JOWO 2025

The Joint Ontology Workshops

Proceedings of the Joint Ontology Workshops 2025

Episode XI: The Sicilian Summer under the Etna

Catania, Italy, September 8-9, 2025

Edited by

John Beverley | Sanju Tiwari | Patrick Lambrix | C. Maria Keet | Naveen Lamba

and for the workshops

CAOS | EIKE | FOMI | FOUST | IFOW | ISD | KM4LAW | ONTOLLM | OSS | PHASES | PLATO | POWERs | PwM2 | SHIELDS | SWODCH

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PREFACE

These proceedings present the papers and extended abstracts that took part in the 2025 Joint Ontology Workshops (JOWO): Episode XI: The Sicilian Summer under the Etna.

JOWO is the main venue of the International Association for Ontology and its Applications (IAOA) for workshops on formal and applied ontology. The mission of JOWO is to facilitate collaboration among diverse communities interested in building, reasoning with, and applying formal ontologies in information sciences, artificial intelligence theory and applications, philosophy and cognitive science, and beyond.

Since 2013, the event has been held alongside the IAOA's flagship conference Formal Ontology in Information Systems (FOIS). Since 2015, each edition of JOWO has its own character, with a different set of workshops selected by the annual organizing team that reflects the respective local research communities and global research trends.

JOWO XI was hosted by the University of Catania, Italy, on 8-9 September 2025. It offered 15 workshops that spanned a broad spectrum of formal ontology research, addressing both foundational aspects and applications in diverse areas:

- CAOS9 - 9th Workshop on Cognition And OntologieS
- EIKE - Workshop on Explicit and Implicit Knowledge Extraction
- FOMI - 14th International Workshop on Formal Ontologies Meet Industry
- FOUST IX - 9th Workshop on Foundational Ontology
- IFOW 2025 - 6th Integrated Food Ontology Workshop
- ISD9 - The Ninth Image Schema Day
- KM4LAW - 4th International Workshop on Knowledge Management and process mining for Law
- ONTOLLM 2025 - 2nd Workshop on Convergence of Large-Language Models and Ontologies
- OSS - 3rd Workshop on Ontologies for Services and Social-good
- PHASES 2025 - Workshop on Promoting Healthy Aging through the Semantic Enrichment of Social Science
- PLATO - Planning and Ontology Workshop
- POWERs - Perspectival Ontology Workshop on Entities that can be Realized (POWERs)
- PwM2 - 2nd Playing with Meanings workshop
- Shields 2 - 2nd International Workshop on Modeling for Cybersecurity
- SWODCH 2025 - 5th International Workshop on Semantic Web and Ontology Design for Cultural Heritage

Fumiaki Toyoshima and Ludger Jansen are the recipients of the "Best of JOWO 2025" award for their submission "Malfunctioning Artifacts: A Step Towards a Realizable-Centered Unifying Account". Accepted to FOUST IX, in this work the authors persuasively argue that malfunctioning artifacts are best understood in terms of intentional realizable entities that fail to be realized.

We would like to thank all authors and speakers for their contributions, and the workshop organizers and programme committee members for making JOWO happen. We would also like to extend our gratitude to the local organizers at the University of Catania as well as International Association for Ontology and its Applications (IAOA).

Proceedings of the Joint Ontology Workshops (JOWO) - Episode XI: The Sicilian Summer under the Etna, co-located with the 15th International Conference on Formal Ontology in Information Systems (FOIS 2025), September 8–9, 2025, Catania, Italy

JOWO Chairs

John Beverley	University of Buffalo, USA
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C. Maria Keet	Meaningfy SARL, Luxembourg and Stellenbosch University, South Africa
Naveen Lamba	Sharda University, Greater Noida, India

CAOS 9
9th Workshop on Cognition And OntologieS

Programme chairs

Guendalina Righetti	University of Oslo, Norway
Stefano De Giorgis	Vrije Universiteit Amsterdam, Netherlands
Gabriele Sacco	Free University of Bozen-Bolzano and Fondazione Bruno Kessler, Italy

Programme committee

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The core goal of CAOS: Cognition And OntologieS is to investigate the fundamental cognitive phenomena and concepts across language, psychology, and reasoning, examining how these can be formally and ontologically analysed with the purpose to model, simulate and represent cognitive phenomena for artificial intelligence in the context of both traditional symbolic AI and contemporary neural approaches.

Currently the artificial intelligence community's discourse appears to be bifurcated: one aspect focuses on the reconceptualization of "intelligence," while another emphasizes a functional approach wherein embodied cognition, cognitive computing, and the intersection of symbolic and neuro-symbolic methodologies with cognitive sciences have become crucial considerations.

CAOS interdisciplinary nature makes it the perfect environment to bridge the gap between knowledge representation, cognitive sciences, neural approaches, and formal ontology. It provides a platform for researchers in either domain to discuss and present their work.

The ninth edition of CAOS received papers covering a wide range of topics, contributed by experienced researchers and students from different domains.

In this edition, we accepted nine papers for publication in this volume, reflecting the interdisciplinary nature of the workshop. The contributions space from the insightful "An Argumentation for Embodied Plant Cognition with Parallels from Animal Cognition" by Maria M. Hedblom, which investigates the very nature of "cognition," and argues for a plausible extension of the cognition attribution beyond humans and animals to include plants; to "Large Language Models as a Tool for Mining Object Knowledge" by Hannah An and Lenhart Schuber, which explores the use of Large Language Models to extract common-sense knowledge about artifacts composition.

Other works proposes ontologies for various domains: "Representing the Conceptual Design Process in Engineering using IAO and OBI" by Dilek Yargan and Ludger Jansen introduces an ontology for the conceptual design phase of the product development process in engineering, which conforms to the

Open Biological and Biomedical Ontologies (OBO) Foundry and aligns to the Basic Formal Ontology (BFO); "Towards a Semantic Representation of Memory Entities" by Soline Felice, Cassia Trojahn, and Frank Arnould proposes an ontology of memory with the aim of disambiguating the key concepts used in different disciplines and theories about memory; "Beyond Copies: Digital Twins as Information Artefacts" by Luca Biccheri and Roberta Ferrario proposes an ontological understanding of Digital Twins as informational artefacts, rather than as copies of physical entities or systems as they are commonly interpreted; finally, "Shadows to Referents" by John Bittner, John Beverley and Timothy Coleman discusses an ontology of anomaly resolution aligned with the Basic Formal Ontology (BFO) and Common Core Ontologies (CCO), inspired by Plato's Cave.

