Forest SAT 2026

Association for Forest Spatial Analysis Technologies

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Title: Spaceborne lidar for vegetation assessment.

Instructors/Affiliation:

- Sorin C. Popescu

PhD Sorin.Popescu@ag.tamu.edu LASERS Lab, Department of Ecology & Conservation Biology Texas A&M University, College Station, Texas, USA.

- Justinn J. Jones

MS, GISP Justinn.J.Jones@tamu.edu LASERS Lab, Department of Ecology & Conservation Biology Texas A&M University, College Station, Texas, USA.

Description: A current and accurate Canopy Height Model (CHM) is the basic building block of a forest assessment. It is not logistically feasible to measure every tree by hand in the field, so we rely on CHMs derived from various remote sensing technologies. In this workshop, we will explore the ICESat-2 spaceborne lidar platform and how it can be used in conjunction with ancillary datasets such as Landsat 8/9 imagery and topographic variables to generate a custom CHM. We will use a Google Colab notebook (coded in Python) to access Open-Source datasets from Google Earth Engine and use Machine Learning regression to generate and evaluate a custom model. We will also explore the SlideRule web client, a graphic user interface website, to access spaceborne lidar data for a specific area of interest with no coding required. The overall goal of this workshop is to introduce students to spaceborne lidar data for vegetation assessment. The specific objectives are to understand and utilize powerful tools such as 1) ICESat-2 data products, 2) Google Earth Engine platform, 3) Google Colab for Open-Source Data Science, and 4) Machine Learning algorithms for model generation and evaluation. The target audience for this workshop is anyone interested in Forest Ecology applications of Open-Source Data Science.

Learning Objectives: By the end of the session, students will have a basic understanding of and hands-on experience with:

- ICESat-2 spaceborne lidar platform and data products.
- The Google Earth Engine platform.
- Python coding language and Google Colab notebooks for Open-Source Data Science applications.
- Machine Learning regression for model generation and evaluation.

Target audience: Graduate students, researchers, GIS/remote sensing professionals, and environmental scientists interested in radar remote sensing, forest monitoring, and land surface deformation detection.

Format & Activities: The workshop includes short presentations and hands-on activities. Participants will use Google Colab (Python) to work with data from Google Earth Engine and create a Canopy Height Model using Machine Learning. They will also explore the SlideRule website to access ICESat-2 data without coding.

Expected outcomes: Participants will learn how to:

- Use ICESat-2 lidar data
- Gain practical experience working with Google Earth Engine and Open-Source spatial datasets
- Apply basic Python and Machine Learning to create a CHM
- Access and visualize remote sensing data for forest analysis

Language: English

Requirements:

- Laptop with access to internet
- Google account / Google Drive (free account)
- Access to Google Colab (free account) https://colab.research.google.com/
- Access to Google Earth Engine (free account) https://console.cloud.google.com/home/dashboard. https://code.earthengine.google.com/ Participant Prerequisites:
- Basic understanding of forestry measurements (preferred)
- Basic understanding of Python coding language (preferred)

Instructor Biography:

- Dr. Popescu's area of research experience and teaching is in 3D vegetation structure and biomass assessment with remote sensing (RS) methods, with a specialty in laser or lidar RS, Unmanned Aerial Systems (UAS), sensors and algorithmic methodologies to derive vegetation biophysical parameters, including biomass, carbon, three-dimensional structure, and fuels and fire risk. Dr. Popescu has received research funding from NASA, NSF, USDA and other federal and state agencies. Since 2014, he has served as Principal Investigator on the NASA Science Team for the Ice, Cloud, and land Elevation Satellite-2 (ICESat 2), which launched in 2018. Dr. Popescu teaches two senior-level undergraduate courses in Remote Sensing of the Environment (ECCB 444) and Drones for Environmental Remote Sensing (ECCB 446), and three graduate courses, Remote Sensing of Environment (ECCB 644), Advanced Remote Sensing (ECCB 656), and Drones for Environmental Remote Sensing (ECCB 646).
- Mr. Jones has over 20 years of industry, academic, and research experience in GIS / Remote Sensing / GeoSpatial Science in ecology and natural resources. Mr. Jones graduated from Texas A&M University with a Master of Science degree in Ecology & Conservation Biology, focusing on advanced remote sensing technological applications in ecology, and is a current PhD student in the same Department. His MS thesis, "Using aerial and terrestrial mobile lidar with high-resolution imagery to estimate biophysical parameters of urban trees," incorporated various remote sensing technologies and traditional forestry measurement methods. Mr. Jones first earned his FAA sUAS remote pilot certificate in 2019 and now serves as lab and fleet manager for the LASERS Lab in the Department of Ecology & Conservation Biology at Texas A&M University. In 2024, Mr. Jones earned a GIS Professional (GISP) Certification, accredited by the GIS Certification Institute.

Requirements: Computer with Cloud Compared installed.

Schedule: March,24,2026, 10:00 AM – 2:00PM (EST)

Duration: 4 hours.

Agenda

Eastern Time (ET)	Topic	Instructor
10:00 AM – 11:00 AM	Introduction to ICESat-2 platform and data products	Sorin C. Popescu, Justinn J. Jones
11:00 AM – 12:00 AM	Introduction to and hands-on learning in Google Colab	Sorin C. Popescu, Justinn J. Jones
12:00 AM – 1:00 PM	BREAK	
1:00 PM – 2:00 PM	Knowledge and skills application guided exercise	Sorin C. Popescu, Justinn J. Jones