CoCo Seminar Series
Fall 2017

Rudimentary Perception-Action in Dissipative Structures

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University of Connecticut

Wednesday November 1, 2017 11:00am-12:00pm
(note the irregular time)
Engineering Building H-9 (Knoll-MacDonald Commons / Watson Commons)

All organisms develop the ability to perceive and act in the service of ends and goals, no matter how rudimentary. Behavioral scientists have traditionally considered perception and action as properties of higher-order animals, but recent work shows that all living things, including single-celled organisms, plants, and fungi, develop the ability to detect information in their environments and use that information to guide action. The diversity of biological systems capable of perception-action suggests that, rather than reflecting a particular biological specialization, perception-action has its origins in a general physical principle that biology has richly exploited. In this talk, I will discuss recent efforts by our group to explore the development of sensors in non-living dissipative structures. We take the theory of dissipative structures from modern thermodynamics as a natural starting place for understanding how perception-action emerges in self-organizing systems. Dissipative structures famously demonstrate the emergence of morphology from the flow of energy and matter. Our work shows that dissipative structures can also detect and move to new energy sources. In addition, they can serendipitously develop sensors that allow them to act in ways that support their own persistence. Implications for biological systems will be discussed.

Dr. James Dixon is a Professor of Psychological Sciences and Director of the Center for Ecological Study of Perception & Action at the University of Connecticut. His research interests include self-organization in perception, action, and cognition; thermodynamic origins of behavior; complex behavior in non-living dissipative systems; and fractal & multifractal analysis.

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