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### **Whale-Inspired Ocean Turbine Blades**

*U.S. Naval Academy Researchers Look to Convert Tidal Energy into Electricity  
Presentation at Fluid Dynamics Meeting Today in Long Beach, CA*

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EMBARGOED for release until 2:30 p.m. Eastern time (U.S.) on Monday, NOV. 22, 2010

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WASHINGTON, D.C., November 22, 2010 -- Interest in developing alternative energy sources is driving the consideration of a promising technology that uses underwater turbines to convert ocean tidal flow energy into electricity.

Now lessons learned from the ocean's largest mammals has inspired United States Naval Academy researchers to tackle one of the serious challenges of this technology: the low velocity associated with many tidal flows and the difficulty of extracting useful energy from low speed flows using current designs. They will present their findings today at the American Physical Society's Division of Fluid Dynamics (DFD) meeting in Long Beach, CA.

"We designed a novel blade modification for potential turbine performance improvement, which was inspired by humpback whale flippers, with the addition of tubercles, or bumps, to the leading edge of each blade," explains Mark Murray, a Naval Academy engineering professor. Previous research demonstrated the addition of biomimetically derived protuberances (technology that mimics nature) improved stall characteristics and aerodynamic performance."

The researchers' modified blades proved to be more effective in extracting energy at low speeds. Importantly, the blades did not degrade performance at high flow speeds or increase the mechanical complexity of the turbine.

Applications of this research may include the development of turbine designs that are more effective in converting low velocity tidal flow energy into useful electricity and more economically feasible to deploy.

This project was conducted as an undergraduate independent research study by Ensign Timothy Gruber, who is currently attending Massachusetts Institute of Technology's masters program, with Murray and Associate Professor David Fredriksson in the Naval Architecture and Ocean Engineering Department acting as his faculty advisors.

The presentation, "Effect of leading edge tubercles on marine tidal turbine blades" is at 11:35 a.m. on Monday, November 22, 2010 in the Long Beach Convention Center Room: 102A. ABSTRACT: <http://meetings.aps.org/Meeting/DFD10/Event/133206>

NOTE: an image is available. For more information, contact [jbardi@aip.org](mailto:jbardi@aip.org)

CAPTION: This image shows the blades being attached to the hub.

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#### MORE MEETING INFORMATION

The 63rd Annual DFD Meeting is hosted this year by the University of Southern California, California State University Long Beach, California Institute of Technology, and the University of California, Los Angeles.

It will be held at the Long Beach Convention Center, located in downtown Long Beach, California. All meeting information, including directions to the Convention Center is at: <http://www.dfd2010.caltech.edu/>

#### USEFUL LINKS

Main meeting Web site: <http://www.dfd2010.caltech.edu/>

Search Abstracts: <http://meetings.aps.org/Meeting/DFD10/SearchAbstract>

Directions to Convention Center: <http://www.longbeachcc.com/>

#### PRESS REGISTRATION

Credentialed full-time journalist and professional freelance journalists working on assignment for major publications or media outlets are invited to attend the conference free of charge. If you are a reporter and would like to attend, please contact Jason Bardi ([jbardi@aip.org](mailto:jbardi@aip.org), 301-209-3091).

#### ONSITE WORKSPACE FOR REPORTERS

A reserved workspace with wireless internet connections will be available for use by reporters in the Promenade Ballroom of the Long Beach Convention Center on Sunday, Nov. 21 and Monday, Nov. 22 from 8:00 a.m. to 5:00 p.m. and on Tuesday, Nov. 23 from 8:00 a.m. to noon. Press announcements and other news will be available in the Virtual Press Room (see below).

#### VIRTUAL PRESS ROOM

The APS Division of Fluid Dynamics Virtual Press Room will be launched in mid-November and will contain dozens of story tips on some of the most interesting results at the meeting as well as stunning graphics and videos. The Virtual Press Room will serve as starting points for journalists who are interested in covering the meeting but cannot attend in person. See: <http://www.aps.org/units/dfd/pressroom/index.cfm>

#### GALLERY OF FLUID MOTION

Every year, the APS Division of Fluid Dynamics hosts posters and videos that show stunning images and graphics from either computational or experimental studies of flow phenomena. The outstanding entries, selected by a panel of referees for artistic content, originality and ability to convey information, will be honored during the meeting, placed on display at the Annual APS Meeting in March of 2011, and will appear in the annual Gallery of Fluid Motion article in the September 2011 issue of the American Institute of Physics' journal, Physics of Fluids.

This year, selected entries from the 28th Annual Gallery of Fluid Motion will be hosted as part of the Fluid Dynamics Virtual Press Room. In mid-November, when the Virtual Press Room is launched, another announcement will be sent out.

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#### ABOUT THE APS DIVISION OF FLUID DYNAMICS

The Division of Fluid Dynamics of the American Physical Society (APS) exists for the advancement and diffusion of knowledge of the physics of fluids with special emphasis on the dynamical theories of the liquid, plastic and gaseous states of matter under all conditions of temperature and pressure. See: <http://www.aps.org/units/dfd/>

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