PiBM Newsletter

August 2024

Introduction

Hello PiBM network members!

Wishing you all a very warm welcome back from your holidays (whether summer or winter, depending on your hemispheric situation)! We have another great read to get you back in the PiBM mood - interesting jobs, conferences, more publications in science, and, in continutation with the previous newsletter from before the holidays, we have part 2 of Kevin Lala's reflections on his career and introductions to his forthcoming co-authored book, *Evolution Evolving*. Get your nootropic or caffeinated beverage ready and dive in!

Enjoy!

Academic Jobs

Department of History and Philosophy of Science, University of Cambridge

Applications are invited for the position of **Assistant Professor in Philosophy of Science and Technology** at the Department of History and Philosophy of Science at the University of Cambridge. The duties of this post will include lectures, supervisions, examining, and administrative duties for both undergraduate and postgraduate programmes, as well as conducting and leading research activities at the highest level. We are particularly interested in candidates with expertise in the philosophy of the physical sciences, in the philosophy of technology, and/or on topics with relevance to current social issues. (...)

Academic Jobs (cont.)

The **deadline is October 15** and the position will start on 1 September 2025. The completion of a PhD (or equivalent) is required before the start date. This is a permanent post, subject to the successful completion of a 5-year probationary period. The post-holder will have standard opportunities for promotion through the University's Academic Career Pathways (Research and Teaching) system.

To apply, please visit: https://www.jobs.cam.ac.uk/job/47824/

Lyman Briggs College, Michigan State University

MSU invites applications for two tenure system faculty positions at the rank of Assistant Professor with a focus on Science and Society (previously known in LBC as History, Philosophy, and Sociology of Science) starting August of 2025. The successful candidate must have a PhD, or a PhD conferred before the position start date, in the Social Sciences and/or Humanities with expertise in Science and Society.

The deadline is open for now, but for more details please visit: https://careers.msu.edu/en-us/job/520358/assistant-professortenure-system

Conferences & CFAs

Scenario Modeling: Epistemology, Practice, and Values
University of Geneva, Tuesday, September 3, 2024

Scientific policy advice is often based on scenarios produced by elaborate computational models. In recent years, such models have been particularly visible in climate science and infectious disease epidemiology. The practice of scenario modeling raises a range of philosophical and practical issues that are closely related to each other. First, how should we think about the epistemology of scenarios and of the models on which they are based? (...)

... Consider that we cannot easily judge the empirical credentials of these models by their predictive success, since many of their most useful predictions (such as those about worst-case scenarios) are typically counterfactual. So what is the appropriate relationship between scenario models and their real-world target systems?

Second, how do practitioners approach scenario modeling? What are the challenges of developing and exploring scenarios, and of conveying their significance to policy experts or the broader public? What is the role of scenario-based scientific advice in public policy debates, and what should its role be?

Third, how do non-epistemic values enter into the production or interpretation of model-based scenarios? Do scenarios offer value-neutral guidance on which we can base our decisions, or are scenarios inherently value-laden?

This workshop will bring together both philosophers and empirical scientists in order to discuss these and related questions from a range of different but complementary perspectives.

Organizers: Marcel Weber and Raphael Scholl

Online Participation: If you would like to participate remotely, please e-mail Raphael Scholl for a Zoom link by **September 2, 2024, at the latest**.

BUMP: The Metaphysics of Pregnancy and Beyond

The European Research Council funded project 'Better Understanding the Metaphysics of Pregnancy' (BUMP) is delighted to invite submissions for a conference to be held at King's College London from **Friday 25th to Sunday 27th of October 2024. 2024.**

The BUMP project has been running since 2016, under the leadership of Professor Elselijn Kingma. Its aim was to launch the metaphysics of pregnancy as an important and fundamental area of philosophical research. This workshop will mark the conclusion of the project, and look towards the future. (...)

Academic Jobs (cont.)

... The theme of the workshop is 'The metaphysics of pregnancy and beyond'. The main focus of this workshop willbe metaphysical or ontological questions related to pregnancy, parenthood and childbirth; however, we also invite submissions which engage with metaphysical or methodological questions through the lens of ethics, epistemology and feminist philosophy, or that investigate the social, political and ethical context and/or consequences of such metaphysical questions. We aim for this workshop to be a launching pad for future paths of research in the field of the metaphysics of pregnancy, with a specific view to identifying new questions or avenues of inquiry which remain unaddressed in the existing literature.

