STEFAN ZETZSCHE

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EMPLOYMENT

Amazon Web Services, Applied Scientist   **Dec 2022 - Present**

- Working on programming language design, theorem proving, software verification, formalized mathematics, and neuro-symbolic AI. Based in the Agentic Automated Reasoning Group.

Meta, Software Engineer Intern   Jul 2022 - Sep 2022

- Extended a static analyzer for the Hack programming language. Advised by Mistral Contrastin.

Amazon Web Services, Applied Scientist Intern   Aug 2021 - Nov 2021

- Wrote a verified quantum circuit optimizer in the Dafny programming language. Advised by Rustan Leino.

EDUCATION

PhD Computer Science, University College London   2018 - 2023

- Wrote my thesis *Canonical Algebraic Generators in Automata Learning* on automata learning, Kleene algebra, and category theory. Supported through grants of VeTSS and ERC. Part of the Programming Principles, Logic, and Verification (PPLV) Group. Advised by Alexandra Silva and Matteo Sammartino.

MSc Mathematics, University of Hamburg   2016 - 2018

- Wrote my thesis *Generalised Duality Theory for Monoidal Categories and Applications* on category theory (First-Class Honours 1.0). Advised by Christoph Schweigert. Graduated with First-Class Honours with Distinction 1.0.

BSc Mathematics, University of Hamburg   2014 - 2016

- Wrote my thesis *Isomorphism Classes of Vertex-Transitive Tournaments* on group and graph theory (First-Class Honours 1.0). Minor in Computer Science. Advised by Matthias Hamann.

PUBLICATIONS

Conferences

[C1] *CLEVER: A Curated Benchmark for Formally Verified Code Generation*   2025
A. Thakur, J. Lee, G. Tsoukalas, M. Sistla, M. Zhao, **S. Zetzsche**, G. Durrett, Y. Yue, S. Chaudhuri
Conference on Neural Information Processing Systems (NeurIPS)

[C2] *Verified Foundations for Differential Privacy*   2025
M. Medeiros, M. Naveed, T. Lepoint, T. Kahsai, T. Ravitch, **S. Zetzsche**, A. Joshi, J. Tassarotti,
A. Albarghouthi, J. Tristan
Distinguished Artifact Award
Conference on Programming Language Design and Implementation (PLDI)

[C3] *Compiler Fuzzing in Continuous Integration: a Case Study on Dafny*   2025
K. Boonriong, **S. Zetzsche**, A. F. Donaldson
International Conference on Software Testing, Verification and Validation (ICST)

[C4] *Well-Behaved (Co)algebraic Semantics of Regular Expressions in Dafny*   2024
S. Zetzsche, W. Różowski
International Colloquium on Theoretical Aspects of Computing (ICTAC)

[C5] *Generators and Bases for Monadic Closures*   2023
S. Zetzsche, A. Silva, M. Sammartino
Conference on Algebra and Coalgebra in Computer Science (CALCO)

[C6] *Guarded Kleene Algebra with Tests: Automata Learning*   2022
S. Zetzsche, A. Silva, M. Sammartino
Conference on Mathematical Foundations of Programming Semantics (MFPS)

[C7] *Canonical Automata via Distributive Law Homomorphisms*   2021
S. Zetzsche, G. v. Heerdt, M. Sammartino, A. Silva
Conference on Mathematical Foundations of Programming Semantics (MFPS)

Workshops

[W1] *ATLAS: Automated Toolkit for Large-Scale Verified Code Synthesis*   2026
M. Bakšys, **S. Zetzsche**, O. Bouissou, S. Kong, R. Delmas
Dafny Workshop at the Symposium on Principles of Programming Languages (POPL)

[W2] *MiniF2F-Dafny: LLM-Guided Mathematical Theorem Proving via Auto-Active Verification*   2026
M. Bakšys, **S. Zetzsche**, O. Bouissou
Dafny Workshop at the Symposium on Principles of Programming Languages (POPL)

[W3] *DafnyPro: LLM-Assisted Automated Verification for Dafny Programs*   2026
D. Banerjee, O. Bouissou, **S. Zetzsche**
Dafny Workshop at the Symposium on Principles of Programming Languages (POPL)

[W4] *CLEVER: A Curated Benchmark for Formally Verified Code Generation*   2025
A. Thakur, J. Lee, G. Tsoukalas, M. Sistla, M. Zhao, **S. Zetzsche**, G. Durrett, Y. Yue, S. Chaudhuri
AI for Math Workshop at the International Conference on Machine Learning (ICML)

[W5] *Well-Behaved (Co)algebraic Semantics of Regular Expressions in Dafny*   2025
S. Zetzsche, W. Różowski
Dafny Workshop at the Symposium on Principles of Programming Languages (POPL)

[W6] *Verifying the Fisher-Yates Shuffle Algorithm in Dafny*   2025
S. Zetzsche, T. Lepoint, J. Tristan, M. Mayer
Dafny Workshop at the Symposium on Principles of Programming Languages (POPL)

[W7] *Dafny as Verification-Aware Intermediate Language for Code Generation*   2025
Y. C. Li, **S. Zetzsche**, S. Somayyajula
Dafny Workshop at the Symposium on Principles of Programming Languages (POPL)

[W8] *Randomised Testing of the Dafny Compiler: Into the CI*   2025
K. Boonriong, A. F. Donaldson, **S. Zetzsche**
Dafny Workshop at the Symposium on Principles of Programming Languages (POPL)

