SO Lab

Home   People   Research   Publications   Teaching

Looking for PhD Students

We are looking for people interested in joining the Software Lab as a PhD student. The Software Lab conducts research at the intersection of software engineering, programming languages, artificial intelligence, and security, with a focus on tools and techniques for constructing reliable, efficient, and secure software. General areas of research include:

- Artificial intelligence to reason about software (e.g., LLM agents for finding and fixing bugs)
- Static and dynamic program analysis (e.g., to infer specifications)
- Test input generation (e.g., to compare the behavior of old and new code via differential testing)

We focus on techniques that apply to real-world software systems. E.g., in the past, we have developed techniques that find and fix bugs in widely used Python, Java, C/C++, and JavaScript code bases, such as Scipy, the Java standard library, the Chrome browser, and various popular web sites.

PhD students will be hired at CISPA and eventually obtain their PhD from the University of Stuttgart. The workplace is in Stuttgart, which is where the lab is located.

Reasons for Joining the Software Lab

- The Software Lab offers a unique chance to work in and shape an ambitious and international research group. We value quality over quantity, both in terms of group size and when choosing publication venues.
- The lab is embedded into an excellent environment for research in computer science, with CISPA being a world-leading research center in security and privacy, and the University of Stuttgart being one of the top-ranked universities in Germany.
- The city of Stuttgart is a cultural and intellectual center, surrounded by beautiful hills, and it has been ranked as one of the cities with the highest quality of life in the world.
- The working language of the lab is English. Knowing German is not required.
- PhD students at the University of Stuttgart have the opportunity to take courses but are not required to do so.
- PhD students are paid a competitive salary (about 4,600 Euro per month in the first year, Bund E13 payscale).
- Regular working hours (40 per week) and 30 days of paid time off per year.
- Many PhD students visit major companies, e.g., Google, Microsoft, and IBM, for research internships during their PhD.
- Graduates of the lab are offered highly competitive and attractive jobs in academia (e.g., as a faculty member at CISPA) and industry (e.g., as a software engineer at Google).

Requirements

Please consider applying if you:

- Have obtained or will soon obtain a master degree in computer science or a related subject
- Want to pursue academic research at the highest level and obtain a PhD degree within four to five years
- Are creative and able to come up with fresh ideas to address technical challenges
- Like to write code and will not be afraid of a large software project
- Like to read and write technical texts in English
- Enjoy working with undergraduate students
- Are persistent and willing to work several years of your life on a project that many people will never understand
- Like to present your work to academic audiences, e.g., at international conferences, and to non-academic audiences (to increase the number of people that understand your work)

To better understand our research and whether it may fit your interests, please read some recent papers by our lab before you apply.

Additional Information

CISPA and the University of Stuttgart have a large interest in increasing the number of female researchers, and hence particularly encourages female candidates to apply. Applicants with a degree of disability of 50% or more will be preferred in case they are otherwise equally qualified to the other candidates. It is generally possible to work part time.

News and Events

5/2025: Matteo has successfully defended his PhD thesis on "Testing and Analysis of Quantum Software". Congrats!

5/2025: Group retreat in Maulbronn.

5/2025: Our MSR'25 paper on using LLMs for annotating software engineering artifacts has received an ACM SIGSOFT Distinguished Paper Award.

4/2025: Big news: Starting from September, the Software Lab will join CISPA, where Michael will be a faculty member while remaining a professor at the University of Stuttgart.

4/2025: Our work on DyLin, a dynamic linter for Python, will be presented at FSE'25.

4/2025: Our paper on ExecutionAgent has been accepted at ISSTA'25.

3/2025: Welcome to Cristian Cadar, who is joining the lab as a visiting professor supported by a Humboldt Research Award (picture).

3/2025: Don't like regressions? Checkout Testora, which detects regressions by leveraging the natural language information provided in pull requests.

3/2025: Michael will serve as PC co-chair of FSE 2027.

3/2025: Doehyun is joining the group as a PhD student. Welcome!

2/2025: Opinion article on agentic-AI-based software engineering.

1/2025: Our work on Treefix, an LLM-based approach toward learning-guided execution, will be presented at ICSE'25.

1/2025: Two papers accepted to FSE'25: (i) validating code changes via learning-guided execution and (ii) a study of suppressed static analysis warnings.

1/2025: Our paper on using LLMs instead of manual annotation of software engineering artifacts will be presented at MSR'25.

12/2024: Need to build and test a project? Check out ExecutionAgent, our new technique for automatically installing, configuring, and testing arbitrary software projects.

11/2024: Welcome to Jialun Cao, who is joining the

How to Apply?

Please send your application, including CV and transcripts of your studies, to **software.lab.phd@gmail.com**. There is no deadline. We are continuously looking for excellent people to join the lab. Positions will be filled as soon as we find suitable candidates.

lab as a visiting professor.

