

Napoli
ITALY
13&14-15 SEPTEMBER 2023

20th European Conference of Multi-Agent Systems



Real Museo Mineralogico - Università degli Studi di Napoli Federico II

2 Invited Talks
16 PhD Presentations
30 Contributed Talks
80 PC Members
10 Local Organizers
27 Countries

PROGRAM

13 September
14:00 PhD day & ICT Table
19:00 Welcome Reception

14 September
08:45: Main Conference
19:00: Social Dinner

15 September
08:45: Main Conference
12:00: Euramas Meeting
17:30: Farewell

INVITED SPEAKERS

Prof. Orna Kupferman
Hebrew University of Jerusalem

Prof. Ana Paiva
University of Lisbon

Co-CHAIRS

Prof. Vadim Malvone
Télécom Paris

Prof. Aniello Murano
University of Naples Federico II

<https://eumas23.github.io/home/>

euramas
European Association for Multi-Agent Systems

DIE UNI NA

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FEDERICO II

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Lecture Notes in
Artificial Intelligence
Lecture Notes in Computer Science

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This is the EUMAS booklet for print use.
Full information about EUMAS can be found at:
<https://eumas23.github.io/home/>

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Preface

In the past two decades, we have seen an enormous increase of interest in agent-based computing and multi-agent systems (MAS). This field is set to become one of the key intelligent systems technologies in the twenty-first century. The European Conference on MultiAgent Systems (EUMAS) series aims to provide the main forum for academics and practitioners in Europe to discuss current MAS research and applications.

EUMAS 2023 followed the tradition of previous editions: Oxford 2003, Barcelona 2004, Brussels 2005, Lisbon 2006, Hammamet 2007, Bath 2008, Agia Napa 2009, Paris 2010, Maastricht 2011, Dublin 2012, Toulouse 2013, Prague 2014, Athens 2015, Valencia 2016, Evry 2017, Bergen 2018, Thessaloniki 2020 (virtual), Israel 2021 (virtual), and Düsseldorf 2022. Like them, EUMAS 2023 aims to provide—in academic and industrial efforts—the prime European forum for presenting, encouraging, supporting, and discussing activity in the research and development of multi-agent systems as the annual designated event of the European Association for Multi-Agent Systems (EURAMAS). We are grateful for the guidance provided by the EURAMAS Board.

The peer-review process carried out by the 83 Program Committee (PC) members put great emphasis on ensuring the high quality of accepted contributions. These papers were presented at EUMAS 2023 and are contained in this volume. Each submission to EUMAS 2023 was peer reviewed by at least three PC members in a single-blind fashion. Out of 47 submissions, the PC decided to accept 24 full papers and 5 short papers for oral presentation. In addition, EUMAS 2023 was preceded by a Doctoral Consortium (PhD Day) at which 16 talks were given by PhD students, who presented their previous results, ongoing work, and future research plans. Sixteen short papers summarizing such contributions to the PhD Day are also contained in this volume. We thank Angelo Ferrando and Munyque Mittelmann for organizing the PhD Day, sifting through the submissions, and selecting them for presentation.

In addition to the papers contained in this volume, the EUMAS 2023 program was highlighted by two great keynote talks given by Orna Kupferman (Hebrew University, Israel) and Ana Paiva (University of Lisbon, Portugal).

Among the accepted papers, chose the best ones based on their review scores during the conference. The award recipients were invited to submit an extended version of their outstanding papers for fast-track publication in the Journal of Autonomous Agents and Multi-Agent Systems (JAAMAS). In addition, selected authors were invited to extend their contributions for a special issue of SN Computer Science.

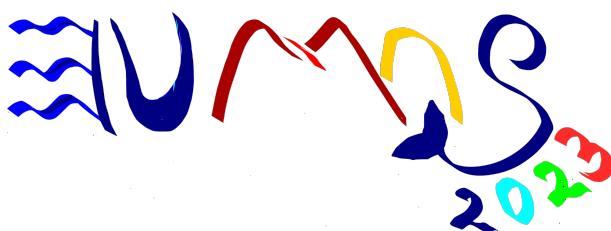
We thank the authors for submitting their work to EUMAS 2023; the PC members of EUMAS 2023 as well as the additional reviewers for reviewing the submissions; the participants for traveling to Naples, listening to and giving great talks, and making this conference a wonderful event; the invited speakers for their excellent talks; the editors of JAAMAS for inviting the award recipients to extend their papers and enjoy a fast-track publication process; the editors of SN Computer Science for supporting a special issue of extended selected papers; the local organizing committee; our sponsors; and Springer for sponsoring the Best Paper Award.

