

# Luca Corbucci

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## About Me

Computer Science PhD with a research focus on AI Safety, specifically on **Fairness**, **Privacy**, and **Explainable AI** for **Federated Learning**. Authored 5+ publications in top-tier venues, including **FACCT** and **ECAI**. Proven leader and collaborator: successfully initiated a 1-year research internship with **Telefónica Research Lab** and projects with **Johannes Gutenberg-Universität Mainz**. Experienced public speaker, community builder (FOSDEM AI Devroom, Superhero Valley, Pisa.dev), and **podcaster** (250+ episodes).

## Education

### University of Pisa - KDD Lab

*Pisa, Italy*

PHD IN COMPUTER SCIENCE - **ADVISORS:** PROF. A. MONREALE AND DR. N. KOURTELLIS. - **FINAL GRADE: SUMMA CUM LAUDE**

*Nov. 2021 - Jul. 2025*

- Developed methodologies to ensure privacy and fairness in Federated Learning models, addressing key challenges in **safe and ethical AI**.
- Explored and designed techniques for private and explainable Federated Learning (**XAI** for FL) to enhance model transparency and trust.
- Started collaboration with **Telefonica Research Lab** (1-year visit) and **Johannes Gutenberg-Universität Mainz**.
- Partially funded and supported by the Horizon Europe project "TANGO".
- Supervised **3 master's theses**, including one that led to a peer-reviewed publication at ECAI 2025.

### Technical University of Munich

*Munich, Germany*

COMPUTER SCIENCE - ERASMUS+ STUDY

*Oct. 2019 - Mar. 2020*

- Won a 5-month Erasmus+ Study grant to visit the Technical University of Munich.
- **Courses:** Machine Learning, Basic Mathematical Tools for Imaging and Visualization, Practical Course: Cloud Databases.

### University of Pisa

*Pisa, Italy*

M.SC. IN COMPUTER SCIENCE - **FINAL GRADE: 110/110 CUM LAUDE**

*Oct. 2018 - Jun 2021*

- **Thesis:** "Semantic enrichment of XAI explanations for healthcare". Paper published at the Discovery Science Conference 2023. [**Paper** | **Code**]
- Supervised by: Prof. Anna Monreale and Dr. Cecilia Panigutti.
- Spent a semester at **Technical University of Munich** thanks to the Erasmus+ study program.

### University of Pisa

*Pisa, Italy*

B.SC. IN COMPUTER SCIENCE

*Sep. 2014 - Oct. 2018*

- **Thesis:** "Construction and Analysis of the Ethereum Transaction Graphs". [**Code**]

## Work Experience

### Telefónica R&D - System AI Lab

*Barcelona, Spain*

RESEARCH INTERN - SUPERVISED BY DR. NICOLAS KOURTELLIS

*Mar. 2023 - Mar. 2024*

- Designed PUFFLE, a **Federated Learning** method achieving 75% fairness improvement with minimal (22%) accuracy loss, while preserving model privacy and utility. [**Paper** | **Code**]
- Integrated fairness constraints based on practitioner requirements, bridging the gap between theoretical fairness and real-world systems.
- **Paper** accepted at the European Conference on Artificial Intelligence (**ECAI**) 2024; **Patent** application submitted.
- Partially funded by the SPATIAL H2020 EU project.

### University of Pisa - Computer Science Department

*Pisa, Italy*

TEACHING ASSISTANT FOR THE "PROGRAMMING AND ALGORITHMICS" BACHELOR COURSE

- Provided support to students over three semesters, helping them with algorithms, data structures, and programming.
- Organized exercise sessions to enhance students' problem-solving skills and algorithmic thinking.

### University of Pisa

*Pisa, Italy*

RESEARCH ASSISTANT

*Jun. 2021 - Oct. 2021*

- Won a research scholarship to work on the semantic enrichment of Explainable AI methods for healthcare.
- The results of this work have been published in a paper presented at Discovery Science Conference 2023.

### Tocket

*Pisa, Italy*

FLUTTER DEVELOPER - TECH STACK: FLUTTER, DART, PYTHON, FLASK

*Mar. 2020 - Jan. 2021*

- Developed the Tocket mobile app released on the iOS App Store and Google Play Store to buy tickets for online and in-person events.
- More than **20k users** have downloaded and used the app.
- Developed internal APIs and dashboard.

