Víctor Ballester Ribó

victorballester7.github.io | victorballester7 | victorballester7
+33 765750262 | v.ballester-ribo24@imperial.ac.uk | London

I am a PhD student in the Department of Astronautics at Imperial College of London. I graduated in 2023 in Mathematics at Autonomous University of Barcelona and next year I moved to Paris to pursue a master degree at Dauphine-PSL University in Applied and Theoretical Mathematics. My main interests are in the field of Computational Mathematics and PDEs. Specifically, I am particularly interested in the application of Mathematics to Fluid Dynamics.

Education

PhD in Aeronautics — October 2024 - Present
Imperial College of London — London, UK

- Working with Nektar++ software on compressible fluids.

M2 in Applied and Theoretical Mathematics — September 2023 - July 2024
Dauphine - PSL University — Paris, France

- GPA: 16.54 / 20.00
- Minor in Physics, specifically in Computational Fluid Dynamics.
- Final master's project (supervised by Alexandros Alexakis and Emmanuel Dormy): *2D turbulence spreading*.

Bachelor's Degree in Mathematics — September 2019 - July 2023
Autonomous University of Barcelona — Cerdanyola, Spain

- GPA: 9.42 / 10.00
- Ranked #1 in my graduating class.
- Honors: 186 / 240 ETCS
- Final bachelor's project (supervised by J.M. Mondelo): *Numerical propagation of trajectories of Earth-orbiting spacecraft* (grade: 10.00 / 10.00 with honors).

Baccalaureate — September 2017 - May 2019
La Llauna High School — Badalona, Spain

- GPA: 7.74 / 10.00
- Research project: *Particle physics* (grade: 10.00 / 10.00).
- Achieved a grade of 11.498 / 14.000 in the University entrance exams (PAU).

Experience

NMK Undergraduate and Graduate Summer Camp — July 14 - July 28, 2024
Nesin Mathematics Village — Selçuk, Turkey

- Attendance to courses on Dynamical Systems, PDEs and Probability.

Barcelona Introduction to Mathematical Research 2023 — July 03 - July 28, 2023
Barcelona Graduate School of Mathematics — Barcelona, Spain

- Attendance to minicourses on Introduction to Research, from the fields of Algebraic Topology and Number Theory to Applied Mathematics and Discrete Mathematics.
- Worked on a research project (supervised by Jezabel Curbelo and Álvaro Meseguer): *From chaotic dynamical systems to fluid turbulence*.

HackUPC 2023 May 12 - May 14, 2023
by Polytechnic University of Catalonia Barcelona, Spain

- Gained knowledge on the applications of artificial intelligence in the optimization of resources.
- Worked on a project of predicting the values of the stock market and on a project of optimizing the demand of the company HP.

Datathon June 11 - June 12, 2022
by Aily Labs Barcelona, Spain

- Gained knowledge on the applications of artificial intelligence in the health sector.
- Worked on a project for the detection of glaucoma in retinal images, using computer vision techniques and CNNs.

Private Tutor September 2018 - Abril 2023
Self-employed Badalona, Spain

- Taught Mathematics, Physics and Chemestry to teenage students.

Volunteering

Trail Maintainer August 11 - August 31, 2024
Thórsmörk, Iceland

- I volunteered together in a group of 12 people in Thórsmörk region in Iceland doing duties such as: changing timbers that serve as steps, redirecting parts of paths, eliminating small scree slopes, adding drains, widening paths or planting trees.

Tourist Guide July 31 - August 21, 2023
Wadi Rum, Jordan

- I worked alone helping a family with his business, which consisted in guiding in jeep tours in the Wadi Rum desert and cooking for the tourists.

Hotel General Maintainer July 8 - August 19, 2022
Belfast, Northern Ireland

- I worked in a team of 4 people in the maintenance of the hotel, which consisted in cleaning the rooms, common areas and the kitchen.

Selected Projects and Reports

2D turbulence spreading February 2024 - July 2024
Fluid dynamics, Turbulence, HPC, C, C++ Report | Code

- Simulation of 2D Navier-Stokes equations with a pseudo-spectral method in order to study the spreading of turbulence in a 2D fluid.
- Final Masterr thesis of the Applied Mathematics's degree at Paris-Dauphine University.
- Grade: 18.00 / 20.00
- Advised by Alexandros Alexakis and Emmanuel Dormy.

2D Numerical simulation of Von Kármán vortex street February 2024 - March 2024
C++, Finite difference, Navier-Stokes equations Report | Code

- Study of the Von Kármán vortex street and the different types of solutions that can be obtained.
- Project conducted as part of the course *Numerical methods* at Université Paris-Dauphine.
- Co-authored with Jona Nägerl.

Numerical study of the 2D Kuramoto-Sivashinsky equation November 2023 - January 2024
Flame propagation, C++, Spectral methods, FFT Report | Code

- Study of the different types of solutions of the 2D Kuramoto-Sivashinsky equation and the bifurcations that occur between them.
- Project conducted as part of the course *Instabilities and nonlinear phenomena* at École Normale Supérieure.
- Advised by Laurette Tuckerman.

