

**Center for Fluid Mechanics, Division of Applied Mathematics  
Fluids, Thermal and Chemical Processes Group, School of Engineering  
Joint Seminar Series**

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**Do Swimming Animals Mix the Ocean**

Recent observations of biologically generated turbulence in the ocean have led to conflicting conclusions regarding the significance of the contribution of animal swimming to ocean mixing. Measurements indicate elevated turbulent dissipation--comparable with levels caused by winds and tides--in the vicinity of large populations of planktonic animals swimming together. However, it has also been noted that elevated turbulent dissipation is by itself insufficient proof of substantial biogenic mixing, because much of the turbulent kinetic energy of small animals is injected below the Ozmidov buoyancy length scale, where it is primarily dissipated as heat by the fluid viscosity before it can affect ocean mixing. This talk will propose a second, previously neglected mechanism of fluid mixing--described over 50 years ago by Charles Darwin (grandson of the Origin of Species author)--as the dominant mechanism of mixing by swimming animals. Low-order numerical models are complemented by laboratory measurements to draw conclusions regarding the feasibility of biomixing as an important driver of ocean mixing.

**Tuesday November 2, 2010  
3:00 PM  
Barus & Holley Room 190**