

# JOWO 2024

## The Joint Ontology Workshops

Proceedings of the Joint Ontology Workshops 2024  
and satellite events  
Episode X: The Tukker Zomer of Ontology

Enschede, The Netherlands, July 15–19, 2024

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and for the workshops

CAOS | Emsusto | FOAM | FOMI | FOUST | IFOW | KM4LAW |  
OK4I | OntoCom | PwM | Semantic Shields | ST4DM | Workshop on  
the Convergence of Large Language Models and Ontologies | YODA

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<https://www.utwente.nl/en/eemcs/fois2024>

# PREFACE

## **JOWO – The Joint Ontology Workshops**

These proceedings collect the papers and extended abstracts presented in the Joint Ontology Workshops - JOWO 2024: Episode X: The Tukker Zomer of Ontology.

JOWO is the main venue of the International Association for Ontology and its Applications (IAOA) for workshops on formal and applied ontology. Since 2023, the event has been held with the IAOA's flagship conference Formal Ontology in Information Systems (FOIS).

JOWO is an umbrella event that promotes interdisciplinary research and international collaboration. As such, it welcomes workshops covering a wide range of disciplines, including, but not limited to, Cognitive Science, Knowledge Representation, Conceptual Modeling, Robotics, Natural Language Processing, Artificial Intelligence, Logic, Philosophy, and Linguistics. With this interdisciplinary approach, JOWO seeks to provide a platform for the diverse communities interested in developing, reasoning with, and applying formalised ontologies.

Since 2015, each edition of JOWO has its own character, with a different set of workshops and tutorials selected by the annual organizing team that reflects the respective local research communities and global research trends. As an overarching event covering all aspects of the IAOA community, the Joint Ontology Workshops (JOWO) continue to grow in importance and influence, reaching its tenth-anniversary milestone this year.

JOWO X was hosted by the University of Twente, the Netherlands, between 15-17 July 2024. The event offered a vibrant program featuring 14 workshops that spanned a broad spectrum of formal ontology research, addressing both foundational aspects (FOUST VIII) and applications in diverse areas, such as in cognitive science (CAOS VIII), sustainability (EMSUSTO), knowledge and data management (FOAM and ST4DM), industries (FOMI and OK4I), modelling the food industries (IFOW 2024), law (KM4LAW), conceptual modeling (ONTOCOM X), Cybersecurity (Semantic Shields I), Large Language Models (Workshop on the Convergence of Large Language Models and Ontologies), and digital archives (YODA). Additionally, the program offered also less traditional research endeavours, such as exploring interaction design techniques for learning, developing, and using ontologies and ontology-based conceptual models with Playing with Meanings (PwM workshop).

The complete list of workshops that were included in the tenth edition of JOWO is as follows:

**CAOS:** Cognition And Ontologies Workshop

**EMSUSTO:** Energy, Materials and Sustainability Ontology Workshop

**FOAM:** FAIR Principles for Ontologies and Metadata in Knowledge Management Workshop  
**FOMI:** Formal Ontologies Meet Industry Workshop  
**FOUST:** Workshop on Foundational Ontology  
**IHOW:** The Integrated Food Ontology Workshop  
**KM4LAW:** 3rd International Workshop - Knowledge Management and Process Mining for Law  
**OK4I:** Ontologies and Knowledge Graphs for Industry  
**ONTOCOM:** International Workshop on Ontologies and Conceptual Modeling  
**PmW:** Playing with Meanings Workshop  
**Semantic Shields:** 1st International Workshop on Modeling for Cybersecurity  
**ST4DM:** Semantic Technologies for Data Management Workshop  
**Large Language Models and Ontologies:** Workshop on the Convergence of Large Language Models and Ontologies  
**YODA:** Contemporary Ontologies for Digital Archives Workshop

Across the 14 workshops, 78 contributions were presented at JOWO X. The scientific program was further enriched by several keynote talks and panel discussions within the workshops.

### Acknowledgements

We would like to thank all authors and speakers for their contributions, and the programme committee members and additional reviewers for their timely reviewing. We would also like to extend our gratitude to the local organizers at the University of Twente for making JOWO X such a remarkable event, and the [International Association for Ontology and its Applications \(IAOA\)](#) for providing organisational support.

### JOWO Chairs

Claudenir M. Fonseca	University of Twente, The Netherlands
Guendalina Righetti	University of Oslo, Norway

### Proceedings Chairs

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Oliver Kutz	Free University of Bozen-Bolzano, Italy
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# JOWO 2024 Workshops

## CAOS VIII

### 8th International Workshop on Cognition And Ontologies

#### Programme Chairs

Stefano De Giorgis	National Research Council (ISTC-CNR), Italy
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The core goal of ‘CAOS: Cognition And Ontologies’ is to investigate the relationship between cognition and ontologies to model, simulate, and represent cognitive phenomena for artificial intelligence.

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

With this in mind, the primary focus of the workshop series lies in the formal modelling and representation of important cognitive phenomena and concepts, encompassing notions from research on language, reasoning, and behaviour. The event attracts an interdisciplinary audience from diverse fields, such as philosophy, linguistics, psychology, cognitive science, computer science, and other related disciplines.

We are delighted to announce that the eighth 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 six papers for publication in this volume. The accepted contributions reflect the interdisciplinary nature of the workshop. Some of the works are focused on the relationship between cognitive approaches and ontological modelling for specific domains, as it is in the case of “From Human Cognitive Expertise to Ontological Formalization: Bridging the Knowledge Gap for Nanophotonic Calculator Design and Simulation” by Ouassila Labbani Narsis, Erik Dujardin, Christophe Nicolle, and Nicolas Gros, which investigates the conjunction of cognitive psychology and physics. “What is Abstraction in Biomimetics?” by Ludger Jansen focuses instead on the wedding between cognitively inspired ontological modelling and biology, in particular biological mimicry and its relation with foundational ontologies. At the crossroads with the medical domain, we can locate “Understanding ASD: Design and Development of a Domain Ontology to Assist Professionals In Understanding Autistic Children Based on DSM-5”, where Jessica Lima, Victor Oliveira, Patrício Silva, and Sebastião Alves Filho propose the development of a domain ontology for the domain of autism, with the scope of assisting professional during the diagnosis.

Physics, language, and ontological modelling are the domains explored in “The Geography of Temperature Space” by George Wright and Matthew Purver, who pave the way to represent ontologically the geometrical space for temperature-related terminology.

In a similar line of investigation about cognitive approaches to ontological modelling and language, Maria Keet’s “Preliminary steps toward an ontology for noun classes in Niger-Congo languages” offers a relevant debate about the potentiality of shaping reality depending on the language and the inner bias in adopting one or another. Finally, the paper “Ontologies, Arguments, and Large-Language Models”, by John Beverley, Francesco Franda, Hedi Karray, Daniel Maxwell, Carter-Beau Benson, and Barry Smith, explores the intersection of ontologies, argumentation, and Large Language Models by extending ARGO, the Arguments Ontology, to promote justification and traceability of LLM.

