Filippo Guerranti

Ph.D. Student in Machine Learning for Graphs

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"*The illusion that we understand the past fosters overconfidence in our ability to predict the future.*"
D. Kahneman

TL;DR
I am conducting research on *machine learning for graphs* with a focus on optimizing relational structures for specific tasks. This includes refining incomplete or noisy structures or creating new ones when absent. I am actively engaged in enhancing graph neural networks performance and applicability to real-world scenarios.

EDUCATION

Ph.D. in Data Analytics and Machine Learning June 2022 – Present
Technical University of Munich *Munich, Germany*

- Research interests: machine learning on graphs, relational learning, reliable machine learning.
- Advisor: Prof. Dr. Stephan Günnemann.
- Teaching activities: lecture and exam preparation, practical course and seminars.
- Attendance of courses on technical aspects of machine learning, scientific paper writing, conference presentations, entrepreneurial leadership, and entrepreneurial mindset.

M.Sc. in Computer and Automation Engineering December 2019 – April 2022
University of Siena *Siena, Italy*

- Grade: 110/110 cum laude with Honors (*highest possible grade*) | GPA: 4.0/4.0.
- Thesis title: "Approximating Logical Reasoning using Neural Networks".
- Supervisors: Prof. Marco Maggini, Prof. Michelangelo Diligenti, Dr. Francesco Giannini, Prof. Edmondo Trentin.
- Major in Artificial Intelligence.

B.Sc. in Computer and Information Engineering October 2015 – December 2019
University of Siena *Siena, Italy*

- Grade: 106/110 | GPA: 3.47/4.0.
- Thesis title: "Software for the automatic generation of the exam date calendar".
- Advisor: Prof. Marco Maggini.
- Major in Systems and Control.

High School of Applied Science Diploma September 2010 – June 2015
Istituto di Istruzione Superiore Tito Sarrocchi *Siena, Italy*

- Grade: 100/100 (*highest possible grade*).
- Thesis title: "The double face of progress".
- Class president for three consecutive years.

RESEARCH EXPERIENCE

Research assistant June 2022 – Present
Technical University of Munich (DAML group) *Munich, Germany*

- Chair's head: Prof. Dr. Stephan Günnemann.
- Led and collaborated on various research topics related to graph learning, including learning graph structure and certifying graph neural networks' robustness.
- Utilized deep learning frameworks (e.g., PyTorch, TensorFlow, and JAX) for the implementation and training of neural networks.
- Employed graph learning libraries (e.g., PyTorch Geometric, DGL), and developed custom libraries for machine learning on graphs.
- Planned and scheduled complex experiments on computer clusters via dedicated libraries (e.g., Slurm, Hydra, and SEML).
- Skilled in utilizing both local and cloud-hosted distributed version control systems (e.g., Git, GitHub, and GitLab) for software development and team collaboration.

Research intern July 2020 – April 2022
University of Siena (SAILab group) *Siena, Italy*

- Chair's head: Prof. Marco Gori.
- Conducted research on the application of first-order logic semantics to neural networks via knowledge graphs, knowledge graph embeddings, and relational learning.
- Employed deep learning libraries (e.g., TensorFlow, and Keras) to implement scientific code.
- Participated in seminars about deep learning, learning with constraints, computer vision, bioinformatics, and natural language processing.

TEACHING EXPERIENCE

Lecture – Machine Learning October 2023 – February 2024
Technical University of Munich (DAML group) *Munich, Germany*

- Responsible for the lectures and exercises on Deep Learning (topics: feedforward neural networks, back-propagation, structured data, training strategies, frameworks, advanced architectures.

Praktikum – Large-Scale Machine Learning March 2023 – July 2023
Technical University of Munich (DAML group) *Munich, Germany*

- Supervision of two groups (six students) on the selected lab projects: (*i*) Adversarial Robustness of Graph Contrastive Learning Methods, and (*ii*) Representation Learning and Anomaly Detection on Heterogeneous Graphs (in collaboration with Energy4U).

