

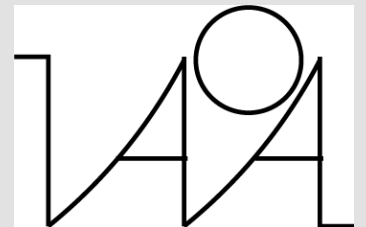


IAOA

The *International Association for
Ontology and its Applications*

Ontolog virtual panel, June 18th, 2009

Nicola Guarino
ISTC-CNR, Laboratory for Applied Ontology, Trento, Italy



The challenges of *interdisciplinarity*

Working at (and in...) the *interfaces* among

Disciplines

Cultures

Languages

Socio-technical systems

...is **HARD!**

- Anyway, these are the main challenges of modern, global, networked society
- Ontologies are certainly intended to address such challenges

A new discipline (or science) is emerging?

See recent proposals for Web Science, Services Science...

Maybe.

For sure, a *humble*, truly interdisciplinary approach is needed, focusing on letting new ideas, approaches, methodologies emerge from the *mutual cross-fertilization* of different disciplines.

That's why we believe that this association is **NEEDED**.

Building an interdisciplinary community: a bit of history

1993: 1st International workshop on Formal Ontology & Information Systems

1998: 1st FOIS conference

2002: Ontolog forum

2003: First proposal for a European Network of Excellence on Axiomatic Ontologies (AXION)

2005: Applied Ontology (IOS Press)

2005: ECOR, NCOR, JCOR...

2006: First public discussion on an ontology association at FOIS (Baltimore)

2008: Public assembly at FOIS (Saarbrücken)

In parallel:

- various consortia focusing mainly on Semantic Web;
- various ontology standardization attempts

From the Statute

“The Association is a non-profit organization the purpose of which is to promote interdisciplinary research and international collaboration at the ***intersection of philosophical ontology, linguistics, logic, cognitive science, and computer science***, as well as in the applications of ontological analysis to ***conceptual modeling, knowledge engineering, knowledge management, information-systems development, library and information science, scientific research, and semantic technologies*** in general.”

Activities (from the Statute)

- Educating interested stakeholders on what ontologies are and how they can be effectively utilized;
- Promoting cooperation among public and private institutions, cultural associations, consortia, and cooperative societies that pursue similar aims;
- Establishing connections with national and international institutions that pursue similar aims;
- Supporting the development of collaborations between research and industry;
- Supporting international scientific exchanges, paying particular attention to rising and developing countries;
- Supporting the publication of journals and books, potentially through direct agreements with publishing companies (agreement with IOS Press concerning Applied Ontology, FOIS, and FOMI already operational);
- Stimulating research in areas related to the Association's purpose through the establishment of scholarships, fellowships, and awards;
- Organizing, potentially in cooperation with related organizations, scientific meetings, conferences, educational activities and similar events;
- Creating temporary or permanent groups comprising members who share specific interests.

Activities (cont.d)

- Community building (cooperation, information exchange, best practices, support to the establishment of local groups)
- Suggestion for curricula in the area of applied ontology, organization of summer schools, collection of teaching resources....
- Reports concerning the status and the strategic perspectives of applied ontological research, aiming at influencing concrete policy choices worldwide
- Support of guidelines, standardization and certification efforts concerning, for instance, ontology quality and evaluation
- Promotion of coordination initiatives among ontology-related projects
- Possible associations to establish contacts with: AAI, ECCAI, ACL, FoLLI, Global Wordnet Association, W3C...

IAOA Executive Council (*)

- Nicola Guarino, ISTC-CNR, Italy *(President)*
- John Bateman, University of Bremen, Germany
- Stefano Borgo, ISTC-CNR, Italy *(Secretary)*
- Paul Buitelaar, DERI, Ireland
- Antony Galton, University of Exeter, UK
- Michael Gruninger, University of Toronto, Canada
- Riichiro Mizoguchi, University of Osaka, Japan
- Mark Musen, Stanford University, USA
- Leo Obrst, MITRE, USA
- Laure Vieu, IRIT-CNRS, France and ISTC-CNR, Italy *(Treasurer)*
- Peter Yim, Ontolog, USA

(*) provisional body, only in charge until the first general Assembly
(to be held within one year)

IAOA: a unique combination of key aspects

1. Interdisciplinarity
2. Cooperation between academy, industry, and community of practice (with an eye on education)
3. Scientific authoritativeness
4. Openness
5. Legal status
6. Transparent governance

Current status

- Formally registered according to the Italian law
- About 190 people in the mailing list
- On-line payment being setup
- Members-only page will give access to benefits
 - Free online access to Applied Ontology, FOIS proceedings, FOMI proceedings
 - Discount on future sponsored conferences, such as FOIS 2010.

