

Xavier Ros-Oton

CONTACT INFORMATION	Universität Zürich Institut für Mathematik Winterthurerstrasse 190, Zürich	xavier.ros-oton@math.uzh.ch user.math.uzh.ch/ros-oton
BIRTH	Barcelona, April 1988	
POSITIONS	Universitat de Barcelona ICREA Research Professor Departament de Matemàtiques Universität Zürich Assistant Professor Institut für Mathematik University of Texas at Austin R. H. Bing Instructor Department of Mathematics	starting 09/2020 09/2017 - 08/2020 08/2014 - 08/2017
EDUCATION	Ph.D. in Mathematics Universitat Politècnica de Catalunya Adviser: Xavier Cabré Master in Mathematics Universitat Politècnica de Catalunya Degree in Mathematics Universitat Politècnica de Catalunya Ranked 1st, finishing the 5 years degree in 4 years.	09/2011 - 06/2014 09/2010 - 06/2011 09/2006 - 06/2010
RESEARCH INTERESTS	My research focuses on elliptic and parabolic PDE . I study: <ul style="list-style-type: none">- Free boundary problems- Integro-differential equations- Variational problems, stable solutions- Fully nonlinear equations- Evolution equations- Isoperimetric inequalities- Classical ODEs	
HONORS AND AWARDS	<ul style="list-style-type: none">• Premio Investigación Científica 2019 from the Fundació Princesa de Girona (Awarded annually to a young Spanish scientist under 35 years. The prize is given by the King of Spain, and comes with a monetary award of 20,000 €.)• PI of the ERC Starting Grant ‘ELLIPTICPDE’ (2019 - 2024) (Awarded amount: 1,335,250 €) Youngest awardee of ERC Starting Grant 2018 (among all panels in all sciences)• PI of SNSF Research Project (04/2018 - 08/2020) (Awarded amount: 200,000 CHF)	

- **Antonio Valle Prize 2017** from the Spanish Society of Applied Mathematics (Awarded annually to the best researcher under 34 years. At age 29, I became the youngest winner of the award ever.)
- **J. L. Rubio de Francia Prize 2017**, Royal Spanish Mathematical Society (RSME) (Awarded annually to a young mathematician from Spain or residing in Spain. It is the highest distinction given by the RSME, and one of the most important prizes in Mathematics in Spain.)
- PI of the NSF Analysis Grant DMS-1565186 (07/2016 - 08/2017) (Awarded amount: \$103,617)
- Vicent Caselles Prize 2015 from the RSME and the BBVA Foundation (Spanish award to the best PhD theses in Mathematics)
- Extraordinary PhD Prize from the Universitat Politècnica de Catalunya
- Évariste Galois Prize 2012 from the Catalan Mathematical Society (SCM) (Best Master's Thesis award)
- Silver Medals at the International Mathematical Competition for University students, 2007, 2008, and 2009
- Bronze Medal at the International Mathematical Olympiad (IMO), 2006

ARTICLES AND
PREPRINTS

- [1] The singular set in the Stefan problem,
A. Figalli, X. Ros-Oton, J. Serra,
preprint (2020).
- [2] Sharp quantitative stability for isoperimetric inequalities with homogeneous weights,
E. Cinti, F. Glaudo, A. Pratelli, X. Ros-Oton, J. Serra,
preprint arXiv (2020).
- [3] The Neumann problem for the fractional Laplacian: regularity up to the boundary,
A. Audrito, J.-C. Felipe-Navarro, X. Ros-Oton,
preprint arXiv (2020).
- [4] Generic regularity of free boundaries for the obstacle problem,
A. Figalli, X. Ros-Oton, J. Serra,
Publ. Math. IHÉS, in press (2020).
- [5] Free boundary regularity for almost every solution to the Signorini problem,
X. Fernandez-Real, X. Ros-Oton,
preprint arXiv (2019).
- [6] The Dirichlet problem for nonlocal elliptic operators with $C^{0,\alpha}$ exterior data,
A. Audrito, X. Ros-Oton,
Proc. Amer. Math. Soc., to appear (2020).
- [7] Obstacle problems for integro-differential operators: higher regularity of free boundaries,
N. Abatangelo, X. Ros-Oton,
Adv. Math. 360 (2020), 106931, 61pp.
- [8] Stable solutions to semilinear elliptic equations are smooth up to dimension 9,
X. Cabré, A. Figalli, X. Ros-Oton, J. Serra,
Acta Math. 224 (2020), 187-252.
- [9] On global solutions to semilinear elliptic equations related to the one-phase free boundary problem,
X. Fernandez-Real, X. Ros-Oton,

Discrete Contin. Dyn. Syst. A 39 (2019), 6945-6959.

