

# Roi Docampo Álvarez

University of Oklahoma ■ Department of Mathematics ■ 601 Elm Avenue, Room 423 ■ Norman, OK 73019  
roi@ou.edu ■ (405) 325-6711 ■ <http://roi.docampo.xyz>

BIOGRAPHICAL	Born May 22, 1978, in Ourense (Spain).
EMPLOYMENT	<p>Assistant Professor, University of Oklahoma, Sep. 2016 – present</p> <p>Contratado Severo Ochoa (Post-doc), ICMAT, Madrid, Feb. 2015 – Sep. 2016</p> <p>Bolsista Ciência sem Fronteiras (Post-doc), Univ. Federal Fluminense, Feb. 2013 – Nov. 2014</p> <p>Wylie Assistant Professor/Lecturer (Post-doc), University of Utah, July 2009 – June 2012</p> <p>Research/Teaching Assistant (Grad. Student), Univ. of Illinois at Chicago, Aug. 2003 – July 2009</p>
VISITING POSITIONS	<p>Université Paris Diderot (France), March 2016</p> <p>Universidade de Santiago de Compostela (Spain), December 2014 – January 2015</p> <p>National Center for Theoretical Sciences, Taipei Office, NCTS/TPE (Taiwan), July – August 2013</p>
EDUCATION	<p>University of Illinois at Chicago, Ph. D. in Mathematics, 2009</p> <p>Ph. D. Thesis: <i>Arcs on determinantal varieties</i>.</p> <p>Thesis Advisor: Lawrence Ein</p> <p>Universidade de Santiago de Compostela, Diploma de Estudios Avanzados, 2003</p> <p>Master Thesis: <i>Noether-Fano Inequalities, Sarkisov Program, and Noether-Castelnuovo Thm</i>.</p> <p>Academic Advisor: Manuel Pedreira Pérez</p> <p>Universidade de Santiago de Compostela, Licenciatura en Matemáticas, 2001</p>
RESEARCH INTERESTS	Algebraic geometry, singularity theory, and valuation theory: birational geometry, multiplier ideals, arc spaces, jet schemes, Nash problem, motivic integration, Riemann-Zariski spaces, Berkovich spaces, homogeneous spaces, determinantal varieties, spherical varieties, Grassmannians, Schubert varieties.
PUBLICATIONS	<p>[1] <i>Arcs on determinantal varieties</i>, Transactions of the American Mathematical Society <b>365</b> (2013), no. 5, 2241–2269. <a href="#">arXiv:1011.1930</a>, <a href="#">doi:10.1090/S0002-9947-2012-05564-4</a>.</p> <p>[2] <i>Jacobian discrepancies and rational singularities</i>, Journal of the European Mathematical Society <b>16</b> (2014), no. 1, 165–199. With Tommaso de Fernex. <a href="#">arXiv:1106.2172</a>, <a href="#">doi:10.4171/JEMS/430</a>.</p> <p>[3] <i>Comparing multiplier ideals to test ideals on numerically <math>\mathbb{Q}</math>-Gorenstein varieties</i>, Bulletin of the London Mathematical Society <b>47</b> (2015), no. 2, 359–369. With Tommaso de Fernex, Shunsuke Takagi, and Kevin Tucker. <a href="#">arXiv:1401.7946</a>, <a href="#">doi:10.1112/blms/bdv006</a>.</p> <p>[4] <i>Terminal valuations and the Nash problem</i>, Inventiones mathematicae <b>203</b> (2016), no. 1, 303–331. With Tommaso de Fernex. <a href="#">arXiv:1404.0762</a>, <a href="#">doi:10.1007/s00222-015-0597-5</a>.</p> <p>[5] <i>The arc space of the Grassmannian</i>, Advances in Mathematics <b>306</b> (2017), 1269–1332. With Antonio Nigro. <a href="#">arXiv:1510.08833</a>, <a href="#">doi:10.1016/j.aim.2016.10.036</a>.</p>
IN PRESS	<p>[6] <i>Differentials on the arc space</i>, Duke Mathematical Journal, to appear. With Tommaso de Fernex. <a href="#">arXiv:1703.07505</a>.</p> <p>[7] <i>Nash blow-ups of jet schemes</i>, Annales de l’Institut Fourier, to appear. With Tommaso de Fernex. <a href="#">arXiv:1712.00911</a>.</p>
BOOKS EDITED	[8] <i>Local and global methods in algebraic geometry</i> , Contemporary Mathematics, vol. 712, American Mathematical Society, Providence, RI, 2018. With Nero Budur, Tommaso de Fernex, and Kevin Tucker. <a href="#">doi:10.1090/conm/712</a> .

