

# CGD SEMINAR



**DATE:** Friday, 17 February 2017

**TIME:** 11 a.m.

**LOCATION:** NCAR, 1850 Table Mesa Drive  
Mesa Lab, Main Seminar Room

**TITLE:** Modeling Ice Sheets and Sea Level  
with the Community Earth System  
Model

**SPEAKER:** Bill Lipscomb, Los Alamos National Lab

## **ABSTRACT:**

Dynamic ice sheets have been part of the Community Earth System Model (CESM) since its initial release. CESM1 simulated the surface mass balance (SMB) of the Greenland ice sheet with good accuracy, but supported only one-way coupling to ice sheets and was limited by the shallow-ice dynamics of the Glimmer ice sheet model. The upcoming CESM2 release includes many new ice-sheet capabilities, including (1) an upgrade to version 2 of the Community Ice Sheet Model (CISM), with robust, parallel higher-order ice dynamics; (2) land and atmospheric physics changes to allow more realistic SMB simulations for Greenland and Antarctica; and (3) support for interactive two-coupling between the Greenland ice sheet and other climate components. Beyond CESM2, the Land Ice Working Group (LIWG) will give increased attention to Antarctica and paleo ice sheets. CISM has recently been verified for several benchmark marine ice sheet experiments, giving accurate results at  $\sim 1$  km resolution. The next step is to simulate the evolution of the whole Antarctic ice sheet under past, present and future climates. Near-term CISM development will focus on efficient numerical methods for the velocity solver, detailed physics for calving and sub-ice-shelf melting, and novel techniques for coupling CISM to ocean models. These improvements will support the LIWG's mission to provide credible estimates of ice-sheet retreat and sea-level rise.