.

- Analysis seminar. Massachusetts Institute of Technology. November 2004.
- Analysis seminar. Royal Institute of Technology (KTH). March 2005. Stockholm, Sweden.
- Seminario di calcolo delle variazioni ed equazioni differenziali. Politecnico di Milano. June 2005. Milan, Italy.
- Geometric Analysis seminar. Princeton University. October 2005.
- PDE seminar. Purdue University. October 2005.
- PDE seminar. Brown University. October 2005.
- Geometry/Analysis Seminar. Columbia University. February 23, 2006.
- PDE Seminar. University of Texas at Austin. August 2006.
- PDE seminar. East China Normal University. June 2007, Shanghai, China.
- Rutgers University. September 18, 2007.
- Geometric Analysis seminar. Princeton University. October 5th, 2007.
- Colloquium. Kansas State University. November 1st, 2007.
- Analysis Seminar. Massachusetts Institute of Technology. February 2008.
- PDE seminar. Universidad de Buenos Aires. July 2008. Argentina.
- Differential Geometry/PDE Seminar. University of Washington. Seattle. January 2009.
- PDE seminar. Carnegie Mellon. March 2010.
- PDE seminar. UT Austin. April 2010.
- PDE seminar. University of Bonn. July 2010. Germany.
- PDE seminar. Georgia Tech. November 2010.
- Seminar at the departamento de aeronáutica, UNLP. La Plata, Argentina, August 2010.
- Geometric Analysis seminar. Princeton University. February 2011.
- Calderon-Zygmund seminar. University of Chicago. March 2011.
- Analysis seminar. University of Wisconsin, Madison. September 2011.
- Analysis seminar. Northwestern University. November 2011.
- PDE seminar. Université Paris-Est Créteil. November 2011.
- Applied Analysis and Computation Seminar. UMass., Amherst. November 2011.
- DG-MP-PDE Seminar. University of British Columbia. January 2012.
- Seminar of Mathématiques appliquées. Collège de France. March 2012.
- Colloquium. Rutgers University. April 2012.
- Colloquium. UCLA. May 2012.
- Seminari d'EDP's i Aplicacions. UPC. Barcelona. September 2012.
- PDE Seminar. Brown University. October 2012.
- Differential Geometry & Geometric Analysis Seminar. Princeton University. February 2013.
- Joint Caltech/UCLA Analysis seminar. April 2013.
- Recent Advances in Nonlinear Partial Differential Equations. Courant Institute. May 2013.
- Seminario di Equazioni Differenziali. Tor Vergata University in Rome. July 2013.
- PDE seminar. Univ. Paris-Dauphine. October 2013.
- Analysis seminar. Ecole Polytechnique. Paris. October 2013.

- PDE/Analysis seminar. Massachusetts Institute of Technology. December 2013.
- Colloquium. Northwestern University. November 2014.
- Colloquium. Notre Dame University. December 2014.
- Joint Princeton-Rutgers Geometric PDE seminar. Princeton. March 2015.
- PDE Seminar. Univ. Creteil. Paris. July 2015.
- Analysis seminar. University of Wisconsin, Madison. October 2015.
- Analysis and Applied Mathematics seminar. University of Illinois at Chicago. November 2016
- PDE seminar. Brown University. November 2017.
- Analysis seminar. Princeton University. November 2017.
- Center for Nonlinear Analysis Colloquium. Carnegie Mellon University. March 2018.
- Colloquium. Louisiana State University. April 2018.
- Applied Math seminar. Stanford University. October 2018.
- Colloquium. Rutgers University. March 2019.

Editorial boards

- Advances in Calculus of Variations
- Analysis in Theory and Applications
- Discrete and Continuous Dynamical Systems - A.
- Interfaces and Free boundaries.
- Journal of Functional Analysis.
- Potential Analysis
- Revista de la Union Mathematica Argentina

Other service

- Refereed articles for many journals.
- Organizer of the workshop “Nonlocal PDEs, Variational Problems and their Applications” at IPAM. 2012
- Organized of the concentration period on nonlinear elliptic PDEs. Chicago. May 2012.
- Organizer of the Inaugural Chicago Summer School In Analysis. June 2014.
- Scientific committee of the 3rd Conference on Nonlocal Operators and Partial Differential Equations. Bedlewo, Poland, June 2016.
- Organizing committee for the SIAM Conference on Analysis of Partial Differential Equations (PD17)
- Centennial Fellowship Committee. July 2017 to June 2019.
- Organizer of the Fourth Chicago Summer School In Analysis. June 2017.
- Organizer of the conference *Non Standard Diffusions in Fluids, Kinetic Equations and Probability*. Marseille. December 2018.