



2020 Virtual Workshop Science On a Sphere® Users Collaborative Network December 1-3, 2020



NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION - U.S. DEPARTMENT OF COMMERCE

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20 YEARS
2005-2025

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Welcome to the 10th Science On a Sphere® Users Collaborative Network Workshop

We are delighted to welcome you to our first virtual workshop! Because we will not be convening at an SOS institution this year, NOAA will be the sole host for the workshop. In recognition of NOAA's 50th anniversary in 2020, the theme of the SOS workshop is "[Celebrating NOAA's 50 years of science, service, and stewardship](#)". We hope you'll enjoy learning more about NOAA's history through this [video](#), as well as through the keynote speakers we have planned.

One major advantage of having a virtual workshop is that it allows greater participation. We have 192 registrants representing 78 institutions and 9 countries including Italy, Japan, Germany, India, Mexico, United Arab Emirates, Canada, Taiwan, and the United States. Attendees are also diverse in their expertise, serving as educators, visualizers, scientists, exhibit designers, movie producers, and technologists. This is our largest and most diverse workshop so far!

Our 2020 SOS Workshop organizers also represent geographic diversity. We live and work in different parts of the U.S., from Washington D.C. to New York City to Colorado. However, these geographic names reflect only the most recent settlers of these lands. We believe it is important to recognize these areas' original stewards. We'd like to acknowledge that we are on the traditional territory of the Anacostan, Munsee Lenape, Cheyenne, Arapaho, and Ute nations. Please consider learning about the history of the land where you reside. This site may help: <https://native-land.ca/>.

This year, recognizing the opportunity presented by a virtual format, we broadened the scope of this workshop beyond the SOS User Network to include groups working with and within NOAA on the use of visualizations for education. Therefore, the expanded objectives of this workshop are to:

- Advance awareness of NOAA's global visualizations that are useful for education
- Share best practices in using visualizations for online learning
- Support the needs of the user community of SOS

Supporting these objectives, you all have submitted 39 presentations. For this workshop, we have organized presentations into the three theme areas based on the primary content of the session: education, society, and visualization.

Living through a pandemic has heightened our awareness that we're in a globally connected society and how the actions of one place affect the well-being of another place. The pandemic has also presented significant challenges for us all and at many levels, from personal, professional, institutional, national and global. At the same time, we have been faced with reminders of the significant threats of climate change with a record-breaking hurricane season and devastating wildfires. Both the pandemic and climate change crisis reveal that we are only as strong as the most vulnerable members of our society. To advance as a society, our critical work to increase scientific and environmentally literacy needs to continue and we must prioritize equitable approaches in everything we do. You can learn more about some of the approaches NOAA supports for this work in the Environmental Literacy Program [Theory of Change](#).

We hope this workshop will provide you with new perspectives, approaches, and techniques for your work to engage the public with visualizations and cutting-edge science.

Finally, as with any workshop, the organization of it is a team effort. We hope you'll appreciate the team throughout the next three days of the workshop. And, we'll ask for your patience and understanding as we run into bumps with offering our first virtual workshop. Our sponsor, the North American Association for Environmental Education (NAAEE), is also an essential element that allows this workshop to take place. Thanks to all for their efforts and support.

Sincerely,

Your NOAA SOS Workshop team,

Carrie McDougall, Maggie Allen, Gabrielle Corradino, Beth Russell, Hilary Peddicord, and Stephen Zepecki

Things to know

If you have attended an SOS workshop before, you might notice that we're doing things a bit differently this time due to the virtual format. We have shortened the workshop to 3 half days and we have also shortened the times for each session. We hope these format changes work better in a virtual environment and still allow for ample time for discussion and learning. Presentation formats are as follows:

- *Lightning talks* - These presentations will be made to all participants and are created to appeal to the majority of workshop attendees. Lightning talks are ~ 5 minutes each and have been pre-recorded by the presenter(s). The pre-recorded videos will be viewed through a YouTube link provided at the time listed on the agenda. Attendees can ask questions and make comments in the Google Meet chat throughout the time when everyone is viewing the videos. There will be time for Q & A at the end of each cluster of 4 lightning talks.
- *20-minute breakout session/small-group discussion* - These sessions will be offered concurrently with other sessions, and are meant to be engaging and dynamic with a smaller group of people. Presenters will make brief presentations and ask for feedback or questions from attendees. These sessions are meant to be more interactive with attendees.
- *40-minute breakout session/small-group discussion* - These sessions will be offered concurrently with other sessions, and are meant to be engaging and dynamic with a smaller group of people. Due to the extended time allowed, there will be more emphasis on skill building and technique training in these sessions. These sessions are meant to be more interactive with attendees.

Website: SOS Workshop [website](#)

Social Media: Please use the hashtag #SOSWorkshop2020 in social media posts about this workshop. Also follow/tag us on:

- Twitter: @NOAAeducation, @scienceonasphere
- Instagram: @noaa.education, @scienceonasphere
- Facebook: @NOAAeducation, @scienceonasphere

Theme areas: To assist you in selecting a breakout session that is most relevant to your work, we have grouped sessions into three themes based on the primary content to be covered in the session. The themes are color coded and a legend can be found in the "Agenda-at-a-Glance".

Program format: All presentation titles in the Agenda-At-A-Glance are hyperlinked to the talk description. In the talk description you will find the link to the Google Meet that will allow you to join this session.