To conclude this edition of CAOS, we had the pleasure of hosting Prof. Laura Palmigiano as the keynote speaker of the event. The keynote captured the audience by discussing “Categories and Categorization”, and by providing examples of how methods, insights, and techniques about structural proof theory, algebraic logic, duality theory, and category theory in mathematics can be used in synergy with one another to develop an overarching logical theory of categories and categorization which can be used to model typicality and related cognitive phenomena.

## CLLMO I

### 1st Workshop on the Convergence of Large Language Models and Ontologies

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The rapid deployment of Large-Language Models (LLMs) has led to recognition of both their value and limitations. It is unnecessary at this point to populate the literature with more examples of LLM 'hallucinations'. More important is the parallel recognition by researchers exploring this novel terrain that certain LLM limitations can be addressed by leveraging knowledge graphs and ontologies. In retrospect, this should have been no surprise. One should not expect architectures based largely on statistical methods to reliably produce trustworthy outputs or indeed provide transparent explanations for when outputs differ from expectations. Expectations aside, it has long been recognized that ontologies and knowledge graphs grounded in well-developed formal languages such as the Web Ontology Language (OWL), can provide precisely such transparent explanations, i.e. formal proofs, and if set up correctly, provide reliably trustworthy output as well. We are at present amid an emerging research area - across academia, governments, and industry - at the intersection of LLMs and knowledge representation, as groups from various quarters aim to push the boundaries of artificial intelligence.

The central purpose of this workshop was to further that push, as evidenced by organizing/program committee members, invited talks, and peer-reviewed presentations, boasting representatives from academia, government, and industry. The collaborative spirit was, moreover, magnified by the association of this workshop with a special issue of the journal Applied Ontology, dedicated to exploring the convergence of knowledge representation and LLM strategies, design patterns, models, and benchmarks. Submissions were received from both the JOWO EasyChair portal and the Applied Ontology journal portal to be considered for CLLMO. We were pleased to receive for this first edition of CLLMO 16 such submissions, of which 8 were selected for the workshop, with 6 published in this volume.

The workshop itself was divided into four major interest areas: framing convergence, convergence on explainability, convergence on application, and convergence on ethics. The program, slides, and recorded talks can be found on the [workshop web page](#). Topics ranged from exploring ontological models underwriting LLM

outputs and supporting explainability for LLM output using knowledge graphs, to promoting ontology learning via vector embeddings and supplementing LLMs with ontology-based Retrieval Augmented Generation (RAG). Our workshop was fortunate enough to have three distinguished keynotes. Barry Smith, from the University at Buffalo, delivered a provocative talk on the creative limitations of artificial intelligence, which led naturally into our second keynote, by Jeremy Ravenel of NAAS, who emphasized methods for building trust in artificial intelligence systems. Our last keynote, Beth Rudden of Bast AI, demonstrated a full stack workflow, leveraging LLMs and knowledge representation throughout, aimed at promoting transparency in artificial intelligence. Given the substantial interest this workshop generated, we added a post-session section to the program web page. There you will find recorded talks, papers, and slides covering convergence topics which - for various reasons - were not able to be included in the workshop proper.



## **Emsusto**

### **2nd Energy, Materials and Sustainability Ontology Workshop 2024**

#### **Programme Chairs**

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Mirjam Stappel	Fraunhofer Institute for Energy Economics and Energy System Technology (IEE), Germany

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Carsten Hoyer-Klick	German Aerospace Center (DLR), Germany

The Energy, Materials, and Sustainability Ontology (Emsusto) Workshop 2024 provided a venue for presenting ontologies and their applications in the domains of renewable energy, materials, and sustainability. The primary goal of this workshop was to offer researchers and practitioners in these domains an opportunity to meet and exchange experiences in developing and using ontologies and to provide a forum for the exchange of knowledge and best practices for ontologies in these domains.

The second installation of this workshop focussed on the heterogeneous landscape of energy ontologies. Various aspects of these different ontologies were introduced in the presentations. One of the key challenges emphasised in the presentations was that there is a multitude of parallel ontology developments revolving around energy, its conversion, transport, and use. This is particularly problematic as the ontological representation of energy is notoriously difficult. Different approaches to modelling such a central concept present an insurmountable obstacle to the integration and cross-use of the resulting ontologies. The following discussion focussed on how the future development of these previously independent resources can be better combined. In the course of this debate, other experts were also involved, allowing additional energy-related ontologies to be included in this convergence process.

## FOAM

### First International Workshop on FAIR Principles for Ontologies and Metadata in Knowledge Management

#### Programme Chairs

Cassia Trojahn	Institut de Recherche en Informatique de Toulouse, France
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Daniel Garijo	Ontology Engineering Group, Universidad Politécnica de Madrid, Spain
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The FAIR principles have been proposed by the scientific community to provide guidance on making research outputs more Findable, Accessible, Interoperable, and Reusable on the Web. The FAIR principles have gained increasing attention in a number of different domains and applications. On the one hand, a key aspect promoted by FAIR is the ability to describe resources correctly and semantically, in particular using ontologies or vocabularies. On the other hand, ontologies themselves have to comply with the FAIR principles.

The main objectives of the ‘FAIR Principles for Ontologies and Metadata in Knowledge Management’ (FOAM) workshop are 1) to bring together new methods for enabling FAIR research outputs (data, software, workflows, ontologies, alignments, etc.) through ontologies and vocabularies; 2) to discuss techniques, metrics and guidelines to improve the FAIRness of ontologies and vocabularies; and 3) to share experiences, identify new challenges and opportunities applying FAIR for different communities.

FOAM is a joint initiative resulting from merging the Workshop on Ontologies for FAIR and FAIR Ontologies (Onto4FAIR), the Workshop for Conceptual Model-

ing, Ontologies and Metadata Management for Findable, Accessible, Interoperable and Reusable (FAIR) Data (CMOMM4FAIR) and the FAIR Ontology Harmonization and TRUST Data Interoperability Workshop (FOHTI).

The first edition of FOAM the workshop accepted five full publications and a poster (as a separate invited presentation). All submissions were subject to peer review, with a minimum of 2 reviews per paper. The presented works can be grouped into three main categories. The first category dealt with FAIR aspects of semantic artefacts: Poveda-Villalón et. al. described a gap analysis in ontology engineering methodologies when making vocabularies FAIR by design, while Martínková et al described the challenges associated with creating FAIR crosswalks and mappings. Magagna et al. provided an analysis of different resources supporting the FAIR principles.