A different take on a similar topic is that of "Non-Monotonic Generalisation of an Ontology" by Gabriele Sacco, Loris Bozzato, Michael Gruninger and Oliver Kutz, where the issue is how to generalise an ontology allowing exceptions to the axioms used, therefore without necessarily requiring a resolution. Addressing more directly the topic of the relationship between models of reality and reality itself is the paper "Coordination, Semantics and Ontologies" by Francesco Antonio Zaccarini and Claudio Masolo, which discusses the foundation of coordination among different agents in the case of opacity towards the real state of the world.

Finally, on the methodology of applied ontology, the paper "Characterising Competency Questions for Ontologies" by C. Maria Keet and Zubeida Khan contributes to the theoretical foundation of Competency Questions for ontologies by proposing a conceptual model of competency questions, aimed at improving the clarity of "Conceptual Questions" and, consequently, their effectiveness in ontology design.

EIKE
Workshop on Explicit and Implicit Knowledge Extraction

Programme chairs

Luana Bulla	University of Catania, Italy
Gabriele Tuccio	University of Catania, Italy
Giusy Giulia Tuccari	University of Catania, Italy
Stefano De Giorgis	Vrije Universiteit Amsterdam, Netherlands

Programme committee

Misael Mongiovì	University of Catania, Italy
Aldo Gangemi	University of Bologna, Italy

Extracting nuanced and context-sensitive information (i.e., the subtle, often implicit data embedded in text, images, and multimodal signals) is a key challenge in advancing Knowedge Extraction (KE) for Entity Linking (EL), Information Retrieval (IR), and any sense-making application. While effective for explicit knowledge extraction, traditional pipelines often struggle to capture more complex elements, such as emotional undertones, sociocultural themes, or context-dependent subtleties. Recent advancements in machine learning, particularly Large Language Models (LLMs), show promise for directly inferring enriched semantic graphs that bridge this gap. The first edition of EIKE - Explicit and Implicit Knowledge Extraction - offers an opportunity to discuss breakthrough techniques, including neuro-symbolic systems, deep learning models, and ontology-based methods to address those challenges. By focusing on the direct extraction and representation of knowledge, the workshop aims to advance the state-of-the-art in semantically rich and context-aware knowledge systems.

The Explicit and Implicit Knowledge Extraction (EIKE) workshop aims to promote discussion on breakthrough techniques, including neuro-symbolic systems, deep learning models, and ontology-based methods to address those challenges.

The papers accepted at EIKE address both applied methodologies for ontology population through knowledge extraction and theoretical approaches to metaphor understanding in computational systems. Cappa et al. introduce a stratified framework for metaphor understanding in computational systems, structured across three layers. Their approach represents metaphorical meaning in a context-sensitive and pragmatically grounded manner, integrating insights from Conceptual Metaphor Theory and Speech Act Theory. The proposed tripartite model aims to overcome limitations of current computational methods, which often fail to adequately capture contextual nuance and the complexity of metaphorical meaning. The three layers consist of: content analysis, which represents basic conceptual elements and associated metadata; conceptual combination, which fuses source and target concepts to generate emergent meanings; and pragmatic intentionality, which analyzes speaker intent, communicative function, and contextual effects. By integrating these dimensions, the framework aspires to advance computational metaphor understanding, making it more closely aligned with the way humans interpret deep and contextually grounded meanings.

The contributions illustrate the role of ontologies and computational models in mediating between formal knowledge representation and the inherent complexity of human language and meaning. By confronting both the practical challenges of managing uncertainty in decision-support systems and the theoretical intricacies of metaphor interpretation, the works presented at EIKE underscore the workshop's contribution to advancing interdisciplinary research towards more explainable, context-sensitive, and semantically grounded AI.

FOMI
14th International Workshop on Formal Ontologies Meet Industry

Programme chairs

João Luiz Rebelo Moreira	University of Twente, The Netherlands
Walter Terkaj	National Research Council of Italy (CNR), Italy

Programme committee

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Luiz Olavo Bonino Da Silva Santos	University of Twente, Netherlands
Marcela Vegetti	CONICET, Argentina
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Patricio de Alencar Silva	UFERSA, Brazil
Pedro Paulo F. Barcelos	University of Twente, Netherlands
Peter Klein	Fraunhofer ITWM, Germany
Pieter Pauwels	Eindhoven University of Technology, Netherlands
Rebeca Arista	Airbus, France
Riichiro Mizoguchi	Japan Advanced Institute of Science and Technology, Japan
Silvia Chiacchiera	STFC UKRI, UK

The 14th edition of the International Workshop on Formal Ontologies Meet Industry (FOMI) continues its tradition of fostering dialogue between researchers in formal ontology and practitioners from industry, engineering, and applied sciences. FOMI provides a unique forum for discussing how ontological methods can support industrial innovation, improve information integration, and enhance decision-making processes across complex domains. In addition, the workshop welcomes discussions on tool support, standards, and collaborations between academia and industry. Since its inception, FOMI has aimed to bridge the gap between foundational ontology research and the operational needs of industrial systems. In recent years, this dialogue has become increasingly relevant, with the growth of AI-driven systems, knowledge graphs, semantic interoperability, and digital twins, all requiring robust ontological frameworks to ensure reliability, transparency, and scalability.

FOMI 2025 brings together contributions that address the application of formal ontologies to industrial use cases, methodological and modeling challenges, and successful case studies that highlight the impact of ontological analysis in real-world settings. The accepted contributions at FOMI 2025, six in total, tackle heterogeneous topics. Two works address challenges in the aerospace and manufacturing industries, including cross-domain system design in aircraft manufacturing (Liu et al.) and the validation of simulation models for manufacturing systems (Benavent Nácher et al.). The assembly and design process is also explored through the automatic generation of precedence matrices from CAD files

(Jaberi et al.). In the materials domain, Sunada et al. propose an ontology-based system to support the selection of analytical methods for inorganic material analysis. The cybersecurity domain is tackled by Amalfitano et al., who present an ontology framework for integrating heterogeneous sources of vulnerability data. A more institutional and environmental focus is found in the work of Schweikert and Hahmann, who develop an ontology design pattern linking facilities to industry classifications for spatial and economic analysis. Across these applications, several foundational ontologies are adopted or extended, including BFO (Liu et al.), DOLCE (Benavent Nácher et al.), and ontology design patterns for conceptual integration and reasoning (Schweikert and Hahmann; Jaberi et al.).

