Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Multiphase turbulence modeling of the flow in the wake of a transom stern KELLI HENDRICKSON, Massachusetts Inst of Tech-MIT, SANKHA BANERJEE, None, DICK YUE, Massachusetts Inst of Tech-MIT — The objective of this effort is to develop and assess multiphase turbulence closure models for incompressible highly variable density turbulent (IHVDT) flows such as the two-phase flow in the wake of a transom stern. These flows, which have an Atwood number $At = (\rho_2 - \rho_1)/(\rho_2 + \rho_1) \approx 1$, are characterized by significant turbulent mass flux for which there is little guidance in turbulence closure modeling for both the momentum and the scalar transport. In this work, high-resolution numerical simulations are performed on the wake of a canonical transom stern at large scales using conservative Volume-of-Fluid (cVOF) and implicit Large Eddy Simulation (iLES). Boundary Data Immersion Method (BDIM) is used to simulate the dry transom stern wake region at three different Froude numbers and two different effective viscosities. Analysis of the simulation results for the turbulent anisotropy, turbulent kinetic energy and turbulent mass flux budget, as well as *a priori* closure model testing will be presented.

Kelli Hendrickson
Massachusetts Inst of Tech-MIT

Date submitted: 01 Aug 2014 Electronic form version 1.4