

# Biology Seminar

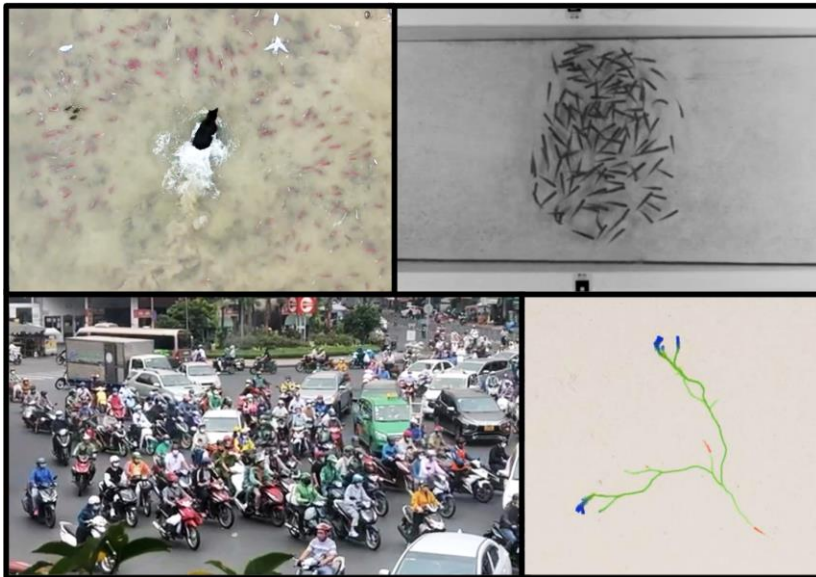
Speaker: **Albert Kao, Ph.D.**

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## Searching for general principles of collective decision-making

Wednesday March 27, 2024 | 12:00PM PST | HCK 132



One of the most intriguing benefits of group living is that animals may collectively tap into emergent properties to improve their decision-making abilities. This benefit likely underlies all biological collective systems, from single-celled organisms with arrays of sensors, to mixed-species flocks of migrating birds. In my work, I have developed a series of mathematical models,

incorporating biological features that should be common across many animal taxa, to generate predictions about how animals in groups can make better decisions about where to go, and more recently, when to perform an action. These models often make surprising and counterintuitive predictions, which I am currently testing in lab experiments with small minnows, the slime mold *Physarum polycephalum*, and other species.

More generally, there is a need for new theoretical and analytical frameworks to synthesize across the many purported benefits of collective behavior. We specifically need a way to measure the relative fitness contributions of different benefits, which will be crucial to an understanding of the major drivers of the evolution of collective behavior. I will outline a new methodology, using a new dataset of videos of brown bears hunting sockeye salmon in Pedro Bay, Alaska, to quantify the different ways in which collective behavior can help animals to avoid predation.