Paolo Frazzetto

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Carreer Objectives & Availbility

I am a **Postdoctoral Researcher** in Machine Learning at the University of Padova, Italy, with a strong interdisciplinary background in Computational Physics and Machine Learning. My research focuses on Graph Neural Networks and their applications, particularly in developing interpretable AI solutions. I am passionate about leveraging statistical learning to understand complex phenomena in the natural and social sciences.

I am eager to advance my career in research, with a particular focus in postdoctoral opportunities abroad. I am actively seeking new positions, and I am available to relocate globally in September/October 2025.

Education

Oct 2024 – present   **Università degli Studi di Padova**, **Research Fellowship** in Deep Learning
- Member of *SymboliG* project, founded by a national research grant under the "Future Artificial lntelligence Research (FAIR)" ☑ group at Fondazione Bruno Kessler, Trento, Italy.
- Research on the integration of symbolic knowledge into graph learning methods from two perspectives: graph generation with constrained diffusion models and symbolic regression of dynamical systems on graphs.

Oct 2021 – Sept 2024   **Università degli Studi di Padova**, **Ph.D. Candidate** in Brain, Mind & Computer Science ☑
- Project: *Accelerate Corporate Development with a self-evolving tool, based on Machine Learning and Process Mining, keeping the Person at the centre*
- Grant: Industrial Ph.D. with Amajor SB S.p.A. ☑
- Supervisor: Prof. Alessandro Sperduti ☑
- Defense: March 26, 2025
- Focus on novel deep-learning approaches in Human Resources and candidate recruitment. Emphasis on graph methods for candidate matching and variational inference approaches for ordinal questionnaire data.

Nov 2023 – May 2024   **HammerLab, Visiting Researcher**, in Bielefeld – Germany
- Funded 6-months research stay at the Machine Learning Group ☑ chaired by Prof. Barbara Hammer ☑
- Research on Machine Learning techniques for HR. Focus on assessing candidates through questionnaire data, incorporating Item Response Theory principles with Variational Inference.
- Additional collaboration on Explainable AI in the graph domain, working closely with international researchers.
- Extra: Attended seminars on Deep Learning, AI Act, German courses level A2

Oct 2018 – Sept 2021   **Università degli Studi di Padova**, **MSc** in **Physics of Data**
Selected in the first cohort of the new Physics of Data ☑ curriculum, combining training in physics and data sciece.
- Thesis: *GTM-based Aggregation for Graph Convolutional Neural Network*
- Supervisor: Prof. Alessandro Sperduti
- GPA: 29.24/30 (97.45%)
- Final grade: 110/110 *cum laude*

Sept 2019 – June 2020   **Instituto Superior Técnico, Erasmus**+, in Lisbon – Portugal
- Courses from MSc in Physical Eng., Computer Science, Mathematics and Applications, Data Science

- Extra activities: WebSummit 2019 volunteer, IST International Ambassador, Portuguese Language Course level A2.2

Sept 2015 – Sept 2018   **Università degli Studi di Padova**, BSc in Physics
- Thesis: *Quantum Random Number Generation by using POVM*
- Supervisor: Prof. Giuseppe Vallone
- Final grade: 97/110

Sept 2013 – July 2014   **RSG Lingecollege, International Exchange Year**, in Tiel – The Netherlands
- Awarded an Intercultura/AFS scholarship for one-year high school exchange program hosted by a Dutch family
- Participated in AFS intercultural learning projects, developing strong adaptability and cross-cultural communication skills

Work Experiences

Oct 2021 – Sept 2024   **Industrial Ph.D.**, Amajor SB S.p.A – Noventa Padovana, PD, Italy
- Research project aimed at applying AI in the field of Human Resources and recruitment, combined with Amajor's Management Consulting expertise
- Development of tools and UIs to assist recruiters and address clients' needs
- Implemented data pipeline with the support of CRM's API, MongoDB, and bots.

Jan 2021 – July 2021   **Emerging Technology Internship**, PwC Italy – Milan, Italy
- Internship focusing on the design and delivery of innovative Business and Technology solutions
- Process Mining (Celonis) and Cloud Architectures (SAP)

Jan 2018 – Aug 2019   **R&D Working Student**, Unox S.p.A – Padua, Italy
- Selected as 'UNIjob' working student, progressing from observation to active support in R&D laboratory activities
- Deepened theoretical knowledge and practical applications in industrial mechanics, electronics, and thermodynamics
- Expereienced processes and dynamics in a market-leading company

List of Publications

2025   **Exact Computation of Any-Order Shapley Interactions for Graph Neural Networks**
Maximilian Muschalik, Fabian Fumagalli, **Paolo Frazzetto**, Janine Strotherm, Luca Hermes, Eyke Hüllermeier, Alessandro Sperduti, Barbara Hammer
openreview.net/forum?id=9tKC0YM8sX ⬈ (The Thirteenth International Conference on Learning Representations (ICLR))

2024   **From Text to Talent: A Pipeline for Extracting Insights from Candidate Profiles**
Paolo Frazzetto, Muhammad Uzair Ul Haq, Flavia Fabris, Alessandro Sperduti
arxiv.org/pdf/2503.17438 ⬈ (The 3rd Italian Conference on Big Data and Data Science (ITADATA), Pisa, Italy, 17-19 September 2024)

