**STEFAN ZETZSCHE**

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## EXPERIENCE

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

- Part of Amazon's Automated Reasoning Group, where I'm involved in programming language design, theorem proving, software verification, formalized mathematics, and neuro-symbolic AI.
- Contributed to DafnyVMC's and SampCert's verified implementations of randomized algorithms in Dafny and Lean, respectively, which are deployed in AWS Clean Rooms. Worked on Automated Reasoning checks in Amazon Bedrock Guardrails, which helps prevent LLM hallucinations through symbolic reasoning.
- Supervised a number of interns, e.g., Yann Herklotz (Imperial), Yue Chen Li (MIT), Wojciech Różowski (UCL), Fabian Zaiser (Oxford). Served as a point of contact for and collaborated with numerous Amazon supported academics.

**Meta**, Software Engineer Intern — 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.

**Amazon Web Services**, Applied Scientist Intern — 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 — 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.

## SELECTED PUBLICATIONS

*CLEVER: A Curated Benchmark for Formally Verified Code Generation.* Preprint, 2025.
*Verified Foundations for Differential Privacy.* PLDI, 2025.
*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.
*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

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,'25; ICFP '24,'25; 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), sub-reviewer (CALCO '23; SPIN '23), program chair (Dafny workshop at POPL '24,'25), program committee (CAV '25)