Ivan **Marisca**

Ph.D. Student

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LANGUAGES

Italian (Native)

English (Professional)

French (Basic)

Spanish (Basic)

About Me

I am a Ph.D. student at the Graph Machine Learning Group, within the Swiss AI lab IDSIA and USI - Università della Svizzera italiana (Switzerland), under the supervision of Prof. Cesare Alippi. Additionally, I am enrolled in the ELLIS Ph.D. program under the joint supervision of Prof. Alippi and Prof. Michael Bronstein. I am currently on a research visit at the University of Oxford, collaborating with Prof. Bronstein.

Previously, I obtained BSc (2017) and MSc (2020) degrees in Computer Science and Engineering at Politecnico di Milano (IT). My master thesis project has been supervised by Prof. Nicola Gatti.

My research focuses on **graph deep learning** for **irregular spatiotemporal data**. I'm interested in the application of **graph-based** methods in problems regarding data coming from **sensor networks**, like **imputation**, **regularization**, and **prediction** of observations.

Education

Ph.D. Student in Informatics   2020 — Ongoing
📍 Università della Svizzera italiana (USI)
Currently, I am a Ph.D. Student at the Swiss AI Lab IDSIA and USI Università della Svizzera Italiana, under the supervision of Prof. Cesare Alippi.

Research visit   Mar 2024 — Aug 2024
📍 University of Oxford
6-month research visit within the group of Prof. Michael Bronstein.

MSc in Computer Science and Engineering   2017 — 2020
📍 Politecnico di Milano
Master's degree with honors (110/110L), defending a thesis on machine learning. During the two years of studies, I mostly attended AI-oriented courses.

Exchange   Sep 2018 — Jan 2019
📍 Universitat Politècnica de València
During the semester spent abroad – in Valencia – within the Erasmus program, I attended Spanish and English courses on programming, robotics and AI.

BSc in Engineering of Computing Systems   2014 — 2017
📍 Politecnico di Milano
The course program covered general topics of engineering and computer science.

High School in Mathematics   2009 — 2014
📍 Liceo C. Caminiti (IT)
High school diploma with a specific focus in mathematics and science.

Academic Activities

Teaching

- **Advanced Topics in Machine Learning** (TA) – MSc at USI   Sep 2023 — Jan 2024
  Teaching assistant, involved in course organization, lecture preparation and student tutoring.

- **Graph Deep Learning** (TA) – MSc at USI   Feb 2023 — Jun 2023
  Lectures design and students tutoring on team projects.

- **Advanced Topics in Machine Learning** (TA) – MSc at USI   Sep 2022 — Jan 2023
  Students tutoring for projects on reproducibility.

- **Graph Deep Learning** (TA) – MSc at USI   Feb 2022 — Jun 2022
  I gave a lecture on Spatiotemporal Graph Neural Networks and tutored students on projects.

- **Introduzione all'Intelligenza Artificiale e ML** (TA) – MSc at USI   Sep 2021 — Jan 2022
  Course on AI and ML delivered in Italian for high school teachers.

- **Machine Learning** (TA) – BSc at USI   Feb 2021 — Jun 2021
  Lab sessions on practical aspects and show how to design machine learning solutions to real-world problems.

Supervised students

- **Valentina Moretti**, MSc at USI and Politecnico di Milano — Ongoing
  State Initialization in Recurrent Neural Networks.

- **Simone Mugnai**, MSc at USI and University of Bologna — 2024
  Graph-based Imputation and Smoothing for Forecasting with Missing Data.

- **Marco Latella**, MSc at USI and University of Milano-Bicocca — 2022
  Graph Representation Learning for Multi-site Photovoltaic Energy Production.

Talks

- **Invited talk** at University of Oxford — May 2024
  Talk on graph deep learning for irregular spatiotemporal data at the Learning on Graphs and Geometry (LoG^2) seminar series.

- **Invited talk** at Baker Hughes (Virtual) — Jul 2022
  Seminar on time series imputation for the Baker Hughes' AI team.

- **Spotlight talk** at TGL Workshop (New Orleans) — Dec 2022
  Presenting the paper Scalable Spatiotemporal Graph Neural Networks at the Temporal Graph Learning Workshop at NeurIPS 2022.

- **Reading group presentation** at TGL reading group (Virtual) — Feb 2024
  Presenting the paper Taming Local Effects in Graph-based Spatiotemporal Forecasting at the Temporal Graph Learning Reading Group. (📹 Video)

- **Reading group presentation** at TGL reading group (Virtual) — Apr 2023
  Presenting the paper Scalable Spatiotemporal Graph Neural Networks at the Temporal Graph Learning Reading Group.

