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	*Santiago de Compostela, Spain*

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*

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

Publications and preprints

Dimensionality of tropical Chow groups
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*

In preparation (drafts available upon request):

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

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

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, 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" *(Vancouver, Canada)*	**Summer 2021**

Attended conferences and summer schools

Mirrors in the Midlands | *University of Birmingham (England, UK)* **Aug 2024**

Topology Workshop | *University of Santiago de Compostela (Santiago, Spain)* **Jul 2024**

London Geometry and Machine Learning | *London (England, UK)* **Jul 2024**

Summer School on h-principle | *ICMAT (Madrid, Spain)* **Jun 2024**

From Hamiltonian Dynamics to Symplectic Topology and Beyond | *IHP (Paris, France)* **Jun 2024**

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**

Una Europa Masterclass — AI in Law | *Uniwersytet Jagielloński w Krakowie (Krakow, Poland)* **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. Kozevnikov 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

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

Python, LaTeX, HTML, Lean