Professor Mittal Receives $1Million in DoD Grants

Marine mammals such as dolphins and fish possess far greater maneuverability than do the current generation autonomous undersea vehicles (known as "AUVs") that the U.S. military operates for reconnaissance and underwater mine clearance. Given the superior maneuverability of fish, the U.S. Department of Defense's (DoD) Office of Naval Research is eager to study the hydrodynamics of fish pectoral fins and determine whether any of their features or mechanisms can be adopted to increase the maneuverability of AUVs. As part of that effort, the DoD has awarded two grants totaling $1 million to Professor Rajat Mittal of the Department of Mechanical and Aerospace Engineering to study propulsive mechanisms in fish.

One of the grants is made under the DoD Multidisciplinary University Research Initiative (MURI) program and involves collaboration with researchers at the Massachusetts Institute of Technology (MIT) and Harvard University. MURI is a program designed to address large, multidisciplinary topic areas that represent exceptional opportunities for future DoD applications and technology options. The awards provide long-term support for research, graduate students, and laboratory instrumentation development that supports specific science and engineering research themes vital to national defense.

The bluegill sunfish is the subject of Prof. Mittal's study.

Using computational fluid dynamics (CFD), Mittal and his research team will perform a detailed study of the fluid dynamics of fish pectoral fins to try to understand the physical mechanisms that determine the hydrodynamic performance of the fin. Specifically, his team will look at the role that fin flexibility plays in thrust generation in order to design an artificial-muscle pectoral fin that naval AUVs can use to improve maneuverability. The computational modeling effort will complement the experimental effort being carried out by Harvard University zoologists who will work with live fish. CFD will also be used to guide the mechanical design of the pectoral fin, which will be carried out by the MIT team.

72 New Students Attend SEAS Retreat

From August 25th-27th, SEAS hosted a new students getaway at New River Gorge National River in West Virginia for 72 freshmen and transfer students. The retreat was held at ACE Adventure Center and included a number of activities designed to introduce the new students to the SEAS community and to create common experiences that allow them to bond with fellow SEAS students.

SEAS Associate Dean Douglas Jones and SEAS students handle the rapids during their whitewater rafting adventure.

Among the many activities available over the two-day retreat were whitewater rafting, horseback riding, hiking, mountain biking, a ropes course, and kayaking. Students also enjoyed "s'mores" and hotdogs around a bonfire, and some of them decided to put their engineering skills into practice early by attempting to catch fish using only a surf shirt and a blueberry muffin. During the second evening, students participated in a student activities fair and learned about the School's many engineering-related student groups in which they may become involved.

Dean's Fellow for Undergraduate Affairs Matthew Norris organized the new students getaway and was assisted by SEAS Associate Dean for Academic Affairs Douglas Jones; Presidential Administrative Fellow Pascale Doumit; and Brendan Lynch, our coordinator of student services. Thirty-eight SEAS upper classmen, peer mentors, graduate students, and club representatives assisted at the retreat, demonstrating the breadth of the SEAS community's involvement in helping the new students acclimate themselves to the School.