







ÁLVARO MUÑIZ-BREA

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Mathematician interested in quantitative finance and machine learning

Education

University of Edinburgh 2021 – present (exp Aug 2025)
PhD in Mathematics Edinburgh, UK

Advisor: Prof. Nick Sheridan

University of Cambridge 2020 – 2021
Part III of the Mathematical Tripos (MASt). Pass with First Class Honours Cambridge, UK

Essay: “A Case Study in Intersection Theory”. Advisor: Prof. Dhruv Ranganathan

Universidade de Santiago de Compostela 2015 – 2020
BSc in Mathematics (double degree). GPA: 9.38/10.00 Santiago de Compostela, Spain

Dissertation: “Differential and algebraic study of Grassmannians”. Advisor: Prof. Manuel Pedreira

Universidade de Santiago de Compostela 2015 – 2020
BSc in Physics (double degree). GPA: 9.28/10.00 Santiago de Compostela, Spain

Dissertation: “Entanglement entropy and holography”. Advisor: Prof. José Edelstein

Ruprecht-Karls Universität Heidelberg 2018 – 2019
Erasmus Programme Heidelberg, Germany

Industry experience

Edinburgh University Trading & Investment Club (EUTIC) October 2024 – present
Quant Division—member Edinburgh, UK

G-Research April 2024
Spring into Quant Finance Royal Riviera (Saint-Jean-Cap-Ferrat, France)

Events attended

Optiver October 2024
Trading Workshop Edinburgh, UK

Cubist Systematic Strategies (Point 72) September 2024
Quant Academy Meet & Greet London, UK

Research experience

University of Edinburgh 2021 – present
Graduate student Edinburgh, UK

- Funded by European Research Council (ERC) grant
- Research on Lagrangian cobordisms and Chow groups

Instituto de Ciencias Matemáticas (ICMAT) Summer 2020
Summer Research Student Madrid, Spain

- Grant programme Severo Ochoa - ICMAT: Introduction to Research 2020
- Research on contact Hamiltonian systems

Universidade de Santiago de Compostela 2019-2020
Undergraduate Student Researcher Santiago de Compostela, Spain

- Funded by Spanish Ministry of Education and Professional Training
- Research on Grassmann varieties

Publications and preprints

Fourier transforms and a filtration on the Lagrangian cobordism group of tori

arxiv:2411.16543

Dimensionality of tropical Chow groups

(submitted) arxiv:2408.12417

Lagrangian cobordisms and K-theory of symplectic bielliptic surfaces

(submitted) arxiv:2403.17098

The Hamilton-Jacobi theory for contact Hamiltonian systems

Mathematics 9(16) (2021)

joint with M. de León and M. Lainz

ML courses

Time Series | *Kaggle* 2024

Intermediate Machine Learning | *Kaggle* 2024

Intro to Machine Learning | *Kaggle* 2024

Awards and scholarships

G-Research Travel Grant | *G-Research* 2024

National Top Graduates Award (*top 1-2% in Spain*) | *Spanish Society of Academic Excellence (SEDEA)* 2021

M. T. Meyer Scholarship & Gertrude Mather Jackson Prize | *Girton College, University of Cambridge* 2021

European Research Council (ERC) Studentship | *University of Edinburgh* 2021-2025

Fellowship for postgraduate studies abroad | *Fundación Barrié* 2020-2021

Grant Programme Severo Ochoa - ICMAT: Introduction to Research 2020 | *ICMAT* 2020

Collaboration Research Grant | *Spanish Ministry of Education and Professional Training* 2019-2020

“Matrícula de Honor” (*top 5%*) in 24 courses | *University of Santiago de Compostela* 2015-2020

Acknowledgment for outstanding performance in university entrance exams | *Xunta de Galicia* 2015

Talks

Conference talks

Topology Workshop | *Universidad de Santiago de Compostela (Santiago, Spain)* 2024

VI Congreso de Jóvenes Investigadores de la RSME | *Universidad de León (León, Spain)* 2023

X Encuentro de Jóvenes Topólogos | *Universidad de Zaragoza (Zaragoza, Spain)* 2022

IYIMeeting 2021 | *The Domus (A Coruña, Spain)* 2021

Matemáticas: moito máis que números! | *Universidad de Santiago de Compostela (Santiago, Spain)* 2021

