

Tkach, Colleen

From: Inform
Subject: EM: Keck Science Department Seminar Announcement

From: Yount, Velda

KECK SCIENCE DEPARTMENT SEMINAR

(This seminar will be held despite Friday, March 31st being a holiday!)

“Sensory and performance limits on bacterial chemotaxis”

Henry Mattingly
Yale University

Friday, March 31, 2023

12:15-1:15PM

PLEASE NOTE THIS SEMINAR IS BY ZOOM ONLY (Link below):

<https://scrippscollege.zoom.us/j/5111960913?pwd=Z2oxdm1qMnU3R3lWVHAyUXlVMWVDQT09>

Abstract:

Organisms need to sense and respond to their environments to survive, making information processing a fundamental feature of living systems. Intuitively, the more accurately an organism senses its environment, the better it can perform survival-relevant tasks and behaviors. However, it has been challenging to make this intuition quantitative, in part because of the difficulties of knowing what task the organism is trying to perform and of experimentally measuring all relevant parts of the sensory system. *Escherichia coli* chemotaxis is a powerful model system in which we can address these questions. This is partly due to its well-understood signaling system and simple behavior, but also due to recent developments in our ability to measure fluctuations and responses in the signal transduction pathways of single bacteria. I will talk about how we have combined these experimental developments with tools from information theory to quantify *E. coli*'s chemical sensing fidelity, theoretical limits on their gradient-climbing speed set by this fidelity, theoretical limits on their fidelity set by physical constraints, and how *E. coli* compare to these limits. These studies provide a framework for understanding the role of information processing in more complex behaviors and organisms.

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