The second category of publications explored application-specific requirements. El Ghosh et al addressed semantic interoperability in the oncology domain, while Hannou et al. explored the use of agile methodologies in adapting FAIR for European Data Spaces.

Finally, the invited presentation described the FAIRness assessment of semantic artefacts in the environmental domain.

The workshop ended with a discussion session where the following key points were highlighted:

1. The existence of different tools for evaluating different aspects of FAIRness of semantic artefacts and the **need for an alignment** between them.
2. The need for **common practices across domains** on how to make data/artefacts FAIR.
3. The need for **tutorials and lectures on how to construct (good) ontologies** and how to reuse ontologies across different domains.
4. The need for **guidelines for the governance of data** in the FAIR ecosystem.
5. The need for a big picture of **tools supporting the different steps of the ontology lifecycle** as highlighted in Poveda-Villalón et. al. work.
6. The need to **involve more people from different communities**, have a FOAM invited talk, include a tutorial/hands-on, and a project networking session (as several international projects in the topic have addressed these topics).

These points open several opportunities and motivate future editions of FOAM.

## FOMI

### 13th International Workshop on Formal Ontologies meet Industry

#### Programme Chairs

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Francesco Antonio Zaccarini	University of Bologna, Italy

FOMI is an international forum where academic researchers and industrial practitioners meet to analyse and discuss application issues related to methods, theories, tools, and applications based on formal ontologies. There is today a wide agreement that knowledge modelling and the semantic dimension of information play an increasingly central role in the networked economy: semantic-based applications aim to provide a framework for information and knowledge sharing, reliable information exchange, meaning negotiation and coordination between distinct organizations or among members of the same organization.

The 13th edition of FOMI saw a significant attendance (more than 35 people), welcoming academic researchers and industry practitioners. This event provided a platform for open discussions on shared challenges and solutions related to ontology applications, without restrictions on the domains involved. The accepted contributions at FOMI 2024, eight in total, tackle heterogeneous topics.

Four works are focused on specific industrial domains. Two works deal with the Oil & Gas domain, considering data retrieval tasks (Rodrigues et al.) and interoperability of specifications (Petry et al.). Additionally, Skrzek et al. analyze manufacturing in the aerospace domain, while Kitamura et al. investigate patents related to inorganic materials.

The remaining four works concentrate on ontology-based methodologies with a broader scope. Hurley et al. present the development of an ontology-based foundation for digital twins, while Moreira et al. introduce a framework to facilitate ontology reuse by software engineers. Finally, two papers are related to ontology alignment, one in a general context (Zaccarini et al.) and the other focused on the life-science domain (De Colle et al.).

## FOUST VIII

### 8th Workshop on Foundational Ontology

#### Programme Chairs

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Riccardo Baratella	University of Genoa, Italy
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Boyan Brodaric	Geological Survey of Canada, Canada
Stefano Borgo	ISTC-CNR Laboratory for Applied Ontology, Italy
Massimiliano Carrara	University of Padova, Italy
Carmen Chui	University of Toronto, Canada
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Pierdaniele Giaretta	University of Padova, Italy
Lucía Gómez Álvarez	INRIA and Univ. Grenoble Alpes, France
Ludger Jansen	University of Rostock, Germany
Gilles Kassel	University of Picardie, France
Oliver Kutz	KRDB, Free University of Bozen-Bolzano, Italy
Øystein Linnebo	University of Oslo, Norway
Claudio Masolo	Laboratory for Applied Ontology, ISTC-CNR, Italy
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Barry Smith	University at Buffalo, USA
Cassia Trojahn	UT2J and IRIT, France
Fumiaki Toyoshima	Institut de Recherche en Informatique de Toulouse, France
Laure Vieu	Institut de Recherche en Informatique de Toulouse, CNRS, France
Salvatore Florio	University of Oslo, Norway
Riichiro Mizoguchi	Japan Advanced Institute of Science and Technology, Japan

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**Keynote: “Introduction to Constructional Ontology”**

**Panel: “From Events to Processes and back”***Speaker:*

Nicola Guarino	Laboratory for Applied Ontology, ISTC-CNR, Trento, Italy
Riccardo Baratella	University of Genoa, Italy
Riichiro Mizoguchi	Japan Advanced Institute of Science and Technology, Japan
Frank Loebe	University of Leipzig, Germany

*Moderator:*


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Giancarlo Guizzardi	University of Twente, The Netherlands
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Foundational ontologies are attempts to systematize very high-level categories of what exists. In practical terms, they aim to understand and formalise the meaning of general ontological entities, such as *physical* and *abstract object, relations, property, event, and process*. Once formalised, these entities provide the top-level categories that are, in principle, common to many (if not all) application domains. Consequently, foundational ontologies are acknowledged as tools for tackling systems interoperability and explainability issues. The Workshop on Foundational Ontology (FOUST) aims to create a platform for researchers to 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 8th workshop edition, FOUST VIII, added a special topic to attract attention to the role of **constructional approaches in applied ontology**. The concept of constructional ontology, introduced by Kit Fine in their 1991 influential paper *The Study of Ontology*, involves assuming a set of ontological givens or basic elements and a set of constructors that can be iteratively applied to generate new elements in the ontology. Elements of the ontology emerge through the constructional process. The idea is related to the iterative conception of sets (Gödel 1964, Boolos 1971), which has been proven to be a powerful and elegant paradigm in the philosophy of mathematics to prevent paradoxes (e.g., the “Russell set”). FOUST VIII served as a platform to kickstart the discussion on how to leverage similar ideas in applied ontology.

The workshop took place in two days, featuring a keynote, a panel, and ten paper presentations. On the first day, FOUST VIII focused on processes, events, and temporal entities. In the first session, Baratella presented a novel reconciliatory approach to the Puzzle of Uniqueness within perdurantism. The work of Rodrigues, Carbonera, and Abel proposed an analysis and modelling of events from a system-based perspective. The vibrant panel “From Events to Processes and Back,” between Nicola Guarino, Riccardo Baratella, Riichiro Mizoguchi, and Frank Loebe, moderated by Giancarlo Guizzardi, wrapped up the first day by entertaining the public with an engaging, interactive debate. The session captivated the audience by addressing the most salient challenges and emerging trends in the ontological modelling of processes and events.

