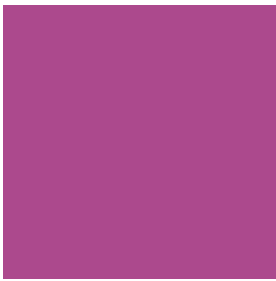
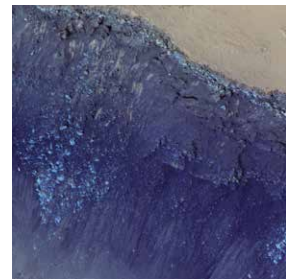


2019 AGU Fall Meeting Schedule of Events at the NASA Booth #535



NASA Science welcomes you to San Francisco, CA. We will showcase a wide variety of science presentations and cutting-edge, interactive science, technology, and data demonstrations. This year's program will be held Monday, December 9, through Friday, December 13, 2019. Hyperwall presentations and In-Booth Science Flash Talks will cover a range of research topics, science disciplines, and programs within NASA.

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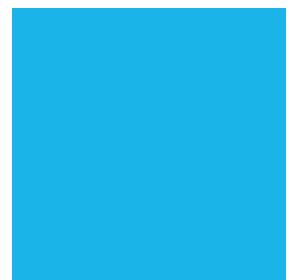
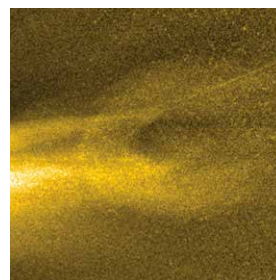
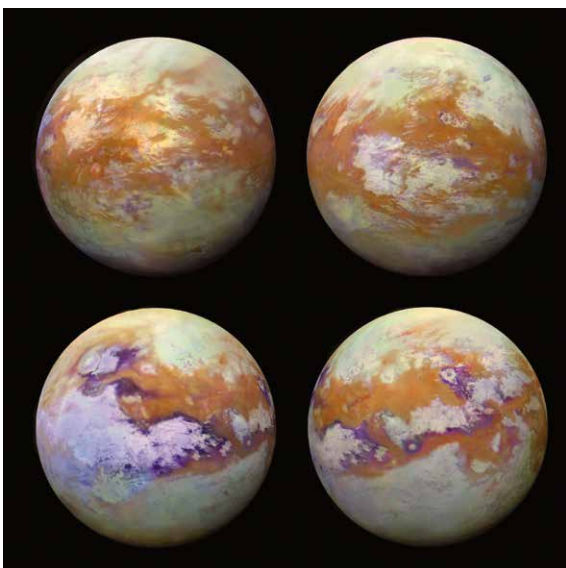


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L E G E N D	HYPERWALL PRESENTATIONS (15 minute talks at Hyperwall)
	FLASH TALKS (7 minute talks at Hyperwall)
	2019 WINNERS OF THE AGU DATA VISUALIZATION AND STORYTELLING COMPETITION (located at Hyperwall)

MONDAY, DECEMBER 9, 2019

TIME	HYPERWALL PRESENTATIONS	PRESENTER
6:05 - 6:10 PM	Opening Remarks from NASA's Science Mission Directorate	SMD Leadership
6:10 - 6:25 PM	NASA Earth Science	Sandra Cauffman
6:40 - 6:55 PM	Sun and Moon Together Again: Helio Science from the Moon	Alex Young
6:55 - 7:10 PM	NASA's Black Marble	Kelli Stokes
7:10 - 7:25 PM	Earth's Living Ocean: The Unseen World	Paula Bontempi
7:25 - 7:40 PM	The Artemis Program: Technology and Science Take a Giant Leap Together	Kelsey Young
7:40 - 7:55 PM	Heliophysics: Studying Everything Under the Sun	Nicky Fox

