Preface

The use of *Artificial Intelligence* (AI) in the context of safety-critical systems has constantly grown in the last years. These applications calls for the adoption of *Formal Methods* (FM) techniques for the design, verification and synthesis of reliable and robust systems. The collaboration between the AI and the FM communities is therefore of increasing importance.

The OVERLAY 2022 workshop is the *4th Workshop on Artificial Intelligence and fOrmal VERification, Logic, Automata, and sYnthesis*. It is sponsored by the OVERLAY group (`https://overlay.uniud.it`) and has the objective of creating and maintaining a long-term scientific forum for topics in the intersection between AI and FM.

This year's edition (`https://overlay.uniud.it/workshop/2022/`) was held on November 28th, 2022 in Udine, Italy, and it was co-located with AIxIA 2022 (`https://aixia2022.uniud.it`). Out of seventeen submissions (ten from Italy, three from Germany, one from United Kingdom and one from China), fifteen papers have been accepted. The topics of the accepted papers are perfect examples of the integration between artifical intelligence and formal methods, ranging from neural network verification and model checking to epistemic logics and temporal reasoning. The invited talk was given by Luca Bortolussi (University of Trieste) about the task of learning Signal Temporal Logic formulas from data or models.

The OVERLAY 2022 workshop had an encouraging number of participants, ranging from thirty to fourty people, which gave life to many interesting discussions between AI and FM researchers. Several people among the participants came from industry, witnessing the concrete importance of the integration of AI and FM outside of academia as well. The works collected in these proceedings are, similarly, witnesses of the excellent quality of the submitted papers.

We thank all the people who made this event possible: the authors of the contributed papers, the reviewers and the PC members and the invited speaker. We also want to thank the organizers of AIxIA 22, Angelo Montanari, Agostino Dovier and Andrea Orlandini for kindly hosting the workshop. Finally, a huge thank you to Nicola Gigante which, in addition of having provided an excellent support with the website, has formatted these proceedings.

The chairs,

Luca Geatti
Guido Sciavicco
Alessandro Umbrico