Attending a Virtual Meeting

We will be using Google Meet as our virtual platform. The Google Chrome browser is the most compatible with Google Meet and therefore we recommend using this browser. Make sure your Google Chrome browser is [up to date](#). Normally updates happen automatically, but if you haven't closed your browser in a while, you might see a pending update. Learn more about using Google Meet in the [Meet Help Center](#), and visit the official [Google Meets FAQ](#) for further troubleshooting. Here are some additional tips to maximize your experience using this platform:

- Please keep yourself on mute unless you are presenting. We will mute participants if there is extraneous noise. You will likely automatically be muted due to the number of participants when you join the Meet.
- If you are having audio problems, click the three dots in the bottom right corner and check your settings for "Sound and Video". Make sure both are selected and connecting correctly. For more troubleshooting, please check this [website](#). We can also provide you a call-in phone number to connect to the audio, if need be.
- As you enter the workshop, feel free to turn your webcam so we can all see each other. As we begin the plenary, keynotes, and lightning talks, please turn your webcams off. If you are comfortable doing so, we recommend having your webcam on during the Q&A and discussion portions of the concurrent sessions. You also have the option to blur your background or add a virtual background. To do this, click the three dots in the bottom right corner and select "Change background". There, you can blur your background either slightly or completely or choose a virtual background to use. Adding a background can impact your video quality and if it becomes a problem, you should consider blurring the background instead of adding a background image.
- Google Meets has a great chat function, and you can use it throughout a presentation to make comments or ask questions to the presenter. Please keep your chat to topics that are germane to our discussion. We will save the chat at the end of each session.
- To see up to 49 people in "grid view", click the three dots in the bottom right corner and select "change layout" (it has the square and rectangle icon on the top). Then click "tiled" and move the "tiles" bar to 49 for the maximum tiles in view. If grid view is not working, make sure it is turned on in your settings. For further details on troubleshooting, check out this [website](#).
- If everyone keeps freezing, you may need to decrease bandwidth. Go to the bottom right corner click the three dots then select "Settings" then "Video". You can decrease the Sending/Receiving resolution from High Definition to Standard Definition. If this still isn't working, try turning off your camera all together.
- If you're having Internet problems or problems connecting your audio, please request a call-in phone number from us. You can either request this in the chat or email us at sos.workshop@noaa.gov

Agenda At-A-Glance - Day 1




 Virtual Science On a Sphere Users Collaborative Network Workshop TUESDAY - DECEMBER 1, 2020			
1:00 PM ET	Welcome Remarks	Dr. Carrie McDougall, Senior Program Manager, NOAA's Office of Education	
1:20 PM	Opening: SOS - High Tech Telling the Terrific Story of NOAA at 50	RDML Tim Galladuet, Assistant Secretary of Commerce for Oceans and Atmosphere, Deputy NOAA Administrator	
1:35 PM	Keynote: 2020 Hurricane Season and Top Things to Take Away	Ken Graham, Director, National Hurricane Center, NOAA's National Weather Service	
BREAK (2:20 - 2:30 PM)			
2:30 PM	Lightning Talks	Introduction to Lightning Talks	
		Pivoting for a Pandemic: Three SOS Activities that JMU Tried from Home	
		Re-imagining our Learning Community	
		Science on the Sphere at VCU - a collaboration between Life Sciences and Education	
		SOS - Present and Future	
		Lightning Talks Q & A	
BREAK (3:10 - 3:15 PM)			
3:15 PM	Active Remote Learning: SOS Explorer mobile and supplemental technologies for K-12 students	Role of Science City, Kolkata in communicating Science to masses using SOS	Grabbing Real-time Data From Anywhere To Enhance Your Visualizations
3:40 PM		Best practices for science communication with high stakes audiences: Visualizing data from the National Geodetic Survey	
			From fieldwork to prediction to visualization: How scientists forecast Red Tide events
BREAK (4:00 - 4:05 PM)			
4:05 PM	SOS Explorer: Creating Interpretative Programming with Virtual Reach	@NOAASatellites Greatest Hits of 2020: Best Social Media Practices	Using NASA Earth Observations for Spherical Display Systems
END of DAY 1 (4:30 PM)			

AGENDA COLOR LEGEND			
PLENARY	EDUCATION	VISUALIZATION	SOCIETY

Agenda At-A-Glance - Day 2




 2020 Virtual Science On a Sphere Users Collaborative Network Workshop WEDNESDAY - DECEMBER 2, 2020			
1:00 PM ET 1:05 PM	Welcome		
	Updates from the Science On a Sphere Boulder, Colorado Team	SOS Boulder Team	
1:45 PM	Keynote: SOS: How the choreography of our contemplation completes a portrait of our distress Lars Jan, Director, Artist, Writer, and Activist		
BREAK (2:25 - 2:35 PM)			
2:35 PM	Introduction to Lightning Talks		
	Lightning Talks	Using Science On a Sphere to connect science and art	
		Adapting aquarium programs for at-home audiences	
		TV Meteorologists as local climate partners	
Life in the Universe			
Lightning Talks Q & A			
BREAK (3:15 - 3:20 PM)			
3:20 PM	Cartography of Contentment	Glimpses of Science On a Sphere shows developed at VITM, Bangalore India	Innovation in the Time of Covid
	Integrating SOS Technology in the K-12 Classroom		
BREAK (3:40 - 3:45 PM)			
3:45 PM	Making a simple color shaded maps in QGIS for the SoS	Virtual SOS Engagement - Two Case Studies	Visualizing Tsunami Warning Operations
	Tiny tutorials: Supporting virtual learning by making data more accessible		
END of DAY 2 - 4:25 PM ET			

