

Anna Becchi



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Date of birth 4 October 1995 Nationality Italian Gender Female

ABOUT ME

I'm a PhD student working on automated formal verification of infinite-state transition systems. My research interests include SMT-based invariant checking techniques and their interaction with approaches based on abstract interpretation. I developed an efficient domain for convex polyhedra, applied to both static analysis and reachability of piecewise constant hybrid systems. I am working on an industrial project addressing the migration from legacy implementations to modern ones for Railway Interlocking Systems, where I tackle reverse engineering, verification, and automated test case generation from electro-mechanical circuits.

CURRENT POSITION

2021 – Today **Enrolled Ph.D. Student in Computer Science**

Institute Fondazione Bruno Kessler *and* Information Engineering and Computer Science Doctoral School, University of Trento, Italy

Topic *Formal verification of complex cyberphysical systems*

Supervisor Prof. Alessandro Cimatti

WORK EXPERIENCE

2019 – 2021 **Software developer**

Fondazione Bruno Kessler, Trento, Italy

Role Team work for industrial projects and research assistant in the *Embedded Systems* (now *Formal Methods*) Unit.

EDUCATION

2017–2020 **Master's Degree in Computer Science**

Institute Department of Mathematics, Computer Science and Physics, University of Udine, Italy.

Curriculum *Languages, Concurrent and Distributed Systems: Analysis and Verification.*

Final grade 110/110 *with honors*

Thesis *Synthesis of P-stable Abstractions for Hybrid Systems*, July 2020

Supervisor Prof. Angelo Montanari; Co-supervisor: Prof. Alessandro Cimatti

2014–2017 **Bachelor's Degree in Computer Science**

Institute Department of Mathematical, Physical and Computer Sciences, University of Parma, Italy

Final grade 110/110 *with honors*

Thesis *NNC Polyhedra: a New Representation and Conversion Algorithm*, September 2017, in Italian, Supervisor: Prof. E. Zaffanella.

2009–2014 **High School Diploma**

Institute Liceo Scientifico G. Marconi, Parma, Italy

Final grade 100/100

PUBLICATIONS

Selected publications (complete list available at my [dblp page](#)).

Conferences

CAV'23 "Searching for i-Good Lemmas to Accelerate Safety Model Checking", Y. Xia, A. Becchi, A. Cimatti, A. Griggio, J. Li, G. Pu

DSN-W'23 "SMT-Based Stability Verification of an Industrial Switched PI Control Systems", S. Basagiannis, L. Battista, A. Becchi, A. Cimatti, G. Gantamidis, S. Mover, A. Tacchella, S. Tonetta, V. A. Tsachouridis

CAV'22	"Abstraction Modulo Stability for Reverse Engineering", A. Becchi, A. Cimatti
TACAS'22	"NORMA: a tool for the analysis of Relay-based Railway Interlocking Systems", A. Amendola, A. Becchi, R. Cavada, A. Cimatti, A. Ferrando, L. Pilati, G. Scaglione, A. Tacchella, M. Zamboni
SEFM'20	"Synthesis of P-Stable Abstractions", A. Becchi, A. Cimatti, E. Zaffanella
ISoLa'20	"A Model-Based Approach to the Design, Verification and Deployment of Railway Interlocking System ", A. Amendola, A. Becchi, R. Cavada, A. Cimatti, A. Griggio, G. Scaglione, A. Susi, A. Tacchella, M. Tessi
SAS'19	"Revisiting Polyhedral Analysis for Hybrid Systems", A. Becchi, E. Zaffanella, Winner of Radhia Cousot Young Researcher Best Paper Award
SAS'18	"An Efficient Abstract Domain for Not Necessarily Closed Polyhedra ", A. Becchi, E. Zaffanella
CAV'18	"A Direct Encoding for NNC Polyhedra", A. Becchi, E. Zaffanella
Journals	
SoSyM '24	"P-Stable abstractions of hybrid systems", A. Becchi, A. Cimatti, E. Zaffanella
Inf&Comp '20	"PPLite: Zero-overhead encoding of NNC polyhedra", A. Becchi, E. Zaffanella

AWARDS

2019 Radhia Cousot Young Researcher Best Paper Award

Awarded by the program committee of the Static Analysis Symposium 2019, for the paper *Revisiting Polyhedral Analysis for Hybrid Systems*, A. Becchi, E. Zaffanella.

ADDITIONAL EXPERIENCES

Dagstuhl Seminar	Participant and collector of Dagstuhl seminar <i>Theoretical Advances and Emerging Applications in Abstract Interpretation</i> , July 2023
MOD'23	Marktoberdorf Summer School <i>Safety and Security through Formal Verification</i>
VTSA'22	EuroProofNet Summer School on Verification Technology, Systems & Applications 2022

SERVICE

AEC member	CAV'22, SAS'22, CAV'23, CAV'24, SAS'24
Subreviewer	TACAS'20, CAV'20, SEFM'20, SETTA'20, TACAS'21, ATVA'21, TACAS'22, SEFM'22, FMCAD'22, CAV'22, ATVA'22, TACAS'23, TACAS'24, CAV'24
Student Volunteer	FLoC'18, FLoC'22, FMCAD'22

PROJECTS

LRA-BDD	C++ library combining MTBDDs and convex polyhedra. Main developer. 2020 – 2022
NORMA	Tool for the analysis of Relay-based Railway Interlocking System, leveraging DIA frontend, nuXmv model checker, PySMT library and MathSAT solver. Contributor. 2020 – 2021
PPLite	C++ library for the convex polyhedra abstract domain (web page). Main developer. 2017 – 2020
PHAVerLite	Hybrid systems verifier (web page). Contributor. 2018 – 2019

LANGUAGES

Italian	Mother tongue
English	First Certificate in English (FCE) - B2