# Loredana Sandu

🔗 loredanasandu.github.io | 🔗 loredana-sandu | 🔗 loredanasandu
✉ loredana-sandu@uoc.edu | 🏠 Mollet del Vallès (Barcelona)

## EDUCATION

**Master's Degree in Computational and Mathematical Engineering**    October 2023 – ongoing
Open University of Catalonia    Barcelona, Spain

- Specializing in mathematical modeling and simulation, artificial intelligence and operations research.
- Expected graduation date: June 2024.

**Bachelor's Degree in Mathematics**    September 2019 – June 2023
Autonomous University of Barcelona    Barcelona, Spain

- Bachelor's Thesis: "Fuzzy Logic in Artificial Intelligence: a study of fuzzy set theory and its applications to Explainable AI" (grade: 10.00 / 10.00, with Honours). Advised by Prof. Pilar Dellunde and Dr. Wolfgang Pitsch.
- Erasmus+ Exchange Programme at the University of Vienna (September 2022 – February 2023).
- GPA: 7.64 / 10.00

**Baccalaureate (with Honours)**    September 2017 – May 2019
Gallecs High School    Barcelona, Spain

- 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).
- GPA: 10.00 / 10.00
- Achieved a grade of 13.76 / 14.00 in the University entrance exams (PAU).

## WORK EXPERIENCE

**Deep Learning Research Assistant**    March 2023 – June 2023
Centre for Research in Agricultural Genomics (CRAG)    Barcelona, Spain

- Intern in the *Rosaceae genetics and genomics* group, part of the Research Program on Plant and Animal Genomics.
- Worked on the development of deep learning models with applications in plant genomics.
- Developed models based on Convolutional Neural Networks (CNNs), Variational Autoencoders (VAEs), Vision Transformers (ViTs) and Generative Adversarial Networks (GANs) to extract patterns of SNPs and predict quantitative traits.

**Private Programming Tutor**    July 2020 – July 2022
Self-employed    Remote

- Taught Python, C and SQL remotely to teenage and adult students. Emphasized practical use cases in the areas of data science, machine learning, and APIs.
- 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.

## SELECTED REPORTS, TALKS AND PROJECTS

**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 mathematical analysis, and numerical and stochastic simulations using Python.
- 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 Dr. Himani Sachdeva and Dr. Jitka Polechová.

**Seasonally fluctuating selection can maintain polymorphism**    January 2023
Research Talk, Public Speaking, Mathematical Population Genetics    📄 Slides

- Seminar talk delivered as part of the *Seminar in Biomathematics* at the University of Vienna.

- Presented insights into how seasonally fluctuating selection can lead to the maintenance of genetic variation in natural populations, delving into the mathematical aspects and the underlying biological implications.
- Advised by Prof. Joachim Hermisson.

### 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.
- 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 Prof. Julià Cufí and Dr. Xavier Mora.

### 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 Dr. Joaquim Roé.

## SELECTED COURSES AND CERTIFICATES

### SQL for Data Science
July 2021

University of California, Davis (online course, via Coursera)

### Python 3 Programming Specialization
March 2021

University of Michigan (online course, via Coursera)

### Certificate of Proficiency in English (CPE)
July 2020

University of Cambridge

### C Programming Course
May 2016

Mollet's Informatics Center

## SKILLS

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|---|---|
| **Industry knowledge** | Programming and Computing | Mathematical Modeling and Optimization | Artificial Intelligence | Deep Learning | Statistics | Simulation | Operations Research |
| **Programming Languages** | Python | C | R | AMPL | MATLAB | SQL | C++ | Julia | JavaScript | HTML | CSS |
| **Libraries and Frameworks** | PyTorch | scikit-learn | Pandas | Numpy | Matplotlib | Seaborn | Django | OpenCV | Pillow | Tesseract |
| **Tools and Platforms** | Git | Jupyter Notebook | Anaconda | LaTeX | SageMath | Heroku | Digital Ocean |
| **Soft Skills and Others** | Resourceful | Innovative | Problem Solving | Fast Learner | Committed | Persistent | Curious | Lively |

## LANGUAGES

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| **English** | Proficient (Level C2) |
| **Spanish** | Native |
| **Catalan** | Native |
| **Romanian** | Intermediate |

## AWARDS AND ACHIEVEMENTS

### Recognition of excellence at the University entrance exams (PAU)
July 2019

Interuniversity Council of Catalonia (CIC), Generalitat de Catalunya

- Distinction 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).

## OTHER INTERESTS

Philosophy | Technology | Literature | Writing | History | Culture and Travelling | Chess | Calisthenics | Swimming | Classical music and guitar