TATIANA TORO
CURRICULUM VITAE

EDUCATION

• Ph.D.: Stanford University -1992 - Advisor: Leon Simon

PROFESSIONAL EXPERIENCE

Spring 2017	Chancellor Professor UC Berkeley
Spring 2017	Member of the Mathematical Sciences Research Institute (MSRI), Berkeley, CA.
2016-	Craig McKibben & Sarah Merner Professor in Mathematics.
2012-2016	Robert R. & Elaine F. Phelps Professor in Mathematics.
Fall 2005	Visiting Professor, University College London, UK.
2002-	Professor, University of Washington.
2001-2002	Visiting Associate Professor and Visiting Scholar, Harvard University (invited).
2001-2002	Fellow at the Radcliffe Institute for Advanced Study, Harvard University (invited).
1998-2002	Associate Professor, University of Washington
Fall 1997	Member at MSRI, Berkeley, California.
1996-1998	Assistant Professor, University of Washington
1994-1996	Assistant Professor, The University of Chicago
1993-1994	Morrey Jr. Assistant Professor, University of California at Berkeley
1992-1993	Member at the Institute for Advanced Study

HONORS & AWARDS

2019	Landolt Distinguished Graduate Mentor Award, UW.
2019-2020	Simons Foundation Fellowship
2017	Miembro Correspondiente de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales
2016	Fellow of the AMS
2016-	Craig McKibben & Sarah Merner Professor in Mathematics
2015-2016	Guggenheim Foundation Fellowship
2012-	Robert R. & Elaine F. Phelps Professorship in Mathematics
2012-2013	Simons Foundation Fellowship
1996-2000	Alfred P. Sloan Research Fellowship
1994-1998	NSF Mathematical Sciences Postdoctoral Research Fellowship
1991-1992	Alfred P. Sloan Doctoral Dissertation Fellowship

NSF GRANTS

1997-2001 National Science Foundation
2000-2003 National Science Foundation
2003-2006 National Science Foundation

Fall 2003 Transitional Support grant from ADVANCE.
2006-2009 National Science Foundation
2009-2014 National Science Foundation
2009-2014 NSF co-PI RTG
2014-2017 National Science Foundation
2017-2020 National Science Foundation

NOTABLE INVITATIONS

• **National Academy of Sciences.** 8th Annual Symposium: *FRONTIERS OF SCIENCE*, Arnold and Mabel Beckman Center, Irvine, California, November 1996.

• **Invited Professor**, Université de Paris Sud, Orsay (One month in 2000).

• **ICM 2010** Invited speaker to the Analysis session at ICM 2010 in Hyderabad, India, August 2010.

• **AMS 2011** Invited one hour address at the Joint Mathematics Meeting in New Orleans, Louisiana, January 2011.

• **2016** NAM Clayton-Woodard Lecture at the Joint Mathematics Meeting in Seattle, Washington, January 2016.

• **2017** 23rd Nevanlinna Colloquium, June 2017, ETH, Zurich.

2018 Riviére-Fabes Symposium, Minneapolis, Minnesota, April 2018.

2018 Memorial José Luis Rubio de Francia, Madrid, Spain, May 2018.

2019 Taft Lecture, University of Cincinnati, Cincinnati, OH, April 2019.

2019 Keynote speaker at the Young Mathematicians Conference (YMC 2019), August 2019, Ohio State University, Columbus,OH

2019 The 2019 Northeast Analysis Network Conference, Excelsior Lecture, September 2019, University of Connecticut, Storrs

2020 First annual AMS Mirzakhani lecture at the Joint Mathematics Meeting in Denver, Colorado, January 2020.

2020 The Abel Symposium, Roros Norway, June 2020

2020 Sexto Congreso Latinoamericano de Matemáticas (CLAM), Montevideo, Uruguay.

SELECTED INVITED MINI-COURSES

• Introductory Workshop in Harmonic Analysis. Mini-course: Geometric Measure Theory, Harmonic Analysis and Potential Theory, MSRI, Berkeley, CA, August 18-22, 1997.

