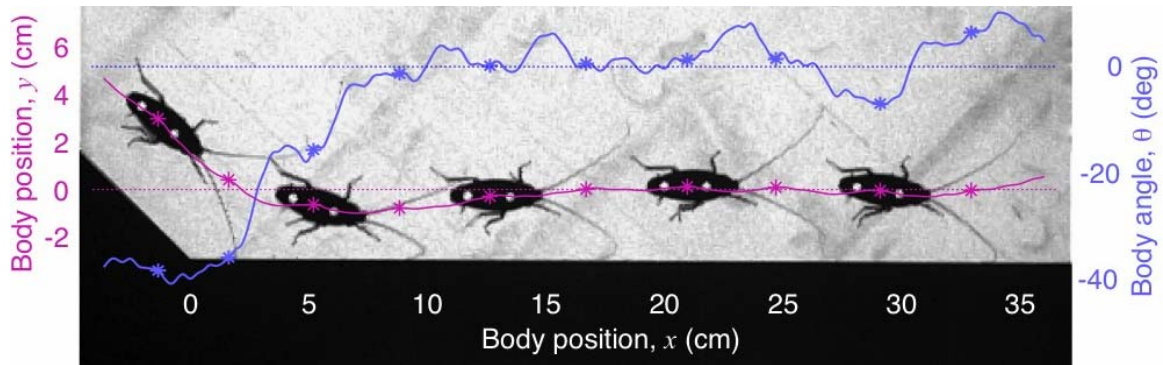


Department of Mechanical and Aerospace Engineering



Decoding Neural Mechanisms for Multisensory Control of Locomotion

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How do neural systems process sensory information to control locomotion? To answer this question, we consider two systems: high-speed wall following in the American cockroach, and refuge tracking in weakly electric knifefish. Both systems involve the stabilization of images on sensory arrays: cockroaches "steer" so as to keep their antenna-based head-to-wall distance measurement constant, and knifefish swim to minimize optic and electrosensory flow so as to remain inside a longitudinally-moving tube. In both cases, we use a model of the locomotor mechanics, together with a set of behavioral sensorimotor perturbations, to infer how sensory information is processed to control the underlying locomotor behavior. We then use these models of sensory processing to guide neurophysiological experiments and to understand the mechanisms of neural processing.

Hosted by Professor R. Mittal: mittal@gwu.edu