TUESDAY, DECEMBER 10, 2019

TIME	HYPERWALL PRESENTATIONS	PRESENTER
10:15 - 10:30 AM	Remote Sensing Training at NASA	Amber McCullum
10:30 - 10:45 AM	The Global Precipitation Measurement Mission	Gail Skofronick-Jackson
10:45 - 11:00 AM	Tracking Extreme Precipitation for Science and Society	Dalia Kirschbaum
11:00 - 11:15 AM	NASA's Student Airborne Research Program	Emily Schaller
11:15 - 11:30 AM	Observation-Constrained Modeling of the Global Earth System	Steven Pawson
11:30 - 11:45 AM	The Changing Arctic: What Does It Mean for Us?	Patrick Taylor
2019 WINNERS OF THE AGU DATA VISUALIZATION AND STORYTELLING COMPETITION		
12:00 - 1:15 PM	GPU Acceleration for Machine Learning and Visualization of NASA Earth Science Data	Jacob Austin
	Using NASA Earth Observations to Map Landslide Susceptibility and Exposure in the Dominican Republic	Gigi Pavur
	Visualizing Open Astronomy Data with Open-Source Code	Eleanor Lutz
	Towards a Better Understanding of Hydrological Extremes for Hurricane-Resilient Healthcare Infrastructure Modeling	Wen-Ying Wu
FLASH TALKS		
1:20 - 1:27 PM	New Climate Simulations from NASA GISS	Gavin Schmidt
1:30 - 1:37 PM	Exploring Science Data with NASA's STEM Innovation Lab	Troy Cline
1:40 - 1:47 PM	Journeys to Small Worlds	Brian Day
1:50 - 1:57 PM	GAVRT: A Radio Astronomy Project Bringing the Universe to the Classroom	Lisa Lamb/Irene Tzinis
2:00 - 2:07 PM	Astrobiology of Titan's Atmosphere	Conor Nixon
2:10 - 2:17 PM	NASA Carbon Cycle Science Data Discovery	Yaxing Wei
2:20 - 2:27 PM	Writing for Search Engine Optimization	Phil Davis
2:30 - 2:37 PM	Up in Smoke: Mapping Invasive Cheatgrass	Kristen Dennis
2:40 - 2:47 PM	NASA Earth Observations for Sustainable Communities	Amanda Clayton
2:50 - 2:57 PM	Pew! Pew! Pew! User Lasers to Explore the Globe with OpenAltimetry	Amy Steiker/ Steve Tanner
HYPERWALL PRESENTATIONS		
3:15 - 3:30 PM	Exploring the "Life" History of Earth's Newest Land in Tonga: 3D Evolution of Oceanic Islands with Connections to Mars	Jim Garvin
3:30 - 3:45 PM	The Disappearing Martian Atmosphere as Revealed by NASA's MAVEN Mission	Gina DiBraccio
3:45 - 4:00 PM	NASA's Carbon Monitoring System: An MRV Model for the Nation and the World	George Hurtt
4:00 - 4:15 PM	The Trees Around the GLOBE Student Research Campaign: Ground-Based and Satellite Measurements of Tree Height	Brian Campbell
4:15 - 4:30 PM	Earth Observations for Disaster Resilience: A Decadal Imperative	David Green
4:30 - 4:45 PM	Terra is Turning 20	Kurt Thome
4:45 - 5:00 PM	Our Beautiful Planet	Michael Abrams
5:00 - 5:15 PM	NASA's Earth Science Data Systems	Kevin Murphy/ Manil Maskey
5:15 - 5:30 PM	Surface Geology of Mercury	Mallory Kinczyk