FOIS 2010

6th International Conference on Formal Ontology in Information Systems



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 - ❖ [Formatting Guidelines](#)
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Welcome to FOIS 2010

Toronto, Canada, May 11-14, 2010

The [FOIS conference series](#) began with the first meeting in Trento, Italy, in June 1998, which was followed by meetings in 2001, 2004, 2006, and 2008. The sixth FOIS conference will be held in Toronto, Canada, during 11-14 May 2010, and we are now calling for papers to be considered for inclusion in the conference.

Ontology began life in ancient times as a fundamental part of philosophical enquiry concerned with the analysis and categorisation of what exists. In recent years, the subject has taken a practical turn with the advent of complex computerised information systems which are reliant on robust and coherent representations of their subject matter. The systematisation and elaboration of such representations and their associated reasoning techniques constitute the modern discipline of formal ontology, which is now being applied to such diverse domains as artificial intelligence, computational linguistics, bioinformatics, GIS, knowledge engineering, information retrieval, and the Semantic Web. Researchers in all these areas are becoming increasingly aware of the need for serious engagement with ontology, understood as a general theory of the types of entities and relations making up their respective domains of enquiry, to provide a solid foundation for their work.

FOIS is intended to provide a meeting point for researchers from these and other disciplines with an interest in formal ontology, where both theoretical issues and concrete applications can be explored in a spirit of genuine interdisciplinarity.

Applied Ontology

Interdisciplinary Journal on Ontological Analysis and Conceptual Modeling



Editors in chief:

Nicola Guarino
ISTC-CNR

Mark Musen
Stanford University

IOS Press

Amsterdam, Berlin,
Washington, Tokyo, Beijing

www.applied-ontology.org

Contributions from IAOA EC members

1. Peter Yim: Community, Collaboration, and Collective IQ
2. Antony Galton and Laure Vieu: IAOA and Education
3. Leo Obrst: Ontologies and Communities of Interest
4. Michael Gruninger: IAOA, Ontologies, and Standards
5. Paul Buitelaar: Ontologies and Natural Language Processing
6. John Bateman: Some Burning Issues for Ontology Initiatives

Your ***active contribution*** is welcome!

Suggestions?
Recommendations?
Questions?
Concerns?



IAOA:

Community, Collaboration & CollectiveIQ

Peter Yim (Ontolog)

18 June 2009

(v. 1.08)

Communities



John Seely Brown: Communities of Practice

- *" ... small group of people who've worked together over a period of time. Not a team, not a task force, not necessarily an authorized or identified group. They are peers in the execution of "real work." What holds them together is a common sense of purpose and a real need to know what each other knows."*

Doug Engelbart: NIC & Meta-NIC

- *"Consider an 'Improvement Community' (IC) as collectively engaged in improving an agreed-upon set either of individual capabilities, or of collective group capabilities – e.g. a professional society. Let's introduce a new category, a 'Networked Improvement Community' (NIC): an IC that is consciously and effectively employing best-possible Dynamic Knowledge Repository (DKR) development and usage."* [\[source\]](#)
 - *IC = Improvement Community*
 - *NIC = Networked Improvement Community*
 - *Meta-NIC = a NIC of NIC's*
 - *DKR = Dynamic Knowledge Repository*

Collaboration: Towards Collective IQ



- Sharing Knowledge
- Engaging the community
- Bootstrapping (à la Doug Engelbart)
- **Collective IQ** *is a measure of how well people work collectively -- how quickly and intelligently people can respond to a situation collectively, leveraging their collective memory, perception, planning, reasoning, foresight, and experience into applicable knowledge. It's ultimately a measure of how effective they are at tackling complex, urgent problems and opportunities. [source]*
- **Reference:**
Engelbart's **Bootstrap Vision & Mission**

Ontolog & IAOA



- a shared goal: to advocate the research, development and application of ontology
- a shared approach: "open"
- CoP vs. Professional Society
 - the "water cooler conversation" vs. the "research institution"
- where Doug Engelbart meets John McCarthy
- Ontolog is committed to supporting and collaborating with IAOA in whatever way we can