Organizing committee

Chairs	Vadim Malvone Aniello Murano	(Télécom Paris) (University of Naples Federico II)
Organizers of the PhD Day	Angelo Ferrando Munyque Mittelmann	(University of Genova) (University of Naples Federico II)
Local Organizers	Marco Aruta Davide Catta Francesco Chiariello Angelo Ferrando Giulia Luongo Alfredo Laino Vadim Malvone Munyque Mittelmann Francesco Noviello Aniello Murano Silvia Stranieri	(University of Naples Federico II) (University of Naples Federico II) (University of Naples Federico II) (University of Genova) (University of Naples Federico II) (University of Naples Federico II) (Télécom Paris) (University of Naples Federico II) (University of Naples Federico II) (University of Naples Federico II) (University of Naples Federico II)

Logo

The Eumas logo is intended to tell, in a graphic and original manner, the nature and purpose of the 20th European Conference on Multi-Agent Systems. The first two letters not only signify the European identity of Eumas, which is the main European forum for researchers, engaged in the theory and practice of autonomous agents and multi-agent systems, but it is a clear reference to mathematical language, frequently used in logical reasoning: " \exists " (Exists), "U" (until). The next three letters: "mas" were a source of inspiration for indicating, in this edition: Naples, as the host city for the event and which will see the University of Naples Federico II, at the center of scientific and cultural ferment. The "M" is meant to be a reference to Vesuvius, recalling its sinuous shape, and its line in the center, deliberately brighter red, is reminiscent of lava. The letter "A" is a yellow curve meant to indicate the sunshine of a vital city, not coincidentally between Vesuvius and the sea. The letter "S" recalls with its tail Parthenope, the mermaid who between myth and legend recounts the origins of the city of Naples.



Timetable

CT: Contributed Talk, IT: Invited Talk, ST: Student Talk.

Wednesday, September 13th

PhD Day registration			
13:50–14:10			
14:10–14:16	ST	Francesco Di Cosmo	Decidability Borders of Verification of Communicating Datalog Agents
14:16–14:22	ST	Gianmarco Parretti	LTLf Best-Effort Synthesis for Single and Multiple Goal and Planning Domain Specifications
14:22–14:28	ST	Marco Favorito	Efficient Algorithms for LTLf Synthesis
14:28–14:34	ST	Luciana Silo	Agent Behavior Composition in Stochastic Settings
14:34–14:40	ST	Gabriel Ballot	Capacity ATL: Reasoning about Agent Profiles and Applications to Cybersecurity
14:40–14:46	ST	Elena Umili	Neurosymbolic Integration of Linear Temporal Logic in Non Symbolic Domains
14:46–14:52	ST	Michał Tomasz Godziszewski	Computational Complexity of Election Control for Euclidean Preferences
14:52–15:00	ST	Andrés Holgado-Sánchez	Value-Awareness Engineering: Towards Learning Context-based Value Taxonomies
15:00–15:30			Poster session
15:30–16:00			Coffee break
16:00–16:06	ST	Mashal Afzal Memon	A brief overview of an approach towards ethical decision-making
16:06–16:12	ST	Silvia Stranieri	Reasoning about smart parking
16:12–16:18	ST	Federica Montesano	Towards the optimization of speculative PDES platforms in shared-memory multi-core machines
16:18–16:24	ST	Rabeaeh Kiaghadi	Optimal rescue sequences in disastrous incidents
16:24–16:30	ST	Samuele Burattini	Supporting Adaptive Multi-Agent Systems with Digital Twins Environments
16:30–16:36	ST	Martina Baiardi	A step forward to widespread BDI AOP: JaKtA
16:36–16:42	ST	Andrea Gatti	Virtual Environments via Natural Language Agents

