

# Víctor Ballester Ribó

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I am a graduate student in Mathematics at Autonomous University of Barcelona. Currently, I am pursuing my master degree at Dauphine-PSL University in Applied and Theoretical Mathematics. My main interests range from computational mathematics in dynamical systems and PDEs, on the branch of Mathematics, to fluid dynamics and other applied aspects in Physics and Engineering.

## EDUCATION

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### M2 in Applied and Theoretical Mathematics

Dauphine - PSL University

September 2023 - July 2024

Paris, France

- Current GPA: 15.50 / 20.00
- Minor in Physics, specifically in Computational Fluid Dynamics.
- Final master's project (supervised by Alexandros Alexakis and Emmanuel Dormy): *Turbulence transition from 2D to 3D* (in progress).

### Bachelor's Degree in Mathematics

Autonomous University of Barcelona

September 2019 - July 2023

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

La Llauna High School

September 2017 - May 2019

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

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### Barcelona Introduction to Mathematical Research 2023

Barcelona Graduate School of Mathematics

July 03 - July 28, 2023

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

by Polytechnic University of Catalonia

May 12 - May 14, 2023

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

by Aily Labs

June 11 - June 12, 2022

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

Self-employed

September 2018 - Abril 2023

Badalona, Spain

- Taught Mathematics, Physics and Chemistry to teenage students.

## VOLUNTEERING

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### 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

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### 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, Python, 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 plotting 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

Mathematical Modeling, C, Music, Academic Writing

April 2021 - June 2021


 [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

C, Graphs, Trees, Discrete Mathematics, Academic Writing

January 2021


 [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

C, Linear Algebra

May 2020

 [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

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

## LANGUAGES

<b>English</b>	Advanced (Level C1)
<b>French</b>	Intermediate (level B2)
<b>German</b>	Intermediate (level B1)
<b>Spanish</b>	Native
<b>Catalan</b>	Native

## AWARDS AND ACHIEVEMENTS

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### **Extraordinary Award in the Bachelor's Degree in Mathematics**

*Issued by Faculty of Science, Autonomous University of Barcelona*

November 2023

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**

*Issued by Paris Graduate School of Mathematical Sciences*

April 2023

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**

*Issued by Simon Marais Mathematics Competition*

November 2022

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**

*Issued by Simon Marais Mathematics Competition*

November 2021

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**

*Issued by Royal Spanish Society of Physics*

April 2019

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**

*Issued by La Llauna High School*

June 2019

Badalona, Spain

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

## OTHERS

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### **Interests**

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

### **Driving licenses**

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