AGENDA COLOR LEGEND			
PLENARY	EDUCATION	VISUALIZATION	SOCIETY

Agenda At-A-Glance - Day 3



 2020 Virtual Science On a Sphere Users Collaborative Network Workshop THURSDAY - DECEMBER 3, 2020			
1:00 PM ET	Welcome		SOS Team
1:05 PM	Keynote: Science On a Sphere: The Creation Story		Dr. Alexander "Sandy" MacDonald, Inventor of Science On a Sphere, Retired Director of NOAA's Earth System Research Laboratory
1:50 PM	Introduction to Lightning Talks		
	Lightning Talks	What's New? Datasets and Visualizations from NOAA Boulder	
		New Datasets from DC	
		SOS as Spherical Cinema	
		NOAA satellites to SOS - where to find and download NOAA satellite imagery	
	Lightning Talks Q & A		
BREAK (2:30 - 2:40 PM)			
2:40 PM	Slide to the Left: Using Microsoft PowerPoint for Entry-Level Dataset Creation	La plastica al giro di boa (Turning the tide on plastic)	Attractive shows for SOS: methodologies for reaching varied audiences
			Small Steps & Major Moves: Building Higher Ed Data Visualization Capacity in an Environment Transformed by COVID-19
BREAK (3:00 - 3:05 PM)			
3:05 PM	Extend your SOS presentations with no-code applications and Story Maps	Keeping it local: how to access the climate data of your own backyard	Teaching the Teachers: Providing Data Visualization Summer Institutes
3:30 PM			Applying and Modifying NOAA Satellite Environmental Data
			BREAK (3:25 - 3:30 PM)
			On the Front Lines with the Underserved: Educating Through Crisis: A Community College Response
BREAK (3:50 - 3:55 PM)			
3:55 PM	Enhancing Visualization Offerings For The Pacific: Movements of Humans and Other Animals	It's Getting Hot in Here: The Story of Arctic Ice Loss	Reimagining a Custom Interactive SOS Field Trip with Kahoot!
			Adding Custom SOS Content with the SOS Visual Playlist Editor
BREAK (4:15 - 4:20 PM)			
4:20 PM	Closing Session		

AGENDA COLOR LEGEND			
PLENARY	EDUCATION	VISUALIZATION	SOCIETY

Detailed Agenda

Day 1 - Tuesday, December 1, 2020

Note: all times shown are Eastern Standard Time (EST = UTC - 5 hours)

Welcome Remarks (1:00 - 1:35 pm)

Carrie McDougall, Senior Program Manager, NOAA Office of Education

SOS - High Tech Telling the Terrific Story of NOAA at 50

Rear Admiral Tim Gallaudet, Ph.D., USN Ret. Assistant Secretary of Commerce for Oceans and Atmosphere & Deputy NOAA Administrator

Join this Session: meet.google.com/zyy-wsna-mde

Keynote (1:35 - 2:20 pm)

2020 Hurricane Season and Top Things to Take Away

Ken Graham, Director, NOAA's National Hurricane Center

Join this Session: meet.google.com/zyy-wsna-mde

Break (2:20 - 2:30 pm)

Lightning Talks (2:30 - 3:10 pm)

Join this session: meet.google.com/zyy-wsna-mde

Pivoting for a Pandemic: Two SOS Activities that JMU Tried from Home

Christie-Joy Hartman, Dhanuska Wijesinghe, and Christy Bradburn (James Madison University)

Re-imagining our Learning Community

Daphne Cook (Metropolitan Community College)

Science on the Sphere VCU - a collaboration between Life Sciences and Education

William Shuart and Robert Tombes (Virginia Commonwealth University)

SOS - Present and Future

Md Aftab Hussain (Srikrishna Science Centre, Patna (NCSM))

Break (3:10 - 3:15 pm)

Concurrent Sessions #1 (3:15 - 4:00 pm)

Active Remote Learning: SOS Explorer mobile and supplemental technologies for K-12 students

Presenters: Nicholas Corcoran and Michael Trumbower (The Wild Center), Hilary Peddicord and Beth Russell (NOAA SOS Boulder)

Join this session: meet.google.com/jzr-izkn-xkn

Explore ways institutions are creating successful and engaging digital programs leveraging the SOSx mobile app and site specific resources. Hear from educators at The Wild Center, NOAA Boulder SOS Team to participate in a collaborative discussion on how to keep digital learning active in today's world.

Grabbing Real-time Data From Anywhere To Enhance Your Visualizations

Presenters: Thomas Quayle and Nathan Wells (Clark Planetarium)

Join this session: meet.google.com/dvv-xxvq-wzb

Real-time data can provide powerful context and provide additional local relevance to specific exhibit spaces and organizational focus as a whole. In this session, participants will be shown ways to integrate real-time data found across the internet and how that information can be used to augment both existing standard and real-time datasets, as well as personally customized ones.

