Exploring the Universe with Artificial Intelligence (UniversAI)
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I. Liodakis & V. Efthymiou, eds.
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Preface

The International Astronomical Union Symposium 397 UniversAI, convened in Athens, Greece on 2–6 June 2025, represented a landmark in the evolving dialogue between astronomy and computer science. Since the beginning of computer science, there has not been any other discipline more closely related to astrophysics and cosmology. While the first artificial intelligence applications in astronomy date back to the 60s, and become more and more popular with each passing day, we have still only just scratched the surface. Astrophysics and Cosmology have recently entered a new big-data multimessenger era. We are constantly acquiring new astrophysics knowledge, but we are still using obsolete ways of processing and representing it. In the next few years, the field of astrophysics will see a revolution across the electromagnetic spectrum, gravitational wave spectrum, and high-energy particles, which will only make things worse. Current and upcoming experiments will generate an immense amount of data that will likely remain largely unutilized if we do not find new and creative ways to handle, structure and represent them. The meeting was conceived to address one of the defining challenges of modern astrophysics: the upcoming unprecedented scale and complexity of astronomical data, and the transformative potential of artificial intelligence to unlock its meaning. This special volume includes 43 of the symposium's invited and contributed talks.

UniversAI, which included 109 participants from 28 countries, took place on the grounds of the historical campus of Harokopio University of Athens. Harokopio was established as a school for home economics in 1929 and converted to a University in 1990. During the meeting, we covered all topics related to artificial intelligence. The days were roughly separated according to astrophysical relevance. We closed the symposium with the customary, for computer science, statistics of the event. During the symposium dinner at the historic grounds of the National Observatory of Athens in Thissio, overlooking the Acropolis, we organized a site tour, which included the Antikythera mechanism - the first computer ever made for astronomical applications.

In addition to the scientific program, we had a lively outreach program in coordination with the National Observatory of Athens and stargazing events at the National observatory and the main campus of the Harokopio University of Athens supported by two Greek amateur astronomy clubs, the Greek Amateur Astronomical Union and the Astronomical Union of Sparta "DIOS KOUROI".

The editors gratefully acknowledge the efforts of the Scientific Organizing Committee, the Local Organizing Committee, and all participants and volunteers whose contributions ensured the success of this meeting. It is our hope that the proceedings collected here will serve as both a record of the discussions held and a catalyst for future collaborations that will shape the way humanity explores the Universe with AI in the decades to come.

V. Efthymiou & I. Liodakis

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