Pecora 22 Full Program

Monday, October 24

Workshops

Workshop: A Primer on Remote Sensing of Water Quality (Pre-registration required)
Michael Meyer and Tyler King, U.S. Geological Survey (USGS)
8:00 am – Noon (4-hour workshop)
Room: Denver Ballroom 1&2

Workshop: Envisioning the Future of International Earth Observations Collaboration (Pre-registration required)
Tim Stryker, USGS
8:30 am – 5:00 pm (8-hour workshop)
Room: Penrose Ballroom 1&2

Workshop: Build a pixel with 50 years of Landsat to share an important story or memory (Pre-registration required)
Sean McCartney, NASA / SSAI
10:15 am – 12:15 pm (2-hour workshop)
Room: Denver Ballroom 3

Workshop: Climate Change Monitoring and Impacts Assessment using NASA Earth Observations (Pre-registration required)
Sean McCartney, NASA / SSAI
1:30 – 5:30 pm (4-hour workshop)
Room: Denver Ballroom 3

Workshop: Demystify SAR for Climate Resilience and Sustainable Future Initiatives (Pre-registration required)
Dr. Lorraine Tighe, Esri, Dr. Franz Meyer, ASF DAAC & University of Alaska Fairbanks, Heidi Kristenson, ASF DAAC
1:30 – 5:30 pm (4-hour workshop)
Room: Denver Ballroom 1&2

Tuesday, October 25

Opening Plenary Session: Exploring the State of the Art, Including State-of-the-Art Earth Observation Capabilities, Advances in Computing and Algorithms with a Focus on the Global Development Community

8:30 – 10:00 am

Room: Colorado Ballrooms F-J

Five speakers giving 15-minute presentations on current and emerging breakthroughs. The speakers will be followed by audience Q&A.

Moderator: Budhendra Bhaduri, Oak Ridge National Lab DOE

Speakers:

- Andiswa Mlisa, Acting CEO, South African National Space Agency
- Catherine Nakalembe, University of Maryland – NASA Harvest Africa Program Director
- Marc Levy, Columbia University Center for International Earth Science Information Network (CIESIN), The Earth Institute (data driven decision making)
- Rebecca Moore, Google, Inc. – How GEE and Cloud Computing Revolutionized Global Remote Sensing

Technical Session #1 10:30 am – Noon

Technical Session 1-1: From Three to Many Shades of Water Color: The Legacy of Landsat and Its Prospects

Moderator: Nima Pahlevan, NASA

Room: Penrose Ballroom 1

Introduction: Landsat 8/9 Collection 2 Provisional Aquatic Reflectance Science Product

Benjamin Page, Earth Space Technology Services, Contractor to the USGS Earth Resources Observation and Science (EROS) Center

Long-Term Monitoring of Water Clarity in Amazon Basin using Landsat data

Daniel Maciel, National Institute of Space Research

Macroscale Ecological Insights from Remotely Sensed Water Color

Topp, Simon, U.S. Geological Survey

Assessing the Maximum Chlorophyll Index for Sentinel-2 at a broad scale

Wilson Salls, U.S. Environmental Protection Agency, Office of Research and Development

Calculated Risk: Leveraging Multi-Mission Compositing and Machine Learning for Managing CyanoHABs

Fickas, Kate, USGS, UC Santa Barbara

Assessment of Artificial Light at Night and Consequent Predation Risk for Juvenile Salmon in the Lake Washington Basin

Jennifer Schulien, U.S. Geological Survey - Western Fisheries Research Center

Technical Session 1-2: Analysis Ready Data: New Providers, New Opportunities

Moderator Maree Wilson, Geoscience Australia

Room: Penrose Ballroom 2

Leveraging Analysis Ready Data with Digital Earth Africa

Adam Lewis, Digital Earth Africa / Group on Earth Observations

Beyond Analysis Ready Data - Embracing 'sensor agnostic' Data Science will be key to Delivering Sustained Value from EO Constellations

Adam Lewis, Digital Earth Africa / Group on Earth Observations

Sentinel Hub: On-Demand Sentinel-1 CARD4L Generation - Digital Earth Africa Use-Case
Grega Milcinski, Sinergise/Sentinel Hub

CEOS Strategy for Analysis Ready Data
Andreia Siqueira, Geoscience Australia

CEOS Analysis-Ready Data Specifications for Synthetic Aperture Radar
Brian D. Killough, NASA Langley Research Center

Planet Fusion: Applications of a Next Generation Analysis Ready Surface Reflectance Product
Rasmus Houborg, Planet Labs PBC

Quantitative Metrics for Interoperability
Cody Anderson, USGS EROS Center

Technical Session 1-3: Advancing Radiometric/Geometric Calibration – I
Moderator: Cody Anderson, USGS EROS Center
Room: Denver Ballrooms 1&2

Operational Land Imager 2: Development and Characterization Lessons Learned
Edward Knight, Ph.D., Ball Aerospace

Landsat 9 Operational Land Imager-2 (OLI-2) Radiometric Calibration and Characterization
Kurtis Thome, NASA Goddard Space Flight Center

Landsat 8/9 Underfly Radiometric Cross Calibration and Validation
Garrison Gross, South Dakota State University

Landsat 9 Calibration Overview – Commissioning and Move to Operations
Cody Anderson, USGS EROS Center

Calibrating the 50-Year Landsat Archive
Esad Micijevic, USGS EROS Center

Landsat-8 Per-Pixel Radiometric Uncertainty Algorithm
Mary Pagnutti, Innovative Imaging and Research, Corp., Stennis Space Center

Interoperability and Calibration for a Heterogeneous Constellation of Satellites
Arin Jumpasut, Planet Labs PBC

Technical Session 1-4: Sustainable Development Goals (SDG) and Coastal Ecosystems
Moderator: Argyro Kavvada, NASA
Room: Denver Ballroom 3

Applications of LandSat Data in Support of SDG15 in Benin and Ghana
Abigail Barenblitt, Massachusetts Institute of Technology

Integration of Earth Observation Data Into Tracking Belize's SDG Commitments
Christine Evans, University of Alabama-Huntsville

Modeling Forest Phenology and Habitat for Species of Conservation Concern for use in Forest Land Use Plans in Argentina in Support of the UN Sustainable Development Goals
Sebastian Martinuzzi, University of Wisconsin-Madison

Monitoring Mangroves and Associated Ecosystems Using Earth Observations
Lola Fatoyinbo, NASA Goddard Space Flight Center

Earth Observations for SDGs: Lessons Learned
Cindy Schmidt, Bay Area Environmental Research Institute/NASA

Technical Session 1-5: National Land Cover Database (NLCD): Next Generation Products and Research
Moderator: Jon Dewitz, USGS EROS Center
Room: Denver Ballroom 4

NLCD: Integrating New Methodologies and Partner Data into Future Products
Jon Dewitz, USGS EROS Center

NLCD Change Detection Using CCDC Synthetic and Composite Imagery
Suming Jin, USGS EROS Center

Improving Classification Accuracy using Deep Learning Artificial Intelligence (AI) for the National Land Cover Database
Patrick Danielson, KBR, Contractor to the USGS EROS Center

Rangeland Condition Monitoring Assessment and Projection (RCMAP): Tracking Ground Cover patterns over a 1985-2021 time-series
Matthew Rigge, USGS EROS Center

The USFS NLCD Tree Canopy Cover Project: Perspective from a Strategic National Dataset, Recent R-2-O Work, and Delivery of New Time Series Products
Karen Schleeweis, USDA USFS Forest Inventory and Analysis Program

2016 NLCD TCC Validation and Comparison with GEDI Canopy Cover
Jill Derwin, Virginia Tech

Technical Session 1-6: Land Elevation and Surface Processes
Moderator: Barry Miller, USGS
Room: Denver Ballrooms 5&6

Historical Change Detection in the USGS Seamless 1/3 Arc-Second DEM
Barry Miller, U.S. Geological Survey

Iterative Orthophoto Refinement of Digital Elevation Model from MAXAR Imagery
Grzegorz Miecznik, MAXAR

The Story of East Timbalier Island
Gary B. Fisher, U.S. Geological Survey

Accuracy Analysis of Copernicus DEM and Comparison to the Current USGS DEM used in Landsat Processing
Shannon Franks, KBR

Digital Earth Australia Coastlines: A Novel Landsat Approach to Monitoring Coastal Change with Proven Potential for Global Uptake
Robbi Bishop-Taylor

Landslide Monitoring Using Uncrewed Aerial Systems and Multiscale Model-to-Model Cloud Comparison Along Railway Corridors
Donna Delparte, Idaho State University

Panel Session: Ladies of Landsat
Room: Colorado Ballrooms F-J

Moderators:
- Dr. Kate Fickas – U.S. Geological Survey
- Dr. Morgan Crowley – Natural Resources Canada

Panelists:

- Dr. Catherine Nakalembe – University of Maryland, NASA Harvest
- Kass Green – Kass Green & Associates
- Dr. Meghan Halabisky – University of Washington, Digital Earth Africa
- Africa Flores-Anderson – University of Alabama in Huntsville, McGill University, SERVIR
- Dr. Keiko Nomura – Climate Engine
- Dr. Raha Hakimdavar – Ball Aerospace

Ladies of Landsat is a Twitter-based organization that started officially in 2018. Led by a group of women hoping to make the field of Earth observation (EO) more equitable and inclusive for underrepresented scientists, they now have grown over 8,000 members! The field of EO has been dominated by the voices of those who have historically held positions of power, and so Ladies of Landsat are working from multiple directions to achieve a broader mission to make an impact on the field. First, they work bottom-up to amplify the representation of women and other underrepresented scientists in EO science. Second, they lead top-down calls for action from leaders in power and active allies who have the capacity to change the status quo when it comes to diversity, equity, justice, inclusion, and accessibility (DEJIA) in remote sensing.

