

## PERSONAL INFORMATION

Birth Date: August 10, 1996

Gender: Female

Nationality: Italian

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Scholar: <https://scholar.google.com/citations?user=uly8D-sAAAAJ&hl=it&oi=ao>

## CURRENT POSITION

**Researcher**, MobS Group, Augmented Intelligence Center,  
Fondazione Bruno Kessler, Trento, Italy.

GNNs - Temporal GNNs - Pooling in GNNs - Expressivity of GNNs - Link  
Prediction with GNNs.

## EDUCATION

17/07/2024 **PhD in Information Engineering & Science (XXXVI cycle)**,  
Department of Information Engineering and Mathematics, University  
of Siena, Italy.

Thesis: "Temporal Graph Processing and Pooling in Graph Neural  
Networks".

Advisors: Monica Bianchini, Chiara Mocenni.

23/10/2020 **MS in Applied Mathematics**, Department of Information  
Engineering and Mathematics, University of Siena, Italy.

Thesis: "Comparative Analysis of Neural Models for Predicting  
Protein Synthesis Levels".

Advisor: Monica Bianchini

Evaluation: 110/110 cum Laude

24/07/2018 **BS in Economia & Commercio**, Department of Economic Sciences,  
University of Florence, Italy.

Thesis: “Differential Calculus in Banach spaces”

Advisor: Antonio Villanacci

Evaluation: 110/110 cum Laude

29/06/2015    **High School Diploma**, Liceo Scientifico Giovanni da Castiglione,  
Arezzo, Italy.  
Evaluation: 100/100

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## PUBLICATIONS

### Papers In Journals and Conference Proceedings

- [1] **V. Lachi**, F. Ferrini, A. Longa, B. Lepri, A. Passerini, M. Jaeger, *Bridging Theory and Practice in Link Representation with Graph Neural Networks*, Advances in neural information processing systems 38 (2025), Spotlight Paper.
- [2] **V. Lachi**, A. Moallem-Oureh, A. Roth, P. Welke, *Expressive Pooling for Graph Neural Networks*, Transactions on Machine Learning Research (2025). <https://openreview.net/pdf?id=xGADlnGWMt>
- [3] S. Beddar-Wiesing, G. A. D’Inverno, C. Graziani, **V. Lachi**, A. Moallem-Oureh, F. Scarselli, J. M. Thomas, *Weisfeiler-Lehman goes dynamic: an analysis of the expressive power of graph neural networks for attributed and dynamic graphs*, Neural Networks, 173, 106213 (2024). <https://doi.org/10.1016/j.neunet.2024.106213>
- [4] F. M. Bianchi and **V. Lachi**, *The Expressive Power of Pooling in Graph Neural Networks*, Advances in neural information processing systems 36, 71603-71618 (2023). <https://openreview.net/forum?id=zqyVjCjhYD>
- [5] A. Longa, **V. Lachi**, G. Santin, M. Bianchini, B. Lepri, P. Liò, F. Scarselli, A. Passerini, *Graph Neural Networks for Temporal Graphs: State of the Art, Open Challenges, and Opportunities*, Transactions on Machine Learning Research (2023). <https://openreview.net/forum?id=pHCdMatOgl>
- [6] P. Andreini, S. Bonechi, C. Graziani, **V. Lachi**, N. Nikolouloupoulou, M. Bianchini, F. Scarselli, *Multi-Stage Synthetic Image Generation for the Semantic Segmentation of Medical Images*, Artificial Intelligence and Machine Learning for Healthcare: Vol. 1: Image and Data Analytics (pp. 79-104). Cham: Springer International Publishing (2022). [https://doi.org/10.1007/978-3-031-11154-9\\_5](https://doi.org/10.1007/978-3-031-11154-9_5)
- [7] P. Andreini, S. Bonechi, C. Graziani, **V. Lachi**, A. Mecocci, A. Sodi, F. Scarselli, M. Bianchini, *A Two-Stage GAN for High-Resolution Retinal Image Generation and Segmentation*, Electronics, 11(1), 60 (2022). <https://doi.org/10.3390/electronics11010060>
- [8] G. Giacomini, C. Graziani, **V. Lachi**, P. Bongini, N. Pancino, M. Bianchini, D. Chiarugi, A. Valleriani, P. Andreini, *A Neural Networks Approach for the Analysis of Reproducible Ribo-Seq Profiles*, Algorithms, 15(8), 274 (2022). <https://doi.org/10.3390/a15080274>