Deadline: 6th of September. Website: https://www.philosophyandmedicine.org/cfa-bump-conference

Please send abstracts of up to 500 words, prepared for blind-review, with 'BUMP Workshop' the subject line to PhilAndMed@kcl.ac.uk. Please note your affiliation/current position in the body of the email.

We especially welcome submissions from postgraduate and early-career researchers, researchers in clinical/empirical fields, as well as from women and other groups underrepresented in philosophy. We will cover accommodation as well as meals, and have bursaries available for reasonable travel (subject to request).

Publications

Barwich, A-S., & Rodriguez, M.J. (2024). "Rage against the what? The machine metaphor in biology." *Biology and Philosophy,* 39 (4):1-24. https://link.springer.com/article/10.1007/s10539-024-09950-4

Conix, S., Cuypers, V., & Pence, C. H. (2024). "Measuring and explaining disagreement in bird taxonomy". *European Journal of Taxonomy*, 943(1), 288–307. https://doi.org/10.5852/ejt.2024.943.2601

Publications (cont.)

Gems D, Okholm S, & Lemoine M. (2024). "Inflated expectations: the strange craze for translational research on aging : Given existing confusion about the basic science of aging, why the high optimism in the private sector about the prospects of developing anti-aging treatments?" *EMBO Reports*. https://doi.org/10.1038/s44319-024-00226-2

Shirbache K, Liaghat A, Saeifar S, Nezameslami A, Shirbacheh A, Nasri H & Namazi H. (2024). "Ultra-overt therapy: a novel medical approach centered on patient consciousness". *Frontiers in Integrative Neuroscience*. 18:1457936. https://doi.org/10.3389/fnint.2024.1457936

Upcoming PiBM Events

PhilInBioMed Seminar Series, Bordeaux - Ford Doolittle

The schedule for the upcoming talks in the PhilInBioMed Seminar series at Bordeaux is now available (here). The first talk in this series will be given by **Ford Doolittle (Dalhousie University)** on **September 24 (17:00 CEST (Paris time zone)).** The title of the talk is "Making Evolutionary Sense of Gaia."

Abstract
After briefly describing James Lovelock's Gaia Hypothesis, I'll argue that Gaia does not reproduce, or rather that it has what Peter Godfrey-Smith would term "too many parents" to undergo natural selection according to Lewontin's Recipe. So it does not make sense to most Darwinians. If that recipe were extended to include differential persistence as well as differential reproduction, or if the "gene's-eye view" of Richard Dawkins as further extended by David Hull and us were adopted, then the Gaia Hypothesis would make sense. That's what the It's the song not the singer(s) theory does.

For more details, visit: https://www.philinbiomed.org/event/ford-doolittle/

Philosophy in *Evolution Evolving (Part 2)* (*go here for Part 1*)

By Kevin Lala, University of St Andrews

As I hinted in Part 1, there are several juicy topics in our '*Evolution Evolving*' book that I believe philosophers of science might like to sink their teeth into, and I obviously hope that readers will consider reading it for themselves and perhaps even engaging with us in further discussion. I think I can speak for all my co-authors in saying we would welcome that. However, as a taster, here I pick out three issues from the book to whet your appetites.

Chapter 9 of our book focuses on natural selection, and revisits Elliott Sober's (1984) important distinction between the selection of objects and selection for properties. Sober famously illustrated this using "a toy that my niece once enjoyed playing with before it was confiscated to serve the higher purposes of philosophy" (an elegant quip that remains one of my favourite lines of academic writing). You will recall the toy is a "selection machine": a transparent container, structured into levels by dividing partitions, and containing balls of differing sizes and colours. Sober explains how the *smallest* balls are the objects that are selected, but *green* balls have been selected at the same time. By highlighting the distinction between selection *of* green balls and selection *for* smallness, Sober's selection toy provides a helpful analogy illuminating the causes and effects of selection. Here, however, having acknowledged our debt to Sober, we deliberately stretch the analogy to encourage further consideration of the role of the organism in selection:

