

Weekly CEA FM Seminar: Spring 2015



JOHNS HOPKINS

Center for Environmental
& Applied Fluid Mechanics

Date: **Friday, February 6, 2015**
Time: 11:00 AM
Location: Gilman Hall # 132
Speaker: **Prof. Cristina L. Archer** (University of Delaware)
Title: ***"Numerical simulations of wind turbine wakes for multi-scale geophysical applications"***

Abstract

Wind turbines generate turbulent wakes that in turn reduce wind power generation of other turbines downstream. Wakes are characterized by a wind speed deficit and high turbulent kinetic energy. The effects of wakes at three scales will be presented: global, regional, and local. Numerical simulations, with a global-to-mesoscale model and with large-eddy simulations, are used to understand these impacts. At the global scales, wakes are accounted for in the calculation of the "saturation" of wind power potential. At the regional scale, the reduction in wind speeds and kinetic energy caused by wakes can weaken hurricanes and reduce storm surge, if large arrays of offshore wind turbines are installed upwind of coastal communities. At the local scale, smart array layouts and inclusion of atmospheric stability can affect how much wind power is generated at wind farms.

Bio

Dr. Cristina L. Archer is an associate professor in the College of Earth, Ocean, and Environment at the University of Delaware, where she has a joint appointment between the Physical Ocean Science and Engineering program and the Department of Geography. Her research interests include wind power, meteorology, air quality, climate change, and numerical modeling.