CIRC Symposium Series 2025-2026

The Epigenetic Road to High-Society: Plasticity of Caste Identity and Longevity in Ants

Karl Glastad, PhD | Department of Biology

The ability to respond adaptively to the environment is a fundamentally important trait of all complex life. Ants provide exceptional natural models within which to study both developmental and adult plasticity: within colonies different classes of individuals (castes) display drastically different behaviors and lifespans that are not genetically determined. Here I will summarize findings identifying an epigenetic-hormonal circuit controlling worker-specific foraging behavior centered on the insect blood-brain barrier.

Isolating EEG Activity Related to the Linguistic Processing of Natural Language

Jin Dou | Department of Biomedical Engineering

Speech is central to human life. Recently, the advances of large language models shed light on the modeling of how the human brain processes natural and narrative speech at the linguistic level. Specifically, a feature that measures the expectedness of an incoming word given its context was extracted using these language models to linearly predict brain signals that were collected during natural speech comprehension. This type of method has been working well in examining the processing of natural speech and can be applied as a biomarker for detecting human language comprehension. However, it is not clear whether this feature can be used to explain all the variance in the brain signals that reflect linguistic processing. In this study, we tried to isolate linguistic processing activities in the scalp brain signals by contrasting brain responses to time-aligned speech and text of the same story. By combining multi-way canonical correlation analysis and temporal response function, our analysis revealed that this commonly used linguistic feature may not be sufficient to explain all the scalp signals that manifest linguistic processing. We also applied several engineering-level modifications to the existing methods to efficiently leverage the computational power of GPUs. This study provides new insights of efficiently estimating the noise ceiling of linguistic processing signals in the brain.

Friday, September 26, 2025
11:30 am - 1 pm
Wegmans Hall 1400

UNIVERSITY of ROCHESTER