The second day of the workshop revolved around constructional approaches together with more traditional foundational topics. It began with the keynote of

Salvatore Florio on “Introduction to Constructional Ontology,” offering a comprehensive perspective on constructional approaches, the discussion of the possible modelling choices such approaches can offer, and their values for ontologies. The constructional contributions comprised the investigation of Berneri, bringing together classical subjects in formal ontology, i.e., metaphysical dependence, with constructional angles. Partridge, Mitchell, de Cesare, Cola, Khan, Price, and Hierl presented the BORO case history as a concrete example of exploiting the constructional approach in applied ontology. Finally, Righetti applied constructional ideas to the notion of concept. The last session of the workshop was dedicated to most traditional topics. The work of Gnatenko, Kutz, and Troquard (winner of the Best of JOWO award) proposed an ontologically motivated knowledge base for computational complexity theory designed to store, query, and reason over the extensive body of knowledge on algorithmic problems, complexity classes, and the like. The research of Porello, Vieu, Borgo, Compagno, Sanfilippo, and Terkaj presented a core OWL2 module of the well-known top-level ontology DOLCE. The study of Yargan and Jansen proposed an investigation of the definitions of functions reflecting on their appropriateness in the biomimetics context. Finally, two papers by Toyoshima, Barton, Koslicki, and Massin focused on the notion of artefacts and artifactual functions, offering a realisable-oriented approach.



## **IFOW 2024**

### **5th Integrated Food Ontology Workshop**

#### **Programme Chairs**

Damion Dooley	Simon Fraser University, Canada
Michaela Kämpel	Universitaet Bremen, Germany
Georgeta Bordea	La Rochelle University, France
Robert Warren	Glengarry Agriculture and Forestry, Canada
Anoosha Sehar	Simon Fraser University, Canada
Matthew Lange	IC-FOODS, United States
Felix Bindt	Dutch National Institute for Public Health and the Environment, Netherlands
Ido Toxopeus	Dutch National Institute for Public Health and the Environment, Netherlands

The Integrated Food Ontology Workshop at FOIS/JOWO 2024 (University of Twente, Enschede, Netherlands) was a full day of twelve presentations organized under four topic areas: Food Ontology modelling, Farm to Fork Food System Representation, LLM/ChatGPT and its role in ontology development and database/knowledge graph search, and Food Safety. The event facilitated a discussion of many different leading-edge areas of research touching on food robotics, Chinese philosophy about food and health, ontological coding of food processing contamination risks, ChatGPT interface to food composition databases, and more!

## KM4LAW

### 3rd International Workshop on Knowledge Management and Process Mining for Law

#### Programme Chairs

Davide Audrito	Legal Studies Department, University of Bologna, Italy
Francesca Grasso	Computer Science Department, University of Turin, Italy
Roberto Nai	Computer Science Department, University of Turin, Italy
Emilio Sulis	Computer Science Department, University of Turin, Italy

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Galileo Sartor	University of Bologna, Italy
Giovanni Siragusa	University of Turin, Italy
Andrea Tagarelli	University of Calabria, Italy
Andrea Vandin	Sant'Anna School for Advanced Studies, Pisa, 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 Knowledge Management and Process Mining for Law (KM4Law) workshop is a forum to discuss these and other related topics.

The swift advancement of AI in recent years has brought us closer to solving long-standing challenges in AI & Law. This progress makes it all the more important to identify the limits of automated systems, especially when faced with the remaining unsolved intentional and unintentional ambiguities and conflicts that demand legal interpretation. This workshop aims to shed light on these is-

sues, exploring the yet unfaced opportunities and challenges that AI presents for knowledge representation in the legal domain.

The goals of our workshop range widely, covering the classification of legal sources, legal design, and legal ontologies. Also included are legal decisions similarity and clustering, prediction, and support during judicial decision-making, and legal interpretation support. Further topics encompass identifying the evolution of legal concepts and definitions over time, information extraction and classification, process mining for legal compliance, and detecting linguistic phenomena and patterns in legal sources. We also focus on multilingual alignments of concepts, both domestic and international, and the identification of legal references and network analysis. In particular, the third edition of the international workshop KM4LAW featured a keynote about challenges in Legal Knowledge Representation by Ítalo Oliveira. Five papers were presented at the workshop, covering diverse topics such as an Ontology-based approach in a conversational system by Frida Milella et al.; a Cross-Country Study Using Topic Modeling on Legal Documents from India and the UK by Krish Didwania et al.; an ontology for legal reasoning on data sharing and processing between law enforcement agencies by Jeremy Bouche-Pillon et al.; Exploring Usability in Regulatory Information Extraction Process by Antoine Sacré et al.; a Multilingual Logical English for Double Taxation Conventions by Galileo Sartor et al. The event's success and the diversity of topics discussed highlight the workshop's relevance to current research in the field.

## OK4I

### Ontologies and Knowledge Graphs for Industry

#### Programme Chairs

Alexander Garcia Castro	Siemens Energy, Germany
Thomas Hubauer	Siemens, Germany
Wolfgang Suess	Karlsruhe Institute of Technology, Germany
Philipp Schmurr	Karlsruhe Institute of Technology, Germany

#### Presenters

Jesualdo Tomás Fernández-Breis	Universidad de Murcia, Spain
José Maria Parente de Oliveira	Aeronautics Institute of Technology, Brazil

Although semantic technologies have made significant advances in the last years, adoption within organizations remains a key challenge in the industry. The goal of this workshop is to foster exchange on key challenges for adoption, and solutions to overcome them. We are interested not only in concrete use cases based on knowledge graphs and ontologies and how they are embedded in the overall enterprise environment, but also in visionary proposals on how recent improvements in the area of semantic technologies and generative AI can help improve data integration and management, knowledge discovery, and AI use cases. OK4I welcomes contributions describing positive as well as negative results, coming from small or large companies as well as academic partners. Across all submissions, emphasis should be put on demonstrating the business value and impact (intended to be) created by using knowledge graphs and semantic technologies to address industry problems.

Questions addressed by OK4I:

- How are KGs and ontologies being adopted? What are industry examples of implementations of these technologies, and what did you do to ensure success?
- What are the main difficulties when using KGs and ontologies? What are examples of a failed adoption, and which lessons have you learnt on this journey?
- Ontologies and KGs in manufacturing, supply chain management, PLM, logistics, procurement, etc.
- Ontologies supporting CAD interoperability and feature extraction; towards smart CAD environments.
- KGs and ontology generation from textual data
- How are KGs and ontologies being used in combination with LLMs?
- How is AI (e.g. LLMs) being used to do KGs and ontology enrichment?
- Where are KGs and ontologies in the Data Mesh, data contracts? How are ontologies and KGs a part of modern data architectures?
- Practical cases of successful and unsuccessful application of ontologies and KG technologies in application domains such as financial, biomedical, e-business, engineering, law enforcement, document management, government, and legislative systems.

- How are KGs and ontologies helping the realization of FAIR data?

