Richard Medina Rodríguez

Curriculum Vitae – May 2026

CEREMADE, Université Paris Dauphine - PSL
Place du Maréchal de Lattre de Tassigny, 75016 PARIS
richard.medina-rodriguez@dauphine.psl.eu
richard-medina.github.io
arXiv *Google Scholar* *Orcid* *Linkedin*

Research Profile

Analysis of PDEs in kinetic theory and statistical physics, with emphasis on boundary effects, domain geometry, and long-time behaviour of solutions.

Currently working on modeling, analysis, and numerical simulation of fluid-particle systems, using my analytical background to guide model construction and support the justification of numerical approaches.

Publications

Accepted/Published

2026 **Evans, J., Medina, R.**, *Existence and Stability of Non-Equilibrium Steady States of a Weakly Non-Linear Kinetic Fokker-Planck Equation in a Domain*, J Stat Phys 193, 47 doi.

• *Existence and asymptotic stability of stationary solutions to a nonlinear kinetic Fokker-Planck equation with non-equilibrium forcing via BGK thermostats and non-isothermal Maxwell boundary conditions.*

Preprints

2026 **R. Medina**, The Boltzmann equation with non-isothermal Maxwell boundary conditions, URL `https://arxiv.org/abs/2604.13572`.

• *Existence, uniqueness and asymptotic stability of non-equilibrium steady states for the Boltzmann equation in non-isothermal bounded domains, under small boundary temperature fluctuations.*

2025 **R. Medina**, The Boltzmann equation on smooth and cylindrical domains with Maxwell boundary conditions, URL `https://arxiv.org/abs/2510.13260`. Submitted to *Kinetic and Related Models*.

• *Well-posedness and exponential convergence of solutions for a Boltzmann equation in bounded domains, including smooth and cylindrical geometries, with Maxwell boundary conditions.*

2024 **K. Carrapatoso, P. Gabriel, R. Medina, and S. Mischler**, Constructive Krein-Rutman result for Kinetic Fokker-Planck equations in a domain, URL `https://arxiv.org/abs/2407.10530`. Submitted to *Analysis & PDE*.

• *Well-posedness and exponential convergence to equilibrium for general kinetic Fokker-Planck equations in non-isothermal bounded domains.*

Long-term Research Stays

Oct. – Nov. 2024 **Warwick Mathematics Institute**, University of Warwick, United Kingdom.
Work in collaboration with Josephine Evans on the effects of interior and boundary thermostats on the long-time behavior of non-linear kinetic Fokker-Planck equations.

Education and Academic Positions

2025 – 2026 **Teaching and Research Fellow (A.T.E.R.)**, Université Paris Dauphine - PSL, France.
Research on kinetic theory; teaching assistant for mathematics courses (real analysis and numerical methods).

2022 – 2025 **PhD in Applied Mathematics**, Université Paris Dauphine - PSL, France.
Thesis title: Hypocoercivity and geometric confinement.
PhD Advisors: Kleber Carrapatoso & Stéphane Mischler.
Defense date: 18 December 2025.
Thesis reviewers: Véronique BAGLAND & José A. CAÑIZO.
Thesis examiners: Émeric BOUIN, Arnaud GUILLIN & Frédéric HÉRAU (president of the jury).

2022 **Master Internship**, *CEREMADE*, Université Paris Dauphine - PSL, France.
Advisors: Kleber Carrapatoso & Stéphane Mischler.
Research Project: Extending hypocoercivity techniques for linearized kinetic equations to non-smooth bounded domains.

2021 – 2022 **Master of Science in Applied and Theoretical Mathematics (M2 MATH)**, Université Paris Dauphine - PSL, France.
With Honors (Mention Bien).

2020 – 2021 **Assistant Professor**, *Department of Mathematics*, Universidad de La Habana, Cuba.
Research on functional analysis and PDEs; teaching assistant for mathematics courses (real and complex analysis).

2016 – 2020 **Bachelor of Science in Mathematics**, Universidad de La Habana, Cuba.
Summa Cum Laude.
Bachelor's Final Project: Random Schrödinger operators in a 2D scheme.
Advisors: Rita Roldán Inguanzo & Laure Dumaz.

