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# Physics of living systems

The spherical cow has long been a tempting trope to pin on physicists working towards an understanding of living systems. Perhaps with good reason: elegance often trumps fidelity when it comes to writing down theory, and when things get as messy as they do in biology, there's a natural tendency to oversimplify. But in recent years there has been a campaign to remove this stigma, and to cast physics as a tool for divining meaning in living systems — rather than merely oversimplifying them. The collection presented here aims to showcase some of these advances as a way of championing this approach.

Part of the drive toward more meaningful collaboration between physicists and biologists comes from a surge of interest in quantitative techniques and theory across the life sciences, inspired in part by the strong history of such approaches in structural biology. Increasingly, collaborations between physicists and biologists are giving rise to more predictive research in cell, developmental and behavioural biology. And joint funding for this collaborative research is enabling this dialogue to become ever stronger.

From the dynamics of molecular motors converting electrochemical energy into mechanical forces to the large-scale coordination of ant colonies, milestones in research on the physics of living systems now span vast length scales. And for this reason, this Insight is organized in terms of these scales, with each piece highlighting new understanding about a specific system or problem on a molecular, cell, tissue, organism or population level.

Ewa Paluch provides a roadmap for this journey through biophysical scales in her Comment on page 646, while taking us through the history of the field we know as 'biophysics'. In doing so, she hints at the term's fall from favour at the tail end of the millennium — in part due to spherical cow syndrome, but also the saturating (and narrowing) effects of the successes of structural biophysics. And indeed, there has been a recent push to drop the term altogether and recast the endeavour as the physics of 'living systems' or simply of 'life' (this Insight being no exception). But Paluch makes a case for keeping the name, and rebranding biophysics as the sort of collaborative multiscale effort published in this collection. Name notwithstanding, we hope that this Insight serves to excite interest in this interdisciplinary research, and the broad set of length scales it encompasses.

Abigail Klopper, Senior Editor

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