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## GRANTS AND AWARDS

Collaboration Grant for Mathematicians, 09/2019 – 08/2024, Simons Foundation  
Junior Faculty Fellowship, 2018, Research Council, Univ. of Oklahoma  
CAS Junior Faculty Summer Fellowship, 2017, College of Arts and Sciences, Univ. of Oklahoma  
Bolsista Ciência sem Fronteiras (Atração Jovens Talentos), 02/2013 – 11/2014, CNPq, Brasil  
Fulbright Fellowship, 08/2003 – 05/2005, Spanish-American Fulbright Commission  
Master's Thesis Travel Grant, 02/2003 – 05/2003, Caixa Galicia Foundation  
Scholarship for the Realization of Graduate Studies, 10/2001 – 08/2003, Xunta de Galicia  
Premio Nacional de Fin de Carrera de Educación Universitaria (Mención Especial)  
(National Award of University Education, Honorable Mention)  
2001 – Granted by the Ministry of Education and Culture of Spain  
Undergraduate Research Scholarship, 2000 – 2001, Ministry of Education and Culture of Spain

## ORGANIZED CONFERENCES

*AMS Special Session on Advances in Birational Geometry* (at the Fall Southeastern AMS Sectional Meeting), November 3–4, 2018, Univ. of Arkansas. With Lance Edward Miller and Wenbo Niu.  
*Local and Global Methods in Algebraic Geometry*, May 12–15, 2016, Univ. of Illinois at Chicago. With Nero Budur, Tommaso de Fernex, and Kevin Tucker.  
*Workshop on Higher Dimensional Algebraic Geometry*, May 18–22, 2015, IMPA, Rio de Janeiro. With Carolina Araujo and Sándor Kovács.

## INVITED TALKS (CONFERENCES)

Workshop on Nash Blow-up and Semple Tower II, Leuven (Belgium)  
06/2019, *Jet schemes and Nash–Semple modifications*  
Singularities and Algebraic Geometry, Da Nang (Vietnam)  
01/11/2018, *Differentials on the arc space*  
2nd Joint Conference of the Belgian, Royal Spanish, and Luxembourg Math. Soc., Logroño (Spain)  
06/2016, *The Arc Space of the Grassmannian*  
Young Researchers in Singularities, Nice (France)  
04/26/2016, *Terminal valuations and the Nash problem*  
3er Congreso de Jóvenes Investigadores de la RSME (Plenary Speaker), Murcia (Spain)  
09/11/2015, *El problema de Nash para espacios de arcos*  
Workshop on Higher Dimensional Algebraic Geometry, IMPA (Brazil)  
05/20/2015, *Terminal valuations and the Nash problem*  
Congreso de la RSME 2015, Sesión de Singularidades, Granada (Spain)  
02/05/2015, *Terminal valuations and the Nash problem*  
FRG Special Month in Ann Arbor (Birational Geometry and Singularities), University of Michigan  
06/13/2014, *Nash problem II*  
Liberdade em Geometria Algébrica (LEGAL) 2014, Teresópolis (Brazil)  
02/17/2014, *Schubert varieties, arc spaces, and LCT's*  
2° Congreso de Jóvenes Investigadores de la RSME, Sesión de Singularidades, Sevilla (Spain)  
09/18/2013, *Jacobian discrepancies and rational singularities*  
Colóquio de Geometria e Aritmética (COLGA), Universidade Federal Fluminense (Brazil)  
08/30/2013, *Jacobian discrepancies and rational singularities*

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## INVITED TALKS (CONFERENCES, CONT.)

