Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Effects of Shape, Surface Area, and Volume on Dissolution of Inertial Particles in Turbulence THERESA B. OEHMKE, EVAN A. VARIANO, University of California, Berkeley — Turbulent environments are abundant in nature, yet they are still not completely understood. Research on particles in turbulence has focused mainly on spherical particles smaller than the viscous scale even though many organisms found in nature exceed the size of the turbulent viscous length-scale and are not spherical in shape. Sea Walnuts and other zooplankton fall into this shape and size ranges of interests. These organisms have long been considered important species in ocean ecosystems. I am interested in understanding how these organisms exchange soluble material with their environment. Using dissolving sugar particles as a proxy, I investigate the fundamental questions of how shape, surface area, and volume affect particle dissolution rates in a laboratory turbulence tank. The research thus far has shown that neither surface area nor volume alone govern the dissolution rate of dissolving particles. Determining a single governing parameter may help elucidate how organisms interact with their environment and can contribute to the design of mini robots with respect to how they sample concentration plumes in rivers, streams, oceans, and other bodies of water.

Theresa Oehmke
University of California, Berkeley

Date submitted: 18 Jul 2019 Electronic form version 1.4