## Workshop Papers

[9] F. Ferrini, **V. Lachi**, A. Longa, B. Lepri, A. Passerini, X. Liu, M. Jaeger, *Beyond Sparse Benchmarks: Evaluating GNNs with Realistic Missing Features*, NeurIPS 2025 Workshop: New Perspectives in Graph Machine Learning. <https://openreview.net/forum?id=GfU8DhOzae#discussion>

[10] F. Ferrini, **V. Lachi**, A. Longa, B. Lepri, A. Passerini, *GNNs Meet Sequence Models Along The Shortest-Path: an Expressive Method for Link Prediction*, NeurIPS 2025 Workshop: New Perspectives in Graph Machine Learning. <https://openreview.net/forum?id=mubWzUoEzI#discussion>

[11] **V. Lachi**, F. Ferrini, A. Longa, B. Lepri, A. Passerini, *A Simple and Expressive Graph Neural Network Based Method for Structural Link Representation*, ICML 2024 Workshop on Geometry-grounded Representation Learning and Generative Modeling (2024). <https://openreview.net/forum?id=EGGSCLyVrz>

[12] **V. Lachi**, A. Moallem-Oureh, A. Roth, P. Welke, *Graph Pooling Provably Increases Expressivity*, NeurIPS 2023 Workshop: New Frontiers in Graph Learning (2023). <https://openreview.net/forum?id=IR5NYB9zrv>

[13] S. Beddar-Wiesing, G. A. D’Inverno, C. Graziani, **V. Lachi**, A. Moallem-Oureh, F. Scarselli, *On the Extension of the Weisfeiler-Lehman Hierarchy by WL Tests for Arbitrary Graphs*, 18th International Workshop on Mining and Learning with Graphs, ECMLPKDD (2022). <https://openreview.net/forum?id=Qt6GrgDz2y5>

## Submitted

[14] F. Ferrini, **V. Lachi**, A. Longa, B. Lepri, A. Matono, A. Passerini, X. Liu, M. Jaeger, *Rethinking GNNs and Missing Features: Challenges, Evaluation and a Robust Solution*, submitted to ICLR (2026).

[15] F. Ferrini, **V. Lachi**, A. Longa, B. Lepri, A. Passerini, *Improving Expressivity in Link Prediction with GNNs via the Shortest Path*, submitted to ICLR (2026).

[16] **V. Lachi**, A. Longa, B. Bevilacqua, B. Lepri, A. Passerini, B. Ribeiro, *Boosting Relational Deep Learning with Pretrained Tabular Models*, submitted to KDD (2026).

## Theses

PhD Thesis: Temporal Graph Processing and Pooling in Graph Neural Networks, <https://usiena-air.unisi.it/handle/11365/1265178>

MS Thesis: Comparative Analysis of Neural Models for Predicting Protein Synthesis Levels, led to publication [9].

BS Thesis: Differential Calculus in Banach Spaces.

07/2025	<b>Best Poster Award</b> LOGML summer school, poster: <i>Bridging Theory and Practice in Link Representation with Graph Neural Networks</i> .
07/2025	<b>Selected as Mentor</b> at the LOGML summer school.
202/2024	CO-PI in the founded project <b>PRIN 2022 'MEDICA'</b>
11/2020-01/2024	<b>PhD full scholarship in Information Engineering &amp; Science.</b>
03/07/2024	<b>ELLIS Mobility Grant</b> to attend GRaM Workshop, ICML 2024, Wien.
25/10/2023	<b>NeurIPS 2023 Scholar Award</b> , NeurIPS 2023, New Orleans.
27/08/2023	<b>Selected Participant</b> , M2L Summer School 2023, Thessaloniki.
28/02/2022	<b>Travel Grant, "Lectures on Mathematics of Deep Learning"</b> , Isaac Newton Institute for Mathematical Sciences, Cambridge.
29/10/2021	<b>First Prize Winner "Rare Disease Hackathon 2021"</b> , Firenze. ( <a href="https://forumdellaleopolda.it/hackathon-2021/">https://forumdellaleopolda.it/hackathon-2021/</a> ).