14th ALGA Meeting, Teresópolis (Brazil)  
07/04/2013, *Jacobian discrepancies and rational singularities*

Western Algebraic Geometry Symposium (WAGS), University of Washington  
04/14/2012, *Jacobian discrepancies and rational singularities*

AMS Sectional Meeting, Utah 2011, Special Session on Algebraic Geometry  
10/23/2011, *Jacobian discrepancies and rational singularities*

AMS Sectional Meeting, Notre Dame 2010, Special Session on Singularities in Algebraic Geometry  
11/07/2010, *Geometry of arcs under birational maps*

## INVITED TALKS (COLLOQUIA)

*The Nash problem for arc spaces*, 02/05/2016, Louisiana State University

*The Nash problem for arc spaces*, 01/21/2016, University of Oklahoma

*The Nash Problem for spaces of arcs*, 11/26/2015, Albert Ludwigs University of Freiburg

*El problema de Nash para espacios de arcos*, 11/12/2015, Universitat Jaume I

## INVITED TALKS (SEMINARS)

*O problema de Nash para espaços de arcos*, 07/19/2018, Universidade de Santiago de Compostela

*Differentials on the arc space*, 06/13/2018, University of Vienna

*Differentials on the arc space*, 04/27/2018, University of Arkansas

*Differentials on the arc space*, 03/06/2018, Princeton University

*Differentials on the arc space*, 02/23/2018, University of Oklahoma

*Differentials on the arc space*, 10/17/2017, Ohio State University

*Arcs and jets in algebraic geometry*, 08/25/2017 and 09/01/2017, University of Oklahoma

*Differentials on the arc space*, 03/28/2017, University of Utah

*The Nash problem for arc spaces*, 03/15/2016, Inst. de Mathématiques de Jussieu-Paris Rive Gauche

*The Arc Space of the Grassmannian*, 03/08/2016, École polytechnique, Paris

*The Arc Space of the Grassmannian*, 11/27/2015, Albert Ludwigs University of Freiburg

*Terminal valuations and the Nash problem*, 11/18/2015, KU Leuven

*Valoraciones terminales y el problema de Nash*, 04/16/2015, Universidad de Valladolid

*Valorizações terminais e o problema de Nash II*, 09/16/2014, Universidade Federal Fluminense

*Valorizações terminais e o problema de Nash*, 09/09/2014, Universidade Federal Fluminense

*Terminal valuations and the Nash problem*, 05/14/2014, IMPA

*Discrepancies on non- $\mathbb{Q}$ -Gorenstein varieties*, 02/25/2014, Univ. of Illinois at Chicago

*Jacobian discrepancies and rational singularities*, 10/31/2013, Univ. Federal do Rio de Janeiro

*Inversion of adjunction, arc spaces and Jacobian discrepancies*, 08/02/2013, NCTS/TPE, Taiwan

*Jacobian discrepancies and rational singularities*, 07/29/2013, NCTS/TPE, Taiwan

*Jacobian discrepancies and rational singularities*, 04/17/2013, IMPA

*Arcs on determinantal varieties II — Motivic integration*, 04/02/2013, Univ. Federal Fluminense

*Arcs on determinantal varieties*, 03/26/2013, Universidade Federal Fluminense

*Singularities in birational geometry and multiplier ideals*, 03/08/2013, University of Oklahoma

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## INVITED TALKS (SEMINARS, CONT.)

