

2012 Fellow American Geophysical Union



James Moum

Professor,
Physics of the Ocean and Atmosphere

James Moum, professor in the College of Earth, Ocean, and Atmospheric Sciences, has been elected as Fellow of the American Geophysical Union for “outstanding contributions to our understanding of ocean mixing in coastal, abyssal and Equatorial regimes using innovative measurement techniques.” To be elected a Fellow of AGU is a special tribute for those who have made exceptional scientific contributions.

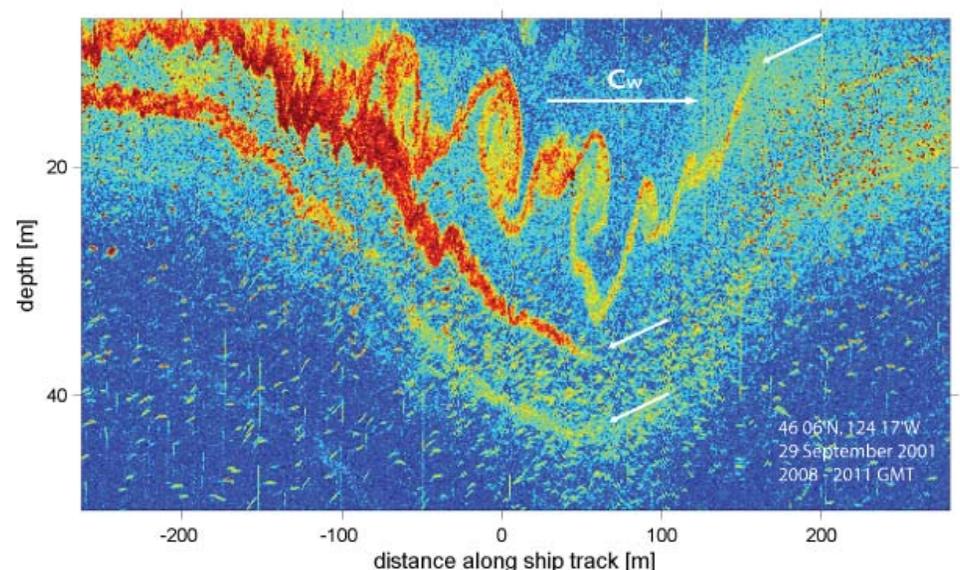
Moum, an expert in small-scale ocean mixing, works with the Ocean Mixing Group at Oregon State University. The distributions of heat, salt and chemicals (including pollutants) are critical to the intensity of ocean currents, to long- and short-term climate variations, and the health of our environment. Each is injected into the ocean at various rates and at

various global locations. Mixing in the ocean acts to smooth distributions of these properties and to reduce concentrations of pollutants to tolerable levels. Understanding how mixing occurs and at what rates it proceeds is important to understanding how the oceans work, and is especially needed before accurate numerical models of the ocean can be developed.

Moum notes, “What we have been attempting to do is bridge the understanding gap between the time and spatial scales that numerical models of ocean circulation can resolve (hours and 10s of kilometers) and the thermodynamically active scales of mixing (seconds and millimeters). This range of scales includes hierarchies of highly nonlinear yet stunningly beautiful fluid dynamics that ultimately feed ocean mixing.”

Recent research includes: new, long-term measurements of mixing at the Equator intended to elucidate mixing’s role in seasonal and interannual variations in equatorial surface temperatures; studies of giant nonlinear internal waves; exploring form drag in the ocean (analogous to atmospheric mountain drag which extracts momentum from the atmosphere’s boundary layer) so this phenomenon can be incorporated into ocean circulation models. The Ocean Mixing Group is actively involved in instrument development, continually trying to make more detailed and more quantitative observations of small-scale oceanic flows.

Moum took a Bachelor’s and then a Master’s of Science in Engineering from University of Toronto. He obtained his PhD in Physics at the University of British Columbia.



Acoustic image of a large amplitude internal wave off Oregon’s coast. This is one example of the beautiful, nonlinear fluid dynamics that lead to ocean mixing but not captured in present models of ocean circulation.

“Election as an AGU Fellow is a great honor and very nice recognition of the work I have been involved in. I have done very little on my own but have had the great good fortune to work with excellent engineers (two for more than 25 years), a string of exceptional students and postdocs and many of the top scientists in the field. I continue to learn from all of these people.” — James Moum