

School of Natural Resources  
and the Environment

Seminar Series: Spring 2018

NEW AND EMERGING SPACE BASED  
MEASUREMENTS OF ECOSYSTEMS:  
FLUX TOWERS IN THE SKY

SPEAKER: David Schimel, NASA

DATE: Wednesday, April 25th, 2018

TIME: 3:00-4:00 pm

LOCATION: ENR2, S107



**ABSTRACT:** Remote sensing using “greenness” and related vegetation indices has allowed the development of global ecology, but greenness is rapidly being complemented by a series of robust measurements of vegetation function, structure and composition from space. The measurements represent the outcome of several decades of hard work to mature instruments and algorithms and several serendipitous and major scientific discoveries. Space-based measurements now correspond to many of the most common field measurements, including analogs to measurements through field identification, gas exchange systems and flux towers. Imaging spectroscopy provides phylogenetically organized information about physiological function, defense and longevity, Lidar and radar characterize height and structure of forests, and Solar-Induced Fluorescence (SIF) is a direct correlate of photosynthesis (GPP). In parallel, CO<sub>2</sub> measured with astonishing precision from space allows net ecosystem exchange to be estimated and in conjunction with SIF and estimates of biomass burning using carbon monoxide (CO), allows ecosystem respiration (NEE – GPP – CO = Reco) to be estimated. This is a transformation of ecological science almost unprecedented in magnitude, only equaled by the changes that occurred as vegetation indices came into use. Early results already to show the power of novel observations to address perennial questions and terrestrial ecosystems and the carbon cycle.