- **Poster presentation** at NeurIPS (New Orleans) — Dec 2023
  Presenting Taming Local Effects in Graph-based Spatiotemporal Forecasting at the 37th Conference on Neural Information Processing Systems.

- **Poster presentation** at AAAI (Washington D.C.) — Feb 2023
  Presenting Scalable Spatiotemporal Graph Neural Networks at the 37th AAAI Conference on Artificial Intelligence.

- **Poster presentation** at NeurIPS (New Orleans) — Nov 2022
  Presenting Learning to Reconstruct Missing Data from Spatiotemporal Graphs with Sparse Observations at the 36th Conference on Neural Information Processing Systems.

- **Poster presentation** at ICLR (Virtual) — Apr 2022
  Presenting Filling the G_ap_s: Multivariate Time Series Imputation by Graph Neural Networks at the 10th International Conference on Learning Representations.

- **Abstract presentation** at MLDM (Virtual) — Nov 2021
  Presenting the abstract "Multivariate Time Series Imputation by Graph Neural Networks" at the 10th Italian Workshop on Machine Learning and Data Mining.

Awards & Scholarships

- **Doctoral Mobility grant** — Università della Svizzera italiana — Dec 2023
  Grant of CHF 20'000 (≈$23K) for a 6-month research stay at University of Oxford to work with Prof. Michael Bronstein's group.

- **Travel Award** — NeurIPS — Dec 2023
  Travel award to attend the NeurIPS conference in New Orleans (US).

- **Best Paper Award** — Temporal Graph Learning Workshop @ NeurIPS — Dec 2022
  For the paper Scalable Spatiotemporal Graph Neural Networks.

- **Travel Award** — NeurIPS — Nov 2022
  Travel award to attend the NeurIPS conference in New Orleans (US).

- **Scholarship** — National Association SAPAR — 2019
  Scholarship awarded to the top-4 students in STEM subjects.

- **Scholarship** — Politecnico di Milano — 2019
  Reduced tuition for high merits.

Program Committee Member

- **Journals**

  IEEE Transactions on Neural Networks (TNNLS) — Neural Networks.

- **Conferences**

  Advances in Neural Information Processing Systems (NeurIPS) — International Conference on Machine Learning (ICML) — International Joint Conference on Neural Networks (IJCNN).

Projects

I believe in worldwide accessibility of science. As such, I make the software I develop for my research publicly available through my GitHub page. You can also find the code related to my publications on the GitHub page of Graph Machine Learning Group.

⚛ Torch Spatiotemporal

Torch Spatiotemporal (**TSL**) is a library built upon PyTorch and PyG for neural spatiotemporal data processing, with a focus on Graph Neural Networks.

 GitHub   Documentation

Other projects

- **GraPV**   Sep 2020 — Feb 2023

  Developing of graph-based methods for multi-site photovoltaic power forecasting, to improve accuracy on portfolio production prediction. The solution is based on novel graph-based AI strategies exploiting existing heterogeneous information and related dependencies. Joint project in collaboration with DXT Commodities, funded by Innosuisse.

Publications

Graph-based Forecasting with Missing Data through Spatiotemporal Downsampling

Ivan Marisca, Cesare Alippi, Filippo Maria Bianchi

International Conference on Machine Learning, 2024

Graph Deep Learning for Time Series Forecasting

Andrea Cini, **Ivan Marisca**, Daniele Zambon, Cesare Alippi

Preprint, 2023

Taming Local Effects in Graph-based Spatiotemporal Forecasting

Andrea Cini[*], **Ivan Marisca**[*], Daniele Zambon, Cesare Alippi

Advances in Neural Information Processing Systems, 2023

Scalable Spatiotemporal Graph Neural Networks

Andrea Cini[*], **Ivan Marisca**[*], Filippo Maria Bianchi, Cesare Alippi

Proceedings of the AAAI conference on artificial intelligence, 2023

Learning to Reconstruct Missing Data from Spatiotemporal Graphs with Sparse Observations

Ivan Marisca[*], Andrea Cini[*], Cesare Alippi

Advances in Neural Information Processing Systems, 2022

Filling the G_ap_s: Multivariate Time Series Imputation by Graph Neural Networks

Andrea Cini[*], **Ivan Marisca**[*], Cesare Alippi

International Conference on Learning Representations, 2022

[*]Equal contribution.