STEFANO FIORINI

BIO AND CONTACTS

Address: Via Cividale del Friuli, 15, Milan, Italy

Phone number: +39 3382504578

E-mail: s.fiorini1994@gmail.com

LinkedIn: https://it.linkedin.com/in/stefano-fiorini

GitHub: https://github.com/Stefa1994

Google Scholar: https://scholar.google.it/citations?user=2O-BN9YAAAAJ&hl=it

PROFILE SUMMARY

I am a PostDoc at the Italian Institute of Technology (IIT) in the Pattern Analysis and Computer Vision (PAVIS) group. My main research interests lie in two areas: the study of Neural Networks theory, particularly on Graph Neural Networks, and the applications of Deep Learning in various research fields.

Research Keywords: Graph Neural Networks, Geometric Deep Learning, Diffusion Models, Computer Vision, Computational Chemistry, Natural Language Processing, Vision-Language Models

RESEARCH EXPERIENCE

PostDoc **Genova, Italy**
Pattern Analysis and Computer Vision group, Italian Institute of Technology (IIT) *April 2023 - Now*

Research on Graph Neural Networks and Diffusion Models, with an emphasis on both theoretical foundations and a range of applications.
Supervisor: Dr. Alessio del Bue

Visiting Researcher **Cambridge, United Kingdom**
Department of Computer Science and Technology, University of Cambridge *March 2025 - May 2025*

Research on directionality applied to Sheaf Neural Networks and its extension to modeling molecular interactions.
Supervisor: Professor Pietro Lio'

Visiting Ph.D. Student **Southampton, United Kingdom**
Department of Mathematical Sciences, University of Southampton *October 2021 - March 2022*

We developed a **new positive semi-definite Hermitian matrix**, called the Sign-Magnetic Laplacian, which extends compared to the state-of-the-art of spectral-based graph convolutional networks to undirected and directed graphs with weights unrestricted in sign and magnitude.
Supervisor: Professor Stefano Coniglio

EDUCATION

Ph.D. in Computer Science cum Laude **Milan, Italy**
University of Milano-Bicocca *November 2019 - May 2023*
Department of Computer Science
Research in the field of Neural Networks and Mathematical Modeling applied to Spatio-Temporal Problems. Sponsor of my Doctoral Scholarship is the Italian National Agency for New Technologies, Energy and Sustainable Economic Development.

Thesis Title: Listening to the city: Artificial Intelligence meets Smart Mobility. `https://boa.unimib.it/handle/10281/415540`

MSc in Data Science (110/110) **Milan, Italy**
University of Milano-Bicocca *September 2017 - October 2019*
Department of Computer Science Final GPA: 28.6/30
Thesis Title: Allocation of resources to support function as a service in a Fog Computing environment.

BSc in Banking, Finance and Insurance (101/110) **Milan, Italy**
University of Milano-Bicocca *September 2013 - March 2017*
Department of Economics Final GPA: 24.6/30
Thesis Title: Globalization of 'minor' markets: some examples.

KEY SKILLS

Computing	Python, R, Git, Tableau, Knime, Linux, HPC
Libraries	Pytorch, Tensorflow, Pandas, Pytorch Geometric, RDKit, DeepChem, SciPy, NumPy, Scikit-Learn
Languages	Italian, English (Fluent), Spanish (Intermediate)
Soft Skills	Teamwork, Problem-Solving, Creativity, Adaptability, Time Management

AWARDS

ELSA mobility grant for PostDoc (April 2024)

Best Poster in the Mediterranean Machine Learning (M2L) Summer School (September 2022)

Winning Team in Hack The Cloud - Cloud Management with OpenStack and Juju (November 2018)

Winning Team in SAS Hackathon Milan (April 2018)

WORK AND TEACHING EXPERIENCE

Internship **Cambridge, United Kingdom**
Nokia Bell Labs *April 2021 - September 2021*

We focused on **designing appropriate features** related to the landscape and demographic aspects of the city to predict the adoption rate of shared vehicles.
Supervisor: Professor Daniele Quercia

External Collaborator **Milan, Italy**
Wapi *September 2019 - April 2020*

Creation of a framework to predict the price of agricultural products. Development of a system for the management and monitoring of the properties of agricultural land using satellite images.