The tools we will use will focus specifically on how to adapt Python, the scripting program that coordinates Science On a Sphere with PowerPoint to supplement datasets. For organizations that do not use supplemental screens, we will show how to convert these slides for use as pips.

During the presentation, we will show a series of examples that will include real-time data for earthquakes, space weather, near-earth asteroids and others. We will also offer to provide additional support beyond the session to help organizations with this process or concepts for use. All participants will receive access to the files and tools presented in this session, as well as an instruction guide to assist in implementing their use.

From fieldwork to prediction to visualization: How scientists forecast Red Tide events

Presenters: Teresa McTigue and Steve Kibler (NOAA National Centers for Coastal Ocean Science), Yizhen Li (Consolidated Safety Services, under contract with NOAA)

Join this session: meet.google.com/oav-exuz-oqz

Learn about the science behind the development of a SOS dataset: During spring and summer months, the Gulf of Maine has red tide events caused by blooms of a phytoplankton species called *Alexandrium catenella*. The algae contains a small amount of a toxin, which accumulates in the gut of filter feeding bivalves. Consumption of the bivalves can lead to paralytic shellfish poisoning (PSP), a severe and at times fatal illness in humans. To help state and federal agencies to prevent exposure, NOAA scientists and their partners have developed a forecast that gives managers warnings as to whether it will be a good or bad year for red tide events and then when and where the algal blooms are likely to occur during the season. We will take participants through how a forecast is developed, from field sampling to lab work to data analysis and prediction. Scientists involved with each step of the process will discuss their work and answer questions.

Concurrent Sessions #1a (3:15 -3:35 pm)

Role of Science City, Kolkata in communicating Science to masses using SOS

Presenters: Subha Sankar Ghosh and Partha Saha (National Council of Science Museums, Ministry of Culture, Government of India)

Join this session: meet.google.com/vge-zqmk-hkr

SOS is a very powerful medium that can be used to disseminate different aspects of Science to different sections of Society, in a unique way. We are exploring new ways to make it even more effective. In addition, we would like to propose some ideas that may be discussed with other members.

Break (3:35 - 3:40 pm)

Concurrent Sessions #1b (3:40 -4:00 pm)

Best practices for science communication with high stakes audiences: Visualizing data from the National Geodetic Survey

Presenter: Brian Shaw (NOAA's National Geodetic Survey)

Join this session: meet.google.com/cao-kreb-hep

Since the SOS was first installed at the NOAA HQ in Silver Spring I developed National Geodetic Survey data visualizations for SOS to help inform decision-making constituents, employees and guests about our products and services. NGS will be updating the National Spatial Reference System (NSRS) in upcoming years and this platform has provided a unique opportunity to show some of the expected changes and data collections done to help enhance NOAA and SOS visualizations and share my experiences creating data visualizations, giving presentations and showcasing the SOS for VIP audiences.

Break (4:00 - 4:05 pm)

Concurrent Sessions #2 (4:05 - 4:25 pm)

SOS Explorer: Creating Interpretative Programming with Virtual Reach

Presenter: Justin Umholtz (Mokupāpapa Discovery Center for Papahānaumokuākea Marine National Monument)

Join this session: meet.google.com/hsm-nbej-vzq

How do we better engage visitors and students with an SOS Explorer exhibit? Can we create custom content for an in-person and virtual audience? The SOS Explorer's Tour Builder feature allows us to develop interpretive programs customized to our sites, serving as both an in-house exhibit and a potential virtual learning platform. In this presentation, I provide an example of an interpretive tour created for Papahānaumokuākea Marine National Monument's Mokupāpapa Discovery Center, located in Hilo, Hawai'i. The SOS team has selected this tour to share across the SOSX platforms including both exhibits and the SOSX App. The tour utilizes datasets and other media to create an interactive narrative of the formation of the Hawaiian Archipelago, the progression toward coral atoll, and the cultural and natural significance of the Northwestern Hawaiian Islands. We will discuss the strengths and limitations of the platform for creating customized content as well as our strategies to leverage the virtual reach of the SOSX App during the current pandemic and beyond.

@NOAASatellites Greatest Hits of 2020: Best Social Media Practices

Presenters: Sara Leeds and Lyric Prince (NOAA NESDIS)

Join this session: meet.google.com/rqv-rybn-kys

NOAA's Satellite and Information Service provides essential environmental information to the world and shares compelling satellite imagery on social media. This presentation will discuss the team's best practices on how they present weather media across different social media platforms as well as how they utilize both free and paid tools to do this. Finally, the talk will delve into the team's successes (and near-misses) that they have learned from over the course of a 12-month period as well as how analytics have helped them strategize to perform optimally in the fast-paced world of social media.

Using NASA Earth Observations for Spherical Display Systems

Presenter: Andi Thomas (NASA)

Join this session: meet.google.com/gdo-jbbx-pcx

NASA Earth Observations (NEO) provides global visualizations of NASA Earth science data. With over 50 datasets to choose from at various spatial and temporal resolutions, this presentation will focus on providing users with the right tools to customize NEO imagery to their needs. In an effort to further support the Science on a Sphere community, we will also leave time to work together with the workshop participants on how to improve our site for integrating NASA Earth science data into spherical display systems.

