Pecora 21/ISRSE 38 Concurrent Sessions October 7, 2019

Technical Session #1 – 10:00am-11:30am

Session 1-1

Land imaging capabilities and user needs Moderator: Zhuoting Wu, U.S. Geological Survey

10:00 am to 11:30 am- Room Harborside E

Sustainable Land Imaging Landsat 10 User Needs

Zhuoting Wu, U.S. Geological Survey

A Land Imaging Architecture Scorecard to Support Decision-Making

Carolyn Vadnais, Integrity Applications Incorporated Michael Babcock, Erin Dale, Ellen Wengert, David Bludis, Emily Crisp, Gregory I. Snyder, and Zhuoting Wu

What is the socioeconomic value of using Landsat imagery to improve post-wildfire response methods?

Bethany Mabee, *Resources for the Future* Richard Bernknopf, Yusuke Kuwayama, Reily Gibson, T.J. Clifford, Brad Quayle, Terry Hardy, Justin Epting, and David Goodrich

Earth Observing System Capabilities

Greg Stensaas, U.S. Geological Survey

Decision-Support for Land Imaging Mission Engagement

Greg Snyder, U.S. Geological Survey

Interagency coordination on satellite needs

Justin Goldstein, National Oceanic and Atmospheric Administration Joseph Conran, David Helms, Louis Cantrell, Aaron Pratt, and Sabrina Taijeron

Trends in Global Land Observation Capacity from Civilian Earth Observation Satellites

Jon Christopherson, *KBRwyle*

Assessing the Impact of Land Imaging

Emily Sylak-Glassman, National Aeronautics and Space Administration, Jason Gallo, Science and Technology Policy Institute

Session 1-2

Challenges and Opportunities for Fulfilling Global Multilateral Agreements

Moderator: Ghassem Asrar, Pacific Northwest National Laboratory, University of Maryland

10:00 am to 11:30 am- Room Harborside B

Panelists include: Climate Grand Science Challenges and Opportunities: A Socioeconomic Perspective James Edmond and Leon Clarke, *Joint Global Change Research Institute and University of Maryland, College Park*

U.S. National Climate Assessment-4: An Overview

David Reidmiller, U.S. Global Change Research Program (USGCRP) Office and Virginia Burkett, U.S. Geological Survey

Global Environmental Outlook-6: An Overview

Pierre Boileau, United Nations Environment Programme

Contributions of Earth Observations to Sustainable Development Goals and Nationally Determined Contributions Guo Huadong, *China*

Sea Level Budget Closure: Results from the ESA Climate Change Initiative Mark Doherty, *ESA*

Session 1-3

Advances in Land Change Detection and Attribution Moderator: Jeffrey Cardille, *McGill University*

10:00 am to 11:30 am- Room Laurel

Synthesizing Open-access Data for a Continuously Updating Land Use / Land Cover Product Across Large Areas with BULC (Bayesian Updating of Land Cover) Jeffrey Cardille, *McGill University*

Introducing automatic satellite image processing into land cover mapping by photointerpretation of airborne data

Mario Caetano, *Direção-Geral do Território* Hugo Costa, Daria Lüdtke, Inês Girão, Filipe Marcelino, and Mário Caetano

Using SOM neural network to improve land use and cover training samples from satellite image time series Michelle Picoli, *INPE* Karine Reis Ferreira, Lorena Alves Santos, and Gilberto Camara

Optimum Three Layers for Change Detection Using Landsat Images

Essam Hamza, Military Technical College

Refinement of historical Cropland Data Layer based on deep learning approach

Chen Zhang, George Mason University Zhengwei Yang, Liping Di, and Li Lin

Session 1-4

Mapping and Monitoring Surface Change: Landslides and Subsistence

Moderator: Sharad Kumar Gupta, Indian Institute of Technology Mandi

10:00 am to 11:30 am- Room Essex

Data Imbalance in Landslide Susceptibility Zonation: Under-sampling for Class-Imbalance Learning

Sharad Kumar Gupta, *Indian Institute of Technology Mandi* Muskan Jhunjhunwalla and Dericks Shukla

Scale dependency of causative factors used in preparation of landslide susceptibility zonation

Sharad Kumar Gupta, *Indian Institute of Technology Mandi* Dericks Shukla

Analysis of Landslide Reactivation using Satellite Data: A Case Study of Kotrupi Landslide, Mandi, Himachal Pradesh, India

Sharad Kumar Gupta, *Indian Institute of Technology Mandi* Nitu Singh and Dericks Shukla

Monitoring subsidence for Arctic infrastructures by SAR interferometry

Todd Burns, *University of Alaska Anchorage* Caixia Wang, Zhaohui Joey Yang, and Kannon Lee

Application of Sentinel 1 in deformation monitoring for Suswa area, Kenya

Mercy Mwaniki, *Jomo Kenyatta University of Agriculture and Technology* Benson Kenduiywo and James Muthoka

Session 1-5

Crop Type Monitoring Initiatives Moderator: Rick Mueller, USDA National Agricultural Statistics Service

10:00 am to 11:30 am- Room Harborside A

30+ Years of Cropland Mapping in South America using Landsat Data Viviana Zalles, *University of Maryland* Matthew Hansen and Peter Potapov

An Update on the Annual National Cropland Data Layer Program

Rick Mueller, USDA National Agricultural Statistics Service

Mapping Crop Types with dense time series of L8 and GF Satellite Data

Fan Jinlong, National Satellite Meteorological Center

The spatio-temporal distribution characteristics of sugarcane planting area and yield in Guangxi, China

Shun Hu, State Key Laboratory of Water Resources and Hydropower Engineering Sciences, Wuhan University Linglin Zeng

Twelve Years Experiences in providing LULC and Crop Type Maps for an Interdisciplinary Research Project, the CRC/TRR32 Patterns in Soil-Vegetation-Atmosphere-Systems (2007 - 2018) Georg Bareth, University of Cologne

Technical Session #2 – 1:00pm-2:30pm

Session 2-1

Space Agencies Outlook Moderator: Peter Schaadt, *DLR German Space Administration*

10:00 am to 11:30 am- Room Harborside C

Copernicus - Europe's eyes on Earth – Sustainable and Continuous Monitoring of our Environment Poter Proger European Commission

Peter Breger, European Commission

NASA Earth Science Division - Path to the Future Sandra Cauffman, *National Aeronautics and Space Administration*

The German Earth Observation Program Peter Schaadt, *DLR German Space Administration*

An Ambitious European EO Space Programme for Current and Future Societal Challenges Ivan Petiteville, *ESA*

Canada's Future Space-based EO Architecture Eric Laliberte, *Canadian Space Agency* Marie-Josee Bourassa

Space Program and Scientific Activities of Korea Aerospace Research Institute Heeseob Kim, *Korea Aerospace Research Institute* Sang-Cherl Lee and Hyo-Suk Lim

Session 2-2

Communicating Science Across the Earth Observation Life Cycle Moderator: Ana Prados, *University of Maryland Baltimore County and NASA GSFC*

10:00 am to 11:30 am- Room Harborside B

Tips for Remote Sensing Scientists: How to Talk to Decision Makers Ana Prados, *University of Maryland Baltimore County and NASA GSFC* Elizabeth Hook

Stories and services: Crafting messages and methods for communicating Earth science Kevin Ward, *Science Systems and Applications, Inc./NASA*

Going beyond data to data-based answers to users' questions in the U.S. Climate Resilience Toolkit David Herring, NOAA Climate Program Office

Knowledge Sharing and Communication between Remote Sensing Scientists, Non-experts and Decision Makers: Delivering Trusted Data in a Real-Time Secure Collaborative Environment Dave Jones, *StormCenter Communications*

Session 2-3

Processing Strategies for Big Data Moderator: Peter Baumann, *Jacobs University, Bremen, Germany*

10:00 am to 11:30 am- Room Essex

Understanding Big Data through Space and Time: How Standards Help Peter Baumann, *Jacobs University, Bremen, Germany*

Prototyping cloud architecture for operational vegetation monitoring: the Global Agricultural Monitoring System

Michael Humber, *University of Maryland* John Keniston and Alyssa Whitcraft

Analysis-Ready Data: the New Challenge for Earth Service Providers Peter Baumann, *Jacobs University, Bremen, Germany*

A workflow to Harmonize Deep Archives of heterogeneous optical multi-mission earthobservation imagery

Wolfgang Luck, PCI Geomatics

USGS 3DEP Lidar Delivery, Visualization and Within-Cloud Processing Strategies

Richard Brown, U.S. Geological Survey

Session 2-4

Understanding Requirements and Improving Results

Moderator: Bobbi Lenczowski, AmericaView

10:00 am to 11:30 am- Room Harborside E

Progress on the NOAA Satellite Observing System Architecture Study and the Way-Ahead Karen St. Germain, *National Oceanic and Atmospheric Administration* Frank Gallagher, Mark Maier, and Phillip Jasper

Users, Uses, and Value of Landsat Satellite Imagery: 2018 User Survey

Crista Straub, *Colorado State University* Stephen Koontz and John Loomis

Landsat Advisory Group Assessment of Landsat Data Cost-Sharing Models

Frank Avila and Bobbi Lenczowski, National Geospatial Advisory Committee/Landsat Advisory Group

Using Giovanni to Enhance Citizen Science Observations

James Acker, National Aeronautics and Space Administration William Teng, Arif Albayrak, Carlee Loeser, Jennifer Wei, and David Meyer

Validating national-scale remote sensing models using crowdsourced observations (Jill Derwin)

Session 2-5

Seasonal Dynamics in Agricultural and Forestry Systems Moderator: Feng Gao, *Hydrology and Remote Sensing Laboratory, USDA-ARS*

10:00 am to 11:30 am- Room Laurel

Spatiotemporally Explicit Forest Phenoclimatology in Northeastern Minnesota, USA Matthew Garcia, *University of Wisconsin-Madison* Brian Sturtevant and Philip Townsend

Near real-time mapping of crop emergence using frequent satellite remote sensing imagery Feng Gao, *Hydrology and Remote Sensing Laboratory, USDA-ARS* Martha Anderson, Arnon Karnieli, William Kustas, and Craig Daughtry

Use of VIIRS to Monitor Sub-Annual Surface Type Dynamics Driven by Seasonal and Shorter Term Changes in Snow Cover and Surface Inundation Chengquan Huang, *University of Maryland*

The Arctic Boreal Vulnerability Experiment (ABoVE) Airborne Campaign

Elizabeth Hoy, *National Aeronautics and Space Administration* Peter Griffith and Charles Miller

Session 2-6

Urban Climate Impact Investigations Using Remote Sensing Moderator: Sunhui Sim, *University of North Alabama*

10:00 am to 11:30 am- Room Harborside A

Heat Vulnerability Index utilizing Landsat derived temperature-NDVI and socio-economic data in Nashville and Portland, USA Sunhui Sim, University of North Alabama

Assessing population sensitivity to urban air pollution using Google Trends and remote sensing datasets

Prakhar Misra, *Institute of Industrial Science, The University of Tokyo* Wataru Takeuchi

City-level analysis of anthropogenic CO2 emissions using OCO-2 observations from 2014 to 2018

Peng Fu, University of Illinois

Thermal Remote Sensing Of Urban Climates In South Africa Through The Mono-Window Algorithm

Adeline Ngie, North West University, Vaal Triangle Campus, South Africa

Technical Session #3 – 3:30pm-5:00pm

Session 3-1

Using Remotely Sensed Data to Map Forest Structure and Attributes Moderator: Lorraine Tighe, *esri*

3:30 pm to 5:00 pm- Room Harborside B

Annual continuous fields of woody vegetation structure in the Lower Mekong region from 2000-2017 Landsat time-series