16:42-16:48	ST	Mahyar Sadeghi Garjan	On Theoretical Questions of Machine Learning, Multi-Agent Systems, and Quantum Computing With Their Reciprocal Applications	
16:50-17:20		Poster session		
17:20-17:30		Closing PhD day		
17:30-18:45		Industrial round table		
19:00-20:00		Welcome reception		

Thursday, September 14th

8:20-8:50		Conference registration		
8:50-9:00		Welcome		
9:00-10:00	IT	Ana Paiva Lisbon, Portugal	Engineering Social Capabilities in Human-Centered AI	
10:00-10:40		Coffee break		
10:40-11:00	CT	Elfia Bezou Vrakatseli, Benedikt Brueckner and Luke Thorburn	SHAPE: A Framework for Evaluating the Ethicality of Influence	
11:00-11:20	CT	Alejandra López de Aberasturi Gómez, Jordi Sabater Mir and Carles Sierra	Modelling Group Performance in Educational Multiagent Systems: Introducing the CollabQuest Simulation Game	
11:20-11:40	CT	Ruhollah Jamali and Sanja Lazarova-Molnar	Towards Developing an Agent-based Model of Price Competition in the European Pharmaceutical Parallel Trade Market	
11:40-11:55	CT	Andreas Kalaitzakis and Jérôme Euzenat	Beneficial multi-tasking in cultural knowledge evolution suggests knowledge transferability among tasks	
11:55-12:15	CT	Michael Vezina, Babak Esfandiari, Sandra Morley and Francois Schwarzentruber	Qualitative Uncertainty Reasoning in AgentSpeak	
12:15-12:35	CT	Zeinab Namakizadeh Esfahani, Débora Engelmann, Angelo Ferrando, Massimiliano Margarone and Viviana Mascardi	Integrating Ontologies and Cognitive Conversational Agents in On2Conv	
12:35-14:00		Lunch (buffet)		
14:00-14:20	CT	Eyal Briman and Nimrod Talmon	Multiple Attribute List Aggregation. Its Application to Democratic Playlist Editing	

14:20–14:40	CT	Martina Baiardi, Samuele Burattini, Giovanni Ciatto and Danilo Pianini	JaKtA: BDI agent-oriented programming in pure Kotlin
14:40–15:00	CT	Giuseppe Petrosino, Stefania Monica and Federico Bergenti	A Comprehensive Presentation of the Jadescript Agent-Oriented Programming Language
15:00–15:20	CT	Leandro Buss Becker, Anthony Downs, Craig Schlenoff, Justin Albrecht, Zeid Kootbally, Angelo Ferrando, Rafael C. Cardoso and Michael Fisher	Using a BDI Agent to Represent a Human on the Factory Floor of the ARIAC 2023 Industrial Automation Competition
15:20–15:40	CT	Peter Stringer, Rafael C. Cardoso, Clare Dixon, Michael Fisher and Louise Dennis	Adaptive Cognitive Agents: Updating Action Descriptions and Plans
15:40–16:20	Coffee break		
16:20–16:40	CT	Aliyu Tanko Ali, Martin Leucker, Andreas Schuldei, Martin Sachenbacher and Leonard Stellbrink	A Comparative Analysis of Multi-Agent Simulation Platforms for Energy and Mobility Management
16:40–17:00	CT	Carlos Marín Lora and Miguel Chover	A multi-agent Sudoku using the wave function collapse
17:00–17:15	CT	Mahyar Sadeghi Garjan, Tommy Chaanine, Cecilia Pasquale, Vito Paolo Pastore and Angelo Ferrando	AGAMAS: A new Agent-Oriented Traffic Simulation framework for SUMO
17:15–17:30	CT	Luca Sabatucci, Agnese Augello, Giuseppe Caggianese and Luigi Gallo	Coordinating Systems of Digital Twins with Digital Practices
18:00–22:00	Social event		

