

Mechanical Engineering Faculty Candidate Seminar



Friday, March 18, 2022

9:30am-10:30am (refreshments at 9:15am)

Koelbel Building, KOBL 341

Zoom: <https://cuboulder.zoom.us/j/99811110982>

Paul M. Rady Department of Mechanical Engineering, University of Colorado, Boulder

Bioinspired robots and underwater vehicles for real-world applications

Nicole Xu, Naval Research Laboratory, Washington, D.C.

As robotics advances, swimming robots can potentially be used for monitoring the ocean, performing tasks in remote locations, and other practical applications. Looking towards nature for inspiration can address some of the grand challenges of robotics, such as improved dexterity and adaptive abilities in unstructured environments. This work presents examples of bioinspired swimming robots using approaches that combine laboratory and field experiments, theoretical models, and computational fluid dynamics. First, we demonstrate a biohybrid robot that uses a microelectronic system to induce swimming in live jellyfish in the laboratory and ocean. Using entirely synthetic materials, we also address how bioinspired sharkskin surfaces and robotic fish fins can improve the performance envelope of vehicles. Future applications include improving swimming speeds, efficiencies, and antifouling properties for enhanced persistence. These examples provide a strong foundation for continued work to design and implement robots for real-world applications.

Biography: Dr. Nicole Xu is an engineer with an interdisciplinary background in robotics, fluid mechanics, and bioengineering. Currently, her research focuses on using 3D-printed bioinspired shark skin surfaces to improve the performance of fish-like robots and autonomous underwater vehicles as a National Research Council Postdoctoral Scholar at the U.S. Naval Research Laboratory. She received her Ph.D. from Stanford University, M.S. from the California Institute of Technology, and B.S.E. from the University of Pennsylvania, and her work has received international press, including interviews on BBC TV and radio.

