The Department of Atmospheric & Oceanic Sciences Special Colloquium
& CIMSS Seminar
Presents

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## *Probing the Earth's Carbon cycle Through Spaced-Based Measurements of Atmospheric $CO_2$*

THURSDAY, April 21, 2011
1:30 PM
Room 811 AO&SS, 1225 W. Dayton St.

Please join us for Coffee, Tea, and Cookies in
Room 853 at 1:00.

Abstract
About half of the 30 billion tons of carbon dioxide emitted into the atmosphere each year by human activities is reabsorbed by the oceans and land biosphere. However, we do not know the geographic distribution of the "CO2 sinks" or if this process will continue unchanged as emissions increase and the climate evolves. Understanding these processes is essential for predicting the rate of greenhouse gas (GHG) buildup in the atmosphere and its effects on the climate. Precise measurements of atmospheric carbon dioxide concentrations can be assimilated into atmospheric transport models to locate and quantify these carbon sinks and sources. The existing ground-based GHG monitoring network makes precise measurements from over a hundred sites, but does not provide the coverage or resolution needed to quantify carbon sources and sinks on regional scales.

The Greenhouse Gases Observing Satellite (GOSAT), launched in January 2009, and the expected launch of the second Orbiting Carbon Observatory-2, provide new opportunities to fill this measurement gap. Both satellites carry instruments to measure high-resolution spectra of reflected sunlight. This talk will describe some of the work and results from the NASA-led Atmospheric Carbon Observations from Space (ACOS) project, which is now operationally producing a CO2 product from GOSAT through an optimal-estimation type retrieval algorithm. Recent results show precisions of significantly better than 1%, and should have the capability of significantly reducing errors in carbon flux estimates.