

# Preface

The use of *Artificial Intelligence* (AI) within the context of safety-critical systems has been experiencing continuous growth for a number of years now. On top of that, the research community is currently aiming to integrate sub-symbolic approaches with symbolic ones to foster their usage in critical scenarios such as, for example, safety-critical systems. These applications call for the adoption of *Formal Methods* (FM) techniques for the design, verification and synthesis of reliable and robust systems. The intersection between the AI and the FM communities is therefore more and more important.

OVERLAY 2024 was the 6<sup>th</sup> edition of the *International Workshop on Artificial Intelligence and fOrmal VERification, Logic, Automata, and sYnthesis*. Supported by the OVERLAY group (<https://overlay.uniud.it>), its primary objective is to establish and sustain a long lasting scientific platform dedicated to topics in the intersection of AI and FM.

This year's edition (<https://overlay.uniud.it/workshop/2024/>) took place on November 28-29, 2024 at the Faculty of Engineering of Free University of Bolzano, Italy, and was the first edition standing on its own. We acknowledge partial funding support of:

- Department of Mathematics and Physics “Ennio De Giorgi” University of Salento;
- AIPlan4EU project: PURPLE project, 1st Open Call for Innovators of the AIPlan4EU H2020 project, a project funded by EU Horizon 2020 research and innovation programme under GA n. 101016442 (since 2021).

A huge thank you goes to Nicola Gigante at Free University of Bolzano who served as the chair of the local organization committee, kept the OVERLAY website always up to date and formatted these proceedings. We also want to thank Andrea Mazzullo and Tiziano Delmonte at the same university for providing additional precious help with the local organization.

The review process involved 22 PC members (plus 4 additional sub-reviewers) whose affiliations came from 6 different countries: Australia (1), Austria (1), France (2), Germany (1), Italy (19), Netherlands (1). Eventually, 16 extended abstracts were accepted for presentation out of a total of 18 submissions that involved 57 authors whose affiliations came from 9 different countries: Australia (1), Austria (1), Germany (1), Hungary (3), Italy (42), Netherlands (5), Spain (1), United Kingdom (2), and USA (1).

Five sessions organized the presentations of the accepted papers:

- Session 1: Model Checking and Hybrid Systems, chaired by Angelo Montanari (University of Udine, Italy);
- Session 2: Formal Methods, chaired by Tiziano Villa (University of Verona, Italy);
- Session 3: Formal Methods for AI - Part 1, chaired by Stefano Tonetta (Fondazione Bruno Kessler, Trento, Italy);
- Session 4: Formal Methods for AI - Part 2, chaired by Davide Bresolin (University of Padova, Italy);
- Session 5: Applications, chaired by Leonardo Picchiami (Sapienza University of Rome, Italy).

The accepted contributions exemplify seamless integration between artificial intelligence and formal methods.

The invited talk “*Mixing automated temporal planning and ML: the role of opaque entities and RL-based guidance synthesis*” that was given by Andrea Micheli from Fondazione Bruno Kessler, Trento, Italy, presented a fascinating approach on how to integrate planning and Machine Learning (ML) as part of the research funded by an ERC grant held by Andrea himself.

Furthermore, OVERLAY 2024 had a *Panel* where Andrea Micheli, Marco Montali (Free University of Bolzano, Italy) and Angelo Montanari took part in a discussion on the relationship between formal methods and AI, under the moderation of Nicola Gigante.

OVERLAY 2024 witnessed a vibrant participation of around 40 attendees, fostering discussions among researchers bridging the realms of AI and FM. The contributions collected in these proceedings prove the outstanding quality of the submissions received.

Finally, we extend our gratitude to all authors and participants and we want to stress one last time that OVERLAY is more than a workshop.

Long live OVERLAY!

The chairs,

Daniele Porello, University of Genova, Italy  
Cosimo Vinci, University of Salento, Italy  
Matteo Zavatteri, University of Padova, Italy.