

Luisa Cicolini

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creativity and formal methods enthusiast, PhD student at the University of Cambridge

Projects

Formalized Semantics For Hardware Verification

September 2024 - present

I am interested in bridging maths and hardware verification, combining bitvectors and coinduction for the verification of latency-insensitive hardware abstractions.

Formalized RISC-V Instruction Set Architecture

March 2025 - present

I work on a fully-bitblastable library for the RISC-V Instruction Set Architecture, proven equivalent to the Sail processor model and aimed at verifying LLVM's backend, particularly the code generation pass. In the process, I also contributed to the development of LLVM's GlobalSel selector.

BitVec in Lean4

July 2024 - present

I have contributed to Lean4, working on the development of Lean's bitvector library and verified bitblaster.

Model Checking For CIRCT

September 2023 - March 2026

I worked on formalizing the semantics of CIRCT's Finite State Machine (FSM) dialect, enabling CIRCT to integrate verification at a higher level of the stack. The pass is now upsteraimed to CIRCT!

Accelerating Regular Expressions Matching

March 2022 - September 2023

I worked on the Multi-Finite-State-Automaton model, aimed at accelerating regex pattern matching.

Talks & Publications

- L. CICALINI, S. L. Kuhn, O. Yasar "Scaling Certified Instruction Selection for LLVM IR Through Bitblasting," technical talk at EuroLLVM' 2026
- H. Böving, S. B. Mala, L. CICALINI, et al. "Interactive Bitvector Reasoning using Verified Bit-Blasting," OOPSLA' 25
- B. Healy, L. CICALINI "Exploiting MLIR Abstractions for Hardware Verification," technical talk at LLVM-dev 2024
- L. CICALINI, F. Carloni, et al., "One Automaton to Rule Them All: Beyond Multiple Regular Expressions Execution," CGO' 24
- B. Branchini, G. Gerometta, L. CICALINI, et al., "Surfing the wavefront of genome alignment," ISCAS' 22

Education

University of Cambridge, UK

- 2025-present, Ph.D. Student with the Cascade Centre
- 2024-2025, Research Assistant

University of Edinburgh, UK

- 2023, Postgraduate Visiting Research Student
- 2023, Teaching Assistant - Theoretical Computer Science

Politecnico di Milano, Italy

- 2024, Abilitazione Professionale - Ingegnere dell' Informazione
- 2021-2023, M.Sc. Computer Science and Engineering
- 2022, Tutor - Progetto di Algoritmi e Principi dell' Informatica
- 2021, Tutor - Informatica A
- 2020-2023, Member - Polifonia Student Association
- 2020-2023, Member/Chair - IEEE Women In Engineering SB
- 2020, Mentee - Lead the Future
- 2018-2023, Research Student - NECSTLab and NECSTCamp
- 2017-2020, B.Sc. Energy Engineering

Technische Universitaet Muenchen, Germany

- 2019-2020, Exchange Student (Erasmus)

Certificates

- Goethe Zertifikat B2 - CEFR B2 - 2016
- Cambridge Proficiency English - CEFR C2 - 2017
- TOEFL iBT - 116/120 - 2023

Misc

- I volunteered with kids and elderlies during summer camps.
- I enjoy playing the piano and singing. I started studying music as a kid and have since performed with different bands - I still love joining a jam session whenever I can.
- I was a student volunteer at DATE (2019 and 2022 (virtual)), PLDI (2024), OOPSLA (2025).
- I was the CGO Publicity Chair in 2024, 2025, 2026.
- I am part of Lead the Future - first as a mentee, now as a mentor. I find meaning in sharing my experience (and mistakes) with younger students and members of the community.