*(On behalf of the co-conveners of Ontolog:
PeterYim, LeoObrst & KurtConrad)*



The **I**nternational **A**ssociation for **O**ntology and its **A**pplications

IAOA and Education

Antony Galton - SECaM - Univ. of Exeter

Laure Vieu - IRIT-CNRS & LOA-ISTC-CNR - Toulouse & Trento

Situation and proposal

- “The Association will achieve its purpose by engaging in different kinds of activities, including:
 - Educating interested stakeholders on what ontologies are and how they can be effectively utilized.”
- Ontology is a relatively new field and as a result is not yet well established in higher education. There are few curricula dedicated to it, and no comprehensive textbook available.
- To overcome this, IAOA will set up a group to guide and coordinate all IAOA educational activities

Suggested Activities of the Education Group

1. maintain a **database of existing courses** that contain ontological content
2. put together recommendations for a set of **"standard" curricula** covering all aspects of ontology which course developers can use as a guideline
3. create a **library of resources** for use by teachers
4. maintain a **set of links** to existing on-line resources as well as a **bibliography** of relevant printed material
5. maintain a **forum / FAQ** to discuss relevant issues
 - e.g., how to implement the required level of interdisciplinarity

Suggested Activities cont'd

6. budget permitting, provide **financial support to PhD students** (from developing countries(?)) attending events endorsed by IAOA
 - summer schools, conferences with paper presented...
7. organize **summer schools**, independently or in association with other initiatives
 - need to add to existing ones? (ESSLI, SSSW, Reasoning Web ...)
8. ?? eventually support an initiative to put together a **textbook** endorsed by IAOA
 - Suggested format:
 - wiki for the knowledge repository (1, 4, 5)
 - pages edited by the group for authored material (2, 3)

Ontologies and Controlled Vocabularies for Communities of Interest

International Association for Ontology and its
Applications (IAOA)
Ontolog Session, June 18, 2009

Dr. Leo Obrst
MITRE
Information Semantics Group

Controlled Vocabularies and Ontologies

- Controlled Vocabularies
 - Controlled vocabularies and other terminologies are necessary lexical resources and should be linked to ontologies
 - Controlled vocabularies and other terminologies are ways of referring to concepts and real world referents
- Ontologies
 - These concepts, real world referents, and their associated relations, properties, values, and rules are characterized by and represented as ontologies
 - A term in a terminology "means" a concept (or a complex collection of associated concepts); without linkage to a concept, a term has no meaning (we are talking about terminologies and ontologies here as engineering products)

Communities of Interest

Vocabularies and Ontologies

- Communities of Interest (COI) are human communities that typically transcend institutional boundaries, and form based upon mutual interests
 - Communities of Interest (COI) self-organize to share information
 - Two or more communities that wish to share information form an intersecting COI
- The COI tries to determine a common vocabulary AND a common set of meanings for that vocabulary and the information referred to
 - An ontology characterizes and represents the meaning of that COI vocabulary
 - An ontology tries to capture and describe the real world entities and relationships of the information the vocabulary refers to
- Both controlled vocabularies & ontologies are necessary

Ontologies and Controlled Vocabularies: IAOA

- IAOA can assist communities and institutions by
 - Providing best practices and lessons learned from many vocabulary and ontology efforts
 - Encouraging the linking of terminologies to formal representations of what they mean and refer to in the world, i.e., ontologies
 - Formal and informal educational outreach about semantics (ways of referring) and ontologies (what is referred to) and COIs, which need both
 - Supporting the development of better engineered human interfaces to applications and services of ontologies



IAOA, Ontologies, and Standards

June 18, 2009

Michael Gruninger

Shared Goals

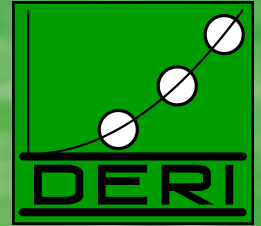
- Ontology design and standards development are closely linked
 - Both strive to identify terminology with a common understanding of the meanings for the terms
 - Both support sharability, reusability, and integration.

Possible Interactions

- Use ontologies to support the development, analysis, and extension of information standards in industrial domains.
 - Ontology Summit 2009
- Designing ontologies to formalize existing standards and support new standards.
- Design of common ontologies that play the role of standards within some community.
- Standards for ontology representation languages (including ontology metadata).

