

Dr. Luca Di Grazia

Post-doctoral Researcher

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* EU Citizenship and Swiss B Permit

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Academic Age: 1 year and 2 months



Research Interests

My research leverages generative AI to improve coding tasks, developer productivity and software quality with a mix of program analysis, information retrieval, and data-driven approaches. I have performed innovative research at top universities (Top-20 CSRankings) and a tech giant (Market Cap > \$100B) among four different countries.

Major Achievements and Awards

- **2024:** Successfully defended my PhD with *Summa cum laude* (the highest grade in the German system).
- **2023:** Won *GenAI Uber's competition* in Amsterdam with my work on using generative AI to boost developer productivity for fixing bugs, beating 103 teams, and presenting as winners to the Uber's CEO and ELT.
- **2022:** Recipient of the *ACM SIGSOFT Distinguished Paper Award* at ESEC/FSE 2022 in Singapore.
- **2022:** Second winner at *ACM Student Research Competition* at ICSE 2022 in Pittsburgh (\$300).
- **2020:** Gnome Challenge 2020 winner (1st phase) to *Reach a new generation of open-source coders* (\$1,000).
- **2016-2018:** Awarded national scholarship to study computer engineering at Polytechnic of Turin (€3,000/year).

Education

02/2024 – **University of Stuttgart, Germany** 🇩🇪

09/2019 *Degree:* Ph.D. in Computer Science (Summa cum laude). Major in Software Engineering & Generative AI.

Supervisor: Prof. Dr. Michael Pradel.

Thesis: "Supporting Software Evolution with Search and Predictions".

Committee: Prof. Dr. Georgios Gousios and Prof. Dr. Kathryn T. Stolee.

07/2019 – **Polytechnic of Turin, Italy** 🇮🇹

09/2013 *Degrees:* Master's and Bachelor's Degree in Computer Engineering. Minor in Embedded Systems.

Thesis: "Protein classification using geometrical features for 3D face analysis". (Published in *PROTEIN*)

Supervisors: Prof. Dr. Federica Marcolin and Prof. Dr. Jack A. Tuszynski.

Positions and Experience

Now – **University of Lugano (USI), Switzerland** 🇨🇭

02/2024 *Role:* Postdoctoral Researcher. Supervisor: Prof. Dr. Mauro Pezzè.

Tasks and Takeaway: I conduct research on using generative AI to test software with real-world scenarios. This involved designing innovative approaches for generating realistic test scenarios and evaluating their effectiveness. I also supervised students, guiding them through research projects and developing their skills.

09/2023 – **Uber, Amsterdam, Netherlands** 🇳🇱

05/2023 *Role:* Research intern (PhD) in Generative AI for Code.

Tasks and Takeaway: Design and work on a research project based on genAI based on the usage of large language models to automatically fix bugs in the Uber source code revealed by static analysis tools. Our project won in a major Uber competition, outshining 103 teams and presenting our work to the Uber CEO.

02/2024 – **University of Stuttgart, Germany** 🇩🇪

09/2019 *Role:* Teaching Assistant.

Tasks and Takeaway: I prepared exercises for a total of 305 students per semester in the courses: programming paradigms, machine learning for code, and program analysis. I developed teaching skills, interacted with large classes, and honed mentoring abilities through feedback and guidance.

06/2019 – **Linux Polito, Turin, Italy** 🇮🇹

03/2018 *Role:* IT Support.

Tasks and Takeaway: I provided tech support to students and helped with the OpenSchool project, setting up computer labs for elementary schools using recycled hardware. I developed the ability to explain technical concepts and configure large-scale systems, bringing joy to children through access to technology.

Peer-reviewed Conference and Journal Publications

Note: All my software engineering publications are in top-tier venues (including the ACM SIGSOFT Distinguished Paper Award).

- ICSE 2024 **PyTy: Repairing Static Type Errors in Python**
Chow, Y.; Di Grazia, L.; Pradel, M. *International Conference on Software Engineering*.
- ECOOP 2024 **The Fault in Our Stars: Designing Reproducible Large-scale Code Analysis Experiments**
Maj, P.; Muroya, S.; Di Grazia, L.; Vitek, J. *European Conference on Object-Oriented Programming*.
- TOSEM 2024 **From Today's Code to Tomorrow's Symphony: The AI Transformation of Developer's Routine by 2030**
Special Issue Qiu, K.; Puccinelli, N.; Ciniselli, M.; Di Grazia, L.. *ACM Transactions on Software Engineering and Methodology (TOSEM), Special Issue 2030 Roadmap*.
- CSUR 2023 **Code Search: A Survey of Techniques for Finding Code**
Di Grazia, L.; Pradel, M. *ACM Computing Surveys*.
- FSE 2022 **The Evolution of Type Annotations in Python: An Empirical Study**
Paper Award Di Grazia, L.; Pradel, M. *Symposium on the Foundations of Software Engineering (ESEC/FSE)*.
- TSE 2022 **DiffSearch: A Scalable and Precise Search Engine for Code Changes**
Di Grazia, L.; Bredl P.; Pradel, M. *IEEE Transactions on Software Engineering*.
- JMGM **A geometrical perspective to explain the contagiousness of COVID-19 strains**
Marcolin F.; Olivetti C.; D'Agostino L.; Di Grazia, L.; Vezzetti E.; Aminpour M.; Tuszynski J. *Journal of Molecular Graphics and Modelling*.
- PROTEINS **A new method for protein characterization and classification using geometrical features for 3D face analysis: an example of Tubulin structures**
Di Grazia, L.; Aminpour M.; Vezzetti E.; Rezaia V.; Marcolin F.; Tuszynski J. *Proteins-Structure Function and Bioinformatics* (Paper made from my Master's Thesis).
- JAPPLSCI **3D Facial Expression Recognition for Users' Requirements: An Emotional Case Study**
Violante, M.G.; Marcolin, F.; Vezzetti, E.; Ulrich, L.; Billia, G.; Di Grazia, L. *Applied Science*.

