

## Rodolfo Ríos-Zertuche, Ph.D.

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CONTACT INFORMATION      Tomasjordvegen 116      +47 967 21 693  
9024 Tomasjord      rodolfooriosz@gmail.com  
Norway      Born on December 24, 1981 in Mexico  
<http://rodolfo.matematicosmexicanos.org>

CITIZENSHIP      Mexico and Spain

RESEARCH INTERESTS      Optimization, dynamics, mathematical physics, geometric measure theory.

PROFESSIONAL HISTORY      **UiT The Arctic University of Norway**

Postdoctoral Fellow, since 2023

- Adviser: Cordian Riener

**Laboratoire d'Analyse et d'Architecture des Systèmes – CNRS**

Postdoctoral Fellow, 2021 – 2023

- Advisers: Milan Korda, Jean-Bernard Lasserre, and Victor Magron

**Artificial and Natural Intelligence Toulouse Institute**

Postdoctoral Fellow, 2019 – 2021

- Advisers: Jérôme Bolte and Edouard Pauwels

**Project continuation**

A study of the variational structure of the space of closed measures.

Redeveloped the theory to correct a subtle mistake in my paper. 2017 – 2019

**École Normale Supérieure de Paris (Ulm) and Université de Paris – Dauphine**

Postdoctoral Fellow, 2015 – 2017

- Adviser: Patrick Bernard

**Max Planck Institute for Mathematics, Bonn**

Postdoctoral Fellow, January 2014 – March 2015

- Adviser: Don Zagier

**Institute for Computational and Experimental Research in Mathematics, Brown University**

Postdoctoral Fellow, Fall 2013

- Adviser: Anton Zorich

**Department of Mathematics, Princeton University**

Lecturer, 2012 – 2013

- Adviser: John N. Mather

EDUCATIONAL HISTORY      **Department of Mathematics, Princeton University**

Ph.D. in Mathematics, 2012

- Dissertation Title: *Near-Involutions, the Pillowcase Distribution, and Quadratic Differentials*, arXiv:1209.4333
- Adviser: Andrei Okounkov

**Centro de Investigación en Matemáticas (CIMAT), Mexico**

M.Sc. in Mathematics, 2007

**Universidad de Guanajuato, Mexico**

B.A. in Mathematics, 2006

**Uppsala University, Sweden**

Visiting student, 2004 – 2005

PUBLICATIONS

*The pillowcase distribution and near-involutions*. Electronic Journal of Probability, 19 (2014): 1-22.

*An introduction to the half-infinite wedge*, in Mexican Mathematicians Abroad: Recent Contributions (N. Bárcenas, F. Galaz, M. Torres, editors), Contemporary Mathematics 657 2016 237 (2016), pp. 214–255.

*Characterization of minimizable Lagrangian action functionals and a dual Mather theorem*. Discrete and Continuous Dynamical Systems, May 2020, 40(5): 2615–2639.

*Examples of pathological dynamics of the subgradient method for Lipschitz path-differentiable functions*. Mathematics of Operations Research, May 2022, 47(4): 3184–3206.

*Long term dynamics of the subgradient method for Lipschitz path differentiable functions*. With J. Bolte and E. Pauwels. Journal of the European Mathematical Society (2022).

*Occupation measure relaxations in variational problems: the role of convexity*. With D. Henrion, M. Korda, M. Kružík. Accepted for publication in SIAM Journal on Optimization, 2024.

*Convergence rates for sums-of-squares hierarchies with correlative sparsity*. With M. Korda and V. Magron. Accepted for publication in Mathematical Programming, 2024.

*Existence of differentiable curves in convex sets and the concept of direction of the flow in mass transportation*. 2018, submitted. arXiv:1810.05999

*Deformations of closed measures and variational characterization of measures invariant under the Euler-Lagrange flow*. 2018, submitted. arXiv:1810.07838

*Weak KAM theory in higher-dimensional holonomic measure flows*. 2019, submitted. arXiv:1901.08181

*A closed-measure approach to stochastic approximation*. With P. Bianchi. 2021, submitted. arXiv:2112.05482.

*The gap between a variational problem and its occupation measure relaxation*. With M. Korda. 2022, submitted. arXiv:2205.14132.