Day 2 - Wednesday, December 2, 2020

Note: all times shown are Eastern Standard Time (EST = UTC - 5 hours)

Welcome (1:00 - 1:05 pm)

Join this session: <https://meet.google.com/mdw-bhbg-agu>

Updates from the NOAA SOS Boulder Team (1:05 - 1:45 pm)

Presenters:

Jebb Stewart, Informatics and Visualization Branch Chief

Beth Russell, Operations Manager

Keith Searight, Lead Software Engineer

Ian McGinnis, Software Engineer

Shilpi Gupta, Software Engineer

Eric Hackathorn, Developer

Hilary Peddicord, Education Specialist

Alexander Kirst, Software Engineer

Evan Sheehan, Web Developer

Join this session: <https://meet.google.com/mdw-bhbg-agu>

Get the latest from the SOS NOAA Boulder Team! We'll update you on what we've been up to and what we are excited about. There will be time at the end for your questions.

Keynote (1:45 - 2:25 pm)

[SOS: How the choreography of our contemplation completes a portrait of our distress](#)

Lars Jan, Director, Artist, Writer, and Activist

Join this session: <https://meet.google.com/mdw-bhbg-agu>

Break (2:25 - 2:35 pm)

Lightning Talks (2:35 - 3:15 pm)

Join this session: <https://meet.google.com/mdw-bhbg-agu>

Using Science On a Sphere to connect science and art

Kathryn Semmens (Nurture Nature Center)

Adapting aquarium programs for at-home audiences

Emily Yam and Staci Wong (Aquarium of the Pacific)

TV Meteorologists as local climate partners

Joe Witte (Aquent/Jet Propulsion Laboratory/NASA)

Life in the Universe

Maurice Henderson (NASA)

Break (3:15 - 3:20 pm)

Concurrent Sessions #3 (3:20 - 3:40 pm)

Cartography of Contentment

Presenter: Bob Raynolds (Denver Museum of Nature & Science)

Join this session: meet.google.com/szc-kuvk-wcb

Before Covid, the Denver Museum of Nature & Science offered short format evening classes for members on Human Geography, involving two hours of contact time with SOS and two hours of contact time in the Planetarium Dome using Uniview. The class format was limited to 25 participants to permit gathering in front of the sphere as well as in-depth audience participation. We featured the Museum playlist "See The People" on SOS. This includes data bases showing global population distribution, global population growth rates through time (babies per mother data set), global agriculture, global literacy, global life expectancy, and self reported global contentment indexes. The goal on the SOS was to illustrate global patterns and to place Colorado in context. Our discussions centered on the factors that make for quality of life and some of the global trends including climate change that are developing as threats to contentment. In the Dome we could push deeper and discuss patterns of urbanization and human dispersal; here we helped people realize how fortunate we are to be situated in the western United States.

We are now using remote programming through the Museum's Digital Earth series, a virtual evening event using OpenSpace software to offer global topical tours.

Glimpses of Science On a Sphere shows developed at VITM, Bangalore India

Presenter: Sadhana Attavar (Visvesvaraya Industrial and Technological Museum Bangalore India)

Join this session: meet.google.com/dpd-qpkr-nwm

This program gives the glimpses of various Science on a Sphere shows developed at Visvesvaraya Industrial and Technological Museum Bangalore India for the benefit of visitors of the museum. It also covers the various online activities being organized by the museum during Covid Pandemic.

Innovation in the Time of COVID

Presenter: Eric Hackathorn (NOAA SOS Boulder)

Join this session: meet.google.com/dei-ikje-gqm

It's safe to say most of our lives have been turned upside-down in 2020. Traditional techniques used with SOS for education don't translate well in a sphere-less society. This talk will discuss new ideas and development initiatives within the SOS team and demoing prototypes of a few activities. Examples potentially include a multi-user web-based sphere and visualizing high resolution tiled datasets for SOS Explorer mobile.

Integrating SOS Technology in the K-12 Classroom

Presenters: Rachel Wellman (Boca Raton Community High School), Lauren Butcher (FAU Pine Jog Environmental Education Center), Kelly Fallon (Linux Systems Administrator, PBCSD Volunteer)

Join this session: meet.google.com/ooa-fvsg-jux

NOAA's Science on a Sphere (SOS) technology has provided a new way for formal educators to present environmental data to students from Kindergarten to 12th grade seniors at Galaxy E3 Elementary School and Boca Raton Community High School in South Florida. Dr. Rachel Wellman started working for the Palm Beach County School District (PBCSD) at Galaxy as a STEM teacher/coordinator for 650 students and adopted the SOS technology as an essential part of her classroom in 2015. In 2016, she transferred to Boca High to teach science, specifically chemistry, environmental science, biology, and the Cambridge (UK) courses AICE Environmental Management and AICE Marine Science (~150 students a year). She and her husband, Kelly Fallon, a Senior Engineer and Linux Systems Administrator for Royal Caribbean Group, have volunteered their time for the past 5 years to help keep the technology going and organized field trips for her high school students to also take advantage of the SOS technology. Datasets have been used to help students understand atmospheric and oceanic circulation patterns, migration patterns, and learn geographic features and relationships. The video shorts have also been helpful in capturing student attention. This session is intended to share Dr. Wellman's experience with SOS in the classroom, her collaborations with district schools and FAU Pine Jog Environmental Education Center, future plans to incorporate SOS technology to help students and teachers learn and communicate climate change science and community resilience plans, and to leave time for open discussion.