It's an exciting time to be in the field of EO as significant advances are being made every day towards increased gender representation. In the past, barriers to mentorship, data accessibility, education, outreach, and collaboration limited women and other underrepresented scientists from using remote sensing and EO. However, these barriers continue to be broken down with the burst of free and open cyberinfrastructure, open science, and accessible communication. With a more diverse, equitable, and inclusive EO community comes more thoughtful, meaningful, and innovative research and applications. Importantly, there is also an increase in representation of who is using the data along with this progress, which is essential for girls and women of all ages to see that folks from all backgrounds, careers, and fields can be part of a broader EO community.

In this panel, Ladies of Landsat of different backgrounds, career stages, sectors, and geographic locations will discuss important topics such as: how EO data has helped open opportunities for underrepresented groups around the world, career trajectories, barriers, challenges and opportunities, parenthood, and the future of EO. Representation matters! Folks of all career stages crave the ability to see women and other underrepresented groups in positions of scientific power, discuss their path, and able to make a difference with their work. Showcasing Ladies of Landsat in this panel creates a platform for this to occur on an international scale.

Technical Session #2 **1:30-3:00 pm**

Technical Session 2-1: Power, Promise and Challenges in Remote Sensing of Water Quality

Moderator: Michael Meyer, USGS
Room: Penrose Ballroom I

Tracking Chlorophyll Trends in Intermountain West Lakes Using Remote Sensing
Samuel J. Sillen, University of Wyoming

Using Landsat-8 Observations to Determine Surface Water Temperature and Ice Cover for 1.4 million Global Lakes
Maartje C. Korver, Geography, McGill University, Canada

Earth Observation Monitoring of Algal Blooms in Oklahoma and Texas Reservoirs
Victoria Stengel, USGS

Assessing Trends and Drivers of Lake Trophic Status Change at Continental Scales
Michael F Meyer, USGS

Mapping and Characterizing Arctic Beaded Streams Through High-Resolution Satellite Imagery
Merritt E. Harlan, University of Massachusetts-Amherst

Spatially Distributed Bias Correction of Provisional Landsat 8 Collection 2 Surface Temperature Products in Rivers, Streams, Lakes, and Reservoirs
Robert J. Welk, USGS

Technical Session 2-2: Conservation and Sustainability, Part 1
Moderator: Robert A. Washington-Allen, University of Nevada-Reno
Room: Penrose Ballroom 2

Dynamical Systems Analysis Across Time Series of Land Degradation Metrics of a Commercial Ranch in Sagebrush Steppe from 1972 - 1998
Robert A. Washington-Allen, Director NevadaView, Dept of Agriculture, Veterinary, & Rangeland Sciences, University of Nevada-Reno

Integration of Landsat Imagery in Protected Area Assessment and Ecosystem Services Mapping in the Tropics
Ellen Delgado Florian, Center for Geospatial Research of the University of Georgia

Digital Earth Africa, Empowering a Billion People with Earth Observations
Adam Lewis, Digital Earth Africa / Group on Earth Observations

Building on the Sustainable Development Goal Indicator 11.3.1 for Identification of Urbanization Hotspots in Africa
Orion Cardenas-Ritzert, Colorado State University

Spatial Optimization of Residential Green Spaces for Water Conservation and Heat Mitigation: A Case of Phoenix Metropolitan Area, Arizona
Chuyuan Carter Wang, Towson University

Technical Session 2-3: Advancing Radiometric/Geometric Calibration – II
Moderator: Cody Anderson, USGS EROS Center
Room: Denver Ballrooms 1&2

Quality Assessment of the Harmonized Landsat/Sentinel-2 Data
Junchang Ju, University of Maryland-College Park

Radiometric calibration and stability monitoring of optical satellite sensors using Global Extended Pseudo Invariant Calibration Sites
Juliana Fajardo Rueda, South Dakota State University

Providing a Satellite Cross-Calibration Capability Across the Global Earth Observation Systems of System
Brian Sauer, USGS EROS Center

AI Based Cloud Clearing for Geolocation Validation with Landsat Chips and VIIRS Imagery
Bin Zhang, ESSIC/CISESS, University of Maryland-College Park

Co-Registration Accuracy Between Collection-2 Landsat-8 and Geometrically Refined Sentinel-2 Orthorectified Products
Rajagopalan Rengarajan, KBR, contractor to USGS EROS center

An Overview on Landsat 9 Operational Geometric Characterization and Calibration Processes and Results
Mike Choate, USGS EROS Center

Comparing the Geometric Performance of Landsat 8 and Landsat 9 Satellites and Their Data Products
Rajagopalan Rengarajan, KBR contractor to USGS EROS Center

Technical Session 2-4: Addressing Local Decision-Making Needs Through the Application of NASA Earth Observations
Moderator: Kenton Ross, NASA
Room: Denver Ballroom 3

NASA DEVELOP's Approach to Building Capacity in Individuals and Organizations to Use Earth Observations for Informed Decision Making
Lauren Childs-Gleason, NASA Langley

Understanding the Impact of Forest Management on the Cameron Peak and CalWood Fires
Chris Choi, NASA DEVELOP - SSAI

Using MODIS to Monitor Spatiotemporal Trends in Fog and Low Cloud Cover along the California and Southern Oregon Coast
Zack Werner, NASA DEVELOP - SSAI

Leveraging NASA Earth Observations to Analyze and Display Crop Phenology Data and Weather Conditions to Support Expansion of Small Grain Crops in the Midwest
Cameron Levine, NASA DEVELOP - SSAI

Evaluating Potential Sites for Coral Reef Restoration in the Golfo Dulce, Costa Rica Based on Turbidity and Sea Surface Temperature
Samuel Furey, NASA DEVELOP - SSAI

Leveraging NASA Earth Observations to Support Modeling Urban Cooling Interventions and Urban Heat Vulnerability in Yonkers, New York
Tamara Barbakova, NASA DEVELOP - SSAI

Leveraging Earth Observations and Health Data to Map Outbreak Risk and Inform Public Health Interventions for Zoonotic Disease Prevention
Ellen Delgado Florian, University of Georgia / NASA DEVELOP

Technical Session 2-5: Monitoring, Assessing, and Projecting Land Change Impacts with LCMAP Science Products
Moderator: Kristi Sayler, USGS EROS Center
Room: Denver Ballroom 4

Sending Mixed Signals: Predicting Landsat Reflectance Patterns with Climate Data
Kate Fickas, USGS, UC Santa Barbara

Historical Landscape Reconstruction and Scenario-Based Modeling in LCMAP
Terry Sohl, USGS EROS Center

Coastal Land-Aquatic System Biogeochemical Cycle Modelling with LCMAP Science Products and the Land Use and Carbon Scenario Simulator (LUCAS)
Jinxun Liu, USGS Western Geographic Science Center

Bringing It All Together: Integrating Landsat Change Detection with High-Resolution Remote Sensing
Jarlath O'Neil-Dunne, University of Vermont

Technical Session 2-6: Land Cover and Land Use Change and Impacts on Decision Making Processes Affecting Food Security and Environment
Moderator: Christine Evans, The University of Alabama-Huntsville
Room: Denver Ballrooms 5&6

Comprehensive Monitoring of Environmental Change: New Opportunities for Capacity Building
Pontus Olofsson, Earth & Environment, Boston University

Mapping Land-Cover Change and Building Capacity Across Amazonia and Beyond
Stephanie Spera, University of Richmond

Leveraging Time-Series Satellite Imagery to Improve Land Cover Monitoring in the Lower Mekong Basin
Robert E Kennedy, College of Earth, Ocean, and Atmospheric Sciences/Oregon State University-Corvallis

Advancing Cropland and Crop-type Mapping with Deep Learning for Agricultural Monitoring in Data Scarce Regions
Catherine Nakalembe, University of Maryland

Satellite-Based Assessment of Changes in Forage Conditions in East African Rangelands
Julius Y. Anchang, New Mexico State University

Featured Session: Advancing the State of the Art in the Next 50 Years
Moderator: Barb Ryan, World Geospatial Industry Council
Room: Colorado Ballrooms F-J

This session will draw upon the perspectives of international EO leaders. Their presentations and the moderator-facilitated Q&A would set the stage for widening the aperture of innovation and expanding the benefits of EO to all societies worldwide. This session will be informed by a Monday workshop on international collaboration, which will consider key programmatic and technical topics for enhanced land-imaging collaboration.

Technical Session #3 **3:30 – 5:00pm**

Technical Session 3-1: Remote Sensing of Open Water Surface Dynamics and Quality
Moderator: Margaret Srinivasan, Jet Propulsion Laboratory California Institute of Technology
Room: Penrose Ballroom 1

Modelling Total Suspended Sediments in the Belize Coastal Lagoon using Meta-Learning and Multi-Sensor Remote Sensing
Chintan B. Maniyar, Department of Geography, University of Georgia-Athens

The Applications Program of the Surface Water and Ocean Topography (SWOT) Mission
Margaret Srinivasan, Jet Propulsion Laboratory California Institute of Technology

Validation of Landsat-8/OLI Virtual Orange Band for the Brazilian Inland Waters
Daniel Andrade Maciel, Instrumentation Lab for Aquatic Systems

Multiscale Remote Sensing of the Upper Chattahoochee Watershed to Monitor Land Cover Changes and Water Surface Area Dynamics
Ali Mehran, University of North Georgia

Using Satellite Derived Water Quality Data from an Automated High Performance Computing Environment for Spatial/Temporal Trend Analysis of 10,000+ Minnesota Lakes
Leif Olmanson,

Technical Session 3-2: Conservation and Sustainability, Part 2
Moderator: Chandra Holifield Collins, USDA-ARS Southwest Watershed Research Center
Room: Penrose Ballroom 2

Rangeland Brush Estimation Tool (RaBET): A Landsat-Informed Aid for Conservation Planning
Chandra Holifield Collins, USDA-ARS Southwest Watershed Research Center

Impact of coal mining, thermal plants, anthropogenic activities on wildlife corridors for national parks and wildlife sanctuaries in the regions of India and Kenya
Abhinav Galodha, School of Interdisciplinary Research, Indian Institute of Technology-Delhi