WEDNESDAY, DECEMBER 11, 2019

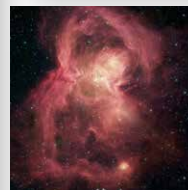
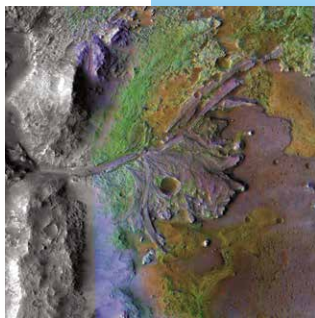
TIME	HYPERWALL PRESENTATIONS	PRESENTER
10:05 - 10:15 AM	NASA Sea Level Change Portal	Carmen Boening
10:15 - 10:30 AM	Dragonfly	Shannon MacKenzie
10:30 - 10:45 AM	Integrating Soil Moisture from Site, Air, and Satellite	Rupesh Shrestha
10:45 - 11:00 AM	Air Quality Research Campaigns Supporting the Preparation for TEMPO	Laura Judd
11:00 - 11:15 AM	Latest Visualizations of Satellite Observed Oceanographic Data	David Moroni
11:15 - 11:30 AM	NASA Harvest	Inbal Becker-Reshef
11:30 - 11:45 AM	Mapping Methane Emissions in California	Andrew Thorpe
2019 WINNERS OF THE AGU DATA VISUALIZATION AND STORYTELLING COMPETITION		
12:00 - 1:15 PM	Estimating the Health Impacts of Air Pollution Using Satellite-Derived Concentration Estimates	Veronica Southerland
	How Do Bedrock Rivers Transport Coarse Sediment? Using UAVs and Field Surveys to Quantify Sediment Transport in Taiwan	Julia Carr
	Investigating Dynamic Earthquake Triggering in the Mariana Subduction Zone Using 3D and 4D Visualization	Amanda Price
	Listening to Eruption Dynamics at Lone Star Geyser, Yellowstone, Using Multivariate Sonification	Anna Barth
FLASH TALKS		
1:20 - 1:27 PM	I've Got My Sights on My Site	Rupesh Shrestha
1:30 - 1:37 PM	sigNals of Opportunity P-band Investigation (SNOPI)	James Garrison
1:40 - 1:47 PM	RainCube: First Cloud and Precipitation Radar in a CubeSat	Ousmane Sy
1:50 - 1:57 PM	Where Do You Want to Go? Find Your Data Pathway	Cynthia Hall
2:00 - 2:07 PM	Accelerating Science with Artificial Intelligence and Machine Learning	Mark Carroll
2:10 - 2:17 PM	Are You at Risk? Linking Hazard and Exposure Data for Research and Applications	Greg Yetman
2:20 - 2:27 PM	Keeping an Eye Out for Disasters with the NASA Disasters Mapping Portal	Lori Schultz
2:30 - 2:37 PM	The Kilometer-Scale GEOS/MITgcm Atmosphere-Ocean Coupled Simulation	Andrea Molod
2:40 - 2:47 PM	Where is My Oceanographic Data and How Do I Get It?	David Moroni
2:50 - 2:57 PM	More than a Hackathon: The NASA International Space Apps Challenge and the Impacts of Mass Collaboration	Ajay Mysore/ Paula Bontempi
HYPERWALL PRESENTATIONS		
3:15 - 3:30 PM	Explore Other Worlds Using NASA Solar System Treks	Emily Law
3:30 - 3:45 PM	NASA's EYES: A Real-Time Solar System Simulator	Jason Craig
3:45 - 4:00 PM	20 Years of Satellite Precipitation Data	George Huffman
4:00 - 4:15 PM	JPSS and Flood Mapping	Mitch Goldberg
4:15 - 4:30 PM	Another Great Year in the Solar System	Lori Glaze
4:30 - 4:45 PM	Planetary Defense	Doris Daou
4:45 - 5:00 PM	New Frontiers in Fire Science	Doug Morton
5:00 - 5:15 PM	Mountain Ice Losses in Venezuela and Colombia Using Landsat Images from 1975 to 2019	Christopher Shuman
5:15 - 5:30 PM	Our Dynamic Worlds	Lori Perkins

THURSDAY, DECEMBER 12, 2019

TIME	HYPERWALL PRESENTATIONS	PRESENTER
10:05 - 10:45 AM	OSIRIS-REx Press Event at the Hyperwall	
10:45 - 11:00 AM	Restricted Earth Return for Astromaterials: Controlled Entry, Landing, and Containment	Michael Calaway
11:00 - 11:15 AM	Advanced Technology Supporting Artemis Science from Moon 2024	Michael Evans
11:15 - 11:30 AM	Airborne Science	Jack Kaye
11:30 - 11:45 AM	By Sea, Air, and Space: NAAMES Wraps Up Five Years of End-to-End Observations of the World's Largest Phytoplankton Bloom	Rich Moore
11:45 - 12:00 PM	Water Clouds, Ice Clouds, and SUPER Super-Cool Clouds	Dave Winker
12:00 - 12:15 PM	Seeing Climate Change by Monitoring Mosquitoes on the Ground, and via Satellites in Space	Russanne Low
12:15 - 12:30 PM	The Ultraviolet Moon	Kurt Retherford
12:30 - 12:45 PM	ScAN	Jim Garvin
12:45 - 1:00 PM	What's up in the Atmosphere?	Richard Eckman
FLASH TALKS		
1:00 - 1:07 PM	Tracking Pollution in the Stratosphere with Satellites and Balloons	Jean-Paul Vernier
1:10 - 1:17 PM	Using the NASA Astrophysics Data System To Be Research Ready	Alberto Accomazzi
1:20 - 1:27 PM	The Hitchhikers Guide to the Galaxy of NASA Data at the NSIDC DAAC	Amy Steiker/Walt Meier
1:30 - 1:37 PM	CHPS and REMI and the Future of Land Imaging	Thomas Kampe/ Dennis Nicks
1:40 - 1:47 PM	Peering Inside of Hurricanes and Typhoons to Sense Rain and Moisture from a Small, Nimble CubeSat	Steven Reising
1:50 - 1:57 PM	Astrobiology: Life at the Energetic Limit	Sanjoy Som
2:00 - 2:07 PM	Upcoming Services for Surface Water at PO.DAAC	Catalina Oaida
2:10 - 2:17 PM	Results from the 2018 NASA GLOBE Clouds Spring Data Challenge	J. Brant Dodson
2:20 - 2:27 PM	Signals of Opportunity: Utilizing all the Electromagnetic Spectrum for Earth Observation	Rashmi Shah
2:30 - 2:37 PM	Exploring Mercury with NASA's Mercury Trek Portal	Brian Day
2:40 - 2:47 PM	Astrobiology: The Search for Life on Exoplanets	Shawn Domagal Goldman
2:50 - 2:57 PM	The Secret to Getting Younger and Thinner: The Story of Arctic Sea Ice Over the Past 35 Years	Walt Meier
HYPERWALL PRESENTATIONS		
3:15 - 3:30 PM	Wildfires and the Carbon Cycle of the Arctic in a Changing World	Peter Griffith
3:30 - 3:45 PM	GEO-Global Wildfire Information System	Vince Ambrosia
3:45 - 4:00 PM	Latest Results from the Mars Science Laboratory Curiosity Rover	Elizabeth Rampe
4:00 - 4:15 PM	Simulating Martian Weather and Climate with the NASA Ames Mars Global Climate Model	Melinda Kahre
4:15 - 4:30 PM	Making Planets: Science in the JSC Experimental Petrology Lab	Kayla Iacovino
4:30 - 4:45 PM	Recent Science Highlights from CERES Data	Norman Loeb
4:45 - 5:00 PM	Machine Learning Applications for Earth Science at NASA IMPACT	Brian Freitag
5:00 - 5:15 PM	Artificial Intelligence-Based Water Science	Grey Nearing
5:15 - 5:30 PM	Interstellar Planetary Probes	Ralph McNutt