2024   **Physics-Informed Graph Neural Cellular Automata: an Application to Compartmental Modelling**
Nicolò Navarin, **Paolo Frazzetto**, Luca Pasa, Pietro Verzelli, Filippo Visentin, Alessandro Sperduti, Cesare Alippi
10.1109/IJCNN60899.2024.10650578 ⬈ (The International Joint Conference on Neural Networks (IJCNN), Yokohama, Japan, June 30 - July 5 2024)

2024   **Beyond the Additive Nodes' Convolutions: a Study on High-Order Multiplicative Integration**
Paolo Frazzetto, Luca Pasa, Nicolò Navarin, Alessandro Sperduti
10.1145/3605098.3636016 ⬈ (Proceedings of the 39th ACM/SIGAPP Symposium on Applied Computing, 2024)

2024   **Improving Soft Skill Extraction via Data Augmentation and Embedding Manipulation**

Muhammad Uzair Ul Haq, **Paolo Frazzetto**, Alessandro Sperduti, Giovanni Da San Martino

10.1145/3605098.3636010 ⧉ (Proceedings of the 39th ACM/SIGAPP Symposium on Applied Computing, 2024)

2023   **Enhancing Human Resources through Data Science: a Case in Recruiting**
Paolo Frazzetto, Muhammad Uzair Ul Haq, Alessandro Sperduti
The 2nd Italian Conference on Big Data and Data Science (ITADATA), Naples, Italy, 11-13 September, 2023, ceur-ws.org ⧉

2023   **Topology preserving maps as aggregations for Graph Convolutional Neural Networks**
Paolo Frazzetto, Luca Pasa, Nicolò Navarin, Alessandro Sperduti
10.1145/3555776.3577751 ⧉ (Proceedings of the 38th ACM/SIGAPP Symposium on Applied Computing, 2023)

List of Works Under Review

Mar 2025   **Local Learning with Boosting-based Backpropagation-Free Graph Neural Networks**
Luca Pasa, **Paolo Frazzetto**, Nicolò Navarin, Alessandro Sperduti
Submitted at the European Conference on Machine Learning (ECML)

Mar 2025   **Benefits of LLMs for Predictive Process Monitoring: Accuracy for Small-Scale Event-Logs and Explainability**
Alessandro Padella, **Paolo Frazzetto**, Nicolò Navarin, Massimiliano de Leoni
Submitted at the 23rd International Conference on Business Process Management (BPM)

Dec 2024   **Graph Neural Networks for Candidate-Job Matching: An Inductive Learning Approach**
Paolo Frazzetto, Muhammad Uzair Ul Haq, Flavia Fabris, Alessandro Sperduti
Submitted at the *Data Science and Engineering* journal, Springer Nature

Conferences and Seminars

Apr 2025   **The Thirteenth International Conference on Learning Representations (ICLR) – Singapore**

Nov 2024   **23rd International Conference of the Italian Association for Artificial Intelligence (AIxIA) – Bolzano, Italy**

Sept 2024   **The 3nd Italian Conference on Big Data and Data Science (ITADATA) – Pisa, Italy**

Apr 2024   **The 39th ACM/SIGAPP Symposium On Applied Computing (SAC) – Avila, Spain**

Sept 2023   **The 2nd Italian Conference on Big Data and Data Science (ITADATA) – Naples, Italy**

June 2023   **Deep Learning: Theory, Algorithms, and Applications – Fondazione Bruno Kessler, Trento, Italy**

Mar 2023   **The 38th ACM/SIGAPP Symposium On Applied Computing (SAC) – Tallinn, Estonia**

Nov 2022   **21st International Conference of the Italian Association for Artificial Intelligence (AIxIA) – Udine, Italy**

Sept 2022   **The 18th International Workshop on Mining and Learning with Graphs (ECML PKDD) – Grenoble, France**

July 2022   **IEEE World Congress On Computational Intelligence – Padua, Italy**

Research Mentoring and Co-Supervision

- Emma Meneghini, *Constrained Graph Diffusion*, Double Degree Master Thesis in Data Science with Prof. Navarin (UNIPD) and Prof. Abadal (UPC), present

- Riccardo Cappi, *Kolmogorov-Arnold Networks for Graphs*, Master Thesis in Computer Science with Prof. Navarin, December 2024

- Filippo Visentin, *Physics Informed Neural Networks in Temporal Graphs*, Master Thesis in Computer Science with Prof. Navarin, April 2023

Reviewer Activities

IEEE Transactions on Neural Networks and Learning Systems (journal), ESANN (conference) 2022 2023 2024, IJCAI (conference) 2024, ICML (conference) 2024, IJCNN (conference) 2024 2025, SAC (conference) 2023 2024, SSCI (conference) 2023, Neurocomputing (journal) 2023

Teaching Experience

2022 – 2025   **Teaching Assistant**, Università degli Studi di Padova
- Course: *Deep Learning*, MSc in Computer Science (200+ students)
- Preparing, administering, and evaluating students' recurring homework and Kaggle Competitions
- Activity conducted during the second semester of AY 2022, 2023, 2024, 2025

Oct 2024 – Jan 2025   **Teaching Assistant**, Università degli Studi di Padova
- Course: *Cognitive, Behavioral and Social Data*, MSc in Data Science
- Supervision of 10 groupwork projects during the semester

Skills

Languages: Italian (Native), English (C2), Dutch (B1), German (A2), Portuguese (A2), French (A1)

Programming: Python (PyTorch), Git, SLURM, MongoDB, SQL, Mathematica, LaTeX