

ISAO 2016 - 3rd INTERDISCIPLINARY SCHOOL ON APPLIED ONTOLOGY

PROGRAMME AND READING GUIDE 27th June – 1st July, Bolzano (BZ), Italy



Summer School program

The program of the 3rd IAOA Interdisciplinary Summer School on Ontological Analysis is structured into courses offered by renowned experts in the fields of Philosophy, Knowledge Representation, Logic, Conceptual Modeling and Ontology Engineering. In addition to the courses, a number of shorter invited talks will also be presented.

A summary of the program is shown here. The following pages show more details about each course, invited talk and social event.

	Monday	Tuesday	Wednesday	Thursday	Friday
PACE / TIME	Eurac	Eurac	Uni – D002	Eurac	Eurac
8:30-9:00	Registration open				
09:00-10:30	Galton	Galton	Vieu	Camara	Galton
10:30-11:00	Coffee Break		Coffee @ bar	Сс	offee Break
11:00-12:30	Artale	Artale	Varzi	Artale	Neuhaus
12:30-14:00	Lunch		Private Lunches		Lunch
14:00-15:30	Camara	Camara	Rittner Erdpyramiden	Varzi	Vieu
15:30-16:00	Coffee Break				Coffee Break
16:00-17:30	Poster Blitztalks	Ferrario		Vieu	Panel
	16:30 Poster Session				
	From 17:00 - Aperitivo	18:15 Walking Tour / Piazza Walther, centre of square	19:30 Ontology Quiz@Temple Bar Terrace		

Program at a glance:

Courses

Alessandro Artale	Reasoning over Ontologies and Conceptual Models
Gilberto Camara	Geospatial Ontology
Antony Galton	Time and Process
Achille C. Varzi	Mereology
Laure Vieu	Language and Ontology

Invited Talks

Roberta Ferrario	The Ontological Analysis of Organizations
Fabian Neuhaus	The Distributed Ontology Language DOL

MESSAGE FROM THE CO CHAIRS

Welcome to ISAO 2016!

It is our great pleasure to welcome you to the 3rd IAOA Interdisciplinary School on Applied Ontology, held in the capital of South Tyrol-Alto Adige, Bozen-Bolzano.

This third edition of the biannual IAOA summer school comprises five courses and two invited talks offered by world-class scholars. The five courses offered throughout the week are: Reasoning over Ontologies and Conceptual Models by Alessandro Artale (Free University of Bozen-Bolzano, Italy), Geospatial Ontology by Gilberto Camara (National Institute for Space Research, Brazil), Time and Process by Antony Galton (University of Exeter, UK), Mereology by Achille C. Varzi (Columbia University, New York, USA), and Language and Ontology by Laure Vieu (CNRS, France). In addition to these exciting courses, we are happy to announce the following invited talks: The Ontological Analysis of Organizations by Roberta Ferrario (Laboratory for Applied Ontology, CNR, Trento, Italy) and The Distributed Ontology Language DOL by Fabian Neuhaus (Otto-von-Guericke University of Magdeburg, Germany). We are very happy to welcome these internationally renowned speakers in Bozen-Bolzano and we look forward to their courses and talks!

But also and at least as much we are happy to welcome you, the participants of ISAO 2016 here in our beautiful city at the meeting and melting point between cultures, languages, and traditions. We are honored to welcome among you students and researchers hailing from four different continents and covering a wide variety of academic specialisations and subject areas. It is great to have you here with us!

We want to thank the Free University of Bozen-Bolzano and the European Academy of Bozen-Bolzano (EURAC) for opening their doors to ISAO 2016 and providing us with the rooms and required equipment for the lectures. Also, we owe an enormous dept of gratitude to Katrin

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Lambacher from the Press and Event Management of the Free University of Bozen-Bolzano since without her relentless help and assistance in almost all aspects relevant for making ISAO 2016 happen we wouldn't be meeting here today. Thank you, Katrin!

Finally, we would like to thank the International Association for Ontology and its Applications (IAOA) and its Executive Council for entrusting us with the opportunity of organizing the 3rd IAOA Interdisciplinary School on Applied Ontology, its premier educational event for the study and application of ontologies.

All which is left to say now is: We hope (and actually are quite optimistic) that all of you will have a pleasant and productive week and a great stay in this beautiful city and region, and that the experiences and new friendships you make at ISAO 2016 will enrich both your professional and personal life for the years to come.

