

# ÁLVARO MUÑIZ-BREA

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## Education

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### 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

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### 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

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### G-Research

April 2024

*Spring into Quant Finance*

*Royal Riviera (Saint-Jean-Cap-Ferrat, France)*

## Publications and preprints

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### 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):*

- Dimensionality of tropical Chow groups
- Fourier transforms and a filtration on the Lagrangian cobordism group of tori

## Awards and scholarships

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G-Research Travel Grant   <i>G-Research</i>	2024
National Top Graduates Award ( <i>top 1-2% in Spain</i> )   <i>Spanish Society of Academic Excellence (SEDEA)</i>	2021
M. T. Meyer Scholarship & Gertrude Mather Jackson Prize   <i>Girton College, University of Cambridge</i>	2021
European Research Council (ERC) Studentship   <i>University of Edinburgh</i>	2021-2025
Fellowship for postgraduate studies abroad   <i>Fundación Barrié</i>	2020-2021
Grant Programme Severo Ochoa - ICMAT: Introduction to Research 2020   <i>ICMAT</i>	2020
Collaboration Research Grant   <i>Spanish Ministry of Education and Professional Training</i>	2019-2020
“Matrícula de Honor” ( <i>top 5%</i> ) in 24 courses   <i>University of Santiago de Compostela</i>	2015-2020
Acknowledgment for outstanding performance in university entrance exams   <i>Xunta de Galicia</i>	2015

## Talks

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### Conference talks

Topology Workshop   <i>Universidad de Santiago de Compostela (Santiago, Spain)</i>	2024
VI Congreso de Jóvenes Investigadores de la RSME   <i>Universidad de León (León, Spain)</i>	2023
X Encuentro de Jóvenes Topólogos   <i>Universidad de Zaragoza (Zaragoza, Spain)</i>	2022
IYIMeeting 2021   <i>The Domus (A Coruña, Spain)</i>	2021
Matemáticas: moito máis que números!   <i>Universidad de Santiago de Compostela (Santiago, Spain)</i>	2021

### Seminar talks

University of Cambridge   <i>Differential Geometry and Topology Seminar</i>	2024
	2023
University of Edinburgh   <i>EDGE Seminar</i>	
University of Edinburgh   <i>Tropical geometry seminar</i>	
University of Edinburgh   <i>Preprint seminar</i>	2022
University of Edinburgh   <i>GPS seminar</i>	
International Centre for Mathematical Sciences (ICMS)   <i>GlaMS induction event</i>	
University of Edinburgh   <i>Hodge Club</i>	
University of Edinburgh   <i>Cob/CH seminar</i>	
University of Edinburgh   <i>Hodge Club</i>	
Online   <i>GlaMS example showcase</i>	

## Teaching

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### **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” ( <i>Vancouver, Canada</i> )	Summer 2021
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## Attended conferences and summer schools

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

## Organizing

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

## Languages

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Spanish (native), Galician (native), English (fluent), German (intermediate), Arabic (*MSA*) (basic).  
Python,  $\text{\LaTeX}$ , HTML, Lean