*Discrepancies*, 03/14/2012, University of Illinois at Chicago  
*Jacobian discrepancies and rational singularities*, 02/21/2012, Ohio State University  
*Discrepancies and Nash blowing-ups*, 02/08/2012, Purdue University  
*Jacobian discrepancies and rational singularities*, 02/08/2012, Purdue University  
*Arcs on determinantal varieties*, 04/15/2011, Brown University  
*Arcs on determinantal varieties*, 09/18/2009, University of Notre Dame  
*Arcs on determinantal varieties*, 09/08/2009, University of Utah  
*Arcs on determinantal varieties*, 12/10/2008, University of Michigan  
*Jet schemes, contact loci and singularities*, 03/03/2005, Universidad de Valladolid

## LECTURE SERIES

*Arc spaces, birational geometry, and the Nash problem*, 03/2015 – 05/2015, ICMAT, Madrid  
*Course on valuation theory and Berkovich spaces*, 01/2011 – 05/2011, University of Utah

## EXPOSITORY TALKS

*Introduction to Invariant Theory*, 02/2017 – 03/2017, University of Oklahoma  
*Total Positivity*, 02/2017, University of Oklahoma  
*Algebraic Geometry: A crash course for differential geometers*, 01/2015, Univ. of Santiago de Comp.  
*Introduction to Python and Sage for mathematicians*, 07/2014, Univ. of Toronto  
*The dual complex of singularities (after de Fernex, Kollár, Xu)*, 11/2013, IMPA  
*Arakelov Geometry: Green Currents*, 05/2013, IMPA  
*Dynamics of automorphisms of compact complex surfaces*, 05/2013, Univ. Federal Fluminense  
*The cohomology of  $p$ -adic symmetric spaces*, 02/2011, University of Utah  
*Introduction to Berkovich spaces*, 04/2010, University of Utah  
*Introduction to G.I.T.*, 11/2008, University of Illinois at Chicago  
*Toric varieties*, 01/2008 – 05/2008, University of Illinois at Chicago  
*Complete conics*, 11/2007, University of Illinois at Chicago  
*The proof of resolution of singularities*, 09/2006 – 12/2007, University of Illinois at Chicago  
*Intersection theory*, 08/2005 – 01/2006, University of Illinois at Chicago  
*Tropical algebraic geometry and Bernstein's theorem*, 04/2005, University of Illinois at Chicago  
*Positivity in algebraic geometry*, 09/2004 – 03/2005, University of Illinois at Chicago  
*D-Modules and derived categories*, 03/2003 – 05/2003, University of Illinois at Chicago

## TEACHING EXPERIENCE

Senior Mathematics Seminar (capstone course for undergraduate majors; topic: Game Theory),  
Lecturer, Fall 2019, University of Oklahoma  
Commutative Algebra, Lecturer, Fall 2019, University of Oklahoma  
Differential and Integral Calculus II, Lecturer, Fall 2018, University of Oklahoma  
Abstract Algebra I, Lecturer, Fall 2018, University of Oklahoma  
Algebraic Geometry, Lecturer, Spring 2018, University of Oklahoma

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## TEACHING EXPERIENCE (CONT.)

Commutative Algebra, Lecturer, Fall 2017, University of Oklahoma  
Discrete Math Structures, Lecturer, Fall 2017, University of Oklahoma  
Differential and Integral Calculus II, Lecturer, Spring 2017, University of Oklahoma  
Algebra Literacy Course (topics course for graduate students),  
Lecturer, Spring 2017, University of Oklahoma  
Linear Algebra I, Lecturer, Fall 2016, University of Oklahoma  
Foundations of Analysis II, Lecturer, Spring 2012, University of Utah  
Foundations of Analysis II, Lecturer, Fall 2011, University of Utah  
Special Topics in Algebraic Geometry: Course on Valuation Theory and Berkovich Spaces,  
Lecturer, Spring 2011, University of Utah  
Partial Differential Equations for Engineering Students, Lecturer, Spring 2011, University of Utah  
Introduction to Complex Variables, Lecturer, Fall 2010, University of Utah  
Calculus II, Lecturer, Spring 2010, University of Utah  
Calculus I, Lecturer, Fall 2009, University of Utah  
Calculus III Lab (Maple), Teaching Assistant, Fall 2008, University of Illinois at Chicago  
Differential Equations, Teaching Assistant, Summer 2008, University of Illinois at Chicago  
Calculus III, TA Lecturer, Spring 2008, University of Illinois at Chicago  
Emerging Scholars Workshop for Calculus I, Instructor, Spring 2007, University of Illinois at Chicago  
Precalculus, Teaching Assistant, Spring 2006, University of Illinois at Chicago  
Precalculus, Teaching Assistant, Fall 2005, University of Illinois at Chicago

