



background

Ontology is both a branch of philosophy and a fast-growing component of computer science concerned with the development of formal representations of the entities and relations existing in a variety of application domains. Ontology has been shown to have considerable potential on the level of both pure research and applications. It provides foundations for diverse technologies in areas such as information integration, natural language processing, data annotation, and the construction of intelligent computer systems.

The University at Buffalo and Stanford University have established the **National Center for Ontological Research (NCOR)**, with Buffalo and Stanford as the two principal sites, together with a number of partner institutions drawn from academia, government, and industry.

methodology

Ontology building has been conceived thus far primarily in pragmatic terms, as outgrowths of knowledge engineering or artificial intelligence research, and as projects motivated by the need to solve problems internal to the development of computer systems. **NCOR**, in contrast, looks beyond the realm of software artifacts, starting out from the idea that the development of ontologies can profit from the application of theoretical rigor based in logic and philosophical ontology.

Too many ontologies used in information systems have been constructed largely by taking as their starting point existing database systems or the conceptualizations used by the practitioners within given domains, without sufficiently checking whether these conceptualizations correspond with identifiable entities and relationships in the world beyond. **NCOR** advocates a view according to which, in advance of implementation, careful attention should be paid to what the world is like. Our approach does not dictate any particular methodological stance with respect to the world being modeled. Indeed, we recognize that the same reality may be sliced in different ways when addressed from different perspectives. Our approach requires, however, that whatever stance is taken, it is used consistently and rigorously, and on the basis of clearly stated principles.

At the same time, we will develop tools designed to help in the selection between ontological frameworks based on criteria such as usability, usefulness, accuracy and reliability. The goal is to establish mechanisms that can bring about cumulative improvements in the quality of ontologies.

goals

NCOR has the goal of advancing ontological investigation within the United States. It will serve as a vehicle to coordinate, to enhance, to publicize, and to seek funding for ontological research activities in its two principal sites and in its partner institutions. A special focus will be on the establishment of tools and measures for quality assurance of ontologies.

NCOR will provide coordination, infrastructure, and other forms of support for investigators working in the United States on theoretical ontology and on applications in fields such as ontology of the sciences, spatial and cognitive ontology, terminological systems, enterprise ontology and in a variety of defense- and homeland security-related projects.

It will also provide US researchers working in ontology-related areas with specialized support in seeking external funding and in assembling collaborative, interdisciplinary teams both nationally and internationally. It will aid the coordination of ontological projects being pursued by its partner institutions and develop resources for the implementation and evaluation of ontologies. **NCOR** will also engage in outreach endeavors designed to broaden the range of institutions and individuals accepting the goals of high quality ontology in both theory and practice.

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ncor-buffalo

The **University at Buffalo** (UB) has a unique concentration of faculty working on research in ontology in a number of inter-disciplinary projects spanning a wide range of Schools and Departments.

Ontologists at UB are involved in collaborative ventures with leading national and international institutions. They have received major funding for ontology-related projects from the NSF, NIH, US and Canadian defense agencies and defense industries, and from the European Union.

NCOR-Buffalo is directed by Barry Smith of UB's Department of Philosophy, which as a result of targeted faculty recruitment is the *de facto* world leader in theoretical research in ontology.

Affiliated Institutions in Buffalo

New York State Center of Excellence
in Bioinformatics & Life Sciences

Center for
Cognitive Science

Center for Multisource
Information Fusion

Department of Computer
Science and Engineering

National Center for
Geographic Information
and Analysis

Roswell Park
Cancer Institute

School of Dental Medicine

School of Informatics

School of Medicine and
Biomedical Sciences

School of Management

ncor-stanford

Stanford Medical Informatics (SMI) is an interdisciplinary research group at Stanford University directed by Mark Musen. SMI brings together scientists who create and validate models of how knowledge and data are used within biomedicine. It studies new methods for acquiring, representing, processing, and managing knowledge and data within health care and the biomedical sciences.

SMI has a long history of studying and using ontology within information systems. The group has pioneered the development of intelligent systems that incorporate explicit, rich ontologies that are linked to reusable problem-solving tools with powerful reasoning capabilities. SMI is well known for development of the Protégé system for ontology development and management.

The journal **Applied Ontology** is edited by Mark Musen together with Nicolas Guarino of the Laboratory of Applied Ontology in Trento, Italy. The journal brings together ontology-related work in philosophy, linguistics, software engineering, natural-language processing, artificial intelligence, and psychology in relation to a wide range of domains and applications.

Stanford is the lead institution of **The National Center for Biomedical Ontology** (NCBO), one of seven NIH-funded National Centers for Biomedical Computing. NCBO member institutions include also the University at Buffalo's Department of Philosophy, Lawrence Berkeley National Laboratory and the Mayo Clinic.

partner institutions

NCOR's two administrative sites in Buffalo and Stanford have a substantial record of nationally and internationally funded research in ontology. Both are committed to the central importance of principles-based ontology as a tool for the integration of data and information in scientific research and practical and commercial applications.

NCOR's partners in academia, industry and government have a proven track record of excellence in ontological research and in the application of ontology to solve concrete problems.

With its partners inside and outside Buffalo and Stanford, **NCOR** will undertake cooperative research in several broad areas of ontological theory, ontology design, implementation, and application. It will develop schemes to facilitate the exchange of research personnel for short- and long-term visits and participation in joint projects, joint supervision of doctoral students, joint development of research papers in the area of ontology, and collaborative participation in nationally and internationally funded research networks. **NCOR's** founding partners include:

Apelon, Inc.

Mouse Genome Informatics

Ontology Works

Gene Ontology Consortium

MUSC Biomedical Ontology
Research Group

Open Biomedical
Ontologies Consortium

Lawrence Berkeley
National Laboratory

The National Center
for Biomedical Ontology

Sierra Nevada Corporation

Medical Ontology Research
National Library of Medicine

National Institute of
Standards and Technology

Structural Informatics Group

The MITRE Corporation

TopQuadrant, Inc.