Quantitative
Eco/evo/etho
Discussions

The Ecology of Collective Behavior

Thursday, March 25th
4:30pm-5:30pm ET

Prof. Deborah Gordon

Collective behavior operates without central control, using local interactions among participants to allow groups to respond to changing conditions. It is widespread in nature, not only producing the coordinated movement of bird flocks or fish schools, but also regulating activity in natural systems from cells, as in cancer metastasis or embryonic development, to the social groups of many vertebrates. An ecological perspective on collective behavior examines how collective behavior adjusts to changing environments. Ant colonies function collectively, and the enormous diversity of more than 14K species of ants, in different habitats, provides opportunities to look for general ecological patterns. Modeling tools from dynamical systems, control theory and distributed algorithms show how local interactions produce the collective foraging behavior of harvester ants in the desert, and generate the trail networks of turtle ants in the tropical forest. These examples suggest how systems with similar dynamics in their surroundings have evolved to show similar dynamics in their collective behavior.

Deborah M Gordon received her PhD from Duke University, then did postdoctoral research in the Harvard Society of Fellows, at Oxford University, and the Centre for Population Biology at the University of London, and joined the faculty at Stanford in 1991. She is the author of two books, *Ants at Work* (Norton 2000) and *Ant Encounters: Interaction Networks and Colony Behavior* (Primers in Complex Systems, Princeton University Press, 2010), and awards include a Guggenheim Fellowship, fellowships at the Center for Advanced Study in Behavioral Sciences, and the Quest award of the Animal Behavior Society. Visit her website for more on her work.

Hosted by the Soft Math Lab.

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Zoom registration