Break (3:40 - 3:45 pm)

Concurrent Sessions #4 (3:45 - 4:25 pm)

Making a simple color shaded maps in QGIS for the SoS

Presenter: Amanda Tickner (Michigan State University)

Join this session: meet.google.com/zrg-xkaj-uym

This workshop will teach the basics of QGIS, the free open source geospatial software. Participants will learn how to make a choropleth (color shaded) map to create their own custom content for the SoS.

Virtual SOS Engagement - Two Case Studies

Presenters: Nick VanAcker (Michigan State University) and Jordan Rice (Science City at Union Station)

Join this session: meet.google.com/tny-kjfs-wit

The Michigan State University Museum and Science City at Union Station have spent the last 6 months virtually engaging visitors with online live shows, pre-recorded video, and social media content. Together, they've reached over 11,000 virtual visitors using Science on a Sphere since March 2020. Join us for a lively discussion about successes, failures, and tips for taking your sphere into the virtual realm!

Visualizing Tsunami Warning Operations

Presenters: Nathan Becker (NOAA/NWS/Pacific Tsunami Warning Center) and Leon Geschwind (NOAA/OCAO/Inouye Regional Center)

Join this session: meet.google.com/ihb-zavt-seb

Tsunami science is complex and difficult to visualize as the effects of these phenomena are multifaceted and yield far-reaching consequences, but Science on a Sphere (SOS) is a powerful visualization tool and an ideal medium for showcasing the truly global impact of tsunamis.

In this session, we will showcase the Pacific Tsunami Warning Center's (PTWC) catalog of historic tsunami animations (<http://bit.ly/ptwc-tsunamis>) for SOS and SOS Explorer. Not only do these animations show the propagation of tsunami waves, they also show their impacts to coastlines, the criteria that PTWC uses to determine the tsunami hazard guidance it will issue to the coastal populations it serves. PTWC created these animations using the same tsunami forecast model it routinely uses in its warning operations, so these animations can also help prepare docents and audiences to interpret PTWC's animations of future tsunamis, which may even be available in real-time. In addition, you will get a behind the scenes 360 virtual tour of PTWC operations and will have an opportunity to provide feedback on future tsunami outreach initiatives such as the upcoming 10th anniversary of the 2011 Japan tsunami.

Tiny tutorials: Supporting virtual learning by making data more accessible

Presenter: Bekkah Lampe (NOAA's Office of Education)

Join this session: meet.google.com/dra-kboa-ums

Data drives science and many people, including educators, want to be more engaged with scientific data. But data can be difficult to navigate because many data products are designed for technical users. Sometimes the hardest part is getting through the first few clicks. Working with education specialists and subject matter experts, we have made a collection of "tiny tutorials," designed to break the barrier of entry for some of NOAA's data websites. In this session, we will discuss our process for making the tiny tutorials and hopefully inspire you to make some of your own! Explore our tiny tutorials at noaa.gov/tiny-tutorials.

Day 3 - Thursday, December 3, 2020

Note: all times shown are Eastern Standard Time (EST = UTC - 5 hours)

Welcome (1:00 - 1:05 pm)

Join this session: meet.google.com/opo-pjqz-jqo

Keynote (1:05 - 1:50 pm)

[Science On a Sphere: The Creation Story](#)

Dr. Sandy MacDonald, inventor of SOS and Retired Director of NOAA's Earth System Research Lab

Join this session: meet.google.com/opo-pjqz-jqo

Lightning Talks (1:50 - 2:30 pm)

Join this session: meet.google.com/opo-pjqz-jqo

[What's New? Datasets and Visualizations from NOAA Boulder](#)

Beth Russell (NOAA Boulder/CIRES)

[New Datasets from DC](#)

Stephen Zepecki (NOAA's Office of Education)

[SOS as Spherical Cinema](#)

Kate Raisz (42 Degrees North Media)

[NOAA satellites to SOS - where to find and download NOAA satellite imagery](#)

Rafael de Ameller (NOAA NESDIS)

Break (2:30 - 2:40 pm)

Concurrent Sessions #5 (2:40 - 3:00 pm)

Slide to the Left: Using Microsoft PowerPoint for Entry-Level Dataset Creation

Presenter: Nick VanAcker (Michigan State University)

Join this session: meet.google.com/ecx-kjvu-rfg

Interested in delving deeper into content creation for SOS, but don't have photo-editing or GIS software? Do you want to allow voices in your community to easily create Sphere content? Presentation programs like Microsoft Powerpoint and Google Slides are widely accessible and can be used to create beautiful, animated datasets for Science On a Sphere! This talk highlights tips and tricks on using this software to create datasets and feature the real-time creation of a new dataset using PowerPoint.

La plastica al giro di boa (Turning the tide on plastic)

Presenter: Paolo Degiovanni (MuSe - Science Museum, Trento, Italy)

Join this session: meet.google.com/stm-netb-ghq

Where does litter go once left in the environment? Can it be harmful for animals? Are Garbage Islands real? What can we do to face this massive problem?

We are very proud to present our brand new Science Show "Turning the tide on Plastic"!!!

It's about the massive problem of litter in the environment, especially plastic waste.

In a nutshell, this Science Show mixes engaging hands-on activities with datasets and images shown on SOS.

