

**Date:** November 7<sup>th</sup>

**Time:** 11:00 AM

**Location:** Ames 234

**Speaker:** Dr. Stephen Monismith  
Stanford University

**Title:** "Buoyancy Driven Flows in the Gulf of Aqaba"

### **Abstract**

In my talk, I will present observations of flow over a fringing coral reef in the northern Gulf of Aqaba near Eilat, Israel. Originally designed as a control volume experiment aiming to compute rates of benthic grazing on phytoplankton by reef organisms, our observations show persistent buoyancy driven cross-shore exchanges. The basic mechanism for these exchange flows is the fact that shallow regions heat or cool more when exposed to a given heat flux than do deep regions, thus creating horizontal temperature variations and thus horizontal pressure gradients. In summer we see a diurnally reversing pattern of onshore and offshore flow at depth whereas during winter (or periods of net cooling) we only see off-shore flow at depth. The velocity profiles we observe appear to be self-similar, with the strength of the exchange flows determined by the heat flux and vertical mixing due to longshore flows over the reef. These observations imply typical residence time of water over the reef of a few hours. As an aside, I will also discuss the origin of the longshore flows themselves, arguing that they represent internal waves generated several days earlier in the Strait of Tiran, 180km south of Eilat.