

Marian Lingsch-Rosenfeld

Doctoral Researcher in Software Verification and Formal Methods

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Research Statement

Enabling people and tools to reach their goals more safely and efficiently, and to reach goals that were previously thought unattainable, is what drives my research. I pursue this by inventing concepts, building tools and libraries that others can use to further their research, so that ideas can flourish and progress can be made faster. Building a community around these topics matters just as much to me, since bringing people together is what turns individual ideas into lasting progress and cooperation. Currently I focus on applying this in the field of software verification. However, my interests lie in the broader field of software engineering.

Education

PhD	LMU Munich , Computer Science Thesis: Standardizing the Software Verification Process - Advisor: Prof. Dr. Dirk Beyer, Software and Computational Systems Lab (SoSy-Lab) - Expected submission: March 2027	Munich, Germany Aug 2023 – present
MSc	University of Augsburg, TUM, LMU Munich , Software Engineering Graduate Program with Honors, jointly run by three universities - Final grade: 1.09, very good (German scale: 1.0 best, 4.0 pass) - Thesis: Coverage Metrics for Testing Neural Networks	Augsburg, Germany Oct 2020 – Jun 2023
Visit- ing	Kyoto University , Computer Science Exchange semester as student researcher during the Master's program Host: Prof. Kohei Suenaga, Graduate School of Informatics	Kyoto, Japan Oct 2022 – Mar 2023
BSc	LMU Munich , Mathematics - Final grade: 1.48, very good (German scale: 1.0 best, 4.0 pass) - Thesis: Asymptotic Quantifier Elimination	Munich, Germany Oct 2018 – May 2022
BSc	LMU Munich , Computer Science - Final grade: 1.07, very good (German scale: 1.0 best, 4.0 pass) - Thesis: Predicting Source Code from UML Models	Munich, Germany Apr 2018 – Jan 2021

Research Experience

LMU Munich, Chair of Software and Computational Systems , Doctoral Researcher - Co-authored two community standards for software verification (SV-LIB and verification witnesses 2.0) - Built and maintained verification, validation, and benchmarking infrastructure used across the group - Supervised 21 Bachelor's and 3 Master's theses, and 7 student research assistants - Teaching assistant for the chair's verification and software-engineering courses	Munich, Germany Aug 2023 – present
LMU Munich , Student Research Assistant - Software verification through program transformation (SoSy-Lab) - Quantum annealing and encodings into QUBO models (Mobile and Distributed Systems) - Comparison of unification algorithms (Programming and Modelling Languages)	Munich, Germany Aug 2018 – Aug 2023

Honors and Awards

Medals and prizes at **SV-COMP**, International Competition on Software Verification

2024 – 2026

- CPAchecker, verification track: gold in ReachSafety (2025, 2026), MemSafety (2025), SoftwareSystems (2025) and Falsification (2024, 2025); silver in the C Overall ranking (2024, 2025, 2026), MemSafety (2026) and Falsification (2026); second place in the SV-LIB track (2026)
- CPAchecker, validation track, correctness witnesses: gold in NoOverflows and SoftwareSystems (2024); silver in the C Overall ranking (2024, 2025, 2026), ReachSafety (2024, 2025), NoOverflows (2025, 2026), SoftwareSystems (2025) and ValidationCrafted (2025)
- CPAchecker, validation track, violation witnesses in format 2.0/2.1: gold in ReachSafety (2026); silver in the C Overall ranking (2026), ReachSafety (2025), NoOverflows (2025, 2026), SoftwareSystems (2025) and Termination (2026)
- CPAchecker, validation track, violation witnesses in format 1.0: gold in MemSafety (2025, 2026), SoftwareSystems (2025, 2026) and Termination (2025); silver in MemSafety (2024), NoOverflows (2024) and ConcurrencySafety (2025)
- MetaVal, validation track: gold in correctness-witness ReachSafety (2026); silver in correctness-witness ReachSafety and SoftwareSystems (2025) and in the violation-witness C Overall ranking (2025)
- SvLibChecker: first place in the SV-LIB track (2026)
- CPAchecker: second place in the Huawei-sponsored concurrency-challenge demonstration category (2026), awarded EUR 1,500 in prize money

Distinguished Artifact Reviewer Award

ECOOP

Awarded by the artifact evaluation committee for the quality of my reviews

2025

Most Impressive Tool Medley Award

VerifyThis at ETAPS

Awarded jointly with Gidon Ernst

2025

Scholarship, **Max Weber Program of the Elite Network of Bavaria**

Apr 2021 – Jun 2023

Bavaria-wide honors program for the highest-achieving students at state universities

