NILS VAN ES OSTOS

Rome, Italy

nilsvanes@gmail.com ◇ linkedin.com/nils-van-es-ostos ◇ github.com/Nilsvanesostos ◇ medium.com/@nilsvanes

ABOUT ME

I am a Ph.D. candidate in Economics and Finance at the University of Rome Tor Vergata. My research focuses on the development of generative models for high-dimensional financial time series, with particular emphasis on score-based diffusion models and flow/bridge matching methods for volatility forecasting. I have a strong background in mathematics, statistics, and machine learning, and I am especially interested in the intersection of probability theory, stochastic modeling, and modern generative AI for financial applications.

EDUCATION

Ph.D. in Economics and Finance, University of Rome Tor Vergata (Italy) Sep 2025 – Present
Doctoral research focused on the intersection of mathematics, statistics, and generative AI. Ph.D. Project: *"Forecasting High-Dimensional Multivariate Time Series with Generative Models"*. Developing and applying score-based generative models and flow/bridge matching methods to model volatility dynamics in financial markets, with emphasis on high-dimensional stock market data.

M.Sc. in BDMA, University of Padua (Italy) Sep 2024 - Sep 2025
Third Semester of the Erasmus-Mundus Joint Master of Big Data Management & Analytics (BDMA). Specializing in Statistics and Deep Learning. Courses takes: Deep Learning for Human Data, Time Series Analysis of Business, Economics & Financial Data, Statistical Learning, Stochastic Methods, & Law & Data. Master Thesis: Emulating Quijote Simulations with Generative Models.

M.Sc. in BDMA, Polytechnic University of Catalonia (Spain) Feb 2024 - Jun 2024
Second Semester of the Erasmus-Mundus Joint Master of Big Data Management & Analytics (BDMA). Special focus on NoSQL tools and Graphs. Courses taken: Big Data Management, Semantic Data Management & Graph Databases, & Machine Learning.

M.Sc. BDMA, Free University of Brussels (Belgium) Sep 2023 - Feb 2024
First Semester of the Erasmus-Mundus Joint Master of Big Data Management & Analytics (BDMA). Special focus on Relational Databases and Data Warehouses. Courses taken: Advanced Databases, Data Warehouses, Data Mining, Database Systems Architecture, & French Language.

B.Sc. in Physics, University of Granada (Spain) Sep 2017 - Jun 2022
Specialization in the fields of Theoretical and Computational Physics. Optional courses taken: Fundamentals of Astrophysics, Mathematical Physics, Analytical Mechanics & Continuous Media, Computational Physics, Atomic & Molecular Physics, General Relativity, Physics of Complex Systems, Quantum Information & Applications, & Field & Particle Theory. Bachelor Thesis: Rare Events in Open Quantum Systems.

TECHNICAL SKILLS

Developer Tools	Python, C, C++, R, Git, Linux, LateX, MATLAB, & Jupyter Notebooks
Big Data Tools	MySQL, PostgreSQL, MongoDB, Apache Spark, Apache Airflow, Neo4j, & SparQL
Frameworks & Libraries	PyTorch, Tensorflow, Scikit-Learn, Pandas, Numpy, Seaborn, & Matplotlib

OTHER SKILLS

Soft Skills	Initiative, Teamwork, Communication, Problem Solving
Languages	Spanish (First Mother Tongue), Dutch (Second Mother Tongue), English (C1 Advanced - Score 180), Italian (C1), French (A2), Catalan (A2)

RELEVANT PROJECTS

Generative Modeling with SDEs and Schrödinger Interpolants (Master Thesis) Oct 2024 – Sep 2025
Generative AI, Diffusion Models, Score Matching, Flow Matching, Stochastic Processes

- Developed a mathematical and computational framework for score-based generative modeling using stochastic differential equations and Schrödinger bridges.
- Studied and implemented Score-based Diffusion Models, Flow Matching, and Bridge Matching for high-dimensional data generation.
- Evaluated models on standard image datasets (MNIST, CIFAR10). Project

Efficient Deep Learning Architectures for Blood Cell Classification Sep 2024 - Jan 2025
Hyperparameter Tuning, Deep Learning, Neural Networks, Attention Mechanism, Feature extraction, TensorFlow

- Development of a pipeline for applying classification techniques to the BloodMNIST dataset.
- Analysis on different supervised neural networks such as CNN, VGG, ResNet, Autoencoders, InceptionNet, with special focus on Attention Mechanisms in TensorFlow. Best accuracy achieved: 98.3 Project

Degree4Free Jan 2024 - Jun 2024
Data Engineering, Machine Learning, Knowledge Graphs, Embedding Algorithms, Transformers

- Development of a unified platform that bridges the gap between university courses and available scholarships.
- Data Engineering pipeline involving data collections, cleaning, and architecture.
- Data exploration by the use of different clustering algorithms and embedding algorithms. Project

Rare Events in Open Quantum Systems (Bachelor Thesis) Jan 2022 - Jul 2023
Schrödinger Equation, Lindblad Equation, Quantum Information, MonteCarlo Algorithm, C++

- Investigation of large fluctuations of time-integrated observables in open quantum systems.
- Theoretical study of the evolution of quantum states in contact with the environment with the Lindblad Master Equation.
- Development of the Time-Dependent Quantum Jump Monte Carlo method for analysis of the statistics of quantum states.
- Implementation of the Doob transform to make rare events occur in a controlled manner. Report

VOLUNTEERING

Language Moderator in Spanish. Participated in the program Conversazioni CreAttive as a moderator during 2025 for the Centro Linguistico di Ateneo (CLA), University of Padua.

Head Basketball Coach. Head Coach in the Basketball Team of the faculty of Science from September 2020 until September 2022 at the University of Granada.

Administration Table Official. Referee assistant in the Andalusian Basketball Federation between 2018 and 2022.

ACHIEVEMENTS

Ph.D. Full Scholarship: Awarded full scholarship to pursue a Doctoral Degree in Economics and Finance at the University of Rome Tor Vergata, focusing on generative AI and mathematical modeling for financial time series (Tor Vergata).

Summer School Poster Presentation: Presentation of a poster on recent trends of combining Knowledge Graphs and Large Language Models at the European Big Data Management & Analytics Summer School (sBISS 2024).

Erasmus Mundus Scholarship: EU funded scholarship to pursue an Erasmus Mundus Joint Master Degree (EMJMD) in Big Data Management & Analytics (BDMA).