Peter Potapov, University of Maryland

Alexandra Tyukavina, Svetlana Turubanova, Matthew Hansen, Nguyen Hanh Quyen, Farrukh Chishtie, Khun San Aung, Biplov Bhandari, David Saah, Yamile Talero, Andres Hernandez-Serna, and Peeranan Towashiraporn

The challenges of scaling-up: Monitoring fractional woody vegetation cover changes in the arid savannahs of Namibia with LiDAR training data, machine learning and SAR Konrad Wessels, *George Mason University*

Frans van den Bergh, Renaud Mathieu, Nichola Knox, Russell Main, Laven Naidoo, and Karen Steenkamp

Airborne lidar sampling strategies to enhance forest aboveground biomass estimation from Landsat imagery

Lindi Quackenbush, *State University of New York College of Environmental Science and Forestry* Siqi Li

Developing a refined fine resolution forest site productivity map by linking biomass growth index to remotely sensed variables

Parinaz Rahimzadeh-Bajgiran, School of Forest Resources, University of Maine Christopher Hennigar and Aaron Weiskittel

Unmanned Aerial Systems (UAS) as a Tool for Investigating Edge Influences in New Hampshire Forests

Heather Grybas, *University of New Hampshire* Russell Congalton

Session 3-2

The Next Generation of the Landsat Archive

Moderator: Christopher Barnes, KBRwyle

3:30 pm to 5:00 pm- Room Essex

USGS Landsat Archive: Revolutionary Enhancements

Christopher Barnes, *KBRwyle*

Landsat Collection 2 Chris Engebretson, U.S. Geological Survey

Cloud Migration for Landsat

Peter Doucette, U.S. Geological Survey Kristi Kline, Steven Labahn, Thomas Sohre, and Stephen Zahn

Landsat Legacy with Landsat 9

Brian Sauer, U.S. Geological Survey

Landsat Science Products Overview Michelle Bouchard, *KBRwyle*

Landsat Provisional Surface Temperature Product Saeed Arab, *KBRwyle*

Session 3-3

Global Hyperspectral Imaging Spectral-library of Agricultural-Crops (GHISA) in Support of NASA's Surface Biology and Geology (SBG) mission

Moderator: Prasad Thenkabail, U.S. Geological Survey

3:30 pm to 5:00 pm- Room Harborside E

Global Hyperspectral Imaging Spectral-library of Agricultural-Crops (GHISA) in Support of NASA's Surface Biology and Geology (SBG) mission

Prasad Thenkabail, U.S. Geological Survey Itiya Aneece

Hyperspectral Remote Sensing of Agriculture and Vegetation: 50-Years of Knowledge Advances

Prasad Thenkabail, U.S. Geological Survey John Lyon and Alfredo Huete

Earth Observing-1 Hyperion Hyperspectral Imaging Spectroscopy Data in Advancing **Classification Accuracies of the Leading World Agricultural Crops through Cloud Computing on the Google Earth Engine**

Itiya Aneece, U.S. Geological Survey Prasad Thenkabail, Terrance Slonecker, and Alfredo Huete

Spaceborne Hyperspectral EO-1 Hyperion data pre-processing Methods, approaches, and algorithms on the Cloud

Itiya Aneece, U.S. Geological Survey Prasad Thenkabail, Terrance Slonecker, John Lyon, and Alfredo Huete

Session 3-4

Public Health and Safety Topics Moderator: Amanda Aragon, University of Georgia

3:30 pm to 5:00 pm- Room Laurel

Monitoring for Village Burnings with SmallSats; a case-study in Myanmar Andrew Marx, University of Southern California

Spatial Analysis Of The 2018 Cholera Outbreak In Harare, Zimbabwe Using Humanitarian OPENSTREETMAP

Walter Musakwa, University of Johannesburg **Emmanuel Fundisi**

Geospatial Evaluation of Former Atlanta Housing Project Sites as Socio-Ecological Nodes Amanda Aragon, University of Georgia

Cassandra Johnson Gaither, Marguerite Madden, and Sergio Bernardes

Global health-care facilities their monitoring and adequacy to cope with extreme environmental emergencies

Andreas Skouloudis, Joint Research Centre

Understanding Variations of Atmospheric CH4 Concentration at Zoige Wetland, China Using Multi-temporal AIRS Datasets and BFAST Algorithm

Yong Wang, *East Carolina University* Yuanyuan Yang

Session 3-5

Space Agencies Outlook Moderator: Peter Schaadt, *DLR German Space Administration*

3:30 pm to 5:00 pm- Room Harborside C

The Future of International Collaboration with the Continuing Evolution of a Global Integrated Observing System

Stephen Volz, National Oceanic and Atmospheric Andministration

The USGS Outlook on Earth Observation

Tim Newman, U.S. Geological Survey

China's Earth Observation Progress and Its Impact on SDGs

Huadong Guo, Insitute of Remote Sensing and Digital Earth, Chinese Academy of Sciences

CNES, French Space Agency Earth Observation Program

Selma Cherchali, CNES, French Space Agency

How COSMO-SkyMed and PRISMA can help decisions: the Italian experience

Laura Candela, *Italian Space Agency* Fabrizio Battazza and Alessandro Coletta

The Emerging Role of Nanosatellites in South Africa

Paida Mangara, South African National Space Agency

Session 3-6

How no-cost Landsat data is reshaping college level remote sensing courses (AmericaView Special Session)

Moderator: Ramesh Sivanpillai, University of Wyoming

3:30 pm to 5:00 pm- Room Harborside A

Integrating Change Detection into Undergraduate Geomorphology and Natural Hazards Courses and the Impact of Landsat's Free Imagery Archives

Rebecca Dodge, *TexasView*

Educating Science and Art with Landsat Imagery at UWG

Jeong Seong, University of West Georgia

Reaping the Benefits of No-Cost Imagery for Geospatial Education

Russell Congalton, University of New Hampshire

Impact of no-cost Landsat imagery on courses at Montana State University: Increased relevance, realistic experiences, and publications

Rick Lawrence, Montana State University

Landsat Archived Data for Time Series Salt Marsh Change Analysis along the mid-Atlantic Coast

Y.Q. Wang, *University of Rhode Island* Anthony Campbell

No Cost Landsat Imagery Supports Student eBook Learning

James Campbell, *Virginia Tech* Tammy Parece and John McGee

No-cost Landsat data redefines student research projects in applied remote sensing classes at UW

Ramesh Sivanpillai, University of Wyoming

Advancing Undergraduate Geospatial Science Education Using No Cost Landsat As A Base To Build Story Map Applications While Enhancing The Remote Sensing Art Gallery EXHIBIT Brent Yantis, University of Louisiana at Lafavette

Utilization of Free Landsat Imagery in Remote Sensing Teaching, Research and Outreach at the University of North Georgia

J.B. Sharma, University of North Georgia

SPatial LITeracy - SPLIT Remote Sensing using no-cost Landsat data by OhioView Anita Simic Milas, *Bowling Green State University*

Tuesday, October 8

Technical Session #4 – 10:00am-11:30am

Session 4-1

Earth Observation and Remote Sensing Education Initiatives

Moderator: Marguerite Madden, University of Georgia

10:00 am to 11:30 am- Room Harborside B

Policy Measures Taken for Natural Resources Data Management In India

Prithvish Nag, Department of Civil Engineering, Indian Institute of Technology

Earth-Centric Technology Paradigm for STEM Education and Public Communication Tim Foresman, *International Center for Remote Sensing Education*

Augmented tools for environmental monitoring: incorporating recent technologies into learning in the geosciences Marguerite Madden, *University of Georgia* Sergio Bernardes

Leveraging open data for informed decision making Amelia Snyder, *World Resources Institute* Corey Filiault

Innovative STEM Curriculum Development for the nextGen Earth Observation workforce Laurie Chisholm, *University of Wollongong*

Session 4-2

Geospatial Fusion: Observations, Features, Decisions Moderator: George Percivall, *Open Geospatial Consortium*

10:00 am to 11:30 am- Room Essex

Geospatial Fusion: Innovation and Standards

George Percivall, Open Geospatial Consortium

Fusing Remote Sensing and Population Data to Map the Human Planet Robert Chen, *CIESIN, Columbia University* Sri Vinay, Kytt MacManus, Gregory Yetman, and Susana Adamo

Landscape Dynamics, Geographic Big Data and Scalable Geocomputation: The Oak Ridge ExperienceLandscape Dynamics, Geographic Big Data and Scalable Geocomputation: The Oak Ridge Experience

Budhendra Bhaduri, Oak Ridge National Laboratory

An interoperable decision support system for flood disaster response assistance Guy Schumann, *Remote Sensing Solutions Inc./DFO/University of Bristol*

Preparing Earth Science Satellite Data for Analysis Robert Wolfe, *National Aeronautics and Space Administration*

Developing a Cloud Analytics Reference Architecture for the Earth Sciences

David Meyer, National Aeronautics and Space Administration

Session 4-3

Understanding and Improving Landsat Measurements

Moderator: Julia Barsi, National Aeronautics and Space Administration

10:00 am to 11:30 am- Room Haborside E

The Evolution of Landsat Science Products for Earth Science Applications

Tom Loveland, U.S. Geological Survey John Dwyer

Landsat-9 OLI-2 Spectral and Radiometric Prelaunch Characterization and a Comparison to Landsat-8 OLI

Julia Barsi, *National Aeronautics and Space Administration* Brian Markham and Lawrence Ong

Radiometric Performance of Imagers Onboard of Landsat 7 and 8 Satellites

Esad Micijevic, *KBRwyle* Md Obaidul Haque, Julia Barsi, Cody Anderson, and Brian Markham

Field validation and intercomparison of surface reflectance derived from Landsat and Sentinel-2 satellites at a continental scale

Guy Byrne, *Geoscience Australia* Medhavy Thankappan, Lan-Wei Wang, Andrew Walsh, Fuqin Li, Tina Yang, and Imam Alam

Landsat Thermal Infrared Sensors Imaging Performance

Brian Markham, *National Aeronautics and Space Administration* Joel McCorkel and Matthew Montanaro

Session 4-4

The Activities of the Committee on Earth Observation Satellites (CEOS) Moderator: Michael Freilich, *Former Director, Earth Science Division, NASA*

10:00 am to 11:30 am- Room Haborside C

Opening: Perspectives on international collaboration on EO from the outside Michael Freilich, *Former Director, Earth Science Division, NASA*

CEOS Objectives (What) and Organisation (How) Steve Volz, *NOAA, CEOS SIT Chair*

CEOS Systems Engineering Office providing support to international multilateral collaboration

Brian Killough, NASA, CEOS SEO

CEOS WG on Disasters

Ivan Petiteville, ESA, WGDisasters member and former Chair

CEOS WG on Capacity Building and Data Democracy

Nancy Searby, NASA, WGCapD Vice-chair

CEOS Ad-hoc Team on Sustainable Development Goals Argyro Kavvada, *NASA, SDG AHT co-chair*

Session 4-5

Land Cover Case Studies for Watershed Management

Moderator: Sarah Brennan, National Aeronautics and Space Administration

10:00 am to 11:30 am- Room Laurel

A comparison of fused Sentinel-2 and Landsat 8 OLI for land cover mapping - a case study of Levhuvhu and Ndzhelele sub-catchments in South Africa

Zama Eric Mashimbye, Department of Geography and Environmental Studies, Stellenbosch University, Stellenbosch, South Africa Nitash Boong, Kaudia Kamati, Hanna Jangan, Hanguai Zang, Walter Muselava, Bang Fu Wu

