Applied Earth Observations Innovation Partnership Webinar Series
October 21, 2022, 9:00 - 10:30 am ET
9:15 am - GEDI Mission and Applications

The Global Ecosystem Dynamics Investigation (GEDI) produces the first high-resolution laser ranging observations of the 3D structure of the Earth. GEDI makes measurements of forest canopy height, vertical structure, and surface elevation, improving our ability to understand how the Earth behaves as a system and make science-based decisions regarding critical resources. Mapping 3D ecosystem structure using GEDI allows us to quantify the amount of carbon stored in Earth's vegetation, estimate carbon fluxes resulting from land use and climate change, and characterize habitat quality among other applications. This presentation will highlight the GEDI mission overall, data products, applications, and current projects. Ms. Schwelling will provide science highlights, describe data product development, and share a variety of resources tailored for data users. Dr. Pascual will discuss current calibration and validation activities within the mission to drive the next releases for height and biomass products. He will provide a practical overview of GEDI data processing scripts available for users.

To conclude, two examples of GEDI data applications will be discussed. Dr. Pijanowski will highlight research at the Center for Global Soundscapes to use three ISS sensor platforms (GEDI, DESIS and ECOSTRESS), a variety of other space-based remote sensing platforms (e.g., ICESat-1/2, MODIS, Landsat), and in situ data to build a multi-sensor biodiversity modeling framework that has been applied to 28 of 32 major biomes. He will tell us about his explorations and summarize the work he has conducted around the world analyzing over 4 million soundscape recordings from places such as Borneo, Mongolia and the Caribbean Sea. Mr. Badouin will discuss VINDREW (Vision Intelligence Networks for Developing Research in Ecosystems of the World), a project to estimate carbon capture and storage in ecosystems at the macro level (e.g., country) using GEDI and Sentinel data and at the micro level (e.g., farm or a single tree) using drone images processed with artificial intelligence and allometric equations based on field data. The presentation will highlight a use case in Mexico in which the VINDREW analysis suite is used to perform agave population counts as well as biomass quantification in the states of Guanajuato and Jalisco.

Adrián Pascual is an Assistant Research Professor in the Department of Geographical Sciences at the University of Maryland, College Park, where he supports the NASA GEDI Science Mission through calibration, modeling, and development of decision-making applications using NASA GEDI data. Adrián received his doctorate in remote sensing and decision-making with a focus on airborne laser data and forestry and has conducted postdoctoral work around the globe. His research focuses on forest carbon monitoring, laser and image data processing and forest modeling, and stand and tree harvest-scheduling models using heuristics and mathematical programming. The goal of his research is to make remote sensing data products actionable and operational for decision-making. He is currently Associate Editor of *Forest Policy and Economics*.

Tali Schwelling is a Faculty Specialist in the Department of Geographical Sciences at the University of Maryland, College Park, where she provides administrative and outreach support for the GEDI mission. Her role includes proposal development, award management, social media and website content creation, community outreach, event planning, and fieldwork campaign planning and coordination. Tali received her BS in environmental science with a concentration in wildlife ecology and she is interested in the intersection of conservation, land use, and environmental justice. Prior to joining the GEDI team, she worked as a wildlife research technician studying wolves, seaducks, bats, and a variety of ungulate species and has extensive experience in sustainable community development.

Bryan Pjanowski is Director of Purdue University's Center for Global Soundscapes and professor of landscape and soundscape ecology. Pijanowski was named a University Faculty Scholar in 2013 and earned the College of Agriculture's PK-12 Education Award for Emerging Faculty in 2016. He was recently named Innovation and Entrepreneurship Ambassador for the College of Agriculture. Using acoustic sensors, artificial intelligence tools and big data mining techniques, Pijanowski and the Center for Global Soundscapes seeks to understand how humans impact biodiversity, so that they can create a better future for all 11 million species, while also improving human well-being. Pijanowski has previously addressed the topic of biodiversity and soundscapes in a TEDx Talk titled "Listen to the Earth" on Nov. 1, 2019.

Juan Isaac Badouin is a an Environmental Science Engineer and Assistant Professor in the Department of Mathematics at the Sonora Institute of Technology (ITSON). He is also a Data scientist at ÚNETE, an engagement and technology for education NGO in Mexico, and collaborating member of RED AMI in conjunction with UNESCO Mexico. He is the founder and CEO of the startup Rubisco (sustainability consulting powered by artificial intelligence) and co-founder and director of research and development at "Precisión Agrícola" (precision agriculture company based on unmanned aerial vehicles and artificial intelligence). Badouin is also president of the Sonora chapter of Tomato Valley Entrepreneur A.C., an NGO that promotes technology-based entrepreneurship and which recently organized the Hermosillo Hackathon as part of the NASA International Space Apps Challenge.