

Daniela De Silva
Professor of Mathematics

Curriculum Vitae

ADDRESSES

Department of Mathematics
Barnard College, Columbia University,
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560 Riverside Dr.,
New York, NY 10027
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DEGREES IN HIGHER EDUCATION

Massachusetts Institute of Technology
September 2001 – June 2005
Ph.D in Mathematics
Dissertation title: “Existence and regularity of monotone solutions to free boundary problems”
Dissertation Advisor: David Jerison

University of Naples “Federico II”
October 1993 – November 1997
B.A. Summa cum Laude in Mathematics

ADDITIONAL PROFESSIONAL TRAINING

Massachusetts Institute of Technology
Department of Mathematics
September 2000 – August 2001
Visiting Student

University of Naples “Federico II”
September 1998 – September 2001
Doctoral Fellow

University of Naples “Federico II”
January 1998 – August 1998
“Istituto Nazionale di Alta Matematica” Fellow

PROFESSIONAL EXPERIENCE IN HIGHER EDUCATION

Barnard College, Columbia University, Department of Mathematics
July 2016 – Present
Associate Professor

Barnard College, Columbia University, Department of Mathematics
 July 2009 – June 2016
 Assistant Professor

Barnard College, Columbia University, Department of Mathematics
 August 2007 – June 2009
 Term Assistant Professor

Johns Hopkins University, Department of Mathematics
 January 2006 – July 2007
 J.J. Sylvester Assistant Professor

Mathematical Sciences Research Institute
 August 2005 – December 2005
 Postdoctoral Fellow

Massachusetts Institute of Technology, Department of Mathematics
 September 2003 – December 2004
 Teaching Assistant

ACADEMIC AND PROFESSIONAL HONORS

Tow Research Award, Spring 2018

GS Excellence in Teaching Award, Spring 2018

AWM Sadosky Research Prize 2016

Honorable Mention for the Emily Gregory Award, 2014-2015

NSF Grant DMS-1301535, 2013-2016

Best paper award in *Annales de l'Institut Henri Poincare* 2012-2013

ERC grant “ ϵ : Elliptic PDE's and Symmetry of Interfaces and Layers for Odd Nonlinearities”, 2012-2016

Gladys Brooks Award for Teaching Excellence, May 2012

COURSES TAUGHT

BARNARD COLLEGE, COLUMBIA UNIVERSITY

- *Calculus IV*
 Spring 2019 (2 Sections)
- *Intro to Fourier Analysis*
 Spring 2018
- *Calculus III*
 Fall 2018, Fall 2017, Spring 2017 (2 Sections), Spring 2016

- *Introduction to Modern Analysis I*
Spring 2016, Spring 2015, Spring 2013, Spring 2012, Spring 2010
- *Introduction to Modern Analysis II*
Fall 2016, Fall 2013, Fall 2012
- *Introduction to PDEs*
Spring 2008
- *Calculus II*
Spring 2015, Fall 2013, Spring 2013, Fall 2011, Spring 2011, Fall 2009, Spring 2009
(2 Sections), Fall 2008, Fall 2007 (2 Sections)
- *Undergraduate Seminars*
Fall 2019, Fall 2018, Fall 2017, Fall 2016, Fall 2014, Fall 2012, Spring 2012, Spring
2010, Spring 2008
- *Perspectives in Mathematics*
Fall 2018, Fall 2017, Fall 2013, Fall 2012
- *Graduate course on PDEs*
Spring 2018, Fall 2014
- *Independent Studies*
Fall 2019 (1BC student), Spring 2016 (1 BC student), Fall 2013 (1 CC student),
Spring 2013 (2 BC students, 1 CC student), Spring 2008(1 CC student)
- *Graduate dissertation Committes*
Beomjun Choi (Spring 2019), Connor Mooney (Spring 2015), Michael Jenkinson
(Spring 2015)

JOHNS HOPKINS UNIVERSITY

- *Introduction to the calculus of variations*
Spring 2006
- *Analysis I*
Spring 2007, Fall 2006
- *Calculus II*
Spring 2006
- *Ordinary differential equations*
Spring 2007
- *Graduate Board Oral exams, Member*
Spring 2007

MIT

- *Calculus 18.02* Teaching Assistant
Spring 2004, Fall 2004
- *Calculus 18.022* Teaching Assistant
Fall 2003