Nitesh Poona, Kaudia Kamati, Henno Jansen, Hongwei Zeng, Walter Musakwa, Bang Fu Wu, Shuai Wang, and Sydney Mevengahama

Assessment of Watershed Resources for Sustainable Agricultural Development: A Case of Developing an Operational Methodology under Indian Conditions through Geospatial Technologies

Balasubramani Karuppusamy, School of Earth Sciences, Central University of Tamil Nadu, INDIA

Change Detection in an Ungauged Basin Using Remote Sensing Data: Implications on Human and Natural systems

Jokotola Taiwo, *Department of Geography, University of Lagos* Shakirudeen Odunuga

Land Cover Monitoring of Laguna Lake Watershed Using MODIS NDVI Data Jommer Medina, Training Center for Applied Geodesy and Photogrammetry, University of the Philippines Ariel Blanco

The factor segmentation of the ecological space and the theoretical and methodological substantiation of the boundaries and integrity in the landscape cover and its components by means of remote sensing

A.N. Krenke, *Institute of Geography, Russian Academy of Sciences* M.Yu.Puzachenko, I.P.Kotlov, R.B.Sandlersky, and T.V. Chernenkova

Using LiDAR and earth observation temporal analysis to characterize and explore historic behavior of uranium mining on the landscape

Victoria Stengel, USGS Texas Water Science Center Bernard Hubbard and Tanya Gallegos

Session 4-6

Surface Water and Ice Monitoring and Assessment Moderator: John Jones, U.S. Geological Survey

10:00 am to 11:30 am- Room Harborside A

A USGS standard product for wetland dynamics monitoring: lessons learned from Dynamic Surface Water Extent (DSWE) application

John Jones, U.S. Geological Survey

Implementation of the Dynamic Surface Water Extent algorithm in Google Earth Engine for Global Applications

Chris Soulard, U.S. Geological Survey Jessica Walker

Remote sensing of riparian zones for measuring stream permanence

Ethan Shavers, U.S. Geological Survey Larry Stanislawski

Towards monitoring Minnesota's under ice limnology and in lake primary productivity using the Landsat-Sentinel Earth observation constellation

Chris Crawford, U.S. Geological Survey Leif Olmanson, Benjamin Page, Mohammad Mousavi, Andrew Bamburger, Roger DeRoo, Ted Ozersky, Krill Shchapov, and Greg Silsbe

Monitoring Lake Ice on Lake Hazen using High-density SAR Time Series

Justin Murfitt, University of Waterloo, Department of Geography and Environmental Management Claude Duguay

Technical Session #5 – 1:00pm-2:30pm

Session 5-1

Copernicus serving Sustainable Development Goals

Moderator: Peter Breger, European Commission

1:00 pm to 2:30 pm- Room Harborside C

The Copernicus Climate Change Service: A Contribution to the Sustainable Development Goals

Vincent-Henri Peuch, European Centre for Medium-Range Weather Forecasts

The Copernicus Atmosphere Monitoring Service and the monitoring of Sustainable Development Goals

Vincent-Henri Peuch, European Centre for Medium-Range Weather Forecasts

The Copernicus Marine Service in support of SDGs

Pierre Bahurel, *Mercator Ocean International* Pierre Yves Le Traon, Karina Von Schuckman, Yann Drillet, Cécile Thomas-Courcoux, and Cecilia Donati

Copernicus Land Monitoring Service to support implementing the SDGs

Tobias Langanke, European Environment Agency

The Global Land Component of the Copernicus Land Service: key products for SDG monitoring

Michael Cherlet, European Commission

Session 5-2

Advances in Retrieval of Water Constituents

Moderator: Leif Olmanson, University of Minnesota

1:00 pm to 2:30 pm- Room Harborside A

A cloud-based approach for continuous monitoring of Cyanobacterial Harmful Algal Blooms using Sentinel 3-OLCI data

Abhishek Kumar, *University of Georgia* Chintan Maniyar and Dee Mishra

Estimation of Chl-a Concentration in Laguna Lake using Sentinel-3 OLCI Images Ariel Blanco, *University of the Philippines*

Satellite Observed Temporal and Spatial Variability of Water Clarity in the Laurentian Great Lakes

Robert Shuchman, *Michigan Technological University, MTRI* Karl Bosse and Michael Sayers

Anomaly Detection in Surface Waters: A Machine Learning Approach Armin Mehrabian, *National Aeronautics and Space Administration* Nima Pahlevan

Optimization Of Bio-Optical Model Parameters For Turbid Lake Water Quality Estimation Using Landsat 8 And WASI-2D

Amihan Manuel, *Department of Geodetic Engineering, University of the Philippines Diliman* Ariel Blanco, Ayin Tamondong, Rey Jalbuena, Olivia Cabrera, and Peter Gege

Advancing water quality monitoring capabilities for inland waters using Landsat and Sentinel data in an automated HPC environment

Leif Olmanson, *University of Minnesota* Benjamin Page, David Porter, Jeffrey Peterson, Marvin Bauer, and Patrick Brezonik

Session 5-3

Climate Impact Investigations

Moderator: Nicole Bartlett, National Oceanic and Atmospheric Administration

1:00 pm to 2:30 pm- Room Essex

GRACE-informed seasonal forecasts of hydrologic extremes in the Contiguous United States

Benjamin Zaitchik, Johns Hopkins University

Geo-information-based Assessments of Climate Change Impacts on Environmental Degradation in Nigeria

Olajumoke Folasade Jejelola, Federal University of Technology Akure

Modelling Earth-Observation Assessments and Adaptation of Gulf-of-Guinea Coast to Climate Change and Future Extreme Events

Samuel Olumide Akande, Centre for Space Research and Applications (CESRA)

Developing Outcome-Based Environmental Informatics: A Pathfinder in Data Integration for Coastal Systems

Nicole Bartlett, *National Oceanic and Atmospheric Administration* Marilyn Yuen-Murphy, Paul DiGiacomo, and Robert Bowen

Enterprise LST Product Status and Its Readiness to Users

Yuling Liu, National Oceanic and Atmospheric Administration Yunyue Yu, Heshun Wang, Peng Yu, and Yuhan Rao

Session 5-4

Global 30-m Landsat-derived Rainfed and Irrigated Croplands for Food and Water Security Studies

Moderator: Prasad Thenkabail, U.S. Geological Survey

1:00 pm to 2:30 pm- Room Harborside E

Global 30-m Landsat-derived Cropland Extent Product for Nominal 2015 produced using Machine Learning Algorithms and Cloud Computing on Google Earth Engine Prasad Thenkabail, U.S. Geological Survey Pardhasaradhi Teluguntla, Jun Xiong, Adam Oliphant, Muralikrishna Gumma, Itiya Aneece,

A meta-analysis of global crop water productivity of three leading world crops (wheat, corn, and rice) in the irrigated areas: An Assessment from Remote Sensing and non-Remote Sensing Studies Over Three Decades

Daniel Foley, Northern Arizona University Prasad Thenkabail, Itiya Aneece, Pardhasaradhi Teluguntla, and Adam Oliphant

Global 30-m Landsat and MODIS Derived Irrigated and Rainfed Cropland Area Maps using Spectral Matching Techniques and Machine Learning Algorithms on the Cloud Pardhasaradhi Teluguntla, U.S. Geological Survey

Prasad Thenkabail, Adam Oliphant, Itiya Aneece, and Daniel Foley

Southeast and Northeast Asian Cropland Mapping using Landsat 30-m Time-series Data, Machine Learning, and Google Earth Engine (GEE) Cloud Computing Adam Oliphant, U.S. Geological Survey Prasad Thenkabail, Pardhasaradhi Teluguntla, Murali Krishna Gumma, Itiya Annice, and Daniel Foley

Session 5-5

Case Studies in Cropland Mapping and Monitoring

Moderator: Lisa Colson, United States Department of Agriculture - Foreign Agricultural Service

1:00 pm to 2:30 pm- Room Laurel

Mapping and Monitoring Croplands using Field Data Collection and the Global Agricultural & Disaster Assessment System

Lisa Colson, United States Department of Agriculture - Foreign Agricultural Service Katie McGaughey

Strengthening food security assessments in Kenya through implementation of a National Crop Monitor System

Lilian Ndungu, Regional Centre for Mapping of Resources for Development (RCMRD)

Agriculturally consistent mapping of smallholder farming systems using remote sensing and spatial modelling

Crespin-Boucaud Arthur, *CIRAD* Lebourgeois Valentine, Lo Seen Danny, and Bégué Agnès

Fine-Scale Spatial and Temporal Monitoring of Crop Growth, Biomass and Weather Damage: Techniques for Small Farms and Community Gardens

Marguerite Madden, *University of Georgia* Shannon Healy, David Cotton, Thomas Jordan, Sergio Bernardes, and Sarah Ross

Evapotranspiration modeling for C4 and C3 crops using remote sensing data Yahampath Marambe, *Bowling Green State University* Anita Simic Milas

Session 5-6

Large Area Land Change Mapping and Monitoring Investigations

Moderator: Chuck Hutchinson, ISRSE

1:00 pm to 2:30 pm- Room Harborside B

The Fate of Tropical Forest Fragments

Matt Hansen, University of Maryland Peter Potapov, Xiaopeng Song, Lei Wang, and Alexandra Tyukavin

Forestry TEP Is Serving Users In Efficent Exploitation Of Earth Observation In Forestry

Tuomas Häme, *VTT Technical Research Centre of Finland Ltd.* Renne Tergujeff, Yrjö Rauste, Clive Farquhar, Peter van Zetten, and Frank Martin Seifert

Comparison of Machine Learning Algorithms for Predicting Lichen Fractions in Northern Canada and Alaska

Blair Kennedy, *Environment and Climate Change Canada* Darren Pouliot, Micheline Manseau, Robert Fraser, Jason Duffe, Jon Pasher, Wenjun Chen, Ian Olthof

Earth observations for global biodiversity monitoring

Cindy Schmidt, National Aeronautics and Space Administration

Copernicus Operational Global Land Cover Service - a Flexible, User-Oriented and Multi-Scale Mapping Approach

Marcel Buchhorn, *VITO - Flemish Institute for Technological Research NV* Myroslava Lesiv, Nandine Tsendbazar, Bruno Smets, Luc Bertels, Ruben Van De Kerchove, Daniele Zanaga, Martin Herold, Dainius Masiliunas, Jan Verbesselt, and Steffen Fritz

The Global Surface Water Explorer 1984 - 2018

Alan Belward, *European Commission Joint Research Centre* J-F Pekel, L. De-Felice, Q. Wen, and Noel Gorelick

Technical Session #6 – 3:30pm-5:00pm

Session 6-1

Societal benefits for Earth Observations in Natural Resources Management Decision Making

Moderator: Carl Shapiro, U.S. Geological Survey

3:30 pm to 5:00 pm- Room Harborside A

Societal Benefits of USGS Science: Indications from a series of pilot studies

Emily Pindilli, U.S. Geological Survey

The Consortium for the Valuation of Applications Benefits Linked with Earth Science (VALUABLES)

Yusuke Kuwayama, *Resources for the Future* Bethany Mabee

Value of Geospatial Information for Food Security, Water Security and Housing Security Jamie Brown Kruse, *East Carolina University*

Valuing the Benefits of Earth Observations: A NOAA Perspective

Monica Grasso, National Oceanic and Atmospheric Administration

Why Pay for EO Satellites?