Spectral Diversity as a Proxy of Forest Biodiversity
Catherine Chan, School of Natural Resources, University of Nebraska-Lincoln

Integration of Landsat Imagery in Protected Area Assessment and Ecosystem Services Mapping in the Tropics
Ellen Delgado Florian, Center for Geospatial Research of the University of Georgia

Technical Session 3-3: Advancing Vicarious Calibration
Moderator: Cody Anderson, USGS EROS Center
Room: Denver Ballrooms 1&2

Impact of 50 years of Landsat on Vicarious Calibration Methods and Accuracies
Kurtis Thome, NASA Goddard Space Flight Center

ECCOE Landsat 8/9 Under-Fly Surface Reflectance Validation
Emily Maddox, KBR, Contractor to USGS EROS Center

Assessing the Potential of the Arable Sensors to Provide Surface Reflectance Data
Cibele Teixeira Pinto, South Dakota State University

Collecting Spectra on a Budget: Comparing Reflectance Measurements from a Modified Laboratory Spectroradiometer to a Field Spectroradiometer for Fieldwork and UAS Mapping Applications
Victoria Scholl, U.S. Geological Survey, Geosciences and Environmental Change Science Center

A Low-Cost Radiometer Designed to Enhance Landsat Thermal Validation
Aaron Gerace, Rochester Institute of Technology

Leveraging NOAA Buoys and Forward Modeling to Support Calibration of Landsat's Thermal Archive
Nina Raqueno

Technical Session 3-4: Advancing Earth Analytics on the Cloud using STAC
Moderator: Jed Sundwall, Radiant Earth
Room: Denver Ballroom 3

An introduction to STAC Spec
Matt Hanson, USGS EROS Center

How Radiant MLHub Uses STAC
Jed Sundwall, Radiant Earth

How Microsoft's Planetary Computer uses STAC
Pete Gadomski, Element84, Contractor to USGS EROS Center

Global Scale Automated Near Real-Time Landcover Maps Using Deep Learning
Katy Densmore, Impact Observatory

Technical Session 3-5: Full Speed Ahead: Increasing Frequency and Reducing Latency of National-Scale Maps
Moderator: Tim Hatten, USGS EROS Center
Room: Denver Ballroom 4

NLCD: Balancing Accuracy and Methodology Innovation with Increasing Production Frequency
Jon Dewitz, USGS EROS Center

Mapping Disturbance for the Conterminous United States in Less than Six Months: Exploring Improvements in Processing Power, Image Compositing, and Improved Change Detection Algorithms
Brian Tolk, KBR, Contractor to USGS EROS Center

A Random Forest-Based Commission Error Filter for LANDFIRE Disturbance Mapping
Sanath Sathyachandran Kumar, ASRC Federal Data Solutions, Contractor to the USGS EROS Center

The LANDFIRE image-based Annual Prototype: Detailed Annual Updates to Vegetation Maps for the United States Using Machine Learning
Daryn Dockter, KBR, Contractor to USGS EROS Center

Painting the Landscape by Number: The use of Image Segmentation to Improve Geospatial Vegetation Classification
Joshua J. Picotte, ASRC Federal Data Solutions, Contractor to the USGS EROS Center

Annual Monitoring of Land Cover Change: The Benefits and Challenges of Lowering Latency
Jesslyn Brown, USGS EROS Center

Technical Session 3-6: Improving Food Security Through Crop Yield Forecasting
Moderator:
Room: Denver Ballrooms 5&6

A New Dissemination Portal for the Cropland Data Layer Program: CroplandCROS
Rick Mueller, USDA/NASS

Two Decades of Mapping US Corn Yields using MODIS
David M. Johnson, USDA National Agricultural Statistics Service

Remote Sensing-based Agro-Geoinformatic Tools for Supporting Agricultural Monitoring and Decision Making in South Asia
Liping Di, Center for Spatial Information Science and Systems, George Mason University

Reviewing the Application of Remote Sensing Towards Improved Field Crop Yields in Sub-Saharan Africa
Adeline Ngie, Unit for Env. Sc. and Management, School of Geo-and Spatial Sciences, Faculty of Natural and Agricultural Sciences, Vaal Triangle Campus, North-West University, South Africa

Panel Session: Imagining Innovation: The Next 50 Years of Earth Observations – Value and Benefits
Room: Colorado Ballrooms F-J

As the Earth observations (EO) community celebrates fifty years of Landsat, we reflect on advancements in understanding the impacts and value of EO on society. Landsat originally focused on land observations, but was eventually leveraged by the larger EO community to support a variety of missions. Its program was also foundational to the broad international EO community in the development of generations of EO satellites.

Today, we have a wide range of Earth observing satellites with many different purposes and capabilities deployed by agencies across the world. These capabilities have fundamentally changed how Earth systems are understood. As we look to the future, we ask ourselves how the emerging paradigm of enhanced satellite observations, new computer models and advanced information technologies will support society over the next 50 years. In this session, we will ask:

- What is the supporting infrastructure that will be necessary to achieve this new paradigm?
- How do we assess the value of satellite information in this context and decide on the key directions forward?
- Why will assessment of value and impact be necessary to bring this future about?

This session is a round table of international agencies and providers of Earth Observation (EO) data to bring their views on possible needs and innovations. This will be envisioned through a broad lens of societal impacts to better understand the multiple aspects of the value of satellite EO data. The panelists will discuss how the vision for the future of EO and EO science will serve people and society.

Panelists:

Canadian Space Agency (video introduction)
David Haight, Director of Economic, International and Regulatory Affairs
European Space Agency
Simon Jutz, Head of Copernicus Space Office
Geoscience Australia
Alison Rose, Chief of Space Division
Japanese Aerospace Exploration Agency
Shinichi Sobue, Deputy Chief Officer of Earth Observations
National Aeronautics and Space Administration
Karen St. Germain, Division Director of Earth Science
National Oceanic and Atmospheric Administration
Stephen Volz, Assistant Administrator for Satellite and Information Services
US Geological Survey
Cindy Lodge, Deputy Director of Operations

STEAM Event:

AmericaView is partnering with USGS, NASA, NOAA, Bentley, and others to host a Science, Technology, Engineering, Art, and Mathematics (STEAM) event at the William T. Pecora 22 Symposium in Denver on Tuesday, October 25th (9:30 AM – 12:30 PM). Denver middle and high school students will attend the Pecora 22 STEAM event with opportunities for students to learn about Earth observation and remote sensing through interactive, hands-on exhibits. During the afternoon (1:30 PM – 3:30 PM) of Tuesday, October 25th, Pecora 22 attendees (and families if they are traveling to the conference) are invited to explore and interact with the exhibits. The STEAM event is organized by AmericaView and funded by USGS. Bentley is a supporting contributor to the event.

Exhibitors Reception:

5:30 – 7:00 pm
Exhibit Hall, Colorado Ballrooms A-E

Take this opportunity to visit with the national and international suppliers exhibiting at the conference. The Exhibitors' Reception is a perfect time to mingle with fellow attendees, thank the Conference Exhibitors', our hosts for the evening, and stop by to view the posters on display and interact with the authors.

Wednesday, October 26

Plenary Session: A Half-Century of Discovery: The Scientific Discoveries and Technical Innovations Enabled by Pecora's Vision

8:30 – 10:00 am

Room: Colorado Ballrooms F-J

This is a 90-minute panel discussion featuring Pecora Award winners (Landsat pioneers) that discuss "what we know now because of Landsat" through short presentations on the major impacts and discoveries over Landsat's 50-year history. Session includes Q&A with the audience and audience Landsat memories and testimonials. Panelists include recent Pecora Award winners with career Landsat credentials.

Moderator: Dr. Jim Irons, NASA (retired)

James R. (Jim) Irons is an Emeritus at the NASA Goddard Space Flight Center following his January 01, 2022, retirement as the Director of the Earth Sciences Division. As Director he managed a staff of over 200 civil servants and over 1200 people not in the civil service, all dedicated to studying the Earth as an integrated system that includes the atmosphere, oceans, biosphere, cryosphere, and geosphere. Jim was also the NASA Landsat 8 Project Scientist beginning in 1999. Prior to 2007, Jim worked 28 years as a physical scientist in the Biospheric Sciences Branch where he served as the Landsat 7 Deputy Project Scientist beginning in 1992. He then served as the Associate Deputy Director for Atmospheres from 2007 to 2013, as the Deputy Director for Hydrospheric and Biospheric Sciences in 2014, and as the Deputy Director of the Earth Sciences Division from 2015 to 2018. Jim received his B.Sc. degree in environmental resources management in 1976 and the M.Sc. degree in agronomy in 1979 from the Pennsylvania State University. He received his Ph.D. degree in agronomy in 1993 from the University of Maryland College Park. As an Emeritus Jim donates service as a mentor and shares legacy knowledge of science and flight projects for the benefit of the Center.

Panelists:

Kass Green, 2020

Kass Green's experience spans over thirty years of managing and supervising GIS and remote sensing professionals for vegetation mapping, as well as leadership in GIS and remote sensing research and policy. Over the last 20 years Ms. Green has focused her career on challenging remote sensing and policy projects for public agencies, development organizations, and NGOs.

Ms. Green's coauthored texts include Imagery and GIS: Best Practices for Extracting Information from Imagery 1, and 3 editions of Assessing the Accuracy of Remotely Sensed Data, Principles and Practices 2. She has served on several Federal Advisory Committees for NOAA, NASA, and the Department of the Interior. Her career is one of 23 profiled in Esri's 2019 book, Women in GIS: Mapping Their Stories 3. Ms. Green was the first woman to receive the ASPRS Lifetime Achievement Award and in 2020 she was awarded the individual Pecora award. Ms. Green is currently part of the leadership team mapping wildland fuels and fine scale vegetation for 7 San Francisco Bay Counties and California's north coast.