FRIDAY, DECEMBER 13, 2019

TIME	HYPERWALL PRESENTATIONS	PRESENTER
9:45 - 10:00 AM	The Deep Space Network: Science from Across and Beyond the Solar System	Joseph Lazio
10:00 - 10:15 AM	Mangrove Mortality from Hurricanes in the Caribbean	David Lagomasino
10:15 - 10:30 AM	Monitoring the Health of the Earth	Danielle Groenen
10:30 - 10:45 AM	NASA POWER: Prediction of Worldwide Energy Resources	Matthew Tisdale
10:45 - 11:00 AM	The James Webb Space Telescope	Stefanie Milam
11:00 - 11:15 AM	Seeing the Forest and the Trees: Making SAR Accessible for Forest Monitoring Around the Globe	Africa Flores
11:15 - 11:30 AM	Aerosols: Effects on Climate and Air Quality	Rob Levy



Detailed Descriptions of Flash Talks

Time/Title	Description	Presenter
Tuesday, December 10		
1:20 - 1:27 PM New Climate Simulations from NASA GISS	What are the latest climate models saying about why climate has changed and what might happen in the future? How do we improve these models using the latest satellite data?	Gavin Schmidt Chief of Lab, NASA Goddard Institute for Space Studies (GISS)
1:30 - 1:37 PM Exploring Science Data with NASA's STEM Innovation Lab	NASA's STEM Innovation Lab is a hybrid makerspace where NASA scientists, engineers and educators may explore and develop new ideas related to infusion of educational technology into STEM activities and programs. During this talk, participants will learn how to connect to the lab through the new STEM Innovation Lab network and see examples of the lab's latest hands-on ideas, including artificial reality (AR) and virtual reality (VR) tools, coding with NASA data and 2D/3D designs.	Troy Cline Educational Technologist/Director, NASA's STEM Innovation Lab
1:40 - 1:47 PM Journeys to Small Worlds	Some of our Solar System's smallest worlds can host some of its biggest surprises! We will use NASA's Solar System Treks data visualization portals to examine amazing discoveries made by NASA's Dawn mission on the dwarf planet Ceres and the planetesimal Vesta. We'll experience some of the magnificent views the Cassini spacecraft provided of Saturn's moons. We will gaze upon the near-Earth asteroids Benu and Ryugu through the eyes of OSIRIS-REx and Hayabusa2.	Brian Day Planetary Mapping and Modeling Lead; NASA Solar System Exploration Research Virtual Institute (SSERVI)
1:50 - 1:57 PM GAVRT: A Radio Astronomy Project Bringing the Universe to the Classroom	With the recent focus on STEAM education and the adoption of the Next Generation Science Standards (NGSS), the demand for real-world learning opportunities has significantly increased. The Goldstone Apple Valley Radio Telescope (GAVRT) Project is a unique partnership between NASA/JPL and the Lewis Center for Educational Research. Through this 20+ year partnership, GAVRT has engaged students, teachers, parents in formal and informal education settings in authentic scientific work. GAVRT participants have an opportunity to join a science/education team to interpret their data, deepen their understanding of the specific campaign, and publish scientific papers. This presentation will share a brief overview of the GAVRT Radio Astronomy Project and provide information for scientists and educators to get involved in this STEAM initiative.	Lisa Lamb President/CEO Lewis Center for Educational Research Irene Tzinis NASA Space Communication and Navigation (SCaN) Data Manager
2:00 - 2:07 PM Astrobiology of Titan's Atmosphere	Titan is the largest moon of Saturn, and the only moon to possess a dense atmosphere, which has some similarities and differences to that of the Earth. Our knowledge of Titan was greatly expanded by the joint NASA/ESA Cassini-Huygens mission that explored the Saturn system from 2004-2017. More recently, Earth-based observations with the ALMA sub-millimeter telescopic array have discovered further complex organic molecules in Titan's atmosphere, expanding the scope for astrochemistry and astrobiology. We will explore what we have learned about Titan's complex atmospheric chemistry, and the ways in which it may inform us about the early evolution of life on Earth, and the search for life on exoplanets.	Conor Nixon Associate Laboratory Chief, Planetary Systems Laboratory, NASA GSFC

