BI-CO MATHEMATICS COLLOQUIUM

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"*Holey Tentacles, Batman*! How complex morphologies affect jellyfish swimming performance"

Monday, April 1, 2019
Talk at 4:00 – H109
Tea at 3:30 – Foyer outside of H109

Abstract:

Jellyfish (Medusozoa) have been deemed the most energy-efficient animals in the world. They are soft body marine organisms composed of gelatinous bell, tentacles containing nematocists for prey capture, and either 4 or 8 oral arms. Their nervous system typically consists of a distributed net of cells. There are between four and sixteen distributed nets of cells around the rim of the bell, which coordinate muscular contraction to propel the jellyfish forward. Their simple morphology and nervous systems make them attractive to robotocists, but we do not understand the limits of jellyfish jet propulsion and maneuverability. Scientists have developed sophisticated computational models of jellyfish that produce forward propulsion, even having compared swimming performance over a large mechanospace of bell flexibility, muscular contraction strength, and contraction frequencies. However, none of these studies have addressed swimming performance in the presence of ambient oscillatory flows, like those in natural oceanic environments, nor have they considered the effects of complex morphologies, e.g., tentacles, or using non-buoyant materials for building a biomimetic robotic jellyfish That is, until last fall.

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