FOUST IX
9th Workshop on Foundational Ontology

Programme chairs

Adrien Barton	CNRS, IRIT (Institut de Recherche en Informatique de Toulouse), France
Mattia Fumagalli	Free University of Bozen-Bolzano, Italy
Oliver Kutz	Free University of Bozen-Bolzano, Italy

Programme committee

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Fabrício Henrique Rodrigues	Federal University of Rio Grande do Sul (UFRGS) Samsung R&D Insitute Brazil (SRBR)
Nicolas Troquard	Gran Sasso Science Institute
Cassia Trojahn	UT2J & IRIT
Fumiaki Toyoshima	University of Neuchâtel, Switzerland
Laure Vieu	Institut de Recherche en Informatique de Toulouse

We are pleased to contribute to the JOWO 2025 Episode XI program with the 9th edition of the FOUST workshop. The mission of JOWO is to facilitate collaboration among diverse communities interested in building, reasoning with, and applying formal ontologies in information sciences. FOUST complements this mission by offering a dedicated forum for researchers to discuss and explore the foundational aspects of applied ontology. This encompasses discussing philosophical foundations, presenting new research on specific foundational ontologies, discussing existing foundational ontologies, comparing them, and examining their relevance to the broader ontological enterprise.

The papers accepted to FOUST IX present a wide spectrum of investigations into foundational ontology, ranging from abstract philosophical issues to concrete implementation strategies.

Brandon Bennett proposes a definitional methodology for ontology construction that begins from the most basic primitives of space, time, and matter, and incrementally extends towards mid-level vocabularies. In this approach, definitions themselves are sufficient to guarantee semantic constraints, eliminating the need for extra axioms when new terms are introduced. He introduced a primitive concept of "matter" as both a reference frame enriching a spatial ontology and as a representation of the actual material substance. Extending the theme of spatial foundations, Lucas Vieira, Cauã Antunes, Mara Abel, Fabricio Rodrigues, and Lisa Stright address the lack of a theory of spatial location in the Unified Foundational Ontology (UFO). They propose treating spatial location as an intrinsic moment of objects, coupled with a taxonomy of spatial relations inspired by the Region Connection Calculus. Their framework provides UFO with a more robust means of modelling spatial relations in real-world domains.

Other contributions consider the role of logic and structural modeling in ontology. Fumiaki Toyoshima and Satoru Niki revisit the notions of subsumption and inclusion, showing that their meaning depends on the logical framework in which they are formulated. By comparing classical and paraconsistent logics, they demonstrate that choices of representation language can shape, and sometimes even determine, ontological commitments. Laure Vieu and Adrien Barton, by contrast, focus on informational entities such as texts. They extend the mereology of slots with an order relation, allowing for the modeling

of linear structures, and discuss conditions under which informational entities can be identified as identical. Fumiaki Toyoshima and Ludger Jansen offer a realizable-centered account of malfunctioning artifacts, arguing that an artifact malfunctions when an intentional realizable entity fails to be realized.

Moreover, two contributions turn to the design and implementation of upper-level ontologies. Ian Bailey and collaborators analyze the alignment of the Basic Formal Ontology (BFO) with the Information Exchange Standard (IES), illustrating how key design patterns and content structures can be connected across the two frameworks. Michel Dumontier and colleagues present the Simplified Upper-Level Ontology (SULO), designed as a lightweight framework that lowers the barrier for adoption by domain experts in biomedicine while maintaining sufficient expressive power.

Finally, two works were included in the FOUST program for presentation only. Riccardo Baratella revisits the Personite Problem, a challenge to perdurantism, the view that persons are four-dimensional entities with temporal parts. Tavi Truman and John Bittner address a fundamental technical issue: BFO's relations are inherently n-ary, yet dominant data frameworks rely on binary structures such as RDF.

Taken together, the contributions to FOUST 2025 highlight the richness of contemporary foundational ontology. They range from metaphysical inquiries into matter, space, and persistence, through logical and structural tools for handling information and artifacts, to innovative frameworks that make upper-level ontologies both rigorous and usable in real-world contexts.

We extend our sincere appreciation to all members of the program committee for their diligent and thoughtful reviews. We are also grateful to all the authors who submitted their work, both those selected and those not, for their valuable contributions. We hope that this collection serves as a valuable resource and a source of inspiration for ongoing and future research in both information systems engineering and metaphysics.

IFOW 2025
6th Integrated Food Ontology Workshop

Programme chairs

Damion Dooley | Simon Fraser University, Canada

Programme committee

Michaela Kümpel	Universitaet Bremen
Robert Warren	Glengarry Agriculture and Forestry
Anoosha Sehar	Simon Fraser University
Felix Bindt	RIVM
Ido Toxopeus	RIVM
Larisa Soldatova	Goldsmiths University of London
Duccio Cavalieri	Università degli Studi di Firenze
Laurette Dube	McGill University
Miezah Ebenezer Kwofie	McGill University
Andrea Borghini	UMIL/Culinary Mind
Renata Guizzardi-Silva Souza	University of Twente

The 6th annual Integrated Food Ontology Workshop (IFOW) is pleased to be a part of the JOWO 2025 Episode XI program in conjunction with FOIS at the University of Catania. We gather to discuss philosophical, applied ontology and sociotechnical aspects of food systems which altogether promise a more stable, permanent open-source vocabulary which can evolve incrementally to describe food system behaviour as it spans from ecosystem and anthropogenic source, to individual and population-level nutritional and socioeconomic import. Philosophical discussion of food semantics helps to arrive at a consensus model/language of food materials, roles, dispositions, functions, and processes – a middle/upper-level ontology that we can all agree upon. A technical / applied ontology perspective brings structure and tools for vocabulary curation, quality control, lookup, and reuse, as well as application focus on food related biosample collection, plant or animal breeding, robotics, industrial automation, etc. A sociotechnical view wraps all of this work into a broader interdisciplinary "lingua franca of data science" effort to blend tangential domains of knowledge – from life science, animal and plant rearing, industrial and distribution infrastructure, food traceability, and regulatory management towards public and environmental health and security. Our time of rapid change demands narratives that identify, anticipate and explain courses of action to alleviate hunger, food insecurity, environmental degradation and climate change, narratives that rely on ontologies to salvage learning by enabling precise integration and comparison of past and present food system research and production data.