Detailed Descriptions of Flash Talks

Time/Title	Description	Presenter
2:10 - 2:17 PM NASA Carbon Cycle Science Data Discovery	<p>Did you know that NASA's Earth observations help us to understand the global carbon cycle? Join us as we explore the wide variety of data available on carbon storage, fluxes, emissions, and atmospheric concentrations and show you how to search for and access these data. We will feature data from the Carbon Monitoring System, the North American Carbon Program (NACP), the Arctic-Boreal Vulnerability Experiment (ABOVE), and airborne measurements from several Earth Venture Suborbital missions, including the Carbon Arctic Reservoir Vulnerability Experiment (CARVE), the Atmospheric Carbon and Transport-America (ACT-America), and the Atmospheric Tomography (ATom) mission.</p>	<p>Yaxing Wei Geospatial Scientist, NASA Oak Ridge National Laboratory DAAC (ORNL DAAC)</p>
2:20 - 2:27 PM Writing for Search Engine Optimization	<p>The science (and art) of writing to capture the attention of search bots and increase your science's search engine profile.</p>	<p>Phil Davis Web Producer, NASA Solar System Exploration Website</p>
2:30 - 2:37 PM Up in Smoke: Mapping Invasive Cheatgrass	<p>In 2012, the Squirrel Creek Fire burned approximately 4,000 (ha) of land within Wyoming's Medicine Bow National Forest, exacerbating the spread of invasive cheatgrass. Partnering with the US Forest Service, a NASA DEVELOP team used NASA satellite data to identify areas of high cheatgrass abundance within the fire boundary. Data products produced by the team can be used by the USFS to analyze the effectiveness of aerial spraying and better inform future land management techniques.</p>	<p>Kristen Dennis NASA DEVELOP Program</p>
2:40 - 2:47 PM NASA Earth Observations for Sustainable Communities	<p>Since 2018, NASA DEVELOP has partnered with Groundwork USA to use Earth science data to address environmental issues in urban areas across the US. Teams have worked with seven local trusts to develop methods that use NASA's Earth observations to map the urban heat island effect, flooding, and land and tree canopy cover that can negatively impact local communities and vulnerable populations.</p>	<p>Amanda Clayton NASA DEVELOP Program</p>
2:50 - 2:57 PM Pew! Pew! Pew! User Lasers to Explore the Globe with OpenAltimetry	<p>NASA's ICESat-2 mission carries a photon-counting laser altimeter that allows scientists to measure the elevation of ice sheets, glaciers, sea ice and more - all in unprecedented detail. A NASA ACCESS project called OpenAltimetry was developed by Scripps, and the San Diego Supercomputer Center with support from NSIDC to address how to visualize this extremely large photon-based datasets. During this demo we will show you how to quickly access and visualize ICESat-2 datasets such as canopy height, bathymetry and ice.</p>	<p>Amy Steiker Data Services Lead, NSIDC DAAC</p> <p>Steve Tanner ICESat-2 and IceBridge Data Operations Manager</p>

Detailed Descriptions of Flash Talks (cont.)

