

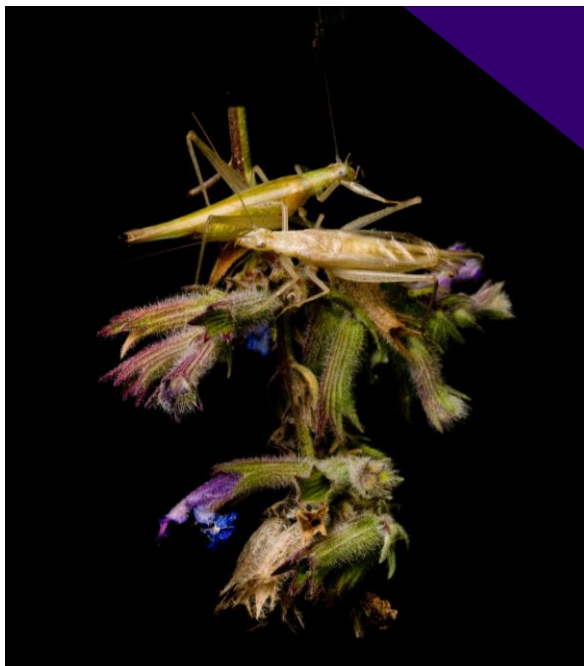
Biology Seminar

Speaker: **Natasha Mhatre Ph.D.**

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Tools for singing loudly and amplifiers for hearing better: the tree cricket story.



Monday May 22, 2023
12:00PM PST | HCK 132

Crickets use sound to find mates. The louder their sound is the further it reaches. The textbooks say that they increase their acoustic space using just morphology and mechanics. Song producing wings and females ears resonate at the same frequency enhancing the size of their acoustic space. But some crickets didn't read the textbook. In this talk, I will present some research on the *Oecanthines*, beautiful insects called tree crickets. Males tree crickets use a behavioural strategy to make themselves louder. They manufacture a baffle, a tool that makes them

louder. In fact, using a series of models and experiments, we showed that they optimize their tools. In fact, a deeper dive into this question of singing efficiency has led us to realize that other crickets may also be using other environmental power boosting mechanisms.

Not to be outdone, tree cricket females, use an amplifier. Female tree crickets have an physiological amplification system that boosts their auditory mechanics. Using careful neurobiology we show that the amplifier doesn't actually make them more sensitive than other crickets, as previously speculated. Rather, it allows them to change the frequency that they are sensitive to. What is even more remarkable is that this amplification is achieved through the activity of only a handful of motor proteins vibrating the ciliated dendrites in their mechanosensory neurons.

Both findings underline the poverty of our descriptions of invertebrate behaviour and biophysics, and point to a wealth of innovations yet to be discovered even among these 'simple' organisms.

Seminar Speaker Host: Abigail Swann