• 6th School on "Analysis and Geometry in Metric Spaces". Mini-course: Geometry of measures, Trento, Italy, June 7-12, 2009.

• MSRI Summer Graduate Workshop on "Geometric Measure Theory and Applications", Berkeley, CA, July 11-22, 2011.

• 9th International conference in Harmonic Analysis and and Partial Differential Equations, El Escorial, Madrid, Spain, June 11-15, 2012.

• Inaugural Chicago Summer School in Analysis, University of Chicago, Chicago, IL, July 7-11, 2014.

- 2015 Workshop for Women in Analysis and PDE, University of Minnesota, Minneapolis, MN, May 28-31, 2015.
- Geometric Measure Theory: Theory and Applications, Summer School Grenoble, June 15-19, 2015.
- Geometric Measure Theory: Theory and Applications, Summer School IMPA, Rio de Janeiro, Brazil, February 15-18, 2016.
- Geometric Measure Theory, ICMAT, Spain, May 2018.
- IAS Women and Math Program, Princeton, NJ, May 2019.

PROFESSIONAL AND PUBLIC SERVICE

Pacific Institute for the Mathematical Sciences Service:
- University of Washington PIMS site director (2000 - 2001).
- Member of the PIMS scientific review panel, 2005 - 2013 (Chair 2009-2013).
- Member of the PRIMA congress scientific committee (Sidney - Australia - 2009).
- Member of the PRIMA steering committee (2010-).
- Member of the PIMS director search committee (2015).
- Member of the PIMS Board of Directors (2016-)

Mathematical Sciences Research Institute Service:

- Member of MSRI Scientific Advisory Board (2016- 2021)(Co-chair 2018-2021)

Institute for Pure and Applied Mathematics Service:
- IPAM Board of Trustees, 2009-
- Nominating Committee IPAM Board of Trustees, 2011
- Speaker on behalf of IPAM's program Interactions between Analysis and Geometry (Spring 2013) at the Modern Mathematics Workshop, SACNAS National Conference, Seattle October 2012.

International Mathematical Union:

- Member of the US National Committee for the International Mathematical Union, 2016-

Sociedad Colombiana de Matematicas

- Member of the evaluation committee for the José Fernando Escobar prize (2017)

Advisory Boards
- College Assistance Migrant Program (CAMP) at the University of Washington (2015-)

Editor:
- Proceedings of the AMS (2009-2015)
- Journal of Potential Analysis, Springer-Verlag (2010-2014)

- AMS University Lecture Series (2011-)
- Analysis and Geometry in Metric Spaces (2012-)
- Transactions and Memoirs of the AMS (2015-2019)
- Coordinating Editor of Geometric Analysis and PDE for Transactions and Memoirs (2017 - 2019)
- Analysis & PDE (2016-2019)

AMS Service:
- Member of the Council at large of the AMS, 1999-2001.
- Member of the Western Section Program Committee, AMS 2000 - 2002 (Chair 2001 -2002)
- Member of the AMS Centennial Fellowship Committee, July 2004-June 2006.
- Chair of the Joint Program Committee for the AMS-MAA Joint Mathematics Meetings, February 2012 - January 2013.
- Member of the Program Committee for National Meeting, February 2015- January 2018 (Chair January 2016 - January 2017)
- Member of AMS Editorial Boards Committee (2016-2019) (elected position)
- Member of the AMS Colloquium Lecture Committee (February 2020 - January 2022)

AWM Service:
- Member of the selection committee for the AWM Sadosky Research Prize in Analysis, 2013-2014.
- Member of the selection committee for the AWM Michler Prize, 2014 -

