

Curriculum Vitae et Studiorum

Luca Ferragina

1 Positions

From June 2023, *Assistant Professor* at DIMES, University of Calabria, Rende (CS), Italy.

From February to June 2023, *Research Fellow* at DIMES, University of Calabria, Rende (CS), Italy.

From November 2019 to March 2023, *PhD student* at DIMES, University of Calabria, Rende (CS), Italy.

From April to October 2019, *Scholarship Recipient* at DIMES, University of Calabria, Rende (CS), Italy.

2 Education

PhD in Information and Communication Technology at DIMES, University of Calabria, Rende (CS), Italy.

Title of the thesis: *Deep Techniques for Anomaly Detection*.

Supervisor: prof. Fabrizio Angiulli.

3 Professional Services

Luca Ferragina has been program co-chair and co-organizer for the following events:

- 1st Workshop on Cooperative AI Models and Applications (CAIMA), co-located with the 29th European Conference on Advances in Databases and Information Systems (ADBIS 2025), Tampere, Finland, 2025,
- 2nd Workshop on Green-Aware Artificial Intelligence (Green-Aware AI), co-located with the 28th European Conference on Artificial Intelligence (ECAI 2025), Bologna, Italy, 2025,
- Thematic Track on Green Aware AI within the PNRR FAIR project, co-located with the 3rd IFToMM for Sustainable Development Goals Conference, Villa San Giovanni, Italy, 2025.

Luca Ferragina has been a member of the Program Committee of

- ECML/PKDD, European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases 2023, 2024, 2025.
- DS, International Conference on Discovery Science 2024.

Moreover, Luca Ferragina has acted as a reviewer for the following journals:

2024 *KAIS*, Knowledge and Information Systems.

2021 *AI Communications*, The European Journal on Artificial Intelligence.

and for the following conferences: IEEE-ICHI2025, PAKDD 2024, IJCAI 2023, SAC 2023, ICDM 2022, SAC 2022, ECML/PKDD 2021, IJCAI 2021, SAC 2021, IDA 2020, SISAP 2020, ICDM 2020, ICDM 2019.

Junior Researcher Supervision

Luca Ferragina currently acts as scientific co-supervisor of a graduate scholarship on the theme “Multi-agent planning systems”, at DIMES, University of Calabria, Rende (CS), Italy (2025).

4 Research Activity

The main topic of Luca Ferragina’s research activity, developed in the course of his period as PhD student at the University of Calabria, is the study and the development of Deep Learning approaches for Anomaly Detection. The initial focus was on *Variational Autoencoders* (VAE), probabilistic models utilizing a stochastic latent space with mean and variance representations to capture the underlying distribution of the data and, in particular, the objective was the definition of anomaly scores that take into account the structure and the properties of the VAE *latent space* and that improve the performances of the standard *reconstruction error*. Later, this approach has been generalized to any architecture that produces an anomaly score and that shares with (Variational) Autoencoders the presence of a latent space.

Subsequently, his research interests have been directed towards peculiar learning paradigms to apply to the Anomaly Detection task such as Cooperative Learning, in which different architectures exchange information with each other to improve their performances, Active Learning, involving the feedback of an expert “human-in-the-loop” in the training, and Negative Learning, exploiting the knowledge of a limited number of anomalies to enhance the difference between the anomaly score of normal and abnormal data.

Another aspect of interest is the topic of eXplainable Artificial Intelligence (XAI), and, in particular, the study and the creation of both a posteriori model-agnostic algorithm for interpreting black-boxes results and self-explainable deep learning algorithms with emphasis on the Anomaly Detection task.

A novel branch of interest under development is represented by neuro-symbolic approaches to the detection and the repair of anomalous evolutions of intelligent agents in planning systems.

5 List of Publications

Journals

- *Enhancing anomaly detectors with LatentOut*. Fabrizio Angiulli, Fabio Fasseti, Luca Ferragina. Extended version for journal. Published on *Journal of Intelligent Information Systems* (2023).
- *LatentOut: an unsupervised deep anomaly detection approach exploiting latent space distribution*. Fabrizio Angiulli, Fabio Fasseti and Luca Ferragina. Extended version for journal. Published on *Machine Learning* (2022).

Conferences

- *On the Environmental Impact of the Algorithm LatentOut for Unsupervised Anomaly Detection*. Fabrizio Angiulli, Fabio Fasseti, Luca Ferragina. 1st AIxIA Workshop on Green-Aware Artificial Intelligence (Green-Aware AI 2024). Bolzano, IT (Nov 2024).
- *A Lightweight Meta-Feature Extraction Strategy for Deep Reinforcement Anomaly Detection*. Simone Amirato, Fabrizio Angiulli, Fabio Fasseti, Luca Ferragina. 1st AIxIA Workshop on Green-Aware Artificial Intelligence (Green-Aware AI 2024). Bolzano, IT (Nov 2024).
- *Indecision-aware Deep Active Anomaly Detection*. Simone Amirato, Fabrizio Angiulli, Fabio Fasseti, Luca Ferragina. 25th International Conference on Intelligent Data Engineering and Automated Learning (IDEAL2024). Valencia, ES (Nov 2024).
- *A Clustering-based Approach for Interpreting Black-box Models*. Luca Ferragina, Simona Nisticò. 32nd Symposium on Advanced Database Systems (SEBD2024). Villasimius, IT (Jun 2024).
- *Deep Cooperative Unsupervised Anomaly Detection*. Fabrizio Angiulli, Fabio Fasseti, Luca Ferragina, Rosaria Spada. 25th International Conference on Discovery Science (DS2022). Montpellier, FR (Oct 2022).
- *Detecting Anomalies with LatentOut: Novel Scores, Architectures, and Settings*. Fabrizio Angiulli, Fabio Fasseti, Luca Ferragina. 26th International Symposium on Methodologies for Intelligent Systems (ISMIS2022). Cosenza, IT (Oct 2022).

- *Meta-Feature Extraction Strategies for Active Anomaly Detection*. Fabrizio Angiulli, Fabio Fassetti, Luca Ferragina, Prospero Papaleo. 22nd International Conference on Intelligent Data Engineering and Automated Learning (IDEAL2021). Manchester, UK (Nov 2021).
- *Improving deep unsupervised anomaly detection by exploiting VAE latent space distribution*. Fabrizio Angiulli, Fabio Fassetti, Luca Ferragina. Proceedings of the International Conference on Discovery Science (DS2020). Thessaloniki, GR (Oct 2020).

Book Chapters

- *Data Mining: Outlier Detection*. Fabrizio Angiulli, Fabio Fassetti, Luca Ferragina. Reference Module in Life Sciences. Elsevier, 2024.

Submitted for publication

- *Explaining Anomalies through Semi-supervised Autoencoders*. Fabrizio Angiulli, Fabio Fassetti, Luca Ferragina, Simona Nisticò. Submitted to international journal.
- *Reconstruction error-based anomaly detection with few outlying examples*. Fabrizio Angiulli, Fabio Fassetti, Luca Ferragina. Submitted to international journal.

6 Teaching activity

Since the A.Y. 2023/2024 Luca Ferragina is the holder of the course “Artificial Intelligence and Machine Learning” (Intelligenza Artificiale e Machine Learning) in the Degree program in *Medicine and Digital Technologies* (Medicina e Tecnologie Digitali) at DFSSN, University of Calabria, Rende (CS), Italy.