The nine paper and presentation abstracts accepted at this years workshop can be broadly categorized into four workshop topics: food system sustainability, traceability, food waste and food ontology development. Giorgio Ubbiali et al. discuss meat production from a general evaluation framework for sustainability ontologies; Sander van Leeuwen et al. investigate rule patterns for describing food risk assessment; Bart Gajderowicz et al. present an ontology framework for detailing food system production and distribution steps and related sustainability and other indicators; Magalie Weber et al. cover an ontology to describe food consumer behavior; Fumiaki Toyoshima et al. explore food waste as a role based on food material or food product roles. Katherine Thornton et al. describe the challenges of harvesting nutritional information from past optically scanned publications; Jenny Johana Gallo Franco et al. dive into the challenges and Wikidata integrated solutions for detailing current food sample metadata relevant to nutritional content; Anoosha Sehar et al. detail the plant, animal, and fungi anatomical and taxonomic template structure that enables a food ontology to be a foundational resource for food composition description, and Damion Dooley et al. describe a recipe model that includes solutions for modeling reference food materials, and for appropriate tracking of food material identity across transformative processes.

ISD9
The Ninth Image Schema Day

Programme chairs

Maria M. Hedblom	Jönköping University, Sweden
Oliver Kutz	Free University of Bozen-Bolzano, Italy

Programme committee

Cordula Baur	Julius-Maximilians-Universität Würzburg, Germany
Maarten Coegnarts	University of Antwerp, Belgium
João M. Cuhna	University of Coimbra, Portugal
Stefano De Giorgis	Vrije Universiteit Amsterdam, Netherlands
Zoe Falomir	Umeå University, Sweden
Rafael Peñaloza	University of Milano-Bicocca, Italy
Mihai Pomarlan Hawkin	University of Bremen, Germany
Guendalina Righetti	University of Oslo, Norway
Marco Schorlemmer	IIIA-CSIC, Spain
Francis Steen	University of California, US

The Image Schema Day is an annually occurring workshop devoted to research on cognitive primitives and investigations into the conceptual puzzle pieces that make the mind work, carried out from a wide variety of scientific disciplines.

The main focal point is the notion of image schemas; defined as experience turned into generalised, mental patterns that humans use to make sense of the world and construct linguistic expression, metaphors, and novel concepts. Originally a theory from cognitive linguistics, image schemas have become a common analytical tool in research in psychology, AI, art analysis and interaction design. Due to their universality, their potential as a component in intelligent computational systems, as a means to ground meaning of linguistic and artistic expressions, and to structure the information around us makes them an interesting and diverse field of study.

Running in its ninth edition, the ISD workshop series has become a platform for researchers from a wide variety of scientific, professional and artistic domains to discuss their use of these patterns and find unexpected synergies.

Organised as a truly interdisciplinary event, each year, researchers from many different disciplines join the event. This year is no exception as the six accepted papers and four abstracts for presentation belong in disciplines spanning philosophy, linguistics, interaction design, film studies, theoretical computer science and robotics.

KM4LAW
4th International Workshop on Knowledge Management and Process Mining for Law

Programme chairs

Davide Audrito	University of Bologna, Italy
Francesca Grasso	University of Turin, Italy
Roberto Nai	University of Turin, Italy
Emilio Sulis	University of Turin, Italy

Programme committee

Valerio Basile	University of Turin, Italy
Guido Boella	University of Turin, Italy
Chiara Di Francescomarino	University of Trento, Italy
Rohan Nanda	University of Maastricht, Netherlands
Italo Jose Da Silva Oliveira	Free University, Bozen-Bolzano
Livio Robaldo	Swansea University, Wales
Davide Riva	University of Milan, Italy
Galileo Sartor	University of Bologna, Italy

Artificial Intelligence (AI), Knowledge Modeling (KM), Information Extraction (IE) and Process Mining (PM) methods are becoming increasingly relevant to numerous sub-domains of legal informatics. These areas include ontologies, argumentation, natural language processing, and legal event log analysis, all of which can be paired with a multilingual approach. The fourth edition of the Knowledge Management and Process Mining for Law (KM4Law) workshop continues to serve as a forum to discuss these and other related topics.

The swift advancement of AI in recent years has brought us closer to addressing long-standing challenges in AI & Law. This progress makes it even more important to identify the limits of automated systems, especially when faced with unresolved intentional and unintentional ambiguities and conflicts that demand legal interpretation. This workshop seeks to shed light on these issues, exploring both the opportunities and the challenges that AI presents for knowledge representation in the legal domain.

The scope of the workshop remains broad, ranging from the classification of legal sources, legal design, and legal ontologies, to the study of legal decision similarity and clustering, prediction and support in judicial decision-making, and assistance in legal interpretation. Further topics include the identification of the evolution of legal concepts and definitions over time, information extraction and classification, process mining for legal compliance, and the detection of linguistic phenomena and patterns in legal sources. Attention is also devoted to multilingual alignments of concepts, both domestic and international, and to the identification of legal references and network analysis.

In this fourth edition, two particularly interesting papers were presented. I. Spada et al. propose a framework that leverages recent advances in Large Language Models to extract events and temporal data from unstructured legal texts, with a focus on tender notices. Their approach demonstrates how event logs can be enriched with previously hidden information, thereby enabling more comprehensive and meaningful process mining analyses in the legal domain.

O. Hobai et al. introduce the Legal Document Ontology (LDO), a conceptual model that distinguishes structural and semantic entities in legal documents and establishes standardised relationships among them. By combining elements from existing ontologies, their contribution highlights how consistent modelling can improve both human understanding and machine interpretation of complex legal corpora.

The continued scientific interest and the quality of the contributions presented this year provide encouraging prospects for a fifth edition of the workshop, further advancing research at the intersection of AI, knowledge representation, and law.

