



INDIAN INSTITUTE OF TECHNOLOGY GANDHINAGAR

RODDAM NARASIMHA DISTINGUISHED LECTURE

Date : January 31, 2014
Timing : 3:30 PM – 5:30 PM
Venue : A-Block Auditorium,
IIT Gandhinagar

Bio-inspired Wind Energy: From Fish Schools and Seagrass to Better Wind Farms

DR. JOHN O. DABIRI

Professor

Director, Center for Bioinspired Wind Energy
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About the Speaker

John O. Dabiri is a Professor of Aeronautics and Bioengineering at California Institute of Technology, USA and a 2010 MacArthur Fellow. His honors include an Office of Naval Research Young Investigator Award and a Presidential Early Career Award for Scientists and Engineers for his research in bio-inspired propulsion. *Popular Science* magazine named him one of its "Brilliant 10" scientists in 2008. For his research in bio-inspired wind energy, *Bloomberg Businessweek* magazine listed him among its Technology Innovators in 2012, and the MIT *Technology Review* magazine named him one of its 35 innovators under 35 in 2013. He is currently the Chair of the Faculty at Caltech.

This talk will describe recent efforts using bio-inspired arrays of counter-rotating vertical-axis wind turbines to reduce the cost, size, and environmental impacts of wind farms. Full-scale field tests of 10-meter tall vertical-axis wind turbines have been conducted under natural wind conditions over the past four years. Whereas wind farms consisting of propeller-style, horizontal-axis wind turbines produce 2 to 3 watts of power per square meter of land area, these field tests indicate that power densities an order of magnitude greater can be achieved by arranging vertical-axis wind turbines in layouts inspired by the configurations of schooling fish and seagrass beds. The higher power density is leveraged to achieve meaningful power generation at lower altitudes than required by existing systems. Research findings suggest an alternative approach to wind farming and pose a broad array of interesting, unanswered scientific questions related to the modeling and control of canopy flows.

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