Mark Doherty, *European Space Agency* William Ricard and Lydie Godel

Session 6-2

Sustainable Land Imaging and the Future of Moderate-Resolution Land Observation Moderator: Jeff Masek, *National Aeronautic and Space Administration*

3:30 pm to 5:00 pm- Room Harborside E

Sustainable Land Imaging

Marissa Herron, *National Aeronautic and Space Administration* Tim Newman and Peter Doucette

Science and Applications Needs for Future Land Imaging Missions Zhuoting Wu, U.S. Geological Survey

Copernicus Sentinel-2 and Candidate Land Surface Temperature Monitoring (LSTM) Missions

Valentina Boccia, *ESA* Ferran Gascon, Benjamin Koetz, and Jeffrey Masek

Overview and status of the Landsat 9 Mission

Del Jenstrom, *National Aeronautic and Space Administration* Brian Sauer

Advantages of Enabling Technologies Applied within Land Imaging Architectures Doug Daniels, *The Aerospace Corp*

Session 6-3

Bathymetry and Near-Shore Investigations

Moderator: Margaret Srinivasan, Jet Propulsion Laboratory California Institute of Technology

3:30 pm to 5:00 pm- Room Essex

A cost-effective method for water depth derivation using remotely sensed imagery (Jerimiah Johnson, *University of Alaska Anchorage* Caixia Wang

Using remote sensing to quantify Paleolithic site potential of ancients by restructuring biocommunities along the kelp highway

JP McGlaughlin, U.S. Geological Survey

Altimetry Applications in Coastal And Inland Waters

Margaret Srinivasan, Jet Propulsion Laboratory California Institute of Technology Faisal Hossain, R. Edward Beighley, and Alice Andral

Aquaculture Mapping and Production Estimation Derived from Copernicus Sentinel-1 Time Series

Marco Ottinger, *German Aerospace Center (DLR)* Patrick Leinenkugel, Juliane Huth, Doris Klein, and Claudia Kuenzer

Session 6-4

Copernicus - Europe's eyes on Earth: Sustainable and Continuous Monitoring of our Environment

Moderator: Peter Breger, European Commission

3:30 pm to 5:00 pm- Room Harborside C

Copernicus: How Europe's eyes on Earth are supporting environment and climate change policy

Hans Bruyninckx, European Environment Agency

The Copernicus Atmosphere Monitoring Service: bringing Earth Observation into your screens

Vincent-Henri Peuch, European Centre for Medium-Range Weather Forecasts

Monitoring and reporting on the Ocean State: the Copernicus Marine Service

Pierre Bahurel, *Mercator Ocean International* Pierre Yves Le Traon, Karina Von Schuckman, Yann Drillet, Cécile Thomas-Courcoux, and Cecilia Donati

The Copernicus Climate Change Service: Monitoring the Earth's Climate and its Evolution Vincent-Henri Peuch, *European Centre for Medium-Range Weather Forecasts* Jean-Noel Thepaut, Freja Vamborg, and Carlo Buontempo

Where Copernicus Global Land products can make a difference!

Michael Cherlet, European Commission

Session 6-5

Harnessing Earth Observations for Improved Fire Response

Moderator: Vincent Ambrosia, National Aeronautics and Space Administration

3:30 pm to 5:00 pm- Room Laurel

The GEO Global Wildfire Information System (GEO-GWIS)

Vincent Ambrosia, National Aeronautics and Space Administration

WildFireSat - A Canadian Wildland Fire Monitoring System

Helena van Mierlo, *Canadian Space Agency* Joshua Johnston and Didier Davignon

Integrating lidar into MTBS burn severity mapping

Birgit Peterson, U.S. Geological Survey

Examining Recent Trends in Fires and Air Quality in the U.S. Using Seven Years of SNPP VIIRS

Shobha Kondragunta, *National Oceanic and Atmospheric Administration* Xiaoyang Zhang and Amy Huff

The Role of Satellite-based Information to Inform Change in Arctic Ecosystems at the Canadian High Arctic Research Station, Nunavut

Donald McLennan, Polar Knowledge Canada - Canadian High Arctic Research Station

Session 6-6 Land Use Ontology

Moderators: John Latham, Visiting Professor University of Southampton and Former Head of Geospatial Environmental Monitoring Unit, UNFAO. Antonio Di Gregorio R.S., GIS, Mapping and Ontology, International Expert.

3:30 pm to 5:00 pm- Room Harborside B

- The role of modern (advanced) ontology in the mapping and monitoring of natural resources
- The object oriented LCML (Land Cover Meta-Language) ISO standard 19144-2; Theoretical Concepts, present and future applications
- Moving forward: the LCHMI (Land CHaractetizationa Meta- language) a new ontology concept, to relate Land Cover Land Use and model their functional relationship
- The ISO route to generate the LCHML standard: an overview of the actual and future activities (Doug Obrien, ISO TC 211 Canada)

Wednesday, October 9

Technical Session #7 – 10:00am-11:30am

Session 7-1

Land Change Monitoring Assessment and Projection (LCMAP): Current Status Moderator: Heather Tollerud, U.S. Geological Survey

10:00 am to 11:30 am- Room Harborside D

Progress towards continuous monitoring of our changing U.S. land cover Jesslyn Brown, U.S. Geological Survey

How to produce land cover and land change from time series data

Heather Tollerud, U.S. Geological Survey Christopher Barber, Jesslyn Brown, Jennifer Rover, and Qiang Zhou

LCMAP land cover and land change products

Christopher Barber, ASRC Federal Data Solutions Ryan Reker

Quality Control And Assessment Of InterpreterR Consistency Of Annual Land Cover Reference Data For The USGS LCMAP Initiative

Bruce Pengra, Stinger Ghaffarian Technologies Stephen Stehman, Josephine Horton, Daryn Dockter, Todd Schroeder, Zhiqiang Yang, Warren Cohen, Sean Healey, and Thomas Loveland

Use of LCMAP reference data for accuracy assessment and area estimation

Steve Stehman, SUNY College of Env. Sci. & Forestry Bruce Pengra and Roger Auch

Session 7-2

Open Data Cube: A new data technology for enhancing the use of satellite data to address sustainable development goals

Moderator: Brian Killough, National Aeronautics and Space Administration

10:00 am to 11:30 am- Room Harborside B

Summary of the Open Data Cube Initiative and its impact on the Sustainable Development Goals Brian Killough, National Aeronautics and Space Administration

Interoperable use of Landsat and Sentinel-1 data in the Open Data Cube Brian Killough, National Aeronautics and Space Administration

Galamsey Monitoring with Sentinel-1 in Ghana

Jörg Haarpaintner, *NORCE - Norut, Tromsø, Norway* Brian Killough, Stella Ofori-Ampofo, and Edward Boamah

Lessons Learned from Using the Open Data Cube (ODC) and Machine Learning Techniques for United Nations (UN) Sustainable Development Goals (SDGs)

Syed Rizvi, *Analytical Mechanics Associates* Brian Killough, Andrew Cherry, Otto Wagner, John Rattz, and Sanjay Gowda

Towards improving the multi-sensor interoperability to mitigate the effects of clouds on analyses using Open Data Cube (ODC) for United Nations (UN) Sustainable Development Goals (SDGs)

Syed Rizvi, *Analytical Mechanics Associates* Brian Killough, John Rattz, Andrew Cherry, Otto Wagner, and Sanjay Gowda

Session 7-3

Earth Observations for International Development

Moderator: Douglas Muchoney, Food and Agriculture Organization

10:00 am to 11:30 am- Room Harborside E

Earth Observations for International Development

Douglas Muchoney, Food and Agriculture Organization

Global Forest Watch, from satellite data to information for decision makers

Fred Stolle, World Resources Institute

Strengthening Capacity in using Earth Observations for societal benefit in the Americas in the context of the AmeriGEO regional initiative

Betzy Hernández Sandoval, *NASA, University of Alabama in Huntsville* Nancy D. Searby, Angélica Gutiérrez-Magness, Lauren Childs-Gleason, Africa Flores-Anderson, Franz J. Meyer, Enrique Montes, and Karyn Tabor

Satellite Earth Observation for Global Development Assistance – From Innovation towards Mainstreaming

Christoph Aubrecht, World Bank

Session 7-4

Advances in Crop Yield Monitoring Approaches Moderator: David Johnson, *United States Department of Agriculture*

10:00 am to 11:30 am- Room Harborside A

VERDE: An Innovative Solution to Deliver Detailed Crop Analytics Eric Johnson, *Airbus Agriculture*

Multi-UAV system for precision agriculture

Georgy Skorobogatov, *Universitat Politècnica de Catalunya - BarcelonaTech* Esther Salamí, Cristina Barrado, and Enric Pastor

From Pixel to Yield: forecasting potato productivity in Lebanon and Idaho

Hanan Abou Ali, *Idaho State University*Donna Delparte and L. Michael Griffel
Estimating US Corn Yields using MODIS Data, Phenology Analysis, and Two-Band
Enhanced Vegetation Index
Arthur Rosales, *United States Department of Agriculture*

Annual field-level crop yield assessment with 35 years of Landsat data

David Johnson, United States Department of Agriculture

Session 7-5

Women in Remote Sensing

Moderator: Bobbi Lenczowski, AmericaView

10:00 am to 11:30 am- Room Essex

Panelists include:

- Kass Green, President, Kass Green & Associates
- Birgit Peterson, Geographer, USGS Earth Resources Observation and Science Center
- Barbara J. Ryan, Former Director of the Group on Earth Observations (GEO)
- Alyssa Whitcraft, Program Scientist, GEOGLAM

Session 7-6

Forest Health and Degradation Monitoring Investigations

Moderator: Rick Lawrence, Montana State University

10:00 am to 11:30 am- Room Laurel

Estimating rates of forest degradation and deforestation for the Amazon Basin from 1995-2017

Eric Bullock, Boston University

Using radar-derived elevation data to characterize land cover changes detected by Landsat imagery in the Northwestern Colombian Amazon

Paulo Arevalo, *Boston University* Svein Solberg, Osama Youssef, and Stefano Puliti

Detection and severity classification of spruce budworm annual defoliation using Sentinel-2 imagery

Rajeev Bhattarai, University of Maine School of Forest Resources

Parinaz Rahimzadeh-Bajgiran, Aaron Weiskittel, and Rob Johns

Landsat time series analysis of a continuous variable response - Percent mortality from a bark-beetle infestation

Rick Lawrence, *Montana State University* Emma Bode

Extraction of young-woody vegetation structure in a savanna semi-arid environment exploiting readily available Sentinel-2 and Landsat 8 images

Emmanuel Fundisi, *University of Johannesburg* Walter Musakwa

Technical Session #8 – 1:00pm-2:30pm

Session 8-1

Advances in the use of Remote Sensing for Watershed Management Moderator: Sarah Brennan, *National Aeronautics and Space Administration*

1:00 pm to 2:30 pm- Room Harborside A

Potentials of Earth Observation for Water Resources Management: Examples from the Catch-Mekong Project

Doris Klein, *German Aerospace Center (DLR)* Patrick Leinenkugel, Juliane Huth, Marco Ottinger, Verena Jaspersen, and Claudia Künzer

Quantifying effects of global change and land use legacy at the land-water interface across the Great Lakes Basin

Colin Brooks, *Michigan Technological University - MTRI* Michael Battaglia, Andrew Poley, Laura Bourgeau-Chavez, and Nancy French **Coastal Land Cover Monitoring: Moving from the past into the future** Nate Herold, *NOAA Office for Coastal Management*

Satellite-based Water Management on the Navajo Nation

Amber Jean McCullum, *BAERI/NASA Ames Research Center* Carlee McClellan, Britta Daudert, and Justin Huntington

Regularized Greedy Forest for Crop Classification from Polarimetric SAR Images Mustafa Ustuner, *Department of Geomatic Engineering, Yildiz Technical University, Turkey* Fusun Balik Sanli, Saygin Abdikan, and Gokhan Bilgin