PUBLICATIONS AND CREATIVE WORK

- De Silva D., Tortone G., *Improvement of flatness for vector valued free boundary problems*, arXiv:1909.01290. Submitted.
- De Silva D., Savin O., *A short proof of Boundary Harnack Inequality*, arXiv:1909.00062. Submitted.
- De Silva D., Savin O., *Quasi-Harnack Inequality*, arXiv:1803.10183. Submitted.
- De Silva D., Savin O., *Almost minimizers of the one-phase free boundary problem*, to appear in Comm. Partial Differential Equations.
- De Silva D., Savin O., *Thin one-phase almost minimizers*, to appear in Nonlinear Analysis.
- De Silva D., Ferrari F., Sandro S., *Recent Progresses on Elliptic Two-Phase free Boundary Problems*, to appear in DCDS (volume in honor of L. Caffarelli.)
- De Silva D., Savin O., *Global solutions to nonlinear two-phase free boundary problems*, to appear in Comm. on Pure and Applied Math.
- De Silva D., Terracini S., *Segregated configurations involving the square root of the laplacian and their free boundaries*, Calc. Var. Partial Differential Equations 58 (2019), no. 3.
- De Silva D., Ferrari F., Sandro S., *Regularity of transmission problems for uniformly elliptic fully nonlinear equations*, Proceedings of the International Conference “Two nonlinear days in Urbino 2017”, 55–63, Electron. J. Differ. Equ. Conf., 25.
- De Silva D., Savin O., *Lipschitz regularity of solutions to two-phase free boundary problems*, Int. Math. Res. Not. IMRN 2019, no. 7, 2204–2222.
- De Silva D., Ferrari F., Sandro S., *Regularity of higher order in two-phase free boundary problems*, Trans. Amer. Math. Soc. 371 (2019), no. 5, 3691–3720.
- Caffarelli L., De Silva D. Savin O., *Two-phase anisotropic free boundary problems and applications to the Bellman equation in 2D*, Arch. Ration. Mech. Anal. 228 (2018), no. 2, 477–493.
- Caffarelli L., De Silva D. Savin O., *The two membranes problem for different operators*, Ann. Inst. Poincaré Anal. Non Linéaire 34 (2017), no. 4, 899–932.
- De Silva D., Ferrari F., Sandro S., *Two-phase free boundary problems: from existence to smoothness*, Adv. Nonlinear Stud. 17 (2017), no. 2, 369–385.
- Caffarelli L., De Silva D. Savin O., *Obstacle type problems for minimal surfaces*, Comm. Partial Differential Equations 41 (2016), no. 8, 1303–1323
- De Silva D. Savin O., *Boundary Harnack estimates in slit domains and applications to thin free boundary problems*, Rev. Mat. Iberoam. 32 (2016), no. 3, 891–912.
- De Silva D., Ferrari F., Salsa S., *Regularity of the free boundary in problems with distributed sources*, Geometric methods in PDE’s, 313–340, Springer INdAM Ser., 13, Springer, Cham, 2015.
- De Silva D., Ferrari F., Salsa S., *Regularity of the free boundary for two-phase problems*

- governed by divergence form equations and applications*, *Nonlinear Anal.* 138 (2016), 3–30.
- De Silva D., Ferrari F., Salsa S., *Perron's solutions for two-phase free boundary problems with distributed sources*, *Nonlinear Anal.* 121 (2015), 382–02.
 - De Silva D., Savin O., *C^∞ regularity of certain thin free boundaries*, *Indiana Univ. Math. J.* 64 (2015), no. 5, 1575–1608.
 - De Silva D., Savin O., *Regularity of Lipschitz free boundaries for the thin one-phase problem*, *J. Eur. Math. Soc. (JEMS)* 17 (2015), no. 6, 1293–1326.
 - De Silva D., Savin O., *A note on higher regularity boundary Harnack inequality*, *Discrete Contin. Dyn. Syst.* 35 (2015), no. 12, 6155–6163.
 - De Silva D., Ferrari F., Salsa S., *Free boundary regularity for fully nonlinear non-homogeneous two-phase problems*, *Journal de Mathématiques Pures et Appliquées* 103 (2015), 658–694.
 - De Silva D., Ferrari F., Salsa S., *On two phase free boundary problems governed by elliptic equations with distributed sources*, *Discrete and Continuous Dynamical Systems*, Volume 7, Number 4 (2014), 673–693.
 - De Silva D., Savin O., Sire Y., *A One-Phase Problem For The Fractional Laplacian: Regularity Of Flat Free Boundaries*, *Bulletin of the Institute of Mathematics Academia Sinica New Series*, Volume 9 (2014), 111–145 (in honor of Neil Trudinger).
 - De Silva D., Ferrari F., Salsa S., *Two-phase problems with distributed source: regularity of the free boundary*, *Anal. PDE* 7 (2014), no. 2, 267–310.
 - De Silva D., Savin O., *$C^{2,\alpha}$ regularity of flat free boundaries for the thin one-phase problem*, *J. Differential Equations* 253 (2012), no. 8, 2420–2459.
 - De Silva D., Roquejoffre J.M., *Regularity in a one-phase free boundary problem for the fractional Laplacian*, *Ann. Inst. H. Poincaré Anal. Non Linéaire* 29 (2012), no. 3, 335–367.
 - De Silva D., *Free boundary regularity for a problem with right hand side*, *Interfaces and free boundaries* 13 (2011), 223–238.
 - De Silva D., Jerison D., *Gradient bound for free boundary graphs*, *Comm. on Pure and Applied Math.* Volume 64, Issue 4 (2011), 538–555.
 - De Silva D., Valdinoci E., *A fully nonlinear problem with free boundary in the plane*, *Ann. Scuola Norm. Sup. Pisa Cl. Sci. (5) Vol. IX* (2010), 111–132.
 - De Silva D., Savin O., *Minimizers of convex functionals arising in random surfaces*, *Duke Math. J.*, Volume 151, Number 3 (2010), 487–532.
 - De Silva D., Spruck J., *Radial graphs of constant mean curvature in the Hyperbolic space*, *Calculus of Variations and PDEs* 34 (2009), no. 1, 73–95.
 - De Silva D., *Bernstein-type techniques for 2D free boundary graphs*, *Math. Z.* 260 (2008), no. 1, 47–60.
 - De Silva D., Savin O., *Symmetry of global solutions to a class of fully nonlinear elliptic*