Role of IAOA

- IAOA will not sponsor or advocate specific standards.
- IAOA will facilitate and coordinate forums in which ontologies and ontology-related standards can be designed and evaluated, aiming at arising public awareness concerning the role of well-founded ontology-driven standards.
- The results of such forums can then be submitted to appropriate international standards bodies.



Ontologies & Natural Language Processing

Paul Buitelaar

DERI – Unit for Natural Language Processing

National University of Ireland, Galway

- **Circumscription (McCarthy 1980)**
- **TACITUS Commonsense Physics (Hobbs et al 1987)**
 - Natural Language Understanding
- **Subworld Concept Lexicon (Nirenburg & Raskin 1987)**
 - Sub-language, Knowledge-based Machine Translation
- **Temporal Ontology (Moens & Steedman 1988)**
 - Event Structure Analysis in Natural Language
- **Naive Semantics (Dahlgren 1988)**
 - Natural Language Understanding (PP attachment)
- **PENMAN Upper Ontology (Bateman et al 1990)**
 - Natural Language Generation
- **MikroKosmos (Mahesh & Nirenburg 1995)**
 - Knowledge-based Machine Translation

- **Conclusions at end of 90s**
 - Knowledge Representation effort/maintenance is too costly & less robust in applications
 - Cheaper, more robust but shallow (semantic) approaches needed
 - Turn towards empirical methods in NLP; KR loses central place in NLP

■ Knowledge Representation

- KR moves to the (Semantic) Web: RDF, DAML/OIL > OWL - standardization
- Distributed, collaborative Ontology Development - less costly, more robust
- Ontology sharing, merging, etc. – Ontology libraries/repositories

■ NLP

- Robust, statistical methods developed for syntactic analysis: part of speech tagging, chunking, dependency parsing
- Renewed interest in semantic analysis: semantic role labelling, temporal analysis, entailment, taxonomy extraction
- Applied work in ontology-based information extraction for specific domains, e.g. biomedical, business intelligence

■ KR & NLP moving slowly back together

- KR provides ontologies for use in NLP – information extraction
- NLP provides input for ontology development – text mining

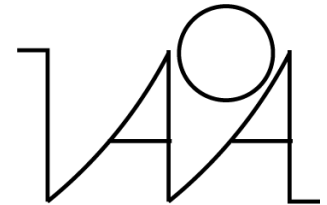
- **Ontology Learning**
 - Extracting domain ontology models from domain-specific text data

- **Ontology Population**
 - Semantic annotation, Ontology-based information extraction
 - Extracting instances from text for knowledge base generation

- **Lexicalized Ontologies, Lexical/linguistic ontology enrichment**
 - Ontologies often lack information on linguistic realization
 - Integration of linguistic information with domain semantics needed
 - LexInfo model: integrating lexical information with ontologies
 - Paul Buitelaar, Philipp Cimiano, Peter Haase, Michael Sintek *Towards Linguistically Grounded Ontologies* In: Proceedings of the 6th European Semantic Web Conference (ESWC 2009). Lecture Notes in Computer Science. Springer.

Some (more) Burning Issues for Ontology Initiatives

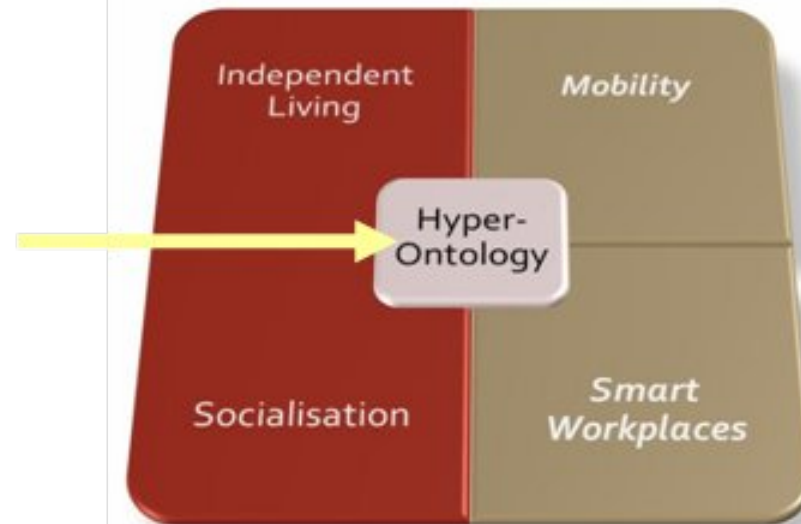
	BREMEN ONTOLOGY RESEARCH GROUP
	Collaborative Research Center for Spatial Cognition (German, DFG)
	German Research Centre for Artificial Intelligence: Bremen Lab
	Open architecture for Accessible Services Integration and Standardisation (EU, Large-scale Integrating Project)



