UNIVERSITY OF DELAWARE

CENTER FOR BIOINFORMATICS & COMPUTATIONAL BIOLOGY

BIOINFORMATICS SEMINAR

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UNIVERSITY OF DELAWARE

DECODING MOUSE ULTRASONIC COMMUNICATION DURING SOCIAL BEHAVIOR

Communication plays an integral role in human social dynamics, and a myriad of neurodevelopmental disorders are characterized by abnormal social communication. Because of their genetic tractability, mice are emerging as an important model system for studying the neurobiology of social behavior. However, the extent that mouse vocalizations influence social dynamics has remained elusive due to the challenges of precisely identifying the vocalizing animal in group interactions. Using a system to track the ultrasonic vocal behavior of individual, freely interacting mice and an algorithm developed to group phonically similar signals, we show that distinct patterns of vocalization emerge as animals perform specific social actions. Mice acting dominantly towards other mice emit different vocal signals than mice avoiding social interactions. Further, we directly show that the patterns of vocal expression impact the behavior of only the socially engaged partner. These findings clarify the function of mouse communication by revealing a communicative ultrasonic signaling repertoire and set the stage for unmasking the neural basis of social communication.

BIOGRAPHY

Josh Neunuebel received a B.S. in Molecular and Cellular Biology and a M.S. in Zoology from Texas A&M University. Josh received a Ph.D. in Neuroscience from UT Health Science Center-Houston. During Josh's doctoral and first post-doctoral appointments (Johns Hopkins University), he systematically mapped the flow of information through the hippocampus and identified key mechanisms of memory storage. As a post-doctoral fellow at HHMI Janelia Research Campus, Josh focused on the neurobiology of animal behavior, in particular, how mouse vocalizations shape the dynamics of social behavior. In the fall of 2014, Josh accepted a faculty position in the Department of Psychological and Brain Sciences at UD. His research focuses on how the nervous system processes and integrates social information that underlies purposeful innate behavior. His research team laid the groundwork for elucidating the neurobiology of social behavior by building a novel system for simultaneously recording neural, audio, and behavioral data from freely socializing mice, which requires high-performance computing and machine- and deep-learning approaches to analyze.

CBCB SEMINAR

2/21/2022

3:30-4:30PM

AP BioPharma Room 140
(590 Avenue 1743)

or via ZOOM:
https://udel.zoom.us/j/93068494454
(Passcode: BINF)

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