

## Xavier Ros-Oton

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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	<b>Universität Zürich</b> Current position: Assistant Professor Institut für Mathematik  <b>University of Texas at Austin</b> R. H. Bing Instructor Department of Mathematics	09/2017 - present  08/2014 - 08/2017
EDUCATION	<b>Ph.D. in Mathematics</b> Universitat Politècnica de Catalunya (UPC) Adviser: Xavier Cabré (ICREA)  <b>Master in Mathematics</b> Universitat Politècnica de Catalunya  <b>Degree in Mathematics</b> 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 <b>elliptic and parabolic PDE</b> . I study: <ul style="list-style-type: none"><li>- Free boundary problems</li><li>- Integro-differential equations</li><li>- Variational problems, stable solutions</li><li>- Fully nonlinear equations</li><li>- Evolution equations</li><li>- Isoperimetric inequalities</li><li>- Classical ODEs</li></ul>	
HONORS AND AWARDS	<ul style="list-style-type: none"><li>• <b>Premio FPdGi Investigación Científica 2019</b> from the Fundación 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 €.)</li><li>• PI of the <b>ERC Starting Grant</b> ‘ELLIPTICPDE’ (2019 - 2024) (Awarded amount: 1,335,250 €) Youngest awardee of ERC Starting Grant 2018 (among all panels in all sciences)</li><li>• PI of SNSF Research Project (04/2018 - 08/2020) (Awarded amount: 200,000 CHF)</li><li>• <b>Antonio Valle Prize 2017</b> 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.)</li></ul>	

- **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] Obstacle problems for integro-differential operators: higher regularity of free boundaries, *N. Abatangelo, X. Ros-Oton*, preprint arXiv (2019).
- [2] Stable solutions to semilinear elliptic equations are smooth up to dimension 9, *X. Cabré, A. Figalli, X. Ros-Oton, J. Serra*, preprint arXiv (2019).
- [3] 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, to appear (2019).  
Special issue Dedicated to Luis Caffarelli on the Occasion of his 70th Birthday.
- [4] Higher-order boundary regularity estimates for nonlocal parabolic equations, *X. Ros-Oton, H. Vivas* Calc. Var. Partial Differential Equations 57 (2018), 111.
- [5] Structure and regularity of the singular set in the obstacle problem for the fractional Laplacian, *N. Garofalo, X. Ros-Oton*, Rev. Mat. Iberoam. (2019), in press.
- [6] The obstacle problem for the fractional Laplacian with critical drift, *X. Fernandez-Real, X. Ros-Oton*, Math. Ann. 371 (2018), 1683-1735.
- [7] The boundary Harnack principle for nonlocal elliptic equations in non-divergence form, *X. Ros-Oton, J. Serra*, Potential Anal., in press (2019).
- [8] Free boundary regularity in the parabolic fractional obstacle problem, *B. Barrios, A. Figalli, X. Ros-Oton*, Comm. Pure Appl. Math. 71 (2018), 2129-2159.
- [9] 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.

- [10] The structure of the free boundary in the fully nonlinear thin obstacle problem,  
*X. Ros-Oton, J. Serra,*  
Adv. Math. 316 (2017), 710-747.
- [11] 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.
- [12] 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.
- [13] Regularity theory for general stable operators: parabolic equations,  
*X. Fernandez-Real, X. Ros-Oton,*  
J. Funct. Anal. 272 (2017), 4165-4221.
- [14] 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.
- [15] 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.
- [16] 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.
- [17] Pohozaev identities for anisotropic integro-differential operators,  
*X. Ros-Oton, J. Serra, E. Valdinoci,*  
Comm. Partial Differential Equations 42 (2017), 1290-1321.
- [18] 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.
- [19] Regularity theory for general stable operators,  
*X. Ros-Oton, J. Serra,*  
J. Differential Equations 260 (2016), 8675-8715.
- [20] Boundary regularity for fully nonlinear integro-differential equations,  
*X. Ros-Oton, J. Serra,*  
Duke Math. J. 165 (2016), 2079-2154.
- [21] Nonlocal problems with Neumann boundary conditions,  
*S. Dipierro, X. Ros-Oton, E. Valdinoci,*  
Rev. Mat. Iberoam. 33 (2017), 377-416.
- [22] Boundary regularity for the fractional heat equation,  
*X. Fernández-Real, X. Ros-Oton,*  
Rev. Acad. Cienc. Ser. A Math. 101 (2016), 49-64.
- [23] 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.

- [24] Regularity for the fractional Gelfand problem up to dimension 7,  
*X. Ros-Oton,*  
J. Math. Anal. Appl. 419 (2014), 10-19.
- [25] Nonexistence results for nonlocal equations with critical and supercritical nonlinearities,  
*X. Ros-Oton, J. Serra,*  
Comm. Partial Differential Equations 40 (2015), 115-133.
- [26] The extremal solution for the fractional Laplacian,  
*X. Ros-Oton, J. Serra,*  
Calc. Var. Partial Differential Equations 50 (2014), 723-750.
- [27] Sharp isoperimetric inequalities via the ABP method,  
*X. Cabré, X. Ros-Oton, J. Serra,*  
J. Eur. Math. Soc. 18 (2016), 2971-2998.
- [28] The Pohozaev identity for the fractional Laplacian,  
*X. Ros-Oton, J. Serra,*  
Arch. Rat. Mech. Anal. 213 (2014), 587-628.
- [29] 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.
- [30] Sobolev and isoperimetric inequalities with monomial weights,  
*X. Cabré, X. Ros-Oton,*  
J. Differential Equations 255 (2013), 4312-4336.
- [31] 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.
- [32] 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.
- [33] On a factorization of Riemann's  $\zeta$  function with respect to a quadratic field and its computation,  
*X. Ros-Oton,*  
Rev. Acad. Cienc. Ser. A Math. 106 (2012), 419-427.
- [34] 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.
- [35] 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.
- [36] 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