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## SCIENTIFIC PRESENTATIONS

### Invited talks

03/2025	TGL Temporal Graph Learning Reading Group, Online. <u>Talk</u> : <i>Temporal Relational Deep Learning</i>
02/2025	University of Aalborg <u>Talk</u> : Pooling in Graph Neural Networks
06/2024	HONS satellite, NetSci 2024, Quebec City, Canada. <u>Talk</u> : <i>Graph Neural Networks for Temporal Graphs</i> .
02/2024	TGL Temporal Graph Learning Reading Group, Online. <u>Talk</u> : <i>Graph Neural Networks for Temporal Graphs</i> .
11/2023	NetPLACE, Online. <u>Talk</u> : <i>Machine Learning for Graphs: Hot Trend and Emerging Frontiers</i> .
09/2023	CENTAI Institute, Turin, Italy. <u>Talk</u> : <i>Graph Pooling in Graph Neural Networks</i> .
11/2022	AIxIA 2022, Udine, Italy. <u>Talk</u> : <i>The Expressive Power of Graph Neural Networks for dynamic graphs</i> .

## Contributed talks

- 07/2023 NetSci 2023, Wien.  
Talk: *The Temporal Evolution of the Italian Vaccine Debate: a Network Based Analysis.*
- 09/2023 20th International Workshop MLG at ECML-PKDD 2023, Turin.  
Talk: *The Expressive Power of Pooling in Graph Neural Networks.*
- 10/2022 Conference on Complex Systems 2022, Palme de Mallorca.  
Talk: *The Temporal Evolution of the Italian Vaccine Debate: a Network Analysis.*

## Poster Presentations

- 09/2025 Visual Intelligence Days 2025, Oslo  
Poster: *Rethinking GNNs Under Missing Features.*
- 07/2025 LOGML Summer School 2025, London  
Poster: *Bridging Theory and Practice in Link Representation.*
- 12/2024 2nd Italian LoG Meetup 2024, Siena.  
Poster: *Graphons for Graph Learning: What, Why, How.*
- 12/2024 2nd Italian LoG Meetup 2024, Siena.  
Poster: *Structural Link Representation Via GNNs on Line Graphs.*
- 07/2024 ICML GRaM Workshop 2024, Wien.  
Poster: *A Simple and Expressive Graph Neural Network Based Method for Structural Link Representation.*
- 12/2023 Neurips 2023, New Orleans.  
Poster: *The Expressive Power of Pooling in Graph Neural Networks.*
- 12/2023 Neurips GLFrontiers Workshop 2023, New Orleans.  
Poster: *Graph Pooling Provably Improves Expressivity.*
- 09/2023 Mediterranean Machine Learning Summer School, Thessaloniki.  
Poster: *The Expressive Power of Pooling in Graph Neural Networks.*
- 12/2023 1st Italian LoG Meetup 2023, Trento.  
Poster: *The Expressive Power of Pooling in Graph Neural Networks.*
- 09/2023 20th International Workshop MLG at ECML-PKDD 2023, Turin.  
Poster: *Graph Neural Networks for Temporal Graphs.*
- 07/2023 NetSci 2023, Wien.  
Poster: *Graph Neural Networks for Temporal Graphs.*

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## ACADEMIC SERVICES

09/2025	Member of the Program Committee of the 22st International Workshop on Mining and Learning with Graphs 2025, Porto.
09/2025	Examiner for PhD in Information Engineering, Siena University
09/2025	Area Chair for LoG conference 2025
06/2025	Area Chair for Temporal Graph Learning Workshop@KDD 2025
05/2025	External Examiner for the PhD Special Curriculum, Statistics, UiT.
05/2025	External Examiner for the STA-2003 Course, UiT.
12/2024	Organizer of the 2nd Italian Meetup of the LoG Conference 2024, Siena.
09/2024	Evaluator for the admission to the ELLIS PhD Program.
09/2024	Member of the Program Committee of the 21st International Workshop on Mining and Learning with Graphs 2024, Vilnius.
07/2024	Organizer of the Artificial Intelligence for Biomedical Applications (AI4BA) Summer School, Siena.
12/2023	Member of the Scientific Committee of 1st Italian Meetup of the LoG Conference 2023, Trento.
09/2023	Member of the Program Committee of the 20st International Workshop on Mining and Learning with Graphs 2023, Turin.
09/2023	Organizer of the 3rd Young Applied Mathematicians Conference (YAMC), Siena.
07/2023	Volunteering at the 17th International Workshop on Neural-Symbolic Learning and Reasoning (NeSy) 2023, Siena.
07/2023	Member of the thesis committee for the Master of Bioinformatics and Data Science, University of Siena.
10/2022	Organizer of the Artificial Intelligence in Complex Systems Workshop at CCS 2022, Palma de Mallorca.
2021—	Referee activity for NeurIPS ICML, ICLR, KDD, IEEE Transactions on Neural Networks (TNNLS), Neurocomputing.

