# STEFAN ZETZSCHE

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## EXPERIENCE

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

- Working on software verification, formalized mathematics, and generative AI. Part of the Automated Reasoning Group.
- Among others, contributed to SampCert's verified implementations of randomized algorithms in AWS Clean Rooms and to Automated Reasoning checks in Amazon Bedrock Guardrails which help prevent factual errors from LLM hallucinations through symbolic reasoning.
- Involved in the supervision of a number of interns, e.g., Yann Herklotz (Imperial), Yue Chen Li (MIT), Wojciech Różowski (UCL), Fabian Zaiser (Oxford).

**Software Engineer Intern**, Meta — Jul 2022 - Sep 2022

- Extended an OCaml static analyzer for the Hack programming language. Facebook's web codebase contains more than a hundred million lines of Hack code. Advised by Mistral Contrastin.

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

- Implemented and formally proved correct a quantum circuit optimizer in the verification-aware programming language Dafny. 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 VeTTs and ERC. Part of the Programming Principles, Logic, and Verification (PPLV) Group. Advised by Alexandra Silva.

**MSc Mathematics**, University of Hamburg (First-Class Honours with Distinction 1.0) — 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.

**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.

## SELECTED PUBLICATIONS

*Verifying the Fisher-Yates Shuffle Algorithm in Dafny.* Dafny workshop at POPL, 2025.
*Dafny as Verification-Aware Intermediate Language for Code Generation.* Dafny workshop at POPL, 2025.
*Compiler Fuzzing in Continuous Integration: a Case Study on Dafny.* ICST, 2025.
*Verified Foundations for Differential Privacy.* Submitted to PLDI, 2025.
*Well-Behaved (Co)algebraic Semantics of Regular Expressions in Dafny.* ICTAC, 2024.
*VMC: a Dafny Library for Verified Monte Carlo Algorithms.* Dafny workshop at POPL, 2024.
*Generators and Bases for Monadic Closures.* CALCO, 2023.
*Guarded Kleene Algebra with Tests: Automata Learning.* MFPS, 2022.
*Canonical Automata via Distributive Law Homomorphisms.* MFPS, 2021.

## TEACHING ASSISTANCE

Logic and Database Theory (UCL '20), Discrete Mathematics for Computer Scientists (UCL '20), Computability and Complexity (UCL '20), Theory of Computation (UCL '19), Principles of Programming (UCL '19), Discrete Mathematics for Computer Scientists (UCL '18), Analysis I (UHH '17), Linear Algebra and Analytic Geometry I & II (UHH '15,'16)

## VOLUNTEERING

Artifact evaluator (CAV '22,'23; ICFP '24; PLDI '24,'25; POPL '24,'25; SPLASH '25), organizer (Dafny workshop at POPL '24,'25), mentor (POPL '21; SPLASH '20), student volunteer (CALCO '19; CAV '21; ICALP '21; MFPS '19; PLDI '20; POPL '20; SPLASH '20), reviewer (CALCO '23; SPIN '23), program chair (Dafny workshop at POPL '24,'25)