

Curriculum Vitae

Bruno Vergara

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Personal Data

Universitat de Barcelona
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Academic Background

PhD

July 2019

Universidad Autónoma de Madrid, Madrid.
Mathematics.

Weighted inequalities in Fluid Mechanics and General Relativity: Carleman estimates and cusped traveling waves.

Cum laude and International Doctorate Mention.

Advisor: Prof. Alberto Enciso.

Master

June 2014

Universidad Complutense de Madrid, Madrid.
Theoretical Physics.

Master Thesis: *Polychronakos–Frahm spin chain of BC_N -type in a magnetic field.*

Grade: 9.5/10.0 (Honors).

Advisors: Prof. F. Finkel, Prof. A. González–López and Prof. M.A. Rodríguez.

4-year degree

September 2013

Universidad Complutense de Madrid, Madrid.
Physics.

Final Degree Project: *Polychronakos–Frahm spin chain.*

Grade: 10.0/10.0.

Advisors: Prof. F. Finkel, Prof. A. González–López and Prof. M.A. Rodríguez.

Professional Interests

Partial Differential Equations, Fluid Mechanics, Geometric Analysis, Mathematical Physics.

Appointments

- Postdoctoral researcher, Universitat de Barcelona, Barcelona, 2020–2022.
- Postdoctoral researcher, Universität Zürich, Zürich, 2019–2020.
- Predoctoral researcher, ICMAT–CSIC, Madrid, 2015–2019.

Publications

1. “Robust quantitative uniqueness and controllability for parabolic equations with inverse square potentials via non-smooth Carleman weights” (with A. Enciso and A. Shao), <https://arxiv.org/abs/2112.04457>.
2. “Carleman estimates with sharp weights and boundary observability for wave equations with critically singular potentials” (with A. Enciso and A. Shao), *Journal of the European Mathematical Society*, 23 (2021), 10, 3459–3495.
3. “Uniqueness and convexity of Whitham’s highest cusped wave” (with A. Enciso and J. Gómez–Serrano), <https://arxiv.org/abs/1810.10935>.
4. “Fractional powers of the wave operator via Dirichlet–to–Neumann maps in anti-de Sitter spaces” (with A. Enciso and M.d.M González), *Journal of Functional Analysis*, 273 (2017), 6, 2144–2166.

In preparation

1. “Homogeneous solutions to the thin obstacle problem in \mathbb{R}^3 ” (with J. Gómez–Serrano and X. Ros–Oton).

Other preprints

1. “Polychronakos–Frahm spin chain of BC_N –type in a magnetic field” (2015) (with F. Finkel, A. González–López and M.A. Rodríguez).

Honors, Awards and Grants

- Extraordinary PhD prize from Universidad Autónoma de Madrid.
- External Member of the grant ERC–StG–EllipticPDE (PI: Xavier Ros–Oton).
- External Member of the grant ERC–StG–GEOFLUIDS (PI: Alberto Enciso).
- Spanish Ministry of Education and Science Scholarship during the academic years 2009–10, 2010–11, 2011–12, 2012–13, 2013–14.

Invited Talks at Conferences and Workshops

- Mathematical congress of the Americas July 2021
Special Session: New Developments in Mathematical Fluid Dynamics
Universidad de Buenos Aires, Buenos Aires
- Mini-Workshop on Wave Equations January 2020
Queen Mary University of London, London
- 12th Americas Conference on Differential Equations December 2019
and Nonlinear Analysis. Special Session: Fluid dynamics
CIMAT, Guanajuato

- Dynamics, Equations and Applications September 2019
Special Session: Dynamics, equations and computation
AGH University of Science and Technology, Kraków
- 11th IMACS International Conference on Nonlinear Evolution Equations April 2019
and Wave Phenomena: Computation and Theory. Special Session:
Existence and stability of peaked waves in nonlinear evolution equations
University of Georgia, Athens
- Spanish–Portuguese Relativity Meeting September 2017
Universidad de Málaga, Málaga

Seminars

- Barcelona Analysis Seminar, Universitat de Barcelona January 2022
- ICMAT November 2021
- Waves in One World, ICMS Edinburgh July 2020
- ICMAT January 2020
- Universität Zürich May 2019
- University of Illinois at Urbana–Champaign April 2019
- University of Minnesota April 2019
- NTNU February 2019
- Lund University February 2019
- KTH February 2019
- Uppsala University February 2019
- Hausdorff Center for Mathematics, Universität Bonn December 2018
- Queen Mary University of London November 2018
- Universidad Autónoma de Madrid October 2018
- ICMAT, Predoc. Seminar December 2017

Other selected International Conferences, Schools and Workshops assisted

- Geometric Measure Theory and Applications: September 2019
From Geometric Analysis to Free Boundary Problems,
Fondazione CIME, Cetraro
- Lund Workshop on Fluid Dynamics and Dispersive Equations, June 2018
Lund University
- Mathematical Analysis of Incompressible Fluid Flows: September 2017
A Sussex School and Workshop on the Navier–Stokes and Euler Equations,
Sussex University
- BCAM Workshop Eighth Itinerant Meeting in PDEs, January 2017
Basque Center for Applied Mathematics–BCAM, Bilbao
- International Workshop: Getting Started with PDEs, September 2016
Einstein Institute of Mathematics, Hebrew university of Jerusalem
- Summer School on Fluid Dynamics and Related Topics, July 2016
Gran Sasso Science Institute–GSSI, L’Aquila
- LMS-CMI Research School: July 2016
Modern Topics in Nonlinear PDE and Geometric Analysis,
University of Reading

Stays in Research Centers

- Queen Mary University of London, 2 Weeks
Host: Arick Shao January 2020
- ICMAT, 1 Week
Host: Alberto Enciso January 2020
- Universität Zürich, 1 Week
Host: Xavier Ros-Oton May 2019
- Princeton University, 4 Weeks
Host: Javier Gómez-Serrano April–May 2019
- Uppsala University, 1 Week
Host: Jordi–Lluís Figueras February 2019
- Queen Mary University of London, 2 Weeks
Host: Arick Shao November 2018
- Princeton University, 13 Weeks
Host: Javier Gómez-Serrano February–May 2018
- BCAM, 1 Week
Host: Luis Vega January 2017
- Universitat Politècnica de Catalunya, 1 Week
Host: María del Mar González May 2015
- ICMAT
Host: Alberto Enciso February–July 2015

Teaching experience (University)

At Universitat de Barcelona

- PhD Seminar: *Quantitative uniqueness for linear waves* Spring 2022

At Universität Zürich

- Students seminars: *Introduction to geometric measure theory* Spring 2020
- Teaching assistant in Linear Algebra I Fall 2019

At Universidad Autónoma de Madrid

- Teaching assistant in Mathematics for 1st year BSc in Environmental Sciences Fall 2017

Languages

- Spanish: Mother tongue.
- English: IELTS 7.5 (Advanced–C1). Certificate obtained in 2014.