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# The extended organism. Scale, adaptation, and the nature of the individual.

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## Abstract

- **Session: Explaining adaptation: Organism/environment interactions across time and spatial scales (Dutreuil, Pocheville, Turner**

Evolutionary biology has long been roiled by controversy over what might the proper focus of natural selection be: gene, individual, group, ecosystem or biosphere? At the heart of this controversy lie many unresolved issues of the nature of the relationship between heredity and function, structure and function, and individual and environment. The current focus on gene selection, for example, presupposes certain tenets of the relationship between hereditary memory and functional adaptation that severely limits the scale of operation of natural selection, to the point where ideas like the evolution of an ecosystem or the biosphere become literally inconceivable. Similarly, our current models of gene selectionism have nothing meaningful to say about the origin of biological design and convergence, cognition and consciousness, the origin of life, or a host of other central issues in the science of life. I propose here that what has been missing is a frankly physiological approach to evolution and adaptation, that refocuses our attention away from the supposed supremacy of the gene in evolution and to the role and nature of the "organism-like system", the extended organism for short, as a recurrent motif in the evolutionary history of life.

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