Loredana Sandu

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Education

Master's Degree in Computational and Mathematical Engineering — September 2023 – ongoing
University of Rovira i Virgili — 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 Prof. 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

Research Intern — 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. Occasionaly, 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 2022
Research Talk, Public Speaking, Mathematical Analysis — 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 Prof. 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 Prof. Joaquim Roé.

Selected Courses and Certificates

SQL for Data Science July 2021
University of California, Davis

Python 3 Programming Specialization July 2021
University of Michigan

Certificate of Proficiency in English (CPE) July 2020
University of Cambridge

C Programming Course May 2016
Mollet's Informatics Center

Skills

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

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 (esp. mind, logic, ethics, Eastern) | Technology | Literature | Writing | History (esp. ancient, Renaissance, contemporary) | Culture and Travelling | Chess | Calisthenics | Swimming | Classical music and guitar