Barb Ryan, 2018

Under Barbara J. Ryan's leadership, millions of satellite images and other Earth observation data have been made available to the general public at no charge, allowing scientists, planners and policy makers to make better-informed decisions on problems that transcend political boundaries. Her work addresses critical issues in agriculture, biodiversity, climate change, disaster planning, energy, health and water.

Barbara Ryan's career began in 1974 when she joined the United States Geological Survey (USGS), the nation's largest natural resource science and civilian mapping agency. She advanced steadily in the USGS, earning master's degrees in geography from the University of Denver and in civil engineering from Stanford University. As associate director for geography at the USGS, she was responsible for the agency's remote sensing, geography and civilian mapping programs, including the Landsat satellites. From 2008 to 2012, she was Director of the World Meteorological Organization (WMO) Space Program, and from 2012 to 2018, Ryan was the Secretariat Director of the intergovernmental Group on Earth Observations (GEO) in Geneva, Switzerland. In January of 2021, Barbara became the second Executive Director of the World Geospatial Industry Council (WGIC), a not-for-profit trade association of private-sector companies working in the geospatial and Earth observation ecosystem. Ryan has served as chair of the international Committee on Earth Observation Satellites (CEOS). She has been awarded an honorary doctorate of science degree from her alma mater, SUNY Cortland. She has been named an Honorary Fellow of the American

Geographical Society, in 2017 she was one of 10 global Leaders to be named to the Geospatial World Forum's Hall of Fame, and in 2019 she was awarded the Department of Interior and NASA's Pecora Award. She serves on several Boards and Advisory Committees including for two start-ups Azimuth1 and Data for Development Insights (D4DInsights), the Ecological Sequestration Trust, the International Centre for Earth Simulation (ICES), the International Symposium for Remote Sensing of Environment (ISRSE), and the Jane Goodall Institute.

Darrel Williams, 2017

Dr. Darrel Williams retired from NASA in 2010, following a distinguished 35-year career in the Earth Sciences Division, NASA Goddard Space Flight Center (GSFC). His career focus was the development and advancement of digital remote sensing techniques to monitor, assess and manage terrestrial ecosystems using Earth observation data, primarily Landsat. He attained BS and MS degrees in Forest Science from the Pennsylvania State University School of Forestry in 1973 and 1974 respectively, and his Doctor of Philosophy in Physical Geography from the University of Maryland in 1989. Following his retirement from NASA, Williams has served as Chief Scientist at Global Science & Technology, Inc., in Greenbelt, Maryland, where among other activities, he has explored innovative approaches to low-cost Landsat-like missions to improve temporal repeat. He was the second author and catalyst behind more than a decade-long effort to compile and document the definitive history of the Landsat program in the book Landsat's Enduring Legacy, published in 2017 by ASPRS via partial support from the NASA History Office.

Curtis Woodcock, 2016

Curtis Woodcock has been a professor at Boston University since 1984, specializing in remote sensing. He has served as team leader or co-leader of the Landsat Science Team since 2006. His areas of expertise include monitoring of environmental change, time series analysis, accuracy assessment and all things Landsat.

Vincent Salomonson, 1987

Vincent V. Salomonson is a Research Professor (Emeritus) at the University of Utah. He served as a Research Professor with joint appointments in the Departments of Atmospheric Sciences and Geography at the University of Utah from 2005-2020. He is also a Senior Scientist (Emeritus) in the Earth Sciences Division at the Goddard Space Flight Center of NASA. Prior to being a Senior Scientist, he was the Director of the Earth Sciences Directorate at the Goddard Space Flight Center, NASA from 1990-2000. He served at Goddard as the Deputy Director for Earth Sciences in the Space and Earth Sciences Directorate (1988-1990), Chief of the Laboratory for Terrestrial Physics (1980-1988), Head of the Hydrospheric Sciences Branch (1973-1980), and as a research meteorologist (1968-1973). From 1988 to 2009 he served as the Science Team Leader for the NASA Earth Observing System (EOS) MODIS instrument and Project Scientist for Landsat 4 and 5 (1977-1989). Prior to coming to Goddard, he spent three years as Weather Officer in the United States Air Force (1959-1962). His academic training includes a B.S. degree in Agricultural Engineering from Colorado State University (1959), a B.S. degree in Meteorology from the University of Utah (1960), an M.S. degree in Agricultural Engineering from Cornell University (1964), and a Ph.D. in Atmospheric Science from Colorado State University (1968). He is a Fellow of the IEEE, a Fellow and Honorary Member of the American Society for Photogrammetry and Remote Sensing (ASPRS), a member of the American Meteorological Society (AMS) and the American Geophysical Union (AGU). His publication record shows over 130 publications in scientific journals, books, conference proceedings, and NASA reports (over 80 are refereed/peer-reviewed publications).

Technical Session #4 **10:30 – Noon**

Technical Session 4-2: Intercomparison and Synergies between Multispectral and Imaging Spectroscopy Earth Observation Data in Preparation for the Future

Moderator: Chris Crawford, USGS EROS Center

Room: Penrose Ballroom 1

An Assessment of Earth Observation Imaging Spectroscopy User Needs

Nathan Roberts, KBR, Contractor to USGS EROS Center

Does higher spatial resolution improve snow estimates?

Edward (Ned) Bair, UCSB

Studying and monitoring freshwater ecosystems: Towards synergistic use of multispectral and hyperspectral observations

Nima Pahlevan, Science Systems and Applications Inc. / NASA Goddard Space Flight Center

Preparing for surface mineral mapping across the Earth by assembling large area airborne imaging spectrometer coverage and analyzing existing soil spectral libraries
Raymond F Kokaly, USGS, Geology, Geophysics, and Geochemistry Science Center (GGGSC), Denver CO

Keeping PACE with the NASA Plankton, Aerosol, Cloud, ocean Ecosystem mission
Jeremy Werdell, NASA

Technical Session 4-2: Remote Sensing of Shallow Water Bathymetry: Methods for a New Era
Moderator: Jeff Danielson, USGS EROS Center
Room: Penrose Ballroom 2

Satellite Derived Bathymetry (SDB) using Physics-Based Algorithm
Minsu Kim, KBR, Contractor to USGS EROS Center

Satellite Derived Bathymetry: Open-Source Module for NASA Ames Stereo Pipeline
Monica Palaseanu-Lovejoy, USGS, GMEG SC

ICESat-2 Operational Global Inland Surface Water Products for Hydrology and Water Resources
Michael F. Jasinski, NASA Goddard Space Flight Center

Assessment of Satellite-Based Observations of Bathymetric Change
Christopher E. Parrish, Oregon State University

Utilizing Deep Learning ICESat-2 Bathymetry Extraction and Multi-Modal Depth Retrieval Model to Derive Satellite Derived Bathymetry
Felicia Nurindrawati, TCarta Marine

Satellite Computed Bathymetry Assessment (SCuBA)
Monique Walker, NGA

Technical Session 4-3: Agricultural Monitoring with Landsat Data
Moderators: Chris Justice, UMD and Alyssa Whitcraft, NASA Harvest
Room: Penrose Ballroom 1

The Symbiotic Relationship Between Landsat and Agricultural Applications
Darrel L. Williams, Chief Scientist, Global Science & Technology, Inc.

NASA Harvest: Satellite Monitoring of Agricultural Productivity, Land Use, and Sustainability
Alyssa Whitcraft, NASA Harvest

Mapping Crop Types Globally using Landsat and Sentinel-2 imagery with Transfer Learning from the US Cropland Data Layer
David M. Johnson, USDA National Agricultural Statistics Service

Advancing Cropland Monitoring Using Multi-Source Optical Time-Series Data
Matthew Hansen, University of Maryland

Extracting fields from space – a Novel Lens on the Changing Global Landscape
Lin Yan, MSU

Landsat for Agriculture: The Way Forward
Chris Justice, UMD

Technical Session 4-4: Community Science Through Remote Sensing of the Environment
Moderator: Peder Nelson, Oregon State University
Room: Denver Ballrooms 1&2

Building community through the Trees Around the GLOBE student research campaign
Peder Nelson, Oregon State University

Integrating ecocultural knowledge and remote sensing in Barbuda, West Indies, through participatory science and story telling
Rebecca Boger, Brooklyn College, CUNY Nebraska Indian Community College's Remote

Sensing Research Applications "Community Science Through Remote Sensing"
Hank Miller, Nebraska Indian Community College

Communicating the meaning of place: Landsat images, art, and discovery
Carole A.S. Mandryk, Osher Lifelong Learning Institute at University of Hawaii at Manoa

Understanding Gender Barriers Today to Inform Equitable Capacity Building Efforts in the Future
Crista Straub, USGS

If Satellites Could Talk
Justin Braaten, Google

Technical Session 4-5: Advancing Geospatial Data Science Through Data Access and Computing, Part 1
Moderator: Peter Doucette, USGS EROS Center
Room: Denver Ballroom 3

Moderate Spatial Resolution Mapping of Global Land Cover and Land Cover Change Across Multiple Decades from Landsat
Mark A. Friedl, Boston University

Modeling Snowmelt Runoff using Landsat Fractional Snow-Covered Area
Saeed Arab, KBR, Inc., Under contract to USGS

Building a Federal Water Data Science Capability at the U.S. Geological Survey
Simon Topp, USGS

Landsat Data and Information in the Cloud Era
Bobbi Lenczowski, Maxar

Is GeoAI the Crystal Ball to the future of Earth Observation?
Vasit Sagan, Geospatial Institute, Saint Louis University-St. Louis

Planet Data Access for Researchers via the NASA Commercial SmallSat Data Acquisition (CSDA) Program
Tanya N. Harrison, Planet Labs, PBC

Technical Session 4-6: Rigorous Assessment and Application of Land Surface Phenology: A Track in Honor of Bradley C. Reed, Part 1
Moderators: John Jones and Jesslyn Brown, USGS
Room: Denver Ballroom 4

Phenometric Lapse Rates Improve Understanding of Land Surface Phenologies in Montane Pastures
Geoffrey M. Henebry, Michigan State University

Thirty Years of Satellite Seasonality: Progress and Challenges
Josh Gray, North Carolina State University

Observing and Modeling Land Surface Phenology at Local, Regional, and Global Scales Using Remote Sensing
Mark A. Friedl, Boston University

Near-real-time crop phenology mapping using harmonized Landsat and Sentinel-2
Feng Gao

The Development and Application of Remotely Sensed Exotic Annual Grass Phenology Metrics in Western U.S. Rangelands
Stephen P. Boyte, USGS EROS Center

Technical Session 4-7: Education & Outreach – Preparing the Next Generation of Remote Sensing Scientists
Moderator: Ginger Butcher, NASA
Room: Denver Ballrooms 5&6

Crossing Paths: Integrating Landsat Imagery with Weather Satellite Imagery in RealEarth
Sam Batzli, WisconsinView - SSEC/CIMSS - University of Wisconsin - Madison

Turning Digital Data Layers into Analog Atlas and Outreaching to Communities in Georgia
Jeong Seong, University of West Georgia

Imagination & Innovation: Turning Ideas into Reality within the Landsat Education and Public Outreach Realm
Ginger Butcher, SSAI, Contractor to NASA

The Impact and Implications of Cloud GeoTechnology on Education and Society
Canserina Kurnia, Esri Inc.