Furthermore, what makes the difference is an exhibition set up directly under the SOS: a blue rope, 5 location pins, a puppet pelican, some fake plastic soup, a rubber band and other stuff are the main ingredients of this activity.

Basically, it's the fictional journey of a plastic waste along a river flowing down from the mountains all downstream directly to the seas and the oceans.

Our prime target is the general public, mainly during weekends and it lasts about 20 minutes. But it was also designed for students, from Elementary to High School, simply adding insights and other practical activities that last longer.

So, ready, steady, go!

Take a seat and....enjoy the presentation!

Attractive shows for SOS: methodologies for reaching varied audiences

Presenter: Amitabh Singh (Srikrishna Science Centre (NCSM))

Join this session: meet.google.com/kci-tkwd-iuy

SoS is an effective tool for visualizing complex scenarios. My presentation goes around developing new attractive & informative shows for visitors especially School children from Class 8th to 12th. I shall discuss a methodology for developing these shows and try to cover most of the issues pop up during survey of SoS network peoples.

Small Steps and Major Moves: Building Higher Ed Data Visualization Capacity in an Environment Transformed by COVID-19

Presenter: Vetrica Byrd (Purdue University)

Joining this sessions: meet.google.com/wdu-ubso-rqd

This talk will discuss the redesign of an introductory data visualization college course to meet COVID guidelines for social distancing. Ordinarily, the class meets twice a week with a lecture/lab format each class session and is taught in-person. The college students taking the class have little to no background in data visualization. One of the hallmarks of the class is the ability to create visualizations in class and engage in-person for presentations and critiques. This semester, in-person engagement has been reshaped to address challenges encountered while providing COVID compliant delivery of content. In this talk small steps and major moves made to keep and maintain class participation and engagement while building data visualization capacity of students are discussed. Students' perception of the efforts to foster class participation and engagement are also presented.

Break (3:00 - 3:05 pm)

Concurrent Sessions #6 (3:05 - 3:50 pm)

Extend your SOS presentations with no-code applications and Story Maps

Presenter: Dan Pisut (Esri)

Join this session: meet.google.com/fzj-cnbw-gko

Fewer people are able to come to museums and science centers, which means that we need to bring our brand of informal education into the home. There are some amazingly simple tools that can help extend the educational value of your SOS and other educational programs. In this demonstration, we'll show how to take your SOS presentation and convert it into a multimedia online presentation. We'll be covering downloading the SOS imagery or movie files, building an application without any coding using StoryMaps, and even embedding other real-time maps and apps, like the COVID-19 Dashboard, or other ready to use data layers and maps from Living Atlas of the World. Have a presentation you'd like to suggest working on? Email dpisut@esri.com. Please register for a free ArcGIS Online account in advance so you can follow along.

Keeping it local: how to access the climate data of your own backyard

Presenter: Tom Di Liberto (CollabraLink - NOAA OAR/CPO - Climate.gov)

Join this session: meet.google.com/kuz-sqgn-oma

A walkthrough of climate resources from the US Climate Resilience Toolkit and Climate.gov to bring climate change to a local level, no matter where you live. This will include a presentation walkthrough of resources as well as how to navigate the Climate.gov and Toolkit websites along with a hands on session where attendees will get a chance to create their own maps on a particular climate change topic.

Applying and Modifying NOAA Satellite Environmental Data

Presenters: Rafael de Ameller and Vivek Goel (NOAA NESDIS)

Join this session: meet.google.com/pta-nxfy-ewi

For more than ten years, the NOAA Environmental Visualization Laboratory (VizLab) has provided real-time content for SOS installations. In this talk, VizLab staff members will provide a behind-the-scenes look at how we use third-party tools to convert scientific datasets to global color images, to ultimately to be used in applications such as Science On a Sphere.

Concurrent Sessions #6a (3:05 - 3:25 pm)

Teaching the Teachers: Providing Data Visualization Summer Institutes

Presenters: Denice Blair, Amanda Tickner, and Teresa Goforth (Michigan State University)

Join this session: meet.google.com/ewh-hibc-owv

Could a summer institute be a good way for you to teach educators how to incorporate SOS into their teaching? In 2019, we were installing Science On a Sphere in our university museum and wanted to start engaging faculty and graduate students right away in content creation for teaching. With two campus partners, we hosted a week-long summer institute focused on exploring three data visualization technologies: the museum's SOS, the library's 360 Room, and the planetarium's dome. Participants learned about the three technologies, data visualization, and creating their own teaching modules for upcoming courses incorporating one or more of the technologies. In 2020, we again hosted the summer institute as an online program. This session will describe the "summer institute" format and discuss how collaborating with partners strengthened the program and made it easier to provide. It will emphasize how the summer institute format was used to quickly teach participants how to incorporate data visualization using SOS into their teaching, along with comparing the in-person and online program designs. Also, it explores the ways an immersive display "ecosystem" can emerge in or among organizations.