Key learnings from the presentations and the workshop include:

- Ontology modeling is (classically) a collaborative process between ontologists and subject-matter experts, which requires finding a common language to bridge the gap between technology and domain. To ensure success, ontologists need to learn the "language of the domain", and SMEs need to embrace some rigidity in thinking required for structured data modeling.
- Tooling for ontology development could be improved significantly to better support this collaborative process.
- To ensure the success of knowledge-graph-based solutions across enterprises and reduce hurdles to adoption by users and developers outside the "semantics bubble", it is essential to integrate KG-based systems into the standard enterprise information infrastructure using APIs or microservices. This should not be limited to information access, but also include means to create and update information.

## OntoCom X

### 10th International Workshop on Ontologies and Conceptual Modeling

#### Programme Chairs

Sergio de Cesare	University of Westminster, UK
Frederik Gailly	Ghent University, Belgium
Giancarlo Guizzardi	University of Twente, The Netherlands
Chris Partridge	University of Westminster, UK and BORO Solutions, UK
Oscar Pastor	Universidad Politécnica de Valencia, Spain

#### Programme Committee

João Paulo Almeida	Federal University of Espírito Santo, Brazil
Mike Bennett	Hypercube, UK
Salvatore Florio	University of Oslo, Norway
Pierre Grenon	National Center for Ontological Research, USA
Renata Guizzardi	University of Twente, Netherlands
Paul Johannesson	Royal Institute of Technology, Sweden
Jim Logan	Dassault Systèmes, USA
Andrew Mitchell	BORO Solutions, UK
Thomas Moser	St. Pölten University of Applied Sciences, Austria
Ítalo José da Silva Oliveira	Free University of Bozen-Bolzano, Italy
Jeffrey Parsons	Memorial University of Newfoundland, Canada
Geert Poels	Ghent University, Belgium
Tiago Prince Sales	University of Twente, Netherlands
Pnina Soffer	University of Haifa, Israel
Marzieh Talebpour	University of Westminster, UK
Karsten Tolle	Goethe University Frankfurt, Germany

This year the International Workshop on Ontologies and Conceptual Modeling (OntoCom X) celebrated its 10th edition.

The importance of conceptual modeling has grown over the years, and it is now common to find examples of conceptual models being developed and used in a range of diverse disciplines not related to computing, including, for example, biology, business, construction, and engineering. Among the reasons for this disciplinary expansion is also the increasing digitalization of all aspects of modern life, as well as the increased complexity that such digitalization entails in terms of emerging needs and requirements. The natural consequence is a proliferation of conceptual models of multiple real-world domains, which sooner or later require data and systems to interoperate and/or integrate. In this emerging scenario, ontology-driven conceptual modeling becomes even more fundamental to modern life due to its intrinsic ability to represent reality in a theoretically and semantically consistent manner. Foundational (or upper ontologies) have the potential to resolve the difficult problems that derive from a lack of a consistent and sound ontological theory. The benefits that can derive from the adoption of a foundational ontology include improved mapping to the real world domain,

increased level of communication and understanding among stakeholders, model reuse, semantic integration and interoperability and increased overall efficiency and effectiveness of information systems development and evolution. The application of foundational ontologies can also assist in overcoming the inscrutable nature of most mainstream artificial intelligence methods (i.e. neural networks and machine learning).

The OntoCom workshop series aim to bring together academics, researchers and practitioners to develop an agenda of future collaborations that combine research and industrial expertise. The research papers presented at the workshop contribute toward this goal.

Contributions were sought in the form of research papers. The submissions were reviewed by three program committee members and evaluated by the organizing committee. Four papers were accepted. These papers focused on the following research areas: the ontological grounding of simulation modeling, the adoption of ontology to assist in the interoperability of legal systems, development of a robust ontological account of what capabilities are, and the definition of sound criteria for characterizing mid-level ontologies.

The workshop concluded with an inspiring keynote by Henderik A. Proper, Professor in Enterprise and Process Engineering in the Business Informatics Group at the TU Wien (Austria). His talk, titled “Understanding the Variety of Domain Models: Views, Programs, Animations, and Other Models”, focused on the foundations of modeling and how diverse modeling artifacts can be used within the context of model-driven systems development.

Finally, we thank all the authors for their valuable contributions, our keynote speaker, and our entire program committee for their insightful reviews and constructive feedback.

## PwM

### 1st Playing with Meanings Workshop

#### Programme Chairs

Greta Adamo  
Max Willis

Basque Center for Climate Change, Spain  
Universitat Politècnica de València, Spain

The Playing with Meanings (PwM) workshop was proposed to explore emergent interaction design methodologies for ontology learning and co-design. Preliminary investigations of participatory sense-making techniques using ontologies, first outlined in [?], led to the design of several tangible games, which serve as discursive artefacts that apply ontologies to extend contemporary practices of stakeholder engagement and knowledge elicitation.

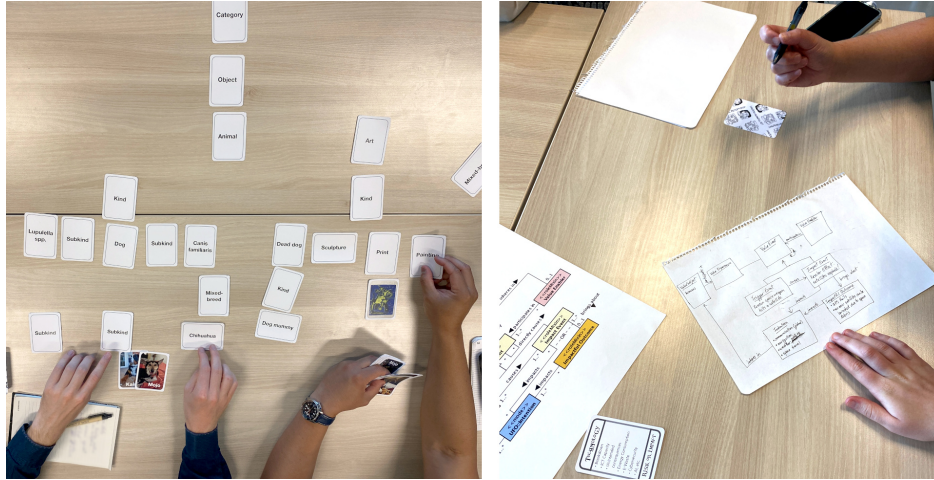
The goals of this workshop were to (i) reflect on the challenges of learning and applying ontological notions, (ii) introduce the game, play, and participatory sense-making concepts, (iii) engage participants hands-on with ontology-based games and collaborative modelling, and (iv) to gather feedback on ontology-based tangible artefacts as participatory research tools.

The PwM workshop was structured around group interactions focused on formal ontologies and ontology-based conceptual models. Workshop participants reflected through action on the unique dispositions of games and play to create a space of social learning, structure communication, and elucidate complexity in an accessible and fun way.

