

## **Consortium for Advanced Research on Transport of Hydrocarbon in the Environment**

Marine oil spills can have dire environmental and socio-economic consequences. Research on their dynamics helps to predict the fate of these spills, which is important for the well-being of coastal communities and their economies. Propagation of oil spills is a very complex biogeochemical process. At NSU, we take a multipronged approach to understand these multiphase dynamics using a combination of laboratory and computational fluid dynamics simulations. We have conducted laboratory experiments and numerical simulations that indicated that the surface dynamics of crude and weathered oil are different and have distinct reactions to dispersant application, which is dependent on the location of dispersant application. This difference may have some consequences for aerial dispersant application during oil spill response. Freshwater lenses and coherent structures also may have a number of practical applications in oil spill propagation in coastal waters as indicated by our numerical simulations. We have also developed a new method including genetic analysis of the sea surface bacterial content in conjunction with SAR satellite imagery, which may help to monitor organic materials in the near-surface water column, including dissolved or dispersed oil spills