

Curriculum Vitae

Carlos Mudarra

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Personal data

Norges teknisk-naturvitenskapelige universitet (NTNU)
Department of Mathematical Sciences
Institutt for matematiske fag NTNU. 7491 Trondheim, Norway
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Birth: Madrid, 1990

Academic background

PhD	September 2018
Universidad Complutense de Madrid, Madrid Mathematics. <i>Differentiable approximation and extension of convex functions</i> Cum laude and International Doctorate Mention Advisor: Prof. Daniel Azagra	
Master	July 2014
Universidad Complutense de Madrid, Madrid Advanced Mathematics Master Thesis: <i>Técnicas de aproximación y extensión diferenciable</i> Advisor: Prof. Daniel Azagra	
5-year degree	July 2013
Universidad Complutense de Madrid, Madrid Mathematics. Award to the highest GPA	

Research fields

Harmonic Analysis, Functional Analysis, Convex Analysis

Professional situation

- Postdoctoral researcher, NTNU, Trondheim, Norway, 2023–
- Postdoctoral researcher, University of Jyväskylä, Finland, 2021–2023
- Postdoctoral researcher, Aalto University, Finland, 2019–2021
- Postdoctoral researcher, ICMAT–CSIC, Madrid, 2018–2019
- Predoctoral researcher, ICMAT–CSIC, Madrid, 2014–2018

Publications and preprints

1. “Traces of vanishing Hölder spaces”, (with K. Mohanta and T. Oikari) *submitted* (2024), available at: <https://arxiv.org/abs/2401.14156>

2. “Approximation in Hölder spaces”, (with T. Oikari) *submitted* (2024), available at: <https://arxiv.org/abs/2401.01695>
3. “Weak porosity on metric measure spaces”, *submitted* (2023), available at: <https://arxiv.org/abs/2306.11419>
4. “Weakly porous sets and Muckenhoupt A_p distance functions” (with T.C. Anderson, J. Lehrbäck and A. Vähäkangas), *submitted*, available at: <https://arxiv.org/abs/2209.06284>
5. “Characterizations of weak reverse Hölder inequalities on metric measure spaces” (with J. Kinnunen and E.-K. Kurki), *Mathematische Zeitschrift*, 301 (2022), no. 3, 2269–2290.
6. “On the extension of Muckenhoupt weights in metric spaces” (with E.-K. Kurki), *Nonlinear Analysis*, 215 (2022), Paper No. 112671, 20 pp.
7. “ $C^{1,\omega}$ extension formulas for 1-jets on Hilbert spaces” (with D. Azagra), *Advances in Mathematics*, 389 (2021), Paper No. 107928, 44 pp.
8. “Kirszbraun’s theorem via an explicit formula” (with D. Azagra and E. Le Gruyer), *Canadian Mathematical Bulletin*, 64 (2021), no. 1, 142–153.
9. “Convex C^1 extensions of 1-jets from compact subsets of Hilbert spaces” (with D. Azagra), *Comptes Rendus. Mathématique. Académie des Sciences. Paris*, 358 (2020), no. 5, 551–556.
10. “Prescribing tangent hyperplanes to $C^{1,1}$ and $C^{1,\omega}$ convex hypersurfaces in Hilbert and superreflexive spaces” (with D. Azagra), *Journal of Convex Analysis*, 27 (2020), no. 1, 79–102.
11. “Extensions of convex functions with prescribed subdifferentials” (with D. Azagra, J. Ferrera and J. Gómez-Gil), *Studia Mathematica*, 253 (2020), no. 2, 199–213.
12. “Approximation of Lipschitz functions preserving boundary values” (with R. Deville), *Journal of Optimization Theory and Applications*, 182 (2019), no. 3, 885–905.
13. “Smooth convex extensions of convex functions” (with D. Azagra), *Calculus of Variations and Partial Differential Equations*, 58 (2019), no. 3, Paper No. 84, 27 pp.
14. “Global geometry and C^1 convex extensions of 1-jets” (with D. Azagra), *Analysis & PDE*, 12 (2019), no. 4, 1065–1099.
15. “Explicit formulas for $C^{1,1}$ and $C_{\text{conv}}^{1,\omega}$ extensions of 1-jets in Hilbert and superreflexive spaces” (with D. Azagra and E. Le Gruyer), *Journal of Functional Analysis*, 274 (2018), no. 10, 3003–3032.
16. “Whitney extension theorems for convex functions of the classes C^1 and $C^{1,\omega}$ ” (with D. Azagra), *Proceedings of the London Mathematical Society*, 114 (2017), no. 1, 133–158.
17. “An extension theorem for convex functions of class $C^{1,1}$ on Hilbert Spaces” (with D. Azagra), *Journal of Mathematical Analysis and Applications*, 446 (2017), no. 2, 1167–1182.
18. “Global approximation of convex functions by differentiable convex functions on Banach spaces” (with D. Azagra), *Journal of Convex Analysis*, 22 (2015), no. 4, 1197–1205.