Integrating per-pixal accuracy metrics in LCMAP and MLCD products
Giorgos Mountrakis, State University of New York Collect, Environmental Science and Forestry

Harvesting the Landsat Archive using Deep Neural Networks: Comparison with Traditional classifiers and multi-sensor
Giorgos Mountrakis, State University of New York Collect, Environmental Science and Forestry

Featured Session: From Landsat 9 Into the Future
Room: Colorado Ballrooms F-J

A look at early results and impacts of the Landsat 9 mission and an introduction to concepts for the next generation of Landsat missions – Landsat Next.

Moderators: Bruce Cook (NASA) and Chris Crawford (USGS), session co-organizers and agency co-chairs of the Landsat Science Team

Presenters:

- Tim Newman, National Land Imaging Program Manager, USGS
- Mike Egan, Landsat Program Executive, NASA

Plenary Session: Observing the Earth for Benefit of All and Presentation of the 2020-2022 Pecora Awards
1:30 – 3:00 pm
Room: Colorado F-J
The 90-minute Wednesday afternoon kick-off plenary features the DOI Secretary and NASA Administrator (or their representatives) talking about the Landsat legacy and the importance of Landsat and broader Earth observation programs. Session closes with the presentation of the 2020-2022 Pecora Awards. The Pecora 22 Conference Chair will moderate

Moderator: Anne Hale Miglarese

Speakers:

- Tanya Trujillo, Assistant Secretary for Water and Science, Department of Interior
- Dr. Karen St. Germain, Earth Science Division Director, NASA

Pecora Award Winners:

2022:

Individual Award: Professor Susan Ustin
Team Award: the Aqua Mission

2021:

Individual Award: Dr. Frank Muller-Karger
Team Award: AmericaView

2020:

Individual Award: Ms. Kass Green
Team Award: Landsat 5 Flight Operations Team

Technical Session #5 **3:30 – 5:00 pm**

Technical Session 5-1: Google Earth Engine — Past, Present and Future
Room: Denver Ballroom 3

This interactive session will be a Fireside Chat with Google Earth Engine Director Rebecca Moore and others who will talk about the discussions/deliberations both inside and outside of Google regarding a development that has revolutionized how we view and analyze continental and global-scale land-surface processes.

Moderator: Barb Ryan, World Geospatial Industry Council

Panelists:

- Alan Belward, Joint Research Center, European Commission
- Matt Hansen, University of Maryland
- Rebecca Moore, Google
- Curtis Woodcock, Boston University

Technical Session 5-2: Integrated Analysis of Land Imaging Satellite Performance and Benefits
Moderator: Gregory Snyder, USGS
Room: Penrose Ballroom 2

User-driven Earth Observation Pathways
Greg Snyder, U.S. Geological Survey

Land Imaging Architecture Analytical Tools and Applications
Ellen Wengert, KBR, Contractor to USGS EROS

The Visualization, Exploration, and Data Analysis (VEDA) project: A unified cyberinfrastructure supporting NASA missions, science, and applications
Brian Freitag, NASA MSFC

New Drivers of Remote Sensing

Ajit Sampath, KBR, Contractor to US Geological Survey, EROS Data Center

ASPRS 10 Year Remote Sensing Forecast 2022-2032
Greg Stensas, ASPRS Primary Data Acquisition Division Director; USGS

GHG Monitoring from Space – A Systematic Mapping of Public, Private and Hybrid Missions
Aaron Davitt, WattTime and Climate TRACE

Technical Session 5-3: Performance of Hyperspectral and Advanced Multispectral Data in the Study of Leading Agricultural Crops of the World
Moderator: Prasad Thenkabail, USGS
Room: Mattie Silks

Measuring, modeling, mapping, and monitoring crop water productivity ("crop per drop") of leading world crops based on a study in California utilizing advanced multispectral remote sensing on the Google Earth Engine (GEE) cloud
Daniel Foley, USGS

Study of some of the leading world agricultural crops using spaceborne new generation (DESIS, PRISMA) and old generation (Hyperion) hyperspectral data
Itiya Aneece, USGS Western Geographic Science Center

Concept and characteristics of global hyperspectral imaging spectral libraries of agricultural crops (GHISA)
Prasad S. Thenkabail, USGS

Performance of new and old generation spaceborne hyperspectral data relative to advanced multispectral data in the study of leading agricultural crops of the world
Prasad S. Thenkabail, USGS

Technical Session 5-4: Opening the Aperture: Citizen Science Ground Photos as Reference for Earth Observations
Moderator: Peder Nelson, Oregon State University
Room: Denver Ballrooms 1&2

Understanding 50 years of land cover changes with citizen scientists using the GLOBE Observer Land Cover mobile application
Peder Nelson, Oregon State University

Assessing Global Landsat and Sentinel-2 Derived Land Cover Datasets Using GLOBE Observer Land Cover Photo Classification Protocols
Di Yang, University of Wyoming

Labeling Citizen Science Land Cover Photos to Enable Machine Learning Classifiers and Searchable Databases within the GLOBE Observer Community
Peder Nelson, Oregon State University

How citizen science can fill the gaps in Landsat Earth Observations
Peder Nelson, Oregon State University

Adopt-a-Pixel 3km: Fostering collaborative student research via citizen science and cloud-based data analysis tools
Russanne Low, Institute for Global Environmental Strategies

Technical Session 5-5: Advancing Geospatial Data Science Through Data Access and Computing, Part 2
Moderator: Peter Doucette, USGS
Room: Penrose Ballroom 1

Landsat Data Access Updates
Jacob Savoy, C2G, Contractor to USGS EROS

Introduction to Using Landsat Data in the Cloud
Holly Wilson, KBR, Contractor to USGS EROS

The Open Data Cube Sandbox: A State-of-the-Art Tool for using Landsat Data
Brian Killough, NASA

Climate TRACE - Tracking Real time Atmospheric Carbon Emissions: How remote sensing, cloud computing, machine learning and artificial intelligence are changing how we approach the climate crisis.
Aaron Davitt, WattTime and Climate TRACE

Exploring Data Interoperability with STAC and the Microsoft Planetary Computer
Peter Gadomski, Element 84, Contractor to USGS EROS Center

50 Years of Landsat: How the Current Landsat Data Ecosystem Creates Value for Decision-Makers and Society
Sarah F. Schenkein, USGS

Land Imaging Program and Social and Economic Analysis Branch, Fort Collins Science Center Developing Analysis Ready Data for the 3D Elevation Program
Jason Stoker, USGS

Technical Session 5-6: Rigorous Assessment and Application of Land Surface Phenology: A Track in Honor of Bradley C. Reed, Part 2
Moderators: John Jones, USGS, and Jesslyn Brown, USGS EROS Center
Room: Denver Ballroom 4

Improved Land Surface Phenology Detections from Time Series fused Landsat and Sentinel-2 with Geostationary Satellites
Xiaoyang Zhang, South Dakota State University

False winter peaks in the NDVI phenology of western coniferous forests
Jessica Walker, USGS

Progress in estimating vegetation phenology from the Copernicus Sentinel 2 and 3 satellites
Lars Eklundh, Lund University

Improving Temporal Sampling of ET Timeseries Retrievals using Multi-Sensor Thermal Imaging Sources
Martha C. Anderson, USDA-ARS

Technical Session Technical Session 5-7: 50 Years of Landsat Terrestrial Monitoring – Past, Present and Future
Moderator: David Roy, Michigan State University
Room: Denver 5&6

Perspectives on USGS Landsat processing and future needs
David Roy, Michigan State University, and Chris Crawford, USGS EROS Center

Perspectives on the explosion of use of Landsat data
Curtis Woodcock, Boston University

The global 2000-2020 land cover and land use change dataset derived from the Landsat archive
Peter Potopov, University of Maryland

Progress and Remaining Challenges for Large Area Mapping with Landsat

Matthew Hansen, University of Maryland

An Update on NASA's Global Harmonized Landsat-Sentinel-2 Products
Brian Freitag, NASA MSFC

NLI Programmatic Outlook
Tim Newman, USGS

Landsat Gala:

A Gala event has been scheduled to celebrate the 50th anniversary of the Landsat Program during the Pecora22 Conference. The event will occur on Wednesday evening, October 26 from 5:30 to 7:00 p.m. in the Ballroom of the Hilton City Center, Denver, CO, the Conference hotel. If you have not already registered, tickets for the event can be purchased at the registration desk for a cost of $30. Tickets will entitle the holder to a wide selection of heavy hors d'oeuvres and to two drinks at the Gala bar (cash will be accepted for more than two drinks). Brief comments will be made by representatives of the Department of the Interior, NASA, and the three Platinum Sponsors -- Ball, General Dynamics and Google Earth. Most of the time will be devoted to connecting with all those present to celebrate the 50th anniversary of Landsat. The dress code is business casual.