> *Helpful though this analogy may be, there are important respects in which the selection toy gives a misleading impression of the action of natural selection – a characterization that portrays organisms in overly passive terms. For instance, the structural features of the toy – the balls and the perforated partitions – were factory made. The balls played no part in building the partitions. The partitions simply exist, and the balls are selected according to the partition's properties (i.e., the size and shape of the holes).*
>
> *(...)*

However, termites construct mounds, and regulate temperature and humidity within them, which redirects selection away from internal organs that deal with water scarcity, such as thick cuticles, towards selection for effective behavioral strategies for humidity control, such as digging down to the water table to retrieve moisture. And desert rhubarb collect water next to their primary root, generating selection for huge, heavily-ridged leaves, as opposed to selection for small leaves or spines. The actions of living organisms determine what is selected for. It is as if the balls in the selection toy themselves build the partitions and cut out the holes.

We go on to quibble that the balls in the selection toy only move when acted upon by external forces, with no ability to choose which level of the toy they will occupy, nor change their shape. Yet, in the real world, organisms can evade extreme conditions through behavioral plasticity, "as if the balls … are made of a squidgy … jelly". We also mention other pathways to adaptive fit, for instance, how bacterial symbionts can detoxify poisons "analogous to the balls releasing an acid to eat away the partition". Finally, we stress how the seemingly arbitrary association between ball size and colour misleads:

There is no reason why small balls need to be green – we are implicitly conscious that they could just as easily be red. This gives the impression that, in selecting for smallness, greenness has been randomly chosen. But here again the analogy is misleading. Floppy ears are not linked to the tameness of domesticated animals by chance: the components of domestication syndrome are connected by joint developmental regulation through the neural crest GRN. Nor are the fragmented bones of cavefish coupled with an improved ability to sense vibrations in the water through historical contingency. Fragmentation is a by-product of the increased production of sensory cells on these bones; cells that form the lateral line and are responsible for this enhanced mechanosensory capability. In the real world, developmental mechanisms connect the selection of *traits to the* selection for *traits, with a powerful implication. Through investigating developmental bias, evolutionary biologists could understand and predict which traits there would be* selection of, *alongside the character* selected for. *(...)*

Our agenda here is, of course, not to give Sober a hard time over the limitations of his analogy, but rather to use it, as he did, to highlight the 'nature of selection' and maybe the habits of evolutionary biologists too. Just as the selection toy starts with a pre-existing partition and round balls (with biologists and philosophers taking as given smallness to be the trait selected for, and greenness as a coincident character) so evolutionary biology often begins with the identification of fitness differences, and works through the ramifications of these for character evolution, adaptation, and speciation, detecting correlated change in other characters in the process. In this respect, the selection toy still provides an excellent analogy for how natural selection is conceptualized by biologists. However:.

> *This focus, while productive, comes at a cost, in the form of limitations on the power of evolutionary explanations. The nonchalant attribution to 'selection' of all evolution arising from fitness differences masks hidden determinants of the* sources *of fitness differences. This would not matter if fitness differences arose by chance, or if those characters selected* for *were packaged with the selection* of *other characters in a coincidental or unknowable manner, but that is not the case. In the real world, balls are green for a reason.*

Moving on to my second example, in chapter 10 of *Evolution Evolving* we turn to consider inheritance, where our treatment owes a debt to the prescient writings of Susan Oyama. We stress how inheritance is a time-distributed developmental process by which diverse developmental resources become available to the next generation. After reviewing extensive evidence for diverse forms of inheritance, we conclude that many extra-genetic inheritance processes are (contra Wray et al, 2014) not luxury "add ons" but rather essential tools for short-term, rapid-response adaptation:

> *Heredity is more than a package of genes and cellular resources handed over at conception like the baton in a relay race: it is a continuous process of developmental reconstruction that spans the life cycle.* (...)

