Stable Self-Healing Neural Circuits in Millimeter-Sized Animal

Friday, November 19, 2021
1:00PM–2:00PM
Zoom (link in email)

Abstract: By understanding the self-healing properties of biological systems, it may be possible to build robust artificial systems with similar stable operation. Here I will discuss how the nervous system of the Hydra - a millimeter-sized aquatic cnidarian - can reorganize itself in a matter of hours to regain function even after half the neurons are lost. Furthermore, I will show how Hydra have distributed function within its network of neurons composed of only 11 neuronal cell types. Despite the simplicity of this network, we observe surprisingly sophisticated behaviors suggesting that Hydra may provide a rich model for understanding how a simple nervous system confined to two layers of cells achieves robust control of the body. By comparing the principles discovered in Hydra to other animals we can understand highly conserved principles of neural circuits that have persisted throughout the phylogenetic tree and we may identify principles for designing and building robust, biological neural control systems.