

UC **SANTA BARBARA**  
Department of Earth Science

# **Speakers Club**

**WEBB 1100 • THURSDAY MAY 24th. • 3:30 PM**

## Discovery and Biogeochemical Investigation of Chlorinated Industrial Waste in the Deep Ocean

**Veronika Kivenson**

**Marine Science  
UC Santa Barbara**

Industrial-scale dumping of organic pollutants to the deep ocean was once common practice, leaving a legacy of chemical pollution for which a paucity of information exists. Using a nested approach with autonomous and remotely operated underwater vehicles, a deep sea legacy dump site offshore California was identified, surveyed and sampled. Discarded barrels and other waste containers littered the site and structured the suboxic benthic environment by facilitating growth of microbial mats on and around discarded barrels. Chemical analysis of sediment samples revealed substantial variability in the concentration of DDT and its analogs, which were reported to have been dumped at the dump site, with DDT concentrations as high as 250  $\mu\text{g/g}$ . Application of a two end-member mixing model with DDT and PCB enabled source differentiation between continental shelf discharge versus containerized waste, indicating that DDT in regional deep ocean samples received 81-100% of their DDT burden from dumping of containerized waste. Analysis of the microbial community reveals that the most abundant microbial mat organism is in the genus *Desulfobacula*. Despite the ubiquity of this sulfate-reducer in marine sediment, this is the first genome to be reconstructed (96% complete) from the ocean, and reveals clues about its ability to thrive in this environment.