Advising and Mentoring

PhD students

- 2024 - Now Qui, K.: "Autonomic Testing: Testing with Scenarios from Production".
- 2024 - Now Molinelli, D.: "Automatic Generating Oracles using LLMs".

Master theses

- 2025 Hu, C.: "Automatic generation of unit test cases with LLM".
- 2021 D'Agostino, L.: "Application of Geometrical Descriptors to classify Spike Proteins".
- 2019 Sadiq, T.: "Application of Face Recognition Methodologies to classify Proteins".

Bachelor theses

- 2025 Molinari, F.: "Improving Software Testing with LLMs for Code Coverage and Mutation Score".
- 2025 Zambetti, G.: "Experimental Validation of LLMs for Generating Test Suites".
- 2020 Bredl, P.: "Improving the Recall of Searching for Code Changes".

Undergraduate students

- 2024 Ramazan, P.: "Generating Test Cases in a startup using generative AI".
- 2023 Kwas, M.; Hoyler, N.; Okonnek, N.; Bertsch, M.: "Improve the Search of Code Changes".
- 2022 Chow, Y.: "Towards Automatically Repairing Type Errors in Python".
- 2021 Maria, E.: "Testing FAISS indexing on DiffSearch".

Diversity and Inclusion

Mentored underrepresented students and participated in events to support diverse people in our community.

- 06/2024 Politics Course for Researchers by the Swiss National Science Foundation (SNSF) in Bern.
- 11/2023 Trained as a hiring evaluator by the European Laboratory for Learning and Intelligent Systems (ELLIS) in diversity and women's growth in science, with a focus on gender and cultural biases.
- 05/2023 Completed advanced training: "Diversity and inclusion at Uber" during my research internship.

Administrative Responsibilities

- 2023 Official evaluator of the PhD pre-screening process to hire top international students for ELLIS.
- 2023 Official evaluator of the PhD pre-screening process for Max Planck Research School (IMPRS-IS).
- 2020 – 2022 My PhD Mentor project: promoter and member of the administrative and technical team.
- 2016 – 2017 IT Laboratory Technician: configuration of PCs and user registrations of the lab.

Teaching Experience

Lecturer

- Spring 2024 **Software Quality & Testing.** Replacement lecturer for three lectures of 90 minutes, at USI.
- Fall 2024 **Code with AI.** Guest lecturer for one lecture of 90 minutes, at University of St. Gallen.

Teaching Assistant

Teaching assistantships involve preparing and presenting exercises in class (90 minute slots), preparing and grading exams, organizing office hours, and organizing larger coding projects.

- 2020 - 2023 **Machine Learning for Programming.** Advanced seminar, where I mentored seven students.
- 2020 - 2023 **Program Analysis.** Five exercises in class with ~30 students per semester (90 minute slots).
- 2019 - 2022 **Program Paradigm.** Nine exercises in class with ~200 students per semester (90 minute slots).

Service

- 2025 Co-Chair of the Tool Demonstration Track at Internetware 2025 (co-located with FSE 2025).
- 2025 Reviewer for International Conference of Software Engineering (ICSE 2026).
- 2025 Reviewer for International Conference on Evaluation and Assessment in SE (EASE 2025)
- 2024 – Now Reviewer for Empirical Software Engineering (ESE).
- 2024 – Now Reviewer for IEEE Transactions on Software Engineering (TSE).
- 2023 – Now Reviewer for ACM Transactions on Software Engineering and Methodology (TOSEM).
- 2021 OOPSLA Artifact Evaluation Committee.
- 2020 Student volunteer for the ESEC/FSE conference (remote due to the Covid-19 pandemic).

Talks

Note: The following does not include regular paper presentations at conferences and workshop.

- 10/2024 Research talk at University of Lausanne (UNIL), Switzerland. Host: Meike Ramon.
- 06/2024 Research talk during CIRCUS at Constructor Institute, Switzerland. Host: Bertrand Meyer.
- 04/2024 Research talk "Searching for Code Changes" at Dagstuhl Seminar 24172 on Code Search.
- 09/2023 Research talk at University of Lugano (USI), Switzerland. Host: Mauro Pezzè.
- 05/2023 Invited talk by Uber in Amsterdam, Netherlands. Host: Peng Liu.
- 03/2023 Invited talk by JetBrains in Munich, Germany. Host: Alexander Bezzubov.

Languages

Italian → C2 (Native level) | English → C1 (Advanced level) | German → B1 (Intermediate level)

March 6, 2025.



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