Thursday, October 27

Closing Plenary Session: The Next 50 Years: Synergy and Collaboration

8:30 – 10:00 am

Room: Colorado Ballrooms F-J

This Town Hall interactive plenary focuses on evolving to a globally comprehensive and complementary system of Earth observations (EO). A 90-minute panel explores the synergy and collaboration between
the U.S. Government, industry, and international partners and engages with the audience to identify the needs, elements, and approaches that might lead to a stronger future EO system. The first half of the session will involve panelist presentations that illuminate issues or opportunities associate with a set of questions identified prior to the start of the session and listed in the conference program. The final half will involve a town hall discussion with the audience.
Moderator: Anne Hale
Miglarese Panelists:

Maurice Borgeaud, Head of Science, Applications, and Climate Activities, Earth Observation Directorate, European Space Agency

Dr. Maurice Borgeaud is Senior Advisor for the Director of the Earth Observation (EO) Directorate of the European Space Agency (ESA). He interacts with the scientific community, ESA Member States and industry in order to propose ground-breaking EO science satellite missions as well as new domains for the development of innovative applications using EO data. He also plays a key role in defining the long-term EO data exploitation strategy addressing the full spectrum of EO user communities. He also advised the ESA office for climate change including the development of essential climate variables, promotes the use of EO data to monitor the UN SDG's, interacts with international partners, and represents ESA on the Board of the International Charter: Space and Major Disasters.

Mr. Borgeaud graduated with a Degree in Engineering from EPFL, Lausanne and holds a Ph.D. from the Massachusetts Institute of Technology (MIT). He is a Fellow of the Institute of Electrical and Electronics Engineers (IEEE) and Associate Editor for the "IEEE Transactions on Geoscience and Remote Sensing".

Grega Milcinski, CEO and Co-founder, Sinergise

Grega Milcinski is the CEO and co-founder of Sinergise, a geospatial company from Slovenia best known for Sentinel Hub and EO Browser. Several years ago, they recognized the potential of open EO data, but hit a wall trying to use existing technologies to work with these large datasets. Fast-forward a couple of years and Sentinel Hub is now processing more than half a billion of requests every month, powering thousands of applications and machine learning workflows worldwide, providing seamless access to Planet, Sentinel, Landsat and many other satellite missions.

Chris Justice, University of Maryland

Professor Chris Justice received his Ph.D. from the University of Reading, UK in 1979. He held post-doctoral fellowships at NASA GSFC and ESA ESRIN, launching a career in satellite earth observation. He is a Distinguished University Professor in the Department of Geographical Sciences, University of Maryland. His research has a focus on the practical use of satellite remote sensing for societal benefit and he has developed satellite–based systems for global agriculture, fire and land use monitoring. His research has contributed to the development and use of time-series earth observation satellite data, starting with the AVHRR and subsequently with MODIS and VIIRS. He was instrumental in developing NASA's LANCE capability. He is the co-lead for the NASA MODIS and Suomi-NPP VIIRS Land Discipline Team. He has been the Project Scientist for the NASA Land Cover Land Use Change Program since its inception. He is Chair of the international GOFC-GOLD Fire Implementation Team and is Co-Chair of the international GEO Global Agricultural Monitoring Initiative (GEOGLAM) which is endorsed by the G20 Agricultural Ministers. He is the science lead for the NASA Harvest Consortium which is NASA's program on the application of remote sensing to agricultural monitoring.

Bill Gail, Google (Earth Science Decadal Survey Co-Chair)

William B. Gail is a product manager for weather and climate at Google. He was previously co-founder and CEO at Global Weather Corporation, an industry-leading provider of weather forecast services to the media, energy, and transportation industries. Prior to that he was a Director in the Startup Business Group at Microsoft, Vice President of mapping products at Vexcel Corporation, and Director of Earth science programs at Ball Aerospace. Dr. Gail received his undergraduate degree in Physics and his PhD in Electrical Engineering from Stanford University, where his research focused on physics of the Earth's magnetosphere. During this period, he spent a year as cosmic ray field scientist at South Pole Station. Dr. Gail is a past-president and Fellow of the American Meteorological Society and a lifetime Associate of the US National Academy of Sciences. He was the co-chair of their 2017 Earth Sciences Decadal Survey, served on their Board on Atmospheric Sciences and Climate, and has participated on many prior National Academies committees including the 2012 review of the National Weather Service and the 2007 Earth Sciences Decadal Survey. He serves or has served on a variety of other editorial, corporate, and organizational boards, including the US Commerce Data Advisory Council and NOAA Environmental Information Services Working Group (EISWG), and has testified in Congress on multiple occasions regarding weather issues. His book Climate Conundrums: What the Climate Debate Reveals About Us was released in 2014, and his opinion pieces have been published in The New York Times, USA Today, and elsewhere.

Joe Morrison, Umbra

Joe Morrison is the VP of Commercial Product at Umbra, a radar satellite imagery company where he is responsible for commercial marketing, sales, and customer success. He won't rest until tasking satellites is as easy as booking hotel rooms. In his spare time, he writes a newsletter on the business and strategy of modern mapping (and tweets too much).

Technical Session # 6

10:30 am – Noon

Technical Session 6-1: Surface Temperature and Evapotranspiration (ET)

Moderator: Forrest Melton, USDA-ARS

Room: Penrose Ballroom 1

Improving Temporal Sampling of ET Timeseries Retrievals using Multi-Sensor Thermal Imaging Sources

Martha C. Anderson, USDA-ARS

Improving evapotranspiration estimation and mapping for global field-scale applications

Gabriel Senay, U.S. Geological Survey (USGS), Earth Resources Observation and Science (EROS) Center, North Central Climate Adaptation Science Center

OpenET: Operational Evapotranspiration Data for Water Management in the Western United States

Forrest Melton, NASA Ames Research Center, Cooperative for Research in Earth Science and Technology

An Introduction to NASA's Western Water Applications Office

Forrest Melton, NASA Ames Research Center, Cooperative for Research in Earth Science and Technology

Landsat 9 Thermal Infrared Sensor 2 (TIRS-2) Radiometric Calibration and Characterization

Matthew Montanaro, NASA Goddard Space Flight Center

Operationalizing the generalized split window algorithm for the TIRS-class sensors

Tania Kleynhans, Rochester Institute of Technology

Technical Session 6-2: High-Latitude Aquatic Remote Sensing

Moderator: Nima Pahlevan, NASA

Room: Penrose Ballroom 2

Discrimination of river runoff over ice from melt ponds by k-mean clustering of Landsat 8 and MODIS derived remote sensing reflectance spectra

Luka Catipovic, MIT

The Bio-Optical Properties of Arctic-Boreal Lakes
Kelly Luis

Development of SAR and EO derived wetland products for waterfowl abundance models in the Arctic-Boreal Zone
Michael Battaglia, Michigan Technological University

Landsat, Sentinel-2A/B, and HLS Albedos of Northern High Latitudes
Crystal Schaaf School for the Environment, University of Massachusetts Boston

Technical Session 6-3: Commodity-Driven Tropical Deforestation
Moderator: Matt Hansen, UMD
Room: Mattie Silks

Delayed palm oil conversion after forest loss: improving burned areas or land speculation?
Diana Parker, Department of Geographical Sciences, University of Maryland

Massive soybean expansion in South America since 2000 and implications for conservation
Xiao-Peng Song, Department of Geosciences, Texas Tech University, Lubbock, TX, USA

Land use expansion in South America, 1985 to 2018
Viviana Zalles, University of Maryland

Tropical forest loss area and driver assessment using multi-source data
Alexandra Tyukavina, University of Maryland

Technical Session 6-4: Current and Future Earth Observation Innovations Across Mobile, Aerial and Satellite Remote Sensing Platforms
Moderator: Brian Soliday, Voxel Maps
Room: Denver Ballrooms 1&2

The Case for an Earth Archive
Christopher Fisher, The Earth Archive/Colorado State University

Automating Infrastructure Risk with Satellite Data, Artificial Intelligence and Machine Learning
Anthony D. Palizzi, LiveEO

Introducing the Computational Reconfigurable Imaging Spectrometer (CRISP)
Milstein, Adam B., MIT Lincoln Laboratory

Evaluating SAR Radiometric Terrain Correction Solutions: Optimal products for applied user
Africa Flores-Anderson, NASA SERVIR

Technical Session 6-5: AmericaView Demonstrates the Power of Landsat Imagery
Moderator: Russell G. Congalton, University of New Hampshire
Room: Denver Ballroom 3

Making the past relevant through the Landsat Time-Series and LandTrendr
Peder Nelson, Oregon State University

ORIGIN: Water Quality Monitoring Across Multiple States using Remotely Sensed Data
Anita Simic Milas, Bowling Green State University

Mapping Forest Height over Cloud Persistent Mountainous Areas with Landsat, Google Earth Engine, Airborne Lidar, and Machine Learning
Qi Chen, University of Hawaii at Manoa

Review of undergraduate remote sensing research activities in the no-cost Landsat data era
Ramesh Sivanpillai, University of Wyoming

Missing pixel reconstruction using Source-Augmented Partial Convolution: application in Landsat 8 land surface temperature image patches
Maosi Chen, Colorado State University

Using Landsat Imagery to Monitor Forest Change in New Hampshire: 1996-2018
Russell G. Congalton, University of New Hampshire

KansasView Online Remote Sensing Tools for Data Exploration and Visualization
Dana Peterson, University of Kansas, Kansas Biological Survey

Technical Session 6-6: Forest Inventory and Condition Mapping
Moderator: Birgit Peterson, USGS
Room: Denver Ballroom 4

Probabilistic Forest Type Predictions Using FIA Field Data, Landsat-Derived GLAD Phenological Metrics, and Digital Terrain Variables
Aaron E. Maxwell, West Virginia University