The workshop activities were introduced through brief presentations outlining the background material for the two workshop sessions. The first session focused on the foundational game artefact *Type Token* [?] which introduces several Unified Foundational Ontology (UFO) constructs [?]; the second deployed *Risk Response* [?], an adversarial discourse game that originated from the ontological analysis and unpacking of climate change risk [?]. The two sessions were independent, and participants could attend one session without being bound to the content of the other. A pre- and post-experience questionnaire was offered to participants, who numbered 19 in the first session and between 14 and 19 in the second session.

*Type Token.* The first PwM session began with an outline of the project’s origins and an introduction to participatory sense-making. Participants were then given the first of two decks of cards, and instructed in the rules of gameplay. Seated around three tables, two groups of 4 to 6 players, and one group of 10 players, began collaborative ontological modelling using the Type Token cards (see Fig. 1, left). After several rounds of gameplay, a second deck of cards was introduced, which when added to the first, allowed for more extensive modelling. The session was concluded with an activity debrief and discussion.





**Figure 1.** 1st PwM gameplay: Type Token (left), Risk Response (right)

*Risk Response.* The second session started with a presentation of some background interaction design knowledge pertinent to the forthcoming activity, and an introduction to the social-ecological systems integrated conceptual model [?] which would be used. This was followed by an embodied sense-making exercise in which the participants role-played elements of the integrated conceptual model to become acquainted with the model's entities and relations. Participants were then familiarised with the Risk Response game, its origins, and rules and formed teams to propose, respond to, and debate plausible (and preposterous) future adaptation and mitigation, referring to a modified futures cone diagram [?]. As part of gameplay, participants engaged in collaborative modelling (see Fig. 1, right) of risk and responses, according to the reference integrated conceptual model, then debated whether the proposed solutions could be viable in a future scenario. In a second round, participants modelled their game interactions using snippets of the Common Ontology of Value and Risk (COVER) [?], a UFO-based ontology specifically dealing with, for example, *risk-experience*, *object at risk*, and *threat event*. The Risk Response session was concluded with a debrief, in which the activities and outcomes were discussed, which elaborated, for example, trade-offs between model quality and the quality of discourse among players, and the roles of the conceptual models, ontologies, and collaborative modelling exercises to stimulate group discourse and foster sense-making.

## Semantic Shields I

### 1st International Workshop on Modeling for Cybersecurity

#### Programme Chairs

Ítalo Oliveira	University of Twente, The Netherlands
Daniele Francesco Santa- maria	University of Catania, Italy
Thijs van Ede	University of Twente, The Netherlands
Dan Klein	Accenture Labs, Israel
Gal Engelberg	Accenture Labs and University of Haifa, Israel
Gianpietro Castiglione	University of Catania, Italy
Giampaolo Bella	University of Catania, Italy
Andrea Continella	University of Twente, The Netherlands
Giancarlo Guizzardi	University of Twente, The Netherlands

#### Programme Committee

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Giancarlo Guizzardi	University of Twente, The Netherlands
Stephane Gagnon	University of Quebec in Outaouais, Canada
Daniele Francesco Santa- maria	University of Catania, Italy
Cyril Onwubiko	CISCO, Intelligence and Security Assurance, E-Security, UK
Gianpietro Castiglione	University of Catania, Italy
Ethan Hadar	Accenture Labs, Israel)
Gal Engelberg	Accenture Labs and University of Haifa, Israel
Raimundas Matulevicius	University of Tartu, Estonia
Thijs van Ede	University of Twente, The Netherlands
Giampaolo Bella	University of Catania, Italy
Andrea Continella	University of Twente, The Netherlands
Alessandro Oltramari	Bosch Research and Technology Center, US
Manfred Jeusfeld	University of Skövde, Sweden
Paolo Prinetto	Cybersecurity National Laboratory, Italy
Nicolò Maunero	Politecnico di Torino, Italy
Paul Smart	University of Southampton, UK
Fabio De Rosa	Cybersecurity National Laboratory, Consorzio Interuniversitario Nazionale per l'Informatica, Italy
Noemi Scarpato	University Telematica San Raffaele Roma, Italy
Victor Corvalan	Visionverse, Switzerland
Jana Ahmad	Czech Technical University in Prague, Czech Republic
Elda Paja	IT University of Copenhagen, Denmark
Omar S. Gomez	ESPOCH, Ecuador
Stephen Phillips	IT Innovation Centre, UK
Zubeida Khan	Council for Scientific and Industrial Research, Pretoria, South Africa

Semantic Shields I: 1st International Workshop on Modeling for Cybersecurity was a forum to discuss theoretical aspects and practical applications of conceptual models and ontologies to cybersecurity.

Cybersecurity, which concerns human and technological aspects, refers to a set of techniques to protect the integrity of networks, programs, and data from attack, damage, or unauthorized access. With the spread of systems and applications, attacks continue to grow in sophistication, with attackers using an ever-expanding variety of tactics such as social engineering, malware, and ransomware. New methods and technologies have been emerging to reduce the risk of cyber-attacks and protect against exploitations. Formal methods, particularly ontologies, constitute an effective approach to mitigate the incompleteness and ambiguity of security directives and semantically characterize security stakeholders, ranging from offensive techniques to compliance, vulnerability, encryption, data protection, authentication, confidentiality, integrity, and availability. The Semantic Shields aims to bring together cybersecurity experts, conceptual modelers, and ontologists, from scholars to practitioners, to develop applications, methods, and tools impacting the cybersecurity domain.

## ST4DM

### First Workshop on Semantic Technologies for Data Management

#### Programme Chairs

Davide Lanti	Free University of Bozen-Bolzano, Italy
Alessandro Mosca	Free University of Bozen-Bolzano, Italy
Federico Maria Scafoglieri	University of Rome La Sapienza, Italy
Guohui Xiao	University of Bergen, Norway

#### Programme Committee

Ahmet Soyly	OsloMet – Oslo Metropolitan University, Norway
Antonis Bikakis	University College London, UK
Roman Kontchakov	Birkbeck University of London, UK
Antonella Poggi	La Sapienza University of Rome, Italy
Jennifer D'Souza	TIB - Leibniz Information Centre for Science and Technology University Library, Germany
David Chaves-Fraga	USC - Universidade de Santiago de Compostela, Spain
Vladislav Ryzhikov	Birkbeck University of London, UK
Tarcisio Mendes de Farias	Université de Lausanne, Switzerland / SIB Swiss Institute of Bioinformatics, Switzerland
Oscar Corcho	UPM - Universidad Politécnica de Madrid, Spain
Gianluca Cima	University of Rome La Sapienza, Italy
Elena Botoeva	University of Kent, UK
Francesco Corcoglioniti	Free University of Bozen-Bolzano, Italy
Ognjen Savkovic	Free University of Bozen-Bolzano, Italy
Valentina Bartalesi Lenzi	ISTI-CNR Pisa, Italy
Tiago Prince Sales	University of Twente, The Netherlands
Jose M Parente de Oliveira	Aeronautics Institute of Technology, Brazil
Ítalo Da Silva Oliveira	University of Twente, The Netherlands
João Rebelo Moreira	University of Twente, The Netherlands
Anastasia Dimou	KU Leuven, Belgium
Filipi Miranda Soares	University of Twente, The Netherlands
Anisa Rula	University of Brescia, Italy
Luca Andolfi	University of Rome La Sapienza, Italy

