

Argenis J. Méndez

CNPQ RESEARCH PRODUCTIVITY FELLOW, LEVEL C

PROFESSOR · IMECC, UNICAMP

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RESEARCHGATE · GOOGLE SCHOLAR · ORCID · MATHSCINET · LATTES

§1 Education

- [1] **Ph.D. in Mathematics**, IMPA (Instituto Nacional de Matemática Pura e Aplicada), Rio de Janeiro, Brazil 2019
Advisor: Felipe Linares · Thesis: *On the Propagation of Regularity in Some Nonlocal Dispersive Models*
- [2] **M.Sc. in Mathematics**, Universidad Central de Venezuela, Caracas, Venezuela 2014
Advisor: Stefania Marcantognini · Thesis: *Dilatación de Semigrupos de Operadores Uniformemente Continuos* (in Spanish)
- [3] **B.Sc. in Mathematics**, Universidad Central de Venezuela, Caracas, Venezuela 2008
Advisor: Mercedes Arriojas · Thesis: *Medidas de Riesgo y Desviaciones Generalizadas* (in Spanish)

§2 Academic Positions

- [1] **Professor Doutor I**, Universidade Estadual de Campinas (UNICAMP), Campinas, SP, Brazil since Nov 2023
Current position.
- [2] **Postdoctoral Researcher**, Centro de Modelamiento Matemático, Universidad de Chile, Santiago, Chile
Mentor: Prof. Claudio Muñoz.
- [3] **Visiting Researcher**, Postdoctoral Summer Program, IMPA, Rio de Janeiro, Brazil Feb 2–25, 2023
- [4] **Visiting Researcher**, Postdoctoral Summer Program, IMPA, Rio de Janeiro, Brazil 2024, 15 days

§3 Funded Research Projects

- [1] **Analytic Regularization Effect for Solutions of the Zakharov–Kuznetsov Equations** 2025, ongoing
Role: Coordinator. Funding: CNPq Research Productivity Grant (Bolsa de Produtividade em Pesquisa, PQ-C).
- [2] **Asymptotic and Analytic Behavior of Solutions of the Schrödinger–Korteweg–de Vries System** 2025, ongoing
Role: Coordinator, with Marcelo Nogueira and Oscar Riaño as team members. Funding: FAPESP (São Paulo Research Foundation). Investigates the asymptotic behavior and scattering of solutions of the coupled system, and the analyticity of solutions in space and time under low-regularity data, using perturbative methods and harmonic analysis techniques.

§4 Research Interests

My academic journey began with an interest in mathematical analysis, which I first explored through a degree thesis on the theoretical foundations of financial markets, focusing on financial risk measures and their quantification using measure theory, functional analysis, convex analysis, and probability.

In my master's studies, I worked on abstract analysis, specifically the harmonic analysis of operators in Krein spaces, exploring unitary dilations of operators. This analytical foundation led me in my Ph.D. to apply harmonic and Fourier analysis to nonlinear dispersive PDEs, central in modeling physical phenomena like water waves and optics, a field highlighted by the 2018 ICM satellite conference in Rio de Janeiro.

Following my Ph.D., I have expanded my research to examine multidimensional nonlinear dispersive models, working at the intersection of harmonic analysis, pseudo-differential operators, and functional analysis. More recently, I have branched into probabilistic well-posedness for PDEs, and I am pursuing discrete harmonic analysis as an emerging interest within my academic career.

§5 Publications

2026

- *Instantaneous analytic smoothing of rough data for the modified and cubic gKdV equations.*
A. Méndez, M. Nogueira. Preprint, arXiv:2607.27115.

2025

- *A monotonicity formula for the fractional Laplacian and instability results for the Shrira equation.*
A. Méndez, O. Riaño. Preprint, arXiv:2509.14870.
- *On decay properties for solutions of the Zakharov–Kuznetsov equation.*
O. Riaño, A. Méndez. *Nonlinear Analysis: Real World Applications*, 81 (2025), Paper No. 104183, 34 pp.

