Manuel **Di Agostino**

MASTER'S STUDENT IN COMPUTER SCIENCE

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Education

University of Parma   *Parma, Italy*

MASTER'S DEGREE IN COMPUTER SCIENCE (EXPECTED)   *Sep. 2024 - Jul. 2026*

University of Parma   *Parma, Italy*

BACHELOR'S DEGREE IN COMPUTER SCIENCE   *Sep. 2021 - Jul. 2024*

Grade: 110/110 *cum laude*
Title: "Valutazione sperimentale sull'individuazione automatica di errori di programmazione nel codice generato da LLM"
Supervisor: Prof. Enea Zaffanella
Co-supervisor: Prof. Vincenzo Arceri
Keywords: *Static Analysis, AI, LLM, Software Verification and Validation*

Interests

My primary academic interests lie in Software Verification, particularly in Static Analysis by Abstract Interpretation. During my internship, I worked on integrating the PPLite library into the Mopsa static analyzer, further enhancing my practical experience and technical skills in this field. My bachelor's thesis focused on evaluating the quality of source code generated by Large Language Models (LLMs) through static analysis.

Additional experience

University of Parma   *Parma, Italy*

TUTOR (LOGIC AND DISCRETE STRUCTURES)   *Sep. 2024 - Present*

- Academic support: provide assistance to first-year undergraduate students in understanding the theoretical concepts of logic and discrete mathematics.
- Practical exercises: guide students in solving problems related to set theory, algebraic structures, natural and structural induction, as well as propositional and predicate logic, helping them consolidate the necessary practical skills.
- Providing resources: offer supplementary materials and useful resources for further exploration of the topics covered in the course (available at `https://github.com/unipr-org/tutorati/tree/main/EdL`).

University of Parma   *Parma, Italy*

INTERNSHIP   *Oct. 2023 - Jan. 2024*

- Examined the Mopsa static analyzer (`https://mopsa.lip6.fr/`) through a series of benchmarks (coreutils-benchmarks, juliet-benchmarks).
- Integrated the PPLite library (`https://github.com/ezaffanella/PPLite`) into the framework.
- Created a docker container to automate the installation (`manueldiagostino/mopsa:pplite`).

Tools and Software

Deep Neural Network Library   *From May 2024*

A flexible C++ library for building, training, and using deep neural networks. Modular, easy-to-use, and high-performance. The library supports various neural network architectures, efficient training tools, and robust inference methods (`https://github.com/unipr-org/deep-neural-network`).

Grants

Research participant, "LLMs Meet Static Analysis: improving quality and reliability of AI-generated code"

ISCRA Project (class C), Cineca   *From Jan. 2024*

Principal Investigator: Prof. Vincenzo Arceri. The goal of the project is to conduct an extensive quality and safety evaluation of the code generated with some of the most popular and open-source LLMs employing static analyzers, that can detect vulnerabilities and run-time errors statically, without executing the code. Once this information is available, it will be included in the code-generation task, to guide the LLM itself to produce a more precise and safe output, in which static analysis is somehow introduced in the pipeline of the code-generation task.

Conferences, workshops and school participations

2024	**Participant**, Lipari Summer School on Abstract Interpretation	*Lipari, Italy*
2024	**Participant**, CSV 2024, 3rd Challenges of Software Verification Symposium	*Venice, Italy*

Grants

Research participant, "LLMs Meet Static Analysis: improving quality and reliability of AI-generated code"

ISCRA Project (class C), Cineca   *From Jan. 2024*