

SEEWIENSEN

## LECTURE SERIES

FALL/WINTER/SPRING 2020/21

Max Planck Institute  
for OrnithologyMAX PLANCK  
GESELLSCHAFT

THURSDAY | February 11, 2021 | 13.00 | ONLINE

## ARKARUP BANERJEE

Cold Spring Harbor Laboratory | Host: Vallentin Research Group

## Motor cortical dynamics underlying vocal interactions in the singing mice

Using sounds for social interactions is common across many taxa. Humans engaged in conversation, for example, take rapid turns to go back and forth. This ability to act upon sensory information to generate a desired motor output is a fundamental feature of animal behavior. How the brain enables such flexible sensorimotor transformations, for example during vocal interactions, is a central question in neuroscience. Seeking a rodent model to fill this niche, we are investigating neural mechanisms of vocal interaction in Alston's singing mouse (*Scotinomys teguina*) – a neotropical rodent native to the cloud forests of Central America. We discovered sub-second temporal coordination of advertisement songs (counter-singing) between males of this species – a behavior that requires the rapid modification of motor outputs in response to auditory cues. We leveraged this natural behavior to probe the neural mechanisms that generate and allow fast and flexible vocal communication. Using causal manipulations, we recently showed that an orofacial motor cortical area (OMC) in this rodent is required for vocal interactions (Okobi\*, Banerjee\* et. al, 2019). Subsequently, in electrophysiological recordings, I find neurons in OMC that track initiation, termination and relative timing of songs. Interestingly, persistent neural dynamics during song progression stretches or compresses on every trial to match the total song duration (Banerjee et al, in preparation). These results demonstrate robust cortical control of vocal timing in a rodent and forces us to reconsider the evolutionary origins of motor cortical control of vocal output.

## WHO IS ARKARUP BANERJEE?

2020 -	Assistant Professor, Cold Spring Harbor Laboratory, NY
2017-2020	Junior Fellow, Simons Foundation Society of Fellows, NY
2016-2020	Post-doctoral Fellow, New York University School of Medicine, NY
Fall, 2016	Adjunct Faculty, Adelphi University, Garden City, NY
2010-2016	Graduate Student, Cold Spring Harbor Laboratory, NY

## SELECTED PUBLICATIONS

- Banerjee, A, Steven M. Phelps and Michael A. Long. 2019. Singing Mice. *Current Biology*, 29:6.
- Okobi DE Jr\*, Banerjee A\*, Matheson AMM, Phelps SM, Long MA. Motor cortical control of vocal interactions in neotropical singing mice. *Science*. 2019, 263 (6430): 983-988.
- Banerjee, A\*, Marbach, F\*, Anselmi, F., Koh, M.S., Davis, M.B., Oyibo, H.K., Gupta, P. and Albeanu, D.F. 2015. Longrange interactions between short axon cells and external tufted cells gate glomerular output in the mouse olfactory bulb. *Neuron* 87: 193-207.

\*co-first authors

## LINK TO TALK

<https://gwdg.zoom.us/j/81400582120?pwd=d3gva1hadlFyYmc3YmZtelkvV29hZz09>

Meeting-ID: 185599 - for code please contact:

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