

Philosophy of Biology at Dolphin Beach (PBDB) 18

October 24 - 26, 2025

Abstracts:

Lindell Bromham (Keynote), *The True Meaning of Darwinism (Or: The Only Thing in Biology That Gets Simpler the Closer you Look)*

Because biology is so complicated, it's easy to forget how simple Darwin's theory of evolution is – just one very simple mechanism that produces a whole heap of very complex outcomes. To highlight this simplicity, this talk will focus on what Darwin resolutely did not have in his theory, including speciation mechanisms, levels of selection, or a distinction between selection and drift. As with any account of the development of evolutionary theory, there will be quite a lot of facial hair, and there will also be alternative titles for *The Origin of Species*, a proselytising Lamarckian, a disgruntled silviculturalist, a pop-sci book with royal appeal, public enthusiasm for pigeons, grumpy uncles of the neo-Darwinian synthesis, and the only known recipe in Charles Darwin's hand (guess what it is for). Along the way we will take in some of the weird and wonderful outcomes of evolution, with case studies including male-killer sperm, beetles with love handles, parasitic orchids, manipulative queens, ants in fancy dress, electrosensitive snouts, motility ectosymbionts, manipulative fungi, and CRISPR-Cas9. There may even be (very out of character for me) a James Bond reference.

Rory Smead, *Game of Red Thrones*

Some interacting species evolve on radically different timescales. This is especially true in host-symbiont relationships where the hosts often evolve much slower than the symbionts. The differing rates of evolution can lead to interesting effects: the Red King effect where the slower evolving species drives the evolutionary dynamics or the Red Queen effect when faster evolution is more important. I will explore some game-theoretic models of host-symbiont coevolution which allow us to characterize some of the strategic components of these interactions very generally. The results of the model show that in fixed interaction settings a Red King effect will be pronounced, but that the Red Queen takes over when interaction itself is evolving. I will also discuss connections with these effects in relation to the evolution of learning and plasticity.

Chad Lee-Stronach, *Interdependent Conventions*

Many pressing social problems require coordinated changes across multiple interconnected domains. Climate action, for instance, requires simultaneous transitions in energy, transportation, agriculture, and consumer behavior, where success in each domain depends on progress in others. We formalize this challenge as the Problem of Interdependent Conventions using evolutionary game theory. Our analysis reveals that interdependence creates qualitatively different coordination challenges than independent domains: it eliminates partial solutions, can make standard interventions like correlation counterproductive, and traps populations in suboptimal equilibria. This augurs poorly for our real-world coordination problems. But all may not be lost. We explore the possibility that conditional cooperation strategies may trigger system-wide transitions to optimal conventions with high probability. This approach may explain why transformative social change often appears impossible until it suddenly becomes inevitable, and explain why practices that foster conditional cooperation --- through mechanisms like contingent agreements, signaling platforms, and staged protocols --- seem to be essential for addressing interconnected coordination challenges.

Krisztina Orban, *Pointing as the Origin of Language*

Could referential pointing be the origin of language? I argue that referential pointing is not merely a deictic gesture but a form of referring and thereby can bridge the gap between non-linguistic and linguistic communication. This view sheds light on both the ontogeny and phylogeny of language. The idea that pointing bears a closer resemblance to language than other gestures is not new. Bates, Camaioni, and Volterra (1975) already suggested that the essential features of pointing are also features of language. More recently, Tomasello (2010) and Planer and Sterelny (2021) have argued that pointing, alongside other gestures, plays a central role in explaining the emergence of language.

It is very important to distinguish *non-referential pointing* from *referential pointing*, because referential pointing provides the origin of language. Referential pointing emerges in human infants between 9 and 15 months (Carpenter et al. 1998; Tomasello et al. 2007; Liszkowski & Tomasello 2011; Liszkowski et al. 2007; Shatz & O'Reilly 1990; Shwe & Markman 1997; Leavens et al. 1996, 2005). I argue that referential pointing is the origin of language which is contrasted with the gestural origin of language. My arguments draw on philosophical, evolutionary, anthropological, physiological, linguistic, and developmental perspectives. I use standard tests for referentiality to show that referential pointing is referential behaviour rather than merely proto-referential. Another reason why referential pointing could be the origin of language is that referential pointing is reference fixing unlike other deictic gestures (showing, begging) or pointing in primates. Unlike language, which is culture-specific, pointing is

universal. Being referential and universal suggest that referential pointing is a plausible candidate to provide the origin of language.

Stewart Saunders, *Lithium: A Biological Mystery*

Lithium is biologically puzzling. It is an exogenous monovalent ion with no dedicated transporters, no homeostatic mechanisms, no set point, and no established obligatory function in humans. It is toxic to many species. It works through ionic mimicry — usually the mechanism of a poison. It directly down-regulates major intracellular pathways that affect all areas of cellular function. Yet humans can tolerate levels a hundred of times above background for decades, with profoundly beneficial effects on the brain. Is this a cosmic coincidence, a trace of a forgotten ecology, or what?

Kate Lynch & Thomas White, *Sentience and Flexible Behaviour*

One way to make inferences about animal sentience is through behaviour. Pain is a key focus of this research, where attempts are made to distinguish conscious pain-related behaviours from unconscious automatic ones. Behaviours described as ‘merely nociceptive’ are typically characterised as reflexive, whereas those taken to indicate a subjective experience of pain are cast as ‘flexible’. But to date, no satisfactory account has been given of what qualifies as sufficient behavioural flexibility to indicate sentience, or even what behavioural flexibility precisely entails. In this talk we suggest that measurable behavioural flexibility is not a single capacity, but a multi-dimensional construct. Different behavioural assays tend to track different dimensions of behavioural flexibility. By integrating these, behavioural flexibility profiles can be developed across taxa, revealing a more nuanced approach to investigating sentience through a behavioural lens.

Hong Yu Wong, *Varieties of Agency: Is There Anything Unified?*

Recent work on agency has expanded well beyond its classical roots in morality and rationality (traced to Aristotle), human neurophysiology (action versus reflex), and social science. Agency is now examined across disparate systems, levels, and time scales: in economic and choice theory, evolutionary biology (down to the intracellular level), environmental systems, and, most recently, artificial intelligence, just to take some examples. A central question is whether these diverse forms of agency share common features and can support a unified theory, or whether their proliferation points instead to pluralism or even eliminativism about agency.