Friday, September 15th

8:45–9:00	Conference registration		
9:00 – 10:00	IT	Orna Kupferman Jerusalem, Israel	Game-Theoretic Perspectives in Reactive Synthesis
10:00–10:40	Coffee break		
10:40–11:00	CT	Giuseppe De Giacomo and Giuseppe Perelli	Behavioral QLTL
11:00–11:20	CT	Matteo Acclavio and Davide Catta	Lorenzen-style strategies as proof-search strategies
11:20–11:40	CT	Romain Demangeon, Catalin Dima and Daniele Varacca	Observational Preorders for Alternating Transition Systems

11:40-11:55	CT	Andrés Holgado-Sánchez, Joaquín Arias, Mar Moreno-Rebato and Sascha Ossowski	On admissible behaviours for goal-oriented decision-making of value-aware agents
12:00-12:45	EURAMAS meeting		
12:45-14:00	Lunch (buffet)		
14:00-14:20	CT	Haolin Sun and Yves Lespérance	Exploiting Reward Machines with Deep Reinforcement Learning in Continuous Action Domains
14:20-14:40	CT	Giuseppe De Giacomo, Gianmarco Parretti and Shufang Zhu	Symbolic LTLf Best-Effort Synthesis
14:40-15:00	CT	Francesco Leofante and Alessio Lomuscio	Robust Explanations for Human-Neural Multi-agent Systems with Formal Verification
15:00-15:20	CT	Benjamin Aminof, Giuseppe De Giacomo, Antonio Di Stasio, Hugo Francon, Sasha Rubin and Shufang Zhu	LTLf Synthesis Under Environment Specifications for Reachability and Safety Properties
15:20-15:40	CT	Giovanni Varricchione, Natasha Alechina, Mehdi Dastani and Brian Logan	Synthesising Reward Machines for Cooperative Multi-Agent Reinforcement Learning
15:40-16:10	Coffee break		
16:10-16:25	CT	Vincenzo Auletta, Diodato Ferraioli and Carmine Viscito	Election Manipulation on Social Networks with Abstention
16:25-16:45	CT	Maaike Venema-Los, Zoé Christoff and Davide Grossi	On the Graph Theory of Majority Illusions
16:45-17:05	CT	Omar Inverso, Salvatore La Torre, Gennaro Parlato and Ermenegildo Tomasco	Verifying Programs by Bounded Tree-width Behavior Graphs
17:05-17:25	CT	Paolo Baldi	Logic-based approximations of preferences
17:25-17:45	CT	Damian Kurpiewski and Wojciech Jamroga	Pretty Good Strategies and Where to Find Them
17:50-18:00	Farewell		

List of Abstracts – Invited Talks

Game-Theoretic Perspectives in Reactive Synthesis

Orna Kupferman

Hebrew University, Israel

The classical definition of reactive synthesis assumes a single-component system interacting with a single-component environment. The setting corresponds to a zero-sum two-player game, where the objectives of the system and the environment are complementary. Realistic settings are much richer. In addition to systems composed of cooperative components, many systems nowadays lack a centralized authority and involve selfish users, giving rise to multi-agent systems in which the agents have their own objectives, and thus correspond to non-zero-sum games. Classical game theory concerns non-zero-sum games for economy-driven applications such as resource allocation, pricing, bidding, and others. The talk surveys concepts and ideas from game theory that have been or are waiting to be explored and used in the context of synthesis.

Engineering Social Capabilities in Human-Centered AI

Ana Paiva

INESC-ID, IST, University of Lisbon, Portugal

Social agents, chatbots or social robots have the potential to change the way we interact with technology. As they become more affordable, they will have increased involvement in our daily activities with the ability to perform a wide range of tasks, communicate naturally with us, and thus, partner with humans socially and collaboratively. But how do we engineer social capabilities in our AI systems? How do we guarantee that these agents are trustworthy? To investigate these ideas we must seek inspiration in what it means to be social and build the technology to support hybrid teams of humans and AI. In this talk, I will discuss how to engineer social capabilities in agents and illustrate it with some case studies, discussing the challenges, recent results, and the future directions for the field of social AI

Local Information

Talks will be held at the historical and unique venue of **Real Museo Mineralogico**.

