

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 <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

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

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

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> <ul style="list-style-type: none">• 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	May 2023
Hodge Club <i>University of Edinburgh</i> <ul style="list-style-type: none">• Co-organised the PhD geometry seminar together with W. Bevington and K. Rega	2022-2023

Languages

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