Special issue Dedicated to Luis Caffarelli on the Occasion of his 70th Birthday.

- [10] Higher-order boundary regularity estimates for nonlocal parabolic equations,
X. Ros-Oton, H. Vivas
Calc. Var. Partial Differential Equations 57 (2018), 111.
- [11] Structure and regularity of the singular set in the obstacle problem for the fractional Laplacian,
N. Garofalo, X. Ros-Oton,
Rev. Mat. Iberoam. 35 (2019), 1309-1365.
- [12] The obstacle problem for the fractional Laplacian with critical drift,
X. Fernandez-Real, X. Ros-Oton,
Math. Ann. 371 (2018), 1683-1735.
- [13] The boundary Harnack principle for nonlocal elliptic equations in non-divergence form,
X. Ros-Oton, J. Serra,
Potential Anal. 51 (2019), 315-331.
- [14] Free boundary regularity in the parabolic fractional obstacle problem,
B. Barrios, A. Figalli, X. Ros-Oton,
Comm. Pure Appl. Math. 71 (2018), 2129-2159.
- [15] On the regularity of the free boundary for the p -Laplacian obstacle problem,
A. Figalli, B. Krummel, X. Ros-Oton,
J. Differential Equations 263 (2017), 1931-1945.
- [16] The structure of the free boundary in the fully nonlinear thin obstacle problem,
X. Ros-Oton, J. Serra,
Adv. Math. 316 (2017), 710-747.
- [17] Obstacle problems for integro-differential operators: regularity of solutions and free boundaries,
L. Caffarelli, X. Ros-Oton, J. Serra,
Invent. Math. 208 (2017), 1155-1211.
- [18] Boundary regularity estimates for nonlocal elliptic equations in C^1 and $C^{1,\alpha}$ domains,
X. Ros-Oton, J. Serra,
Ann. Mat. Pura Appl. 196 (2017), 1637-1668.
- [19] Regularity theory for general stable operators: parabolic equations,
X. Fernandez-Real, X. Ros-Oton,
J. Funct. Anal. 272 (2017), 4165-4221.
- [20] Infinite speed of propagation and regularity of solutions to the fractional porous medium equation in general domains,
M. Bonforte, A. Figalli, X. Ros-Oton,
Comm. Pure Appl. Math. 70 (2017), 1472-1508.
- [21] Global regularity for the free boundary in the obstacle problem for the fractional Laplacian,
B. Barrios, A. Figalli, X. Ros-Oton,
Amer. J. Math. 140 (2018), 415-447.
- [22] A one-dimensional symmetry result for a class of nonlocal semilinear equations in the plane,
F. Hamel, X. Ros-Oton, Y. Sire, E. Valdinoci,
Ann. Inst. H. Poincaré Anal. Non Linéaire 34 (2017), 469-482.

