

Earth System Science Pathfinder (ESSP) Program Office Executive Summary

Spring 2025



(Please click on [hyperlinks](#) for more information)

Accolades

Congratulations to **ACTIVATE**'s Dr. Xubin Zeng (U. of Arizona) for winning the [2024 AGU Bert Bolin Global Environmental Change Award and Lecture](#)! This annual award recognizes ground-breaking research and leadership in global environmental change across disciplines research in the past 10 years.

ESSP's 2025 Program Forum!!

ESSP's fifth Program Forum is being held August 26-28, 2025 at the NASA Langley Research Center. We are busily planning for several days of productive discussions, lessons learned, and time to discover new synergies and collaborations. For more information, contact Jennifer.R.Olson@nasa.gov

Recent project Applications and other highlights

- [This recent article](#) describes how machine learning algorithms have been successfully combined with **ECOSTRESS** data and several other biophysical factors to predict the likelihood of wildfire spread as an aid to policymakers, fire managers and city planners to assess, manage, prepare, and mitigate future wildfires.
- The EMIT team has developed an Acid Mine Drainage (AMD) assessment model through use of the space-borne hyperspectral imagery to identify and classify mineral products that are linked to AMD. [The team paired up with ESRI](#), which combined this assessment model with a raster function template in ArcGIS to generate [AMD assessment maps](#) that can identify AMD hotspots and enhance information available to decision makers. The EMIT team's maps will also soon be available for the Western US through their open data portal, VISIONS. Stay tuned!
- A team at the University of Notre Dame is cross-referencing satellite data, including **GEDI** and **ECOSTRESS** observations, with genetic sequencing data from trees to monitor forest health on a global scale. The researchers sequence transcriptomes for tree species to understand responses to extreme conditions, such as drought. As discussed [in this article](#), the researchers are investigating the linkage of biological variables to remote sensing information: GEDI lidar are used to identify areas of tree sickness through loss of biomass, ECOSTRESS infrared sensors measure the forest temperature and indicate water retention and degree of drought stress, and DESIS, an instrument from the German Aerospace Center (DLR) on board the ISS, measures the color pattern reflected from trees which gives information about the tree's internal chemical structure due to transcriptomic variation. The goal is to enable identification of forest infestations or infections more quickly than waiting for signs of visible damage to emerge, at which time it is often too late to avoid.

As a spinoff from the **EMIT** Acid Mine Drainage, the team is collaborating with USGS to use EMIT data obtained over the North Carolina mountains before and after Hurricane Helene to study the impact of extreme storms on regional acid mine drainage and mine waste remediation.

FYI for our projects: NASA's SmallSat LEARN forum

NASA initiated a pilot program named LEARN (Learning from Experiences, Achievements, and Resolution Navigation) in 2022 as a community of NASA SmallSat Missions targeted to PIs, PMs and other SmallSat mission participants. It is intended to facilitate networking, information exchange, and collaborative learning through a bi-monthly interactive webinar series. If you are interested in learning more, check out the [LEARN forum here](#). A link to sign up for participation is provided.