

ÁLVARO MUÑIZ-BREA

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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 (top 5%) Santiago de Compostela, Spain

Universidade de Santiago de Compostela 2015 – 2020
BSc in Physics (double degree). GPA: 9.28/10.00 (top 5%) Santiago de Compostela, Spain

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

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

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, supervised by Prof. Manuel de León

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

Industry experience

G-Research Spring 2024
Spring into Quant Finance France

Awards and scholarships

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

Publications

The Hamilton-Jacobi theory for contact Hamiltonian systems

Mathematics 9(16) (2021)

joint with M. de León and M. Lainz

In preparation (drafts available upon request)

- A tropical analogue of Mumford's theorem (15 pages)
- Lagrangian cobordism and K-theory of bielliptic surfaces (40 pages)

Talks

Conference talks

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

2024

University of Cambridge | *Differential Geometry and Topology Seminar*

2023

University of Edinburgh | *EDGE Seminar*

University of Edinburgh | *Tropical geometry seminar*

University of Edinburgh | *Preprint seminar*

2022

University of Edinburgh | *GPS seminar*

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

University of Edinburgh | *Hodge Club*

University of Edinburgh | *Cob/CH seminar*

University of Edinburgh | *Hodge Club*

Online | *GlaMS example showcase*

Teaching

Tutoring at the University of Edinburgh

Python Programming (MSc course), General Topology **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” (*Vancouver, Canada*) **Summer 2021**

Attended conferences and summer schools

Symplectic Paradise | *Bozeman (MT, USA)* **Aug 2023**

A conference in honour of Leonid Polterovich | *ETH (Zurich, Switzerland)* **July 2023**

Symplectic Topology workshop | *Imperial College London (England, UK)* **June 2023**

Graduate Summer School on Mirror Symmetry in the log Calabi-Yau setting | *Eyam (England, UK)* **May 2023**

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

Homological Mirror Symmetry annual meeting | *University of Miami (FL, USA)* **Jan 2023**

2022 Simons Collaboration on Homological Mirror Symmetry Annual Meeting | *New York (NY, USA)* **Nov 2022**

XXVIII Encuentro de Topología | *Universidad de Zaragoza (Zaragoza, Spain)* **Oct 2022**

Periods in Mirror Symmetry | *International Centre for Mathematical Sciences (Scotland, UK)* **Sep 2022**

SYNC Early Career Workshop | *University of Davis (CA, USA)* **Aug 2022**

Séminaire de Mathématiques Supérieures 2022: Floer Homotopy Theory | *PIMS (BC, Canada)* **Jul 2022**

Convexity in contact and symplectic topology | *Institut Henri Poincaré (Paris, France)* **Aug 2022**

Organizing

Graduate School on Mirror Symmetry in the log Calabi-Yau setting | *Eyam Hostel (England, UK)* **May 2023**

- Summer school co-organised with D. Kozlovnikov and K. Hugtenburg
- Managed a £20,000 budget to organise a 5 day residential summer school with over 30 participants

Hodge Club | *University of Edinburgh*

2022-2023

- Co-organised the PhD geometry seminar together with W. Bevington and K. Rega

Languages

English (fluent), Spanish (native), Galician (native), German (intermediate), Arabic (basic).

Python, \LaTeX , HTML, Lean