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Workshop on the Philosophy of Biophysics  
University of Bristol, September 2023

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## **Workshop on The Philosophy of Biophysics**

**14-15 September 2023, Department of Philosophy, University of Bristol**

**Cotham House G2**

Biophysics has existed as a discipline since the nineteenth century, and has expanded considerably in recent years to become a thriving area of research at the interface between physics and biology. It raises interesting and important questions both within philosophy of biology and in philosophy of science more generally. In philosophy of biology, debates about reductionism have focused almost exclusively on genetic reductionism, but biophysics instead raises the issue of explanatory relations between biological wholes and their physical parts and their interactions, both above and below the molecular scale. The philosophical study of biophysics can also illuminate longstanding questions concerning the nature of life and how it emerges from non- living matter. The philosophy of biophysics can also inform debates concerning interdisciplinarity, causal explanation at different scales, how biology relates to the physical sciences, and the unity of science.

### **Programme**

#### **14 September**

09:00 – 10:30 Margarida Hermida and James Ladyman (University of Bristol) – Physical Explanation and the Autonomy of Biology

10:30 – 11:00 Coffee break

11:00 – 11:40 Kenneth Aizawa (Rutgers University) – Hogkin and Huxley's "Empirical Description"

11:40 – 12:20 Bosco García and Karishma Chhabria (University of California San Diego) – Least action-based selection of neuronal populations

12:20 – 13:00 Sepehr Ehsani (University College London) – The Plasma Membrane and the Principle of Cellular Synchrony

13:00 – 14:00 Lunch break

14:00 – 15:30 Michael Levin (Tufts University) – Developmental bioelectricity underlies the collective intelligence of morphogenesis (online)

15:30 – 16:00 Coffee break

16:00 – 17:30 Karl J. Niklas (Cornell University) – A Biophysical Perspective of a Botanist

### **15 September**

09:30 – 11:00 Jennifer McManus (University of Bristol) - Understanding assembly and phase transitions in biology

11:00 – 11:30 Coffee break

11:30 – 12:10 Yihan Jiang (University of Leeds) – The Metaphysics of Mechanisms: An Ontic Structural Realist Perspective

12:10 – 12:50 Hamed Tabatabaei Ghomi (University of Cambridge) – The minimum set of necessary ontological commitments for structural metaphysical emergence

12:50 – 14:00 Lunch break

14:00 – 15:30 Carlos Mariscal (University of Nevada, Reno) – Appropriate Abstractions: When Biophysics is Universal

15:30 – 16:00 Coffee break

16:00 – 17:30 Patricia Palacios (University of Salzburg) – From Spins to Flocks: Model Adaptation in the Study of Critical Behavior (online)

(All times BST/UTC+1)

### **Organisers:**

Margarida Hermida (University of Bristol)

James Ladyman (University of Bristol)

