Alejandro Basilio Galván Pérez-Ilzarbe

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First year **PhD** student in **Mathematics** at **Dartmouth College**. My research focuses on **enumerative combinatorics** and other areas of **discrete mathematics**.

Education

PhD in **Mathematics** Dartmouth College	2024 – 2029
Master's degree in Advanced **Mathematics** and Mathematical Engineering Universitat Politècnica de Catalunya (average grade: 9.65/10)	2023 – 2024
Bachelor's degree in **Mathematics** Universitat Politècnica de Catalunya (average grade: 7.96/10)	2018 – 2023
Bachelor's degree in **Engineering Physics** Universitat Politècnica de Catalunya (average grade: 7.78/10)	2018 – 2023

Enrolment Grant and Residence Grant in the Centre de Formació Interdisciplinària Superior (CFIS-UPC) to simultaneously study two bachelor's degrees.

Research experience

Collaboration grant with UPC Department of Mathematics October 2023 – May 2024

Grant awarded by the Spanish Ministry of Education based on academic merit. Worked with Prof. Juanjo Rué on the enumeration of maximal K_5-minor-free graphs for my master's thesis (final grade: 10/10 with honors). Currently writing down a paper for publication.

Research stay at Dartmouth College September 2022 – May 2023

Research stay for bachelor's thesis (2024 Emmy Noether prize to the best bachelor's thesis in mathematics in Catalonia). Worked full-time on the combinatorics of triangular partitions supervised by Prof. Sergi Elizalde.

DESY Summer Student Programme July 2021 – September 2021

Selected for the project *New QCD predictions for deep inelastic scattering and comparison with measurements* supervised by senior researcher Hannes Jung. Coded C++-based analyses to test the accuracy of Monte Carlo simulations of electron-proton collisions.

Publications and preprints

Elizalde, Sergi, and Galván, Alejandro B. "Triangular partitions: enumeration, structure, and generation." *Advances in Applied Mathematics* 163 (2025): 102807.

Galván, Alejandro B. "Properties of triangular partitions and their generalizations." *https://reportsascm. iec. cat ISSN electronic edition: 2385-4227* (2024): 31.

Elizalde, Sergi, and Galván, Alejandro B. "Combinatorial Properties of Triangular Partitions" *Proceedings of the 36th International Conference on "Formal Power Series and Algebraic Combinatorics". FPSAC.* (2024).

Abdulhamid, M. I., et al. "Rivet, RivetHZTool and HERA--A validation effort for coding HERA measurements for Rivet." *arXiv preprint arXiv:2112.12598* (2021).

Invited talks and conferences

Dartmouth Combinatorics Seminar
January 2025
Structure and enumeration of maximal K_5-minor-free graphs

FPSAC 2024
July 2024
Combinatorial Properties of Triangular Partitions (poster)

UPC LIMDA Seminar
February 2024
Enumeration, structure and generation of triangular partitions and their generalizations

Dartmouth Combinatorics Seminar
May 2023
On triangular partitions and their generalizations

Teaching experience

Preparation classes for the Mathematical Olympiad   2020 – 2022
Collaborated with Prof. Gustavo Ochoa of the Public University of Navarre preparing students for the Spanish Mathematical Olympiad.

Selected awards

-	Premi Emmy Noether Prize to the best bachelor's thesis in mathematics in Catalonia	1st *ex aequo*	2024
-	Spanish Mathematical Olympiad (final stage)	Silver medal	2018
-	Spanish Mathematical Olympiad (local stage in Navarre)	1st place	2018
-	Spanish Mathematical Olympiad (local stage in Navarre)	1st place	2017
-	Navarre, Aragon and Rioja Triangular Mathematical Olympiad	1st place	2018
-	Navarre, Aragon and Rioja Triangular Mathematical Olympiad	1st place	2017

Other awards

-	Spanish Biology Olympiad (local stage in Navarre)	1st place	2018
-	Spanish Philosophy Olympiad (local stage in Navarre)	1st place	2017
-	Regional History Olympiad (Navarre)	1st place	2016
-	Extraordinary Prize of Secondary Education		2016

Programming languages

C++, MATLAB, Maple, R, AMPL.

Languages

Spanish (native), English (C2), Catalan (C1), Basque (B1).