

Metabolism in Motion: Mechanics, Physiology, and Ecology of Fish Movement

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Symposium overview:

Understanding fish movement is a central challenge in biology that integrates decades of fundamental research in physiology, biomechanics, energetics, and hydrodynamics. We are now at the edge of a profound transformation. Emerging and rapidly maturing tools, such as AI-enhanced kinematic tracking, minimally invasive biologgers on free-moving animals, robotic surrogates, and ocean-scale tracking, are shifting the paradigm: from individual to collective behaviour, from the energetics of fine-scale kinematics to activities of large-scale movement, and from controlled experiments to real-world complexity. The relevant topics in this symposium include, but are not limited to, kinematic-metabolic coupling, collective movement, climate-driven range shifts, as well as physiological limits of fish locomotion, and their implications for conservation, aquaculture, and welfare, by asking how fish generate, regulate, and optimize movement and/or energetics in dynamic environments.

