

# Lorenzo Perini

Research Scientist, PhD Computer Science

✉ [lorenzo.perini@kuleuven.be](mailto:lorenzo.perini@kuleuven.be)  
📁 [people.cs.kuleuven.be/~lorenzo.perini/](https://people.cs.kuleuven.be/~lorenzo.perini/)  
🌐 [Lorenzo Perini](https://www.linkedin.com/in/Lorenzo-Perini)  
📧 [Lorenzo-Perini](https://github.com/Lorenzo-Perini)  
👤 [Lorenzo Perini](#)

## Research Interests

Making AI models robust and reliable with research on uncertainty quantification, anomaly/out-of-distribution detection, and adversarial attacks; previous research on learning from weakly supervised settings, including learning to reject, active learning, PU learning, transfer learning, and multi-instance learning.

## Academic Education

- 10/2019 **PhD in Computer Science at KU Leuven**,  
03/2024 with thesis: Operational, Uncertainty-Aware, and Reliable Anomaly Detection. Advisor: Prof. Dr. Jesse Davis.
- 02/2022 **Visiting Researcher at University of Helsinki**,  
08/2022 working on Bayesian Learning, Variational Inference. Advisor: Prof. Dr. Arto Klami.
- 10/2017 **MSc in Mathematical Engineering at Politecnico di Torino (Grade: 110/110 cum laude)**,  
07/2019 with major in Statistics on Data and Network Optimization. Thesis on Predictive Maintenance and Anomaly Detection (ML). Industrial collaboration with Terra SpA. Advisor: Prof. Dr. F. Vaccarino.
- 10/2014 **BSc in Mathematics at University of Florence (Grade: 110/110)**,  
07/2017 with thesis on Stochastic Differential Equations (probability theory). Advisor: Dr. L. Poggiolini.

## Industrial Experience

- 09/2023 **Research Scientist Intern at Robert Bosch GmbH**,  
01/2024 with the task of designing a data quality metric for generated defects in anomaly detection.
- 02/2019 **Data Scientist Intern at Terra SpA**,  
07/2019 with tasks: data engineering, time-series analysis, deep learning, predictive maintenance, anomaly detection.

## Awards & Grants

- 11/2021 4-year PhD Fellowship for Fundamental Research (FWO) on Uncertainty Quantification and Anomaly Detection.
- 02/2021 Scientific prize Gustave Boël-Sofina Fellowship for talented researchers for long stay abroad.
- 09/2020 Overall and Chairs' Engagement Award at ECML-PKDD'20.

## Selected Main Author Publications

- [1] Uncertainty-aware Evaluation of Auxiliary Anomalies with the Expected Anomaly Posterior, **ArXiv'24**.
- [2] Machine learning with a reject option: A survey, **Machine Learning Journal 2024**.
- [3] Unsupervised Anomaly Detection with Rejection, **NeurIPS'23**.
- [4] Estimating the Contamination Factor's Distribution in Unsupervised Anomaly Detection, **ICML'23**.
- [5] Learning from Positive and Unlabeled Multi-Instance Bags in Anomaly Detection, **KDD'23**.
- [6] Transferring the Contamination Factor between Anomaly Detection Domains by Shape Similarity, **AAAI'22**.
- [7] Quantifying the confidence of anomaly detectors in their example-wise predictions, **ECML-PKDD'20**.
- [8] Class Prior Estimation in Active Positive and Unlabeled Learning, **IJCAI-PRICAI'20**.

More on [Google Scholar](#).

## Academic Activities

- Editorial Board Member for Machine Learning Journal (MLJ).
- Reviewer for top-tier conferences (NeurIPS, ICML, AAAI, AISTATS, KDD, SDM, ECML), and journals (JAIR).
- Supervisor of 11 Master Theses ([Link](#)).
- Teaching Assistant: PU Learning (2020 - 2022), Data Mining (2019 - 2023), Introduction to Data Mining (2022 - 2023).

## Projects

- Core development team member of **PyOD** on Unsupervised Anomaly Detection repository with > 8k stars ([Link](#)).
- Contributor of **PyThresh** for Thresholding Anomaly Scores ([Link](#)).
- The implementation of my papers is open-source on [GitHub](#).

## Skills

Python (PyTorch, Pandas, NumPy, SkLearn, SciPy), R, Java, C, Matlab,  $\text{\LaTeX}$ , SQL, Git, Bash, Linux.

I hereby authorize the use of my personal data in accordance with the GDPR 679/16 - "European regulation on the protection of personal data".