ONTOLLM 2025
2nd Annual Workshop on Convergence of Large-Language Models and Ontologies

Programme chairs

John Beverley	Assistant Professor, Department of Philosophy, University at Buffalo
Peter Elkin	Chair, Department of Biomedical Informatics, University at Buffalo
Jeremy Ravenel	CEO, Naas.AI
Ken Archer	AI Director of Product, Microsoft
Jose Maria Parente de Oliveira	Professor, Computer Science, Technological Institute of Aeronautics
Alcides Lopes	Knowledge Modeling Specialist, SysManager

Programme committee

Bart Gajderowicz	Centre for Social Services Engineering, University of Toronto
Regina Hurley	Assistant Professor, Department of Philosophy, University at Buffalo
Finn Wilson	PhD Researcher, Department of Philosophy, University at Buffalo
Cristian Keroles	Ontologist, CUBRC, Inc.
Damayanthi Jesudas Beera	Postdoc, College of Dentistry, University of Florida
William D. Duncan	Clinical Associate Faculty, College of Dentistry, University of Florida
Sarah Ayed	Lecturer, Department of Computer Science, Arab Open University
Micheal Debellis	Retired

The central theme of the Convergence of Large Language Models and Ontologies (ONTOLLM) workshop remains the same as in our inaugural meeting: that ontologies and knowledge graphs, grounded in formal semantics and logic, can serve as indispensable complements to LLMs. By pairing statistical language architectures with structured symbolic knowledge, researchers and practitioners can mitigate hallucinations, enable more trustworthy reasoning, and build hybrid architectures that extend the frontiers of artificial intelligence.

This second workshop once again brings together voices from academia, government, and industry to explore the opportunities and challenges of this convergence. Our program reflects the growing breadth of the field: from position pieces rethinking ontology evolution in the age of generative models, to case studies in safety-critical and industrial domains, to surveys mapping the landscape of retrieval-augmented generation enriched by ontological structure. Accepted submissions to this workshop include:

- **RAG Architecture to Integrate Ontologies and LLMs to Create a Climate Obstruction Portal** Climate change remains one of humanity's greatest challenges, yet coordinated action is often blocked by disinformation campaigns. This paper presents a neurosymbolic system that combines OWL reasoning with LLM embeddings to model theories from the Climate Social Science Network. The system can retrieve examples of climate obstruction from multiple databases, classify new cases such as greenwashing, and support causal modeling of disinformation. The next step is testing the system with social scientists to refine its practical use.
- **RAG and Ontologies for Information Retrieval: A Survey** This review examines how ontologies and knowledge graphs improve retrieval-augmented generation (RAG) systems that rely on LLMs. It looks at application domains, methods, and data requirements, and assesses how structured semantics help improve retrieval quality and factual accuracy. The survey highlights both the benefits and current limitations of ontology-driven RAG.
- **Challenges in the Convergence of LLMs and Knowledge Graphs for Air Traffic Information Systems** Air traffic management requires highly reliable information systems. This study explores a system that combines LLMs, RAG, and knowledge graphs to answer aviation queries using data from regulations, incidents, and operations in Brazil. Results show that broad, general-purpose graphs often reduce accuracy, while smaller, focused graphs give more precise answers. The work highlights the importance of knowledge granularity and careful design in safety-critical domains.

- **Advanced Planning and Scheduling with Semantic Knowledge Graphs and LLMs** outlines a strategy to facilitate freeform text descriptions into advanced planning solutions, leveraging LLMs to automate the construction of knowledge graphs. The authors adopt a RAG-based strategy, specifically Retrieve and Re-Rank, to demonstrate the value of extracting semantics from free text in this domain.

These contributions signal a maturing research community that is moving beyond proofs of concept toward systematic investigation and deployment.

We thank the authors, reviewers, program committee, and all participants whose contributions have made this second edition of ONTOLLM possible. We look forward to the continued growth of this research area and to the collaborations that will shape the future of ontology-augmented AI.

OSS
3rd Workshop on Ontologies for Services and Social-good

Programme chairs

Bart Gajderowicz	Centre for Social Services Engineering, University of Toronto, Canada
Daniela Rosu	Centre for Social Services Engineering, University of Toronto, Canada
Janna Hastings	University of Zurich, University of St. Gallen, Switzerland
Jacqueline Csonka-Peeren	University of Waterloo, Waterloo, Canada

Programme committee

Adrien Barton	Researcher, CNRS, IRIT, Université de Toulouse
Andrew Fisher	Postdoctoral Fellow, York University
Damion Dooley	Ontology Development Lead, Simon Fraser University
Luca Biccheri	Research Fellow, Italian National Research Council, ItalianInstitute for Cognitive Sciences and Technologies
Roberta Ferrario	Researcher, Institute for Cognitive Sciences and Technologies of the CNR
Paulina Schenk	Research Fellow, Department of Clinical, Educational and Health Psychology, University College London

Semantic technologies offer a formal approach to representing knowledge in a manner that is interpretable by computers, supported by a technology stack that facilitates the storage, integration, and querying of information semantically. Over the past decade, their growing role alongside AI has created exciting opportunities to apply them to increasingly complex societal challenges. The 3rd Workshop on Ontologies for Services and Social-good (OSS 2025), held in conjunction with the 5th International Conference on Formal Ontology in Information Systems (FOIS 2025) and Joint Ontology Workshops (JOWO 2025) in Catania, Italy, continues this mission by fostering communication and strengthening interdisciplinary work at the intersection of semantic technologies, service provisioning, and social good. This year's program reflects the richness of the field, with accepted papers spanning three tracks: Applications and Methods, Foundations, and Domain Ontologies. Together, these contributions demonstrate how ontologies can serve as unifying frameworks for conceptual clarity, interoperability, and real-world application in domains as diverse as healthcare, economics, urban planning, and social services. By bridging theory and practice, OSS 2025 showcases how semantic and ontological methods can empower practitioners, researchers, and policymakers to design more accountable, effective, and human-centered services. We hope that the discussions fostered during this workshop will inspire future collaborations and contribute to advancing the shared mission of applying semantic technologies for the greater good.

The Applications and Methods track highlights work at the interface of ontology-driven methodologies and practical deployment. One contribution introduces a methodology to manage linguistic uncertainty in shared decision-making texts, combining risk management practices with an ontology suitable for artificial intelligence applications where tolerance for uncertainty is limited. A second paper, focusing on urban systems, presents the KnOCS project, which integrates ontologies with discrete-event simulation to enable flexible, semantically rich, and risk-free modelling of smart city behaviours. Complementing these technical advances, another study addresses the design and evaluation of social services for newcomer youth, proposing a representational framework that aligns stakeholder needs, program objectives, and measurable outcomes, thereby strengthening coherence, communication, and outcome-based evaluation across the social service ecosystem. In the Foundations track, a single but conceptually significant paper tackles the ontological nature of money. Building on the "pure commodity theory," the work develops a representation of money as a commodity in line with the Basic Formal Ontology (BFO). This perspective provides a robust theoretical grounding for analyzing economic reality, while accommodating competing perspectives, such as the credit theory of money, and emphasizes the importance of foundational ontology in clarifying abstract yet socially critical concepts.

