

Whale-inspired ocean turbine blades

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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.

More information: The presentation, "Effect of leading edge tubercles on marine tidal turbine blades" was on Monday, November 22, 2010. Abstract: meetings.aps.org/Meeting/DFD10/Event/133206

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