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Gilberto **Recupito**

1 Personal Information

Full Name
Gilberto Recupito

Date of Birth
January 25th, 1997

Place of Birth
Salerno, Italy

Current Address
Via Roma 2 - 84084, Fisciano, Salerno, Italy

2 Work Experience

Research Intern — **Mar 2025 – May 2025**
Project collaboration with Prof. Foutse Khomh at École Polytechnique de Montréal — *Montréal, Canada*

Guest Researcher — **May 2024 – Jul 2024**
Project collaboration with Prof. Michael Felderer at German Aerospace center (DLR) — *Cologne, Germany*

Research Assistant — **Apr 2022 – Sep 2022**
CloudSea.AI, research group with Prof. Davide Taibi at Tampere University — *Tampere, Finland*

3 Education

Ph.D. in Computer Science **2025**
Excellent, Advisors: Profs. Fabio Palomba & Dario Di Nucci Università degli studi di Salerno

Master's Degree (MSc) in Computer Science **2022**
Magna cum laude, Advisor: Prof. Fabio Palomba Università degli studi di Salerno

Bachelor's Degree (BSc) in Computer Science **2019**
Advisor: Prof. Vittorio Scarano Università degli studi di Salerno

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4 Research Areas

My primary research area is **Software Engineering for Artificial Intelligence (SE4AI)**. My work advances the engineering of AI-intensive systems by:

- **AI Technical Debt**: Characterizing and mitigating sources of technical debt in AI-enabled systems, including system-level [1], data-centric [2], and ML-specific code quality issues [3], to improve reliability and maintainability.
- **MLOps and Engineering of ML Pipelines**: Defining practices, features, and tools that support the development, automation, and operation of robust ML pipelines [4]. This includes empirical analysis of ML projects, enabling the characterization of *ML-Model Producers* and *ML-Model Consumers* [5].
- **LLM4SE and Agentic AI**: Investigating how Large Language Models can support software engineering tasks, with a focus on the design of prompt patterns to manage complexity in LLM-generated code and support code quality evaluation [6].
- **Empirical Software Engineering & Mining Software Repositories**: Contributing to empirical methods and MSR research, including educational work culminating in a book chapter to support instructors in teaching MSR techniques [7].

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5 Professional Activities

5.1 Organizing Activities

International Conference on Software Maintenance and Evolution (ICSME) — **2026**
Tool Demo and Data Showcase Track Program Committee — *Benevento, Italy*

International Conference on Software Maintenance and Evolution (ICSME) — **2026**
Industry Track Program Committee — *Benevento, Italy*

3rd Workshop on Software Quality Assurance for Artificial Intelligence (SQA4AI) — **2026**
Organizer — *Limassol, Cyprus*

International Conference on AI Engineering (CAIN) — **2026**
Poster Track Program Committee — *Rio De Janeiro, Brazil*

1st ECAI Workshop on MLOps (MLOps) — **2025**
Session Chair — *Bologna, Italy*

International Conference on AI Foundation Models and Software Engineering (FORGE) — **2026**
Program Committee — *Rio De Janeiro, Brazil*

Euromicro Conference on Software Engineering and Advanced Applications (SEAA) — **2025**
Session Chair — *Salerno, Italy*

International Conference on AI Foundation Models and Software Engineering (FORGE) — **2025**
Program Committee — *Ottawa, Canada*

International Conference on Software Analysis, Evolution and Reengineering (SANER) — **2025**
Session Chair — *Montréal, Canada*

2nd Workshop on Software Quality Assurance for Artificial Intelligence (SQA4AI) — **2025**
Program Committee Member — *Montréal, Canada*

International Conference on Automated Software Engineering (ASE) — **2024**
Artifact Evaluation Track Program Committee — *California, United States*

International Conference on AI Foundation Models and Software Engineering (FORGE) **2024**
Program Committee *Lisbon, Portugal*

International Working Conference on Mining Software Repositories (MSR) **2024**
Junior Program Committee *Lisbon, Portugal*

Seminar Series on Advanced Techniques & Tools for Software Evolution (SATToSE) **2023**
Social Media Chair *Salerno, Italy*

International Conference on Software Engineering Advances (ICSEA) **2023**
Program Committee Member *Valencia, Spain*

Annual Symposium for Computer Science **2022**
Organizing Committee Member *Tampere, Finland*

