Abstracts

Daniel S. Brooks

"Against Clarity: Open-Ended Problems, Content Acquisition, and Ambiguity in Scientific Reasoning"

One stated value within both philosophy and science is the elimination of ambiguity in applying concepts. In this endeavor, the two fields are considered ideal partners in that philosophy proclaims to specialize in conceptual clarification while science both benefits from such clarificatory work and provides the means for shaping concepts to fit aims of human flourishing. However, attempting to eliminate ambiguities may frequently not only be impossible, it can also and more importantly lead to profound, and systematic, distortions in our reasoning about the natural world and decision-making in scientific investigation. These distortions in turn can have serious implications for the usefulness of scientific concepts in achieving stated and implicit goals related to articulating problems and exploring solutions to these problems. In this talk, I will begin by tracing these trends to flawed conceptual-methodological expectations in concept usage, which are shared by, or at least stated in, both philosophy and science. One important such class of flawed expectations include those that lead to what I will call the *de-contextualization* of concepts from their usage settings. Following this, I look to positive contributions of ambiguity when applying concepts in scientific reasoning. One prong to this concerns how concepts acquire content, where determinate meaning should be balanced with the ability to apply to novel situations. A second prong concerns communication within and between scientific communities that at least nominally share interest in a common overarching research problem. As I will argue, these and other types of usage contexts stand to gain from ambiguity in concrete conceptual tasks such as interpreting or reinterpreting the generalizability of scientific claims and the (re)articulation of problems in the face of acknowledged progress but where no solution has yet reached consensus. In this way, I conclude, ambiguity (or at least elements of it) may not only be unavoidable to scientific investigation, it actively contributes to its flourishing.

James DiFrisco

"Clarity, fundamentality, and importance: conceptual methodology for philosophical biology"

The work of philosophy is sometimes understood as clarification of fundamental concepts. Generally, a concept is "fundamental" to the extent that other concepts asymmetrically depend on it. Clarity is normally pursued via the method of conceptual analysis, in which proposed necessary/sufficient conditions for membership in a class or concept are fit to some descriptive data, such as intuition or scientific usage of a term. This methodology, which traces back to the origins of Western philosophy, was crystallized in general analytic philosophy and became entrenched early on in philosophy of science. In this talk I will explain why this approach tends to fail when applied to concepts outside of the formal domains of

mathematics and logic, and particularly in the inexact sciences. As an alternative, I explore an approach that tethers the meaning of scientific concepts (e.g., gene, species, character, individual) to inferential roles in scientific investigation. This relationship between (variations in) a concept and (variations in) achievement of inferential roles is "*important*" when it is characterized by counterfactual *specificity* and *relevance*. "Importance" in this sense contrasts with the non-specific dependency usually at stake when philosophers invoke fundamentality—for example, the fundamentality of physics vis-à-vis biology. This notion of importance, I claim, can set the granularity or resolution of biological concepts. It thereby makes otherwise unresolvable debates over pluralism versus monism about concepts (like gene, species, character, or individual) answerable to scientific investigation. In the same way, importance determines the degree of clarity in the refinement of concepts that matters, and the appropriate degree of tolerance of ambiguity and vagueness. In short, I argue that the clarification of fundamental concepts should be replaced by explication of important inferential relationships as the primary activity of philosophical biology. I envisage such a methodological shift to be crucial to forging a more progressive relationship between philosophy and science—i.e., a new naturalism.

Melinda Bonnie Fagan

"Explanatory particularism, interdisciplinarity, and the new naturalism"

I propose a naturalistic approach to philosophical studies of scientific explanation. The latter topic, though a long-term staple of philosophy of science, has largely evaded recent turns to scientific practice. Instead, philosophical debate about explanation is framed around debates internal to philosophy: how mathematics bears on the physical world, the nature of causality, laws of nature, and the like. My approach, "explanatory particularism" (EP) turns the traditional project on its head. EP's basic thesis is that scientific explanations are major achievements that advance understanding for members of particular scientific communities. What counts as an explanation, what makes for an advance in understanding, etc., are the first instance context-dependent. On this approach, philosophical theories of explanation are tools for clarifying and explicating scientists' own explanatory achievements. This directs philosophers' attention to the specialized diversity of explanatory achievements across the sciences, undercuts traditional epistemic hierarchies, and highlights social (notably, pro-social) aspects of scientific explanation and understanding. Alongside these abstract results, EP offers more concrete guidance for interdisciplinary research involving disparate scientific fields.

