

## Evolution of pheromone communication in sea lamprey

*Tyler Buchinger, Department of Fisheries and Wildlife, Michigan State University*

### **Abstract:**

Sea lamprey (*Petromyzon marinus*) rely on a suite of pheromones during reproduction, and provide a useful system to study signal evolution. Migratory sea lamprey select spawning streams following the odors released by stream-resident larvae. Once sexually mature, male sea lampreys release a bile alcohol mating pheromone (3-keto petromyzonol sulfate; 3kPZS) that attracts spawning females. In this seminar, I will discuss recent studies focused on the evolution of female responses to 3kPZS. Ontogenetic and phylogenetic comparisons indicate that females originally evolved to cue onto larva-released 3kPZS for migrating into streams, and male sea lamprey later evolved to mimic larval odor by signaling with 3kPZS during spawning. Although both larval odor and the male pheromone contain 3kPZS, females stop responding to larval odor during spawning, indicating they evolved to discriminate between the original cue and the male-released mimic. Chemical analyses and behavioral assays indicate that a pheromone antagonist in larval odor prevents females from moving towards larvae when searching for mates. Taken together, the results indicate that 3kPZS originated as a deceptive signal but now guides honest communication. Research on sea lamprey pheromones not only provide insight to the evolution of communication, but may provide tools for controlling invasive populations in the Great Lakes.