Tentative agenda:

1. Gaps, challenges, bottlenecks, potential solutions: (*italics* = added)

- *Common requirements and tooling needs resulting from science use-cases*
- Tools for collaboratively creating, engineering, and vetting ontologies
- Accelerating text extraction of terms and composition of logical expressions
- Achieving interoperability (for the purposes of reasoning and data integration) between ontologies
- Achieving semantic interoperability between logical data models for phenotype and trait observations. Disseminating data in interoperable form, and integrating data from different sources.
- Scalable yet expressive reasoning over large knowledgebases with both large A- and T-boxes.
- *Semantic expressivity levels and what questions / use-cases they enable (or don't enable).*
- *Understand the use-cases from the different participating communities*

2. Groups, communities, and people to engage to facilitate cross-pollination and joined forces. Coordination channels, existing or to-be-created, to ensure effective knowledge and experience exchange.

Common requirements and tooling needs resulting from science use-cases

- Capturing information with ontologies
- Ontologies that findable, shareable, and can continously be updated
- Tools specifically usable by non-technical domain experts
    - Hide unnecessary logic computing details (such as OWL axioms)
    - But also need to educate / train domain experts in logic modeling and its implications. Still much skepticism in some communities, which could be overcome with training.
    - Lowering the barrier of entry should not mean dumbing down semantics to the extent that (stated or implied) information is lost.
- Different strata of users have different needs and different technical expertise:
    - Ontology and data curators
    - Bioinformatics developers (tool engineers)
    - Biology domain scientist "end-user"
- Synonyms in ontologies
- Reasoning is one of the fundamental motivations for ontologies. Yet, many uses of ontologies does not make any use of reasoning.
    - Is obtaining the deductive closure scientifically useful? This is only an implementation strategy. Unfortunate absence of transitive closure operators in SQL.
    - On-the-fly reasoning needs to become more efficient and more scalable.
    - Potential for help in automatic consistency checking.
    - "Abductive reasoning" (http://en.wikipedia.org/wiki/Abductive_reasoning): suggested by Larry Hunter as the next necessary step
    - Implementing ontologies in relational formats has limitations, specifically in the context of using full reasoning in a form that is integrated with a query framework.
- Best-practice guide to ontology construction
    - One of the aims of the RCN, actually.
    - GO has a lot of this already, albeit reflecting the Smith et al philosophy.
    - Ontology and class design patterns
- We don't know how other communities (metagenomics, earth sciences, etc) are going about developing their ontologies
    - Some are highly modular (e.g., SWEET), with possibly obscure dependency-caused import / term reuse issues.

Informatics issues from report-outs of the 3 clade-based groups:

Arthropod group

- Developing a strategy on collaboratively managing the common insect anatomy ontology
  - version control: svn? git? dropbox?
  - juggling 4 different OWL files
  - ontology project management questions
- how to train domain experts to use Protége - this is probably the wrong approach: shouldn't put technological barriers in the way of knowledge capture from domain experts

Vertebrate group

- The tools aren't quite there for integrating and linking the different anatomy ontologies for vertebrate model organisms and subgroups (teleosts, amphibians).
- Convert graphical concept maps (such as CmapTools concept maps) into OWL (or OBO) files.
- Merging an embryo anatomy ontology with an adult anatomy ontology

Plant group

- Building an image archive for illustrating anatomy ontology terms, as a means to train and educate users of the ontology.
- How to model position of repeated anatomical elements.

Overall:

- How do we model homology.
  - Derived from versus homologous to: is this analogous to orthology and paralogy for gene homology?
- Propagation of annotations following develops_from in AmiGO leads to wrong results.

Final report-out:

- Collaborative management and development of ontologies: could a GCE-based tool be the solution that transparently manages versioning, provenance, and collaboration?
- Bring images into the definition of ontology terms. (HAO practices this already, using SVG layers. PO is keenly interested to develop an image catalog, for entities as well as for phenotypes.)
- Connecting visual graph / concept map tools with OBO and OWL file formats
- Visualization of origin of the imported terms in an ontology, as well as taxon-based partitions
- Wishlist for Protége plugins.