Johannes Jäger

"From Naturalistic Philosophy of Biology to Philosophical Biology"

As a practicing theoretician and former empiricist in the fields of evolutionary, systems, and organismic biology, I see two kinds of ways in which naturalistic philosophy is crucial to my thinking and research practice. The first is a reflective approach that helps me better understand what I am doing at a very fundamental level. In my case, what I find helpful is a philosophy of biology based on process thinking, multi-perspectival realism, and a deliberative approach, especially concerning pluralism and controversies in science. These are the topics I teach in my philosophy courses for researchers across the formal, natural, and social sciences. They constitute what I consider an adequate epistemology for 21st century biology. The second is a philosophical approach to biology itself, which I will call philosophical biology to distinguish it from the kind of contemporary "theoretical biology" which mainly consists of mathematical modelling, especially dynamical systems approaches. Instead, the kind of philosophical biology I envision is a contemporary, naturalistic version of the theoretical biology of old, from organicism to Waddington to the process structuralism I intellectually grew up with. It is focused on conceptual problems in biology, with the aim to generate new research questions and research programs. I will present a number of examples concerning the conceptualization of biological modules, approaches to process homology, and the rigorous integration of organismal agency into evolutionary theory, to illustrate this approach. My main argument here is that a proper naturalistic philosophy that is useful to contemporary biology must include both of these complementary pillars.

Steven Orzack

"Philosophy of Biology: The beginning of the end? / The end of the beginning?"

Many philosophers of biology aspire to engage with science or believe that they are so engaged. Most biologists avoid if not disparage philosophy of biology. I will describe how the gap between philosophers' talk about engagement with biology and biologists' lack of engagement with philosophy arises from epistemic and non-epistemic differences between the disciplines. The former include philosophers' claim of priority for logic, which is resisted by biologists, biologists' mixed attitudes toward investment in formal arguments, and biologists' investment in a lack of unification. The non-epistemic differences include the disciplines' disjunct professional reward systems in the university and more broadly, biologists' lack of training in philosophy, philosophers' lack of training in biology, the intellectual "bottleneck" arising from identification by philosophers of biology with the writings of three prominent biologists, and philosophers' lack of investment in the practice in philosophy as involving engagement with data. I will illustrate the last two issues by describing philosophers' engagement with Richard Levins's claims about model building. Finally, I discuss ways of reducing these epistemic and non-epistemic differences between philosophy and biology so as to create a philosophical biology.

Luz Christopher Seiberth

"Who makes the rules around here? A Meta-Classificatory approach to Categories"

All theory formation, in the humanities and natural sciences alike, presupposes basic conceptual elements and assigns fundamental status to some of them. This makes possible distinguishing empirical from categorial terms. In doing so, theoretical biology, sociology, psychiatry or literary studies, for example, proceed differently. If the methodological self-understanding of a discipline is based on its categorical constitution, scientific disciplines depend on philosophical categories. Just how to understand this dependence relation is the focus of my talk. This not only invites asking how systems of categorical order relate to each other, and to their history. It also invites asking in how far we discover or make categories, in what instances and in which disciplines? And it mandates answering what sets their status apart from mere empirical lists of things. Do they ever change, or does our understanding of them change? While time-invariance of a philosophical category-system is classically taken to be deductively justified, empirical taxonomies are seen as answerable to inductive procedures establishing what makes something a criterion constitutive of a category. Since individuation of unities (from cancer to platypuses and back) advances in light of a category and thus presupposes its defining criterion to already be operative, category-constitution and criterion choice are — as logically prior — themselves a topic of interest. The higher order problematic inherent in this, can be stated in neutral terms: How a discipline ontologically classifies its 'contents' and 'units of concern' already borrows from (pre)philosophical intuitions, that is, heavyweight category-theoretic background commitments. In my talk, I discuss this availment as the dependence of object- on meta-level classification. My approach interprets categories as meta-classificatory rules for qualifying contents. For this, I examine paradigm cases of deriving, describing and evaluating meta-level rules informing criteria for classification.

Jacqueline Sullivan

"Collaborations at the Intersection of Naturalism and Epistemology of Science with a Focus on Behavioral Neuroscience"

Naturalists are committed to the idea that the scientific method is superior to philosophical methods for generating knowledge about humans and how they come to know about themselves and the world. However, recent "crises" in science (e.g., replication) have been accompanied by demands for greater methodological transparency (e.g., "open" science) and closer analytic scrutiny of scientific practice, which supports the idea that epistemology itself (i.e., the study of how we come to know about ourselves and the world) cannot be completely naturalized; science needs an epistemology of science. Yet, what should such an epistemology of science look like? Could conceptual-analytic tools on offer in epistemology serve as a basis for the *collaborative* development of conceptual-analytic tools to positively reform scientific practice and science education? There is a growing consensus (that includes participants in this very workshop) that they can, and the aim of my talk is to describe some recent work I

have been undertaking in collaboration with rodent behavioral neuroscientists to develop some such tools, with the hope of generating lively discussion about the promises and pitfalls that accompany such work.