Seminar – Selected Topics in Machine Learning Research October 2023 – February 2024 2022 – January 2023
Technical University of Munich (DAML group) *Munich, Germany*

- Supervision of three students on the selected topics: (*i*) Graph Structure Learning, (*ii*) Graph Contrastive Learning, and (*iii*) Graph Discovery for Time-Series Data and Interacting Systems.

WORK EXPERIENCE

Aptitude Assessment Commission member June 2022 – Present
Technical University of Munich *Munich, Germany*

- Responsible for conducting interviews with prospective candidates, and identifying talented and promising individuals with strong foundations in computer science, a passion for innovation, and a dedication to pursuing advanced studies in the fields of Data Engineering and Analytics, and Informatics.
- Gained experience reviewing resumes and CVs to evaluate the academic and professional qualifications of candidates, and their potential fit for the programs.

PUBLICATIONS

Guerranti, F., Yi, Z., Starovoit, A., Kamel, R. M., Geisler, S., & Günnemann, S. (2023). On the Adversarial Robustness of Graph Contrastive Learning Methods. *NeurIPS 2023 Workshop: New Frontiers in Graph Learning*.

Guerranti, F., & Dimitri, G. M. (2023). A Comparison of Machine Learning Approaches for Predicting Employee Attrition. *Applied Sciences*, 13(1), 267.

Guerranti, F., Mannino, M., Baccini, F., Bongini, P., Pancino, N., Visibelli, A., & Marziali, S. (2021). CaregiverMatcher: Graph neural networks for connecting caregivers of rare disease patients. *Procedia Computer Science*, 192, 1696-1704.

INVITED TALKS

Approximating Logical Reasoning using Neural Networks February 2022
Technical University of Munich *Online*

- Hosted at the Data Analytics and Machine Learning groupchair, by Prof. Dr. Stephan Günnemann.

Approximating Logical Reasoning using Neural Networks March 2022
CISPA Helmholtz Center for Information Security *Online*

- Hosted at the Trustworthy Information Processing chair, by Prof. Dr. Aleksandar Bojchevski.

SCHOLARSHIPS & AWARDS

Best Student Award – Computer and Automation Engineering, *University of Siena* October 2022
Top 8 – Rare Disease Hackathon, *PadMatch project* April 2020
Personal grant – Scholarship for part-time student collaboration, *University of Siena* March 2018
Personal grant – Scholarship for deserving students, *Banca CRAS Siena* July 2015

CERTIFICATIONS

Semi Intensive General English Course Advanced Level, ELC, Sydney, Australia August 2015
FCE Certificate in English B2, Cambridge English Certificate in ESOL International May 2015
ECDL Full Standard, Italian Association of Informatics and Automatic Computing February 2015

MEMBERSHIPS

Member of the executive board February 2021 – April 2022
UDIEMS, USiena Dept. of Information Engineering and Mathematics Society *Siena, Italy*

- Organization of seminars and events related to computer science and mathematics for students.

Computer science author May 2020 – October 2021
Passaporto Futuro (social media) *Online*

- Drafting of web and social articles related to the field of computer science, with particular emphasis on artificial intelligence and machine learning topics.

LANGUAGES

Italian (mother tongue), English (C1), German (A2), Spanish (A2).

SKILLS

Programming Languages	Python, C/C++, R, Bash, Prolog, SQL, MATLAB
Packages & Frameworks	PyTorch, PyTorch Geometric, TensorFlow, JAX, DGL, Hydra, Slurm, SEML, Numpy, Scipy, Networkx, PyTorch Lightning, Keras, Matplotlib, Pandas, Scikit-learn
Software & Tools	Git, GitHub, GitLab, LaTeX, Visual Studio Code, MS Office
Operating Systems	macOS, Linux, MS Windows

HOBBIES AND INTERESTS

Sports: gravel biking, running, snowboarding, swimming, hiking, bouldering, yoga.
Reading: psychology, phylosophy, science, economy, non-fiction, novel.
Travels: backpacking and bikepacking trips, camper van trips, tent camping.