[W9] *VMC: a Dafny Library for Verified Monte Carlo Algorithms*   2024
F. Zaiser, **S. Zetzsche**, J. Tristan
Dafny Workshop at the Symposium on Principles of Programming Languages (POPL)

SUPERVISION

Interns at Amazon Web Services

- Jonas Bayer (PhD Student at the University of Cambridge)   2025
- Mantas Bakšys (PhD Student at the University of Cambridge)   2025
- Debangshu Banerjee (PhD Student at the University of Illinois Urbana-Champaign)   2025
- Yue Chen Li (Undergraduate Student at MIT)   2024
- Wojciech Różowski (PhD Student at the University College London)   2024
- Fabian Zaiser (PhD Student at the University of Oxford)   2023
- Yann Herklotz (PhD Student at Imperial College London)   2022

TEACHING

Teaching Assistant

- *Logic and Database Theory*, University College London   2020
- *Discrete Mathematics for Computer Scientists*, University College London   2020
- *Computability and Complexity*, University College London   2020
- *Theory of Computation*, University College London   2019
- *Principles of Programming*, University College London   2019
- *Discrete Mathematics for Computer Scientists*, University College London   2018
- *Analysis I*, University of Hamburg   2017

- *Linear Algebra and Analytic Geometry II*, University of Hamburg — 2016
- *Linear Algebra and Analytic Geometry I*, University of Hamburg — 2015

TALKS

[T1] COMP0010 Software Engineering module at the University College London — 2025

[T2] Dafny Workshop at the Symposium on Principles of Programming Languages (POPL) — 2025

[T3] International Colloquium on Theoretical Aspects of Computing (ICTAC) — 2024

[T4] South of England Regional Programming Languages Seminar (SREPLS) at Jane Street — 2024

[T5] Theoretical Computer Science Seminar Series at the University of Birmingham — 2023

[T6] Oxford Advanced Seminar on Informatic Structures at the University of Oxford — 2023

[T7] Programming Languages Discussion Group at Cornell University — 2023

[T8] Lectures on Logic and its Mathematical Aspects Seminar at the University of Amsterdam — 2023

[T9] Programming Principles, Logic, and Verification Seminar at the University College London — 2023

[T10] Conference on Algebra and Coalgebra in Computer Science (CALCO) — 2023

[T11] Conference on the Mathematical Foundations of Programming Semantics (MFPS) — 2022

[T12] Programming Principles, Logic, and Verification Seminar at the University College London — 2022

[T13] Lectures on Logic and its Mathematical Aspects Seminar at the University of Amsterdam — 2022

[T14] Symposium on Compositional Structures (SYCO) at the Tallinn University of Technology — 2021

[T15] Conference on the Mathematical Foundations of Programming Semantics (MFPS) — 2021

[T16] Programming Principles, Logic, and Verification Seminar at the University College London — 2021

[T17] Programming Principles, Logic, and Verification Reading Group at the University College London — 2020

[T18] VeTSS Verified Software Workshop at the Isaac Newton Institute for Mathematical Sciences — 2019

[T19] Scottish Programming Languages and Verification Summer School — 2019

[T20] School of Computer Science at the University of Birmingham — 2018

PROFESSIONAL SERVICES

Artifact Evaluator

- International Conference on Computer-Aided Verification (CAV) — 2025
- Conference on Programming Language Design and Implementation (PLDI) — 2025
- International Conference on Functional Programming (ICFP) — 2025
- Symposium on Principles of Programming Languages (POPL) — 2025
- Conference on Systems, Programming, Languages and Applications: Software for Humanity (SPLASH) — 2025
- International Conference on Functional Programming (ICFP) — 2024
- Conference on Programming Language Design and Implementation (PLDI) — 2024
- Symposium on Principles of Programming Languages (POPL) — 2024
- International Conference on Computer-Aided Verification (CAV) — 2023
- International Conference on Computer-Aided Verification (CAV) — 2022

Organizer

- Dafny Workshop at the Symposium on Principles of Programming Languages (POPL) — 2026
- South of England Regional Programming Languages Seminar (SREPLS) — 2025
- Dafny Workshop at the Symposium on Principles of Programming Languages (POPL) — 2025
- Dafny Workshop at the Symposium on Principles of Programming Languages (POPL) — 2024

Student Volunteer

- International Conference on Computer-Aided Verification (CAV) 2021
- Conference on Systems, Programming, Languages and Applications: Software for Humanity (SPLASH) 2020
- Symposium on Principles of Programming Languages (POPL) 2020
- Conference on Programming Language Design and Implementation (PLDI) 2020
- Conference on Mathematical Foundations of Programming Semantics (MFPS) 2019
- Conference on Algebra and Coalgebra in Computer Science (CALCO) 2019

Mentor

- Symposium on Principles of Programming Languages (POPL) 2021
- Conference on Systems, Programming, Languages and Applications: Software for Humanity (SPLASH) 2020

Program and (Sub-)Review Committee Member

- International Conference on Machine Learning (ICML) 2025
- International Conference on Computer-Aided Verification (CAV) 2025
- Conference on Algebra and Coalgebra in Computer Science (CALCO) 2023
- International Symposium on Model Checking of Software (SPIN) 2023

Program Committee Chair

- Dafny Workshop at the Symposium on Principles of Programming Languages (POPL) 2026
- Dafny Workshop at the Symposium on Principles of Programming Languages (POPL) 2025
- Dafny Workshop at the Symposium on Principles of Programming Languages (POPL) 2024