Stefano Blando

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Profile — PhD student in Artificial Intelligence working at the intersection of AI, agent-based modeling, and economics. Research focuses on adaptive multi-agent systems, statistical verification of economic simulations, and robust quantitative methods for financial and socio-economic data.

Education

PhD in Artificial Intelligence *Nov 2025 – Present*
National PhD Program – Scuola Superiore Sant'Anna & University of Pisa
Research focus: adaptive multi-agent systems, agent-based macroeconomic modeling, statistical model checking, network dynamics, and machine learning.

Second-Level Master in Customer Experience, Statistics, ML and AI *Feb 2025 – Feb 2026*
University of Rome Tor Vergata + SAS Academy
Final Grade: 110/110 cum laude
Thesis: "Network Topology Analysis and Machine Learning Techniques for Systemic Risk Prediction in U.S. Equity Markets"
Advanced program in data science, machine learning, and artificial intelligence with SAS Academic Specialization in Advanced Data Analytics and Machine Learning Engineering.

MSc in Financial Markets and Financial Intermediaries *Oct 2022 – Apr 2025*
University of Rome Tor Vergata, School of Economics and Finance
Final Grade: 108/110
Thesis: "High-dimensional Robust Portfolio Optimization Under Contamination: A Factor-Analytic Approach"
Supervisor: Prof. Alessio Farcomeni

BSc in Governance and International Relations *Sep 2019 – Sep 2022*
University of Rome Tor Vergata, School of Law
Final Grade: 110/110 cum laude
Thesis: "Consumer Choice Under Uncertainty: From Homo Oeconomicus to Homo Temperatus"
Supervisor: Prof. Gustavo Piga
Erasmus+ Exchange: University of Paris Est-Créteil, France *Aug 2021 – Feb 2022*
Selected courses: Trade Data Analysis, Sustainable Development, Business and AI, International Strategy

BA in Philosophy *Sep 2015 – Sep 2017*
La Sapienza University of Rome
Coursework in logic, epistemology, and analytical philosophy.

Research Experience

Selected Papers & Submissions

- **"Statistical model checking of the Fagiolo-Dosi Island Model"** (Accepted at MARS @ ETAPS 2026) – Reproduction and extension of the Island Model with statistical model checking, formal convergence guarantees, and comprehensive parameter sweeps.
- **"Statistical Model Checking of the Keynes+Schumpeter Model: A Transient Sensitivity Analysis of a Macroeconomic ABM"** (Submitted to QEST + FORMATS 2026) – Full-paper submission on property-driven statistical verification of macro-ABM dynamics, extending the Island Model workflow to the Keynes+Schumpeter setting.
- **"Robust Portfolio Optimization Under Systematic Market Disruptions: A Factor-Analytic Approach"** (Submitted to Computational Economics) – Development and empirical validation of robust estimators (PFSE, SSRE) for portfolio allocation under row-wise contamination patterns.
- **"A Multi-Method Validation Framework for Large-Scale Multilingual Text Analytics"** (Accepted at JADT 2026) – Methodological framework validating 18 analytical approaches on 999,152 multilingual reviews to identify method-invariant patterns.

Selected Academic Training & Workshops

- **Co-organizer, COMPASS — Complexity, Markets, Policy, and AI in Social Systems** - Pisa, May 2026

Interdisciplinary scientific workshop organized within the National PhD Program in AI, with three keynote lectures, three thematic panels, and a multi-institutional network spanning UniPi, SSSA, CNR, UCL, and Penn State
- **Workshop in Economic Complexity** - Enrico Fermi Research Center, Rome, July 2025
  Advanced methodologies in complexity economics and network analysis
- **Oxford Summer School in Economic Networks** - University of Oxford, June 2025
  Leading researchers including Doyne Farmer, Rama Cont, Aaron Clauset, Renaud Lambiotte, with lectures and coding tutorials in network formation theory and complex systems applications

Grants & Awards

- **University of Pisa Doctoral Grant for Student-Led Scientific Events (2026):** Awarded funding to co-organize COMPASS, an interdisciplinary scientific workshop on complexity, markets, policy, and AI in social systems
- **2nd Place, AI Data Hackathon 2024:** Developed predictive model for gas leak detection using CTGAN data augmentation and SHAP explainability
- **Finalist, Alpine Climate Data Challenge 2025:** Selected among 150+ teams for climate forecasting with Copernicus ECMWF, NOAA, and Arpa Piemonte datasets
- **Two Academic Tutorship Awards:** University of Rome Tor Vergata (Data Processing Center and Supply Chain Management course support)

Teaching & Academic Support

Academic Tutor, University of Rome Tor Vergata *Mar 2020 – Jan 2025*

- Provided individual academic support and guidance to students at Data Processing Center and University Library
- Supported the Sustainable Supply Chain and Operations Management course and supervised student projects
- Provided statistical guidance, study planning support, and course selection advice

Selected Research Projects

Multiple Equilibria Characterization in Agent-Based Models *Feb 2026 – Present*

- Develop a characterization framework for multiple equilibria in ABMs using EM+BIC on Gaussian mixture models, extending MultiVeStA from non-ergodicity detection to equilibrium characterization.
- Estimate the number, location, dispersion, and reachability probabilities of equilibria with bootstrap confidence intervals for stochastic simulation outputs.

Firm-Level Functional SDR for Financial Distress (in progress) *Feb 2026 – Present*

- Develop scalar-on-function models for European listed firms using trajectory-based predictors such as returns, volatility, and volume.
- Combine robust functional dimension-reduction methods with financial distress prediction in a high-dimensional FDA pipeline.

Multi-Agent Orchestration *Mar 2026*

- Built an event-driven multi-agent orchestration system with phase-specific strategies, structured action interfaces, and runtime state tracking for real-time decision making.
- Integrated persistence, metrics, and replay analysis to improve execution reliability under noisy and time-constrained environments.

RiskSentinel – Microsoft AI Dev Days Hackathon 2026 *Feb 2026*

- Built a multi-agent systemic-risk simulator on S&P 500 networks (210 stocks, 3,081 snapshots) with multiple contagion models, including DebtRank, Linear Threshold, and Cascade Removal.
- Developed interactive visualization and reporting workflows around a tested simulation engine with 41 passing unit tests.

Technical Skills

- **Programming:** Python, R, MATLAB, SQL, SAS, Bash, Git, LaTeX
- **AI Systems & Machine Learning:** supervised and unsupervised learning, deep learning, LLM applications, tool-using agents, agentic systems
- **Statistics & Econometrics:** robust statistics, high-dimensional data analysis, factor models, time-series analysis, Bayesian methods
- **Networks & Graph Learning:** network science, graph analytics, graph neural networks, financial and economic network modeling

- **Agent-Based & Simulation Methods:** agent-based modeling, statistical model checking, contagion simulation
- **Quantitative Finance:** systemic risk modeling, stress testing, portfolio optimization, financial econometrics
- **Research & Engineering Tools:** CLI workflows, tool integration, testing, Bloomberg Terminal, LSEG Workspace, Streamlit

Languages

Italian (Native), English (C1), French (B1), Spanish (A2), German (A1)