Session 8-2

Land Change Monitoring Assessment and Projection (LCMAP): New Land Change Science Research and Development

Moderator: Christopher Barber, ASRC Federal Data Solutions

1:00 pm to 2:30 pm- Room Harborside D

A New System for Near Real-time Monitoring and Characterization of Land Disturbance

Zhe Zhu, University of Connecticut

Future directions and updated capabilities for LCMAP

Heather Tollerud, U.S. Geological Survey Christopher Barber, Jesslyn Brown, Timothy Larson, Ryan Reker, Kelcy Smith, Qiang Zhou, and Zhe Zhu

Algorithm development for mapping land disturbance agent

Shi Qiu, *University of Connecticut* Junxue Zhang and Zhe Zhu

Mapping Causal Agents of Disturbance in the ABoVE Domain using time series of Landsat data

Yingtong Zhang, Center for Remote Sensing, Boston University Shijuan Chen, Yetianjian Wang, and Curtis Woodcock

Towards A Moderate Spatial Resolution Data Record of 21st Century Global Land Cover, Land Use, and Land Cover Change

Curtis Woodcock, *Center for Remote Sensing, Boston University* Mark Friedl, Tom Loveland, and Pontus Olofsson

Session 8-3

New Generation of NOAA Operational Satellites to support Land, Arctic, and Coastal Waters Applications

Moderator: Mitch Goldberg, National Oceanic and Atmospheric Administration

1:00 pm to 2:30 pm- Room Harborside C

Advancing Environmental Remote Sensing with VIIRS and ABI

Changyong Cao, National Oceanic and Atmospheric Administration

Application of GOES-16/ABI Imagery in Flood Detection

Sanmei Li, *George Mason University* Donglian Sun, Dan Lindsey, and Mitchell Goldberg

Active fire monitoring and applications from NOAA's new generation operational satellites Ivan Csiszar, *National Oceanic and Atmospheric Administration*

Observing Hail Swaths Using the GOES Advanced Baseline Imager

Kevin Gallo, *National Oceanic and Atmospheric Administration* Philip Schumacher and Dillon Blount

The NOAA CoastWatch Program and Operational Satellite Oceanography Data for Research and Applications

Paul DiGiacomo, *National Oceanic and Atmospheric Administration* Veronica Lance and Guangming Zheng

New Generation of NOAA Polar-Orbiting Satellites to Enhance Global Land Applications and Services

Felix Kogan, National Oceanic and Atmospheric Administration

Session 8-4

Cropland and Soil Monitoring

Moderator: Claire Boryan, USDA National Agricultural Statistics Service

1:00 pm to 2:30 pm- Room Laurel

Wheat sown area mapping in Afghanistan using knowledge based decision tree and machine learning method with optical and RADAR images in Google Earth Engine cloud environment

W. Lee Ellenburg, *National Aeronautics and Space Administration* Varun Tiwari

Paddy Rice Mapping in Cloudy Southeast Asia with Multitemporal Synthetic Aperture Radar and Optical Images in the Google Earth Engine Cloud Platform

Fuyou Tian, State Key Laboratory of Remote Sensing Science, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences; University of Chinese Academy of Sciences

Early Season Winter Wheat Identification Using SENTINEL-1 Synthetic Aperture RADAR And Optical Imagery

Claire Boryan, USDA National Agricultural Statistics Service Zhengwei Yang, Patrick Willis, and Avery Sandborn

Downscaling of SMAP Radiometer Soil Moisture In CONUS

Bin Fang, University of Virginia

A Strategy for a National Soil Moisture Network

Michael Cosh, USDA-ARS, Hydrology and Remote Sensing Laboratory Jordan Clayton, Steven Quiring, Tyson Ochsner, Molly Woloszyn, Bruce Baker, Veva Deheza, John Bolten, Mark Svoboda, and Peter Goble

Session 8-5

Forest Monitoring and MRV Case Studies

Moderator: Charlene DiMiceli, University of Maryland

1:00 pm to 2:30 pm- Room Essex

Space-Time heterogeneity of the Cerrado deforestation

Alan de Brito, *Brazilian National Institute for Space Research* Ana Paula Dutra Aguiar, Dalton de Morisson Valeriano, and Leila Maria Garcia Fonseca

Interoperability of Various Data Streams within Guyana's Monitoring Reporting &

Verification System Pradeepa Bholanath, *Guyana Forestry Commission*

Using Guyana's Monitoring Reporting & Verification System to Guide National Forest Management & Decision Making

Nasheta Dewnath, Guyana Forestry Commission

Measuring Global Forest Fragmentation Change using Landsat Imagery in Support of the UN Sustainability Goals

Charlene DiMiceli, University of Maryland

Aspects of forest dynamics of the East European plain based on Global Forest Change data and local field observations

T.V. Chernenkova, *Institute of Geography, Russian Academy of Sciences* A.N.Krenke, M.Yu.Puzachenko, N.G. Belyaeva, and O.V.Morozova

Session 8-6

New Earth Observations and Measurements

Moderator: Vanessa Escobar, National Aeronautics and Space Administration

1:00 pm to 2:30 pm- Room Harborside B

Preliminary validation of GOES-16 ABI aerosol optical depth product

Mi Zhou, *IMSG at NOAA/NESDIS/STAR* Istvan Laszlo and Hongqing Liu

Total Propagated Uncertainty of the Surface Reflectance of the Satellite Imagery Minsu Kim, *KBRwyle*

A novel re-compositing approach to create a continuous and consistent cross-sensor global NDVI data set

Wenze Yang, *IMSG at NOAA/NESDIS/STAR* Felix Kogan, Wei Guo, and Yong Chen

USGS Operational Implementation of Lidar Data Quality Measure Software 2019

Barry Miller, U.S. Geological Survey

Evaluating suspended sediment load and skin temperature in Arctic inland and nearshore waters using Landsat archive

Sundarabalan, V Balasubramanian, *National Aeronautics and Space Administration* Nima Pahlevan and Brandon Smith

Session 8-7

Earth Observations for International Development

Moderator: Douglas Muchoney, Food and Agriculture Organization

1:00 pm to 2:30 pm- Room Harborside E

Small Satellites & International Development

Krystal Wilson, Secure World Foundation

SERVIR: Fourteen years of bringing space to village

Emil Cherrington, National Aeronautics and Space Administration/University of Alabama in Huntsville Daniel Irwin, Nancy Searby, Eric Anderson, Africa Flores-Anderson, Lee Ellenburg, Emily Adams, Amanda Markert, and Ashutosh Limaye

Utilizing earth observation to map ecosystem extent and condition in West Papua, Indonesia

Timothy Wright, Conservation International

Harnessing Earth Observations to Support Indigenous-led Land Management

Karyn Tabor, Conservation International

Technical Session #9 – 3:30pm-5:00pm

Session 9-1

Land Change Monitoring Assessment and Projection (LCMAP): Advancing Land Cover Applications and Assessments Moderator: Qiang Zhou, ASRC Federal InuTeq

3:30 pm to 5:00 pm- Room Harborside D

Remote sensing as the foundation for the next generation of United States landscape projection models

Terry Sohl, U.S. Geological Survey

Comparative study between NLCD and LCMAP land cover maps Qiang Zhou, *ASRC Federal InuTeq*

Christopher Barber and George Xian

Characterize landscape thermal feature and change in urban environment using Landsat ARD and LCMAP products

George Xian, U.S. Geological Survey Hua Shi

LCMAP Applications in Hydrological Sciences

Jennifer Rover, U.S. Geological Survey

Initial LCMAP Prototype Land Cover Classification Composition and Change Metrics, 1985-2016

Roger Auch, U.S. Geological Survey Kristi Sayler, Bruce Pengra, Kelcy Smith, and Ryan Reker

Session 9-2

An overview of the current Analysis Ready Data products, tools, applications and impacts Moderator: Andreia Siqueira, *Geoscience Australia*

3:30 pm to 5:00 pm- Room Essex

CEOS Analysis Ready Data for Land (CARD4L) - An Overview on the Current and Future Work

Andreia Siqueira, *Geoscience Australia* Adam Lewis and Medhavy Thankappan

Time-Series and Applications of Advanced Sentinel-1 Analysis Ready Data for Africa (SAR-4-Africa)

Jorg Haarpaintner, *NORCE - Norut, Tromsø, Norway* Heidi Hindberg, Temesgen Gebrie Yitayew, Brian Killough, Renaud Mathieu, Landing Mane, Berhan Gessesse, Stella Ofori-Ampofo, and Eddie Boamah

Copernicus Sentinel-2 Surface Reflectance Products from a CARD4L Perspective

Valentina Boccia, *ESA* Ferran Gascon, Rosario Iannone, Philippe Goryl, Enrico Cadau, Jérôme Louis, Uwe Müller-Wilm, Bringfried Pflug, Magdalena Main-Knorn, and Vincent Debaecker

The USGS's Progress Towards Analysis Ready Data (ARD) Products

Cody Anderson, U.S. Geological Survey Dennis Helder, Steven Labahn, Christopher Engebretson, Christopher Crawford, Calli Jenkerson, and Christopher Barnes

Sen2like, a Tool to Generate Sentinel-2 Harmonised Surface Reflectance Products toward the integration of new missions

Sebastian Saunier, *Telespazio FR* Vincent Debaecker, Jerome Louis, Thomas Beaton, Enrico Cadau, Valentina Boccia, Ferran Gascon, and Philippe Goryl

Session 9-3

Case Studies in National Land Cover Mapping Projects

Moderator: John Latham, University of Southampton

3:30 pm to 5:00 pm- Room Harborside B

A National Land Cover Monitoring System for Afghanistan

W. Lee Ellenburg, *National Aeronautic and Space Administration* Mir Matin

Optical and Radar Data Analysis for Land Cover/Use Mapping in Peru

Barry Haack, *George Mason University* Ron Mahabir

Living Earth Australia: Land cover mapping to address Sustainable Development Goals using Digital Earth Australia

Christopher Owers, *Department of Geography and Earth Sciences, Aberystwyth University* Richard Lucas, Pete Bunting, Daniel Clewley, Norman Mueller, Belle Tissott, Ben Lewis, and Graciela Metternicht

Quantification of recent land cover changes in Ethiopia

Reza Khatami, *Geography Department, University of Florida* Jane Southworth, Carly Muir, Trevor Caughlin, Alemayehu Ayana, Daniel Brown, Chuan Liao, and Arun Agrawal

Earth Monitor: A Multi-Criteria Change Monitoring Service Using Satellite Imagery

Peter Barren, Airbus Analytics Strategy, Digital Services Arnaud de Saint Vincent

Session 9-4

Open Civil Applications Committee Meetings

Moderator: Dan Opstal, U.S. Geological Survey

3:30 pm to 5:00 pm- Room Harborside E

Civil Applications Overview

Paul Young, U.S. Geological Survey James Reilly

Leveraging DoD Imagery for Civil Applications

Steve Hak, U.S. Geological Survey

Geospatial Sensing for the Wildland Firefight

Everett Hinkley, U.S. Forest Service

The Opportunity Project

Drew Zachary, U.S. Census Bureau

Spectral Remote Sensing of Harmful Algal Blooms Dan Opstal, U.S. Geological Survey

stal, U.S. Geological Survey

Terry Slonecker

Session 9-5

Advances in Soil Moisture and Condition Measurement and Monitoring Moderator: John Bolten, *National Aeronautic and Space Administration*

3:30 pm to 5:00 pm- Room Laurel

Multi-layer soil moisture mapping at regional scale using multi-source data and machine learning methods