Selected Invited Talks

Invited Talks at Conferences and Workshops

Jun. 2024 ***The Boltzmann equation in a cylinder near the hydrodynamic limit***, *presented at the conference Analysis of PDEs in Mathematical Physics*, University of Bath, United Kingdom.

Feb. 2023 ***Weighted L^∞ estimates for the Boltzmann equation***, *presented at the MAFRAN Days*, King's College, United Kingdom.

Jun. 2019 ***Fixed points in non-expansives maps***, *presented at the International Congress COMPUMAT 2019*, Universidad de La Habana, Cuba.

Mar. 2019 ***Extrapolation Methods for Approximating a Fairness Functional***, *presented at the International Workshop on Operations Research (IWOR)*, Universidad de La Habana, Cuba.

Mar. 2018 ***Restriction-based interpolation with cubic A-splines***, *presented at the International Conference on Operations Research (ICOR)*, Universidad de La Habana, Cuba.

Invited Talks at Seminars

Feb. 2026 ***The Boltzmann equation with non-istohermal Maxwell boundary conditions***, *presented at the SPIKE Seminar*, Institut Henri Poincaré (IHP), France.

Jan. 2025 ***Brief introduction to the Boltzmann equation***, *presented at the Young Researchers Seminar*, Université Paris Dauphine - PSL, France.

Nov. 2024 ***Constructive Krein-Rutman result for kinetic Fokker-Planck equations in a domain (joint work with P. Gabriel, K. Carrapatoso and S. Mischler)***, *presented at the Junior Analysis Seminar*, Imperial College London, United Kingdom.

Oct. 2024 ***The Boltzmann equation on C^1 and cylindrical domains near the hydrodynamic limit***, *presented at the Partial Differential Equations and their Applications Seminar*, University of Warwick, United Kingdom.

Nov. 2023 ***Introduction to the kinetic Fokker-Planck equation and its long-time behavior***, *presented at the Young Researchers Seminar*, Université Paris Dauphine - PSL, France.

May 2023 ***Hypocoercivity estimates for some linearized kinetic operators***, *presented at the Young Researchers Seminar*, Université de Lille, France.

Mar. 2023 ***Hypocoercivity estimates for some linearized kinetic operators***, *presented at the Young Researchers Seminar*, Université Paris Dauphine - PSL, France.

Poster Presentations

Jul. 2024 ***Constructive Krein-Rutman result for kinetic Fokker-Planck equations in a domain (joint work with P. Gabriel, K. Carrapatoso and S. Mischler)***, *presented at the summer school Collective behavior and Pattern formation*, CIRM, France.

Jun. 2024 ***Constructive Krein-Rutman result for kinetic Fokker-Planck equations in a domain (joint work with P. Gabriel, K. Carrapatoso and S. Mischler)***, *presented at the summer school Frontiers in Interacting Particle Systems, Aggregation-Diffusion Equations & Collective Behavior*, CIRM, France.

Participation on Conferences, Workshops and Schools

Jul. 2024 ***Summer school on Collective Behavior and Pattern Formation***, CIRM, France.

Jun. 2024 ***Research school on Frontiers in Interacting Particle Systems Aggregation-Diffusion Equations & Collective Behavior***, CIRM, France.

Nov. 2022 ***Research School on Kinetic Theory***, CIRM, France.

Jul. 2022 ***Conference on When Kinetic Theory Meets Fluid Mechanics***, FIM - Institute for Mathematical Research, ETH Zürich, Switzerland.

Jun. 2019 ***CIMPA Research Summer School on Mathematical Models in Biology and Related Applications of Partial Differential Equations***, Universidad de La Habana, Cuba.

Mar. 2019 **III** ***Winter School in Computer Science on Selected Topics in Probability and Statistics***, Universidad de La Habana, Cuba.

Awards, Fellowships & Grants

2022 ***MathInParis2020 COFUND Fellowship*** — PhD grant awarded by the Fondation de Sciences Mathématiques de Paris (FSMP).

2021 ***PSL PhD Track Grant 2021*** — Master's Excellence Scholarship awarded by the Université Paris Sciences et Lettres.

2020 ***Prize for Scientific Merit*** awarded by the Universidad de La Habana for outstanding scientific work during the Bachelor's studies.

Organization of Seminars and Conferences

Jun. 2024 Co-organizer of the ***Young Researchers Days*** conference, held at *Domaine de la Tour*, Saint-Pierre-Canivet, France. Three-day conference for PhD students to present and discuss their research. Supported by the Dauphine Doctoral School.

2023 – 2024 Co-organizer of the ***Young Researchers Seminar*** at the Université Paris Dauphine - PSL.

Teaching Experience

Spring 2026 **Algebra 4 & Numerical methods**, *problem-solving sessions for second-year Mathematics students*, Université Paris Dauphine - PSL, France.

Fall 2025 **Analysis 1**, *lectures and problem-solving sessions for first-year Mathematics students*, Université Paris Dauphine - PSL, France.

May 2025 **Functional Analysis Summer School**, *problem-solving sessions for graduate Mathematics students*, Universidad de La Habana, Cuba.

Spring 2024 & 2025 **Analysis 2**, *problem-solving sessions for first-year Mathematics students*, Université Paris Dauphine - PSL, France.

Fall 2023 **Mathematical Methods**, *lectures and problem-solving sessions for first-year Economics students*, Université Paris Dauphine - PSL, France.

Spring 2021 **Complex Analysis**, *problem-solving sessions for third-year Mathematics students*, Universidad de La Habana, Cuba.

Fall 2020 **Introduction to Mathematics**, *lectures and problem-solving sessions for first-year Mathematics students*, Universidad de La Habana, Cuba.

2017 – 2019 **Tutorship**, *assisting in problem-solving sessions for Mathematics students*, Universidad de La Habana, Cuba.
Subjects: Topology, Analysis 4 (series and Fourier analysis), Analysis 3 (analysis of functions of several variables), Analysis 2 (analysis of functions of one variable), and Introduction to Mathematics.

Outreach

May 2024 Volunteer Stand Animator at the ***Salon de Culture et Jeux Mathématiques*** at Place Saint-Sulpice, Paris, France.

March 2024 Volunteer judge at the ***Math en Jeans 2024 Congress*** at the Université Paris Dauphine - PSL, France.

2016 – 2019 Instructor for high-school students in an advanced mathematics program, preparing them for the Cuban National Mathematics Competitions, La Habana, Cuba.

Editorial Service

Referee for international journals (*Communications in Mathematical Physics*).

Computer Skills

Programming Languages: Python (advanced), **C#** (intermediate), HTML (intermediate).

Scientific software: Wolfram Mathematica (advanced), Matlab (intermediate).

Typesetting & visualization: LaTeX (advanced), Ti*k*Z/Beamer (advanced).

Competitions

2019 ***Ibero-American University Mathematics Olympiad*** - Silver medal.

2018 ***Ibero-American University Mathematics Olympiad*** - Bronze medal.

2017 ***Raimundo Reguera National University Mathematics Olympiad*** - Silver medal.

2017 ***Ibero-American University Mathematics Olympiad*** - Honorable Mention.

2016 ***Raimundo Reguera National University Mathematics Olympiad*** - Honorable Mention.

2015 ***Cuban National High School Mathematics Olympiad*** - Gold medal (ranked 3rd).

2014 ***Cuban National High School Mathematics Olympiad*** - Silver medal.

Languages

Spanish: Native speaker.

English: Bilingual proficiency, TOEIC C1 (June 2022).

French: Bilingual proficiency.

Referees

Prof. Stéphane Mischler
CEREMADE, Université Paris Dauphine - PSL;
& Institut Universitaire de France (IUF).
mischler@ceremade.dauphine.fr

Prof. Josephine Evans
Warwick Mathematics Institute,
University of Warwick.
Josephine.Evans@warwick.ac.uk

Prof. Kleber Carrapatoso
Centre de Mathématiques Laurent Schwartz (CMLS),
École Polytechnique.
kleber.carrapatoso@polytechnique.edu

Prof. Pierre Gabriel
Institut Denis Poisson,
Université de Tours.
pierre.gabriel@univ-tours.fr