Awards and honours

- Marie Curie European Fellowship 2023. European Commission.
- Vicent Caselles Mathematical Research Award 2019, BBVA Foundation–RSME (Spanish Mathematical Society). Best Spanish Mathematicians under 30
- Extraordinary award in the Doctoral degree in Mathematics, Universidad Complutense de Madrid. Best PhD thesis defended in the academic year 2017–2018
- Marie Curie Actions Seal of Excellence 2019, European Commission
- Extraordinary award in the Bachelor’s degree in Mathematics. Award to the highest GPA

Funding and grants

- Marie Skłodowska-Curie Action (MSCA-EF) European Fellowship 2023. Two-year individual research grant. Horizon Europe Funding. **Principal Investigator.**
- Research funding from the Research Council of Norway project Fourier Methods and Multiplicative Analysis. PI: Kristian Seip. NTNU. 2023–
- Research funding from the Academy of Finland projects Geometric Analysis (PI: Pekka Koskela), Incidences on Fractals (PI: Tuomas Orponen), and Geometric Aspects of Sobolev Space Theory (PI: Tapio Rajala), at University of Jyväskylä. 2021–2023
- Research funding from the Academy of Finland project Geometric Analysis and Conformal Structures. PI: Kari Astala. Aalto University, 2019–2021
- Research funding from the grant Severo Ochoa for Centres of Excellence in R&D SEV-2015-0554, at ICMAT. PI: Diego Córdoba. 2018–2019
- PhD Fellowship from the grant La Caixa-Severo Ochoa International PhD Programme, at ICMAT, Madrid, Spain. 2014–2018

Research groups

- Postdoctoral member of the research groups Geometry and Analysis, Geometric Measure Theory, and Non-smooth Geometry, at the University of Jyväskylä. 2021–
- Postdoctoral member of the research group Nonlinear Partial Differential Equations, led by Juha Kinnunen, at Aalto University. 2019–2021
- Member of the research project Geometric and Nonlinear Functional Analysis, PGC2018-097286-B-I00 Ministerio de Ciencia e Innovación, Spain (PI: Daniel Azagra and Juan Benigno Seoane). 2014–

Talks at Conferences and Workshops

- Advanced Course on Operator Theory and Complex Analysis June 2024
Universidad de la Laguna, Tenerife, Spain
- Complex Analysis Seminar-Bench Math Session December 2023
Jagiellonian University, Kraków, Poland
- International Workshop on Operator Theory and its Applications September 2022
AGH University of Science and Technology in Kraków, Poland
- 28th Nordic Congress of Mathematicians August 2022
Aalto University, Finland
- Functional Analysis in Lille. A conference in honor of Gilles Godefroy June 2022
Université de Lille, France
- XX EARCO Encuentros de Análisis Real y Complejo May 2022
University of Cartagena, Spain
- 2021 AGENT-Forum (Young Researchers in Analysis and Geometry) October 2021
Aalto University, Finland
- **(Plenary speaker)** 14th Whitney Problems Online Workshop June 2021
University of California, Davis, United States
- Fifth Workshop of Young Researchers, RSME January 2020
Universitat Jaume I, Castelló, Spain

- **(Plenary speaker)** Function Theory on Infinite Dimensional Spaces XVI November 2019
Universidad Complutense de Madrid, Spain
- Banach spaces and Optimization June 2019
Université de Franche-Comté, France
- XII Workshop of Young Researchers in Mathematics September 2018
Universidad Complutense de Madrid, Spain
- Function Theory on Infinite Dimensional Spaces XV February 2018
Universidad Complutense de Madrid, Spain

Seminars

- NTNU, Trondheim. Analysis Seminar November 2023
- University of Jyväskylä. Analysis Seminar March 2022
- University of Jyväskylä. Geometric Analysis Seminar September 2021
- Aalto University March 2020
- Aalto University November 2018
- Université de Bordeaux November 2017
- Universidad Complutense de Madrid April 2016

Research stays

- Aalto University, 6 Weeks May–June 2019
Supervisor: Prof. Juha Kinnunen
- Aalto University, 1 Week November–December 2018
Supervisor: Prof. Juha Kinnunen
- Université de Bordeaux, 2 Weeks September 2018
Supervisor: Prof. Robert Deville
- Université de Bordeaux, 15 Weeks October 2017–January 2018
Supervisor: Prof. Robert Deville

Teaching experience

At NTNU, Trondheim

- Subject: Complex Analysis. Task: Lecturer Spring 2025
Programme: Master's Programme in Mathematics
- Subject: Complex Function Theory and Differential Equations. Task: Lecturer Fall 2024
Programme: Bachelor's Programme in Mathematics
- Subject: Harmonic Analysis. Task: Lecturer Spring 2024
Programme: PhD Programme in Mathematical Sciences

At University of Jyväskylä

- Subject: Sobolev Spaces. Hours: 32. Tasks: Lecturer (8 hours), and Fall 2022
Assistant Lecturer (24 hours). Programme: Master's Degree in Mathematics
- Subject: Real Analysis. Hours: 10. Task: Assistant Lecturer Fall 2021
Programme: Master's Degree in Mathematics

At Universidad Complutense de Madrid

- Subject: Real Variable Analysis. Hours: 30. Task: Assistant Lecturer Spring 2018
Programme: Bachelor's Degree in Mathematics-Economics & Statistics
- Subject: Real Variable Analysis. Hours: 36. Task: Assistant Lecturer Fall 2015
Programme: Bachelor's Degree in Mathematics
- Subject: Differential Calculus. Hours: 30. Task: Assistant Lecturer Fall 2015
Programme: Bachelor's Degree in Mathematics & Physics

Supervision experience

- Supervision of Bachelor's thesis. Student: Tuomas Niemi. 2022–2023
Programme: Bachelor's Degree in Mathematics
University of Jyväskylä, Finland

Other merits

- Referee for the *Bollettino dell'Unione Matematica Italiana*, the *Journal of Mathematical Analysis and Applications* and the *Mediterranean Journal of Mathematics*.
- Reviewer of articles and books for Mathematical Reviews.