Scholarship, **Studienstiftung des Deutschen Volkes**

Jun 2019 – Jun 2023

German Academic Scholarship Foundation, the country's most selective merit scholarship

Grants and Funding

Travel grant, **VerifyThis Verification Competition at ETAPS**

2025

EUR 750 to attend ETAPS 2025 in Hamilton, Canada

Selected Publications

SvLibChecker: A Light-Weight Tool for Software Model Checking

2026

D. Beyer, *M. Lingsch-Rosenfeld*

[10.1007/978-3-032-32537-2_12](https://doi.org/10.1007/978-3-032-32537-2_12) (Proc. CAV, Springer)

Transition Invariants Revisited: Termination Witnesses and Their Validation

2026

D. Beyer, M. Jankola, *M. Lingsch-Rosenfeld*

[10.1007/978-3-032-32537-2_2](https://doi.org/10.1007/978-3-032-32537-2_2) (Proc. CAV, Springer)

SV-LIB 1.0: A Standard Exchange Format for Software-Verification Tasks

Nov 2025

D. Beyer, G. Ernst, M. Jonáš, *M. Lingsch-Rosenfeld*

[10.48550/arXiv.2511.21509](https://arxiv.org/abs/10.48550/arXiv.2511.21509) (arXiv/CoRR)

Non-termination Witnesses and Their Validation

2025

Zs. Ádám, P. Ayaziová, L. Bajczi, D. Beyer, M. Jankola, **M. Lingsch-Rosenfeld**, J. Strejček
[10.1109/ASE63991.2025.00164](https://doi.org/10.1109/ASE63991.2025.00164) (Proc. ASE, IEEE)

Software Verification Witnesses 2.0

2024

P. Ayaziová, D. Beyer, **M. Lingsch-Rosenfeld**, M. Spiessl, J. Strejček
[10.1007/978-3-031-66149-5_11](https://doi.org/10.1007/978-3-031-66149-5_11) (Proc. SPIN, Springer)

Research Projects

SV-LIB

Nov 2025 – present

Co-author and maintainer of a standard exchange format for software-verification tasks

- Implemented a Python library for reading and writing SV-LIB programs, and a light-weight model checker that serves as an executable semantics for the format
- Introduced as a demonstration category in SV-COMP 2026, the first competition edition to evaluate verifiers on SV-LIB tasks

Software Verification Witnesses

Aug 2023 – present

Co-author and maintainer of the specification language that automatic verifiers use to express proofs and counterexamples in a machine-readable way

- Drove multiple extensions of the format, covering (non-)termination, concurrency and memory safety
- Maintain the format specification and the validation infrastructure used in SV-COMP

Software

CPAchecker, Contributor

Aug 2023 – present

Configurable framework for automatic software verification of C and SV-LIB programs

- Improved the overflow and concurrency analyses
- Implemented support for verification witnesses 2.0 and for SV-LIB as an input language

SvLibChecker, Author

Jan 2026 – present

Light-weight software model checker that doubles as an executable semantics for SV-LIB

PySvLib, Author

Oct 2025 – present

Python library for parsing, analyzing, and generating SV-LIB programs

MetaVal, Maintainer

Oct 2024 – present

Configurable framework allowing program transformations to be used seamlessly with any backend

DescribErr, Author

Jan 2024 – present

Tool for synthesizing precise descriptions of the error inputs under which a program fails

TransVer, Author

Nov 2023 – present

Modular program-transformation framework that reduces verification tasks, such as termination, overflows, memory safety, to reachability, so that any off-the-shelf reachability checker can solve them

Teaching and Supervision

Thesis supervision

LMU Munich

Supervised 21 Bachelor's and 3 Master's theses on program analysis, verification witnesses, program transformation, and benchmarking

Aug 2023 – present

Google Summer of Code mentoring

LMU Munich

Mentored two students contributing to open-source verification tooling

2025 – 2026

Student research assistants

Supervised seven student research assistants working on the group's verification tools and benchmarking infrastructure

