



PHYSICS COLLOQUIUM:

The Physics of Cooperative Transport in Groups of Ants

Date: **3/13/20**

Time: **10:30–11:50 AM**

Location: **COB2 140**

Nir Gov

Professor, Department of Chemical and Biological Physics
Weizmann Institute of Science

For more information,
contact: **Kinjal Dasbiswas**
kdasbiswas@ucmerced.edu

Abstract

Anyone who has moved furniture together with friends will appreciate that cooperative transport requires some non-trivial communication. Yet ants are adept at collectively moving objects several times their size. How they do so has long been a subject of research, but recent advances have suggested that this communication occurs through the forces the ants exert on the load.

This implies that the collective transport problem can be mapped to an Ising model, in which decisions by individual ants are described by spin flips. Within this framework, the group is poised in the vicinity of the transition between uncoordinated and coordinated motion. It thus profits from both internal coordination and maximal responsiveness to external information, mediated by temporarily informed leader ants. When confronted by an obstacle, the ants exhibit "problem-solving" behavior which we demonstrate to be "emergent": no ant has to comprehend the problem, and the "rational" behavior is emergent only at the collective level.

Feinerman, Ofer, Itai Pinkoviezky, Aviram Gelblum, Ehud Fonio, and Nir S. Gov. "The physics of cooperative transport in groups of ants." *Nature Physics* 14, no. 7 (2018): 683-693.

About the Speaker

Nir Gov did his Ph.d in Physics at the Technion - Israel Institute of Technology (1998). He then did post-docs at the UIUC, and at the Weizmann Institute, where he is a independent researcher since 2004.

****This seminar will be presented via videoconferencing due in COB2 140****