

# Dr. Luca Di Grazia

Great Minds Fellow at HSG

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Academic Age: 1 year and 8 months



## Research Interests

My research focuses improving software security with a mix of program analysis, information retrieval, and data-driven approaches. I have performed innovative research at top software engineering universities (Top-20 CSRankings) and a tech giant (Market Cap > \$100B) among four different countries.

## Three Major Achievements

- **2025:** *Great Minds Grant* (principal investor) funded by the Universität St.Gallen with 189,747 CHF (~\$230,000) for the project *Secure Software in the Age of Massively GenAI-Generated Code*.
- **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.

## Education

- 02/2024 – **Universität Stuttgart**, Germany 🇩🇪
- 09/2019 *Degree:* Ph.D. in Computer Science (Summa cum laude). Major in Generative AI for Programming.  
*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 – **Politecnico di Torino**, 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 – **Universität St.Gallen (HSG)**, Switzerland 🇨🇭
- 08/2025 *Role:* Great Minds Fellowship. Host: Prof. Dr. Guido Salvaneschi.  
*Tasks and Takeaway:* Research leadership role to enhance software security in the age of Generative AI by developing automated security testing methods. My focus is on generating security oracles, designing frameworks for complex systems, and establishing metrics for evaluating security risks.
- 07/2025 – **Università della Svizzera Italiana (USI)**, Lugano, Switzerland 🇨🇭
- 02/2024 *Role:* Post-doctoral Researcher. Supervisor: Prof. Dr. Mauro Pezzè.  
*Tasks and Takeaway:* Conduct research on using generative AI to test software with real-world scenarios. This involved designing innovative approaches for generating 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 Programming.  
*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 – **Universität 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.

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## Peer-reviewed Conference and Journal Publications

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

- ASE 2025 **Do LLMs Generate Useful Concrete Test Oracles? An Empirical Study with an Unbiased Dataset**  
Molinelli, D.; Di Grazia, L.; Lopez, A.; Ernst, M.; Pezzè, M. *International Conf. on Automated Software Engineering*.
- TOSEM 2025 **From Today Code to Tomorrow Symphony: The AI Transformation of Developer Routine by 2030**  
Qiu, K.; Puccinelli, N.; Ciniselli, M.; Di Grazia, L.. *ACM Transactions on Software Engineering and Methodology*.

### Publications based on my PhD

- 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*.
- 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*.

### Publications based on my master thesis

- 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.; Rezanian V.; Marcolin F.; Tuszynski J. *Proteins-Structure and Bioinformatics*.
- 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*.

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## Research Funding

- 2025 *Great Minds Grant* (principal investor) funded by the Universität St.Gallen with 189,747 CHF (~\$230,000) for the project *Secure Software in the Age of Massively GenAI-Generated Code*.

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## Awards and Distinctions

- 07/2025 ACM SIGSOFT certificate in recognition of outstanding contributions to Internetwork 2025.
- 02/2024 Successfully defended my PhD with *Summa cum laude* (the highest grade in the German system).
- 06/2023 Won Uber's competition with my project on using generative AI to boost developer productivity, beating 103 teams, and presenting as winners to the Uber's CEO.
- 11/2022 ACM SIGSOFT Distinguished Paper Award at ESEC/FSE 2022 for *The Evolution of Type Annotations in Python: An Empirical Study*.
- 05/2022 Second winner at ACM Student Research Competition at ICSE 2022 for *Efficiently and Precisely Searching for Code Changes with DiffSearch* (\$300).
- 08/2020 Gnome Challenge 2020 (first phase) to *Reach a new generation of open-source coders* (\$1,000).
- 2016 – 2018 Scholarship at Polytechnic of Turin for computer engineering from 2016 to 2018 (~\$3,000/year).

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## Awards Received by Students Under My Supervision

- 06/2025 Ketai Qiu (PhD I officially co-supervise). Winner at ACM Student Research Competition at FSE'22. *Ever-Improving Test Suite by Leveraging Large Language Models*.

## Talks

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

### 2025

- 04/2025 EPFL, Switzerland. Host: Matthias Payer.
- 04/2025 IT University of Copenhagen, Denmark. Host: Paolo Tell.
- 03/2025 University of Duisburg-Essen, Germany. Host: Lucas Vincenzo Davi.

### 2024

- 11/2024 Meta FAIR, France. Host: Gabriel Synnaeve.
- 10/2024 University of Lausanne (UNIL), Switzerland. Host: Meike Ramon.
- 06/2024 Constructor Institute of Technology, Schaffhausen, Switzerland. Host: Bertrand Meyer.
- 04/2024 Dagstuhl Seminar 24172 on Code Search, Germany.

### 2023

- 09/2023 Università della Svizzera Italiana (USI), Lugano, Switzerland. Host: Mauro Pezzè.
- 05/2023 Uber in Amsterdam, Netherlands. Host: Peng Liu.
- 03/2023 JetBrains in Munich, Germany. Host: Alexander Bezzubov.

## 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.

## 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 in Stuttgart.
- 2019 - 2022 **Program Paradigm.** Nine exercises in class with ~200 students per semester in Stuttgart.
- 2017 - 2019 **Introduction to C.** Eight exercises in class with ~40 students per semester in Turin.

## Advising and Mentoring

**Note: This is a list of students for whom I was an official co-supervisor**

### PhD students

- 2024 - Now Qui, K.: *"Autonomic Testing: Testing with Scenarios from Production"*.
- 2024 - Now Molinelli, D.: *"Automatic Generating Concrete Oracles using a Neurosymbolic Approach"*.

### Master theses

- 2025 Hu, C.: *"Automatic generation of unit test cases with LLMs"*.
- 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 Automated Test Case Generation"*.
- 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"*.
- 2024 Abal, S.: *"Code Search Role in Mitigating Divergences in Software Design: A UX Perspective"*.
- 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"*.

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## Service and Reviewing

### Organizer

- 2025 Co-Chair of the Tool Demonstration Track at Internetware 2025 (co-located with FSE 2025).
- 2025 Co-Organizer Huawei workshop on software testing, hosted at USI on March 20, 2025.

### Committee member

- 2025 International Conference of Software Engineering (ICSE 2026).
- 2025 International Conference on Evaluation and Assessment in SE (EASE 2025).
- 2025 AI IDE 2025 (workshop co-located with FSE 2025).
- 2021 OOPSLA Artifact Evaluation Committee.

### Review

- 2024 – Now Empirical Software Engineering (ESE).
- 2024 – Now IEEE Transactions on Software Engineering (TSE).
- 2023 – Now ACM Transactions on Software Engineering and Methodology (TOSEM).

### 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).
- 2021 – 2022 Head of the communication team abroad for an Italian political party.
- 2020 – 2022 My PhD Mentor project: promoter and member of the administrative and technical team.
- 2020 Student volunteer for the ESEC/FSE conference (remote due to the Covid-19 pandemic).
- 2016 – 2017 IT Laboratory Technician: configuration of PCs and user registrations of the lab.

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## Languages

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

August 31, 2025.



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