SELECTED CONFERENCES ORGANIZED

- (Joint G. Fabes and J. Pipher) Workshop in Harmonic Analysis, Potential Theory and Geometric Measure Theory, MSRI, Berkeley, CA,1997.
- (Joint S.T. Yau) JDG 2002: Fifth Conference on Geometry and Topology: Special celebration in honor of Karen Uhlenbeck's brithday, Harvard University, Boston, MA, 2002.
- (Joint Ana Granados and Hervé Pajot) Analysis and Geometric Measure Theory Workshop, BIRS, Banff, Canada, 2002.
- (Joint D. Dos Santos Ferreira, J. Pipher, and G. Ponce) International Conference on Harmonic Analysis and Partial Differential Equations, University of Chicago, IL, 2004. Funded by NSF, IMA and the Clay Institute.
- (Joint P. Li, F. Lin, R. Schoen and S.T. Yau) International Conference in Geometry and Analysis in Celebration of Professor Leon Simon's 60th Birthday, Center of Mathematical Sciences, Zhejiang University, Hangzhou, China, 2005.
- Co-organizer of the Free Boundary Problems and Applications program at MSRI Spring 2011.
- (Joint Camillo DeLellis) MSRI Summer Graduate Workshop on "Geometric Measure Theory and Applications", Berkeley, CA, 2011.
- Co-organizer of Lat@math 2015 sponsored by IPAM and PIMS, IPAM, UCLA, April 9-11, 2015.
- Co-organizer AWM Symposium, IPAM, April 2017.
- Co-organizer 2017-2022 (joint Alessio Figalli & Neshan Wickramasekera) Calculus of Variations, Mathematisches Forchungsinstitut Oberwolfach, Germany.

- Co-organizer of Lat@math 2018, UCLA, March 2018.
- Co-organizer (joint C. Kenig, F-H. Lin & S.Mayboroda) IAS/Park City Mathematics Institute, July 2018.
- Co-organizer of IAS Women and Math Program, May 2019.

THESIS STUDENTS

Ph.D. Degrees Supervised

- Kris Kissel, PhD 2007, UW. Tenure at Green River College, WA.
- Matthew Badger, Ph.D. 2011, UW. Simons postdoctoral fellow at Stony Brook (2011-2014) - NSF postdoctoral fellowship (2012-2015). Currently tenure track position at the University of Connecticut. CAREER grant (2016-2021).
- Stephen Lewis, PhD 2014, UW. He held a postdoctoral position at the University of Minnesota for 6 months, then moved to industry currently at Panopto.
- Jessica Merhej, PhD 2016, UW. Assistant Professor Notre Dame University, Beirut, Lebanon.
- Dali Nimer, PhD 2017, UW. Fall 2017, postdoctoral position at the University of Chicago. Visiting student at the University of Warwick (Winter 2017) under the supervision of D. Preiss.
- Zihui Zhao, PhD 2018. IAS 2018-19, postdoctoral position at the University of Chicago 2019-2022.
- Sean McCurdy, PhD 2019, UW. Postdoctoral position at Carnagie Mellon.
- Yue Zhao, 6th year graduate student, UW.
- Max Goering, 5th year graduate student, UW.
- David Simmons, 4th year graduate student, UW.

POSTDOCTORAL FELLOWS

- Emmanouil Milakis, currently University of Cyprus.
- Tu Nguyen.
- Jonas Azzam, currently University of Edinburgh.
- Mariana Smit Vega Garcia, UW.
- Spencer Becker-Kahn, UW.
- Simon Bortz, UW.

Articles

1. *Surfaces with generalized second fundamental form in L^2 are Lipschitz manifolds*, J. Differential Geometry, **39**, 1994, 65-101.

2. *Geometric conditions and existence of bilipschitz parameterizations*, Duke Mathematical Journal, **77**, 1995, 193-227.

3. *Compactness Properties of Weakly p-Harmonic Maps into Homogeneous Spaces*, (with C.Y. Wang), Indiana Univ. Math. J., **44**, 1995, 87-113.

4. *Harmonic Measure on Locally Flat Domains*, (with C. Kenig), Duke Mathematical Journal, **87**, 1997, 509-551.

5. *Doubling and Flatness: Geometry of Measures*, Notices of the AMS, **44**, 1997, 1087-1094.

NOTE: H. Rossi, editor of the Notices of the AMS requested that I write this paper for the Notices. It was subsequently refereed by two people.

6. *Free Boundary Regularity for Harmonic Measures and Poisson Kernels* (with C. Kenig), Annals of Math. **150**, 1999, 369-454.

