

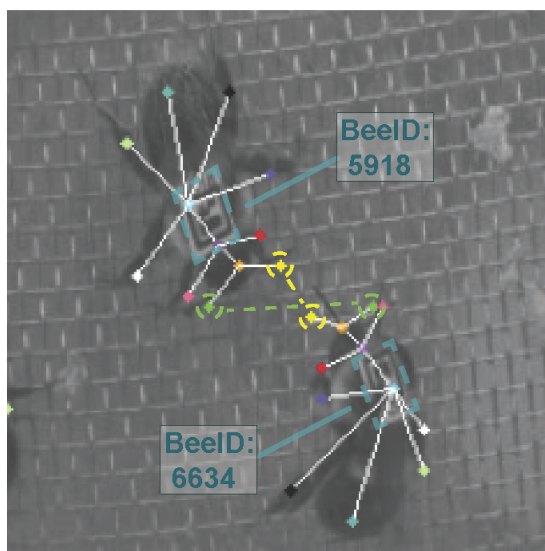
# Biology Seminar

Speaker: **Matthew Smith, Ph.D.**

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## Two bees or not two bees: towards a mechanistic understanding of variability in individual and collective responses of insects to ecological stressors

Monday March 4, 2024 | 11:30AM PST | GNOM S060



- antenna (L)
- head
- antenna (R)
- Upper thorax
- Foreleg (L)
- Foreleg (R)
- Centroid
- Midleg (L)
- Midleg (R)
- Abdomen
- Hindleg (L)
- Hindleg (R)

Social insects, like the bumblebee, are essential to global agroecosystems, contributing to the pollination services needed for roughly a third of consumable crops. Given their global importance, and evidence for declines of pollinators, it is imperative to better understand how insects respond to ecological challenges- including overuse of pesticides and increased competition. These stressors are encoded by insect sensory systems,

which can in turn affect interactions between individuals and the resultant collective decisions. My research seeks to further our understanding of collective behavior in insects through resolving individual level responses to such stressors, with a focus on the sensory systems generating individual-to-individual differences and variability in collective responses. Through building custom behavior rigs I am able to track individuals and whole colonies across long time periods, and classify their responses to various stimuli. Drawing on principles from ecology, behavioral neuroscience, and computer science, I will present three topics pertaining to individual and collective behavior in insects: 1) individual and collective responses within bumblebees responding to cold stress, pesticide exposure, and competition 2) intragenotypic variability of plasticity dependent behaviors within *Drosophila* 3) deployable tools for sampling insect behavior in natural settings