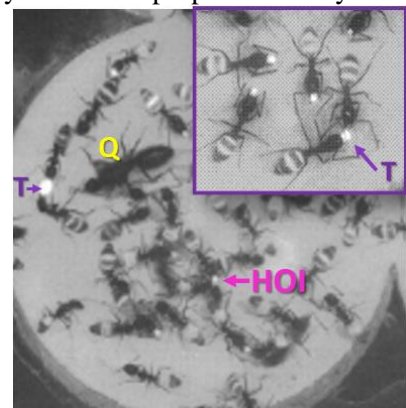


## Postdoctoral position – The causes and consequences of Higher Order Interactions (HOI)

We are excited to announce an opening for a postdoctoral researcher position to work on a newly NSF-funded project, which is a collaboration between Noa Pinter-Wollman (UCLA) and Nina Fefferman (UTK) on “**The causes and consequences of Higher Order Interactions (HOI)**”. The work aims to establish a new framework for studying how higher order interactions, the simultaneous interactions of multiple individuals, influence social processes. The work will build on recent advances in automated tracking and develop new quantitative tools to expand the current use of social network analysis.

**Project Summary:** System-level outcomes, such as the social behavior of animal groups, emerge from interactions among system components. While substantial work has been devoted to examining the intricate network of interactions among animals, these interactions are described and analyzed as dyadic events. However, multiple individuals can interact simultaneously. For example, an alarm call is broadcast to multiple individuals at once rather than through multiple one-on-one interactions. Despite the important conceptual and functional differences between dyadic and higher order interactions, there are only few methodological approaches that emphasize the higher order nature of social interactions, and we lack an analytic framework to study higher order interactions in animal social systems. We propose to study the causes and consequences of higher order interactions, and the feedback between them, by adapting and implementing existing mathematical tools in novel ways. Specifically, our first aim is to determine the conditions under which higher order interactions emerge (Aim 1); our second aim is to examine the consequences of higher order interactions (Aim 2); and our third aim is to investigate feedback between causes and consequences of higher order interactions to uncover potential evolutionary pathways for their emergence (Aim 3). Social insects are an especially powerful system for examining the questions we propose because of the profound fitness consequences of interactions among individuals for the group. Therefore, we will study the foraging and food transmission of Argentine ants (*Linepithema humile*) to examine the internal and external causes and consequences of higher order interactions.



Argentine ants fed with fluorescently dyed liquid food. Q-queen, T-trophallaxis (pair), HOI- Higher order trophallaxis interaction.

The position will be based at UCLA, and work will be conducted in close collaboration with the UTK team. The postdoctoral scholar’s research activities will focus on data collection, image analysis, data processing, and the implementation of simplicial sets to study higher order interactions. We are therefore looking for candidates with strong quantitative skills and preferably with experience in image analysis.

Salary will be commensurate with experience and will follow the [UCLA postdoctoral salary scale](#). Postdoctoral scholars at UCLA are provided with comprehensive [benefits](#) as well as ample opportunities [for professional development](#) and will be joining a vibrant and active [research group](#). Candidates are required to hold a PhD before their start date. Start date is flexible and can be as early as September 1<sup>st</sup>, 2024.

To apply please email your CV, a brief statement of interest, and names of three references to [nmpinter@ucla.edu](mailto:nmpinter@ucla.edu).

Review of applications will begin immediately and continue until the position is filled.