europass Curriculum vitae

PERSONAL INFORMATION Marco Calamo

Current Position	Phd Student in Engineering in Computer Science
SSD	ING-INF/05
Research Topics	Artificial Intelligence, Large Language Models, Retrieval Augmented Generation, Knowledge Graphs, Industry 4.0
Scientific Qualification (Google Scholar)	**H-index:** 2; **No. Publications:** 7; **No. citations:** 23
Thematic Area Keyword	Digital Transition

EDUCATION AND TRAINING

2023–Current Ph.D. in Engineering in Computer Science — Second Year

Sapienza University of Rome, Rome, Italy

Research Interests: My research, situated at the intersection of industrial and computer science, focuses on developing AI-based frameworks to enhance and optimize tasks and operations across various domains, particularly in Smart Manufacturing (Industry 4.0). Furthermore, it analyzes the impact of artificial intelligence within large organizational contexts to better understand how to adopt new technologies, such as AI, more effectively. The main topics addressed include Large Language Models (LLMs), Knowledge Graphs (KGs), Retrieval Augmented Generation (RAG), and Prompt Engineering (PE).

2020–2022 Master's Degree in Engineering in Computer Science — 110, with honours

Sapienza University of Rome, Rome, Italy

Thesis: Design and Implementation of an Industry 4.0 Architecture for Smart Die-Cutters

My master's thesis, which was experimental in nature, focused on designing and developing a Industry 4.0 system for quality control in cardboard industry. My work involved developing a Vue.js based dashboard for real time data visualization, a Javascript back-end for the system and an embedded firmware for an IoT sensor that monitors the die-cutter production session.

2017–2020 Bachelor's degree in Engineering in Computer Science — 110/110

Sapienza University of Rome, Rome, Italy

TEACHING ACTIVITIES

A.A. 2024/25 **Teaching Assistance** — Sapienza University of Rome

Seminars in class **Basi di Dati** in Laurea Triennale in Ingegneria Gestionale

A.A. 2023/24 **Teaching Assistance** — Sapienza University of Rome

Seminars in class **Laboratory of Advanced Programming** Master's Degree in Engineering in Computer Sceince

A.A. 2023/24 **Computer Science Professor** — ITS Lazio Digital Academy

Full class in **Object Oriented Programming**

MAIN RESEARCH ACTIVITIES

2024 – current **MICS - SPOKE 8**

I am involved in Spoke 8 (https://www.mics.tech/spokes/spoke-8/) of the MICS project, as it funds my research fellowship. Spoke 8 focuses on developing a new concept of sustainable and resilient digital factories, where artificial intelligence, digital technologies, and collaborative robotics work together to create efficient human-machine systems. My role within Spoke 8 is to contribute to these research goals through the development of AI-based solutions. The main activity focuses on developing a pipeline that addresses complex linguistic tasks—those requiring domain-specific knowledge—by leveraging Large Language Models (LLMs), Knowledge Graphs (KGs), and Retrieval-Augmented Generation (RAG).

2022 – current **Electrospindle 4.0**

The goal of Electrospindle 4.0 is to apply innovative technologies to realise a family of Zero Defects products (spindles), produced through a Zero Defects Manufacturing process. During the project duration I was able to improve my knowledge in Industry 4.0 research field, and work hands on with REST-API in the back-end and Dashboarding in the front-end.

2019 – current **TopKontrol**

Rotalaser Industrial Project, the aim of TopKontrol is the development of a die cutter 4.0 to improve the production process. During the project duration I was able to learn and imporve the following skills: Machine Learing models, Software Development in: Python, JavaScript, Vue-js, C, C#, Java. I was also able to experience a real industrial environment.

2022 – 2023 **Giustizia Agile - per una giustizia giusta**

In July 2022, I was awarded a research scholarship for the project "Giustizia Agile - Per una giustizia giusta: innovazione ed efficienza negli uffici giudiziari". I began my assignment on August 1st. The main activities undertaken during the project included: *(i)* studying and implementing a BPM methodology for reengineering the assistance request process at the Office for Informatics and Statistics of the Criminal Court of Rome; *(ii)* collecting and analyzing requirements for non-ministerial software; *(iii)* developing an automated statistics processing and updating system for the IV Penal Section; *(iv)* conducting an in-depth analysis of the S.I.C.P. system to identify the causes of false pendings within the criminal justice system. The project provided valuable insights into optimizing judicial processes and leveraging technology to improve efficiency. During the duration of the fellowship I also contributed to the TopKontrol and Electrospindle 4.0 projects.

2020-2021 **Research Contract**

During the research contract at La Sapienza University working on the TopKontrol project, I had an enriching and impactful experience. In my role, I collaborated closely with a team of experts, researchers, and professionals. We worked together to develop and implement innovative solutions for packaging quality monitoring. My responsibilities included conducting thorough research, analyzing data, and providing valuable insights to optimize the project's outcomes. I actively participated in brainstorming sessions, contributing ideas and suggestions to enhance project effectiveness. The dynamic and stimulating environment fostered constant learning and skill development

OTHER RESEARCH ACTIVITIES

Nov 2024 **Conference - ISM2024** Prague, Czech Republic

SAMBA: A reference framework for Human-in-the-Loop in adaptive Smart Manufacturing , Filippo Bianchini, Marco Calamo, Francesca De Luzi, Mattia Macrì, Matteo Marinacci, Jerin George Mathew, Flavia Monti, Jacopo Rossi, Francesco Leotta, Massimo Mecella. Partecipation to International Doctoral Workshop (IDW) and presentation of the paper. *6th International Conference on Industry 4.0 and Smart Manufacturing*