Linglin Zeng, *Wuhan University* Shun Hu

Conserving soils through operational monitoring of salt accumulation and waterlogging in irrigated agricultural fields

Adriaan van Niekerk, *Stellenbosch University* Jascha Muller, Theo Pauw, and Garth Stephenson

Object-Based Classification approach to determine the fallow period for shifting agriculture in Indigenous Communities in Guyana

Haimwant Persaud, *Ministry of Natural Resources, Guyana* Rehana Thomas, Pradeepa Bholanauth, and Towana Smartt

Using Space-Borne Image Spectroscopic Data to Estimate At Canopy Level Maize Nitrate Status In A Linear Regression Model

Adeline Ngie, North West University, Vaal Triangle Campus, South Africa

Compact Polarimetry Soil Moisture Retrieval: Preparing For The Radarsat-Constellation And Validation Using SMAP Data

Amine Merzouki, Agriculture and Agri-Food Canada Heather McNairn and Jarrett Powers **Consistency of NASA SMAP and NASS Surveyed Soil Moisture Enable Enhancement for Crop Monitoring** Andreas Colliander, Jet Propulsion Laboratory, California Institute of Technology

Andreas Colliander, Jet Propulsion Laboratory, California Institute of 1

Session 9-6

A Conversation on the Landsat Program and its Data Policy

Moderator: Barbara Ryan, Former Director of the Group on Earth Observations (GEO)

3:30 pm to 5:00 pm- Room Harborside A

Panelists include:

• Samuel Goward – Professor Emeritus, Department of Geographical Sciences, University of Maryland

- Kass Green President, Kass Green and Associates, and former President, Space Imaging Solutions and Pacific Meridian Resources
- Chris Justice Professor and Chair, Department of Geographical Sciences, University of Maryland
- Barbara Ryan Former Director, Group on Earth Observations (GEO), and USGS Associate Director for Geography
- Darrel Williams Chief Scientist, Global Science and Technology (GST) Inc., and former NASA Landsat Project Scientist

Thursday, October 10

Technical Session #10 – 10:00am-11:30am

Session 10-1

Importance of System Calibration and Data Quality on Earth Observation Moderator: Greg Stensaas, U.S. Geological Survey

10:00 am to 11:30 am- Room Laurel

Copernicus Sentinel-2 calibration activities and data quality status after two years of fully deployed on-orbit constellation

Valentina Boccia, *ESA* Sebastien Clerc, Vincent Lonjou, Angélique Gaudel-Vacaresse, Michel Le Berre, Bruno Lafrance, Marion Neveu-VanMalle, Bahjat Alhammoud, Stéphane Massera, Jan Jackson, Catherine Bouzinac, Alejandro Garcia-Soto, Laetitia Pessiot, and Rosario Iannone

Comparison of Dove-Landsat radiometric quality to Landsat 8 OLI

Minsu Kim, KBRwyle

The Importance of Calibration on the Usability of Earth Observation Data

Michael Choate, U.S. Geological Survey Greg Stensaas

Multi constellation calibration at Planet and L1 interoperability with other missions

Arin Jumpasut, *Planet* Ignacio Zuleta, Rasmus Houborg, Joshua Greenberg, and Alan Collison

The Land Product Characterization System: A tool for comparative analysis of satellite data and products

Kevin Gallo, National Oceanic and Atmospheric Administration Greg Stensaas

Session 10-2

Special Technical Session – "Ignite" Short Talk Session

Moderator: Peter Erskine, The University of Queensland

10:00 am to 11:30 am- Room Essex

Unicorns to workhorses: extending routine sunphotometry to the oceans

Stephen Broccardo, National Aeronautics and Space Administration

Examining reference ecosystems and the resilience of mine rehabilitation using ground data with and high-resolution imagery

Peter Erskine, *The University of Queensland* Renee Bartolo

Detecting leaf damages with true color photos obtained from mobile phones

Ela Piskorski, *University of Wyoming* S Bala Dhanalakshmi, N.M. Ramyakala, P. Pavithra, M. Bhuvaneshwari, S. Sushmidha, S. Sivani, and Ramesh Sivanpillai

Earth Observations and crop modeling to support agricultural water resources management

Pierre Guillevic, *University of Maryland* Jean-Claude Roger

Analysis Ready High Revisit, High Resolution SAR Data

Davide Castelletti, Capella Space

Apples and Oranges: Meta-analysis and Analytic Inference from Published Land-cover Classifications

Peter Kennedy, *University of Lethbridge* Craig Coburn

Historical Photographic Analysis in Environmental Remediation Shiloh Dorgan, USACE Army Geospatial Center

Performance Analysis of Image Classification Through Different Feature Sets

Camila Souza dos Anjos, *Federal Institute of Education, Science and Technology of South of Minas Gerais* Claudia Maria de Almeida, Paulo Roberto da Silva Ruiz, and Marielcio Gonçalves Lacerda

Session 10-3

Lidar vegetation canopy metrics: toward developing standards Moderator: James Ellenwood, *US Forest Service*

10:00 am to 11:30 am- Room Harborside B

Validating 3DEP lidar data using TLS

Jason Stoker, U.S. Geological Survey

Evaluating the potential of NAIP-derived canopy height models to support operational forest inventory applications in the southeastern U.S

Todd Schroeder, U.S. Forest Service Randolph Wynne, Valerie Thomas, Bharat Pokharel, Mark Healey, and Joe McCollum

Lidar Vegetation Canopy Metrics - towards developing standards - a forest inventory perspective

James Ellenwood, U.S. Forest Service

A method for characterizing stratified forest using hyperspectral and LiDAR data Shuai Gao, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences **Pinliang Dong**

Unmanned Aircraft Systems (UAS) LiDAR Considerations, Comparisons, and Current **Scanners to Assess Forest Canopy Features**

Mark Bauer, U.S. Geological Survey

Session 10-4

High Resolution Land Cover Using NAIP

Moderator: Michael Norton, Praedictus Climate Solutions

10:00 am to 11:30 am- Room Harborside E

Creating High-resolution Land Cover Data: Opportunities and Pitfalls

Michael Norton, Praedictus Climate Solutions

West Virginia Statewide Land Cover Classification from NAIP Orthophotography: **Findings and Recommendations**

Aaron Maxwell, West Virginia University

Utilizing NAIP Imagery to Perform High-Resolution Land Cover Mapping in a Desert Landscape: Successes and Challenges

Rachel Soobitsky, Chesapeake Conservancy

Using deep learning for high-resolution land cover mapping: challenges and opportunities Caleb Robinson, Georgia Institute of Technology Le Hou, Kolya Malkin, Bistra Dilkina, Nebojsa Jojic, Rachel Soobitsky, and Jacob Czawlytko

High-Resolution Change Detection: Overcoming Challenges Jarlath O'Neil-Dunne, University of Vermont

Session 10-5

Investigations in Support of Human Welfare

Moderators: Estefania Palacios Tamayo and Amanda Aragon, University of Georgia

10:00 am to 11:30 am- Room Harborside A

Seeing mosquitoes from space? Help from citizen scientists using the GLOBE Observer's Mosquito Habitat Mapper and Land Cover tools

Russanne Low, Institute for Global Environmental Strategies

Soil monitoring for the detection of Improvised Explosive Devices using Remote Sensing techniques

Mit Kotecha, *Harsukhbhai K Dhruv Centre of Planning* Zalak Bhavsar

Monitoring Invasive Kudzu in Urban Environments: Indicators of Neglected Structures, Social Impacts and Loss of Biodiversity

Estefania Palacios Tamayo, *University of Georgia* Amanda Aragon and Marguerite Madden

Towards development of methodology to detect informal settlement using high resolution imagery-South African Case study

Naledzani Mudau, University of Witwatersrand, SANSA

Cadastral map Digitization using Geospatial Tecnology

Abhilash Maryada, Jawaharlal Nehru Technological University Hyderabad

Session 10-6

Vegetation Condition Case Studies

Moderator: Matthew Garcia, University of Wisconsin-Madison

10:00 am to 11:30 am- Room Harborside D

Landsat-based Detection of White Spruce Masting in the Kluane Region, Yukon Matthew Garcia, *University of Wisconsin-Madison* Benjamin Zuckerberg, Philip Townsend, and Jalene M. LaMontagne

Satellite-based mapping of field-scale stress indicators for crop yield forecasting: an application across the Corn Belt, USA

Yang Yang, USDA-ARS, Hydrology and Remote Sensing Laboratory Martha Anderson, Feng Gao, Yun Yang, and Wayne Dulaney

Hyperspectral remote sensing of Striga weed severity using in-situ spectroscopy and multivariate discriminatory techniques

Bester Mudereri, International Center of Insect Physiology and Ecology (ICIPE)

Estimating tree species diversity using biophysical and biochemical properties derived from the inversion of radiative transfer models

Sabelo Madonsela, Council for Scientific and Industrial Research, Earth Observation Group

Corn Crop Growth Condition Assessment Based on Growth Dynamics: a Multi-source Method

Zhengwei Yang, USDA National Agricultural Statistics Service Yonglan Qian, Liping Di, Md.Shainoor Rahman, Lei Xue, Zhenyu Tan, Feng Gao, Eugene Yu, and Xiaoyang Zhang

Technical Session #11 – 1:00pm-2:30pm

Session 11-1

Satellite Interoperability Moderator: Jon Christopherson, *KBRwyle*

1:00 pm to 2:30 pm- Room Laurel

Landsat Collection-2 Reference Data Updates for Improved Registration to Sentinel-2 Rajagopalan Rengarajan, *KBRwyle* James Storey

Towards enhanced sensor interoperability and harmonized surface reflectance products Rasmus Houborg, *Planet*

Ignacio Zuleta, Arin Jumpasut, and Alan Collison

Improved Interoperability through systemic radiometric calibration

Dennis Helder, South Dakota State University

Spectral Harmonization: Can It Be Done?

Jon Christopherson, *KBRwyle*

Multispectral and Hyperspectral Satellite Data For Hydrothermal Alteration Mapping Using The MTMF Algorithm In An Unexplored Region

Aliyu Jaafar Abubakar, *Department of Geography, Kaduna State University, Nigeria* Mazlan Hashim and Amin Beiranvand Pour

Development and Validation of JPSS VIIRS VI and GVF Products Ivan Csiszar, National Oceanic and Atmospheric Administration Yunyue Yu, Mingshi Chen, and Zhangyan Jiang

Session 11-2

NASA Harvest and other recent advances in remote sensing of agricultural applications and food security

Moderator: Mike Humber, University of Maryland

1:00 pm to 2:30 pm- Room Harborside B

NASA Harvest: a program enhancing the use of earth observations for agriculture

Chris Justice, *University of Maryland* Inbal Becker-Reshef, Alyssa Whitcraft, Catherine Nakalermbe, Christina Justice, Brian Barker, Michael Humber, and Antonio Sanchez Galvez

The GEOGLAM Crop Monitors

Brian Barker, *University of Maryland* Inbal Becker Reshef, Christina Justice, Antonio Sanchez, Estefania Puricelli, Mike Humber, Christopher Justice, Alyssa Whitcraft, Catherine Nakalembe, Ritvik Sahajpal

Monitoring and modeling field-level crop yield and environmental sustainability for the US Corn Belt

Kaiyu Guan, *University of Illinois at Urbana-Champaign* Bin Peng and Sibo Wang

Using Earth Observations to Provide Early Warning for Food Insecurity

Greg Husak, *UC Santa Barbara* Michael Budde and James Rowland

Monitoring and forecasting water availability with the FEWS NET Land Data Assimilation System