I A O A

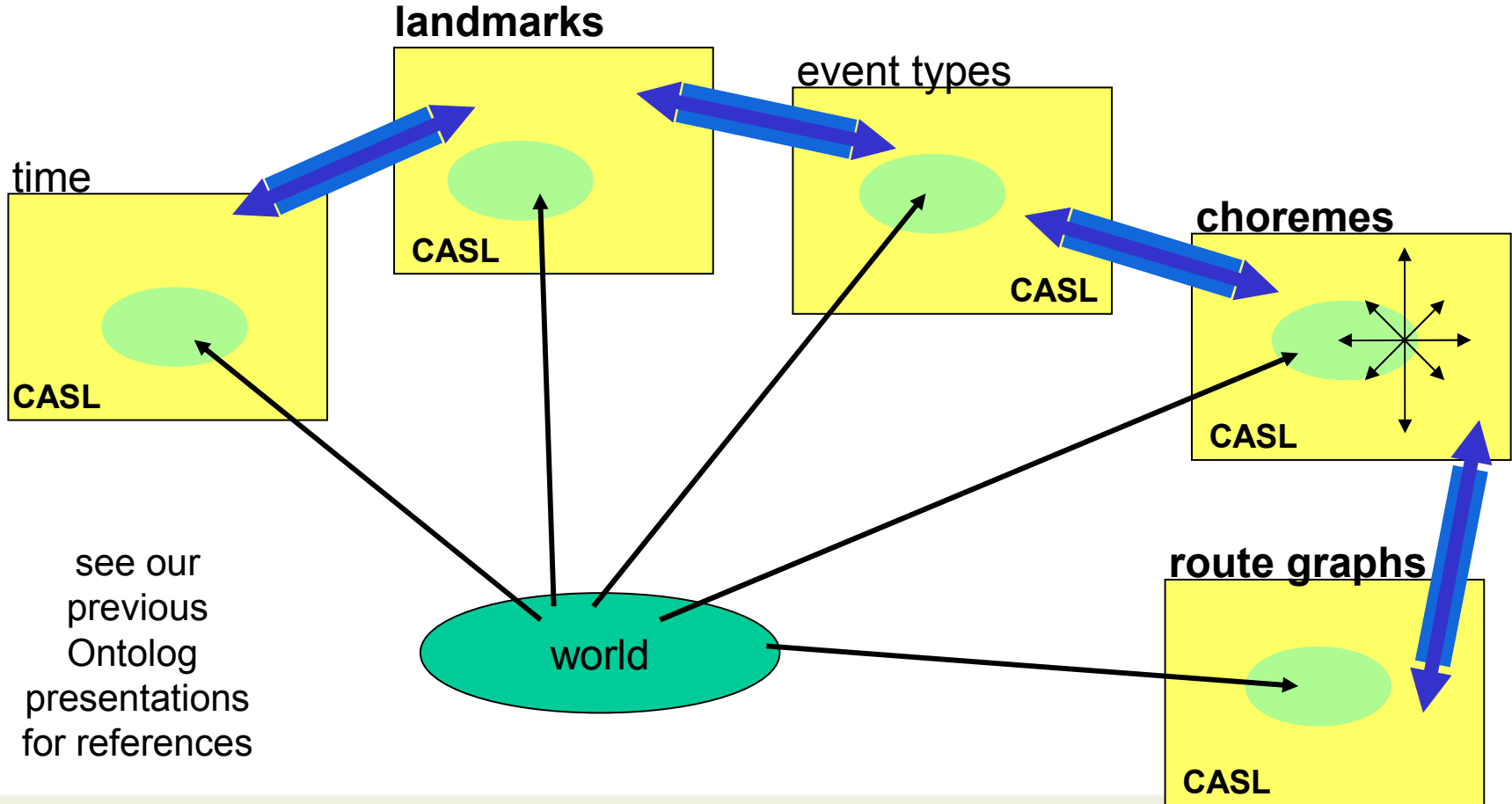
Background: Current Ontology Work in Bremen