Knowledge Graphs (KGs) have become a popular format of data representation mainly due to their flexible data model, which renders them particularly suited to those tasks where data coming from multiple, possibly heterogeneous, sources has to be integrated in order to be fully exploited. KGs have received both the attention of academia, through foundational efforts stemming from scientific research areas such as Knowledge Representation, Machine Learning, or Databases, and the enterprise world. Enterprise applications, in particular, exploit tools implementing standard recommendations from the Semantic Web community (such as RDF and OWL), and proprietary formats based on property graphs. The general data model of KGs allows for representing both extensional knowledge, the data itself, and intensional information made available by means of domain ontologies. Hence, KGs provide a way to enrich data coming from legacy sources with se-

semantic information coming from the application domain and expert knowledge. This empowers users with automated inference support, enriches interpretability of data, and overall facilitates data access and integration.

The goal of this workshop is to create a specialized forum for researchers and practitioners working at the intersection of semantic technologies and KGs, focusing on both data and ontologies. Many existing venues tend to emphasize one or the other — such as the Database community’s focus on data, or the Knowledge Representation and Semantic Web communities’ focus on ontologies. However, initiatives focusing on leveraging semantic technologies for data management necessitate an integrated perspective that merges data with semantics. This also calls for bespoke techniques that seamlessly combine the two.

The first edition the ST4DM workshop opened with a keynote by Antonella Poggi, who discussed metamodeling (also known as “multi-level modeling”) and meta-querying for Data Management. This was followed by four presentations that spanned a range of subjects, from foundational research to practical applications in various fields. Specifically, the presentations covered: implementing controlled query evaluation in Ontology-Based Data Access systems by Divya Baura *et al.*; improving the cost of updates in Virtual Knowledge Graphs by Romuald Esdras Wandji *et al.*; Ontology-Driven Data Management Design in Health-Care Domain by Leonardo Cocco *et al.*; and integrating multiple Knowledge Graphs in Digital Humanities by Alberto Morvillo *et al.*

We trust that this workshop serves as a fruitful platform for advancing the integration of data and semantics through Knowledge Graphs, inspiring future work and collaboration in this dynamic area.

## YODA

### Contemporary Ontologies for Digital Archives

#### Programme Chairs

Krzysztof Kutt	Jagiellonian University, Poland
Jesualdo Tomás Fernández Breis	University of Murcia, Spain
Alois Pichler	University of Bergen, Norway
Gábor Palkó	Eötvös Loránd University of Budapest, Hungary
Grzegorz J. Nalepa	Jagiellonian University, Poland

#### Programme Committee

Martin Atzmüller	Osnabrück University, Germany
Jesualdo Tomás Fernández Breis	University of Murcia, Spain
Rune Falch	University of Bergen, Norway
Zsófia Fellegi	Institute for Literary Studies (HUN-REN), Hungary
Rafael Valencia García	University of Murcia, Spain
Jakub Gomułka	AGH University of Krakow, Poland
Christophe Guillotel-Nothmann	Centre National de la Recherche Scientifique, France
Krzysztof Kutt	Jagiellonian University, Poland
Ulrich Lobis	University of Innsbruck, Austria
Grzegorz J. Nalepa	Jagiellonian University, Poland
Gábor Palkó	Eötvös Loránd University, Hungary
José Tomás Palma Méndez	University of Murcia, Spain
Alois Pichler	University of Bergen, Norway
Elżbieta Sroka	Lukasiewicz – EMAG, Poland
Joseph Wang-Kathrein	University of Innsbruck, Austria

The primary goal of the YODA workshop is to offer an interdisciplinary venue for discussion of all issues related to the development of ontology-based systems for storing cultural heritage artifacts. Therefore, the workshop is open to submissions from all stakeholders working in any institution in the GLAM sector (galleries, libraries, archives, and museums) or using their resources, including collection curators, librarians, philologists, historians, enthusiasts, and knowledge engineers. A wide range of theoretical and practical papers are accepted, covering topics from crafting a model underlying a collection, through compiling metadata about individual documents and digital collections and considering integration across systems of various institutions to exchange and complement information about collections, to supporting advanced research processing scenarios.

The YODA workshop was packed into a single session with five papers presented, each of which was accepted based on the evaluation of at least 2 reviewers. It started with two conceptual presentations.

In the first, the authors considered how to properly model texts and works. Since there is no consensus here even among scholars, the authors proposed a new approach that relies on design patterns instead of a monolithic ontology, which will be more robust.

The second conceptual presentation was a kind of tutorial on how to choose the vocabularies that best suit the goals and needs of a specific project, from among a whole range of different vocabularies to describe archival documents. The second part of our adventure focused on presentations of three use cases. It started with the Wittgenstein Ontology, which will model the philosophical content of Ludwig Wittgenstein's writings digitized in the Wittgenstein Archives at the University of Bergen, Norway. Then, we saw the Our Heritage, Our Story project, which with the help of natural language processing techniques seeks to connect community archives from across the United Kingdom. In the last presentation, we looked at attempts to create an ontology to describe manuscripts stored at the Jagiellonian University, Poland.

# FOIS 2024 Satellite Events

## Early Career Symposium

### Programme Chairs

Zubeida C. Khan

Council for Scientific and Industrial Research, South Africa

Pedro Paulo Favato Barcelos University of Twente, Netherlands, and Ghent University, Belgium

João Moreira

Univesitait Twente, The Netherlands

The Early Career Symposium (ECS) is an integral part of the FOIS conference, created with the specific aim of providing students and early career researchers with a stage to present their work and receive feedback and insights from experienced researchers.

In the spirit of cultivating young talent and fostering knowledge exchange, this year's participants in the ECS had the chance to showcase their research through both short oral presentations in front of the FOIS audience and engaging poster presentations.

Each participant could engage in an extended conversation with a senior mentor in their respective fields during a dedicated mentoring lunch. This interaction serves as a bridge between generations of researchers, facilitating guidance, wisdom, and knowledge transfer from experienced hands to those just starting their academic journey, and, in turn, contributes to the collective advancement of knowledge by allowing young researchers to provide innovative ideas.