Amy McNally, *National Aeronautics and Space Administration* Daniel Sarmiento, Jossy Jacob, Kristine Verdin, Abheera Hazra, Kristi Arsenault, Christa Peters-Lidard, and James Verdin

Integrating field scale EO metrics to grow domestic conservation practices within supply chain decision support tools

Nathan Torbick, Applied GeoSolutions

Session 11-3

Collaboration in the Diverse Geospatial Workforce: How Early Career Professionals Can Bring Innovations to the Technical Community

Moderator: Amanda Aragon, University of Georgia

Panel Discussion, participants TBD

1:00 pm to 2:30 pm- Room Essex

Session 11-4

Moderate Resolution Data Characterization and Transformations

Moderator: Jie Xue, USDA-ARS, Hydrology and Remote Sensing Laboratory

1:00 pm to 2:30 pm- Room Harborside E

Cloud Detection Algorithm for Multi-Modal Satellite Imagery using Convolutional Neural-Networks (CNN)

Michal Segal Rozenhaimer, National Aeronautics and Space Administration Alan Li, Kamalika Das, and Ved Chirayath

The Tasseled Cap Transform Revisited

Thomas Parris, *ISciences LLC* Richard Cicone, Eric Crist, and Michael Metzler

Bulk processing of the European Space Agency Landsat Multi Spectral Scanner archive: recent improvements and developments

Sebastien Saunier, *Telespazio FR* Samantha Lavander, Andrea Melchiore, Luca Galli, Roberto Biasutti, Amy Beaton, Daniele Dierasmo, and Valentina Boccia

A multi-scale segmentation approach to filling gaps in Landsat ETM+ SLC-off images through pixel weighting

Rennan de Freitas Bezerra Marujo, *INPE* Leila Maria Garcia Fonseca, Thales Sehn Korting, and Hugo do Nascimento Bendini

Generating high spatiotemporal land surface temperatures through sharpening multisensor thermal imagery

Jie Xue, USDA-ARS, Hydrology and Remote Sensing Laboratory Feng Gao, Martha Anderson, Liang Sun, and Yun Yang

Session 11-5

Case Studies in Flood Monitoring and Management Moderator: Konrad Wessels, *George Mason University*

1:00 pm to 2:30 pm- Room Harborside A

Flood Risk Mapping of the Nasia River in Northern Ghana Using HAND Contours and Historical Flood Data

Eric Kwabena Forkuo, Department of Geomatic Engineering, Kwame Nkrumah University of Science and Technology, Kumasi-Ghana Benjamin Ghansah, Emmanuel Agyapong, and Emmanuel Obuobie

Flood Vulnerability Mapping: A Case Study Of Okoko Basin Osogbo Nigeria Adedoja Toyosi Beatrice, *Copine, ile-ife osun Nigeria*

Rapid Urban Flood Mapping Using Integrated Backscattering and Coherence from Multitemporal ALOS-2 Data

Young-Joo Kwak, International Centre for Water Hazard and Risk Management-UNESCO

Ryo Natsuaki and Sang-Ho Yun

Flood Inundation Mapping And Monitoring In Lower Ganga And RAMGANGA Doab In India Using SENTINEL-1 SAR Data

Ashwani kumar Agnihotri, Department of Civil Engineering IIT (BHU), Varanasi, India Anurag Ohri, Shivam, Nilendu Das, and Sachin Mishra

Technical Session #12 – 3:30pm-5:00pm

Session 12-1

UAS: Changing the Future of Remote Sensing Moderator: Greg Stensaas, U.S. Geological Survey

3:30 pm to 5:00 pm- Room Laurel

USGS Small UAS Present and Future Scientific Research and Operational Applications Matthew Burgess, U.S. Geological Survey

UAS for Remote Sensing: System Capabilities and Products Quality and Accuracy Qassim Abdullah, *Woolpert*

Generating consistent UAS Remote Sensing data

Ajit Sampath, KBRwyle

Laboratory Radiometric Calibration/Characterization and Workflow for Low Cost sUAS VNIR Cameras

Mary Pagnutti, *Innovative Imaging and Research Corp.* Robert Ryan, Kara Burch, and Daniel Cuervo **The Odysseus High-Altitude Solar Aircraft for Earth Observation** Chris Ellsworth, *Aurora Flight Sciences*

Issues in Developing Larger Area (1.0 km2) sUAS Based GEOBIA Applications J.B. Sharma, *University of North Georgia*

Session 12-2

Biodiversity and Conservation Case Studies Moderator: Hikari Murayama,

3:30 pm to 5:00 pm- Room Essex

Geospatial Modeling of Human-Wildlife Conflict and Habitat Suitability for Jaguar Corridors in Costa Rica

Hikari Murayama, Wellesley College

Samuel Furey, Brooke Bartlett, Ryan Palmer, Marie Bouffard, Shelby Ingram, Marguerite Madden

Spatial Multi-Criteria Modeling for Habitat Suitability of Flagship Species in Western Himalaya

Ramesh Silwal, International Centre for Integrated Mountain Development Vishwas Chitale, Janita Gurung, Mir Matin, and Subrata Nandy

Spatio-Temporal Analysis of Habitat Characteristics at the Adhesive Spawning Site in Water-level Fluctuation Zone over the Three Gorges Reservoir

Ding Fang, Resources and Eco-environmental Research Center, Chinese Academy of Fishery Science Wang Lin, Ni Zhao Hui, Cao Kun, Li Xiao Shu, Yuan Li Lai, Yang Wen Bo, Li Ji Long, and Li Ying Ren

Ecological Remote Sensing Monitoring of Sichuan-yunnan Ecological Defense in China

Li Liang, *The Third Engineering of Surveying and Mapping Academy in Sichuan Province* Li Sheng, Shen Xue-lin, and Ying Guo-wei

Session 12-3

Agricultural and Agri-environmental monitoring for SDG 2: Zero hunger

Moderator: John Latham, Visiting Professor University of Southampton, Former Head of Geospatial Environmental Monitoring Unit, UNFAO

3:30 pm to 5:00 pm- Room Harborside B

Operational agricultural monitoring: addressing the SDG reporting requirements John Latham, *University of Southampton*

Geospatial information for agricultural and agri-environmental statistics

Elisabetta Carfagna, University of Bologna

Success countries where satellite imagery has been used to design a statistical system William Wigton, *Agricultural Assessments International Corp.*

Session 12-4

National Land Cover Database 2016, Offering New Change Insights Across the Conterminous United States Moderator: Collin Homer, U.S. Geological Survey

3:30 pm to 5:00 pm- Room Harborside E

Release of the 2016 U.S. National Land Cover Database, Providing New Opportunities for Land Cover Science

Collin Homer, U.S. Geological Survey

NLCD 2016 Tree Canopy Results and Change Patterns, 2011-2016 Stacie Bender, *United States Department of Agriculture* Greg Liknes, Karen Schleeweis, and Kevin Megown

NLCD 2016 Impervious Surface Distribution and Change Patterns George Xian, U.S. Geological Survey

New NLCD 2016 Shrub and Grass Products, Offering Unprecedented Characterization and Monitoring of U.S. Shrublands Collin Homer, U.S. Geological Survey

Future Plans for NLCD 2019 Jon Dewitz, U.S. Geological Survey

High Resolution Land Cover Classification using the National Land Cover Database Tool, Imagery and Historical Data Jeff Van de Vaarst, *Hexagon US Federal*

Session 12-5

Remote Sensing Investigations of Wetlands and Near-Shore Issues Moderator: Colin Brooks, *Michigan Technological University - MTRI*

3:30 pm to 5:00 pm- Room Harborside A

Integrating optical and SAR Earth observation data to support the production of a comprehensive wetlands inventory dataset for Alaska Chengquan Huang, University of Maryland Ben Devries and Megan Lang A Completed Wetland Inventory of Newfoundland and an Ongoing Wetland Inventory of CANADA Using EO Data on Google Earth Engine Bahram Salehi, State University of New York Masoud Mahdianpari, Fariba Mohammadimanesh, and Brian Brisco

Applying UAS for evaluating transportation infrastructure and monitoring invasive aquatic plants

Colin Brooks, Michigan Technological University – MTRI

Satellite Remote Sensing Reveals More than Three Decades of Increasing Coral Bleaching Heat Stress

Gang Liu, NOAA Coral Reef Watch and University of Maryland Earth System Science Interdisciplinary Center William Skirving, Scott Heron, Jacqueline De La Cour, Erick Geiger, Benjamin Marsh, Denise Devotta, Andrea Gomez, and C. Mark Eakin

Using NOAA Coral Reef Watch Ecoforecasts to Prepare for and Respond to the 2014-17 Global Coral Bleaching Event

C. Mark Eakin, *NOAA Coral Reef Watch* Gang Liu, Jacqueline De La Cour, Erick Geiger, William Skirving, Scott Heron, Denise Devotta, Andrea Gomez, and Benjamin Marsh

Scaling High Latitude Peatland Emissions Using Multi-scale Earth Observation

Nathan Torbick, *Applied GeoSolutions* Xiaodong Huang, Beth Ziniti, Ruth Varner, Justin Fisk, and Jia Deng

Session 12-6

Case Studies in Urban Growth Monitoring

Moderator: Peter Doucette, U.S. Geological Survey

3:30 pm to 5:00 pm- Room Harborside D

Monitoring growth of top Indian Metropolises and its consequences using Earth observations

Ankit Sikarwar, International Institute for Population Sciences, Mumbai

Continuous urban change detection from satellite imagery to support the deployment of UAS for rapid updates of digital surface models in smart communities

Corey White, Center for Geospatial Analytics, North Carolina State University Anna Petrasova, William Reckling, and Helena Mitasova

Application of Cellular Automata-Markov Chain and Multi-Layer Perceptron-Markov Chain Models for simulating Land Cover Changes in Comilla City Corporation (CCC) Area, Bangladesh Abdulla - Al Kafy, *Rajshahi Development Authority*

Managing Urban Sprawl Using Remote Sensing and GIS

Anilkumar PP, National Institute of Technology Calicut Krishnaveni K S

Reconciling Citizen Science and Landsat Land Cover Observations in Heterogenous Settings

Eric Brown de Colstoun, *National Aeronautics and Space Administration* Peder Nelson and Helen Amos

Friday, October 11

Technical Session #13 - 8:30am-10:00am

Session 13-1

New Technology and Techniques to Increase Scientific and Applications Access to Satellite Earth Observations

Moderator: Sara Lubkin, National Aeronautics and Space Administration

8:30 am to 10:00 am- Room Harborside E

The Multi-Mission Algorithm and Analysis Platform: Sharing Data and Algorithms Across Agencies and Scientists

Ian Schuler, *Development Seed* Aimee Barciauskas, Kaylin Bugbee, Christopher Lynnes, Manil Maskey, Hook Hua, George Chang, Laura Jewell, Rahul Ramachandran, Kevin Murphy, and Marco Lavalle

Utilizing the NASA Atmospheric Science Data Center (ASDC) Geospatial Platform for Data Analysis

Matthew Tisdale, National Aeronautics and Space Administration

Pangeo: A Big-data Ecosystem for Scalable Earth System Science

Joseph Hamman, National Center for Atmospheric Research Scott Henderson, Amanda Tan, Rob Fatland, Anthony Arendt, Dan Pilone, and Andrew Pawloski

Designing the User Experience for Earth Observation Data Services in the Cloud Christopher Lynnes, *National Aeronautics and Space Administration*

Visualizing Earth Observations for Science and Applications with NASA Worldview and Global Imagery Browse Services

Mike McGann, Science Systems and Applications, Inc.