Seminar talks

University of Cambridge | *Differential Geometry and Topology Seminar* 2024

University of Cambridge | *Differential Geometry and Topology Seminar* 2023

University of Cambridge | *Differential Geometry and Topology Seminar* 2023

University of Edinburgh | *EDGE Seminar* 2023

University of Edinburgh | *Tropical geometry seminar* 2023

University of Edinburgh | *Preprint seminar* 2023

University of Edinburgh | *Preprint seminar* 2022

University of Edinburgh | *GPS seminar* 2022

International Centre for Mathematical Sciences (ICMS) | *GlaMS induction event* 2022

University of Edinburgh | *Hodge Club* 2022

University of Edinburgh | *Cob/CH seminar* 2022

University of Edinburgh | *Hodge Club* 2022

Online | *GlaMS example showcase* 2022

Teaching

Tutoring at the University of Edinburgh

Discrete-Time Finance, Probability	2024-2025
Python Programming (MSc course), General Topology, Computing and Numerics, Statistics	2023-2024
Computing and Numerics, General Topology, Honours Complex Variables, Differential Geometry	2022-2023
Calculus & its Applications, MathsBase	2021-2022

Other support

TA for “Séminaire de Mathématiques Supérieures 2022: Floer Homotopy Theory” (<i>Vancouver, Canada</i>)	Summer 2021
Personal tutor (freelance)	2016-2020

Attended conferences and summer schools

Mirrors in the Midlands <i>University of Birmingham (England, UK)</i>	Aug 2024
Topology Workshop <i>University of Santiago de Compostela (Santiago, Spain)</i>	Jul 2024
London Geometry and Machine Learning <i>London (England, UK)</i>	Jul 2024
Summer School on h-principle <i>ICMAT (Madrid, Spain)</i>	Jun 2024
From Hamiltonian Dynamics to Symplectic Topology and Beyond <i>IHP (Paris, France)</i>	Jun 2024
Symplectic Paradise <i>Bozeman (MT, USA)</i>	Aug 2023
A conference in honour of Leonid Polterovich <i>ETH (Zurich, Switzerland)</i>	July 2023
Symplectic Topology workshop <i>Imperial College London (England, UK)</i>	June 2023
Graduate Summer School on Mirror Symmetry in the log Calabi-Yau setting <i>Eyam (England, UK)</i>	May 2023
VI Congreso de Jóvenes Investigadores de la RSME <i>Universidad de León (Leon, Spain)</i>	Feb 2023
Homological Mirror Symmetry annual meeting <i>University of Miami (FL, USA)</i>	Jan 2023
2022 Simons Collaboration on Homological Mirror Symmetry Annual Meeting <i>New York (NY, USA)</i>	Nov 2022
XXVIII Encuentro de Topología <i>Universidad de Zaragoza (Zaragoza, Spain)</i>	Oct 2022
Periods in Mirror Symmetry <i>International Centre for Mathematical Sciences (Scotland, UK)</i>	Sep 2022
Una Europa Masterclass — AI in Law <i>Uniwersytet Jagielloński w Krakowie (Krakow, Poland)</i>	Sep 2022
SYNC Early Career Workshop <i>University of Davis (CA, USA)</i>	Aug 2022
Séminaire de Mathématiques Supérieures 2022: Floer Homotopy Theory <i>PIMS (BC, Canada)</i>	Jul 2022
Convexity in contact and symplectic topology <i>Institut Henri Poincaré (Paris, France)</i>	Aug 2022

Organizing

Graduate School on Mirror Symmetry in the log Calabi-Yau setting <i>Eyam Hostel (England, UK)</i>	May 2023
<ul style="list-style-type: none">• Summer school co-organised with D. Kozverniov and K. Hugtenburg• Managed a £20,000 budget to organise a 5 day residential summer school with over 30 participants	
Hodge Club <i>University of Edinburgh</i>	2022-2023
<ul style="list-style-type: none">• Co-organised the PhD geometry seminar together with W. Bevington and K. Rega	

Languages

Spanish (native), Galician (native), English (fluent), German (intermediate), Arabic (*MSA*) (basic).
Python (*numpy*, *pandas*, *scikit-learn*), git, \LaTeX , HTML, Lean

Activities and interests

Poker, books, fitness, hiking & backpacking