## CONFERENCES ATTENDED

*Recent Progress in Moduli Theory*, 05/2019, MSRI  
*Derived algebraic geometry and its applications*, 03/2019, MSRI  
*Intro. Workshop: Derived Alg. Geom. and Birational Geo. and Moduli Spaces*, 01/2019, MSRI  
*Berkovich spaces – 30 years*, 07/2018, Institut Henri Poincaré, Paris (France)  
*Conférence en l'honneur de François Loeser*, 05/2018, Banyuls-sur-Mer (France)  
*Singularities and Algebraic Geometry*, 01/2018, Da Nang (Vietnam)  
*2nd Joint Conference of the Belgian, Royal Spanish, and Lux. Math. Soc.*, 06/2016, Logroño (Spain)  
*Young Researchers in Singularities*, 04/2016, Nice (France)  
*3er Congreso de Jóvenes Investigadores, RSME*, 09/2015, University of Murcia  
*Workshop on Higher Dimensional Algebraic Geometry*, 05/2015, IMPA, Rio de Janeiro.  
*Congreso de la RSME 2015*, 02/2015, University of Granada  
*FRG Special Month in Ann Arbor*, 05/2014, University of Michigan  
*Positive Characteristic Algebraic Geometry Workshop*, 03/2014, Univ. of Illinois at Chicago  
*Liberdade em Geometria Algébrica, LEGAL 2014*, 02/2014, Teresópolis, Brasil  
*New Aspects on Singularity Theory*, 09/2013, ICMAT, Madrid  
*2° Congreso de Jóvenes Investigadores, RSME*, 09/2013, University of Seville

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## CONFERENCES ATTENDED (CONT.)

