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Bud Mishra*, Courant Institute, 715 Broadway Room 1002, New York, NY 10003. *“Darwin, Development and Dysplasia: Signalling Games that Cells Play”*. Preliminary report.

Signaling is a well-studied phenomenon both in evolutionary game theory and in cell biology. In game theory, signaling frameworks have been used to study the evolution of such fundamental phenomena as conventions and cooperation, while in biology, signal transduction has been extensively studied as a basic ingredient to multicellularity, enabling cells to communicate and coordinate. However, approaches that span both fields are scarce.

In this talk, we explore the idea of viewing multicellular organisms as signaling systems in the game-theoretic sense, attempting to unify these two perspectives on signaling. A multicellular organism corresponds to a population of cells in a cooperative state, with a working signaling system in place. We will discuss how the evolution of such a system may be modeled. Then, we will in particular be interested in the breakdown of cooperation, leading to an interpretation of cancer as a disease of multicellularity. (Received September 21, 2011)