LMU Munich
Aug 2023 – present

Teaching assistant

- Semantics, Elite Graduate Program (Mar 2027 – upcoming)
- Project Management, Elite Graduate Program (Oct 2025, Oct 2026 – upcoming)
- Software Verification (Apr 2026 – Oct 2026)
- Software Testing, Elite Graduate Program (Apr 2026)
- Formal Specification and Verification (Oct 2024 – Apr 2025, Oct 2025 – Apr 2026)
- Methods in Software Engineering (Apr 2025 – Oct 2025)
- Advanced practical course on Software Engineering (Apr 2024 – Jul 2024)
- Seminar: Bachelor Theses on the Analysis of Real-World Software (Oct 2023 – Apr 2024)

LMU Munich
Oct 2023 – present

Student tutor

Held tutorials alongside my own studies, before starting the PhD

- Databases, Logic and Discrete Structures, Computer Networks, and Software Analysis and Verification

LMU Munich
Oct 2019 – Sep 2022

Academic Service

SV-COMP, International Competition on Software Verification

- Organization committee: infrastructure development (SV-COMP 2025 and 2026) and tool qualification (SV-COMP 2026)
- SV-LIB language chair (SV-COMP 2027)
- Jury member for CPAchecker Validator, LIV, MetaVal, PySvLib-Validator and SvLibChecker (SV-COMP 2026), for CPAchecker and CPAchecker Validator, LIV, MetaVal and MetaVal++ (SV-COMP 2025), and for WitnessLint (SV-COMP 2024)

Jury and reviewer
Jan 2024 – present

Artifact evaluation committees

FM 2024, VMCAI 2024, ECOOP 2025, ISSRE 2025, FM 2026

Committee member

Peer review as Reviewer

- Competitions: SV-COMP 2024, 2025, and 2026

Peer review as Subreviewer

- Conferences: CAV 2025 and 2026, ASE 2025, ASE 2026 Industry Showcase, TACAS 2025 and 2026, FM 2024 and 2026, FSE 2025 and 2026, FMCAD 2026, ATVA 2025, FASE 2026, ICSE 2025, ICPC 2025
- Journals: IEEE Transactions on Software Engineering (2026), PeerJ Computer Science (2026)

Workshop organization

- CPAchecker workshops 2025 and 2026
- Joint VeWit and SV-COMP workshop 2025

Organizer

Student volunteering

- Student volunteer chair: (Programming) 2026 and ASE 2026
- Student volunteer: International Summer School Marktoberdorf 2025

Examination board (Prüfungsausschuss) support

Assisted the examination board for Computer Science

- Prepared the decisions on disability accommodations (Nachteilsausgleich)
- Supported the allocation of final-thesis topics to students

LMU Munich
Nov 2024 – present

Student representative, ConVeY Research Training Group

Represent the doctoral researchers of DFG Research Training Group 2428 (Continuous Verification of Cyber-Physical Systems)

- Organized focus-group sessions for doctoral researchers to discuss the challenges they face during the PhD

LMU Munich and TUM
Sep 2025 – present

Student representative, Faculty of Mathematics, Computer Science and Statistics

- Elected member of the faculty council and of the student council
- Participated in the university-wide convention of student councils
- Led the orientation program for around 1000 first-year students

LMU Munich
Apr 2018 – Aug 2023

Talks and Presentations

Conference talks

- **2026**
 - SvLibChecker: CAV, Lisbon
 - Transition Invariants Revisited: CAV, Lisbon
- **2024**
 - Software Verification Witnesses 2.0: SPIN, Luxembourg

Invited talks

- **2025**
 - SV-LIB 1.0: VerifyThis Online Seminar on Contract Languages

Guest lectures

- **2026**
 - SV-LIB 1.0: Elite Graduate Program in Software Engineering
- **2025**
 - Software Verification Witnesses 2.0: Elite Graduate Program in Software Engineering

Workshop and community talks

- **2026**
 - SV-LIB: SV-COMP, HCVS, CompBench, ACV, COOP, ConVeY
 - Verification witnesses: COOP, ConVeY
- **2025**
 - Verification witnesses: ConVeY, CPAchecker workshop, SV-COMP
 - LIV: Alpine Verification Meeting
- **2024**
 - Verification witnesses: ConVeY, SV-COMP, Alpine Verification Meeting
 - LIV: SV-COMP, COOP
- **2023**
 - Verification witnesses: VeWit

Certificates

Certificate for Teaching in Higher Education of the Bavarian Universities

Mar 2025

Formal teaching qualification (Zertifikat Hochschullehre der Bayerischen Universitäten), covering course design, assessment, and student supervision

Skills and Languages

Programming: Java, Python, C, Rust

Tools: Git, Docker, LaTeX, BenchExec

Languages: German (native), Spanish (native), English (fluent)

