ALABAMAVIEW
REMOTE SENSING ACTIVITIES
2015 - 2016

URBAN HEAT ISLAND EDUCATIONAL MODULES

Summer workshop with high school students who are using field data collectors to capture data and understand temperature variations between different surfaces

AlabamaView created the Summer Science Institute (SSI) at Auburn University (AU) as a summer science program for rising 11th–12th grade students with a high aptitude and interest in the fields of science and math. The program, supported by the College of Sciences and Mathematics at Auburn University, partners students with experienced AU Science and Math research faculty to explore topics more advanced than what is typically taught in a public or private high school environment.

The Summer Science Institute is not a science camp. It is an institute for highly motivated high school juniors and seniors with a serious interest in pursuing a math, science, or related degree. Students experience science at the cutting edge level in collaboration with Auburn University's unique faculty and facilities, helping set the stage for careers in science or science-related fields. Specific topics include climate change, urbanization, urban heat islands, data collection, plotting, interpolation (kriging), and interpretation of results. Using these interactions, students were exposed to remote sensing and spatial science that might not be covered in a traditional public or private high school.

MAPPING TREE COVER IN URBAN AREAS

AlabamaView has generated derivative products from Light Detection and Ranging (LiDAR) in previous years. Those products were then incorporated into a follow-on project in partnership with the Southern Research Station of the US Forest Service. Together, the process of mapping urban tree canopy in Alabama began, which has been incorporated into a new product that Forest Service employees will utilize and share for promoting and maintaining urban forests. This multi-year effort is critical to the state of Alabama as urban trees and forests provide essential ecological, economic, and social benefits to a large part of the population. These include land managers, local municipalities, utility boards, as well as state and federal forest land agencies.

AlabamaView combined the LiDAR data with color infrared images to map urban tree cover using Geographic Object Based Image Analysis (GeOBIA) methods. In combination with Landsat 8 leaf-off imagery, this distinguished and separated deciduous and coniferous tree cover. The resulting datasets have classes of urban tree cover by zone and can be analyzed for distribution and spatial extent using established geographic information system practices. These data and derivative products also provide urban foresters and city managers with estimates of urban canopy cover using existing and usually publicly available data. Modifications to the classification algorithm are made from one dataset or area of interest to another based on the characteristics of the input data, usually when dealing with differently classified LiDAR or similarly classified data from differing vendors.
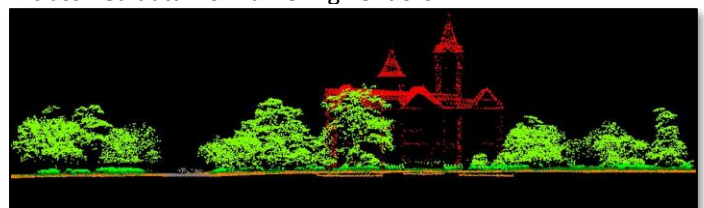
Shown above is an example of an urban airborne LiDAR dataset used to generate the urban landcover classification. Note the different coloration for each classification (green for urban canopy, red for building, etc.) These data are used in conjunction with raster imagery for urban tree canopy identification and mapping.

BENEFITS TO ALABAMA

- Exposing high school students to math and science topics concerning remote sensing fundamentals as well as atmospheric science principles
- Using the "Five E's: Engage, Explore, Explain, Extend, Evaluate" procedure for effectively training students.
- Distributing urban tree canopy data, which are used by local managers in decision-making for ecological, economical, and social benefits
- Creating and altering methodologies for mapping urban tree landscapes from one area to another
- Involving graduate and undergraduate students in examining new and traditional remote sensing techniques
- Developing modules for grades 6-8 in earth sciences for better understanding climatology
- Aligning modules with Course of Study and National Science Education Standards
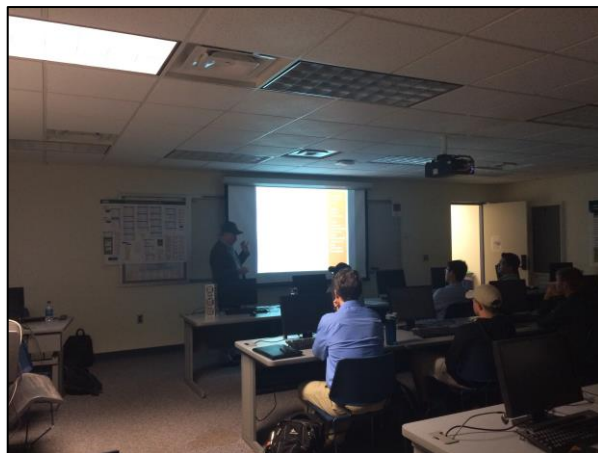
Auburn University undergraduate students in an introductory GIS course that utilizes AlabamaView's publicly available data for laboratory analysis and semester projects.

ALABAMAVIEW CONSORTIUM MEMBERSHIP

Federal consortium members identified above do not receive funding from AmericaView.

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