Curriculum Vitae

Daniela De Silva, Associate Professor of Mathematics

02/06/2017

ADDRESSES

Department of Mathematics
Barnard College, Columbia University
2990 Broadway
New York, NY 10027
Phone: 212-854-5135

560 Riverside Dr.
New York, NY 10027
Phone: 212-665-1907

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

AWM Sadosky Research Prize 2016

Honorable Mention for the Emily Gregory Award, 2014-2015

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

Gladys Brooks Award for Teaching Excellence, May 2012

COURSES TAUGHT

Barnard College, Columbia University

- *Calculus III*
  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 2016, Fall 2014, Fall 2012, Spring 2012, Spring 2010, Spring 2008

· *Perspectives in Mathematics*
Fall 2013, Fall 2012

· *Graduate course on PDEs*
Fall 2014

· *Independent Studies*
Spring 2016 (1 BC student), Fall 2013 (1 CC student), Spring 2013 (2 BC students, 1 CC student), Spring 2008(1 CC student)

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

Journal Articles

· Caffarelli L., De Silva D. Savin O., *The two membranes problem for different operators*, to appear in Annales de l'Institut Henri Poincare.

· 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,* To appear in Geometric Methods in PDEs.

· 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 Mathematiques Pures et Appliquees 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. Poincare Anal. Non Lineaire 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 Schroödinger 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).

Conference Presentations and Lectures

· JISD Summer School 2017, Barcelona, Spain, June 2017 (expected).

· "Calculus of Variations and PDE", UC Berkeley, May 2017 (expected).

· 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 (Fall 2015)
  Cornell (Spring 2015)
  Rutgers (Fall 2014)
  University of Texas at Austin (Fall 2012)
  University of Maryland (Spring 2012)
  Brown University (Fall 2010)
  University of Connecticut (Spring 2010)
  University of Rome "Tor Vergata" (Summer 2008)
  University of Texas at Austin (Spring 2008)
  Columbia University (Fall 2006)
  Purdue University (Spring 2006)
  University of California at Los Angeles (Fall 2005)
  Mathematical Science Research Institute (Fall 2005)
  Massachusetts Institute of Technology (Spring 2005)
  Purdue University (Spring 2005)
  Brown University (Spring 2005)
  Princeton University (Fall 2004)
  Courant Institute (Fall 2004)
  Johns Hopkins University (Fall 2004)

WORKS SUBMITTED FOR PUBLICATION

- De Silva D., Ferrari F., Sandro S., *Two-phase free boundary problems: from existence to smoothness*, submitted.
- De Silva D., Ferrari F., Sandro S., *Regularity of higher order in two-phase free boundary problems,* submitted.
- Caffarelli L., De Silva D. Savin O., *Two-phase anisotropic free boundary problems and applications to the Bellman equation in 2D*, submitted.

GRANT ACTIVITY

"Regularity properties of stationary and evolution free boundary problems"
Principal Investigator: Daniela De Silva
National Science Foundation (NSF) Grant DMS-1301535
Project Period: August 2013 – July 2016
Amount: $127,092

"ϵ: Elliptic PDEs and Symmetry of Interfaces and Layers for Odd Nonlinearities"
Principal Investigator: Enrico Valdinoci
Co-PIs: Daniela De Silva, Alberto Farina, Fausto Ferrari, Isabeau Birindelli, Luois Dupaigne, Matteo Novaga, Ovidiu Savin, Berardino Sciunzi, Yannick Sire
European Research Council (ERC) Grant
Project Period: 2012 – 2016
Amount: $952,550

SERVICE TO COLLEGE/UNIVERSITY

Computer Science Search Committee
Present
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

Graduate Admission Committee, Columbia University
Spring 2012
Member

Faculty Elections, Barnard College
Spring 2010
Faculty Teller

SERVICE TO PROFESSION

Journal Reviewing

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.

Committees

Association for Women in Mathematics Sadosky Research Prize Selection Committee.

PROFESSIONALLY-RELATED COMMUNITY SERVICE

Sonya Kovalesky Day at Barnard
Fall 2015, Fall 2014, Spring 2013, Spring 2012
Co-Organizer