Further Publications

- AutoSV-Annotator: Integrating Deductive and Automatic Software Verification** 2025
L. Armbrorst, D. Beyer, M. Huisman, **M. Lingsch-Rosenfeld**
[10.1007/978-3-032-00942-5_4](#) (Proc. FMICS, Springer)
- TransVer: A Modular Program-Transformation Framework for Reduction to Reachability** 2025
D. Beyer, M. Jankola, **M. Lingsch-Rosenfeld**, T. Xia, X. Zheng
[10.1007/978-3-032-06847-7_1](#) (Proc. SPIN, Springer)
- Towards Automatic Structured Inference of Module Abstractions** 2025
G. Ernst, **M. Lingsch-Rosenfeld**
[10.1007/978-3-031-92196-4_15](#) (Go Where the Bugs Are (Festschrift for W. Reif), Springer)
- CPAchecker 4.0 as Witness Validator (Competition Contribution)** 2025
D. Beyer, **M. Lingsch-Rosenfeld**
[10.1007/978-3-031-90660-2_11](#) (Proc. TACAS, Springer)
- Software Verification with CPAchecker 3.0: Tutorial and User Guide** 2024
D. Baier, D. Beyer, P.-C. Chien, M.-C. Jakobs, M. Jankola, M. Kettl, N.-Z. Lee, T. Lemberger, **M. Lingsch-Rosenfeld**, H. Wachowitz, P. Wendler
[10.1007/978-3-031-71177-0_30](#) (Proc. FM, Springer)
- P3: A Dataset of Partial Program Fixes** 2024
D. Beyer, L. Grunske, M. Kettl, **M. Lingsch-Rosenfeld**, M. Raselimo
[10.1145/3643991.3644889](#) (Proc. MSR, ACM)
- CPAchecker 2.3 with Strategy Selection (Competition Contribution)** 2024
D. Baier, D. Beyer, P.-C. Chien, M. Jankola, M. Kettl, N.-Z. Lee, T. Lemberger, **M. Lingsch-Rosenfeld**, M. Spiessl, H. Wachowitz, P. Wendler
[10.1007/978-3-031-57256-2_21](#) (Proc. TACAS, Springer)
- SEGym: Optimizing Large Language Model Assisted Software Engineering Agents with Reinforcement Learning** 2024
G. Stenzel, K. Schmid, M. Kölle, P. Altmann, **M. Lingsch-Rosenfeld**, M. Zorn, T. Bücher, T. Gabor, M. Wirsing, L. Belzner
[10.1007/978-3-031-75434-0_8](#) (Proc. AISoLA, Springer)
- CEGAR-PT: A Tool for Abstraction by Program Transformation** 2023
D. Beyer, **M. Lingsch-Rosenfeld**, M. Spiessl
[10.1109/ASE56229.2023.00215](#) (Proc. ASE, IEEE)
- A Unifying Approach for Control-Flow-Based Loop Abstraction** 2022
D. Beyer, **M. Lingsch-Rosenfeld**, M. Spiessl
[10.1007/978-3-031-17108-6_1](#) (Proc. SEFM, Springer)
- Cube Bot: A Smart Factory Showcase for the Real-Time Container Architecture** 2022
J. Hirsch, M. Lichtblau, **M. Lingsch-Rosenfeld**, K. Telschig, A. Knapp
[10.1109/INDIN51773.2022.9976101](#) (Proc. INDIN, IEEE)
- Simple Quantum State Encodings for Hybrid Programming of Quantum Simulators** 2022
T. Gabor, **M. Lingsch-Rosenfeld**, C. Linnhoff-Popien
[10.1109/ICSA-C54293.2022.00040](#) (Proc. ICSA Companion, IEEE)

How to Approximate any Objective Function via Quadratic Unconstrained Binary Optimization

2022

T. Gabor, **M. Lingsch-Rosenfeld**, C. Linnhoff-Popien, S. Feld
[10.1109/SANER53432.2022.00149](#) (Proc. SANER, IEEE)

A Probabilistic Game of Life on a Quantum Annealer

2021

T. Gabor, **M. Lingsch-Rosenfeld**, C. Linnhoff-Popien
[10.1162/isal_a_00441](#) (Proc. ALIFE, MIT Press)

Preprints

Correctness Witnesses with Function Contracts

Jan 2025

M. Heizmann, D. Klumpp, **M. Lingsch-Rosenfeld**, F. Schüssele
[10.48550/arXiv.2501.12313](#) (arXiv/CoRR)