Research Scientist in AI and Complex Systems

Davide Torre

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PhD-trained AI researcher specializing in complex systems and agent-based simulation. **4 years of experience**: 2 years in industry plus 2 years in academia. Expert in applying computational methods to demographics, epidemiology, and urban dynamics. Seeking to leverage expertise in humanitarian intelligence for logistics, pandemic response and crisis assessment.

Academic Experience

Postdoctoral researcher *ISI Foundation*

Jan 2025 - (present)

SIESTA-EOSC production; maintenance; algorithm design; testing

Responsibilities

- coding: 90% development / 10% maintenance
- decomposing research requirements into technical tasks

Tech Stack Python, C, Rust

Description SIESTA (**S**ecure **I**nteractive **E**nvironments for **S**ensi**T**ive data **A**nalytics) is a Horizon Europe project developing cloud-based trusted environments and tools to enable secure sharing and analysis of sensitive data within the **E**uropean **O**pen **S**cience **C**loud (EOSC). The project delivers reproducible research environments, state-of-the-art anonymization techniques, and methodologies that demonstrate how FAIR principles can be applied to confidential data while maintaining privacy and usability for researchers.

Assegnee *CNR - IAC*

Jul 2020 - Jul 2021

Urban Social Network production; maintenance; testing

Responsibilities

- coding: 60% development / 40% maintenance
- decomposition of research requirements into technical tasks

Tech Stack Python, C, Javascript, Processing, .NET.

Description A data-driven simulation framework for generating realistic urban social networks using demographic and social-mixing data. The system creates age-stratified, geo-referenced synthetic populations with household and friendship ties, enabling the simulation of disease propagation in urban environments. Built with Python, the tool processes geospatial data (WorldPop, ISTAT) to generate contact graphs and implements epidemic models (SIR) for public health research and policy evaluation.

Industry Experience

Data Scientist *Musicoff Plus SRL*

Mar 2015 - Mar 2017

Automatic SMM production; maintenance; conceptualization

Responsibilities

- coding: 60% development / 10% maintenance / 30 % copy
- defining, monitoring and assessing KPIs
- data mantainence

Tech Stack Bash, C, VB, Excel, .NET, rclone

Education

PhD - Artificial Intelligence *Luiss Guido Carli and UniCampus Biomedico* — Jun 2025

- Machine Learning for Health
- Ecological Network
- Network generation with known Community Structure

Master's degree in Physics *Sapienza Università di Roma* — Mar 2017

Additional activity

Development of Python Package *TaGra* — Mar 2024 - Nov 2024

- Publication on PyPI
- Publication on Computer Science PeerJ

Tech Stack Python, NetworkX, scikit-learn, pandas

Description TaGra is a comprehensive Python library for data preprocessing, graph construction from tabular data, and network analysis. The package provides automated tools for handling missing data, feature scaling, encoding, and manifold learning techniques. It enables seamless conversion of data tables into network structures with minimal configuration requirements. Key features include automated data cleaning pipelines, multiple graph construction algorithms, and integrated network analysis capabilities, making it accessible for researchers and practitioners working with complex relational data.

High school teacher *I.I.S Luigi Einaudi* — Mar 2024 - Sep 2024

- Winner of the grant "Actions for prevention and contrast of school dropout"
- Training on mathematical methods for AI for grades 3-5 of high school

Data Scientist (part time) *Musicoff Plus SRL* — Sep 2011 - Mar 2015

Languages

Italian: Native language
English: Upper-Intermediate (B2)
Chinese: Elementary (HSK2)
Russian: Beginner (A1)

Selected bibliography

- **Torre, D.**, Chicco, D. (2025, July). TaGra: an open Python package for easily generating graphs from data tables through manifold learning. PeerJ Computer Science
- Guarino, S., Mastrostefano, E., **Torre, D.** (2023, November). The Hidden-Degree Geometric Block Model. In International Conference on Complex Networks and Their Applications (pp. 409-419). Cham: Springer Nature Switzerland.
- **Torre, D.**, Italiano, G. F., & Sinaimeri, B. (2023, September). A Network Approach to Aquatic Food Web Dynamics. In International Meeting on Computational Intelligence Methods for Bioinformatics and Biostatistics (pp. 1-15). Cham: Springer Nature Switzerland.
- Pompa, M., **Torre, D.**, Bretti, G., De Gaetano, A. (2023). Sensitivity Analysis of a 2D Stochastic Agent-Based and PDE Diffusion Model for Cancer-on-Chip Experiments. Axioms, 12(10), 930.
- Guarino, S.; Mastrostefano, E.; Bernaschi, M.; Celestini, A.; Cianfriglia, M.; **Torre, D.**; Zastrow, L.R. (2021) Inferring Urban Social Networks from Publicly Available Data. Future Internet 2021, 13, 108.
- Guarino, S.; Mastrostefano, E.; Bernaschi, M.; Celestini, A.; Cianfriglia, M.; **Torre, D.**; Zastrow, L.R. A Model for Urban Social Networks (2021). In: Paszynski M., Kranzlmüller D., Krzhizhanovskaya V.V., Dongarra J.J., Sloot P.M. (eds) Computational Science – ICCS 2021. ICCS 2021. Lecture Notes in Computer Science, vol 12744. Springer, Cham.