Date: **April 2nd**

Time: **11:00 AM**

Location: **Ames 234**

Speaker: **Dr. Brian Arbic**
Princeton University

Title: **"A forward model of global ocean tides and tidal dissipation present and past"**

Abstract

We examine the accuracy of surface elevations in a forward global model of tides, that is, a tide model that is unconstrained by data. Accuracy is affected by the topographic dataset used, parameterized drag, self-attraction and loading, and baroclinicity. The most plausible source of drag is internal wave breaking over rough topography. Our drag scheme begins with a linear analysis for drag over arbitrary small-amplitude topography, and adds dimensional corrections for drag due to nonlinear wave breaking at the bottom. A multiplicative factor that makes up for missing small scales in the topographic dataset is tuned to minimize the fit between modeled and observed tidal elevations. A numerical scheme for convergent iterations of the self-attraction and loading term is developed, meaning that our model is self-consistent. The accuracy of the surface tide in a two-layer model is better than that in a one-layer model, and the drag needed in the two-layer case is the same as that in the one-layer case, against expectations that low modes represent a drag on the system. The large-scale topographies derived from GEBCO do not produce as accurate a tide as those from Smith and Sandwell, and the drag inferred from the roughness in GEBCO is an order of magnitude smaller than that inferred from Smith and Sandwell, thus confirming the value of satellite altimetry in estimates of bottom topography.