5.2 Journal Services

Journal of Systems and Software **2025, current**
Guest Editor - Special Issue Software Quality Assurance for AI

Automated Software Engineering Journal **2025**
Reviewer

SoftwareX **2024,2025**
Reviewer

Journal of Software: Evolution and Process **2024**
Reviewer

ACM Transactions on Software Engineering and Methodology **2023-2025**
Reviewer

Empirical Software Engineering **2024, 2025**
Reviewer

IET Software **2025**
Reviewer

ACM Conference On Computer-Supported Cooperative Work And Social Computing **2023, 2024**
Reviewer

Journal of Systems and Software **2023, 2024**
Reviewer

Science of Computer Programming **2023**
Reviewer

Journal of Decision Systems **2022**
Reviewer

5.3 Teaching Activities

During the three years of Ph.D., I provided support and served as guest lecturer for the following courses:

5.3.1 University of Salerno, Italy

Software Engineering (B.Sc.) **2024, 2025**
Guest Lecture on LLM-enabled software development. Prof. Di Nucci

Sustainable Software Engineering (M.Sc.) **2023, 2024, 2025**
Guest Lecture on Technical Debt. Prof. Di Nucci

Software Dependability (M.Sc.) **2023, 2024**
Support to course projects. Prof. Di Nucci

Software Engineering for Artificial Intelligence (M.Sc.) **2023,2024**
Support to course projects and guest lecture on Transfer Learning, Transformers and MLOps. Prof. Palomba

Software Engineering, Management and Evolution (M.Sc.) **2023,2024**
Support to course projects and guest lecture on DevOps. Prof. De Lucia

Software Engineering (B.Sc.) **2023,2024**
Support to course projects and guest lectures on Maven, GitHub, and testing frameworks. Prof. De Lucia

5.4 Advising Activities

In my career, I had the opportunity to advise Bachelors and Masters students in their career.

- MLOps: A systematic review of the literature on MLOps practices and properties. *Damiana Buono, Bachelor's Degree (2023).*
- Data Smells: towards the exploration and analysis of the impact on data quality. *Raimondo Rapacciuolo, Master's Degree (2023).*
- CAMILLE: A chatbot for ML-specific code Smells identification and refactoring. *Francesco Pinto, Bachelor's Degree (2024).*
- Analysis and Exploration of MLOps tools for monitoring data drift - *Ranjeet Kumar, Bachelor's Degree (2024).*
- Synthetic data smell injection: Effect and impact on quality in ML-enabled systems. *Davide La Gamba, Master's Degree (2024).*
- Machine Learning Detection of Data Smells. *Nicolò Gallotta, Bachelor's Degree (2024).*
- Multi-Agent System for information needs extraction of code review tasks. *Giulio Palladino, Bachelor's Degree (2024).*
- CRANE - Code Review AI Network Engine. *Luca Morelli, Master's Degree (2025).*

- Development and testing of CodeSmile: a plugin for the automatic analysis of Machine Learning Code Smells. *Daniele Pio Scaparra, Bachelor's Degree (2025).*
- Analysis of the Correlation between Data Smells, Performance, Fairness, and Sustainability in Machine Learning-Based Systems. *Domenico D'Antuono, Master's Degree (2025).*
- Analysis of the evolution of code smells in Machine Learning-Based Systems. *Simone Silvestri, Master's Degree (2025).*

6 Conferences and School Participations

International Workshop of Software Quality Assurance for Artificial Intelligence (SQA4AI) **2024**
Presentation of [8] and [6] *Salerno, Italy*

International Conference on Evaluation and Assessment in Software Engineering (EASE) **2024**
Attended *Salerno, Italy*

3rd International Conference on AI Engineering (CAIN) **2024**
Presentation of [2] *Salerno, Italy*

Seminar Series on Advanced Techniques & Tools for Software Evolution (SATToSE) **2023**
Speaker *Salerno, Italy*

International School of Software Engineering (ISSSE) **2023**
Attended *Salerno, Italy*

48th Euromicro Conference on Software Engineering and Advanced Applications (SEAA) **2022**
Presentation of [4] *Gran Canaria, Spain*

7 Additional Contributions

PRIN Project: FRINGE **2023**
Actively contributed to the PRIN project FRINGE awarded by NextGeneration EU and the MUR (Ministero dell'Università e della Ricerca).

PRIN Project: QUALAI **2022**
Actively contributed to the PRIN project QUALAI awarded by the MUR (Ministero dell'Università e della Ricerca).