11/2024: Our work on RepairAgent, an autonomous LLM agent for program repair, will be presented at ICSE'25.

10/2024: Welcome to Zhongxin Liu, who is joining the lab as a visiting professor.

7/2024: We have an opening for a(nother) full professor in Software Engineering at the University of Stuttgart.

7/2024: Our work on calibration and correctness of LLMs for code will appear at ICSE'25.

7/2024: Michael is joining UCLA for part two of his sabbatical.

6/2024: Wasm-R3, the first record-and-replay technique for WebAssembly, will be presented at OOPSLA'24. Congrats to everyone involved in this CMU-Google-KAIST-Stuttgart collaboration.

4/2024: LintQ, our static analysis framework for checking quantum programs, will be presented at FSE'24.

3/2024: Introducing RepairAgent, the first autonomous, LLM-based agent for automated program repair.

2/2024: Michael is joining UC Berkeley for a sabbatical.

2/2024: Luca has successfully defended his PhD thesis on "Supporting Software Evolution via Search and Prediction" and is starting a post-doc at USI Lugano.

1/2024: DyPyBench, a novel benchmark of executable Python code, will be presented at FSE'24.

12/2023: Our paper on repairing static type errors in Python will be presented at ICSE'24.

12/2023: ACM SIGSOFT Distinguished Paper Award for our work on LExecutor.

10/2023: Our work on universal fuzzing with large language models will be presented at ICSE'24.

9/2023: Daniel receives the infos award for the best PhD thesis of the year 2022 in our Computer Science Department. Congrats!

8/2023: Our empirical study of workflows of GitHub Actions will be presented at ICSE'24.

8/2023: Group retreat at Obermarchtal.

7/2023: Our work on LExecutor will be presented at FSE'23. Congrats to Beatriz on the first top-tier paper during her PhD!

7/2023: Two awards at ISSTA'23: An ACM SIGSOFT

Distinguished Paper Award for bimodal taint analysis and an ACM SIGSOFT Distinguished Artifact Award for our work on WebAssembly call graphs.

7/2023: Co-organizing two Dagstuhl seminars in 2024: Code Search (April) and Automated Programming and Program Repair (October).

6/2023: Thanks to Prem Devanbu for the amazing time we had during his five-month visit of our lab.

5/2023: Interested in call graphs and/or WebAssembly? Check out our new ISSTA'23 paper.

5/2023: Luca is heading out for an internship at Uber. Have fun!

4/2023: Beatriz is joining the group as a PhD student.

2/2023: Prem Devanbu is joining the lab for five months with a Humboldt Research Award. Welcome!

2/2023: Fun and inspiring Dagstuhl seminar on Programming Language Processing.

1/2023: Our paper on bimodal taint analysis will be presented at ISSTA'23.

12/2022: Four papers accepted at ICSE'23. Congrats to everyone involved!

12/2022: Michael gets recognized as an ACM Distinguished Member.

11/2022: Our work on DiffSearch (paper, tool) will appear in IEEE TSE.

10/2022: Islem wins the ACM Student Research Competition at ASE'22 for his work on detecting inconsistencies in if-condition-raise statements.

10/2022: Our ASE'22 paper on CrystalBLEU has been selected for an ACM SIGSOFT Distinguished Paper Award.

10/2022: Our survey of code search techniques will appear in ACM CSUR.

10/2022: Huimin Hu is joining the group as a PhD student. Welcome!

9/2022: Our paper on type annotations in Python is receiving an ACM SIGSOFT Distinguished Paper Award at FSE'22.

9/2022: Michael will serve as PC Chair of ISSTA 2024.

7/2022: Our work on CrystalBLEU, a novel metric for measuring the similarity of code, will be presented at ASE'22. Congrats to Aryaz!

7/2022: Daniel successfully (with summa cum laude) defends his PhD on program analysis for WebAssembly. Congrats!

6/2022: Three papers accepted at FSE'22, on Python type annotations, on the first dynamic analysis framework for Python, and on neural code editing to generate vulnerabilities.

5/2022: Luca wins the 2nd prize in the ACM Student Research Competition at ICSE'22 for his work on DiffSearch. Congrats!

5/2022: Looking for particular kinds of code changes, e.g., to build a dataset? Check out DiffSearch, our scalable and precise search engine for code changes.

5/2022: Group retreat at Schloss Hornberg.

3/2022: Our paper on recovering precise types in WebAssembly binaries will appear at PLDI'22.

3/2022: Our paper on bugs in quantum computing platforms will appear at OOPSLA'22.

2/2022: Interview with Deutschlandfunk (one of three German national radio stations) on neural software analysis.

More news

Thesis topics

Looking for a thesis topic?

Jobs

Current job opportunities

Visitors

Information for visitors

Mail address

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