Oliver Kutz (General Chair)

Tarek R. Besold (Local Chair)



COURSE THE ONTOLOGY OF TIME AND PROCESS



The Ontology of Time and Process Antony Galton

University of Exeter, UK

ABSTRACT: We consider different views of the relationship between things which exist and things which happen. Do these form distinct categories (e.g., "continuants" vs "occurrents")? If so, what sorts of relationships (e.g., one-way or mutual dependence) hold between them? If not, what kind of ontology is implied by this (e.g., some form of "four-dimensionalism")? Amongst things which happen we consider subcategories such as processes vs events, and again ask if these form distinct categories, and if so how they are related. In particular, do they represent distinct objective properties in reality, or do they rather reflect different ways of conceptualising reality? These issues are explored against the background of some existing ontologies (e.g., BFO, DOLCE) and also used as the stimulus for developing some more or less radical alternatives. If there is time, we will then go on to look at the implications of these ideas for the analysis of causality and causal relations.

CV: Antony Galton works at the University of Exeter, UK, where he holds the post of Reader in Knowledge Representation. His research interests are focused on Knowledge Representation and Ontology, with especial emphasis on spatial, temporal, and spatiotemporal phenomena. He is particularly interested in the interface between formal and philosophical approaches to these topics and believes that a fully-rounded account of the field should encompass both aspects.

COURSE WEBSITE: http://isao2016.inf.unibz.it/?page_id=1009

SUGGESTED READINGS:

- Pierre Grenon and Barry Smith. SNAP and SPAN: Towards dynamic spatial ontology. *Spatial Cognition and Computation*, Volume 4, number 1, 2004, pages 69-104.
- Antony Galton. Experience and History: Processes and their Relation to Events. *Journal of Logic and Computation*, Volume 18, number 3, 2008, pages 323-340.
- Antony Galton and Riichiro Mizoguchi, The Water Falls but the Waterfall does not Fall, *Applied Ontology*, Volume 4, number 2, pages 71-107, 2009.
- Donald Davidson, Causal Relations, *Journal of Philosophy*, Volume 64, pages 691-703, 1967.

Mon-Tue-Thu	
une 27 th - 28 th – 30 th	



Reasoning over Ontologies and Conceptual Models Alessandro Artale

Free University of Bozen-Bolzano, Italy

ABSTRACT: The aim of the course is to provide students with an understanding of the formal foundations of classical logic-based knowledge representation languages, with an overview of the reasoning methods for them, and of the application of techniques developed in knowledge representation to classical data management problems. In particular, the course will focus on description Logics, from the propositional DLs based on ALC to the new DL-Lite languages, and on their application to reason over (dynamic) conceptual modelling languages and Ontologies.

CV: Prof. Alessandro Artale is an Associate Professor in the Faculty of Computer Science at the Free University of Bozen-Bolzano where he teaches graduate and undergraduate courses. His research interests include temporal logics, logics for knowledge representation, extentions of the ontology-based data access paradigm with a temporal dimension and reasoning over conceptual data models including their dynamic behaviour. He got a PhD in Computer Science from the University of Florence in 1994. He published more than 80 papers in international journals and conferences and as book chapters. He acted as both Chair and PC member in International Conferences, and as editor of both proceedings and journal's special issues. His research has been funded by both European and National funds.

SUGGESTED READINGS:

- Franz Baader, Diego Calvanese, Deborah McGuinness, Daniele Nardi, and Peter F. Patel-Schneider, editors. The Description Logic Handbook: Theory, Implementation and Applications. Cambridge University Press, 2003.
- Klaus Schild. A correspondence theory for terminological logics: Preliminary report. In Proc. of the 12th Int. Joint Conf. on Artificial Intelligence (IJCAI 1991), pages 466–471, 1991.
- Francesco M. Donini, Maurizio Lenzerini, Daniele Nardi, and Werner
- Nutt. The complexity of concept languages. Information and Computation, 134:1–58, 1997.
- Daniela Berardi, Diego Calvanese, and Giuseppe De Giacomo. Reasoning on UML class diagrams. Artificial Intelligence, 168(1–2):70–118, 2005.
- Alessandro Artale, Diego Calvanese, Roman Kontchakov, Vladislav Ryzhikov, and Michael Zakharyaschev. Reasoning over extended ER models. In Proc. of the 26th Int. Conf. on Conceptual Modeling (ER 2007), volume 4801 of Lecture Notes in Computer Science, pages 277–292. Springer, 2007.