- [23] Pohozaev identities for anisotropic integro-differential operators,
X. Ros-Oton, J. Serra, E. Valdinoci,
Comm. Partial Differential Equations 42 (2017), 1290-1321.
- [24] The Dirichlet problem for nonlocal operators with singular kernels: convex and non-convex domains,
X. Ros-Oton, E. Valdinoci,
Adv. Math. 288 (2016), 732-790.
- [25] Regularity theory for general stable operators,
X. Ros-Oton, J. Serra,
J. Differential Equations 260 (2016), 8675-8715.
- [26] Boundary regularity for fully nonlinear integro-differential equations,
X. Ros-Oton, J. Serra,
Duke Math. J. 165 (2016), 2079-2154.
- [27] Nonlocal problems with Neumann boundary conditions,
S. Dipierro, X. Ros-Oton, E. Valdinoci,
Rev. Mat. Iberoam. 33 (2017), 377-416.
- [28] Boundary regularity for the fractional heat equation,
X. Fernández-Real, X. Ros-Oton,
Rev. Acad. Cienc. Ser. A Math. 101 (2016), 49-64.
- [29] Local integration by parts and Pohozaev identities for higher order fractional Laplacians,
X. Ros-Oton, J. Serra,
Discrete Contin. Dyn. Syst. A 35 (2015), 2131-2150.
- [30] Regularity for the fractional Gelfand problem up to dimension 7,
X. Ros-Oton,
J. Math. Anal. Appl. 419 (2014), 10-19.
- [31] Nonexistence results for nonlocal equations with critical and supercritical nonlinearities,
X. Ros-Oton, J. Serra,
Comm. Partial Differential Equations 40 (2015), 115-133.
- [32] The extremal solution for the fractional Laplacian,
X. Ros-Oton, J. Serra,
Calc. Var. Partial Differential Equations 50 (2014), 723-750.
- [33] Sharp isoperimetric inequalities via the ABP method,
X. Cabré, X. Ros-Oton, J. Serra,
J. Eur. Math. Soc. 18 (2016), 2971-2998.
- [34] The Pohozaev identity for the fractional Laplacian,
X. Ros-Oton, J. Serra,
Arch. Rat. Mech. Anal. 213 (2014), 587-628.
- [35] The Dirichlet problem for the fractional Laplacian: regularity up to the boundary,
X. Ros-Oton, J. Serra,
J. Math. Pures Appl. 101 (2014), 275-302.
- [36] Sobolev and isoperimetric inequalities with monomial weights,
X. Cabré, X. Ros-Oton,
J. Differential Equations 255 (2013), 4312-4336.
- [37] Regularity of stable solutions up to dimension 7 in domains of double revolution,
X. Cabré, X. Ros-Oton,
Comm. Partial Differential Equations 38 (2013), 135-154.

- [38] Existence of periodic solutions with nonconstant sign in a class of generalized Abel differential equations,
J. M. Olm, X. Ros-Oton,
Discrete Contin. Dyn. Syst. A 33 (2013), 1603-1614.
- [39] On a factorization of Riemann's ζ function with respect to a quadratic field and its computation,
X. Ros-Oton,
Rev. Acad. Cienc. Ser. A Math. 106 (2012), 419-427.
- [40] Periodic solutions with nonconstant sign in Abel equations of second kind,
J. M. Olm, X. Ros-Oton, T. M. Seara,
J. Math. Anal. Appl. 381 (2011), 582-589.
- [41] Stable inversion of Abel equations: application to tracking control in DC-DC nonminimum phase boost converters,
J. M. Olm, X. Ros-Oton, Y. B. Shtessel,
Automatica J. IFAC 47 (2011), 221-226.
- [42] Approximate tracking of periodic references in a class of bilinear systems via stable inversion,
J. M. Olm, X. Ros-Oton,
Discrete Contin. Dyn. Syst. Ser. B 15 (2011), 197-215.

EXPOSITORY
 PAPERS,
 SHORT NOTES,
 BOOK CHAPTERS

- [43] Understanding singularities in free boundary problems,
X. Ros-Oton, J. Serra,
Matematica, Cultura e Società 4 (2019), 107-118.
 Special volume in honor of Alessio Figalli.
- [44] Free boundaries and obstacle problems: an overview,
X. Ros-Oton,
SeMA J. 75 (2018), 399-419.
- [45] Boundary regularity, Pohozaev identities, and nonexistence results,
X. Ros-Oton,
 Chapter 9 in 'Recent developments in the Nonlocal Theory', De Gruyter, 2018.
- [46] Nonlocal elliptic equations in bounded domains: a survey,
X. Ros-Oton,
Publ. Mat. 60 (2016), 3-26.
- [47] Euclidean balls solve some isoperimetric problems with nonradial weights,
X. Cabré, X. Ros-Oton, J. Serra,
C. R. Math. Acad. Sci. Paris 350 (2012), 945-947.
- [48] Fractional Laplacian: Pohozaev identity and nonexistence results,
X. Ros-Oton, J. Serra,
C. R. Math. Acad. Sci. Paris 350 (2012), 505-508.

BOOKS

- [49] Regularity Theory for Elliptic PDEs,
X. Fernandez-Real, X. Ros-Oton,
 submitted (2019).

