LadHyX Seminar – January 29th, 10:45

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Comparing Snake Swimming Hydrodynamics Across Ecologies

Snakes are anguilliform swimmers, they move through water by propagating a traveling wave of increasing amplitude along their body length. As the snake undulates its body pushes against the surrounding fluid and produces both propulsion and drag. Their relatively simple body shape and swimming style has made them a popular model in robotics. Yet, we know little about how snakes achieve their swimming efficiency and how specific adaptations affect that efficiency. We use digital defocusing particle tracking velocimetry to measure the movement of the surrounding fluid and reveal a foot print of its movement. By reconstructing the velocity field we are able to identify shed vortices and directly calculate parameters such as hydrodynamic impulse and kinetic energy. We use these results, incorporated with the snake's swimming kinematics, to explore differences in swimming efficiency between snakes that are adapted to different ecologies with different morphological characteristics. Our results will help to inform the development and refinement of snake-like swimming robots.

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