The Domain Ontologies track encompasses a diverse set of contributions that apply ontological methods to healthcare and occupational contexts. Two papers explore healthcare applications: one extends the Oral Health and Disease Ontology (OHD) to model the temporal and psychological dimensions of dental fear and anxiety, integrating multi-survey data to support personalized interventions; the other develops an ontology-based model for physiotherapy sessions within the SORTT project, extending the DOLCE ontology to support IoT-enabled systems that improve supervision and accessibility of patient care. Alongside these, another paper addresses the occupational domain by systematically defining concepts such as skills, abilities, competences, and related dispositions for inclusion in the Occupation Ontology (OccO). Together, these works demonstrate how ontologies can enhance data integration and semantic clarity in healthcare, therapy, and workforce applications, underscoring their role in improving both practical services and theoretical models.

PHASES 2025
Workshop on
Promoting Healthy Aging through the Semantic Enrichment of Social Science

Preface

Research on solitude has often been framed as a risk factor, linked to depression, cognitive decline, and mortality. However, research on gerotranscendence links solitude to a shift toward greater self-transcendence, connectedness, and wisdom in aging, framing solitude as a conduit for well-being. Despite the clear overlap, the research domains on solitude and gerotranscendence remain fragmented and conceptually ambiguous. The workshop is part of an effort to bridge this gap by seeking contributions exploring how semantic technologies can advance healthy aging research, with particular attention to solitude, gerotranscendence, and their intersections. Topics in scope included:

- Formalizing constructs of solitude, loneliness, and transcendence across disciplines,
- Developing ontologies or semantic models that integrate psychosocial and health data,
- Identifying ethical and normative dimensions of modeling lived experiences in aging,
- Showcasing use cases where ontology-driven approaches inform interventions for well-being.

The papers in this workshop demonstrate the promise of ontology applications to align research traditions, support practical applications, and inspire new directions in the study of healthy aging. You will find in this volume the following:

Towards Healthy Aging through Semantic Enrichment. This paper introduces SOLO (Solitude Ontology) and GERO (Gerotranscendence Ontology), interoperable ontologies modeling psychological constructs central to healthy aging. Built on the Behavioral Change Intervention Ontology, they clarify distinctions between solitude, loneliness, self-transcendence, and gerotranscendence, while encoding their realization across the lifespan.

Groundwork for the Ontology of Curiosity. Curiosity is key to resilience in aging but remains inconsistently defined. This paper proposes an ontological framework grounded in Basic Formal Ontology (BFO) to distinguish curiosity as an emotional process and as a disposition. Subtypes of both categories are modeled, resolving ambiguities while aligning with empirical findings.

Towards an Ontology-Based System to Foster Older Adults' Mental Health via Indoor Comfort Management. This paper presents OAIC (Older Adults Indoor Comfort), an ontology-based framework supporting mental health by managing environmental factors like lighting, temperature, and air quality. Integrating standard ontologies (SOSA, ICD, ICF) with clinical measures such as the Geriatric Depression Scale, OAIC uses semantic rules to detect deviations from comfort thresholds and trigger adaptive interventions.

Closure Through an Ontological Lens. This paper explores "closure" as a key theme in narrative identity research, where individuals integrate past adversities into life stories. Using Basic Formal Ontology (BFO) and extensions, the authors propose the Closure Design Pattern, modeling closure as a disposition linked to processes of moving beyond regret and fostering self-transcendence.

Formalizing Heuristics: Cognitive Strategies for Decisions Under Constraint. This paper introduces the Heuristic Decision Ontology (HDO), which models heuristics as Directive Information Content Entities (DICE) in life-critical contexts like medical triage. Grounded in Basic Formal Ontology (BFO 2020) and aligned with Common Core Ontologies (CCO), HDO frames heuristics as prescriptive cognitive shortcuts guiding rapid judgment.

By clarifying constructs, enabling interoperability, and supporting practical applications, the papers collected here continue the effort towards advancing research on healthy aging by leveraging semantic technologies.

PLATO
Planning and Ontology Workshop

Programme chairs

Alessandro Umbrico	CNR – Institute of Cognitive Sciences and Technologies
Emilio M. Sanfilippo	CNR – Institute of Cognitive Sciences and Technologies
C. Fabio Longo	CNR – Institute of Cognitive Sciences and Technologies

Programme committee

Luca Biccheri	CNR – Institute of Cognitive Sciences and Technologies
Stefano Borgo	CNR – Institute of Cognitive Sciences and Technologies
Matteo De Pellegrin	Heriot-Watt University
Chiara Di Francescomarino	University of Trento
Mauro Dragoni	Fondazione Bruno Kessler
Bastien Dussard	CNRS – Laboratoire de recherche spécialisé dans l'analyse et l'architecture des systèmes
Lars Kunze	Oxford University
Antonio Lieto	University of Salerno
Fulvio Mastrogiovanni	University of Genova
Alberto Olivares-Alarcos	Universitat Politècnica de Catalunya – Institut de Robotica i Informatica Industrial
Andrea Orlandini	CNR – Institute of Cognitive Sciences and Technologies
Rocco Paolillo	CNR – Institute of Research on Population and Social Policies
Ron Petrick	Heriot-Watt University
Jan Rosell	Universitat Politècnica de Catalunya
Daniele Francesco Santamaria	University of Catania
Corrado Santoro	University of Catania
Federico Fausto Santoro	University of Catania
Uli Sattler	University of Manchester
Walter Terkaj	CNR – Institute of Intelligent Industrial Technologies and Systems for Advanced Manufacturing
Elisa Tosello	Fondazione Bruno Kessler
Mauro Vallati	University of Huddersfield
Sara Zuppiroli	CNR – Institute of Cognitive Sciences and Technologies

Automated Planning and Ontology are two well-established fields of Artificial Intelligence (AI). The former investigates techniques to formally model and reason about the effects of actions, and decide the combinations of actions that allow an agent to achieve goals. The latter investigates techniques to formally represent and define knowledge (by formally describing domain entities and their interrelations), allowing agents to process information about objects, events, and other sorts of entities, and incrementally build and verify beliefs.

Both Automated Planning and Ontology generally rely on logic to model knowledge and reasoning over it, organizing reasoning mechanisms. They support the development of cognitive capabilities that autonomous agents need to effectively act in the real world.

