The Anatomy of Marine Animals

Adam Summers

Professor in the Department of Biology and in the School of Aquatics and Fisheries

CURRENT RESEARCH

Drawing inspiration from the form and function of marine organisms

Living organisms have solved many important problems: how to stick to things, how to slide, how to burrow, and how to move quickly with minimal energy. Looking at the marine environment can yield biologically inspired solutions to vexing engineering challenges. The Sea can be a source for novel biomedical devices, as well as inspiration for new technologies in a broader context. Dr. Adam Summers, Professor of Biology as well as Aquatics and Fisheries at the University of Washington, studies the anatomy and the functions of fish and other marine organisms. His research into fundamental biological questions like how marine animals smash prey or disappear under the sand leads him to investigate the mechanisms at work and often results in the development of bioinspired materials and new mechanical approaches to every-day problems.

Leveraging his background in Engineering and Mathematics, Summers brings a multidisciplinary approach to understanding marine biology. He uses a number of different methodologies including clearing and staining, CT Scanning, MRI, materials testing, and rapid prototyping to discover nature's solutions to engineering problems by examining the anatomy of fish at different levels of detail.

Among his toolset, the technique of clearing and staining is particularly notable for its visual beauty as well as the scientific insight it provides. By processing a specimen in a series of chemical baths, Summers renders the skin of the organism completely transparent while highlighting bone and cartilage in different colors thus providing a 3-D view of the anatomy in the animal. This method enables Summers to study the intricate form of the animal, and when he can understand the form, he can...

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AFFILIATION

University of Washington

EDUCATION

- Ph.D. in Organismic and Evolutionary Biology 1999,University of Massachusetts at Amherst
- M.S. in Biology 1991, New York University
- B.A. in Mathematics 1986, Swarthmore College
- B.S. in Engineering 1986, Swarthmore College

AWARDS

- George A. Bartholomew Award, 2003
- Best American Nature and Science Writing–2003
- Celebration of Teaching, Excellence in Undergraduate Education, Biological Sciences, 2004
- UCI Academic Senate Distinguished Assistant Professor Award for Teaching, 2005
- Fellow of the American Association for the Advancement of Science, 2008

RESEARCH AREAS

Technology, Materials Science / Physics, Photonics / Imaging, Robotics

FUNDING REQUEST

Your contributions will support the continued research of Dr. Adam Summers at University of Washington as he uses biology to inspire new solutions. Donations will help fund the annual $300K needed to support equipment, supplies, travels to field stations, and most importantly transdisciplinary researchers who walk the line between biology, engineering, mathematics, and physics. Partner with Dr. Summers as he derives solutions from the sea!