Time/Title	Description	Presenter
Wednesday, December 11		
1:20 - 1:27 PM I've Got My Sights on My Site	Satellite data is extremely useful to scientists who are conducting research at particular locations, but the file formats can be challenging and cutting the data down to just the area of interest can be time-consuming. This presentation will focus on NASA tools to help users identify, subset, visualize and download data for a specific geographical location.	Rupesh Shrestha Geospatial Scientist, NASA ORNL DAAC
1:30 - 1:37 PM Signals of Opportunity P-band Investigation (SNoOPI)	P-band reflectometry is a promising new technique for remote sensing of root-zone soil moisture (RZSM) and snow water equivalent (SWE). The longer wavelength enables penetration of vegetation and soil layers and less phase unwrapping. SNoOPI will be the first spaceborne demonstration of 240-380 MHz reflectometry, testing key requirements of this technology: 1) Signal coherence from various terrains, 2) Robustness to radio frequency interference (RFI), and 3) Operation with uncertainty in source signal and orbit.	James Garrison Professor, School of Aeronautics and Astronautics, Purdue University
1:40 - 1:47 PM RainCube: First Cloud and Precipitation Radar in a CubeSat	RainCube is the first cloud and precipitation radar operated from a CubeSat. Built on a 6U platform, RainCube has demonstrated the capability of Ka-band precipitation radar technologies on low-cost platforms. We will show the variety of storms that have been observed by RainCube since its launch (May 2018), and its ability to capture the morphology of clouds and precipitation. We will also discuss RainCube's potential for future constellations of radars.	Ousmane Sy Engineer, NASA Jet Propulsion Laboratory (JPL), Caltech
1:50 - 1:57 PM Where Do You Want to Go? Find Your Data Pathway	New to using NASA Earth data or not sure how to find the data you need? Topic-based data pathfinders are designed to help guide you through the process of selecting datasets and learning how to use them. They provide direct links to commonly used datasets from across NASA's Earth science data collections and point you to applicable tools that provide different ways of visualizing, transforming, and analyzing the data. Come begin your journey!	Cynthia Hall Community Coordinator, NASA Earth Science Data Systems (ESDS) Program
2:00 - 2:07 PM Accelerating Science with Artificial Intelligence and Machine Learning	Data holdings at NASA are growing at a geometric rate, with an estimated 100 petabytes of Earth science imagery alone. Traditional analysis methods are insufficient to produce answers in a reasonable time frame, so scientists have turned to Artificial Intelligence and machine learning (AI/ML) methods. Several NASA projects are using AI/ML methods in concert with high-performance computing to derive products and inferences from satellite imagery, model outputs, and other image products.	Mark Carroll Data Scientist, Goddard Space Flight Center (GSFC) Computational and Information Sciences and Technology Office

Detailed Descriptions of Flash Talks

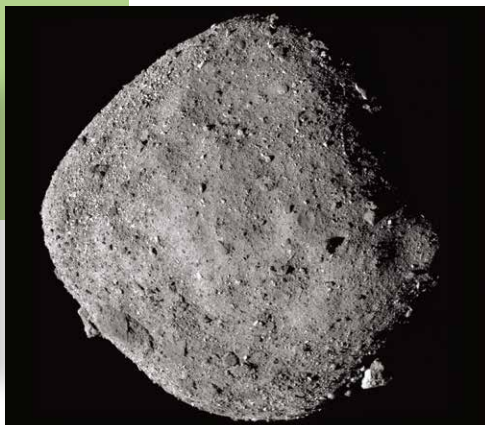
Time/Title	Description	Presenter
<p>2:10 - 2:17 PM</p> <p>Are You at Risk?</p> <p>Linking Hazard and Exposure Data for Research and Applications</p>	<p>Satellites can not only help us monitor many different types of hazards and extreme events, but also map where human settlements, critical infrastructure, and people are in relationship to these risks. Remote sensing data such as night-time lights and high-resolution imagery are helping to revolutionize our ability to assess population exposure and vulnerability to diverse hazards. New tools and apps can make these data readily accessible for both research and real-world disaster mitigation and response.</p>	<p>Greg Yetman Associate Director, Geospatial Applications Division, NASA Socioeconomic Data and Applications Center (SEDAC) Affiliate</p>
<p>2:20 - 2:27 PM</p> <p>Keeping an Eye Out for Disasters with the NASA Disasters Mapping Portal</p>	<p>The NASA Disasters Program leverages its GIS Portal (https://maps.disasters.nasa.gov) to provide NASA disaster-related products to end users in an easy-to-use GIS format that makes the data more discoverable and accessible to non-science users. We will demonstrate how to use the Portal and provide examples of products and applications created by the Disasters Program for recent disasters around the world.</p>	<p>Lori Schultz NASA Disasters Program Marshall Space Flight Center (MSFC) Coordinator</p>
<p>2:30 - 2:37 PM</p> <p>The Kilometer-Scale GEOS/MITgcm Atmosphere-Ocean Coupled Simulation</p>	<p>The model development groups of the Goddard Earth Observing System (GEOS) atmospheric model and the Massachusetts Institute of Technology (MIT) general circulation ocean model have worked to couple the models and produce high resolution coupled simulations. We highlight results from coupled model simulation with 6-km resolution in the atmosphere and 4-km in the ocean, and show examples of the ability to reproduce ocean mesoscale features, which were recently shown to have large impacts on coupled ocean-atmosphere processes.</p>	<p>Andrea Molod Research Physical Scientist, GMAO, NASA/GSFC</p>
<p>2:40 - 2:47 PM</p> <p>Where is My Oceanographic Data and How Do I Get It?</p>	<p>NASA's Physical Oceanography Distributed Active Archive Center (PO. DAAC) has over 500 publicly discoverable datasets spanning dozens of unique science parameters, but as times have changed and datasets have become more diverse, so have the means for discovering, accessing and making the best use of that data. Since June 2019, FTP service has gone away, and with that, we have a number of HTTPS-compatible access services to provide a more secure and user-oriented data access experience. A number of helpful visualization and subsetting services will be showcased.</p>	<p>David Moroni Data Engineer, NASA PO.DAAC</p>
<p>2:50 - 2:57 PM</p> <p>More than a Hackathon: The NASA International Space Apps Challenge and the Impacts of Mass Collaboration</p>	<p>With over 80 countries hosting local events in 2019, the NASA International Space Apps Challenge is known as the largest global hackathon. This annual mass-collaboration event — which challenges participants to use NASA's open data to solve science and technology problems faced on Earth and in space — grew from 25 locations in 2012 to over 225 in 2019, with more than 20,000 participants. The growth of Space Apps is associated with a variety of sociotechnical benefits, ranging from science and technology innovation, to professional development, to international diplomacy. This presentation will review results from the program's latest event in October, 2019, and describe some of the less quantitative impacts that make it a favorite among participants and hosts alike.</p>	<p>Ajay Mysore Technical Lead, Space Apps Program/ Booz Allen Hamilton, NASA Headquarters</p> <p>Paula Bontempi Deputy Director (Acting), Earth Science Division, NASA Headquarters</p>