Assessing the utility of NAIP digital aerial photogrammetric point clouds for estimating pine canopy height in the southeastern United States
Alison Ritz, Virginia Polytechnic Institute and State University, Forest Resources and Environmental Conservation

A comparison of methods for wall-to-wall biomass mapping in Mexico using Landsat
Nadine Drigo, Boston University

Integrating imagery, point clouds, and surface models in an object-based approach for mapping forest canopy extent and structure
Keith C. Pelletier, University of Minnesota

Diameter Estimation of Eucalyptus Plantations in Southern Brazil using GEDI data and Support Vector Regression
Benjamin Mill, Virginia Tech

Developing remote sensing method for mapping community tree canopy in Nebraska
Hugh Ellerman, University of Nebraska - Lincoln

Technical Session 6-7: Advancing Earth Analytics on the Cloud using STAC
Moderator:
Room: Denver Ballrooms 5&6

Featured Session: Future international collaboration between the US & other international space agency programs
Moderator: Tim Stryker, Steering Committee convener
Room: Colorado Ballroom F-J
Leading Earth observations executives from NOAA, NASA, and USGS will report on their current and planned future Earth-observing (EO) satellite capabilities, and the anticipated benefits of these systems to U.S. and global users. These capabilities will include discussions of commercial and international partnerships, and opportunities to advance a more seamless Earth observation "system of systems". Much like the Tuesday afternoon international plenary session, this session will be informed by a Monday workshop on international collaboration, which will consider key programmatic and technical topics for enhanced land-imaging collaboration.
Presenters:

- Kevin Gallagher, Associate Director, Core Science Systems, USGS
- Karen St-Germain, Director, Earth Science Division, NASA
- Steve Volz, Assistant Administrator for Satellite and Information Services, NOAA

Technical Session #7

1:30 – 3:00 pm

Technical Session 7-1: New Applications Using Declassified Defense and Intelligence Community Remote Sensing Data and Technology
Moderator: Dan Opstal, USGS
Room: Penrose Ballroom 1

Global Fiducials Library (GFL)
Steve Smith, USGS

Historic Imagery Availability Working Group (HIAWG)
Jon Griffith, USGS

Environmental Security Working Group (ESWG)
Jordan Beauregard, USGS

Tasking/International Charter Update
Dan Opstal, USGS

Satisfying U.S. Government Hi-Resolution Imagery Needs
Peter Rinkleff, USGS

The Global Fiducials Library
Steve Smith, USGS

Providing Research-Ready Declassified Historical Imagery
Jon Griffith, DOI / USGS / NCAC

Technical Session 7-2: Fire Detection, Monitoring, and Remediation
Moderator: Sanath Sathyachandran, USGS
Room: Penrose Ballroom 2

Leveraging Consumer Drones for Wildland Fire Monitoring: Validating The Positional And Thematic Accuracy of Georeferenced Small UAS Motion Imagery
Loren Russell, Pennsylvania State University

Contemporary (1984-2020) fire history metrics for the conterminous United States
Melanie Vanderhoof, GECSC, U.S. Geological Survey*Impact of wildfire on vegetation water use using*

Evapotranspiration data from OpenET
Yun Yang, University of Maryland College Park

Burn Severity Portal
Seth Bogle, USDA Forest Service, Geospatial

Technology and Applications Center (GTAC) Effect of burn severity on vegetation succession: a case study of 1983 Rosie Creek Fire, interior Alaska
Anushree Badola, Geophysical Institute, University of Alaska Fairbanks, Fairbanks, AK 99775, USA

Synthesizing wildfire monitoring objectives and information needs using a whole-system conceptual framework
Morgan A. Crowley, McGill University

Spaceborne mapping of fire-retardant drops using machine learning techniques
Troy Saltiel, Pacific Northwest National Lab

Technical Session 7-3: Monitoring Spatial Patterns and Causes of Deforestation and Degradation
Moderator: Africa Ixmucane Flores-Anderson, McGill University / NASA-SERVIR
Room: Mattie Silks

Multi-scalar Time Series of Earth Observations for Assessing Human-Environment Impacts of Mining in Ghana
Amanda D. Aragon, University of Georgia - Center for Geospatial Research

Mapping causal agents of forest disturbance in high latitudes
Yingtong Zhang, Boston University

Monitoring and analyzing shifting cultivation in Laos
Shijuan Chen, Earth and Environment, Boston University, USA

Spatial and Temporal Availability of Cloud-free Optical Observations in the Tropics to Monitor Deforestation
Africa Ixmucane Flores-Anderson, McGill University / NASA-SERVIR

Temporal transferability of remote sensing models for large area monitoring of tree cover
Steven Filippelli, Colorado State University

Technical Session 7-4: Detecting and Monitoring Land Cover and Land Use Change, Part 1
Moderator: Zhe Zhu, University of Connecticut
Room: Denver Ballroom 1&2

Widespread Changes in 21st Century Vegetation Cover in Argentina, Paraguay, and Uruguay
Radost Stanimirova, Department of Earth and Environment, Boston University, Boston, MA 02215

Cross-Comparison of Carbon Emission Estimates based on variable Land Use Land Cover Changes within SERVIR Focus Regions
Christine Evans, Earth System Science Center, The University of Alabama Huntsville, SERVIR Science Coordination Office

A Multifaceted View of Conterminous US Land Change
Zhe Zhu, University of Connecticut
Classifying Small-Town Built Environments using Object-Based Image Analysis (GEOBIA) in the Beqaa Valley, Lebanon
Lynn Abdouni, Clemson University

A High-Resolution National Land Cover Census
Kyle Barnes, NOAA Office for Coastal Management

Technical Session 7-5: AmericaView and StateView Educational Outreach Empowers Earth Observation Education
Moderator: Rebecca L Dodge, MSU Texas
Room: Denver Ballroom 3

Rebecca L Dodge
Amy Logan
Tom Muelle
Karen Babyak
Amy Logan
Tracy DeLiberty
Mary Schorse
John McGee
Brad Shellito

Technical Session 7-6: Forest Growth and Ecosystem Productivity Estimation
Moderator:
Room: Denver Ballroom 4

Remotely quantified forest functional traits and diversity as predictors of gross primary productivity in forested ecosystems
Paige Tatum Williams, Virginia Tech

Discrimination of Forest Regrowth from Conversion to Other Land Uses Using Remotely Sensed Products from Landsat and NAIP
Randy Wynne, Virginia Tech

Remote sensing estimation of foliar traits: Effect of leaf traits expression and scaling approach on model performance and prediction accuracy
Tawanda W Gara, School of Forest Resources, University of Maine

Green University: Using Google Earth on Mobile for Tree Survey
Yaowaret Jantakat, Rajamangala University of Technology ISAN

Technical Session 7-7: Advancing Nighttime Imaging Technology
Moderator: Mary Pagnutti, I2R
Room: Denver Ballroom 5&6

The VIIRS Day-Night Band (DNB) and other nighttime satellite imagers can capture unprecedented low-light images of Earth. However, the lack of accurate nighttime surface retrievals limits this imagery's use. Furthermore, the interpretation of measurements from point or extended sources depends on sensor characteristics, calibration, and the source's spatial and spectral properties, as well as knowledge of atmospheric properties, which are often poorly understood. To address these challenges, ground-based sources, such as Terra Vega, a portable NIST-traceable point source, and Angstrom, a star photometer to measure the nighttime aerosols, could potentially provide widespread, easily deployable, cost-effective, and accurate radiometric calibration for night-imaging satellites. In this

context, our panel will present the current state of quantifying nighttime radiometric calibration and atmospheric correction, as well as potential future developments.
Our panel will explore the following questions:

- What is the importance of nighttime radiometry for earth observations?
- What are the benefits of improving radiometry and atmospheric correction?
- What emerging techniques can we use to improve surface retrievals?

Speaker presentations will be followed by a 15-minute panel discussion, addressing audience comments and questions on nighttime imaging.

Nighttime Light Surface Radiance Analysis Ready Data
Brian Killough, NASA

The Day/Night Band: Lighting a Pathway to Nocturnal Discovery
Steven Miller, CSU

NASA's Black Marble Nighttime Light Product Suite
Zhuosen Wang, UMD

A New Framework for Research on Recurrent Acute Disasters
Miguel O. Román, Leidos

Technologies that Advance and Improve Night Imaging Products through Vicarious
Mary Pagnutti/ Robert Ryan, I2R

Panel Session: Qualifying and Quantifying Earth Observation Value
Room: Colorado Ballroom F-J

Communities across the globe must make decisions to deal with the effects of current and future climate and environmental change, create sustainable development, reduce the risk from natural disasters, and much more. These decisions occur every day across different levels of governance and different sectors. Earth observation (EO) data and information are essential in this decision making process. This information not only enhances the collective understanding of our natural systems, but also reveals interactions between natural and human systems that enable the modeling and prediction of human impacts on the environment in support of policy development and decision making. Socioeconomic assessments are used to study the benefits of this information, and identify future EO infrastructure needs.

This session explores and highlights the broad range of approaches and perspectives for measuring the socioeconomic impacts of EO through a diverse and inclusive interdisciplinary panel.

