



CoCo Seminar Series Spring 2018

Optimization Properties in the Construction of Living Bridges by Army Ants

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(note the irregular time)

Engineering Building H-9 (Knoll-MacDonald Commons / Watson Commons)

A striking artifact of collective behavior among social insects is their ability to cooperate to form living structures. A particularly interesting example of this is the construction of 'living bridges' by New World army ants. The ants use these bridges to shorten their foraging trails and the phenomenon provides a unique example of a collective behavior where costs and benefits have been experimentally measured and related to each other. As a result, it is possible to make quantitative predictions about when and how the behavior will be observed. In this talk, we describe a procedure for analyzing the optimal formation, and final configuration, of army ant living bridges given a means to express the geometrical configuration of foraging path obstructions. We show how using this procedure allows us to derive experimentally testable predictions of the final bridge position, as well as the optimal formation process for certain cases, for a wide range of scenarios, which more closely resemble common terrain obstacles that ants encounter in nature.

Dr. Jason Graham is an Associate Professor of Mathematics at the University of Scranton. His research interests include applied mathematics, mathematical biology, and applications of mathematical/computational modeling and analysis to the studies of biological/physiological/ecological phenomena.

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