Detailed Descriptions of Flash Talks (cont.)

Time/Title	Description	Presenter
Thursday, December 12		
1:00 - 1:07 PM Tracking Pollution in the Stratosphere with Satellites and Balloons	The stratosphere matters for climate. After a large volcanic eruption, long-lasting aerosol layers provide a temporary veil that reduce solar radiation and cool the entire planet. Scientists have now discovered that, not only volcanoes, but also pollution from Asia can reach the stratosphere. NASA and ISRO space agencies have team up to study human-induced particulate footprints in the stratosphere with satellite and balloon observations.	Jean-Paul Vernier Project Scientist, National Institute of Aerospace (NIA)
1:10 - 1:17 PM Using the NASA Astrophysics Data System To Be Research Ready	The new Astrophysics Data System allows users to more easily keep up with the scholarly literature and explore it in novel ways. A new set of analytical tools and visualizations allow users to interactively explore research topics, collaborations, and their impact in the literature.	Alberto Accomazzi Principal Investigator, NASA Astrophysics Data System
1:20 - 1:27 PM The Hitchhikers Guide to the Galaxy of NASA Data at the NSIDC DAAC	NASA data sets are getting larger and more complex. Finding, accessing, and downloading data can be a chore. The National Snow and Ice Data Center Distributed Active Archive Center (NSIDC DAAC) has ways to easily search, filter, subset, and customize your data orders that allow users to spend less time getting data and more time doing the fun stuff: science.	Amy Steiker Data Services Lead Walt Meier Senior Research Scientist NASA National Snow and Ice Data Center Distributed Active Archive Center (NSIDC DAAC)
1:30 - 1:37 PM CHPS and REMI and the Future of Land Imaging	The goal of the NASA Earth Science Technology Office (ESTO) Sustained Land Imaging (SLI) program is to identify and validate new Land Imaging technologies that result in lower cost, less resource systems to continue the Landsat mission. The Reduced Envelope Multispectral Imager (REMI) and the Compact Hyperspectral Prism Spectrometer (CHPS) – designed, built and demonstrated by Ball Aerospace – are airborne prototype instruments meant to prove out technologies that can be eventually implemented as a spaceborne remote sensing system. This Flash Talk will introduce the CHPS and REMI instruments, present data from recent aircraft campaigns, and compare the resource requirements of CHPS/REMI based Landsat 10 payloads with the Landsat 8 and 9 payloads	Thomas Kampe Staff Consultant, Optics; Principle Investigator, CHPS Dennis Nicks Senior Program Manager; Principle Investigator, REMI Ball Aerospace and Technologies Corporation
1:40 - 1:47 PM Peering Inside of Hurricanes and Typhoons to Sense Rain and Moisture from a Small, Nimble CubeSat	TEMPEST-D, a weather-observing small, nimble 6U CubeSat, deployed as an experimental satellite in July 2018 and is demonstrating the capability to perform atmospheric science measurements much more accurately than its small size, mass and cost suggest. Now on its second tropical cyclone season in a 400-km (250-mile) orbit above the Earth, TEMPEST-D's multi-frequency microwave sensors observe the interior of hurricanes and typhoons, demonstrating potential scientific capabilities of future trains of TEMPEST satellites.	Steven Reising Professor of Electrical and Computer Engineering, Colorado State University
1:50 - 1:57 PM Astrobiology: Life at the Energetic Limit	Life depends on the energy made available by the environment. In extraterrestrial environments where sunlight may not be accessible to life, energy can be provided by water-rock reactions. The purpose of this talk is to present a new way of quantitatively assessing the energetics of an environment to assess habitability beyond the presence or absence of liquid water.	Sanjoy Som Research Scientist, Blue Marble Space Institute of Science/ NASA Ames Research Center