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## RESEARCH STAYS

01/2023—05/2023	Visiting Scholar, UiT the Arctic University of Norway, Tromsø. Host: Professor Filippo Maria Bianchi
02/2022	Visiting Scholar, GAIN group, University of Kassel. Host: Dr. Josephine Maria Thomas

## TEACHING EXPERIENCE

09/2025 — 10 hours	Teaching Assistant, Master of Bioinformatics and Data Science, University of Siena. <u>Course:</u> Data Mining for Biological Big Data
09/2024 — 10 hours	Teaching Assistant, Master of Bioinformatics and Data Science, University of Siena. <u>Course:</u> Data Mining for Biological Big Data.
07/2024 — 12 hours	Lecturer, Università per Stranieri di Siena. <u>Course:</u> Fundamentals of Mathematics.
01/2024 — 20 hours	Lecturer, ITS course Web Developer, Arezzo. <u>Course:</u> Statistics.
01/2024 — 12 hours	Lecturer, University of Siena. <u>Course:</u> Mathematics and Physics for TOLC-MED.
09-12/2023 — 30 hours	Lecturer, CET Academic Programs, University of Virginia. <u>Course:</u> Artificial Intelligence.
09/2023 — 10 hours	Teaching Assistant, Master of Bioinformatics and Data Science, University of Siena. <u>Course:</u> Data Mining for Biological Big Data.
10/2022 — 12 hours	Lecturer, Università per Stranieri di Siena. <u>Course:</u> Fundamentals of Mathematics.
10/2022 — 10 hours	Teaching Assistant, Master of Bioinformatics and Data Science, University of Siena. <u>Course:</u> Data Mining for Biological Data.
09-12/2021 — 40 hours	Teaching Assistant, University of Siena. <u>Course:</u> Mathematical Analysis.
10/2021 — 8 hours	Lecturer, ITS Fondazione Vita, Siena. <u>Course:</u> Databases Systems.

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## THESES AND PROJECTS CO-SUPERVISION

**MSc Theses**

2022/2023

B.W.C., *The Tutte-Whitney Polynomial for Topologically Informed Graph Neural Networks*, MSc thesis in Applied Mathematics, University of Siena.

**Research Project**

2025—

D.N., J.L., G.S., *Towards a more Rigorous Evaluation of Hyperbolic Graph Neural Networks*, Research Project at LOGLM summer school.

2025—

E.M., *Statistical Analysis and Temporal Graph Neural Networks for the Mathematical Modeling of Disinformation Propagation*, PhD project, FBK and University of Trento.

2024/2025

N.M. and C.D., *Approximating volume computations via GNNs*, MSc project for the course Advanced Topics in Machine Learning and Optimization, University of Trento.

2024/2025

A.J. and C.K., *Graph Neural Networks for Relational Databases*, MSc project for the course Advanced Topics in Machine Learning and Optimization, University of Trento.

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**OTHER EDUCATIONAL ACTIVITIES**

08/2023

Participant M2L Summer School, Thessaloniki 2023.

06/2022

Participant ACAI-Taylor Summer School, Barcellona 2022.

05/2022

Participant Theoretical CS Spring School, Marseille 2022.

03/2022

Participant Lectures by Gitta Kutyniok, Mathematics of Deep Learning, University of Cambridge 2022.

07/2021

Participant IRDTA School on Deep Learning, Las Palmas (2021).

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**OTHER SKILLS**

Language

Italian: mother tongue, English: fluent.

Coding

Python, Matlab: advanced knowledge.