Antonio **H. Acuaviva**

Doctoral Researcher in Pure Mathematics · Lancaster University

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Education

Lancaster University

Lancaster, UK

PhD in Pure Mathematics

October 2023 – Present

- Supervisor: Professor Niels J. Laustsen.
- Research in functional analysis, with emphasis on Banach space theory and operator theory: complemented subspaces and primariness, $C(K)$-spaces, operator ideals and Calkin algebras, and nonlinear Banach space theory.
- Awarded the **Pure Mathematics Prize** for exceptional performance during the first and third years of the PhD programme.
- EPSRC Doctoral Training Partnership Studentship (2023–present).

University of Cambridge

Cambridge, UK

Master of Advanced Study in Mathematics (Part III)

October 2022 – June 2023

- Result: **Distinction**.
- Received the **1912 Senior Scholarship** and **Fitzwilliam College Prize** for academic performance.
- Supported by the ***la Caixa* Foundation Postgraduate Fellowship Abroad**.

Universidad Complutense de Madrid (UCM)

Madrid, Spain

Double Degree in Mathematics and Physics

September 2017 – June 2022

- Overall averages: **9.84/10 in Mathematics** (ranked **1st of 171 graduates**) and **9.66/10 in Physics** (ranked **1st of 247 graduates**).
- Recipient of the **Bachelor's Degree Extraordinary Award** in both Mathematics and Physics.
- Awarded the **Arturo Duperier Award** for the best academic record in Physics at UCM.
- Received **Community of Madrid Excellence Grants** in four consecutive years.
- Physics thesis: *Resilient Source Seeking with Robot Swarms*. Related journal article: *Fully distributed and resilient source seeking for robot swarms*.

University of California, Berkeley

Berkeley, USA

Non-degree exchange programme (UCEAP)

August 2019 – June 2020

- Selected for a year-long study programme; recipient of the **UCM–University of California Scholarship**, awarded to the **top seven students** at Universidad Complutense de Madrid.

Publications

Published Journal Articles in Analysis

[1] A. Acuaviva. *The class of Banach lattices is not primary*. *Forum of Mathematics, Sigma*, 14:e41, 1–18 (2026).

[2] A. Acuaviva and A. B. Nasseri. *Quantifying (non-)weak compactness of operators on AL- and $C(K)$-spaces*. *Proceedings of the Edinburgh Mathematical Society*, 1–56 (2026).

[3] A. Acuaviva. *Complemented subspaces of a $C(K)$-space constructed by Candido*. *Journal of Mathematical Analysis and Applications*, 556(1):130115 (2026) (11 pages).

[4] A. Acuaviva. *Operators on injective tensor products of separable Banach spaces and spaces with few operators*. *Journal of Functional Analysis*, 290(1):111203 (2026) (17 pages).

[5] A. Acuaviva. *Factorizations and minimality of the Calkin algebra norm for $C(K)$-spaces*. *Journal of the London Mathematical Society*, 112(4):e70321 (2025) (20 pages).

[6] A. Acuaviva and D. Seco. *Equidistribution of zeros of some polynomials related to cyclic functions*. *Analysis and Mathematical Physics*, 12(2):53 (2022) (24 pages).

Other Published or Accepted Journal Articles

[7] J. Bautista*, A. Acuaviva*, J. Hinojosa, W. Yao, J. Jimenez, and H. Garcia de Marina. *Fully distributed and resilient source seeking for robot swarms*. *IEEE Transactions on Automatic Control*, Early Access, pp. 1–16 (2026). *Equal contribution.

[8] A. Acuaviva, A. Chan, S. Eldridge, C. Godsil, M. How-Chun-Lun, C. Tamon, E. Wright, and X. Zhang. *State transfer in chiral quantum walks*. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 383(2306):20240420 (2025) (19 pages).

Preprints in Banach Space Theory

[9] A. Acuaviva. *A negative solution to the complemented subspace problem for Banach spaces with unconditional bases*. arXiv:2609.08921 (2026) (26 pages).

[10] A. Acuaviva and T. Kania. *Banach's isometric conjecture over the complex field*. arXiv:2608.18257 (2026) (17 pages).

[11] A. Acuaviva and P. Acuaviva. *The uniform primary factorisation property for $C(K, E)$*. Preprint (2026) (16 pages).

[12] A. Acuaviva and P. Acuaviva. *Mathematical discovery in the wild: AI-guided proofs in Banach space theory*. arXiv:2607.17388 (2026) (141 pages).