- Diego Calvanese, Giuseppe De Giacomo, and Maurizio Lenzerini. Conjunctive query containment and answering under description logics constraints. ACM Trans. on Computational Logic, 9(3):22.1–22.31, 2008.
- Artale, D. Calvanese, R. Kontchakov, and M. Zakharyaschev. The DL-Lite family and relations. Journal of Artificial Intelligence Research (JAIR), 36:1–69, 2009. DOI: 10.1613/jair.2820; Citation Index: 253. AAAI Press.
- Artale, R. Kontchakov, V. Ryzhikov, and M. Zakharyaschev. Complexity of reasoning over temporal data models. In Proc. of the 29th International Conference on Conceptual Modeling (ER-10), volume 6412 of Lecture Notes in Computer Science, pages 174–187. Springer, 2010.

Mon-Tue-Thu-Fri June 27th -28th -30th -1st july

Geospatial Ontology Gilberto Camara

INVITED TALK

GEOSPATIAL ONTOLOGY

National Institute for space Research, Brazil

ABSTRACT: Ontologies of the geographic world are important to allow the sharing of geographic data among different communities of users. A geo-ontology provides a description of geographical entities, which can be conceptualised in two different views of the world. The field view considers spatial data to be a set of continuous distributions. The object view conceives the world as occupied by discrete, identifiable entities. Objects and fields are not merely located in space, they are tied intrinsically to space. However, to properly represent changes, it is also necessary to describe concepts that convey the dynamics of spatial phenomena. The notions of events and processes are useful to explicitly include the temporal dimension. The lectures present a general overview of the main trends in Geospatial Ontology, discussing the concepts of objects, fields and events for representation of geographical phenomena. The course also highlights the specific area of land use and land cover ontology, an area of considerable importance for geospatial ontology research.

CV: Prof. Dr. Gilberto Câmara is a researcher in Geoinformatics, Spatial Database and Land Use Change at Brazil's National Institute for Space Research, where he was General Director (2006-2012). He is internationally recognized for promoting free access for geospatial data and for setting up an efficient satellite monitoring of the Brazilian Amazon rainforest. From 2013-2015, he was Brazil Chair at the University of Münster. Gilberto has advised 50 graduate students and published 150 papers that have been cited more than 7500 times. He has received a Dr. Honoris Causa from the University of Muenster, a Chevalier (Knight) of the Ordre National du Mérite of France, the Global Citizen Award of the Global Spatial Data Infrastructure Association, and the Pecora Award from USGS and NASA.

COURSE LINK: http://isao2016.inf.unibz.it/?page_id=1018

SUGGESTED READINGS:

- Barry Smith and David Mark, Ontology and geographic kinds. Proceedings, International Symposium on Spatial Data Handling, Vancouver, Canada, 1998.
- Antony Galton, "On the ontological status of geographical boundaries". In Matt Duckham, Michael F. Goodchild and Michael F. Worboys (eds.), Foundations of Geographic Information Science, Taylor and Francis, 2003, pages 151-171.
- Mike Worboys, Event-oriented approaches to geographic phenomena. International Journal of Geographical Information Science 19(1):1-28, 2005.
- Karine Ferreira, Gilberto Camara, Miguel Monteiro, "An algebra for spatiotemporal data: from observations to events". Transactions in GIS,18(2):253–269,2014.

Tue June 28th



The Ontological Analysis of Organizations Roberta Ferrario

Laboratory for Applied Ontology, CNR, Trento, Italy

ABSTRACT: Nowadays, nearly every aspect of our lives depends on organizations, since the day we are born until the day we die. It comes thus with no surprise the continuous quest for tools, methods and techniques that enable to deal with and manage them. Ontological modeling is one among these methodologies. But organizations are such complex and elusive objects that the possibility of providing meaningful models of them requires a deep and thorough analysis. This lecture is meant to provide a wide overview on some of the main notions that need to be analyzed prior to modeling organizations. These range from the foundations (e.g. collective intentionality, speech acts...), to the constituents (e.g. roles, groups...), to the theoretical perspectives which presuppose – or should presuppose – an understanding of them (e.g. socio-technical systems, cyber-physical systems...).

