

Carl Linnaeus Lecture on Ontology

Biological Ontologies

Barry Smith.

IFOMIS, Saarland University, Saarbrücken, University at Buffalo, NY, USA

phismith@buffalo.edu

Biomedical research increasingly involves the computerized navigation through large bodies of information, deriving from research in areas such as functional genomics or from the biochemistry of disease pathways. To make such navigation more effective, controlled vocabularies have been developed, which are designed to allow data from different sources to be unified by imposing a consistent use of biological terms. One of the most influential developments in this regard is the so-called Gene Ontology, or GO, created in the late 1990s by an international consortium of biologists and consisting of a list of some 20,000 standardized terms describing cellular constituents, biological processes and molecular functions, organized into hierarchies via relations of class inclusion and parthood.

Unfortunately GO as currently constituted, like many similar endeavors in the field of bio-ontology, is marked by a number of shortcomings which detract from its usefulness in supporting biomedical research. Many of these shortcomings relate to issues -- such as the treatment of space and time, of definitions and logical relations, of vagueness and prototypicality, of function and agency -- which are familiar to philosophers from the literature of analytical metaphysics. The talk will sketch the results of a project currently being carried out in conjunction with the GO Consortium, which seeks to use the lessons learned from philosophy in order to provide a rigorous logic of classification and a coherent ontology of bio-ontological relations that can be used as a foundation for systems like GO in the future.