Chen Institute Symposium 2021

Speaker: Michale Fee

Title: The neuronal control and learning of bird song

Abstract: The songbird has emerged as a powerful animal model in which to study the neural mechanisms underlying complex learned behaviors such as speech, language, music and athletic performance. Using newly developed technologies for monitoring and manipulating the activity of neurons in the brain of singing birds, circuits have been identified in the songbird brain that perform key functions of vocal production and learning. One of these circuits produces a highly precise representation of time in the brain – essentially a clock. Another circuit produces highly variable output that drives large fluctuations in the songs of juvenile birds, allowing them to creatively explore different vocal patterns during learning. And yet another circuit carries out an evaluation of song performance that enables gradual song improvement during learning. I will combine these observations to propose a simple mechanistic theory of how brain circuits learn and perform such sophisticated behaviors.