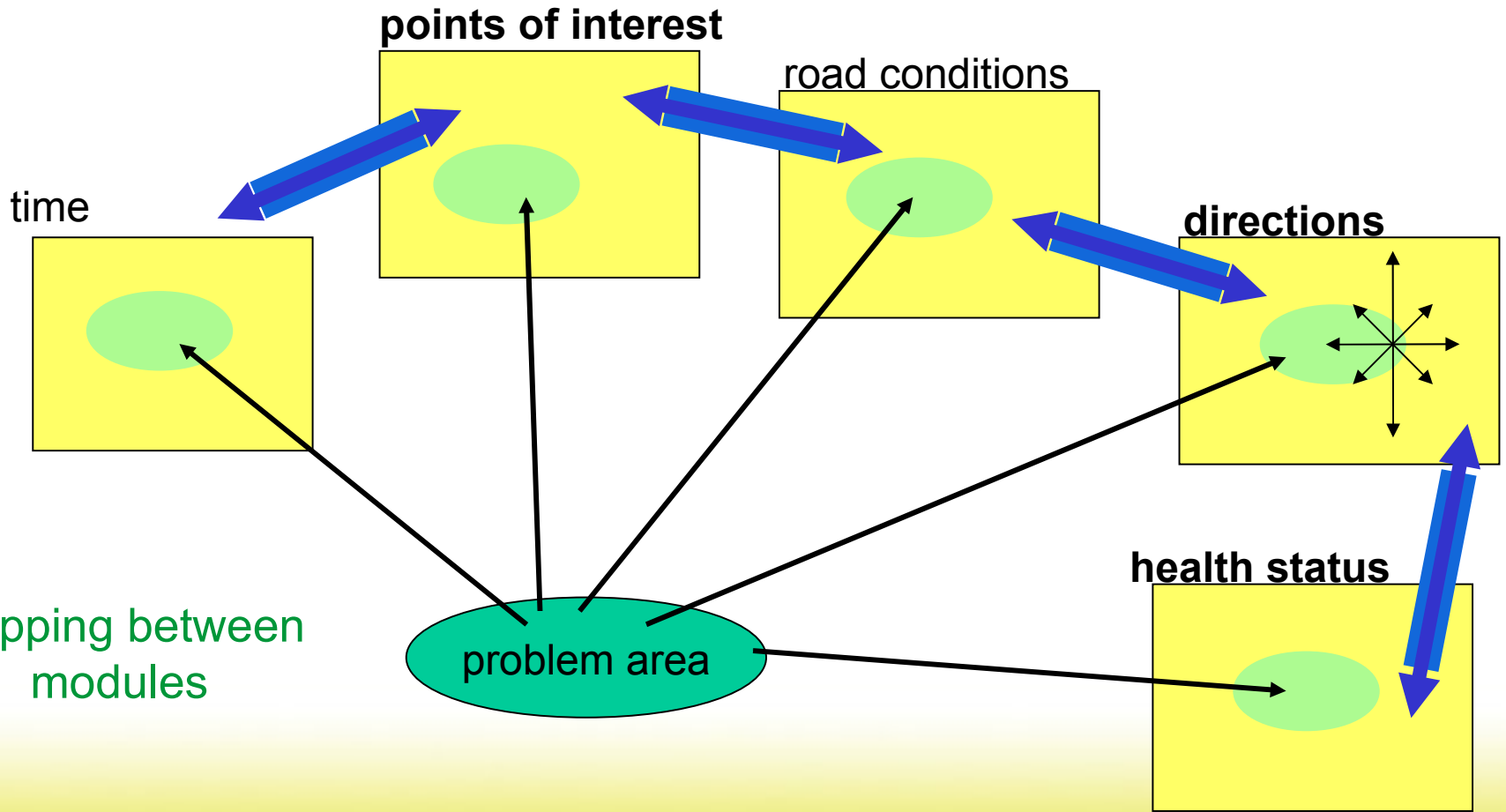
- Ontology of **linguistic semantics** (Generalized Upper Model) and its use for natural language processing
- Ontologies of **space** (many diverse spatial calculi) and their use for spatial reasoning
- Ontologies of:
 - **tourism,**
 - **assisted living,**
 - **buildings,**
 - **navigation,**
 - **transportation,**
 - **health monitoring,**
 - **sensors, ...**
- in Open Ontology Repositories



