



**Title:** GeoAI for Wildfire Recovery and Deforestation Monitoring: Applied Earth Observation for Multi-Year Landscape Analysis

**Instructors/Affiliation:**

- Philippa Burgess, GeoCyber Systems LLC



This three-hour virtual workshop introduces practical GeoAI and earth observation workflows for assessing wildfire recovery and deforestation across multiple years and landscapes. Using case studies from the Jasper (2000) and Legion Lake (2017) fires in South Dakota and an international example from the Congo Basin, participants will see how Landsat, Sentinel, MTBS fire severity products, and other global datasets can be combined to track burn severity, vegetation recovery, and forest loss driven by multiple factors. Live demonstrations in Google Earth Engine and ArcGIS Pro will walk through NBR and related spectral indices, fishnet sampling and space time cube modeling, and an example LSTM time series forecast to reveal recovery trajectories and temporal patterns. Throughout the session the focus is on transparent, reproducible workflows that use public satellite data and GeoAI tools to support risk-informed decision making in wildfire recovery, deforestation monitoring, and broader forest condition assessment.

Participants will receive links to example scripts, workflow outlines, and follow up modules that they can complete at their own pace after the workshop with async and time blocked sync instructor access for troubleshooting and questions.

**Learning Objectives**

Participants in this workshop will learn how to:

- Acquire and organize multi-year wildfire recovery and forest monitoring datasets from USGS Earth Explorer and ESPA, including access to preprocessed indices such as NBR, dNBR, and NDVI, and integrate national fire severity products such as MTBS.

- Understand how spectral indices and MTBS severity classes are used to map burn severity and monitor post fire vegetation change and recovery trends over time, using case studies from the Jasper (2000) and Legion Lake (2017) fires in South Dakota.
- Follow instructor led, step by step demonstrations of reproducible workflows in Google Earth Engine and ArcGIS Pro, including fishnet sampling, creation of a Space Time Cube, and example time series forecasting using the LSTM option in ArcGIS Pro's Train Time Series Forecasting Model.
- See how similar methods apply to broader forest monitoring in an international example from the Congo Basin by using global datasets in Google Earth Engine, including Sentinel based products, to track deforestation and forest change driven by multiple factors.
- Compare how these workflows support both wildfire recovery assessment and ongoing forest monitoring and discuss how they can be adapted to different fires, study areas, and structural data sources (LiDAR, ALS, TLS, and Field Data).
- Use shared scripts, workflow outlines, and follow up modules to replicate and extend the demonstrated analyses on their own time after the workshop.

**Target audience:** This workshop is designed for forestry researchers, geospatial analysts, environmental scientists, and resilience or land-management planners who use remote sensing and want to better understand how GeoAI and earth observation workflows can support multi-year wildfire recovery and forest monitoring.

**Format and activities:** This virtual workshop combines lecture, guided discussion, and live demonstrations to provide both conceptual grounding and practical examples. Participants will see instructor led overviews of multi-year wildfire recovery workflows, followed by step-by-step demos using Google Earth Engine and Esri tools. The session focuses on clearly presented, repeatable workflows that participants can adapt to their own data and study areas. Question and answer segments are integrated into each module to clarify methods and connect the demonstrated techniques to real world wildfire recovery and forest monitoring scenarios.

**Expected outcomes:** By the end of the workshop, participants will understand how to acquire and organize multi-year wildfire recovery and forest monitoring datasets using USGS portals, MTBS, and related fire severity and vegetation products, and how to apply spectral indices such as NBR and dNBR to assess post fire change and longer-term forest condition. They will be able to follow example workflows in Google Earth Engine and ArcGIS Pro for visualizing recovery trajectories, tracking deforestation and forest change over time, and summarizing results across multiple fires and regions. Participants will leave with clear step by step guidance for recreating these analyses on their own and will

understand where GeoAI and deep learning fit into both wildfire recovery and deforestation monitoring workflows, and how these tools can streamline analysis and support risk informed decision making.

**Language:** English

**Requirements:** Participants should have an intermediate level of familiarity with GIS, remote sensing, or spatial data analysis. Prior experience with geospatial tools or satellite imagery is helpful but not required. The workshop is designed for researchers and professionals in forestry, ecology, environmental science, disaster recovery, or geospatial analysis.

This session will be delivered primarily as lecture and live demonstrations using Google Earth Engine and Esri tools, with guidance on how to recreate the workflows after the conference. Participants are encouraged to join the virtual session from their laptop, if they wish to follow along with the demonstrations, but no specific software installation is required in advance. Links to key datasets, example scripts, and workflow outlines will be provided so attendees can repeat the analyses on their own after the workshop.

**Schedule:** 9 AM – 12 PM on Monday May 4th

**Duration:** 3 hours.

#### **Instructor Biography:**

**Philippa Burgess** is the Principal of GeoCyber Systems LLC, a content-first technology firm advancing resilience and innovation across geospatial intelligence, cloud computing, artificial intelligence, and security. She holds an MS in Human Security and Geospatial Intelligence with a GIS Certificate from the USC Spatial Sciences Institute and an MA in Urban Planning and completed a year-long internship at the U.S. Geological Survey Earth Resources Observation and Science (EROS) Center in Wildland Fire Support as part of her graduate studies. Her award-winning work on the Jasper (2000) and Legion Lake (2017) fires in South Dakota fuses remote sensing, GeoAI, and decision support workflows. At GeoCyber Systems she creates content, delivers training, and leads applied projects in wildfire recovery, forest monitoring, and risk informed decision making.

#### **Agenda**

<b>Eastern Time (ET)</b>	<b>Topic</b>	<b>Instructor</b>
9:00 – 9:30	Welcome & Workshop Overview	Philippa Burgess
9:30 – 10:15	Module 1: Data Types, Acquisition & Preprocessing	Philippa Burgess
10:15 – 10:30	<b>Break</b>	

10:30 – 11:15	Module 2: GeoAI Analysis in Google Earth Engine and ArcGIS Pro Deep Learning	Philippa Burgess
11:15 - 12:00	Module 3: Reproducible Workflows & Lab Direction	Philippa Burgess