



- ▶ **Principles for a successful ontology enterprise**
 - ▶ requires widespread use to be effective
 - ▶ OBO: includes principles that need to be followed & approximately 60 ontologies. Now in the process of filling the missing ontologies for domains that aren't covered already
 - ▶ People re-building new ontologies, just because they can't find every term they need in existing ontologies.
 - ▶ **Ontologies are constantly in flux.**



Ontology Building

- ▶ Every entity in the ontology should refer to some thing that you believe truly exists.
- ▶ An ontology is like a science text
- ▶ The distinction between Universals vs. instances is analogous to the difference between a catalog (types of instances) & an inventory (actual instances)
- ▶ The importance of definitions in proper Aristotelian form

The spectrum of OBO

- ▶ The importance of shared relations
- ▶ The Common Anatomical Reference Ontology (CARO) and other anatomies
- ▶ A bit on EnvO, used to describe where samples come from.
- ▶ Orthogonality so that ontologies work together



What is needed

- ▶ It is better to try and determine which view on reality is more accurate, despite the difficulty of reaching consensus.



Chris Mungall on PATO

- ▶ Uses: genetic mutations, clinical phenotypes (OMIM), autism, neuro-degenerative diseases, environmental qualities, biological process, phylogenetic character states.
- ▶ Formal modeling: E+Q, structure of PATO, relational qualities, absence, and so on
- ▶ Querying a database of E+Q statements
- ▶ Pre vs. post coordination of terms



Paula Mabee's wish list

- ▶ What genes underlie a given morphological character?
- ▶ What correlations exist between genetics and morphology?
- ▶ Models of morphological evolution
- ▶ Phenotypic BLAST

Recap

- ▶ Develop ontologies for evolutionary work
- ▶ Technical resources
 - ▶ refine syntax for evolutionary characters
 - ▶ to annotate phenotypes
- ▶ establish and maintain communication



Synthesis: ontologies needed

▶ Shared taxonomy

- ▶ What groups have a stake in a shared taxonomy: NCBI, UBIO, tdwg, gbif, EoL, BarCode, ToL projects, ...

▶ Cross anatomical interoperability

- ▶ CARO
- ▶ Most Recent Common Ancestor
- ▶ Homology
- ▶ Uberon (Haendel and Mungall)



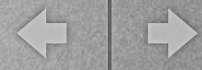
Synthesis: resources

- ▶ Software utilities for collecting, incorporating and tracking community input
- ▶ Central Online location for community resources
 - ▶ e.g. Ability to know the list of ontologies a given community is using.
- ▶ Manual semantic annotation to contribute to on-line corpus (Phenote/Phenoscape)



Synthesis: community communication

- ▶ **NSF Research Coordination Networks: funding for meetings to allow communities to collect shared resources**



Action Items?

- ▶ RCN for taxonomy: Paula (PI?), steering committee: (all present?), exchange visits among members.
- ▶ RCN for evolutionary processes from RNA, proteins, up to organisms
- ▶ RCN for anatomy & development, including synthesizing methodology. This a common interest of both the MOD and evolutionary biology communities.
- ▶ Connection to phylogenetics: how to do this properly and with a minimum of pain. How would a phylogenetic matrix map onto an ontology.
- ▶ Incremental improvements to annotation tools and strategies.