The ECS is not just about formal presentations and structured mentoring but also offers a venue to build informal networks and relationships. To facilitate this, we hosted an ECS breakfast, creating a relaxed and friendly atmosphere where early career researchers and their mentors could interact with each other more informally, exchange ideas, and build lasting connections.

As it is connected to the FOIS conference, the ECS welcomes research addressed in an interdisciplinary aptitude towards formal and philosophical ontology, cognitive science, knowledge representation, linguistics, and more.

We express our deepest gratitude to all participants, mentors, and attendees for making ECS an essential component of the FOIS conference.



## Ontology Showcase

### Programme Chairs

Laura Daniele	TNO, The Netherlands
João Paulo A. Almeida	Federal University of Espirito Santo, Brazil

### Programme Committee

Mara Abel	Federal University of Rio Grande do Sul, Brazil
Luis Olavo Bonino Da Silva Santos	University of Twente, Netherlands
Stefano Borgo	Italian National Research Council, Italy
Cornelis Bouter	TNO, Netherlands
Oscar Corcho	Polytechnic University of Madrid, Spain
Victor de Boer	Vrij Universiteit (VU) Amsterdam, Netherlands
Sergio de Cesare	University of Westminster, United Kingdom
Damion Dooley	Simon Fraser University, Canada
Mauro Dragoni	Fondazione Bruno Kessler (FBK), Italy
Bart Gajderowicz	University of Toronto, Canada
Pawel Garbacz	John Paul II Catholic University of Lublin, Poland
Janna Hastings	University of Zurich, Switzerland
Maxime Lefrançois	IMT - MINES Saint-Étienne, France
João Luiz Rebelo Moreira	University of Twente, Netherlands
Emilio Sanfilippo	Italian National Research Council, Italy

As the Applied Ontology community, we have reached the point where an impressive variety of ontologies have been developed across a wide range of domains. For the most part, however, there has been a lack of coordination among these efforts and even a lack of awareness about the work that is being done by groups within the community. The Ontology Showcase at FOIS 2024 facilitates the sharing and reuse of ontologies, to achieve the vision of seamless semantic interoperability of curated ontologies within their applications.

## Demonstrations

### Programme Chairs

Pawel Garbacz  
Robert Pergl

John Paul II Catholic University of Lublin, Poland  
Czech Technical University in Prague, Czech Republic

### Programme Committee

Claudenir M. Fonseca  
Robert Hoehndorf  
Alessandro Oltramari  
Marek Suchánek  
Walter Terkaj

University of Twente, Netherlands  
King Abdullah University of Science and Technology, Saudi Arabia  
Bosch Research and Technology Center, USA  
Czech Technical University in Prague, Czech Republic  
CNR-STIIMA, Italy

The demonstration track complements FOIS 2024 main tracks by offering an interactive platform for authors to present and discuss their work. It invites demonstrations of methods and tools developed using ontologies and those to create, maintain, integrate, publish, evaluate, and implement ontologies. It also welcomes demonstrations of novel ontology (anti)patterns and challenges arising in the ontology engineering life cycle.

This year, five papers were accepted in the demonstration track. One was presented during the on-site part of FOIS and the remainder in the online part. The papers discussed tools for education, reasoning systems, and the application of knowledge graphs.

## **Research and Industrial Project Exhibition**

### **Track Chairs**

Enrico Franconi  
Paul Johannesson

Free University of Bozen-Bolzano, Italy  
Stockholms Universitet, Sweden

## **Journal-First**

### **Programme Chairs**

Adrien Barton	Institut de Recherche en Informatique de Toulouse (IRIT), CNRS, France
Emilio M. Sanfilippo	Laboratory for Applied Ontology ISTC-CNR, Italy

For the first time within the FOIS context, the Journal-First Track provided a forum for discussing recently published research on topics related to formal ontology, aiming to facilitate broader dissemination within the FOIS community. This track invited submissions of extended abstracts from papers that had been published or accepted for publication in journals, provided they had not been previously presented at FOIS or any other major venue focused on applied ontology, such as ICBO, ISWC, ESWC, K-CAP, or JOWO workshops.

## Tutorials

### Tutorial Chairs

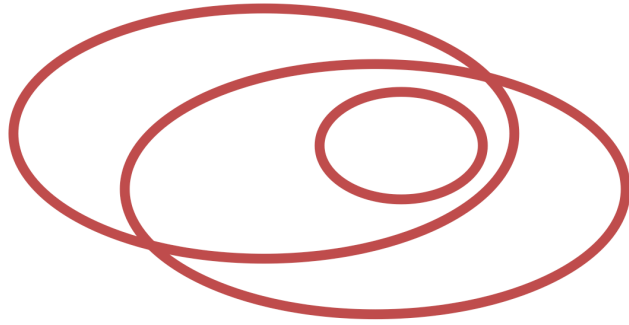
Chiara Ghidini  
Veruska Zamborlini

Free University of Bozen-Bolzano, Italy  
Federal University of Esp rito Santo, Brazil

The tutorial sessions of the FOIS 2024 edition aimed to provide attendees with an engaging learning experience, balancing both theoretical exploration and practical applications in key areas of ontology and knowledge engineering. Through expert-led discussions and interactive exercises, four tutorials offered participants opportunities to delve into discussions on ontological analysis of events and processes, the engineering of hybrid intelligent systems, and advanced methods for ontology implementation in OWL.

1. “Knowledge Engineering for Hybrid Intelligence (CommonKADS in Hybrid Scenarios)” by Ilaria Tidli, Victor de Boer, and Stefan Schlobach from Vrije Universiteit Amsterdam, introduced the CommonKADS methodology in hybrid intelligence contexts, combining explanation of the methodology with hands-on activities.
2. “Events, Processes, and their Descriptions” by Nicola Guarino from ISTC-CNR Trento, shared his expertise on the conceptualization of events and processes, shedding light on their descriptions in ontological terms.
3. “Generating Ontology Conceptualization and Pattern Libraries with Chowlk” by Mar a Poveda-Villal n, Ra l Garc a-Castro, and Sergio Carulli-P rez from Universidad Polit cnica de Madrid, was a hands-on tutorial introducing participants to Chowlk, a tool for generating ontology conceptualizations and pattern libraries through practical exercises.
4. “DOLCE in OWL” by Emilio M. Sanfilippo and Walter Terkaj from CNR ISTC and CNR STIIMA from Italy, provided a combined theoretical and practical session on implementing the DOLCE foundational ontology in OWL.

We express our gratitude to the presenters for their invaluable contributions and to the participants who gained valuable insights into current challenges and methodologies, leaving them with enhanced skills and fresh perspectives to apply in their own research and projects.



I A O A