Neuronal circuits in our brain are known to be plastic and are subject to experience-driven changes causing neurons to modify their structure, and functional connectivity and responses. Individual neuron receives and integrates inputs from numerous sources and produces relevant outputs. Plasticity refers to the ability of the neuron to reorganize its synaptic connections and functions in response to alterations in sensory experience or learning. Neuronal plasticity is a leading theory for how the brain learns and forms memories. However, the synaptic mechanisms underlying such plasticity remain to be resolved. With the recent advancements in cutting-edge techniques in molecular genetics, optogenetics, synaptic tagging, and high resolution two-photon in vivo imaging, it is now possible to correspond functional properties with structural changes at the level of dendritic spines. This talk will highlight a novel synaptic mechanism, termed locally coordinated plasticity (LCP), and the underlying molecular mechanisms of LCP crucially mediated by the immediate early gene product Arc.

ABOUT THE SPEAKER

During his postdoctoral training at MIT, Dr. Ip devoted his research focus on investigating the synaptic mechanism underlying autism spectrum disorder and other psychiatric disorders through the use of multidisciplinary approaches. The foundation of his research builds on bridging the gaps between disciplines, particularly in molecular and system neuroscience, and foundational neurobiological research and problems in human medicine. His long-term goal is to apply multidisciplinary cutting-edge neurotechnology to probe brain function in health and disease. Dr. Ip has received a number of international fellowships including the Human Frontier Science Program (HFSP) Long-Term Fellowship and the International Brain Research Organization (IBRO) Research Fellowship.