POWERs
Perspectival Ontology Workshop on Entities that can be Realized

Programme chairs

Fabrício Henrique Rodrigues	Federal University of Rio Grande do Sul (UFRGS), Brazil Samsung R&D Institute Brazil (SRBR)
Adrien Barton	CNRS, Institut de Recherche en Informatique de Toulouse (IRIT), France

Programme committee

João Paulo Almeida	Federal University of Espírito Santo, Brazil
John Beverley	University at Buffalo, USA
Stefano Borgo	Laboratory for Applied Ontology, ISTC-CNR, Italy
Rodrigo Calhau	Federal Institute of Espírito Santo, Brazil
Ludger Jansen	PTH Brixen College, Italy
Max Kistler	University Paris 1 Panthéon-Sorbonne, France
Ítalo Oliveira	University of Twente, Netherlands
Barry Smith	University at Buffalo, USA
Fumiaki Toyoshima	Université de Neuchâtel, Switzerland

There is a long-standing view according to which potency precedes actuality. Under this view, the happening of an event consists in the realization or manifestation of potentialities that already exist in the event's participants. Indeed, the world seems full of entities that encapsulate such potentialities, which we usually refer to as *realizable entities*, with dispositions being among the most significant ones. A disposition is an entity that inheres in another entity and determines the behavior of the latter under certain circumstances. Dispositions are closely related to the causal powers that objects have in the world and encompass what we usually call *abilities*, *capabilities*, *tendencies*, *propensities*, *liabilities*, *capacities*, and so on.

As they link the static structure of the world (i.e., the endurants/continuants that populate it) to its dynamical structure (i.e., the perdurants/occurrents that can happen to or be performed by such continuants), realizable entities have become a popular topic in the Formal Ontology community, being subject of active research. Among other applications, realizable entities have been employed to represent diseases and biological functions, provide ontological grounds for risks and probabilities, model engineered artifacts and affordances, and describe organizational capabilities and social roles.

The purpose of POWERs was to turn the spotlight on this issue, providing a venue for researchers and practitioners to present their work on dispositions and other realizable entities, exploring their various perspectives with an interdisciplinary lens.

The four papers presented at POWERs 2025 advance the study of realizable entities by probing their scope, representation, and application across diverse fields. Neuhaus discusses a limitation of BFO 2020: its inability to accommodate functions, roles, and dispositions of generically dependent continuants such as software and datasets. He examines the structural reasons for this gap and proposes both defined class-based workarounds and principled modifications to BFO, thereby extending its adequacy for computational artifacts and their roles in modeling. The paper of Schulz, Dumontier, Remzi, Serafimova, and Martínez Costa can be seen as complementing this effort by expanding the typology of realizable entities to include structured and epistemic forms, such as plans and information content entities. Their unified "*refers to*" relation generalizes realization, concretization, and aboutness, and is supported by OWL design patterns aimed at reasoning with both individuals and universals, including hypothetical or future entities. Adamo, Willis, Mosca, and Sperotto turn to the domain of climate change and disaster risk, analyzing the contested semantics of vulnerability. They highlight its multi-dimensional, dynamic character and propose preliminary guidelines for clarifying and systematizing its ontological treatment. Finally, Jansen and Yargan approach realizable entities through the lens of engineering design, proposing an ontological treatment of working principles in terms of dispositions, their bearers and triggers.

These contributions beautifully reflect the vibrant research currently being conducted on this topic and exemplify the many facets of realizable entities. We hope they will inspire further exploration and discussion in the field.

PwM2
2nd Playing with Meanings workshop

Programme chairs

Max Willis	Universitat Politècnica de València (ES)
Greta Adamo	Free University of Bozen-Bolzano (IT)

Playing with Meanings returns this year to the Joint Ontology Workshops program for its second iteration, PwM2, a full-day workshop that continues the exploration of games, play and ontology-based group conceptual modelling. Participants to the workshop will be guided through a series of structured, rule-based, discursive interactions that are designed to incite stimulating discussion around the topic of ontologies and conceptual modelling as mediums for eliciting, mediating and visualising shared understandings. Playing with Meanings takes a distinctly human-centric approach, exploring participatory methods for inclusion and diversity, collectively voicing perspectives, experiences and worldview(s) while co-producing formal, human- and machine-readable knowledge. The convivial 3rd place and collaborative social contract of game and play set the stage for PwM activities, fostering intersubjective engagement between participants, navigating expertise discourses, and allowing every participant to articulate their knowledge and opinions as equal contributions to group discussions. In combination with games, we practice various methods of ontology-based group modelling to concretise players' emergent, shared understandings of concepts and their relations, leveraging visual and embodied communication in the creation of conceptual models, discursive artefacts in and of themselves, which aid in establishing, interrogating and co-producing knowledge.

PwM strives for a relaxed atmosphere of competitive fun and open-ended play, and is open to all JOWO and FOIS attendees. The workshop is divided into fixed sessions, each introducing and playing a purpose-built ontology-based group modelling game to allow participants to experience the actual co-production of knowledge while practicing in-game group modelling techniques and discussing the potentials to apply these participatory practices to their own research and development projects. The games to be showcased at PwM2 will include:

- *Risky Futures*, an updated version of our adversarial discourse game which guides teams to imagine future socio-ecological, socio-political and socio-technical risks and responses to them, using a variety of ontology-based reference models;
- *Particular Universes*, our new game for competitive group modelling using Basic Formal Ontology (BFO)[1] entities and relations, which plays on themes such as cats, mummies, donuts, holes and interstellar objects;
- A proto-game experiment exploring *Impact Chain*[2] climate and disaster risk analysis using a dual-perspective model that combines *Social-Ecological Systems Integrated Ontology* (SESsION)[3] and *Common Ontology of Values and Risk* (COVER)[4].