Ontological diversity

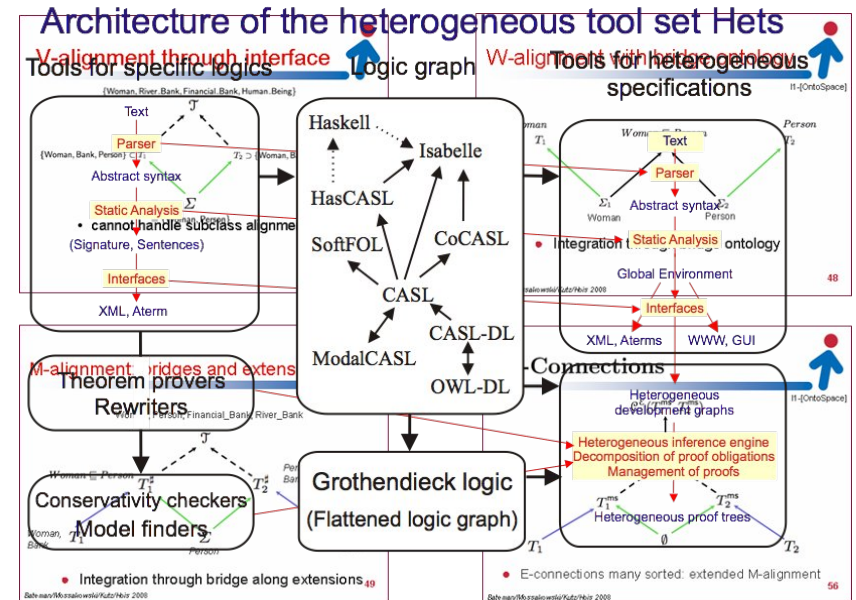
➔ inter-ontology mappings





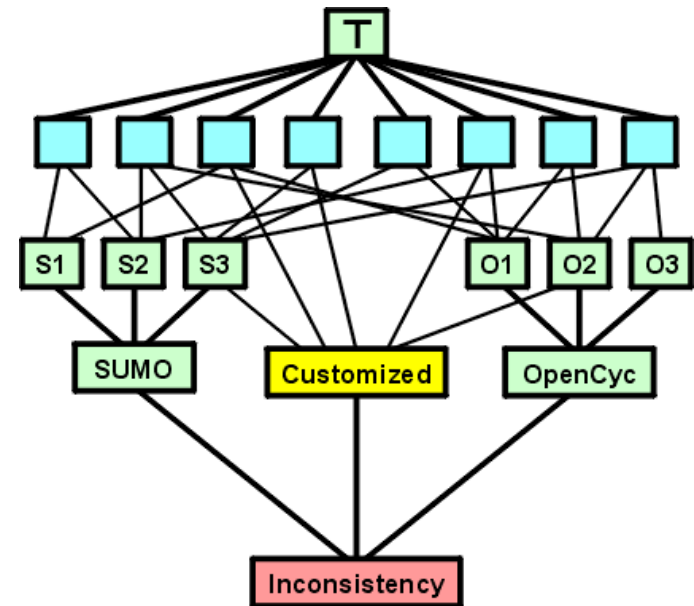
Current Ontology Work in Bremen

- **Tools** for ontological development (HETS)
- Formalisation of **ontological modularity** (CASL) experiments:
 - DOLCE in CASL,
 - SUMO+MILO in CASL,
 - spatial calculi in CASL, ...
 - formal ontology alignment, ...
- **Methodologies** for sound ontological development and benchmarking
- **Evaluation** and correction of existing ontologies



IAOA + *Ontological Modularity*

- Proposed Action Area:
 - **Ontology Structuring Mechanisms and Ontological Modularity**
 - Formalizing and populating John Sowa's 'lattice of theories' as a structured graph of heterogeneous specifications (HETS)
- Relations between ontology development and **standardisation** standards as modular ontologies?
- Standardisation of the modularisation layer itself?
- Building awareness of modularisation into ontology courses and curricula?
- Thinking small rather than monolithic!



John Sowa
(email/web discussion)

IEEE Standard
Upper Ontology
Working Group