CV: Roberta Ferrario is researcher at the Institute of Cognitive Sciences and Technologies of the CNR (National Research Council) in Trento (Italy). She has finished her PhD in Philosophy under the scope of a cotutorship program between the Universities of Milan (Italy) and Strasbourg (France) in 2003. In 2004 she has spent an academic year at the Suppes Center for the Interdisciplinary Study of Science and Technology of Stanford University (USA). Back in Trento, she has worked on ontology of mind, of organizations and of services. Lately, her research interests have been on ontology of socio-technical systems and on the integration of ontological and computer vision approaches. She has been PI of the VisCoSo project (2012-2016), a three year "Research Unit" project grant of the Autonomous Province of Trento. She is member of the Executive Council of the International Association of Ontology and its Applications (IAOA), Associate Editor of the International journal Applied Ontology (IOS Press), PC Chair of the 9th International Conference on Formal Ontology in Information Systems (FOIS 2016) and she has been co-founder of series of workshops like CONTACT (Computer vision + ONTologies: Applied Cross-disciplinary Techniques) and FOMI (Formal Ontology Meets Industry). She's author of a monograph, two edited books and more than 70 scientific articles and book chapters on social ontology, ontology of services, ontology of mental entities, philosophy of language.

SUGGESTED READINGS:

Whitworth, B., A brief introduction to socio-technical systems, Encyclopedia of Information Science and Technology, Second ed, Ed Claude Ghaoui, Hershey: Idea Group Publishing, pp. 394-400, 2009. [http://brianwhitworth.com/2008-STSIntro.pdf]

Searle, J. R., Social ontology: Some basic principles, in J.R. Searle, Philosophy in a New Century, Cambridge University Press, 2008, pp. 26-52 [http://ddd.uab.es/pub/papers/02102862n80p51.pdf]

Dietz, J. L. G., Enterprise Ontology: Theory and Methodology, Springer 2006. (In particular chapters 2 and 8)

Fri July Ist

The Distributed Ontology Language DOL

Fabian Neuhaus

Otto-von-Guericke University of Magdeburg, Germany

ABSTRACT: There is a diversity of ontology languages in use, among them OWL, RDF, OBO, Common Logic, and F-logic. Related languages such as UML class diagrams, entity-relationship diagrams and object role modelling provide bridges from ontology modelling to applications, e.g. in software engineering and databases. Another diversity appears at the level of ontology modularity and relations among ontologies. There is ontology matching and alignment, module extraction, interpolation, ontologies linked by bridges, interpretation and refinement.

The Distributed Ontology, Model and Specification Language (DOL) is an Object Management Group standard, which aims at providing a unified metalanguage for handling this diversity. In particular, DOL provides constructs for (1) "as-is" use of ontologies, models and specifications (OMS for short) formulated in a specific ontology, modelling or specification language, (2) OMS formalised in heterogeneous logics, (3) modular OMS, (4) mappings between OMS, and (5) networks of OMS. The presentation will cover the basics of DOL and provide examples for its application.

CV: After Fabian Neuhaus received his Ph.D. at Humboldt University in 2002, he worked on topics in formal ontology and applied ontology in the life sciences first at the Institute for Formal Ontology and Medical Information Science at Saarland University and as part of the National Center for Biomedical Ontology at SUNY Buffalo. Between 2006 and 2013 Fabian Neuhaus was a guest researcher at the National Institute of Standards and Technology. In 2013 Fabian Neuhaus accepted a position at the Institute of Knowledge and Language Engineering at the University of Magdeburg, where he serves as the principal investigator for the EU project "Concept Invention Theory". Since 2013 Fabian Neuhaus has been member of the Executive Council of the International Association for Ontology and its Applications (IAOA). Further, he is one of the principle contributors to both the revision of ISO Common Logic and the Object Management Group (OMG) Distributed Ontology, Model, and Specification Language (DOL). Currently, his main research interests are ontology languages and ontology evaluation.

SUGGESTED READINGS:

Specification can be found at: <u>http://www.omg.org/spec/DOL/</u>

Till Mossakowski, Mihai Codescu, Fabian Neuhaus, and Oliver Kutz. The Road to Universal Logic–Festschrift for 50th birthday of Jean-Yves Beziau, Volume II, chapter The distributed ontology, modelling and specification language - DOL. Studies in Universal Logic. Birkhäuser, 2015.