> *All forms of inheritance collectively guide offspring development by contributing to the production of a phenotype predicted to match the expected environment, where that 'prediction' is based on transmitted genes and updated by inherited extra-genetic information accrued through both detection and selection mechanisms. Parents construct offspring developmental environments by transferring resources internally and externally, choosing and building structures, and regulating conditions, in ways that enable reliable implementation of genetically inherited predispositions.*

What is transmitted across generations, we suggest, is "the developmental means to construct phenotypes that are predicted to match anticipated environmental conditions". However, we emphasize that those 'means' not only include genes and other resources passed from parents to offspring, but also the activities that parents engage in to construct the environmental context in which their offspring develop:

> *If there are similarities between the traits of parents and offspring it is because, within lineages, phenotypes are reliably re-constructed across generations. That reconstruction is consistent because it is informed by processes of environmental detection and selection, operating at a range of temporal and spatial scales, including, but not restricted to, the selection of genetic variation.*

My third example again delves deep into the nature of selection. Richard Lewontin famously decomposed natural selection into three subprocesses: phenotypic variation, differential fitness and heredity. However, as another philosopher from whom I have learned a great deal, Dennis Walsh (2015, 2019), has emphasized, the dominant view that selection is the sole cause of adaptive evolution is tied to an additional assumption that the three subprocesses are effectively 'quasi-autonomous'. That is, they are thought to feed into each other, but not to modify each other's operation. Following Walsh, in our book we stress how much of the debate over the role that developmental processes play in evolution relates to instances where the three subprocesses become intertwined. By contributing to all three subprocesses simultaneously, and by modifying how subprocesses operate, developmental processes can violate the assumption that Lewontin's components are independent. (...)

An example is provided by the niche construction of dung beetles. We first suggest:

> *A traditional evolutionary explanation for the adaptive fit between dung beetles and their environments would invoke mutations that change, say, the beetles' brood-ball-processing in a manner that enhances fitness, and are inherited by the next generation. This allows brood-ball processing to be construed as a proximate mechanism and – since the generation of variation by mutation is assumed to be random and inheritance is assumed to be unbiased – allows fitness differences to explain the brood-ball processing adaptation.*

However, we go on to describe experiments carried out by Armin Moczek and the members of his laboratory, that show how the underlying causation is actually more complicated (and interesting!). This is illustrated by Figure 1, reproduced from the book.