RESEARCH PROJECTS	<p>ERC Starting Grant 2018 01/2019 - 01/2024 Project: “<i>Regularity and singularities in elliptic PDE’s</i>” PI: X. Ros-Oton Awarded amount: 1,335,250 €</p> <p>SNSF Research Project (Switzerland) 04/2018 - 08/2020 Project: “<i>Integro-differential elliptic equations</i>” PI: X. Ros-Oton Awarded amount: 200,000 CHF</p> <p>Start-up Grant J. L. Rubio de Francia 10/2017 - 09/2020 BBVA Foundation PI: X. Ros-Oton Amount: 35,000€</p> <p>NSF Analysis Grant DMS-1565186 (USA) 07/2016 - 08/2017 Project: “<i>Regularity theory for elliptic equations and free boundaries</i>” PI: X. Ros-Oton Awarded amount: \$103,617</p>
ORGANIZATION OF CONFERENCES	<ul style="list-style-type: none"> • <i>PDE’s and Geometric Measure Theory</i> Organizers: A. Figalli, X. Ros-Oton, J. Serra. Zürich, October 2018.
MENTORING	<p>PhD students</p> <ul style="list-style-type: none"> • <i>Damià Torres</i>, 2020-present. • <i>Teo Kukuljan</i>, 2019-present. • <i>Wiktoria Zatoń</i>, 2019-present. <p>Postdocs</p> <ul style="list-style-type: none"> • <i>Bruno Vergara</i>, 2019-present. • <i>Alessandro Audrito</i>, 2019-2020. • <i>Nicola Abatangelo</i>, 2018-2019. <p>Other</p> <ul style="list-style-type: none"> • <i>Giorgio Tortone</i>, visiting postdoc, Spring 2020. • <i>Juan Carlos Felipe</i>, visiting PhD student, Fall 2019. • <i>Xavier Fernandez-Real</i>, Bachelor’s Degree Thesis 2014 and PhD Reading Courses 2015-2016.
EDITORIAL WORK	<ul style="list-style-type: none"> • Editor for <i>Nonlinear Analysis</i> (2020 - present). Ranked 41/313 in MATHEMATICS
INVITED TALKS AT CONFERENCES	<ul style="list-style-type: none"> • <i>Frontiers in Nonlocal Nonlinear PDEs</i> Anacapri, Italy, June 2021.

- *2020 Fields Medal Symposium*
The Fields Institute, Toronto, October 2020.
- *15th International Conference on Free Boundary Problems*
Plenary talk.
Berlin, September 2020.
- *IMI Workshop in PDEs*
UCM, Madrid, February 2020.
- *Workshop in honor of Alessio Figalli*
UPC, Barcelona, November 2019.
- *Workshop in Analysis & Probability*
Plenary talk.
Cardiff (Wales), June 2019.
- *ICIAM 2019*
Special session on “Analysis of nonlinear operators”.
Valencia, July 2019.
- *ICIAM 2019*
Special session on “Trends in nonlocal PDEs”.
Valencia, July 2019.
- *Barcelona Analysis Conference 2019*
Plenary talk.
Universitat de Barcelona, June 2019.
- *Biennial Conference of the Royal Spanish Mathematical Society*
Plenary talk.
Santander (Spain), February 2019.
- *Winter meeting on nonlocal PDEs and applications*
Universidad Autónoma de Madrid, December 2018.
- *Fields Medal day (Swiss Mathematical Society)*
Colloquium talk on the work of Alessio Figalli.
Bern, October 2018.
- *Nonlocal interactions: Dislocations and beyond*
University of Bath, June 2018.
- *Maxwell Symposium in PDEs*
International Centre for Mathematical Sciences (Edinburgh), December 2017.
- *Conference on Partial Differential Equations*
KTH Stockholm, December 2017.
- *Mathematical approaches to complex systems: Statistical mechanics and PDEs*
Convento da Arrábida (Portugal), July 2017.
- *XXV Congreso de Ecuaciones Diferenciales y Aplicaciones*
Plenary talk on the occasion of the Antonio Valle Prize 2017.
Cartagena (Spain), June 2017.
- *2016-17 Warwick EPSRC Symposium: Non-local equations and fractional diffusion*
Warwick University, May 2017.
- *Fall Meeting of the American Mathematical Society*
Special session on ‘New developments in the analysis of nonlocal operators’.
Minneapolis, October 2016.