2024

- *Long time asymptotics of large data in the Kadomtsev–Petviashvili models.*
C. Muñoz, A. Méndez, F. Poblete, J. Pozo. *Nonlinearity*, 37(5) (2024), Paper No. 055017, 52 pp.
- *Well-posedness for the extended Schrödinger–Benjamin–Ono system.*
F. Linares, A. Méndez, D. Pilod. *Vietnam Journal of Mathematics*, 52(4) (2024), 1043–1066.

2023

- *On the propagation of regularity for solutions of the Zakharov–Kuznetsov equation.*
A. Méndez. *Analysis and Applications* (2023).
- *On Kato’s smoothing effect for a fractional version of the Zakharov–Kuznetsov equation.*
A. Méndez. *Discrete & Continuous Dynamical Systems*, 43(5) (2023), 2047–2101.

2022

- *On some regularity properties for the dispersive generalized Benjamin–Ono–Zakharov–Kuznetsov equation.*
R. Freire, A. Méndez, O. Riaño. *Journal of Differential Equations*, 322 (2022), 135–179.

2021

- *On local energy decay for large solutions of the Zakharov–Kuznetsov equation.*
C. Muñoz, A. Méndez, F. Poblete, J. Pozo. *Communications in Partial Differential Equations*, 46(8) (2021).
- *On long time behavior of solutions of the Schrödinger–Korteweg–de Vries system.*
F. Linares, A. Méndez. *SIAM Journal on Mathematical Analysis*, 53(4) (2021).
- *Asymptotic behavior of solutions of the dispersion generalized Benjamin–Ono equation.*
F. Linares, A. Méndez, G. Ponce. *Journal of Dynamics and Differential Equations*, 33(2) (2021), 971–984.

2020

- *On the propagation of regularity for solutions of the dispersion generalized Benjamin–Ono equation.*
A. Méndez. *Analysis & PDE*, 13(8) (2020), 2399–2440.
- *On some properties in solutions of the fractional KdV equation.*
A. Méndez. *Journal of Differential Equations*, 269(11) (2020), 9051–9089.

§6 Work in Progress

- *Analytic solutions of the Schrödinger–Korteweg–de Vries system under minimal conditions of regularity.* With Marcelo Nogueira.
- *On the Schrödinger–Benjamin–Ono system: global well-posedness, the existence of solitary waves, and asymptotic behavior.* With Felipe Linares.

- *Instability of the solutions of the Shrira equation in dimension two.* With Oscar Riaño.
- *Analytic smoothing effect for solutions of the dispersive generalized Benjamin–Ono equation in spaces with low regularity.*

§7 Talks & Presentations

2025

- 2025 **Talk** (venue not on record).
Well-Posedness for the Extended Schrödinger–Benjamin–Ono System. With Felipe Linares and Didier Pilod.

2024

- Aug 19–23 **Lecture**, Workshop in Nonlinear PDE, IMPA, Rio de Janeiro, Brazil.
Analyticity and smoothing effect for the dispersive generalized Benjamin–Ono equation.

2023

- Feb **Talk**, Analysis & PDE Seminar, IMPA, Rio de Janeiro, Brazil.
Long time asymptotics of large data in the Kadomtsev–Petviashvili models.
- Jan 30 – Feb 3 **Talk**, 13th Americas Conference on Differential Equations and Nonlinear Analysis / ICMC Summer Meeting on Differential Equations, São Carlos, Brazil.
Long time asymptotics of large data in the Kadomtsev–Petviashvili models.

2022

- Sep **Minicourse**, Semana de la Matemática, Pontificia Universidad Católica de Valparaíso, Chile.
Transformada de Fourier y el problema de restricción.
- Aug **Seminar Talk**, Analysis Seminar, Centro de Modelamiento Matemático (CMM), Santiago, Chile.
On the fractional Zakharov–Kuznetsov equation.
- Jun **Invited Talk**, Mathematical Seminar, Universidad Técnica Federico Santa María, Valparaíso, Chile.
On the fractional Zakharov–Kuznetsov equation.
- Mar **Invited Talk**, V-Coloquio (joint seminar, PUCV / Universidad de Valparaíso / Universidad Técnica Federico Santa María), Chile.
Energy decay of solutions of the Zakharov–Kuznetsov equation.