[13] A. Acuaviva and P. Acuaviva. *A unital Banach algebra which is not a Calkin algebra*. arXiv:2607.15075 (2026) (21 pages).

[14] A. Acuaviva. *A separable Banach space with a Schauder basis which is not a Lipschitz retract of its bidual*. arXiv:2607.12935 (2026) (21 pages).

[15] A. Acuaviva, B. Horváth, and T. Kania. *Pure infiniteness and primary factorisation*. arXiv:2607.01467 (2026) (19 pages).

[16] A. Acuaviva. *Preservation of primariness under ℓ_1-, c_0-, and ℓ_∞-sums of Banach spaces*. arXiv:2606.26417 (2026) (39 pages).

[17] A. Acuaviva. *Primariness of the spaces $\ell_p(C(K))$ for $1 \leq p \leq \infty$*. arXiv:2605.29854 (2026) (35 pages).

[18] A. Acuaviva and T. Kania. *Primariness and the primary factorisation property*. arXiv:2605.21711 (2026) (74 pages).

[19] A. Acuaviva. *$C(K)$-spaces with few operators relative to posets*. arXiv:2511.22339 (2025) (26 pages).

Other Preprints and Manuscripts

[20] A. Acuaviva, A. Acuaviva, and P. Acuaviva.
CNOT-distance is NP-complete under all-to-all connectivity. arXiv:2608.03825 (2026) (14 pages).

[21] A. Acuaviva, J. Esson, E. Kastis, and B. Schulze. *Curved RUM spectra of periodic frameworks*. Preprint (2026).

Conference Proceedings

[22] A. Acuaviva, J. Bautista, W. Yao, J. Jimenez, and H. Garcia de Marina. *Resilient source seeking with robot swarms*. In *2024 IEEE 63rd Conference on Decision and Control (CDC)*, pp. 57–63 (2024).

Selected Research Experience

Fields Institute for Research in Mathematical Sciences — *Toronto, Canada*

Undergraduate Researcher, Fields Undergraduate Summer Research Program — *June 2021 – August 2021*

- Investigated state transfer in quantum walks with Ada Chan, Christino Tamon, and Xiaohong Zhang; the project contributed to the later journal article *State Transfer in Chiral Quantum Walks*.
- Presented *Quantum Walks on Graphs: Perfect State Transfer and Periodicity* at the Canadian Undergraduate Mathematics Conference (2021).

Institute of Mathematical Sciences (ICMAT) — *Madrid, Spain*

Introduction to Research Grant Recipient — *June – September 2020 & 2021*

- Received the competitive Severo Ochoa Introduction to Research Grant in two consecutive years and undertook projects in mathematical analysis.

Employment

Lancaster University — *Lancaster, UK*

Graduate Teaching Assistant (GTA) — *October 2023 – December 2025*

- Taught on Numbers and Relations (MATH111), Discrete Mathematics (MATH112), Real Analysis (MATH210), and Complex Analysis (MATH215), including marking, tutoring, and problem classes.

Honours & Awards

2024, 2026 **Pure Mathematics Prize**, Lancaster University

2025 **Spring Into Quant Finance Programme**, G-Research

2023 **EPSRC Doctoral Training Partnership Studentship**, Lancaster University

2023 **1912 Senior Scholarship**, Fitzwilliam College, University of Cambridge

2023 **Fitzwilliam College Prize**, Fitzwilliam College, University of Cambridge

2022 **Postgraduate Fellowship Abroad**, *la Caixa* Foundation

2022 **Bachelor's Degree Extraordinary Award**, Universidad Complutense de Madrid (Ranked 1st in class)

2022 **Department Research Grant**, Dept. of Mathematical Analysis, UCM

2022 **Blas Cabrera Summer Scholarship**, Universidad Internacional Menéndez Pelayo and Spanish Ministry of Science and Innovation

2022 **Arturo Duperier Award**, Pedro Bernardo City Council (best academic record in Physics at UCM)

2018–2021 **Excellence Grants**, Community of Madrid (awarded in four consecutive years)

2020 **Becas Atrévete 2020**, McKinsey & Company

2019 **UCM–University of California Scholarship**, Universidad Complutense de Madrid (top seven students selected)

2019 **Santander Progress Scholarship**, Santander Bank

2015–2017 **Goñi and Rey Foundation Fellowship**, Full academic funding

Languages

Languages English (Full Professional Proficiency), Spanish (Native), German (basic)