- *3rd Conference on Nonlocal Operators and PDEs*
Plenary talk.
Conference Center of the Polish Academy of Sciences (Będlewo, Poland), June 2016.
- *Nonlocal Variational Problems and PDEs*
Pacific Institute of Mathematical Sciences (Vancouver), June 2016.
- *Recent trends on elliptic nonlocal equations*
Fields Institute (Toronto), June 2016.
- *Spring Meeting of the American Mathematical Society*
Special session on ‘*Fractional calculus and nonlocal operators*’.
East Lansing (Michigan), March 2015.
- *10th AIMS Conference on Dynamical Systems, Differential Equations and Applications*
Special session on ‘*Geometric variational problems*’.
Madrid, July 2014.
- *10th AIMS Conference on Dynamical Systems, Differential Equations and Applications*
Special session on ‘*Nonlocal problems and related topics*’.
Madrid, July 2014.
- *Recent Advances in Nonlocal and Nonlinear Analysis, Theory and Applications*
ETH Zürich, June 2014.
- *Meeting on PDEs and Applications*
Girona, June 2014.
- *Workshop on Non-Standard Diffusions*
Austin, May 2014.
- *Workshop on Partial Differential Equations and applications*
Pisa, February 2014.
- *Workshop on Nonlinear equations*
Universidad Carlos III Madrid, October 2013.
- *Congress of young researchers of the Real Sociedad Matemática Española*
Special session on PDEs.
Sevilla, September 2013.
- *Conference of young researchers of the Societat Catalana de Matemàtiques*
Special session on Analysis and PDEs.
Barcelona, October 2012.
- *Barcelona-Boston-Tokyo Number Theory Congress in Memory of Fumiyuki Momose*
Barcelona, May 2012.

INVITED TALKS
AT SEMINARS,
COLLOQUIUMS

- *ShanghaiTech University*. PDE Seminar. April 2020.
- *Universidad Carlos III de Madrid*. Colloquium. February 2020.
- *École Polytechnique Fédérale de Lausanne*. Analysis Seminar. May 2019.
- *University of Washington*. Analysis Seminar. April 2019.
- *Universitat Autònoma de Barcelona*. Analysis Seminar. November 2018.
- *Universitat de Barcelona*. Colloquium IMUB. November 2018.
- *Universität Zürich*. Videoseminar Berkeley / Bonn / Paris-Nord / Zürich. October 2018.
- *Wuhan Institute of Physics & Mathematics, Chinese Academy of Sciences*. July 2018.
- *Wuhan University*. July 2018.
- *University of Texas at Austin*. Analysis seminar. May 2018.

- *University of Houston*. PDE seminar. April 2018.
- *Universitat Politècnica de Catalunya*. Colloquium FME-UPC. April 2018.
- *Universidad Autónoma de Madrid*. PDE seminar. March 2018.
- *Instituto de Ciencias Matemáticas*. PDE's & Fluid Mechanics seminar. March 2018.
- *ETH / Universität Zürich*. Zürich Graduate Colloquium. February 2018.
- *Institut des Hautes Études Scientifiques*. Séminaire *Laurent Schwartz*. January 2018.
- *Universität Basel*. Analysis seminar. December 2017.
- *Universidad Autónoma de Madrid*. Colloquium. October 2017.
- *Massachusetts Institute of Technology*. PDE/Analysis seminar. April 2017.
- *ETH Zürich*. Analysis seminar. March 2017.
- *École Polytechnique Fédérale de Lausanne*. Colloquium. March 2017.
- *Courant Institute, New York University*. Analysis seminar. February 2017.
- *Universitat Politècnica de Catalunya*. PDE Seminar. December 2016.
- *Hausdorff Center for Mathematics (Bonn)*. December 2016.
- *University of California Los Angeles*. Analysis seminar. December 2016.
- *Universität Zürich*. November 2016.
- *Rice University*. Colloquium. November 2016.
- *University of Texas at Austin*. Analysis seminar. October 2016.
- *Columbia University*. Analysis seminar. February 2016.
- *Michigan State University*. Analysis seminar. October 2015.
- *University of Copenhagen*. Analysis and Geometry seminar. June 2015.
- *African Institute of Mathematical Sciences (Senegal)*. PDE seminar. June 2015.
- *University of Chicago*. PDE seminar. February 2015.
- *Universidad del País Vasco (UPV/EHU)*. Analysis seminar. May 2014.
- *Universität Basel*. Analysis seminar. December 2013.
- *Università di Roma Tor Vergata*. PDE seminar. November 2013.
- *Universitat Politècnica de Catalunya*. PDE seminar. April 2013.
- *Basque Center for Applied Mathematics*. PDE seminar. February 2013.