- [37] Understanding singularities in free boundary problems,  
*X. Ros-Oton, J. Serra,*  
Matematica, Cultura e Società (2019), to appear.
- [38] Free boundaries and obstacle problems: an overview,  
*X. Ros-Oton,*  
SeMA J. 75 (2018), 399-419.
- [39] Boundary regularity, Pohozaev identities, and nonexistence results,  
*X. Ros-Oton,*  
Chapter 9 in ‘Recent developments in the Nonlocal Theory’, De Gruyter, 2018.
- [40] Nonlocal elliptic equations in bounded domains: a survey,  
*X. Ros-Oton,*  
Publ. Mat. 60 (2016), 3-26.
- [41] 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.
- [42] Fractional Laplacian: Pohozaev identity and nonexistence results,  
*X. Ros-Oton, J. Serra,*  
C. R. Math. Acad. Sci. Paris 350 (2012), 505-508.

INVITED TALKS  
AT CONFERENCES

- *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

- *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

- *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.

RESEARCH PROJECTS	<p>ERC Starting Grant 2018  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)  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  BBVA Foundation  PI: X. Ros-Oton  Amount: 35,000€</p> <p>NSF Analysis Grant DMS-1565186 (USA)  Project: “<i>Regularity theory for elliptic equations and free boundaries</i>”  PI: X. Ros-Oton  Awarded amount: \$103,617</p>	<p>01/2019 - 01/2024</p> <p>04/2018 - 08/2020</p> <p>10/2017 - 09/2020</p> <p>07/2016 - 08/2017</p>																																	
ORGANIZATION OF CONFERENCES	<ul style="list-style-type: none"> <li>• <i>PDE’s and Geometric Measure Theory</i>  Organizers: A. Figalli, X. Ros-Oton, J. Serra.  Zürich, October 2018.</li> </ul>																																		
SCIENTIFIC AND ADMINISTRATIVE RESPONSIBILITIES	<ul style="list-style-type: none"> <li>• Reviewer of research proposals for different national science agencies: DFG (Germany); NCN (Poland); FONDECYT (Chile).</li> <li>• Co-Organizer of the U. Zürich Seminar on <i>PDE &amp; Mathematical Physics</i></li> <li>• Co-Organizer of the Basel-Zürich Seminar in Analysis</li> <li>• Scientific Committee member for the Biennial Conference of the Royal Spanish Mathematical Society 2021</li> <li>• Referee for several journals, including: <table border="0" style="margin-left: 20px; width: 100%;"> <tr> <td>Acta Math.;</td> <td>Invent. Math.;</td> <td>Duke Math. J.;</td> </tr> <tr> <td>Comm. Pure Appl. Math.;</td> <td>J. Eur. Math. Soc.;</td> <td>Arch. Rat. Mech. Anal.;</td> </tr> <tr> <td>Geom. Funct. Anal.;</td> <td>J. Math. Pures Appl.;</td> <td>Anal. PDE;</td> </tr> <tr> <td>Int. Math. Res. Not.;</td> <td>J. Funct. Anal.;</td> <td>Trans. AMS;</td> </tr> <tr> <td>Ann. Inst. H. Poincaré;</td> <td>Comm. Math. Phys.;</td> <td>J. Differential Equations;</td> </tr> <tr> <td>Proc. Lond. Math. Soc.;</td> <td>Calc. Var. PDE;</td> <td>Ann. Mat. Pura Appl.;</td> </tr> <tr> <td>Comm. PDE;</td> <td>Publ. Mat.;</td> <td>Rev. Mat. Iberoam.;</td> </tr> <tr> <td>J. Math. Anal. Appl.;</td> <td>J. Lond. Math. Soc.;</td> <td>SIAM J. Math. Anal.;</td> </tr> <tr> <td>Proc. Amer. Math. Soc.;</td> <td>Nonlinear Anal.;</td> <td>Studia Math.;</td> </tr> <tr> <td>Com. Contemp. Math.;</td> <td>Arch. Math.;</td> <td>Nonl. Diff. Eq. Appl.;</td> </tr> <tr> <td>Rev. Acad. Cienc. Math.;</td> <td>Manuscr. Math.;</td> <td>Math. Nachr.;</td> </tr> </table> </li> <li>• Referee for Springer books (2)</li> </ul>	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.;	
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SCIENCE OUTREACH & MEDIA	<ul style="list-style-type: none"> <li>• Lecture at the BBVA Foundation aimed at public outreach.  Title: ‘<i>Las ecuaciones que mueven el mundo</i>’  Madrid, April 2018.</li> </ul>																																		



- Interview for the newspaper ‘El Español’ (April 2018)
- Video-Interview for ‘SwissInfo’ (August 2018)

CITATIONS

- More than 1500 citations in *Google Scholar*; more than 700 in *MathSciNet*.