8 Publications

[1] G. Recupito, F. Pecorelli, G. Catolino, V. Lenarduzzi, D. Taibi, D. Di Nucci, and F. Palomba, "Technical debt in ai-enabled systems: On the prevalence, severity, impact, and management strategies for code and architecture," *Journal of Systems and Software*, p. 112 151, 2024, ISSN: 0164-1212. DOI: https://doi.org/10.1016/j.jss.2024.112151.

[2] G. Recupito, R. Rapacciuolo, D. Di Nucci, and F. Palomba, "Unmasking data secrets: An empirical investigation into data smells and their impact on data quality," *3rd International Conference on AI Engineering – Software Engineering for AI*, 2024.

[3] G. Recupito, G. Giordano, F. Ferrucci, D. Di Nucci, and F. Palomba, "When code smells meet ml: On the lifecycle of ml-specific code smells in ml-enabled systems," in *Empirical Software Engineering (EMSE)*, 2025.

[4] G. Recupito, F. Pecorelli, G. Catolino, S. Moreschini, D. Di Nucci, F. Palomba, and D. A. Tamburri, "A multivocal literature review of mlops tools and features," *Euromicro Conference on Software Engineering and Advanced Applications*, 2022. DOI: http://dx.doi.org/10.13140/RG.2.2.10257.71526.

[5] V. De Martino, G. Recupito, G. Giordano, F. Ferrucci, D. Di Nucci, and F. Palomba, "Into the ml-universe: An improved classification and characterization of machine-learning projects," *Journal of Systems and Software*, 2025.

[6] A. Della Porta, G. Recupito, S. Lambiase, D. Di Nucci, and F. Palomba, "Unlocking code simplicity: The role of prompt patterns in managing llm code complexity," in *International Workshop of Software Quality Assurance for Artificial Intelligence (SQA4AI)*, 2025.

[7] Z. Codabux, F. Fard, R. Verdecchia, F. Palomba, D. Di Nucci, and G. Recupito, "Teaching mining software repositories," in *Handbook on Teaching Empirical Software Engineering*. Springer, 2024.

[8] G. Recupito, V. De Martino, D. Di Nucci, and F. Palomba, "A first look at the lifecycle of dl-specific self-admitted technical debt," in *International Workshop of Software Quality Assurance for Artificial Intelligence (SQA4AI)*, 2025.

[9] G. Recupito, G. Giordano, D. Di Nucci, and F. Palomba, "Detecting semantic data smells with bert: A transformer-based approach to data quality," 2025.

[10] F. Palomba, G. Voria, A. Parziale, V. Pentangelo, A. D. Porta, V. D. Martino, G. Recupito, and G. Giordano, "Teaching software engineering for artificial intelligence: An experience report," in *Euromicro Conference on Software Engineering and Advanced Applications*, Springer, 2025, pp. 214–230.

[11] D. La Gamba, G. Iuliano, G. Recupito, G. Giordano, F. Ferrucci, D. Di Nucci, and F. Palomba, "Toward a search-based approach to support the design of security tests for malicious network traffic," in *Proceedings of the 28th International Conference on Evaluation and Assessment in Software Engineering*, ser. EASE '24, , Salerno, Italy, Association for Computing Machinery, 2024, pp. 624–628, ISBN: 9798400717017. DOI: 10.1145/3661167.3661288.

[12] N. Novielli, R. Oliveto, F. Palomba, F. Calefato, G. Colavito, V. De Martino, A. Della Porta, G. Giordano, E. Guglielmi, F. Lanubile, *et al.*, "Qualai: Continuous quality improvement of ai-based systems.," in *RCIS Workshops*, 2024.

[13] N. Novielli, R. Oliveto, F. Palomba, F. Calefato, G. Colavito, V. De Martino, A. Della Porta, G. Giordano, E. Guglielmi, F. Lanubile, *et al.*, "Continuous quality improvement of ai-based systems: The qualai project," in *Proceedings of the 18th ACM/IEEE International Symposium on Empirical Software Engineering and Measurement*, 2024, pp. 603–607.

[14] A. Della Porta, V. De Martino, G. Recupito, C. Iemmino, G. Catolino, D. Di Nucci, and F. Palomba, "Using large language models to support software engineering documentation in waterfall life cycles: Are we there yet?," 2024.

In Fede: