

# Chen Institute Symposium 2023

## Keynote Address

**Speaker:** Cori Bargmann

**Talk title:** Organizing behaviors across timescales

**Abstract:** How do genes and the environment interact to generate a variety of behaviors? How are behavioral decisions modified by context and experience? We study the relationships between genes, experience, and behavior in the nematode *C. elegans*, whose nervous system consists of only 302 neurons with reproducible functions, morphologies, and synaptic connections. In addition to rapid information processing through classical synaptic neurotransmitters, behavior is reversibly modified over longer timescales by neuromodulators such as serotonin, dopamine, and many neuropeptides. We have characterized roles for neuromodulators in spontaneous foraging states, sensory behaviors, and learned behaviors of *C. elegans*, and mechanisms by which they act. One striking example of neuromodulatory action is seen in sickness behavior, where animals reprioritize their sensory preferences to escape pathogens. Our results indicate that antagonistic, distributed neuromodulatory signals interact to modify behavioral decisions in sick animals, transiently rewiring the functional properties of the nervous system.