This seminar will focus on the NOAA/JIMAR Coral Reef Ecosystem Program’s (CREP’s) work tracking patterns of response to changing temperatures, nutrient addition, and gradients in the reef carbonate system. Efforts range from local manipulative experiments to comparisons across over 6,000 km of reefs throughout the Coral Triangle and Central Pacific. I will provide an overview of CREP’s areas of focus, and as the lead for CREP’s Oceans and Climate Change Team, I will report on our ongoing programs monitoring the US Pacific’s reef in-situ temperatures, carbonate chemistry, rates of carbonate accretion, and patterns of reef biodiversity. I will report our efforts to identify environmental drivers of these variables using on large-scale correlative models. Further I will discuss our ongoing manipulative experiments tracking linkages between thermal stress and inorganic nutrient in the reef system.