- equations in 2D*, Indiana Univ. Math. J., (2009); 58 (1), 301–315.
- De Silva D., Jerison D., *A singular energy minimizing free boundary*, J. Reine Angew. Math., 635 (2009), 1–22.
 - De Silva D., *Existence and regularity of monotone solutions to free boundary problems*, Amer. J. of Math. 131 (2009), no. 2, 351–378.
 - Bejenaru I., De Silva D., *Low regularity solutions for a 2D quadratic non-linear Schrödinger equation*, Trans. Amer. Math. Soc. 360 (2008), 5805–5830.
 - De Silva D., Pavlovic N., Staffilani G., Tzirakis N., *Global well-posedness and polynomial bounds for the defocusing L^2 -critical nonlinear Schrödinger equation in \mathbf{R}* , Comm. in PDEs. Vol. 33 (2008), n. 8, 1395–1429(35).
 - De Silva D., Pavlovic N., Staffilani G., Tzirakis N., *Global well-Posedness for the L^2 -critical nonlinear Schrödinger equation in higher dimensions*, CPAA, Vol. 6 (2007), n.4, 1023–1041.
 - De Silva D., Pavlovic N., Staffilani G., Tzirakis N., *Global well-posedness for a periodic nonlinear Schrödinger equation in 1D and 2D*, Discrete and Continuous Dynamical Systems, Vol. 19 (2007), n. 1, 37–65.
 - De Silva D., *Estimates for the gradient of solutions of elliptic equations in Orlicz-Sobolev spaces*, Ricerche di Matematica, vol. LI, issue 1, p. 25-47, (2002).
 - De Silva D., Trombetti C., *Some remarks on nonlinear elliptic equations and applications to Hamilton-Jacobi equations*, C.R. Acad. Sci. Paris, t. 333, Serie I, p. 91-96, (2001).

WORKS IN PROGRESS

- De Silva D., Tortone G., *A vectorial free boundary problem for the fractional Laplacian*, in preparation.
- De Silva D., Savin O., *On certain degenerate free boundary problems*, in preparation.

GRANTS SUBMITTED FOR FUNDING

NSF RTG: Research Training in Physics- and Data-based Modeling, Analysis and Computation at Columbia University (PT-AABP4461.)

Date submitted: 06/2019

SELECTED CONFERENCES PRESENTATIONS AND LECTURES

- Eastern Sectional Meeting of the AMS, Invited Address, Tufts University, Medford, March 2020.
- “Workshop for Northeast women in PDE and Applied Math”, UConn, October 2019.
- “Bruno Pini Mathematical Analysis Seminar”, Bologna, Italy, July 2019.
- “European Mathematical Society Summer School, PDEs from theory to applications,” Milan, Italy, July 2019.