TEACHING  
EXPERIENCE

*At UiT The Arctic University of Norway:*  
 Spring 2024 Lecturer, Differential Equations  
*At the Toulouse School of Economics:*  
 Spring 2021 Travaux dirigés, Statistiques Inferentielles  
 Travaux pratiques, Optimization for Big Data  
*At PSL/ESPCI, Paris:*  
 2016–2017 Travaux dirigés, Mathématiques Fondamentales 2  
*At Princeton University:*  
 Spring 2013 Lecturer, Linear Algebra with Applications  
 Fall 2012 Lecturer, Multivariable Calculus, 2 sections  
 Spring 2012 Teaching Assistant and Grader, Multivariable analysis  
 Fall 2011 Teaching Assistant and Head of Graders,  
 Mathematics for Economists  
 Spring 2011 Grader, Multivariable Calculus  
 Fall 2010 Lecturer and Grader, Calculus II  
 Fall 2009 Grader, Multivariable Calculus  
*At CIMAT, Guanajuato, Mexico:*  
 Spring 2007 Teaching Assistant, Calculus I  
 Fall 2005 Teaching Assistant, Visualization Workshop:  
 a Mathematica-aided multivariable calculus course  
*At Universidad Iberoamericana, Mexico City:*  
 Summer 2003 Lecturer, Mathematica in the Classroom

HONORS AND  
AWARDS

2021–2022 Postdoctoral Fellowship, LAAS-CNRS  
 2019–2021 Postdoctoral Fellowship, ANITI  
 2015–2017 Postdoctoral Fellowship, École Normale Supérieure–Ulm / Université de Paris–Dauphine  
 2014 Postdoctoral Fellowship, Max Planck Institute for Mathematics  
 2013 Postdoctoral Fellowship, ICERM – Brown University  
 2007–2012 Fellowship for Ph.D. Studies, Princeton University  
 2007–2010 Fellowship for Ph.D. Studies, CONACYT-Mexico  
 2007–2010 Excellency Scholarship, SEP-Mexico  
 2006–2007 Fellowship for M.S. Studies, CONACYT-Mexico  
 2004–2005 Support for one-year exchange program with  
 Uppsala University, Universidad de Guanajuato  
 2001–2006 Fellowship for Undergraduate Studies, CIMAT

TALKS AND  
MINICOURSES

2023	July	SIAM AG23, Eindhoven, Netherlands
2022	September	POEMA Final Workshop, Paris, France
	July	Studying PDE dynamics via optimization with integral inequality constraints (remotely), BIRS, Banff, Canada
	May	Séminaire Pluridisciplinaire d'Optimisation de Toulouse, France
2021	February	BrainPOP seminar (remotely), LAAS-CNRS, Toulouse, France
2020	October	Alumni colloquium (remotely), CIMAT, Mexico
	September	Journées SMAI-MODE 2020 (remotely), Inria, France
	April	Séminaire S <sup>2</sup> A (remotely), Telecom Paris, France.
2019	February	Dynamics Oberseminar, Fakultät für Mathematik, Ruhr-Universität, Bochum, Germany.
2016	May	Séminaire d'analyse harmonique, Université de Paris Sud 11, Orsay.
	March	<i>ANR Geometrya – Sixth Meeting</i> , École Normale Supérieure, Paris.
2015	May	Department colloquium, CIMAT, Yucatán, Mexico.
	May	Department colloquium, CIMAT, Guanajuato, Mexico.
	March	Dynamics Seminar, École Normale Supérieure, Lyon.
2014	December	Dynamics Oberseminar, Institut für Mathematik, Julius-Maximilians-Universität Würzburg.
	December	Dynamics Oberseminar, Fakultät für Mathematik, Ruhr-Universität, Bochum, Germany.
	November	Dynamics Seminar, École Normale Supérieure, Paris.
	November	Seminar on Factorization Algebras, Max Planck Institute for Mathematics, Bonn, Germany.
	October	(minicourse) Calculus of variations done with measures. Max Planck Institute for Mathematics, Bonn, Germany.
	October	(minicourse) Representation Theory Seminar, Max Planck Institute for Mathematics, Bonn, Germany.
	October	Dynamics Oberseminar, Mathematisches Institut der Albert-Ludwigs-Universität Freiburg.
	July	Süd-West-Arithmetik-Seminar, Karlsruhe Institute of Technology.
	March	Oberseminar, Max Planck Institute for Mathematics, Bonn, Germany.
2013	October	Postdoc and Graduate Student Seminar, Institute for Computational and Experimental Research in Mathematics, Providence, RI.
2011	August	<i>Young Mexican mathematicians in the world workshop</i> , CIMAT, Guanajuato, Mexico.
	February	<i>Department retreat on integrable systems</i> , Princeton University.

EVENTS  
ORGANIZED

CIMAT *alumni colloquium*, CIMAT-Mexico, Fall 2020; August 2022–present.

*Third worldwide meeting of Mexican mathematicians*, CIMAT-Mexico, August 15–19, 2016.

*Second worldwide meeting of Mexican mathematicians*, CIMAT-Mexico, December 15–19, 2014.

*Voz Latina 2011 — Immigration in the twenty first century*, a symposium of the Latino Graduate Student Association, Princeton University, October 14–15, 2011.

LANGUAGES

Spanish (native), English (fluent), French (fluent), Swedish (advanced), German (intermediate).