*Algebra and Geometry and Topology of Singularities, Luengo 60th*, 09/2013, Miraflores de la Sierra  
*13th ALGA Meeting*, 06/2013, Teresópolis, Brasil  
*YMIS 13: Seventh Meeting for mathematicians in Segovia*, 02/2013, University of Valladolid  
*Western Algebraic Geometry Symposium*, 04/2012, University of Washington  
*Singularities in Com. Algebra and Alg. Geometry, AMS Sectional Meeting*, 03/2012, Univ. of Kansas  
*Special Session on Algebraic Geometry, AMS Sectional Meeting*, 10/2011, University of Utah  
*Western Algebraic Geometry Symposium*, 10/2011, Colorado State University  
*AIM Workshop: Relating test ideals and multiplier ideals*, 08/2011, AIM  
*2<sup>nd</sup> International Conference and Workshop on Valuation Theory*, 07/2011, Segovia/El Escorial  
*Western Algebraic Geometry Symposium*, 04/2011, Stanford University  
*Singularities in Algebraic Geometry, AMS Sectional Meeting*, 11/2010, Univ. of Notre Dame  
*Summer School “Berkovich spaces”*, 06/2010, Institut de Mathématiques de Jussieu, Paris  
*School on Birational Geometry and Moduli Spaces — VIGRE Mini-course*, 06/2010, Univ. of Utah  
*Western Algebraic Geometry Symposium*, 05/2010, University of British Columbia  
*Combinatorial, Enumerative and Toric Geometry*, 03/2009, MSRI  
*Modern Moduli Theory*, 02/2009, MSRI  
*Classical Algebraic Geometry Today*, 01/2009, MSRI  
*Michigan-Ohio State-UIC Workshop on Algebraic Geometry*, 10/2008, University of Michigan  
*Alg. Geometry and Commutative Alg. (Hartshorne’s 70th)*, 04/2008, Univ. of Illinois at Chicago  
*Michigan-Ohio State-UIC Workshop on Algebraic Geometry*, 10/2007, University of Michigan  
*Algebraic Geometry Session, AMS Meeting*, 10/2007, DePaul University  
*Hot Topics: Minimal and Canonical Models in Algebraic Geometry*, 04/2007, MSRI  
*UIC-Purdue Workshop on Alg. Geom. and Comm. Alg.*, 12/2006, Purdue Univ., West Lafayette  
*International Congress of Mathematicians*, 08/2006, Madrid  
*Satellite Conference on Algebraic Geometry*, 08/2006, University of Valladolid (Segovia Campus)  
*Moduli Spaces and Arcs in Algebraic Geometry*, 08/2006, University of Cologne  
*Recent Developments in Higher Dimensional Alg. Geom. (JAMI)*, 03/2006, Johns Hopkins Univ.  
*AMS Summer Institute in Algebraic Geometry*, 07/2005 and 08/2005, University of Washington  
*Graduate Student Workshop for AMS Summer Inst. in Alg. Geom.*, 07/2005, Univ. of Washington  
*YMIS 2005: First Meeting for Young Mathematicians in Sedano*, 02/2005, University of Valladolid  
*PRAGMATIC 2004: Hyperbolicity of Complex Varieties*, 08/2004 and 09/2004, Univ. of Catania  
*Midwest Comm. Alg. and Geom. Meeting (Lipman’s fest)*, 05/2004, Purdue Univ., West Lafayette  
*Asymptotic and Effective Results in Complex Geom. (JAMI)*, 03/2004, Johns Hopkins University  
*Cohomological Methods in Algebraic Geometry*, 09/2002, University of Santiago de Compostela  
*Seminar on Higher Algebraic Geometry*, 07/2002, University of Santiago de Compostela

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## SERVICE

Referee for *Advances in Mathematics*, *Bulletin of the LMS*, *Communications in Algebra*, *Journal of Algebra*, *Journal of Algebraic Geometry*, *Journal of Pure and Applied Algebra*, *Journal of Singularities*, *Manuscripta Mathematica*, and *Pacific Journal of Mathematics*.

Co-organizer of the Putnam Problem-solving Seminar at University of Oklahoma.

Co-organizer of the Algebra and Representation theory Seminar at the University of Oklahoma, the Algebra Seminar at the Universidade Federal Fluminense, the Algebraic Geometry Seminar at the University of Utah.

Webmaster of the Department of Mathematics at the University of Oklahoma.

## TECHNICAL SKILLS

Operating Systems: Unix, Linux, OS X, Microsoft Windows.

Programming Languages: Python, FORTRAN, C, C++, HTML, PHP.

Others: Sage, Mathematica, Maple, Singular, Macaulay2,  $\text{T}_\text{E}\text{X}$ ,  $\text{L}^{\text{A}}\text{T}_\text{E}\text{X}$ .

## LANGUAGES

Native Speaker of Spanish and Galician

Fluent in English and Portuguese

Reading skills in French and Italian

## REFERENCES

Carolina Araujo, Instituto Nacional de Matemática Pura e Aplicada (IMPA)

Tommaso de Fernex, University of Utah

Lawrence Ein, University of Illinois at Chicago

Javier Fernández de Bobadilla, Basque Center for Applied Mathematics (BCAM)

Mircea Mustață, University of Michigan

Ana Bravo, Universidad Autónoma de Madrid (teaching)

Henryk Hecht, University of Utah (teaching)