

Samuel Lozano Iglesias

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Positions

Research Associate

September 2024 - Present

Faculty of Physical Sciences, Universidad Complutense de Madrid

Madrid, Spain

Human Frontier Science Programme (HFSP) project: *The Emergence of Collective Intelligence: Understanding Human Behavior through AI Agents*, coordinated by Prof. Miguel Ruiz García (UCM).

This project is in collaboration with Prof. Andrew Saxe (University College London), Prof. Erin Teich (Wellesley College) and Prof. Markus Spitzer (Martin Luther University Halle-Wittenberg). The research focuses on understanding the principles behind the emergence of collective intelligence (CI) in human and biological systems using reinforcement learning models inspired by cognitive science.

Education

Universidad Alfonso X El Sabio

Madrid, Spain

MSc. in Artificial Intelligence. GPA: 9.32 out of 10.

September 2024 - June 2025

Total of 66 ECTS. Final Master Thesis:

- *Dynamics of Cooperation in Multiagent Systems: An Approach Based on Reinforcement Learning.* Supervised by Juan Agustín Fraile Nieto. GPA: 10 out of 10.

Universidad Complutense de Madrid

Madrid, Spain

Double Degree in Mathematics and Physics. GPA: 9.09 out of 10.

September 2019 - June 2024

Obtained honours in 60 ECTS, out of a total of 360 ECTS, with an outstanding performance in Algebra, Geometry and Topology (9.57 on average).

Final Degree Projects:

- *Application of Machine Learning Techniques for Water Turbidity Prediction:* theoretical study of predictive models with Machine Learning, going deeper into LSTM networks and successfully applying them to the prediction of water turbidity in desalination plants operated by ACCIONA. Supervised by Ángel González Prieto and Miguel Ruiz García. GPA: 9.8 out of 10.
- *Chaos and Statistical Physics in Quantum Systems:* study of a chaotic quantum system with Random Matrix Theory. Supervised by Armando Relaño Pérez. GPA: 9.9 out of 10.

Université de Genève

Geneva, Switzerland

Exchange year in Mathematics and Physics. Average grade: 5.65 out of 6.

September 2021 - June 2022

Obtained honours in 18 ECTS, out of a total of 72 ECTS, with a special interest in the subject *Random Matrices at Finite N*.

Grants & Internships

Mathematical Sciences Institute, ICMAT (CSIC)

Madrid, Spain

Recipient of a grant from the Severo Ochoa Research Introduction Program.

June 2024 - July 2024

Study of Kolmogorov-Arnold networks and differential equations, with Professor Rafael Orive.

Theoretical Physics Institute, IFT (CSIC)

Madrid, Spain

Educational stay: Introduction to research in particle physics.

March 2017 - April 2017

Relevant Work Experience

ACCIONA

Madrid, Spain

Data Scientist and Machine Learning

September 2023 – May 2024

- Development of predictive models with Machine Learning focused on the needs of the different business units, using LSTM networks and programming in Python (Keras).

- Study of cause-effect relationships and possible opportunities for improvement in project planning through the analysis of large volumes of data (*Knowledge applied to business*, KAB).

Redsys Servicios de Procesamiento S.L.

Madrid, Spain

Financial Data Analyst

July 2022 – January 2023

- Development of ETL processes with SQL to optimise data processing in the BIZUM service, using IBM's tools such as Datastage and Netezza.

Publications & Awards

Towards a curriculum for neural networks to simulate symbolic arithmetic

February 2025

S. Lozano, M. Spitzer, Y. Strittmatter, K. Moeller, M. Ruiz-Garcia.

Proceedings of the Cognitive Science Society Conference (CogSci 2025).

[Link](#).

Historia de España: 2º Bachillerato

November 2021

Compilation of the History of Spain divided into sections and aimed at preparing for the Spanish university entrance exam (EvAU).
ISBN: 979-8768042295 ([Link](#))

Winner of the Una Europa Challenge: Data Science and AI for Social Welfare

July 2025

Project name: *Reimagining Justice through Ethical AI: An Interdisciplinary Audit of COMPAS Recidivism Tools*.

Triple winner of the Spring Mathematics Competition

Madrid, Spain

Complutense University of Madrid: editions XVI, XIX and XXIII.

2012, 2015 and 2019

Talks & Posters

47th Meeting of the Cognitive Science Society (San Francisco, United States)

01/08/2025

In CogSci 2025, presentation of the paper titled *Towards a Curriculum for Neural Networks to Simulate Symbolic Arithmetic*.

8th Advanced Course on Data Science & Machine Learning (Grosseto, Italy)

13/07/2025

One-week course at Riva del Sole (Italy), where I gave a talk titled *Towards a Curriculum for Neural Networks to Simulate Symbolic Arithmetic*.

Seminar at University College London (London, UK)

20/02/2025

One-week research stay at UCL, where I gave a talk titled *Towards a Curriculum for Neural Networks to Simulate Symbolic Arithmetic*.

2nd Spanish Soft Matter 1 1/2 Day (Benasque, Spain)

05/11/2024

Presented a poster titled *Water Turbidity Prediction in Desalination Plants Using Machine Learning-Based Models*.

Skills & Interests

Technical Skills: Programming in Python (JAX, Torch and TensorFlow), GitHub, MATLAB and SQL.

Languages: Spanish (native), English (C1 - Advanced, CAE certificate), and French (B1).

Research Interests: Machine Learning (Reinforcement Learning), mathematical modeling and optimization. Particularly interested in the intersection of AI and physics, including information processing in neural networks, statistical physics approaches to learning, and emergent intelligence in complex systems.