

Swimming Inspired by Biology



Dr. Daniel Floryan

Kalsi Assistant Professor
Department of Mechanical Engineering
University of Houston
(Dr. Floryan's lab website: <https://dfloryan.github.io/>)

Abstract

Nature's swimmers have benefitted from over 500 million years of evolution to become fast, efficient, maneuverable, and stealthy. Through evolutionary pressure, swimmers have converged on a common set of features and behaviours entirely different from traditional human-made swimming machines. What secrets do they hold? We use theory, experiments, and computations to answer two questions: (1) What are the underlying physical mechanisms that have led nature's swimmers to converge on their observed features and behaviours? (2) How can we leverage the underlying physical mechanisms to engineer human-made swimmers that not only match, but outperform nature's swimmers? The second question points at an underappreciated fact: evolution has not necessarily optimized swimmers for swimming ability, and there is surely much room to engineer even better swimmers.

Speaker Biography

Daniel Floryan is the Kalsi Assistant Professor of Mechanical Engineering at the University of Houston. His research is at the intersection of fluid mechanics and nonlinear dynamics, with interests in bio-inspired locomotion and using data to model and control dynamical systems. Daniel received a B.S. in mechanical engineering and a B.A. in economics from Cornell University, and an M.A. and Ph.D. in mechanical and aerospace engineering from Princeton University, where he graduated as the Porter Ogden Jacobus Fellow.