Presenter (Oral Presentation):
Sarah N. Hemmings

Authors:
Nathan Renneboog, Stephen Firsing III, Sarah N. Hemmings, Emily G. Capilouto, Joshua Harden, Robyn Hyden, Meghan Tipre, Zhang Yan, Herman Foushee and Jeffrey C. Luvall

Title:
Reducing tick-borne disease in Alabama: Linking health risk perception with spatial analysis using the NASA Earth Observing System

Learning Objectives
1) Describe the use of remotely sensed NASA Earth Science Data for projects related to human health.
2) Discuss the benefits of using remote sensing in the prediction and mitigation of diseases.
3) Discuss the combination of health behavior data with vector habitat mapping to inform a health communication campaign.

Abstract (max. 300 words; 5 sections):
Background
Lyme disease (LD) accounts for most vector-borne disease reports in the U.S., and although its existence in Alabama remains controversial, other tick-borne illnesses (TBI) such as Southern Tick-Associated Rash Illness (STARI) pose a health concern in the state. Phase One of the Marshall Space Flight Center-UAB DEVELOP study of TBI identified the presence of the chain of infection for both LD (*Ixodes scapularis* ticks carrying *Borrelia burgdorferi* bacteria) and STARI (*Amblyomma americanum* ticks and an as-yet-unidentified agent) in Alabama.

Objective/Purpose
Both LD and STARI are associated with the development of *erythema migrans* rashes around an infected tick bite, and while treatable with oral antibiotics, a review of educational resources available to state residents revealed low levels of prevention information. To improve prevention, recognition, and treatment of TBI in Alabama, Phase Two builds a health communication campaign based on vector habitat mapping and risk perception assessment.

Methods
NASA Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) satellite imagery identified likely tick habitats based on remotely sensed measurements of vegetation vigor (Normalized Difference Vegetation Index) and soil moisture. To target a high-risk group —outdoor recreation program participants at Alabama universities—

the study developed a behavior survey instrument based on existing studies of LD risk factors and theoretical constructs from the Social Ecological Model and Health Belief Model.

Results
Likely tick habitats, identified as those containing both high vegetation density and soil moisture, included Oak Mountain State Park, Bankhead National Forest, and Talladega National Forest. The survey instrument was amended to include geographic variables in the assessment of TBI knowledge, attitudes, and prevention behaviors.

Discussion/Conclusions
Remotely sensed environmental data combined with risk perception assessments inform an ongoing outreach campaign consisting of stakeholder meetings and educational seminars. The vector habitat model will incorporate additional environmental variables and *in situ* data.