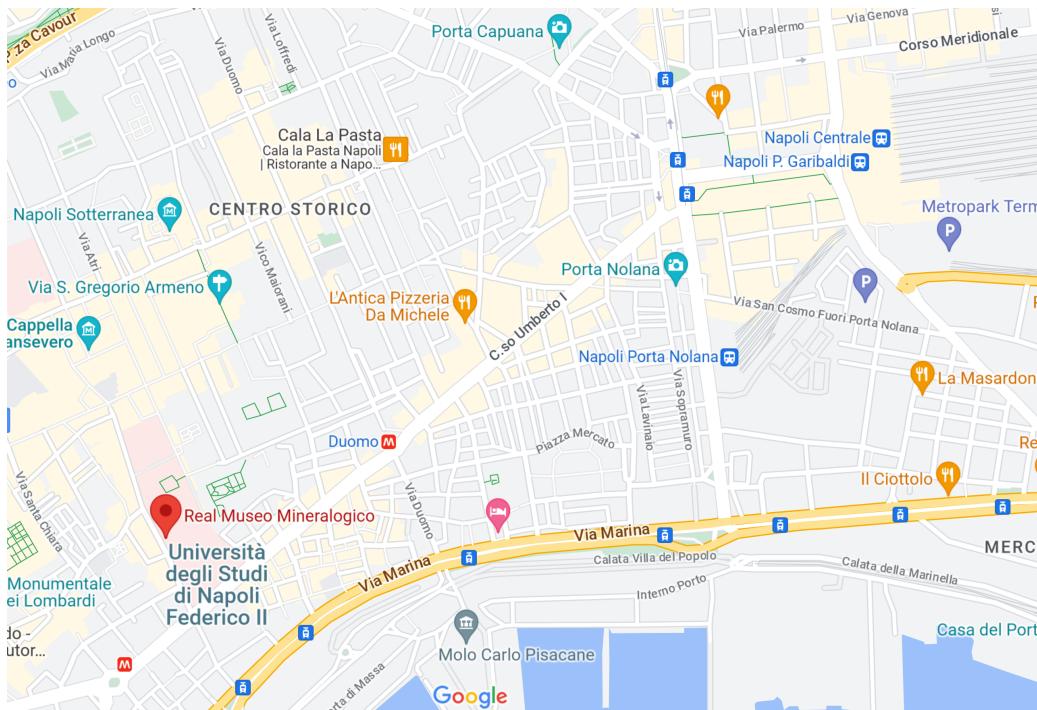
The **social event** on Thursday will be held at the restaurant Club Nautico della Vela, Piazzetta Marinari, 12, 80132 Naples.



How to get to the venue?

The address of the Real Museo Mineralogico is Via Mezzocannone, 8, 80134 Naples, Italy. It can be reached by:

- **Subway:** Line L1 direction Piscinola, 10 minutes from Napoli Centrale;
- **Walk:** 25 minutes from Napoli Centrale.



What to do in Naples

Main touristic attractions in Naples:

- National Archaeological Museum of Naples
- Underground Naples
- Complex of Santa Chiara
- Royal Palace of Naples
- Piazza del Plebiscito
- Lungomare
- Spaccanapoli and Via dei Tribunali



Complex of Santa Chiara

And outside Naples:

- Vesuvius National Park
- Pompeii Archaeological Site
- Procida, Ischia, and Capri islands
- Positano
- Royal Palace of Caserta



Positano

Where to eat

Restaurants near the venue:

- Trattoria da Nennella (Vico Lungo Teatro Nuovo)
- Tandem (Via Paladino)
- Taverna dell'Arte (Rampe S. Giovanni Maggiore)
- Vitto Pitagorico (Via Enrico Pessina) [Vegan-Vegetarian-Gluten Free]

Pizzerias in the city center

- Sorbillo (Via dei Tribunali)
- Antica Pizzeria Di Matteo (Via dei Tribunali)
- Starita (Via Materdei)
- Pizzeria da Attilio (Via Pignasecca)
- Pizzeria Salvo (Riviera di Chiaia)
- Isabella De Cham Pizza Fritta (Via Arena della Sanità)



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