

# Loredana Sandu

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Undergraduate student of Mathematics, an avid learner with a highly curious nature and entrepreneurial spirit. Fond of intellectual challenges from early ages, I have developed a passion about programming and the applications of mathematics, especially in the fields of artificial intelligence and data science. Proficient in spoken and written English.

## EDUCATION

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### Bachelor's Degree in Mathematics

Autonomous University of Barcelona

September 2019 – July 2023

Barcelona, Spain

- At the moment, I have passed 213 credits and I am enrolled for 30 credits, including an Internship and the Bachelor's Thesis.
- Current GPA: 7.33 / 10.00
- Currently conducting research for my thesis under the supervision of Dr. Pilar Dellunde. Focusing on the use of fuzzy-logical operators to develop interpretable neural network models.
- Studied at the University of Vienna as part of the Erasmus+ exchange program.
- As a remark, I achieved a honorable mention in the course *Computational Tools for Mathematics* (grade: 9.70 / 10.00).

### Erasmus+ exchange program, Mathematics

University of Vienna

September 2022 – February 2023

Vienna, Austria

- As part of the Erasmus+ Exchange Programme.
- GPA: 8.43 / 10.00 (equivalence in the Spanish grading system)

### Baccalaureate (with Honors)

Gallecs High School

September 2017 – May 2019

Barcelona, Spain

- GPA: 10.00 / 10.00
- Research project: "Study on the evolution of the labour market in Spain during the decade following the 2008 economic recession" (grade: 10.00 / 10.00).
- Achieved a grade of 13.76 / 14.00 in the University entrance exams (PAU).

## EXPERIENCE

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### Research Intern

Centre for Research in Agricultural Genomics (CRAG)

March 2023 – Present

Barcelona, Spain

- Intern in the *Rosaceae genetics and genomics* group, part of the Research program on Plant and Animal Genomics.
- Working on the development of deep learning models with applications in fruit genomics. Developing hybrid models of Convolutional Neural Networks (CNNs) and Feed Forward Neural Networks (FFNNs) to extract patterns of SNPs and predict quantitative traits.
- Exploring other deep learning architectures such as Recurrent Neural Networks (RNNs), Long Short-Term Memory (LSTM), Autoencoders (AEs), Generative Adversarial Networks (GANs), and Transformer models.

## Private Programming Tutor

Self-employed

July 2020 – July 2022

Remote

- Taught Python, C and SQL remotely to teenage and adult students.
- The classes were focused on libraries like Pandas, Matplotlib, scikit-learn and Pytorch, and tools like Jupyter Notebook, Git, and Json. I also included the use of frameworks like Django, and databases like MySQL.
- Most students were located in the United Kingdom, Germany and Spain. Occasionally, I also worked with students from the United States and Ecuador.
- Emphasized practical use cases in the areas of data science, machine learning, and APIs.

## SELECTED PROJECTS AND REPORTS

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### Extending the SIR model through Branching Processes

February 2023

Mathematical Modeling, Stochastic Processes, Python, Academic writing

 [Report](#) |  [Code](#)

- Modeled the spread of an infection through a population with two types of individuals: those with a high number of social contacts and those with a low number of social contacts.
- Performed numerical and stochastic simulations using Python, based on previous mathematical analysis.
- Wrote a report on the development and mathematical analysis of the model, and the results of the simulations.
- Project conducted as part of the course *Modeling in evolutionary ecology and epidemiology* at the University of Vienna, co-authored with Aäron Roex.
- Advised by Himani Sachdeva and Jitka Polechová.

### Simulation of the flocking behavior of birds

June 2021

Mathematical Modeling, Python, GnuPlot, Git, Academic Writing

 [Report \(in Catalan\)](#) |  [Code](#)

- Modeled the flocking behavior of birds, and the effect of the presence of elements such as food sources and predators on the flock.
- Developed a program using Python and GnuPlot to run the simulation.
- 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 Anna Danot, Núria Fernández and Jan Mousavi.
- Advised by Julià Cufí and Xavier Mora.

### Digit Recognition

May 2021

Python, Deep Learning, PyTorch


 [Source code](#)

- Logistic regression model that classifies handwritten digits.
- Accuracy: 90.27%.

### Face Recognition

March 2021

Python, Computer Vision, Numpy, OpenCV, Pillow, Tesseract


 [Source code](#)

- Program that recognizes faces of an image. Tested with newspapers.
- Capstone Project for the *Python 3 Programming Specialization* by the University of Michigan.

### Classification of Convex Cones

May 2020

C, Abstract 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.

## COURSES AND CERTIFICATES

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<b>SQL for Data Science</b> University of California, Davis	July 2021
<b>Python 3 Programming Specialization</b> University of Michigan	July 2021
<b>Certificate of Proficiency in English (CPE)</b> University of Cambridge	July 2020
<b>C Programming Course</b> Mollet's Informatics Center	May 2016

## SKILLS

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<b>Industry knowledge</b>	Programming   Mathematical Modeling   Data Science   Machine Learning   Deep Learning   Data Analysis
<b>Programming Languages</b>	<i>Experienced:</i> Python   C   SQL   R   AMPL   HTML   CSS   $\text{\LaTeX}$ <i>Familiar:</i> C++   MATLAB   JavaScript   Solidity
<b>Libraries and Frameworks</b>	PyTorch   scikit-learn   Pandas   Numpy   Matplotlib   Seaborn   Django   OpenCV   Pillow   Tesseract
<b>Tools and Platforms</b>	Jupyter Notebook   Anaconda   Git   SageMath   Heroku   Digital Ocean   Wordpress
<b>Soft Skills and Others</b>	Resourceful   Innovative   Curious   Committed   Persistent   Fast Learner   Problem Solving   Lively

## LANGUAGES

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<b>English</b>	Proficient (Level C2)
<b>Spanish</b>	Native
<b>Catalan</b>	Native
<b>Romanian</b>	Intermediate

## PARTICIPATION IN HACKATHONS

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<b>Datathon by Aily Labs</b>	June 11 – June 12, 2022   Barcelona, Spain
<ul style="list-style-type: none"><li>• Gained knowledge on the applications of artificial intelligence in the health sector.</li><li>• Worked on a project for the detection of glaucoma in retinal images, using computer vision techniques and CNNs.</li></ul>	
<b>HackUPC 2022</b>	April 29 – May 1, 2022   Barcelona, Spain
<ul style="list-style-type: none"><li>• Gained knowledge and experience in the fields of computer vision and game autoplayers.</li><li>• Participated in events related to cybersecurity and algorithms.</li></ul>	

## AWARDS AND ACHIEVEMENTS

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### **Recognition of excellence at the University entrance exams (PAU)**

July 2019

Interuniversity Council of Catalonia (CIC), Generalitat de Catalunya

- These distinctions are awarded to students in Catalonia who, in the June ordinary sitting, have obtained a grade equal to or higher than 9.00/10.00 points as a qualification for the general phase of the University entrance exams (PAU).

### **2nd place at a regional chess tournament**

May 2015

Granollers Chess Club

- I had an interest in chess at early ages and played in several regional tournaments.

## OTHER

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### **Interests**

Philosophy | General Science | Literature | Writing | Calisthenics |  
Swimming | Botany | Classical music and guitar

### **Driving licenses**

A2 | B