

**The Graduate Program in Biomedical Sciences
is proud to announce the**



**Ph.D. Dissertation Defense of
ROGELIO JUNIOR NUÑEZ FLORES**

**Biomedical Sciences Ph.D. Candidate
in the Ray Lab**

Dr. Anandasankar Ray Chairperson

**“Unseen Influences: The Pervasive Impact of Environmental Volatiles on
Eukaryotic Gene Expression and Physiology”**

The culmination of this research underscores the significant role that volatile organic compounds (VOCs) play in shaping the physiology and gene expression of eukaryotes, including animals, plants, and even disease vectors like mosquitoes. The findings highlight the complex interactions between organisms and their environment, particularly how varying exposure to microbial volatiles can influence biological processes across different species. In animals, the work with *Drosophila melanogaster* and subsequent studies in mice and human cells demonstrate that long-term exposure to volatiles such as diacetyl can lead to wide-ranging changes in gene expression and histone modification. These changes not only affect the olfactory system but also have broader implications for brain function and disease progression, suggesting that VOCs could have therapeutic potential. In plants, the study reveals that similar volatile compounds can epigenetically influence key developmental processes and stress responses. The discovery that both plants and animals share conserved pathways for responding to environmental volatiles emphasizes the universal importance of these compounds in eukaryotic biology. Finally, the research into *Aedes aegypti* olfaction provides critical insights into how disease vectors detect and respond to human-relevant odors. Understanding the olfactory mechanisms of these insects opens up new avenues for controlling their behavior and potentially reducing the spread of diseases. Overall, this body of work highlights the profound and often underappreciated impact of environmental volatiles on eukaryotic organisms, with implications for health, agriculture, and disease control. It calls for a deeper exploration of how these ubiquitous compounds shape the biological world around us.

Wednesday, August 28th, 2024

1:00 PM (PST)

School of Medicine Education II Building, Room 205

Join via Zoom:

<https://ucr.zoom.us/j/96180188730?pwd=pUZbfJwlMM9PIENyt38XSvuSoVMZjv.1>