- “Women in Analysis workshop”, BIRS, June 2019.
- “Women in math”, Colloquium Speaker, Institute for Advance Studies, May 2019.
- “Workshop on Free Boundary Problems – in honor of L. Caffarelli” (organizer), Columbia University, May 2019.
- “Nonlinear PDEs” (organizer), Columbia University, November 2018.
- AMS sectional meeting, Northeastern University, Boston April 2018.
- SIAM conference on Analysis of PDEs, Plenary speaker, Baltimore December 2017.
- JISD Summer School 2017, Barcelona, Spain, June 2017.
- “Calculus of Variations and PDE”, UC Berkeley, May 2017.
- AMS sectional meeting, Hunter College NY, May 2017.
- French-Romanian Colloquium in Applied Mathematics, August 2016.
- Recent trends on elliptic nonlocal equations, Fields Institute, Toronto, June 2016.
- “Calculus of Variations and PDE” (organizer), Columbia University, May 2016.
- Distinguished Women in Mathematics Lectures, UT Austin, May 2016.
- 6th Symposium on Analysis and PDEs, Purdue University, June 2015.
- The Workshop for Women in Analysis and PDEs, IMA University of Minnesota, Twin Cities, May 2015.
- “PDEs in Continuum Mechanics” during the AWM Research Symposium Maryland, April 11–12, 2015.
- Scuola Matematica Interuniversitaria, Summer School, Cortona Italy, August 2014.
- GNAMPA School “Differential Equations and Dynamical Systems” Serapo (Italy), June 11-15, 2012.
- AMS Fall Central Meeting, Waco TX, Session on “Harmonic Analysis and Partial Differential Equations,” Fall 2009.
- JAMI Conference on Nonlinear dispersive equations, Spring 2007.
- Conference on Geometric Analysis and Non-linear Elliptic PDEs (in honor of J. Spruck’s 60th birthday), Fall 2006.
- CMS, Winter Meeting 2006, Special session on Schrödinger equations.
- CMS, Winter Meeting 2005, Special session on Free Boundary problems.
- **Analysis and PDE Seminars:**
Princeton-Rutgers, Cornell, Rutgers, University of Texas at Austin, University of Maryland, Brown University, University of Connecticut, University of Rome “Tor Vergata,” Columbia University, Purdue University, University of California at Los Angeles, Mathematical Science Research Institute, Massachusetts Institute of Technology, Courant Institute, Johns Hopkins University.

SERVICE TO COLLEGE/UNIVERSITY

Department Chair, Barnard College

Fall 2019 –

Hiring Committee, Columbia University

2018-2019 Open Search

Member

Grants Committee, Barnard College

Fall 2017–Spring 2019

Member

IRAC Committee, Barnard College

Fall 2017–Spring 2019

Member

Graduate Admission Committee, Columbia University

Spring 2012, Spring 2018, Spring 2020

Member

Computer Science Search Committee

Spring 2017–Fall 2017

Member

HHMI Pre-Proposal Committee

Fall 2016

Member

Academic Curricular Review, Barnard College, First Year Foundations Subcommittee

Fall 2013 – Spring 2015

Member

Committee on Programs and Academic Standing, Barnard College

Fall 2012 – Spring 2015

Member

Geometry and Analysis Seminar, Columbia University

Fall 2009 – Present

Organizer

Adviser, Barnard College

Fall 2008 – Present

First/Second Year, Major and Vanderbilt International Scholar Program Adviser

Prize Exam Committee, Barnard College, Columbia University

2008 – Present

Member

Barnard Libraries and Academic Information Services Committee

Spring 2011 – Spring 2012

Member

Undergraduate Committee, Columbia University

Fall 2011 – Spring 2012

Member

Faculty Elections, Barnard College

Spring 2010

Faculty Teller

SERVICE TO PROFESSION

Journal Reviewing

Calc. Var and PDEs, Nonlinear Analysis, Analysis and PDE, Journal of the European Mathematical Society, Proceedings of the American Mathematical Society, Pacific Journal of Mathematics, Journal de l'Ecole polytechnique, Annales de l'Institut Henri Poincare, Journal of Differential Equations, Journal of Geometric Analysis, Annales des sciences mathematiques du Quebec, SIAM Journal on Mathematical Analysis, Nonlinearity, American Journal of Mathematics, Duke Math Journal, Communications in PDEs, DCDS.

Committees

Association for Women in Mathematics Sadosky Research Prize Selection Committee.

Editorial Board

Notices of the American Mathematical Society.

Guest Editor, Nonlinear Analysis, Special volume on Free boundary problems.

PROFESSIONALLY-RELATED COMMUNITY SERVICE

Sonya Kovalesky Day at Barnard

Fall 2015, Fall 2014, Spring 2013, Spring 2012

Co-Organizer

Date: 02/19/2020