

# **Ontology, Rules, and Logic Programming for Reasoning and Applications**

**(RulesReasoningLP)**

**Session 3**

**Concepts and Foundations of Rules and  
Ontologies: Logic Programs, Classical Logic, and  
Semantic Web - 2**

**November 21, 2013**

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# Topics: Ontology, Rules, Reasoning, Logic Programming, and Applications

<http://ontolog.cim3.net/cgi-bin/wiki.pl?RulesReasoningLP#nid3XS0>

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- Ontology-Rule Knowledge Representation containing Classical Logic, Declarative Logic Programs (Pure Prolog), and Rulelog
  - Standards incl.: Rule Interchange Format, RuleML, and Common Logic
- Ontology and Rule Reasoning Tools, Systems: Requirements, Design, Implementation
  - Examples include Semantic Web and Description Logic-based systems, First-Order Logic systems, Logic Programming systems, Rulelog systems, and Hybrid Description Logic + Logic Programming (Description Logic Programming) systems
  - E.g., Cyc, Pellet, Jena, Prover9, Vampire, SILK, Coherent, RuleLog; various Prologs such as SWI-Prolog, XSB Prolog, Ciao Prolog, Prova, Flora-2
  - Answer Set Programming, Constraint Logic Programming, Deductive Databases, SAT and SMT reasoners, decision-support systems, business rule systems, etc. [Deductive, Inductive, Abductive, Probabilistic, etc., reasoning]
- Ontology and Rule Reasoning Optimization: Knowledge Compilation from Development Time Ontologies and Rules to Run-Time Reasoning, Tabling, Memo-izing, Extensionalizing, Delayed / Lazy Evaluation, Type Subsumption Encodings, etc.
- Ontology and Rule Reasoning Applications

# Goals

<http://ontolog.cim3.net/cgi-bin/wiki.pl?RulesReasoningLP#nid3XS5>

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- 1) Sketch out the current field of ontology and rule reasoning: what are the relevant standards, architectures, reasoning methods, reasoning engines, techniques, and applications?
- 2) Provide a perspective on emerging technologies, techniques, and tools relevant for ontology and rule reasoning
- 3) Discuss the issues and architectures involved in developing applications that use ontology and rule reasoning
- 4) Describe visualization and explanation technologies and techniques for ontology and rule reasoning

# Mini-Series Program – sessions

[each with co-chairs listed]

<http://ontolog.cim3.net/cgi-bin/wiki.pl?RulesReasoningLP#nid3XRK>

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1. RulesReasoningLP: Mini-series Launch Event - Survey and Introduction [Leo Obrst, Benjamin Grosf] [October 24, 2013](#)
2. Concepts and Foundations of Rules and Ontologies: Logic Programs, Classical Logic, and Semantic Web - I [Leo Obrst, Harold Boley] [October 31, 2013](#)
3. ***Concepts and Foundations of Rules and Ontologies: Logic Programs, Classical Logic, and Semantic Web - II [Pascal Hitzler, Leo Obrst]*** [Today, November 21, 2013](#)
4. Guide to Reasoning Applications      Development and Cases  
[Henson Graves, Ken Baclawski] [December 19, 2013](#)
5. Rule Standards: Common Logic, RuleML, and RIF [Harold Boley, Adrian Paschke, Mike Dean] [January 9, 2014](#)
6. ... And more to come ...

# Today's Agenda

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- The second of two sessions devoted to addressing the concepts and foundations of the technologies underlying ontology and rule reasoning, especially focused on the Semantic Web and Logic Programming
- Today's Panelists:
  - **Dr. Markus Kroetzsch** (Technische Universität Dresden) - "Existential Rules in Ontological Modelling"
  - **Dr. Hector Perez-Urbina** (Clark & Parsia, LLC) - "Modeling with Rules in Practice"
  - **Professor Hassan Aït-Kaci** (Université Claude Bernard Lyon) - "Reasoning and the Semantic Web"
  - **Professor Enrico Franconi** (Free University of Bozen-Bolzano) - "The Logic of Extensional RDFS"
- Q&A and open discussion (30 min)