Stratified near wake of a slender body[1] JOSE LUIS ORTIZ-TARIN, SHEEL NIDHAN, SUTANU SARKAR, University of California San Diego — Motivated by applications in submersible hydrodynamics, the effect of density stratification on the wake of a slender body is numerically investigated. Large-eddy simulations with an immersed boundary method are employed to simulate the flow past a 6:1 prolate spheroid at zero angle of attack. The Reynolds number based on the minor-axis diameter is fixed to $Re_D = UD/\nu = 10^5$, and different levels of stratification measured by $Fr = U/ND$ are compared: $Fr = 2$ which is close the critical value of Froude number ($Fr_c = 6/\pi$) where the turbulence suppression in the wake is maximal; a moderately stratified case ($Fr = 4$) and the unstratified case ($Fr = \infty$). A trip placed near the nose of the body is used to force laminar-turbulent transition and the wake is simulated to $25D$. Preliminary results that include the evolution of the boundary layer, mean velocity and turbulence statistics will be presented.

[1]Office of Naval Research

Jose Luis Ortiz-Tarin
University of California San Diego