

Gonzalo Cao-Labora

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🌐 Citizenship: Spanish (EU)

Positions 2024–. **Courant Institute, New York University (USA)**
Courant Instructor / Assistant Professor.

Education 2020–2024. **Massachusetts Institute of Technology (USA)**
PhD Student.
Advisor: Prof. Gigliola Staffilani
I was awarded the Presidential Fellowship, a distinction among graduate students admitted to MIT.

Universitat Politècnica de Catalunya, Barcelona (Spain)
BSc in Mathematics, 2020.
Top of the class.
I completed my degree thesis as a Visiting Student in Princeton University, advised by Prof. Javier Gómez-Serrano.
I was awarded the 2021 Noether prize for my degree thesis (prize awarded to the best degree thesis in Mathematics in Catalonia)

Universitat Politècnica de Catalunya, Barcelona (Spain)
BSc in Engineering Physics, 2020.
Third of the class.

Languages English (fluent), Spanish (native), Galician (native), Catalan (fluent).
C++, \LaTeX , Mathematica, Matlab, Python.

Teaching

Spring 2025	Analysis 1 (Math-UA-325) New York University. 2.5h/week
Fall 2024	Analysis 1 (Math-UA-325) New York University. 2.5h/week
Fall 2023	Recitation leader for Calculus (18.01A and 18.02A) MIT. 2h/week
Fall 2022	TA, Differential Geometry (18.95). MIT
Spring 2022	TA, Stochastic Calculus (18.676). MIT
Year 2018-2019	Undergraduate TA (freshman Analysis and Algebra). UPC

Publications

RESEARCH PUBLICATIONS:

1. "Low regularity analysis of the Zakharov–Kuznetsov equation on $\mathbb{R} \times \mathbb{T}$ ". Submitted
2. "Non-radial implosion for the defocusing nonlinear Schrödinger equation in \mathbb{T}^d and \mathbb{R}^d " (with J. Gómez-Serrano, J. Shi and G. Staffilani). Submitted
3. "Self-similar singularity formation and wellposedness theory for compressible fluids and dispersive PDE". PhD Thesis
4. "Evaluating Borwein integrals using residue theory" (with D. Cao Labora) Complex Analysis and Operator Theory (CAOT)
5. "Non-radial implosion for compressible Euler and Navier-Stokes in \mathbb{T}^3 and \mathbb{R}^3 " (with J. Gómez-Serrano, J. Shi and G. Staffilani). Submitted
6. "Smooth self-similar imploding profiles to 3D compressible Euler" (with T. Buckmaster and J. Gómez-Serrano). Quarterly of Applied Mathematics, 81, 517-532 (2023). Special issue dedicated to Constantine Dafermos' 80th birthday
7. "Smooth imploding solutions for 3D compressible fluids" (with T. Buckmaster and J. Gómez-Serrano). **Forum of Mathematics, Pi** 13, e6 (2025)
8. "Self-similar profiles in Analysis of Fluids, a 1D model and the compressible Euler equations". Degree Thesis (2020).
9. "An Erdős-Fuchs theorem for ordered representation functions" (with J. Rué and C. Spiegel). The Ramanujan Journal 56, no. 1, 183-201 (2021).

OTHER PUBLICATIONS:

1. "Self-similar profiles in Analysis of Fluids, a 1D model and the compressible Euler equations". Reports@SCM 6, 35-48 (2021).
2. "Holomorphic functional calculus for sectorial operators" (with H. Ariza, L. Cabezas, J. Canto, M. L. Godoy, M. M. Utrera and J. Betancor) TEMat monográficos 1, 61-77 (2020)
3. "Aplicación en combinatoria de las representaciones de grupos". TEMat 2, 67-83 (2018).

Awards and prizes:

- Presidential Fellow, special distinction among best PhD applications admitted at MIT
- Emmy Noether prize for the best mathematics degree thesis in Catalonia
- CFIS prize to the best academic record among all double-degrees at UPC
- Facultat de Matemàtiques i Estadística award to the best academic record in the Mathematics degree

Talks

- Speaker. PDE in Barcelona Conference. (May 2025)
- Speaker. Eastern AMS Sectional Meeting. Hartford CT (April 2025)
- Speaker. NSF-FRG Conference on Fluids and Computer Assisted Proofs. Princeton (March 2025)
- Speaker. Youth conference of the Spanish Mathematics Society (RSME juvenes), Bilbao, Spain (January 2025)
- Speaker. Jornadas Peregrinando, Universidade de Santiago de Compostela (December 2024)
- Plenary speaker at the Barcelona Analysis Conference BAC24 (June 2024)
- Seminar. PDE Seminar, EPFL, Switzerland (May 2024)
- Speaker. PDE Mini-School 'Recent Developments in wave turbulence theory', University of North Carolina at Chapel Hill, Durham (April 2024)
- Speaker. 'Nonlinear dispersive and wave equations: recent developments and future directions', Monash University, Melbourne (December 2023)
- Symposium "Recent Developments in Fluids Dynamics" at ICIAM. Waseda University, Tokyo (August 2023)
- Conference. AMS New England Grad Student Conference, Brown University (April 2023)
- Seminar. Invited talk, Universidade de Santiago de Compostela (March 2023)
- Seminar. Analysis and PDE Seminar, MIT (February 2023)
- Seminar. PDE Seminar, Brown University (December 2022)
- Conference. Geometry & Analysis Seminar for Boston Area Grad Students (October 2022)
- Seminar. Analysis of Fluids Seminar, Princeton University (November 2021)
- Poster. Summer School on Harmonic Analysis and PDEs, Bilbao Center of Applied Mathematics (July 2019)
- Seminar. Introduction to Research Seminar (SII), Universidade de Santiago de Compostela (April 2019)
- Short talk. Workshop on Functional Analysis, Bilbao Center of Applied Mathematics (March 2019)

Other Attended Conferences

Simons Collaboration on Wave Turbulence Annual Meeting. New York.	Dec 2024
FRG Conference on Fluids and Computer Assisted Proofs. Minneapolis, MN	Apr 2024
Riviere-Fabes Symposium. Minneapolis, MN	Apr 2024
Simons Collaboration on Wave Turbulence Annual Meeting. New York.	Dec 2023
Recent Advances in Mathematical Fluid Dynamics. Duke University, NC	May 2023
Simons Collaboration on Wave Turbulence Annual Meeting. New York.	Dec 2022
Wave Turbulence and Beyond. Torino.	Jul 2022
PDEs and Non-Linear Analysis. CIMAT, Guanajuato	Dec 2019
Harmonic Analysis and PDEs: Restriction Theory. BCAM, Bilbao	Jul 2019

Selected undergraduate and highschool contests

Two gold medals and one silver medal, International Mathematics Competition	2017–2019
Silver Medal, Southwestern Europe Regional Contest (SWERC)	2016
Bronze medal and honourable mention, International Mathematics Olympiad	2014–2015
Tenth national extraordinary award of secondary education	2014
Second regional extraordinary award of secondary education	2013