Attendees to the conference are welcome to join for any or all of the workshop sessions, and in-between the dedicated game-play events, the games will be available for visitors to explore freely. For more information please feel free to contact Max Willis and/or Greta Adamo at: info@humanfactorsinsemantics.net

[1] https://journals.sagepub.com/doi/abs/10.3233/AO-220262
[2] https://www.frontiersin.org/journals/climate/articles/10.3389/fclim.2023.1095631/full
[3] https://github.com/gretaAd/session
[4] https://github.com/unibz-core/value-and-risk-ontology

Shields 2
2nd International Workshop on Modeling for Cybersecurity

Programme chairs

Ítalo Oliveira	University of Twente
Daniele Francesco Santamaria	University of Catania
Gal Engelberg	Accenture Labs Israel, University of Haifa
Gianpietro Castiglione	University of Catania
Giampaolo Bella	University of Catania

Programme committee

Ítalo Oliveira	University of Twente
Daniele Francesco Santamaria	University of Catania
Gal Engelberg	Accenture Labs Israel, University of Haifa
Gianpietro Castiglione	University of Catania
Giampaolo Bella	University of Catania
Victor Corvalan	Accenture CIO Security Strategy
Manfred Jeusfeld	University of Skövde, School of Informatics
Paul Smart	University of Southampton
Noemi Scarpato	University Telematica San Raffaele Roma
Giancarlo Guizzardi	University of Twente
Nicolò Maunero	IMT School for Advanced Studies Lucca

Semantic Shields II: 2nd International Workshop on Modeling for Cybersecurity The workshop provided a forum for discussing both theoretical foundations and practical applications of conceptual models and ontologies in the field of cybersecurity.

Cybersecurity, which encompasses both human and technological dimensions, refers to the set of techniques and practices designed to protect the integrity of networks, systems, applications, and data from attacks, damage, or unauthorized access. As digital infrastructures expand, cyber-attacks continue to increase in sophistication, exploiting a growing variety of tactics such as social engineering, malware, and ransomware. In response, new methods and technologies are constantly emerging to mitigate risks and counteract exploitation attempts.

Among these approaches, formal methods—and ontologies in particular—offer powerful means to reduce the incompleteness and ambiguity of security policies. They enable the semantic characterization of security stakeholders and processes, covering aspects ranging from offensive techniques to compliance, vulnerability management, encryption, data protection, authentication, confidentiality, integrity, and availability.

Semantic Shields aims to bring together cybersecurity experts, conceptual modelers, and ontology researchers—spanning academia, industry, and practice—to advance methods, applications, and tools that strengthen cybersecurity through conceptual and semantic approaches.

SWODCH 2025
5th International Workshop on Semantic Web and Ontology Design for Cultural Heritage

Programme chairs

Antonis Bikakis	University College London
Roberta Ferrario	ISTC-CNR
Stéphane Jean	University of Poitiers – ENSMA
Béatrice Markhoff	University of Tours
Alessandro Mosca	Free University of Bozen-Bolzano
Marianna Nicolosi-Asmundo	University of Catania

Programme committee

Trond Aalberg	Norwegian University of Science and Technology (Norway)
Valentina Bartalesi	ISTI-CNR
Carmen Brando	EHESS Paris
Catherine Faron	Université Côte d'Azur
Manolis Gergatsoulis	Department of Archives, Library Sciences and Museology
Kalliopi Kontiza	UCL
Konstantinos Kotis	University of the Aegean, Dept. of Cultural Technology and Communication
Ludovica Marinucci	CID Ethics, CNR
Yannis Marketakis	Institute of Computer Science, FORTH-ICS
Nada Mimouni	CEDRIC lab - CNAM Conservatoire National des Arts et Métiers Paris
Laura Pandolfo	University of Sassari
Louise Parkin	University of Tours
Davide Picca	University of Lausanne
Emilio Sanfilippo	ISTC-CNR
Daniele Francesco Santamaria	University of Catania
Michalis Sfakakis	Dept. Archives, Library Science and Museology, Ionian University
Daria Spampinato	ISTC-CNR
Sofia Stamou	Ionian University
Maria Rosaria Stufano Melone	Dicatech, Technical University of Bari
Maria Theodoridou	FORTH-ICS
Konstantin Todorov	University of Montpellier
Christos Tryfonopoulos	University of Peloponnese
Douglas Tudhope	University of South Wales
Jouni Tuominen	University of Helsinki
Genoveva Vargas-Solar	Laboratoire d'InfoRmatique en Image et Systèmes d'information
Costas Vassilakis	University of Peloponnese
Dan Vodislav	ETIS, CNRS, University of Cergy-Pontoise

SWODCH 2025 is the fifth edition of the International Workshop on Semantic Web and Ontology Design for Cultural Heritage.

Following the tradition of the previous workshops, the purpose of the 2025 edition of SWODCH is two-fold: First, it aims to gather foundational research work on the design of conceptual models, knowledge graphs, ontologies, and Semantic Web (SW) technologies for Cultural Heritage (CH) and the Digital Humanities (DH). A plethora of heterogeneous and multi- format data currently available in these domains asks for principled methodologies and technologies to semantically characterise, integrate, and reason with data, and to support their retrieval, management, analysis and visualisation. Philosophical and sociological analyses of data, knowledge representation models, and modeling practices in CH and DH, possibly taking into account the social or historical dimensions of data, are also within the scope of the workshop. Second, SWODCH aims to bring together stakeholders from various fields of Computer Science and the Humanities involved in the development and deployment of concrete SW solutions for

CH, efficiently building, managing, exploring, visualising or mining CH knowledge graphs. More than 20 years after the beginning of this century, any SW solution should be designed according to the FAIR principles and the workshop supports the creation of datasets and applications that embrace and are compliant with these principles.

For this edition, we received 9 submissions. Each paper was peer-reviewed by at least three experts in the field based on five criteria: relevance to the topics of the workshop, originality, quality of presentation, technical quality, and reusability. Given the high quality of the submitted manuscripts, all of them were accepted.

The topics of the papers included: Representing cultural heritage knowledge (*"Development of the Lem Knowledge Graph: Implementation of LRMoo Ontology"*, *"From the Hellenic peristyle to the monastic cloister: an architectural legacy traced through ontology"*, *"Towards a realism-based ontology of archeology: Artifacts, CIDOC-CRM and BFO"*); Ontologies for linguistic phenomena and qualitative research (*"Ontological approaches to morpho-semantics in Modern Greek derivation"*, *"An Etymological Dataset for Nouns and Verbs in the Gallo-Italic Variety Spoken in Nicosia and Sperlinga"*, *"Domain Ontology for Grounded Theory Qualitative Research: Bridging Interpretation and Structure in Digital Humanities"*); Ontologies to represent, navigate and classify musical and literary works (*"Using Omeka S in Cataloguing Stanisław Lem's Letters"*, *"Modeling Knowledge for the PAVES-e Project: a Formal Ontology of Cesare Pavese's Work"*, *"A Preliminary Investigation on Event Modeling in Music: Performances and Their Reception"*).