Panelists:

- Adrianna Duarte, Nebraska Indian Community College / Dakota and Omaha Tribes
- Becky Chaplin-Kramer, Principle Research Scientist, University of Minnesota / Senior Fellow, Stanford University / Executive Director, SPRING
- Bronya Cuddy Gregg, Manager, Strategic Planning – Canadian Space Agency
- Maree Wilson, Branch Head, Digital Earth Branch | Space Division – Geoscience Australia
- Nikki Tulley, University of Arizona / Navajo Nation

Technical Session #8 **3:30 – 5:00 pm**

Technical Session 8-1: Landsat-Derived Global Rainfed and Irrigated-Cropland Product at 30m (LGRIP30) for World's Food and Water Security in the twenty-first Century
Moderator: Prasad Thenkabail, USGS
Room: Penrose Ballroom 1

Landsat-derived Global Rainfed and Irrigated-Cropland Product at 30m (LGRIP30) for World's Food and Water Security in the twenty-first Century

Prasad S. Thenkabail, United States Geological Survey (USGS)

Landsat-derived Global Rainfed and Irrigated-Cropland Product at 30m for the Conterminous United States (CONUS): Study of irrigated and rainfed areas at the country, state, and county level
Pardhasaradhi Teluguntla, Bay Area Environmental Research Institute (BAERI)@USGS

Automated cropland fallow algorithm (ACFA) for the Great Plains of United States for 2010-2021 using decision-tree algorithms on the Google Earth Engine (GEE) cloud
Adam J. Oliphant, Western Geographic Science Center, USGS, Flagstaff AZ

Global Cropland Products from 1-km to 30-m in support of world's food and water security in the twenty-first century: An overview of multiple data products, access, impact, and future plans
Prasad S. Thenkabail, United States Geological Survey (USGS)

Technical Session 8-2: Floods, Weather Events and Other Hazards
Moderator: Birgit Peterson, USGS
Room: Penrose Ballroom 2

Analysis of Brine Spill Impacted Lands of Western North Dakota Using Landsat 7 ETM+ and Landsat 8 OLI Imagery
Gregory Vandeberg, Department of Geography & GISc., University of North Dakota and North DakotaView

Dissemination of Global Flood Severity and Surface Water Mapping using Remote Sensing Data to Global Stakeholders
Margaret T. Glasscoe, University of Alabama in Huntsville

Automated Pipeline for Satellite Imagery from Tidal Alert Monitoring
Erik Friesen, Planet

Tagging Flood Data
Jeffrey Ganuza, USGS

Near-real-time Agricultural Flood Monitoring and Crop Damage Assessment under Google Earth Engine
Zhe Li, United States Department of Agriculture, National Agricultural Statistics Service

Examining spatial and temporal surface water inundation patterns in California, USA croplands using satellite imagery
Britt Smith, U.S. Geological Survey

Technical Session 8-3: Forest Health and Invasive Species Monitoring
Moderator:
Room: Mattie Silks

Multi-Source Mapping of Forest Susceptibility to Spruce Budworm Defoliation Based on Stand Age and Composition across a Complex Landscape in Maine, USA
Rajeev Bhattarai, The University of Maine

Mapping dry forest in two regions of Colombia using Landsat time series
Paulo Arévalo, Boston University. Department of Earth and Environment.

Understanding the climate drivers of forest health and productivity in Alaska using Time-series analysis (2000-2021)
Sumana Sahoo, University of Alaska, Fairbanks

Predicting Forest Decline in Rhode Island with Remote Sensing and GIS
Jason Parent, University of Rhode Island

The Sentinel GreenReport using Google Earth Engine
Chen Liang, University of Kansas

Detecting Eastern Redcedar encroachment in Kansas using Sentinel-2 imagery and a machine learning model
Chen Liang, University of Kansas

Technical Session 8-4: Detecting and Monitoring Land Cover and Land Use Change, Part 2
Moderator: Nancy HF French, Michigan Technological University
Room: Denver Ballroom 1&2

Continuous change-detection of wetlands dynamics using two decades of Landsat legacy data
Lindi J. Quackenbush, Professor and Chair at SUNY-ESF

Landsat-based mapping of bi-national wetlands and land cover changes for the Great Lakes Basin
Nancy HF French, Michigan Technological University

A Global Training Dataset of Land Cover from 1985 to 2019 for the Global Land Cover Estimation (GLanCE) Project
Radost Stanimirova, Department of Earth and Environment, Boston University, Boston, MA 02215

Improving the temporal consistency of global land cover and land cover change maps across multiple decades using Landsat time series
Paulo Arévalo, Boston University. Department of Earth and Environment.

Thematic Accuracy Assessment in the Time of Landsat MSS
Russell G. Congalton, University of New Hampshire

Evaluation of Landsat Image Compositing Algorithms
Shi Qiu, University of Connecticut

Technical Session 8-5: "Rising Waters"- A Summer Workshop Providing an Inside Look into the World of Imagery for High School Students
Moderator: Rebecca L. Dodge, MSU Texas
Room: Denver Ballroom 3

Recruiting Geoscience Majors through Combined Service Learning and Undergraduate Student Research Projects
Brent Yantis

Exposing High School Students to Geoscience Concepts through Local Environmental Challenges
Rebecca L. Dodge

Assessing the Results of the First GEO SERVICE Workshops
Heather Stone

Undergraduate Mentors' Perspectives on Connecting with Potential Geoscience Majors
Courtney A. Poirier

Technical Session 8-6: Using Earth Observations for Marine and Freshwater Applications Research
Moderator:
Room: Denver Ballroom 4

Fore-C: A new coral disease forecasting product
Megan J Donahue, Hawaii Institute of Marine Biology

Remote sensing, population viability analysis, and the next generation of native trout conservation
Daniel Dauwalter, Trout Unlimited

Dynamic, satellite-derived seascapes: a global framework for observing and understanding biodiversity patterns in ocean ecosystems
Maria T. Kavanaugh, College of Earth, Ocean, and Atmospheric Sciences, Oregon State University, Corvallis OR, 97331

Detection and Characterization of coastal tidal wetland Change (DECODE) – An Operational Model for Monitoring Change and Targeting Coastal Wetland Management Actions
Xiucheng Yang, University of Connecticut

Hot spots in the ice: using satellites to reveal relationships between marine ecosystems and sea ice in coastal Antarctica
Alice Duvivier, National Center for Atmospheric Research

Multiscale Spectroscopy of Intertidal Biofilm: Modeling Quantity, Quality and Composition
Kristin Byrd, USGS Western Geographic Science Center

Predicting the Long-Distance Dispersal of Ichthyoplankton in the Intra-Americas Sea: A Data-Assimilative Decision Support Tool for Effective Living Marine Resource Management
Ruoying He, North Carolina State University / Fathom Science

Technical Session 8-7: Developing Capacity to Apply Earth Observations for Global Societal Benefit
Moderator: Maury Estes
Room: Denver Ballroom 5&6

Monitoring Container Ship Backlog at the Los Angeles Port in Light of Supply-Chain Challenges using VIIRS, Landsat, and Sentinel 2 images
Yan Bai, University of Maryland, CISESS

Air quality dynamics estimation during COVID-19 travel restrictions using Goggle Earth Engine: A case of Johannesburg, South Africa
Emmanuel Fundisi , Department of Geography, Environmental Management and Energy Studies, University of Johannesburg, South Africa

Application of Earth observation data for improved environmental and disaster monitoring in Central America
Lauren Carey, University of Alabama in Huntsville (UAH)

Poster Session- Exhibit Hall

Poster presenters will be available to discuss their work during the Exhibitors' Reception on Tuesday, October 25 from 5:00–7:00 pm.

AEROKATS and ROVER Education Network (AREN) … a Pathway for Remote Sensing Engagement
Kay Rufty, Blackswift Technologies LLC

Age-height relationships for pines in the Southeastern U.S using ICESat-2 and Landsat products
Sonia Sharma Banjade, Virginia Polytechnic Institute and State University

AlabamaView- Creating Environmental Awareness Among Alabama Citizens Using Interdisciplinary Sciences and Remote Sensing
Pooja P, Department for Geosciences, Auburn University

Compact Hyperspectral Prism Spectrometer (CHPS) Airborne Science Demonstrations for Sustainable Land Imaging
Zachary Rovig, Ball Aerospace

Earth Observation Capabilities: A database of civil and commercial missions
Kimberly Casey, USGS

Effect of establishment fertilization on leaf area development of loblolly pine plantation stands in the southeastern United States
Matthew N. House, Virginia Tech Forest Resources and Environmental Conservation

Identification of Potential Sites for a Multi-Purpose Dam Using a Dam Suitability Stream Model
Qazi Muhammad Yasir, School of Geographical Sciences, Northeast Normal University, Changchun, China

Land Change Monitoring, Assessment, and Projection (LCMAP): E-Learning Materials to Connect Users to Over Three Decades of Landsat-derived Land Cover Science Products
Cole Krehbiel, KBR, Contractor to USGS EROS Center

Long-Term USGS Landsat Science Products
Michelle Bouchard, KBR, Contractor to USGS EROS Center

Mapping the 2013 Galena ice-jam flood using Landsat
Soumitra Sakhalkar, University of Alaska Fairbanks

Missing pixel reconstruction using Source-Augmented Partial Convolution
Maosi Chen, ColoradoView; USDA UV-B Monitoring and Research Program, Natural Resource Ecology Lab, Colorado State University

Modeling Efforts to Support Requirements for the Sustainable Land Imaging Program
Rehman Eon, Rochester Institute of Technology

Pragmatically Mapping Phragmites with UAS: Comparing Invasive Species Classification Results from RGB Imagery, Multispectral Imagery, and Spectral Profiles
Alexandra D. Evans, Woods Hole Oceanographic Institution

Remote Data Collection for Predicting Soil Organic Matter in Coastal Wetlands
Rajneesh Sharma, Department of Geography, University of Georgia-Athens

Remote monitoring of power grid activity
Genady Pilyavsky, STR

The potential of using active and passive remote sensing to detect frequent harvesting of alfalfa
Yuting Zhou, Department of Geography, Oklahoma State University-Stillwater

Using Imagery to Evaluate the Impact of the Bonnet Carre Spillway on the Mississippi Sound
Luke Campbell, Mississippi Mineral Resources Institute, University of Mississippi

Using Imagery to Evaluate the Impact of the Bonnet Carre Spillway on the Mississippi Sound
Luke Campbell, Mississippi Mineral Resources Institute, University of Mississippi

Using Remote Sensing to Meet 4th Grade Education Standards in Michigan
Michael Battaglia, Michigan Technological University

Weather driven scenarios base early prediction of exotic annual grass in rangelands of the western United States
Devendra Dahal, KBR, Contractor to USGS EROS Center

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