1098-93-298 **M. Ani Hsieh*** (mhsieh1@drexel.edu), 3141 Chestnut St, Randell 115, Philadelphia, PA 19104, and **Matthew Michini**, **Dennis Larkin**, **Eric Forgoston** and **Phil A. Yecko**. *Collaborative Tracking of Geophysical Fluid Dynamics: An Experimental Approach.* Preliminary report.

There has been a steady increase in the deployment of autonomous underwater and surface vehicles for applications such as ocean monitoring, tracking of marine processes, and underwater hazardous waste mitigation. The underwater environment poses unique challenges since robots must operate in a communication and localization-limited environment where their dynamics are tightly coupled with the environmental dynamics. This work presents current efforts in understanding the impact of geophysical fluid dynamics on underwater vehicle control and autonomy. This talk focuses on the experimental design and validation of the multi-robot Coherent Structure Testbed (mCoSTe) - an experimental testbed for evaluating the performance of manifold and coherent structure tracking strategies by a team of autonomous vehicles in 2D flows. We show how the mCoSTe is capable of producing repeatable and controllable coherent structures in 2D by analyzing the surface flows using a combination of Finite-Time Lyapunov Exponents (FTLE) and Dynamic Mode Decomposition (DMD). Building upon our existing work, we show how robotic tracking of manifolds and coherent structures in 2D flows can be validated using the mCoSTe. (Received January 28, 2014)