## Academic Roles

- Reviewer for European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases **ECML PKDD 2024 and 2025**
- Reviewer for European Conference on Artificial Intelligence **ECAI 2023**

## Publications

Under Review	<b>L. Corbucci</b> , M. Heikkilä, D. Noguero, A. Monreale, N. Kourtellis, “Self-Adaptive Balancing of Fairness, Privacy, and Utility in Federated Learning”	
Under Review	V. Bonsignori, <b>L. Corbucci</b> , F. Naretto, A. Monreale, “Interpreting Federated Learning by Aggregating SHAP Explanations”	
Under Review	X. Heilmann, <b>L. Corbucci</b> , M. Cerrato, Anna Monreale, “FeDa4Fair: Client-Level Federated Datasets for Fairness Evaluation”	
	<b>L. Corbucci</b> , J. A. B. Legrottaglie, F. Spinnato, A. Monreale and R. Guidotti, “An Interpretable Data-Driven Unsupervised Approach for the Prevention of Forgotten Items” - Accepted at European Conference on Artificial Intelligence (ECAI) 2025	Bologna, Italy
Sep 2025	<b>L. Corbucci</b> , F. Naretto, A. Monreale, “Enhancing Local Explanations with GAN-Based neighborhood generation” - Accepted at International Conference on Discovery Science 2025	Ljubljana, Slovenia
Jun 2025	X. Heilmann, <b>L. Corbucci</b> , M. Cerrato, “A Benchmark for Client-level Fairness in Federated Learning” - Accepted at European Workshop on Algorithmic Fairness 2025	Eindhoven, The Netherlands
Jun 2025	<b>L. Corbucci</b> , X. Heilmann, M. Cerrato, “Benefits of the Federation? Analyzing the Impact of Fair Federated Learning at the Client Level” - Accepted at ACM Conference on Fairness, Accountability, and Transparency (FAccT) 2025	Athens, Greece
Jun 2025	V. Bonsignori, <b>L. Corbucci</b> , F. Naretto, A. Monreale, “Differentially Private FastSHAP for Federated Learning Model Explainability” - Accepted at International Joint Conference on Neural Networks (IJCNN) 2025	Rome, Italy
Oct 2024	<b>L. Corbucci</b> , M. Heikkilä, D. Noguero, A. Monreale, N. Kourtellis, “PUFFLE: Balancing Privacy, Utility, and Fairness in Federated Learning” - Accepted at European Conference on Artificial Intelligence (ECAI) 2024	Santiago de Compostela, Spain
July 2024	<b>L. Corbucci</b> , A. Monreale, R. Pellungrini, “Enhancing Privacy and Utility in Federated Learning: A Hybrid P2P and Server-Based Approach with Differential Privacy Protection” - Accepted at SECUREPT 2024	Dijon, France
Oct 2023	<b>L. Corbucci</b> , A. Monreale, C. Panigutti, M. Natilli, S. Smiraglio, D. Pedreschi, “Semantic enrichment of explanations of AI models for healthcare” - Accepted at International Conference on Discovery Science 2023	Porto, Portugal
Jul 2023	<b>L. Corbucci</b> , R. Guidotti, A. Monreale, “Explaining Black-Boxes in Federated Learning” - Accepted at World Conference on Explainable Artificial Intelligence	Lisbon, Portugal

## Software Projects

### PUFFLE (Written in Python, check on Github)

Pisa, Italy

A SOLUTION TO BALANCE PRIVACY, UTILITY, AND FAIRNESS IN FEDERATED LEARNING

Mar. 2023 - Ongoing

- Designed and developed a regularization-based method with Telefónica Research to ensure fairness and privacy in Federated Learning models.
- Enabled practitioners to define custom fairness requirements, bridging the gap between AI safety theory and real-world application.
- Achieved a 75% unfairness reduction with a minimal 22% accuracy trade-off.

### Fire360 (Written in Python, check on Github)

Pisa, Italy

A COMPREHENSIVE AND FAST LOCAL EXPLANATION APPROACH TAILORED FOR TABULAR DATA.

Feb. 2025 - Mar. 2025

- Developed a computationally efficient local explainer that avoids costly per-instance generation by using a single synthetic neighborhood.
- Outperformed competing methods by 95% in explanation stability and robustness on multiclass datasets.

### FastShap++ (Written in Python, check on Github)

Pisa, Italy

A DIFFERENTIALLY PRIVATE AND FAST FEDERATED LEARNING EXPLAINER

Oct. 2024 - Feb. 2025

- Developed an extension of the FastShap explainer for Federated Learning, integrating Differential Privacy to protect client data during the explanation process.

## Leadership & Community Involvement

### Devroom Manager

Brussels, Belgium

“LOW-LEVEL AI ENGINEERING & HACKING” DEV ROOM @ FOSDEM 2025

Feb 2025

- Co-organized the “Low-Level AI Engineering & Hacking” Dev Room at Fosdem 2025, managing speaker selection, scheduling, and logistics.

### Superhero Valley

Pisa, Italy

CO-FOUNDER AND COMMUNITY MANAGER

Oct. 2020 - Ongoing

- Co-founded and grew a community for 2000+ computer scientists, leading to 100+ members securing roles in Big Tech.
- Lead a team of 5 helpers in organising community activities and events.

### PointerPodcast

Pisa, Italy

CO-CREATOR AND PODCASTER

May. 2019 - Ongoing

- Co-created a tech podcast with 250+ episodes and over 40k+ listens, featuring 70+ guests from academia and industry.