7. *Reifenberg Flat Metric Spaces, Snowballs and Embeddings*, (with G. David), Math. Ann., **315**, 1999, 641-720.

8. *Asymptotically Optimally Doubling Measures and Reifenberg Flat Sets with Vanishing Constant*, (with G. David and C. Kenig), Comm. Pure Appl. Math, **54**, 2001, 385-449.

9. *A new approach to absolute continuity of elliptic measure, with applications to non-symmetric equations*, (with C. Kenig, H. Koch and J. Pipher), Adv. Math. **153**, 2000, no. 2, 231–298.

10. *Free Boundary Regularity for the Poisson Kernel*, Proceedings of the Eleventh Tokyo Conference in Nonlinear PDE 2001.

11. *Free Boundary Regularity for the Poisson Kernel below the Continuous Threshold*, (joint C. Kenig), Math. Research Letters, **9**, 2002, 247-254.

12. *Poisson Kernel Characterization of Reifenberg Flat Chord Arc Domains*, (with C. Kenig), Ann. Scient. Ec. Norm. Sup. **36**, 2003, 323-401.

13. *On the free boundary regularity theorem of Alt and Caffarelli*, (with C. Kenig), Discrete and Continuous Dynamical Systems **10**, 2004, 397-422.

14. *Regularidad por debajo del umbral de continuidad*, Boletín de Matemáticas, **8**, 2001, 60-67.

15. *On the free boundary regularity theorem of Alt and Caffarelli, Errata*, (with C. Kenig), Discrete and Continuous Dynamical Systems **14**, 2006, 857-859.

16. *Free boundary regularity below the continuous threshold: 2-phase problems* (with C. Kenig), J. Reine Angew. Math. **596**, 2006, 1-44.

17. *When do good parameterizations exit?*, (extended abstract) Proceedings of the AWM and MSRI workshop Women in mathematics: the legacy of Ladyzhenskaya and Oleinik , May 2006.

18. *Stability of Lewis and Vogel's result* (with D. Preiss), Revista Matemática Iberoamericana **23**, 2007, 17-55.

19. *Two phase free boundary regularity problem for Harmonic measure and Poisson kernel* Report No 33/2005, Mathematisches Forschungsinstitut Oberwolfach, 1898-1900.

20. *Regularity of measures with Hölder density ratio* Report No 35/2007, Mathematisches Forschungsinstitut Oberwolfach, 2046-2048.

21. *A generalization of Reifenberg's theorem in $\mathbf{R}^3$* (with G. David and T. DePauw), GAFA **18** 2008, 1168-1235.

22. *Geometry of Measures: Harmonic Analysis meets Geometric Measure Theory* Handbook of geometric analysis. No. 1, 449465, Adv. Lect. Math. (ALM), 7, Int. Press, Somerville, MA, 2008

23. *Boundary Structure and size in terms of interior and exterior harmonic measures in higher dimensions* (with C. Kenig and D. Preiss), J. Amer. Math. Soc. **22** (2009), 771-796.

24. *On the smoothness of Hölder-doubling measures* (with D. Preiss and X. Tolsa), Calculus of Variations and PDE's 35 (2009), 339-363.

25. *Divergence form operators in Reifenberg flat domains* (with E. Milakis), Mathematische Zeitschrift 264 (2010), 15-41.

26. *The Cauchy problem for Schrödinger flows into Kähler manifolds* (joint Kenig, Lamm, Pollack, Staffilani) Discrete and Continuous Dynamical Systems **27**, 2010, 389-439.

27. *Potential Analysis meets Geometric Measure Theory*, Proceedings of ICM 2010, **III**.

28. *Reifenberg parameterizations for sets with holes* (joint G. David), Memoirs of the AMS, **215** 2012.

29. *Harmonic Analysis on Chord Arc Domains* (joint with E. Milakis and J. Pipher), J. Geom. Anal. **23** (2013), 2091–2157.