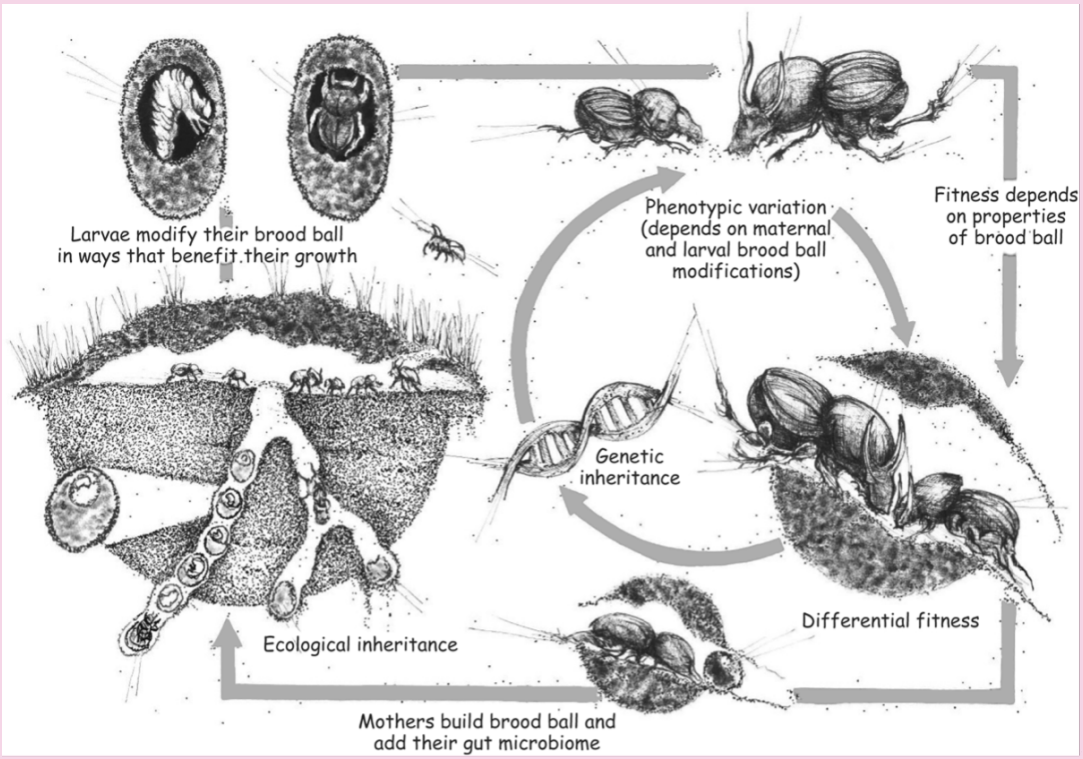

Figure 1. The intertwining of variation, fitness, and inheritance in dung beetles. Reproduced from Figure 14 in *Evolution Evolving*.

(...)

The experiments show that the extent to which dung beetle traits, such as body size and developmental time, contribute to fitness depends on variation in the niche-constructing behavior of mothers and larvae:

> *Experiments quantify how the contribution to fitness of offspring traits depends critically on the properties of the brood ball, which is constructed by the mother and modified by the larvae to act as an external rumen (i.e., depends on niche construction). Also, inheritance is not independent of phenotypic variation and fitness differences, as the brood ball is a parental effect that is ecologically inherited by the larvae. Again, niche construction brings about qualitative changes in how inheritance occurs. For instance, experiments show this inheritance depends critically on whether or not the mother incorporates into that brood ball a pedestal containing a sample of her microbiome... Further, phenotypic variation is not independent of inheritance since beetles develop in the beetle-constructed environment of the brood ball, which experiments show fundamentally influences both the developing larvae's traits and relationships among them.*

These interactions between the components of natural selection mean that beetle niche construction is no longer just a proximate mechanism, and attributing the complementarity between beetles and their environments solely to fitness differences becomes open to question. Drawing on another distinction brought to prominence by Elliott Sober, between 'variational' and 'transformational' explanations, we suggest that analysis of the interactions between sub-processes reveals a poorly appreciated role for transformational explanations in adaptive evolution:

> *The 'fittedness' or 'match' of dung beetles to their immediate local environment arises partly because those beetles experiencing a poor fit have died or failed to reproduce, but also partly because individual beetles inherit a maternally modified brood ball that is well-suited to other aspects of the larval phenotype, and partly because how the larvae develop inside that brood ball is sensitive to the brood-ball's properties.*

(...)

> *Thus, three processes operate here to bring about an organism-environment match: the standard* variational explanation *of the selective survival of fit individuals, the* transformation *of the developmental environment experienced by the larvae arising through both maternal and larval activities, and the* transformation *of the larvae through the development of the focal phenotype in a specialised organism-constructed medium. Moreover, these three processes interact, both in the present and in the past, and cannot be traced to just one original cause.*

It should also, by now, be apparent why we have called our book *Evolution Evolving*. The title illustrates our core claim that how organisms develop – including their behaviour, physiology and plasticity – and what organisms do – including their niche construction – influence the rate, pattern, and direction of evolution. Development matters in evolution; and it is precisely because development matters that evolution is evolving. This is an exciting time for evolutionary biology, and we have tried to write a book that communicates some of that excitement, but is written in a non-technical style that people can understand. At the same time, we hope that there is enough of substance in our work to be of interest to both professional biologists and philosophers.

There is much more that I could mention – I have coauthored articles, or have worked closely with several other philosophers, including Robert Richardson, John Dupre, Nancy Cartwright, Lynn Chiu and Thomas Pradeu – but I don't want this article to get too long. Suffice to say that a large number of philosophers have contributed to my intellectual development and that of my coauthors, and to arguments presented in our book. I hope one day that *Evolution Evolving* will come to be regarded as a prime example of how the close interaction between biologists and philosophers can be productive.

You can find out more about *Evolution Evolving* (including content information, a Q&A with the authors, and some short animations illustrating key ideas) at the book website (https://www.evolutionevolving.org/). The website also provides a code offering readers who pre-order the book a 30% discount. Follow on social media (Twitter: @evoevolving LinkedIn: https://www.linkedin.com/in/profkevinlala/).

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PiBM Reflections (cont.)

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