Wed-Thu-FriCOURSEJune 29th - 30th July 1stLANGUAGE AND ONTOLOGY



Language and Ontology Laure Vieu

CNRS, France

ABSTRACT: In this course I will review the interaction between language and ontology from a theoretical and a practical point of view. I will show that on the theoretical side linguistic semantics, especially formal semantics and lexical semantics, has always been closely related to formal ontology, and for a good reason: semantics is about referring to what there is while ontology is about what there is. On the practical side, I will address the fertile relationship between ontology engineering and natural language processing through two major topics: building ontologies from text, which leverages on the fact that texts are among the strongest data available to acquire knowledge; and semantic resources, essential for many NLP tasks and information systems, which often mix up lexical and ontological knowledge and improve when these are disentangled. Finally, I will focus on systematic polysemy and complex categories, a phenomenon illustrating the language and ontology interplay in both its theoretical and engineering dimensions.

CV: Laure Vieu is a French National Research Council (CNRS) senior researcher at Institut de Recherche en Informatique de Toulouse (IRIT). She has been working in formal ontology, formal semantics, lexical semantics, discourse semantics, and their interplay for over 25 years. She has coordinated a long-term interdisciplinary lab on interacting knowledge systems between (among others) IRIT and the Laboratory for Applied Ontology from the ISTC-CNR in Trento, Italy, where she was on secondment for 7 years.

Wed-Thu June 29th - 30th COURSE MEREOLOGY



Mereology Achille C. Varzi

Columbia University, New York, USA

ABSTRACT: This tutorial will offer a brief introduction to mereology, understood as a formal theory of the relations of part to whole and the relations of part to part within a whole. The focus will be on so-called classical mereology, according to which parthood is a partial ordering (a reflexive, transitive, antisymmetric relation) constrained by extensionality (no two composite wholes have the same proper parts) and closed under composition (any plurality of things compose a whole). Weaker theories obtained by relaxing some of these requirements will also be surveyed briefly, as will extensions obtained by enriching the language with intensional operators to represent tense and modality or with additional binary predicates to represent contact relations and further properties of mereologically structured entities (mereotopology).

CV: Achille Varzi is professor of Philosophy at Columbia University, New York, where he has taught since 1995. His main research interests are in logic and metaphysics, with special emphasis on the application of formal methods to questions concerning the structure and persistence conditions of spatiotemporally extended entities. He is an editor of The Journal of Philosophy, a subject editor of the Stanford Encyclopedia of Philosophy, and an associate or advisory editor of The Monist, Synthese, Dialectica, The Review of Symbolic Logic, and several other journals.

PRACTICAL INFORMATION

Summer School Venue:

The school will be held at the European Academy of Bozen/Bolzano (EURAC) and at the Free University of Bozen-Bolzano.

The EURAC and the main building of the Free University of Bozen-Bolzano are located in the center of the town and are within walking distance from the train station.



SOCIAL EVENTS:

- 18:15, Tuesday 28th: Piazza Walther / Walterplatz



- 19:30, Wednesday 29th at Temple Bar



- 14:00, Wednesday 29th : Ritten Erdpyramiden:

Website: http://www.ritten.com/de/sonnenplateau/highlight/erdpyramiden.html



How to get there:



Useful telephone numbers:

Person /	/ service	Phone numbers
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Emergency	Emergency/Police	113
services	Ambulance Service	118
	Fire Department	115

Hotels:

Name	Address	Telephone
Rainerum	Piazza Domenicani 15, I-39100 Bolzano	+39 0471 972283
<u>Kolpinghaus Bozen</u>	Largo Adolph Kolping 3 I-39100 Bolzano	+39 0471 308400

Transportation:

Туре	Information
Airport	Airport Innsbruck Airport Verona Villafranca
Bus Station	public city bus service by SASA http://www.sasabz.it/bozen/ Bus app: sasabus app
Taxi	 Stops near the venue: Piazza Walther Piazza Domenicani Train Station Taxis can also be called via telephone with the number: 0471 981111

ORGANISATION & CONTACT

General contact for all inquiries concerning the school: isao2016@unibz.it

General Chair:

• Oliver Kutz

Technical Program:

- Maria Keet
- Zena Wood

IAOA Coordinators:

- Frank Loebe
- Fabian Neuhaus

Local Organising Committee:

- Tarek R. Besold (Chair)
- Maria M. Hedblom
- Mihai Codescu

Registration and Accommodation:

• UNIBZ Event Management Office

NOTES

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