30. *Quasisymmetry and rectifiability of quasispheres* (joint with M. Badger, J. Gill and S. Rohde), Trans. Amer. Math. Soc. **366** (2014), no. 3, 1413-1431.

31. *Perturbations of elliptic operators in chord arc domains* (joint with E. Milakis and J. Pipher), Contemporary Mathematics, **612** (2014) Amer. Math. Soc., 143-161.

32. *Rectifiability via a square function and Preiss' theorem* (joint with X. Tolsa), to appear in International Mathematics Research Notices 2014; (DOI) 10.1093/imrn/rnu082

33. Regularity of Almost Minimizers with Free Boundary (joint with G. David), Calculus of Variations and PDEs,**54** (2015), 455-524.

34. *Square Functions and the A_∞ Property of Elliptic Measures* (joint C. Kenig, B. Kirchheim, and J. Pipher) The Journal of Geometric Analysis, **26** (2016), 2383-2410. (DOI) 10.1007/s12220-015-9630-6

35. *Quasiconformal planes with bi-Lipschitz pieces and extensions of almost affine maps* (joint with J. Azzam and M. Badger), Adv. Math., **275** (2015), 195-259.

36. *Wasserstein Distance and the Rectifiability of Doubling Measures: Part I* (joint with J. Azzam and G. David), Mathematische Annalen, **364** (2016), 151-224.

37. *Wasserstein Distance and the Rectifiability of Doubling Measures: Part II* (joint with J. Azzam and G. David) Mathematische Zeitschrift, **286** (2017), 861-891.

38. *Structure of sets which are well approximated by zero sets of harmonic polynomials* (joint M. Badger and M. Engelstein) Analysis & PDE 10-6 (2017), 1455–1495. DOI 10.2140/apde.2017.10.1455 (arXiv:1509.03211)

Articles Accepted

39. *A new characterization of chord-arc domains* (joint J. Azzam, S. Hofmann, J.M. Martell, and K. Nyström) to appear in JEMS.

40. *A_∞ implies NTA for a class of variable coefficient elliptic operators* (joint S. Hofmann and J.M. Martell) (arXiv:1611.09561) to appear in Journal of Differential Equations.

41. *Boundary rectifiability and elliptic operators with $W^{1,1}$ coefficients* (joint with Z. Zhao) to appear in Advances in Calculus of Variations.

42. *Geometric measure theory - Some recent applications*, Notices of the AMS in April 2019.

Preprints

43. *Free boundary regularity for almost-minimizers* (joint G. David and M. Engelstein)(arXiv:1702.06580)to appear in Advances in Mathematics

44. *Uniform rectifiability and elliptic operators satisfying a Carleson measure condition. Part I: The small constant case* (joint S. Hofmann, J.M. Martell, S. Mayboroda, and Z. Zhao) arXiv:1710.06157

45. *Regularity of the singular set in a two-phase problem for harmonic measure with Hölder data* (joint M. Badger and M. Engelstein) arXiv:1807.08002

46. *Characterization of rectifiable measures in terms of α-numbers* (joint J. Azzam and X. Tolsa) arXiv:1808.07661

47. *Perturbation of elliptic operators in 1-sided NTA domains satisfying the capacity density condition* (joint M. Akman, S. Hofmann and J.M. Martell) arXiv:1901.08261

48. *Perturbations of elliptic operators in 1-sided chord-arc domains. Part II: Non-symmetric operators and Carleson measure estimates* (joint J. Cavero, S. Hofmann, J.M. Martell) arXiv:1708.06541

49. *Two Phase Free Boundary Problem for Poisson Kernels*(joint S. Bortz, M.Engelstein, M. Goering, and Z. Zhao) arXiv:1908.03033

50. *Uniform rectifiability and elliptic operators satisfying a Carleson measure condition. Part II: The large constant case* (joint S. Hofmann, J.M. Martell, S. Mayboroda, and Z. Zhao) arXiv:1908.03161

51. *Regularity for almost-minimizers of variable coefficient Bernoulli-type functionals*(G. David, M. Engelstein, M. Smit-Vega-García & T. Toro), arXiv:1909.05043