End-to-end Machine Learning Applications Framework for Earth Science

Brian Freitag, University of Alabama in Huntsville

Session 13-2

Applications of NASA Earth Observations for Local Decision Making: 20 Years of the NASA DEVELOP Program

Moderator: Kenton Ross, National Aeronautics and Space Administration

8:30 am to 10:00 am- Room Harborside B

Patuxent Water Resources: Assessing Land Cover and Land Use Change to Inform Watershed Resource Management

Stephanie Rockwood, *Science Systems and Applications, Inc.* Shaifali Prajapati, Kyung "Robin" Kim, and Connor Holzmann

Monitoring the Urban Heat Island Effects on the Health of Residents of New Orleans, Louisiana Metropolitan Area

Madison Murphy, *Science Systems and Applications, Inc.* Charles Christonikos, Alahna Moore, and Ann Rodden

Utilizing SAR and NASA Earth Observations to Identify Optimal Transportation Routes to Assist Emergency Responders

Christine Evans, *Science Systems and Applications, Inc.* Kane Cook, Sara Miller, and Alex Younger

Employing Remote Sensing Techniques to Quantify Sediment Supply and Evaluate Marsh Vulnerability in the Plum Island Estuary

Zach Bengtsson, *Science Systems and Applications, Inc.* Bogumila Backiel, Ruizhe Guo, Kimberly Johnson, Sydney Neugebauer, Linnea Smith, and Henrik Westerkam

Utilizing Landsat and Sentinel-2 to remotely monitor and evaluate the performance of winter cover crops throughout Maryland

Julio Peredo, Science Systems and Applications, Inc.

Alison Thieme, Perry Oddo, John Fitz, Sean McCartney, Logan Kline, Diane Portillo, Benjamin Whong, Callum Wayman, Bryan Eder, Victor Lenske, and Sunita Yadav-Pauletti

Using NASA Earth Observations to explore urban heat and flood vulnerability in Providence, RI & Elizabeth, NJ

Sarah Aldama, *Science Systems and Applications, Inc.* Colton Avila, Heather Dulaney, and Holly Gould

Session 13-3

Crop-Water Stress Investigations using Earth Observations

Moderator: Martha Anderson, USDA-ARS, Hydrology and Remote Sensing Laboratory

8:30 am to 10:00 am- Room Laurel

Estimation of Vegetation Health Index for Agricultural drought monitoring using NDVI and Land Surface Temperature Imageries: A case Study in Barind Tract of Bangladesh Abdulla - Al Kafy, *Rajshahi Development Authority*

Towards operationalization: Evaluation of a regional drought and yield assessment system in Kenya

W. Lee Ellenburg, National Aeronautics and Space Administration

Characterizing Field-Scale Water Use and Crop Stress in Agricultural Landscapes using Multi-Sensor Data Fusion

Martha Anderson, USDA-ARS, Hydrology and Remote Sensing Laboratory Feng Gao, Jie Xue, Yang Yang, Yun Yang, and Chris Hain

Measurement Uncertainty and Model Validation: An Instructive Case Study of an Irrigated Cotton Crop

Joseph Alfieri, USDA-ARS, Hydrology and Remote Sensing Laboratory William Kustas, Martha Anderson, John Prueger, Steven Evett, and Christopher Neale

Session 13-4

Applications of Earth Observations for Disaster Assessments and Management Moderator:

8:30 am to 10:00 am- Room Essex

Post Disaster Analysis Of Brazilian Iron Ore Mining Dam Failure Using Advanced Geospatial Technologies

Muhammad Ahsan Mahboob, *School of Mining Engineering - Wits University, South Africa* Bekir Genc and Iqra Atif

North Queensland Flood Monitoring Using U-NET Architecture For Semantic Segmentation With SENTINEL -1 SAR And INSAR Imagery Isabella Lee, University of New South Wales

John Trinder

Identifying hurricane impacts on Barbuda using citizen science ground observations, drone photography and satellite imagery Rebecca Boger, *Brooklvn College*

Monitoring Agriculture during Disasters using Remote Sensing and Geospatial Data Products

Avery Sandborn, USDA National Agricultural Statistics Service Claire Boryan, Zhengwei Yang, and Patrick Willis

Session 13-5

Advances in Mapping and Monitoring Water Characteristics

Moderator: Robert Shuchman, Michigan Technological University, MTRI

8:30 am to 10:00 am- Room Harborside A

A Satellite-based analysis Tool for Rapid Evaluation of Aquatic environMents (STREAM)

Nima Pahlevan, National Aeronautics and Space Administration Navid Glopayegani, Armin Mehrabian, Asen Radov, and Nidhi Pal

Combining Sentinel-2 and Landsat-8 for benthic vegetation monitoring in Sleeping Bear Dunes National Lakeshore

Robert Shuchman, *Michigan Technological University, MTRI* Amanda Grimm, Michael Sayers, and Reid Sawtell

Estimating Phytoplankton Productivity in the Largest Lakes of the World using Satellite Remote Sensing

Michael Sayers, *Michigan Technological University, MTRI* Gary Fahnenstiel and Robert Shuchman

Lining Remote Sensing and Ecophysiology for Aquatic Ecosystem Management in the California Delta

David Bubenheim, National Aeronautics and Space Administration Edward Hard

Monitoring Land Use and Water Use Change over Forested Landscapes in North Carolina, USA using Multi-Sensor Data Fusion

Yun Yang, USDA-ARS, Hydrology and Remote Sensing Laboratory Martha Anderson, Feng Gao, Zhe Zhu, Junxue Zhang, Ge Sun, and Christopher Hain

Session 13-6

Earth Observation Missions and Services Moderator: Vanessa Escobar, *National Aeronautics and Space Administration*

8:30 am to 10:00 am- Room Harborside D

Demonstrating next generation high-altitude, long endurance aircraft for Earth science

Matthew Fladeland, *National Aeronautics and Space Administration* Susan Schoenung and Randal Albertson

NASA Airborne Science Contributions to Continuous Earth Monitoring

Susan Schoenung, National Aeronautics and Space Administration

The DLR Earth Sensing Imaging Spectrometer (DESIS) Instrument On-Orbit

Performance and Data Access through TCloud Kara Burch, *Innovative Imaging and Research Corp.* Robert Ryan, Mary Pagnutti, Jack Ickes, and Heath Lester **SIR-C data recovery for continuous monitoring of the Earth** Kenneth Arnoult, *Alaska Satellite Facility, UAF* Rudi Gens

Developing a National Terrain Model

Stephen Aichele, U.S. Geological Survey Jason Stoker

Poster Session – Exhibit Hall

- 1. Bathymetry mapping in North American waters using a radiative-transfer based modeling approach (Christopher Olayinka Ilori)
- 2. Quantitative Analysis of Habitat Selection Preference for Schizothorax fishes in Brahmaputra by Remote Sensing (Wang Lin)

- 3. Deforestation and rainforest fires in an agricultural frontier area in Eastern Amazon, Brazil (Cesar Teixeira Donato de Araujo)
- 4. Deforestation relationship between agriculture activities and livestock in a palm oil expansion area in Brazilian Amazon (Cesar Teixeira Donato de Araujo)
- 5. Mapping Mangrove Species with the Combination of Worldview-3 and Airborne Lidar Data (Qiaosi, Li)
- 6. Accuracy Assessment of sUAS Photogrammetrically-Derived Point Clouds (Amal Suleiman, Omar Mora)
- 7. GOES-16 ABI SRB Products: method, evaluation, and possible improvements (Hye-Yun Kim)
- 8. UAV for invasive plant species in the Old Woman Creek estuary, Ohio using machine learning classifiers (Tharindu Abeysinghe)
- 9. Long-term root zone moisture trends across CONUS from a new root-zone soil moisture product called SMERGE (Kenneth Tobin)
- 10. GOES-16/17-based Evapotranspiration and Drought Monitoring Products from NESDIS GET-D System (Li Fang)
- 11. Crop phenology monitoring using fused remote sensing data (Donghui Xie)
- 12. Twenty Years of Disaster and Natural Hazards Monitoring with the ASTER Instrument on NASA's Terra Platform (Michael Abrams)
- 13. Kite Systems for Local Scale Remote Sensing (Geoff Bland)
- 14. Rice greening versus sand whitening on drylands: a geospatial modelling of sustainable agriculture expansion to anticipate desert fronts progress around the Magaâs floodplain, Far-north Cameroon (Alfred Homere)
- 15. Modelling Risk of Soils Degradation Through Statistics Analysis Of Spectral Indices: Case Study On The Cameroonians Shores Of Lake Chad And Its Hinterland (Paul Gerard Gbetkom)
- 16. A Geospatial Technology for Soil Resource Management of Goa State (Gaurav Dongre)
- 17. Assessment of soil erosion by RUSLE model using earth observation- A case study of North West Coastal Area, Egypt (Samy Abo Ragab)
- 18. Societal response and community resilience to environmental pollution and extreme events along Nigeria Coast (Olajumoke Folasade Jejelola)
- 19. SELEGUA a new BSRN station in Southern Mexico (Roberto Bonifaz)`
- 20. Using very high spatial resolution imagery and an object-oriented paradigm for predicting above-ground biomass in Togo, West Africa (Hobabalo Pereki)
- 21. Mapping Submarine Groundwater Discharge SGD of the Northern Guam Lens Aquifer NGLA with a UAV and a TIR sensor (Eliana Cortes Walker)
- 22. Combining field sampled and imagery sampled data for crop area estimation (Sunita Yadav)
- 23. An approach of Machine Learning to improve the results reliability of burning areas product in the Brazilian Woody Savannah (Fabiano Morelli)
- 24. The Effects of Floodwaters from the Bonnet Carra Spillway on the Mississippi Gulf Coast Oyster Reefs (Jarett Bell)
- 25. Big Change of the Forest and the Coastal zone of Madagascar via satellites (Noasilalaonomenjanahary Ambinintsoa Lucie)

- 26. Assessing Satellite-Derived Phenological Metrics and Terrain data as a Proxy for Vegetation Dynamics Along the Brazilian Savanna Corridor (Hugo do Nascimento Bendini)
- 27. Water quality monitoring using semi-analytical algorithm on the western coast of California (Jee-Eun Min)
- 28. Guidelines for effective environmental assessment and monitoring with drones (Renee Bartolo)
- 29. Climate change impact identified using Ecosystem accounting at local scale (Rakotondraompiana, Solofo)
- 30. Enhancing Chlorophyll-a Retrievals from Multispectral Observations via Machine Learning (Brandon Smith)
- 31. Inter- and intra-annual changes in the three dimensional structure of urban canopies detected by airborne, terrestrial and SLAM LiDAR measurements (Youngkeun Song)
- 32. Characterizing Plant Functional Properties in Arctic Biome with a Novel Multi-Sensor Unmanned Aerial System (Dedi Yang)
- 33. Habitat assessment for western gray squirrels (Sciurus griseus) in eastern Washington State (Brian Cosentino)
- 34. Study on the extraction, distribution and influence of mountain base elevation in the Qinling-Daba Mountains (Liu Junjie)
- 35. Integrating HiRISE images and MOLA data for accurate surface topographic mapping (Ahmed Elaksher)
- 36. Creating Benchmark Data to Support Autonomous Vehicle Navigation and Validation of Satellite Image-based Mapping (Charles Toth)
- 37. Distribution Patterns of the Altitudinal Belts in the Qinling-Daba Mountains (Zhao Fang)
- 38. An Analysis of Straight-Line Boundaries and Conflict in the Mideast Region (David Luzader)
- 39. Leveraging Geospatial Intelligence (GEOINT) in Mining of Rare Earth Elements Ore Deposits (Emma Jean Bouie)
- 40. GIS Analysis of Future Locations for Electric Charging Stations (Phillip Agbesi)