Numerical propagation of trajectories of Earth-orbiting spacecraft January 2023 - July 2023
Astrophysics, C, C++, Academic Writing Report | Code

- Reconstruction of orbits of satellites from real initial data when considering the Earth a non--uniform spherical distribution of mass and other minor perturbations.
- Final Bachelor thesis of the Mathematics's degree at Autonomous University of Barcelona.
- Grade: 10.00 / 10.00 with honors
- Advised by Josep Maria Mondelo.

Notes in Mathematics August 2020 - July 2024
Mathematics, Academic Writing Website | Code

- Summaries of each subject of the Mathematics's degree at Autonomous University of Barcelona.

Numerical simulation of the n-Body Problem August 2022
Physics, C, Pyhton, Matplotlib Code

- Integrated the n-Body Problem in 2 and 3 dimensions considering the bodies as point masses.
- Developed a program using C for the numerical computation and Python for ploting the results.

AI for Connect-4 game September 2022 - November 2022
Connect 4, C, AI, Minimax Code

- Implemented artificial intelligence for the classical Connect-4 game using the Minimax algorithm.
- Project conducted as part of the course *Advanced Mathematics* at the Autonomous University of Barcelona.
- Advised by Vicenç Soler.

Measuring musical dissonance April 2021 - June 2021
Mathematical Modeling, C, Music, Academic Writing Report (in Catalan) | Code

- Modeled the dissonance and consonance of musical tones from the point of view of simple tones.
- Developed a program using C to run the model.
- Wrote a report on the development and implementation of the model, and the results of the simulations.
- Project conducted as part of the course *Workshop in Mathematical Modelling* at the Autonomous University of Barcelona, co-authored with Oriol Bosquet and Carlo Sala.
- Advised by Xavier Mora.

Number of spanning trees in a graph and minimum spanning tree January 2021
C, Graphs, Trees, Discrete Mathematics, Academic Writing Report (in Catalan)

- Report on the number of spanning trees in a graph and algorithms for finding the minimum weight spanning tree.
- Project developed as part of the course *Discrete Mathematics* at the Autonomous University of Barcelona, co-authored with Oriol Bosquet, Eric Recio and Carlo Sala.

Classification of Convex Cones May 2020
C, Linear Algebra Source code

- Program that classifies the convex cone generated by input vectors in the 3-dimensional real vector space.
- Project developed as part of the course *Computational Tools for Mathematics* at the Autonomous University of Barcelona.
- Advised by Joaquim Roé.

Skills

Industry knowledge	Programming | Mathematical Modeling | Numerical Analysis | Applied Mathematics | Computational Mathematics | CFD | FFT
Programming Languages	C | C++ | Python | LaTeX | Maple | Julia | MATLAB | Octave | Java | Bash | R | HTML | CSS | JS | SQL
Libraries and Frameworks	Numpy | Matplotlib | Make | Cmake | Pandas | PyTorch
Tools and Platforms	VSCode | Neovim | Jupyter Notebook | Git | SageMath
Soft Skills and Others	Resourceful | Innovative | Curious | Committed | Persistent | Competitive | Ambitious | Open-minded | Responsible | Problem-solving

Languages

English	Advanced (Level C1)
French	Intermediate (level B2)
German	Intermediate (level B1)
Spanish	Native
Catalan	Native

Awards and Achievements

Extraordinary Award in the Bachelor's Degree in Mathematics November 2023
Issued by Faculty of Science, Autonomous University of Barcelona Barcelona, Spain

- Extraordinary award for the best academic record in the Bachelor's Degree in Mathematics for the 2019-2023 graduating class at the Autonomous University of Barcelona.

Master scholarship from Paris Graduate School of Mathematical Sciences April 2023
Issued by Paris Graduate School of Mathematical Sciences Paris, France

- Scholarship that covers tuition fees and provides a monthly stipend of 1100€ for the M2 Applied and Theoretical Mathematics program at Dauphine-PSL University.

Second-best Spanish individual Simon Marais Competition November 2022
Issued by Simon Marais Mathematics Competition Barcelona, Spain

- Second best qualified Spanish individual and top quartile on the west division of the 2022 Simon Marais Mathematics Competition.

Best Spanish pair Simon Marais Competition November 2021
Issued by Simon Marais Mathematics Competition Barcelona, Spain

- Best qualified Spanish pair on the west division of the 2021 Simon Marais Mathematics Competition, jointly with Misael Malqui.

Silver medal at XXX Spanish Physics Olympiad April 2019
Issued by Royal Spanish Society of Physics Salamanca, Spain

- Obtained a Silver medal on the XXX Spanish Physics Olympiad of a total of over 200 participants from all over Spain.
- Previously selected as one of the best Catalonia participants to compete in the Spanish competition.

Honorable mention on Physics June 2019

Issued by La Llauna High School Badalona, Spain

- Distinction awarded based on the outstanding grades obtained in Physics along the high school.

Others

Interests Cycling | Hiking | Physics | Engineering | General Science | Swimming | Classical music | Car racing

Driving licenses B