Jun 2024 **Poster session - SummerSoc2024** Crete, Grece

Enhancing Complex Linguistic Tasks Resolution Through Fine-Tuning LLMs, RAG and Knowledge Graphs, Filippo Bianchini, Marco Calamo, Francesca De Luzi, Mattia Macrì, Massimo Mecella. *18th Symposium and Summer School On Service-Oriented Computing - SummerSOC2024, Crete, Greece*

Jun 2024 **Conference - CAiSE2024** Limassol, Cyprus

Enhancing Complex Linguistic Tasks Resolution Through Fine-Tuning LLMs, RAG and Knowledge Graphs (Short Paper), Filippo Bianchini, Marco Calamo, Francesca De Luzi, Mattia Macrì, Massimo Mecella. *36th International Conference on Advanced Information Systems Engineering*

Oct 2023 **Conference - ECAI2023** Krakow, Poland

Cicero: a GPT2-based writing assistant to investigate the effectiveness of specialized LLMs' applications in e-justice, Filippo Bianchini, Marco Calamo, Francesca De Luzi, Mattia Macrì, Massimo Mecella. *26th European Conference on Artificial Intelligence ECAI 2023*

Jun 2023 **Conference - CAiSE2023** Zaragoza, Spain

TopKontrol: a monitoring and quality control system for the packaging production, Calamo, M. and De Franceschi, A. and De Santis, G. and Leotta, F. and Mazzaroppi, C. and Mathew, J. G. and Mecella, M. and Monti, F. and Sabatino, C. and Visani, L. and Visani, M. *35th International Conference on Advanced Information Systems Engineering*

ADDITIONAL INFORMATION

Mother tongue: Italian

Other languages

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C1	C1	C1	C1	C1
French	A2	A2	A2	A2	A2

Levels: A1 and A2: Basic user – B1 and B2: Independent user – C1 and C2: Proficient user
Common European Framework of Reference for Languages

Soft skills I am a highly communicative individual, valuing clear and effective interaction as a cornerstone of my work and relationships. Teaching is a source of great satisfaction for me, as I take pride in sharing knowledge and witnessing the growth and learning of others. My passion for education fuels my collaborative nature, fostering inclusive and positive environments, whether in teamwork or individual endeavors, and my commitment to precision and detail ensures every task is carried out with exceptional accuracy.

Computer skills
- Programming languages: PYTHON, C, C++, JAVA, KOTLIN, SWIFT, RUST, JAVASCRIPT, SQL
- Operating Systems: Windows, Unix, Macintosh, Android
- Programs: Microsoft Office, LaTeX, Canva

PUBLICATIONS

[1] Filippo Bianchini, **Marco Calamo**, Matteo Marinacci, Jacopo Rossi, and Massimo Mecella. “Automating Industrial Quality Control: A Multimodal LLM and RAG Framework for Anomaly Detection”. In: *21st International Conference on Artificial Intelligence Applications and Innovations - AIAI*. 2025.

[2] **Marco Calamo**, Massimo Mecella, and Monique Snoeck. “Assessing the Suitability of Large Language Models in Generating UML Class Diagrams as Conceptual Models”. In: *Enterprise, Business-Process and Information Systems Modeling: 26th International Conference, BPMDS 2025, and 30th International Conference, EMMSAD 2025, Held at CAiSE 2025, Vienna, Austria, June 16–17, 2025, Proceedings*. Springer Nature, 2025.

[3] F. Bianchini, **M. Calamo**, F. De Luzi, M. Macrì, and M. Mecella. “A service-based pipeline for complex linguistic tasks adopting LLMs and Knowledge Graphs”. In: *SummerSOC*. 2024.

[4] Filippo Bianchini, **Marco Calamo**, Francesca De Luzi, Mattia Macrì, Matteo Marinacci, Jerin George Mathew, Flavia Monti, Jacopo Rossi, Francesco Leotta, and Massimo Mecella. “SAMBA: A reference framework for Human-in-the-Loop in adaptive Smart Manufacturing”. In: *6th International Conference on Industry 4.0 and Smart Manufacturing - ISM*. 2024.

[5] Filippo Bianchini, **Marco Calamo**, Francesca De Luzi, Mattia Macrì, and Massimo Mecella. “Enhancing Complex Linguistic Tasks Resolution Through Fine-Tuning LLMs, RAG and Knowledge Graphs (Short Paper)”. In: *International Conference on Advanced Information Systems Engineering*. Springer. 2024, pp. 147–155.

[6] **M. Calamo**, A. De Franceschi, G. De Santis, F. Leotta, C. Mazzaroppi, J. G. Mathew, M. Mecella, F. Monti, C. Sabatino, L. Visani, and M. Visani. “TopKontrol: a monitoring and quality control system for the packaging production”. In: *RPE@ CAiSE*. 2023.

[7] **M. Calamo**, F. De Luzi, M. Macrì, T. Mencattini, and M. Mecella. “Cicero: a GPT2-based writing assistant to investigate the effectiveness of specialized LLMs’ applications in e-justice”. In: *PAIS*. 2023.

According to law 679/2016 of the Regulation of the European Parliament of 27th April 2016, I hereby express my consent to process and use my data provided in this CV

Rome, 29/10/2025

Marco Calamo