2021

- Nov 11 **Invited Talk**, Analysis and PDE Seminar, IMPA, Rio de Janeiro, Brazil.
On long time behavior of solutions of the Schrödinger–Korteweg–de Vries system.
- Sep **Seminar Talk**, Seminario Las Palmeras, Universidad de Chile, Santiago, Chile.
On long time behavior of solutions of the Schrödinger–Korteweg–de Vries system.
- ca. 2021 **Colloquium**, Florida International University, Miami, Florida, USA.
On local energy decay for large solutions of the Zakharov–Kuznetsov equation. (exact date not on record)
- Jul 19–24 **Talk**, Mathematical Congress of the Americas, Buenos Aires, Argentina. Session: *Deterministic and probabilistic aspects of nonlinear evolution equations.*
On long-time behavior of solutions of the Schrödinger–Korteweg–de Vries system.

2020

- Oct 15 **Seminar Talk**, Seminario DMAT, Universidad Técnica Federico Santa María, Valparaíso, Chile (online).
On some regularity properties for the dispersive generalized Benjamin–Ono–Zakharov–Kuznetsov equation.
- Jun 12 **Lecture**, Seminario de Ecuaciones Dispersivas, Universidad Nacional de Colombia, Bogotá (online).
On the propagation of regularity for solutions of the Zakharov–Kuznetsov equation.
- Jun 10 **Lecture**, Seminario Latinoamericano de EDPs Dispersivas, Universidade Federal de Minas Gerais (online).
Local smoothing properties for a higher dimensional family of dispersive equations.
- Jan **Lecture**, Analysis and PDE Seminar, Centro de Modelamiento Matemático (CMM), Universidad de Chile, Santiago, Chile.
On the propagation of regularity for solutions of the Zakharov–Kuznetsov equation.

2019

- Nov 5–8 **Lecture**, Fourth Workshop on Nonlinear Dispersive Equations, IM-UFRJ, Rio de Janeiro, Brazil.
On some intrinsic properties associated with the solutions of the Zakharov–Kuznetsov equation.
- Mar 7 **Lecture**, Analysis and PDE Seminar, IMPA, Rio de Janeiro, Brazil.
On some properties of propagation of regularity in some non-local dispersive models.
- Feb 22 **Lecture**, Workshop de EDP e Matemática Aplicada, Universidade Federal Fluminense, Niterói, Brazil.
Propagation of regularity in solutions of the dispersive generalized Benjamin–Ono equation.
- Feb 4–6 **Talk**, ICMC Summer Meeting on Differential Equations, Universidade de São Paulo, São Carlos, Brazil.
Propagation of regularity in solutions of the dispersive generalized Benjamin–Ono equation.

2018

- Dec **Poster**, III Congresso Brasileiro de Jovens Pesquisadores em Matemática Pura, Aplicada e Estatística, Curitiba, Brazil.
The Propagation of Regularity in Solutions of the Dispersion Generalized Benjamin–Ono Equation.
- Aug **Poster**, International Congress of Mathematicians, Satellite Conference: Nonlinear Dispersive Equations, Florianópolis, Brazil.
The Propagation of Regularity in Solutions of the Dispersion Generalized Benjamin–Ono Equation.

2017

- Dec **Lecture**, Analysis Seminar, Universidad Central de Venezuela, Caracas, Venezuela.
On the Kato smoothing effect and the propagation of regularity for some dispersive models.

§8 Academic Experience

UNIVERSIDADE ESTADUAL DE CAMPINAS (UNICAMP), CAMPINAS, BRAZIL, PROFESSOR DOUTOR I

- Semester 2, 2026 (current) **Calculus 2** (undergraduate, Engineering, Turma K)
- Semester 1, 2026 **Harmonic Analysis** (graduate)
- Semester 2, 2025 **Linear Algebra** (undergraduate, Engineering), course coordinator
- Semester 1, 2025 **Calculus 1** (undergraduate, Engineering)
- Summer, 2025 (Jan–Feb) **Functional Analysis** (graduate)
- Semester 2, 2024 **Linear Algebra** (undergraduate, Engineering), course coordinator, 7 sections
- Semester 1, 2024 **Geometria Analítica** (undergraduate, Engineering)

PONTIFICIA UNIVERSIDAD CATÓLICA DE VALPARAÍSO, VALPARAÍSO, CHILE, ASSOCIATE PROFESSOR

- First Semester, 2023 **Calculus II** (undergraduate)
- Aug–Dec 2022 **Differential Equations** (undergraduate)
- Mar–Jul 2022 **Measure Theory** (graduate), joint with Universidad de Valparaíso and Universidad Técnica Federico Santa María
- Aug–Dec 2021 **Metric Spaces** (undergraduate, hybrid modality)

UNIVERSIDAD DE CHILE, SANTIAGO, CHILE, CONTRACTED PROFESSOR

- Mar–Jul 2021 **Introduction to Calculus** (undergraduate, online)
- Sep 2020–Jan 2021 **Advanced Calculus and Applications** (undergraduate, online)

INSTITUTO NACIONAL DE MATEMÁTICA PURA E APLICADA (IMPA), RIO DE JANEIRO, BRAZIL

- Jan–Feb 2018 **Graduate Teaching Assistant**, “Introduction to Nonlinear Dispersive Equations”
- Aug–Nov 2017 **Graduate Teaching Assistant**, “Partial Differential Equations: Linear Theory”

UNIVERSIDAD CENTRAL DE VENEZUELA, CARACAS, VENEZUELA

- 2015–2018 Assistant Professor
- 2011 Instructor and Course Coordinator, Calculus II, 12 sections
- 2008–2015 Instructor, Analysis I–II, Calculus I–IV, Mathematical Methods for Physicists, Complex Analysis, Functional Analysis (undergraduate)
- 2006–2008 Undergraduate Teaching Assistant, Calculus I, II, III

§9 Mentoring

MASTER’S

- [1] **Iván Felipe Salamanca Medina**, Universidad Nacional de Colombia, Sede Bogotá current, 2026
Joint direction with Prof. Oscar Riaño. Project: asymptotic behavior of solutions to certain nonlinear, nonlocal dispersive models.

BACHELOR’S

- [1] **Cristian Andrade**, Pontificia Universidad Católica de Valparaíso, Chile completed Dec 17, 2022
Thesis: *Estimación de la Transformada de Fourier sobre Reticulados Aleatorios* (in Spanish).

UNDERGRADUATE RESEARCH (INICIAÇÃO CIENTÍFICA)

- [1] **Vinicius de Oliveira Morais**, Mechanical Engineering, UNICAMP current, since 2025
Project: *Análise de Fourier Aplicada a Modelos Dispersivos de Difusão e Vibração: Estrutura Espectral e Soluções Exatas em Sistemas Refinados*.

§10 Thesis Committees & Qualification Exams

PH.D. THESIS COMMITTEE

- **Thyago Souza Rosa Santos**, *Well-posedness and special solutions for local and nonlocal dispersive models*. Ph.D. in Mathematics, IMPA 2025
Committee: A. Méndez, A. P. Ferreira, Ademir Pazoto, Felipe Linares, Simão Correia.
- **Maicon Santori Hespanha**, *A study on nonlinear Schrödinger systems with critical energy*. Ph.D. in Mathematics, UNICAMP 2024
Committee: A. P. Ferreira, M. P. Panthee, L. G. Farah, N. F. N. Salgado, A. Méndez.

MASTER’S THESIS COMMITTEES

- **Carlos Alberto Garzón Gutiérrez**, *Pseudo-differential calculus and Benjamin-type equations*. M.Sc. in Mathematics, Universidad Nacional de Colombia, Bogotá 2025
Committee: A. Méndez, Felipe Linares, Oscar Riaño.
- **Thais Ester Gonçalves**, *A equação de Schrödinger não linear: boa colocação local e global*. M.Sc. in Mathematics, UNICAMP 2025
Committee: A. P. Ferreira, Mikael Cardoso, A. Méndez.

DOCTORAL QUALIFICATION EXAMS

- **Felipe Milan Guarnieri**, *Schrödinger Equations with Double Nonlinearities*. Qualification exam, UNICAMP 2024
Committee: A. Méndez, M. P. Panthee, A. P. Ferreira.
- **Iris Jalane Nascimento dos Santos**, *Asymptotic Behavior of Solutions of the Schrödinger–Boussinesq System*. Qualification exam, Universidade Federal de Minas Gerais 2024
Committee: L. Farah, L. Campos, A. Méndez.
- **Hamilton de Almeida Nascimento**, *Scattering for the Nonlinear Schrödinger Equation*. Qualification exam, IMECC, UNICAMP 2024
Committee: A. Méndez, M. P. Panthee, A. P. Ferreira.

§11 Service

SCIENTIFIC COMMITTEES & EVENT ORGANIZATION

- Organizing Committee, Congresso do IMECC, UNICAMP, Campinas, Brazil 2025
- Organizing Committee, V Conferencia del Doctorado en Matemática, Valparaíso, Chile Sep 2022
- Organizing Committee, Escuela del Doctorado en Matemática, Valparaíso, Chile Sep 2021
- Organizing Committee, Analysis and PDE Seminar, CMM, Universidad de Chile, Santiago, Chile Feb-Jul 2021
- Organizing Committee, XXVIII Venezuelan Mathematics Conference, Faculty of Science, Universidad Central de Venezuela
Mar 23–26, 2015

EDITORIAL SERVICE (REVIEWER)

- Nonlinear Analysis: Real World Applications
- Partial Differential Equations and Applications (Springer)
- Nonlinear Analysis (Elsevier)
- Mathematische Annalen
- Nonlinearity
- Communications on Pure and Applied Analysis
- Mathematische Zeitschrift
- Discrete and Continuous Dynamical Systems
- Nonlinear Differential Equations and Applications (NoDEA)
- Zeitschrift für angewandte Mathematik und Physik (ZAMP)
- SN Partial Differential Equations and Applications

INSTITUTIONAL SERVICE

- Library Management, Instituto de Matemáticas, Pontificia Universidad Católica de Valparaíso 2022–2023

OUTREACH

- Supervised the community outreach project in applied mathematics at public schools, Universidad Central de Venezuela (UCV)
2012
Students: María Clara Sapiain, Andrea Alfonzo, Alex Padrón, Giuseppe Carlo Morreale.

CONFERENCE & WORKSHOP ATTENDANCE (NON-PRESENTING)

- International Congress of Mathematicians, Rio de Janeiro, Brazil Aug 2018
- Third Workshop on Nonlinear Dispersive Equations, IMECC-UNICAMP, Campinas, Brazil Nov 2017
- Nonlinear PDE's @ IMPA, Rio de Janeiro, Brazil 2016
- International Workshop on Elliptic and Kinetic PDEs, IMPA, Rio de Janeiro, Brazil Jul 2015

§12 Grants & Fellowships

- CNPq Research Productivity Fellowship (Bolsa de Produtividade em Pesquisa), Level C 2025, ongoing
- CNPq Full Ph.D. Fellowship 2015–2019
- Salary and Fellowship for Professors, Universidad Central de Venezuela 2009–2014

§13 Languages

- Spanish, Native
- English, Intermediate

- Portuguese, Intermediate
- German, Basic
- Italian, Basic

§14 Personal

Full name: Argenis José Méndez García. Citizenship: Venezuelan.

Last updated: September 10, 2026