MINICOURSES

- *Program on 'Elliptic Partial Differential Equations, Geometry, and the Calculus of Variations'* (Matrix Institute, Australia).
Minicourse on 'Integro-differential equations'.
November 2021.
- *Summer School at the Hausdorff Institute (Bonn)*.
Minicourse on 'Regularity of free boundaries'.
June/July 2021.
- *Workshop on Nonlocal Operators with Applications to Jump Processes (Dresden)*.
Minicourse on 'Boundary regularity for nonlocal operators'.
October 2020.
- *Concentration period on GMT and PDE (Seattle)*.
Minicourse on 'Regularity of free boundaries'.
August 2020.
- *CIME summer school "Geometric Measure Theory and Applications" (Italy)*.
6h Minicourse on 'Regularity of free boundaries in obstacle problems'.
September 2019.

- *African Institute for Mathematical Sciences* (Senegal).
4h Minicourse on ‘Free boundary problems’.
February 2019.
- *Huazhong University of Science and Technology* (China).
16h Minicourse on ‘Nonlocal PDE’.
July 2018.

SCIENTIFIC AND
ADMINISTRATIVE
RESPONSIBILITIES

- Co-Organizer of the U. Zürich Seminar on *PDE & Math. Physics* (2018 - 2020)
- Co-Organizer of the Basel-Zürich Seminar in Analysis (2019 - 2020)
- Scientific Committee member for the Biennial Conference of the Royal Spanish Mathematical Society 2021
- Scientific Committee member for the ‘Congreso de Jóvenes Investigadores de la RSME’ 2020
- Reviewer of research proposals for different national science agencies:
DFG (Germany); NCN (Poland); FONDECYT (Chile).
- Referee for several journals, including:

Acta Math.;	Invent. Math.;	Duke Math. J.;
Comm. Pure Appl. Math.;	J. Eur. Math. Soc.;	Arch. Rat. Mech. Anal.;
Geom. Funct. Anal.;	J. Math. Pures Appl.;	Anal. PDE;
Int. Math. Res. Not.;	J. Funct. Anal.;	Trans. AMS;
Ann. Inst. H. Poincaré;	Comm. Math. Phys.;	J. Differential Equations;
Proc. Lond. Math. Soc.;	Calc. Var. PDE;	Ann. Mat. Pura Appl.;
Comm. PDE;	Publ. Mat.;	Rev. Mat. Iberoam.;
J. Math. Anal. Appl.;	J. Lond. Math. Soc.;	SIAM J. Math. Anal.;
Proc. Amer. Math. Soc.;	Nonlinear Anal.;	Studia Math.;
Com. Contemp. Math.;	Arch. Math.;	Nonl. Diff. Eq. Appl.;
Rev. Acad. Cienc. Math.;	Manuscr. Math.;	Math. Nachr.;
- Referee for Springer books

OTHER

- Member of the ‘Societat Catalana de Matemàtiques’
- Member of the ‘Real Sociedad Matemática Española’

SCIENCE
OUTREACH
& MEDIA

- Public lecture at the BBVA Foundation.
Title: ‘*Las ecuaciones que mueven el mundo*’
Madrid, April 2018.
- Interview for the newspaper ‘El Español’ (April 2018)
- Video-Interview for ‘SwissInfo’ (August 2018)
- Interview for the newspaper ‘El Periódico’ (October 2019)
- Interview for the newspaper ‘elDiario.es’ (November 2019)
- Interview for the newspaper ‘El Punt Avui’ (December 2019)
- Interview for the newspaper ‘El País’ (January 2020)
- Public lecture for high school students.

INS Joan Miró, Cornellà, January 2020.

CITATIONS

- More than 1900 citations in *Google Scholar*; more than 900 in *MathSciNet*.
- Most cited mathematician among those who finished the PhD in 2014.