

CLAUDIA CAULI, PhD

Software Correctness Engineer | Team Lead | Huawei R&D

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PERSONAL SUMMARY

Software Engineer specialising in software correctness, systems reliability, and provable assurance. I integrate automated reasoning and formal verification into software systems — including AI and agentic pipelines — to build software that is provably correct and trustworthy, particularly where bugs are costly or carry regulatory or criminal liabilities. 9+ YoE spanning research, engineering, and team leadership. Recipient of Huawei's Individual Gold Medal 2025, awarded to the top 1% of employees globally.

PROFESSIONAL EXPERIENCE

06/2024 - *current* **Team Lead - Principal Research Engineer (G19)** Huawei R&D

- Built and led a 5-person Formal Methods team across China and Europe; set verification methodology and strategic direction for critical cloud infrastructure reliability.
- Led protocol-level verification of Huawei Cloud KVS's transaction and replication protocols with P and TLA⁺. Prevented 6 critical atomicity and consistency bugs from reaching production.
- Coordinated code-level verification of Go codebases with Gobra and Dafny.
- Unblocked launch of a core IAM security feature by reducing verification runtimes of 8–270x through abstraction techniques and SMT optimisations. Identified and fixed 7 soundness bugs.
- Verified the eBPF validator in **DPDK**: from fuzzing to bounded model checking (CBMC/ESBMC) and deductive verification (Frama-C/WP), augmented by LLM-assisted reasoning. Discovered 15 bugs (4 high-severity). All fixes formally verified with ESBMC and Frama-C/WP.
- Advancing proposals on agentic systems combining AI and formal methods, with a long-term vision for multi-modal agentic code reasoning towards provable reliability.

10/2021 - 06/2024 **Applied Scientist L5** AWS Automated Reasoning Group

- Built a domain-specific language for modelling AWS service designs to detect privilege escalation vulnerabilities. Implemented compiler and verification backends using Tamarin and Boogie.
- Partnered with AWS AppSec and product teams to capture security requirements for verification.
- Diagnosed a distributed systems bug surfaced by P model checking; identified the root cause.
- Mentored 5 junior team members. Interviewed 19 candidates.

07/2019 - 09/2019 **SDE Intern** AWS AppSec & ARG

Automated the pre-deployment static analysis of IaC templates for detecting security misconfigurations.

04/2018 - 06/2018 **SDE Intern** AWS AppSec & ARG

Worked on knowledge representation, reasoning, and ontologies for machine-readable threat models.

EDUCATION

10/2016 - 09/2021 **CS PhD** Chalmers University & University of Gothenburg (Sweden)

09/2015 - 09/2016 **MSc in Advanced Computational Methods**, University of Leicester (UK)

10/2013 - 07/2015 **BSc in Computer Science**, Università di Cagliari (Sardinia, Italy)

SKILLS & TECHNOLOGIES

Programming: Rust, Go, Java, C++, Bash, ANTLR, Git
Property-based Testing: QuickCheck, PropTest, Hypothesis
Model Checking: CBMC, ESBMC, Kani
Code-level Verification: Dafny, Gobra, Lean, Boogie, Viper
Model-based Specification: TLA⁺, P
Solvers & Provers: Z3, CVC5, Tamarin
Domains: Cloud Infrastructure, Distributed Systems, IAM, Security, Network Protocols

EVENTS & SERVICE

Co-organizer Dagstuhl “Neurosymbolic Reasoning About Policies and Legal Texts” 2026
Participant Dagstuhl “Resilient Software Configuration and Infrastructure Code Analysis” 2023
PC Member CAV 2025, TACAS 2024, CAV 2023

PATENTS & PUBLICATIONS

1. Cauli C, et al. *Lessons Learned from Incorporating Formal Methods in Huawei Cloud Reliability*. EuroSys 2026
2. Cauli C, Pre-deployment Description Logic-based Reasoning for Cloud Infrastructure Security. PhD Thesis, 2022 [🔗](#)
3. Cauli C, Ortiz M, Piterman N. *Actions over Core-closed Knowledge Bases*. IJCAR 2022 [🔗](#)
4. Cauli C, Ortiz M, Piterman N. *Closed- and Open-world Reasoning in DL-Lite for Cloud Infrastructure Security*. KR 2021 [🔗](#)
5. Tkachuk O, Cauli C, Rungta N, Bolignano P V, Hortala J R, Maher S. *Automatically generating a machine-readable threat model using a template associated with an application or service*. US Patent 11,128,653. Assignee: Amazon Technologies Inc [🔗](#)
6. Cauli C, Li M, Piterman N, Tkachuk O. *Pre-Deployment Security Assessment for Cloud Services through Semantic Reasoning*. CAV 2021 [🔗](#)
7. Cauli C, Piterman N. *Equivalence of μ^p -Calculus and p -Automata*. CIAA 2017 [🔗](#)