Intership **Milan, Italy**
DISCo (Department of Computer Science), University of Milano-Bicocca *February 2019 - April 2019*

Resource allocation of Function as a Service (FaaS) in Fog Computing environments: Modeling and simulation of complex time-varying systems.

Teaching Assistant **Milan, Italy**

For companies, I provided the following courses:

- **Neural Language Processing (NLP)** to HUDi - Digital Humanism (2021)

- **Computer Vision and its application via Python (Tensorflow)** to IBM Italia (2021)

At the University of Milano-Bicocca, I lectured or tutored in the following courses:

- **Technological Infrastructures for Data Science** (Master Degree in Data Science) (2020 - 2022)
- **Decision Model** (Master Degree in Data Science) (2021 -2021)
- **Advanced Machine Learning** (Master Degree in Computer Science) (2021 -2021)

OTHER ACADEMIC ACTIVITIES

I **reviewed several papers** for conferences (IEEE BigData, IEEE ITSC, ICLR) as well as journals (SIVP, AI Communication, TPAMI).

I am currently supervising a PhD student and have previously supervised Master's students.

I have **collaborated** with universities, including the Politecnico di Torino and the University of Cambridge, as well as research groups such as Nokia Bell Labs and the Italian National Agency for New Technologies, Energy, and Sustainable Economic Development (ENEA).

ATTENDED COURSES AND SCHOOLS

Ph.D. Courses. Deep Learning, Graph Theory and Algorithms, Image Understanding

4th International School on Deep Learning. Virtual, July 26-30, 2021

Mediterranean Machine Learning (M2L) Summer School. In-person, 12-16 September 2022

INVITED TALKS

"SigMaNet: One Laplacian to Rule Them All" at the University Bocconi and the Machine Learning and Massive Data Analysis group, Center Borelli, ENS Paris-Saclay, France (10 January 2023)

"The role of data science in smart mobility" at Kilometro Rosso, Technologies for Smart Cities lab (July 19, 2022)

"City Communities: a multi-criteria detection algorithm" at OR63 Conference (September 2021)

SELECTED PUBLICATIONS

S. Fiorini, G. M. Bovolenta, S. Coniglio, M. Ciavotta, M. Parrinello, A. Del Bue. *DLGNET: Hyperedge Classification through Directed Line Graphs for Chemical Reaction.* Under review.

S. Fiorini, S. Coniglio, M. Ciavotta, A. Del Bue. *Let There be Direction in Hypergraph Neural Networks.* Proceedings of Transactions on Machine Learning Research (TMLR).

G. Scaropellini[1], **S. Fiorini**[1], F. Giuliari[1], P. Morerio, A. Del Bue. *DiffAssemble: A Unified Graph-Diffusion Model for 2D and 3D Reassembly.* Proceedings of the Computer Vision and Pattern Recognition Conference, 2024.

S. Fiorini, S. Coniglio, M. Ciavotta, E. Messina. *Graph Learning in 4D: a Quaternion-valued Laplacian to Enhance Spectral GCNs.* Proceedings of the 37th AAAI Conference on Artificial Intelligence (AAAI-24).

F. Giuliari, G. Scarpellini, **S. Fiorini**, S. James, P. Morerio, Y. Wang, and A. Del Bue. *Positional diffusion: Graph-based diffusion models for set ordering.* Pattern Recognition Letters 186 (2024).

S. Fiorini, S. Coniglio, M. Ciavotta, E. Messina. *SigMaNet: One Laplacian to Rule Them All.* Proceedings of the 37th AAAI Conference on Artificial Intelligence (AAAI-23).

[1]equal contribution