Detailed Descriptions of Flash Talks

Time/Title	Description	Presenter
2:00 - 2:07 PM Upcoming Services for Surface Water at PO.DAAC	The Surface Water and Ocean Topography (SWOT) mission will be NASA's first mission to measure heights of inland water, along with ocean surface topography. To accommodate oceanographers and the new hydrologist user communities, new services are being built and current services being upgraded. Join us to learn more about the mission, and to hear about the data resources that will be available at NASA's Physical Oceanography Distributed Active Archive Center (PO. DAAC) for working with SWOT datasets	Catalina Oaida Applied Science System Engineer, NASA JPL
2:10 - 2:17 PM Results from the 2018 NASA GLOBE Clouds Spring Data Challenge	The Spring Data Challenge was an initiative conducted by NASA's GLOBE Clouds to collect a large number of citizen scientist cloud observations during 15 March through 15 April 2018. The Challenge exceeded expectations by collecting 55,639 observations from all continents, or 25% percent of the total observations collected for 2018. The data are used to characterize the global cloud properties from a ground-based perspective, in a manner which can be compared with collocated satellite observations.	J. Brant Dodson Research Scientist, Science Systems and Applications, Inc. (SSAI), NASA Langley Research Center
2:20 - 2:27 PM Signals of Opportunity: Utilizing all the Electromagnetic Spectrum for Earth Observation	Signals-of-opportunity (SoOp) re-utilizes satellite transmissions in frequencies allocated for space-to-Earth communications and navigations, enabling microwave remote sensing outside of the limited number of protected bands. As a bistatic radar, SoOp views the Earth in the forward direction differently from radars and radiometers. Sea-surface height, ocean winds, snow water-equivalent, and soil moisture have all been measured in SoOp experiments incorporating frequencies from P- to Ka-band. SoOp instruments are small, low-power, and passive; ideal for small-satellite constellations.	Rashmi Shah Research Technologist, NASA JPL/Caltech
2:30 - 2:37 PM Exploring Mercury with NASA's Mercury Trek Portal	With European and Japanese space agencies' BepiColombo mission on its way to Mercury, we will use NASA's new Mercury Trek portal to explore the exotic terrain of this fascinating world, featuring data gathered from NASA's trailblazing MESSENGER mission. Mercury Trek supports NASA's partnership with the Japanese Space Agency and the BepiColombo mission.	Brian Day Planetary Mapping and Modeling Lead, NASA SSERVI
2:40 - 2:47 PM Astrobiology: The Search for Life on Exoplanets	Do global biospheres similar to Earth exist beyond the solar system? This is one of the driving questions behind the design of some of the concepts and plans for future telescopes. In the next 10 years, extremely large telescopes on the ground will begin a search for atmospheres and potential biosignatures on planets around stars much cooler than the Sun. And concepts for next-generation space-based telescopes describe facilities that could expand that search to planets around more Sun-like stars. This presentation will describe this potential future, and what it could teach us about systems science on our home planet and the neighboring worlds of our Solar System.	Shawn Domagal Goldman Deputy Study Scientist, LUVUOR Mission Concept STDT member, HabEx Mission Concept, NASA Goddard Space Flight Center
2:50 - 2:57 PM The Secret to Getting Younger and Thinner: The Story of Arctic Sea Ice Over the Past 35 Years	The loss of sea ice surface area is well known and data on thickness are getting better, especially with the launch of NASA's Ice, Cloud and land Elevation Satellite (ICESat-2) mission. However, for a longer record, we rely on ice age (how long the ice has survived in the Arctic) as a proxy for thickness (older ice = thicker ice, on average). An updated animation from the NASA Scientific Visualization Studio (SVS) tells a compelling story of older, thicker sea ice types gradually and then rapidly being lost over the last 35 years.	Walt Meier Senior Research Scientist, NASA National Snow and Ice Data Center Distributed Active Archive Center (NSIDC DAAC)



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