Break (3:25 - 3:30 pm)

Concurrent Sessions #6a (3:30 - 3:50 pm)

On the Frontlines with the Underserved: Educating Through Crisis: A Community College Response

Presenters: Daphne Cook and Gary Girard (Metropolitan Community College)

Join this session: meet.google.com/byx-dwvi-ijs

MCC re-purposed its North Express Learning Center into a Community Learning Hub to provide a safe and sanitary space for students to maintain a continuity of learning. Engage all students in integrated K-8 STEAM based enrichment activities. An environment that connects students with resources and opportunities that will provide them with the support needed to stay on track academically. Central to the mission of this new endeavor was NOAA's Science on a Sphere which exposed learners to global perspectives in terms of solar systems, global warming, horticulture, water and a variety of relevant current events. MCC teamed up with TinkRworks to create a unique planetary system to work in concert with the SOS. This hands-on Planetary Pathway which creates a rotating model of the Sun, Earth and Moon. This STEM project includes electronics, a motor to drive the model and lights to illuminate the sun. While working on this hands-on project, we utilized the Science on a Sphere to bring to life elements of the Sun, Earth and Moon to further explain the relevance of the solar system. In addition, we were able to immediately answer questions students had by demonstrating other datasets.

Break (3:50 - 3:55 pm)

Concurrent Sessions #7 (3:55 - 4:15 pm)

Enhancing Visualization Offerings For the Pacific: Movements of Humans and Other Animals

Presenters: Andy Collins (NOAA Papahānaumokuākea Marine National Monument) and Leon Geschwind (NOAA Inouye Regional Center), and Justin Umholtz (NOAA Mokupāpapa Discovery Center)

Join this session: meet.google.com/poe-wkdm-crk

While there are a good number of visualizations and data sets for the Pacific, there are not many that tell the story of human and other animal movements across the largest ocean. The story of human colonization and traditional voyaging in the Pacific, ship movements and shipwrecks during the whaling era, migrations of humpback whales, and foraging patterns of seabirds from the Hawaiian Archipelago are all stories of interest. For many of these we have very good datasets and matching narratives that could bring the Pacific to life on SOS. This discussion will focus on these stories of interest, and solicit input on available data sets, story ideas, and other complementary tours, data sets and story lines. This workshop will be of particular interest to SOS customers around the Pacific.

It's Getting Hot in Here: The Story of Arctic Ice Loss

Presenters: Mars Knight and Sarah Vise (Science Central)

Join this session: meet.google.com/ggq-vfsr-gjk

This presentation discusses effective global climate change teaching tools and highlights the importance of motivating people toward action, by unveiling a new dataset covering arctic ice minimums. Mars A. Knight is the INSGC Science On a Sphere intern at Science Central; during their internship, Mars has focused on bringing climate change education into classrooms and living rooms by creatively combining the sleek technology of Science On a Sphere with simple, tangible experiments to highlight the negative impacts humans have on the Earth. Mars maintains this passion for climate education as a co-lead of the Motivational Presenting Project for Citizens' Climate Lobby. Using experience gained at Science Central and tools provided as a National Geographic Certified Educator, Mars hopes to continue to inspire future climate scientists into action. Sarah E. Vise, B.S. in Physics and Astronomy, is the Science On a Sphere Coordinator at Science Central; passionate about space and her cat, Sarah strives to encourage young women to pursue STEM careers. She will be actively moderating the chat during the presentation.

Reimagining a Custom Interactive SOS Field Trip with Kahoot!

Presenter: Patrick Rowley (Richmond Science Center, CCPS)

Join this session: meet.google.com/isx-kobm-htt

Sunny & Friends, one of our very first original SOS programs from our opening year, and debuted at the SOS Workshop in Portland in 2015, is one of our most popular SOS field trip experiences. Being part of a public school system, we are still conducting field trips, but virtually for 2020-21. Sunny & Friends, being so popular, had to make it into the virtual experience. But how? Being a unique interactive program, with animated characters asking students questions and "talking" to the facilitator, an adaptation to virtual certainly took some reimagining. The Kahoot! platform allowed for the interactivity, while recording the SOS presentation with the facilitator allowed for the characters to still talk to him. Join us for this presentation and experience the program for yourself!

Adding Custom SOS Content with the SOS Visual Playlist Editor

Presenters: Beth Russell and Shilpi Gupta (NOAA SOS Boulder)

Join this session: meet.google.com/qtd-cnet-iam

Join Shilpi and Beth for a quick refresher tutorial on the Visual Playlist Editor. They will go over the basics of the playlist editor, how to create a presentation, how to add a new custom dataset, and how to add image and text PIPs. Questions are welcome along the way.

Break (4:15 - 4:20 pm)

Closing Session (4:20 - 4:30 pm)

Presenters: Carrie McDougall and NOAA Office of Education Leadership

Join this session: meet.google.com/opo-pjqz-jqo

Make sure to pop in to hear closing remarks from NOAA's Office of Education as well as the next steps for the network and our efforts together. Also, we'll announce the answers to the trivia questions and the winners.

Keynotes

Rear Admiral Tim Gallaudet, Ph.D., USN Ret.

Assistant Secretary of Commerce for Oceans and Atmosphere &
Deputy NOAA Administrator

Opening Address

SOS - High Tech Telling the Terrific Story of NOAA at 50

Tuesday, December 1, 1:20 - 1:35 pm EST

Biography: Rear Admiral Tim Gallaudet, Ph.D., US Navy (ret) is the Assistant Secretary of Commerce for Oceans and Atmosphere and Deputy Administrator of the National Oceanic and Atmospheric Administration (NOAA). From 2017-2019 he served as the Acting Undersecretary of Commerce for Oceans and Atmosphere and NOAA Administrator. Before these assignments, he served for 32 years in the US Navy, completing his service in 2017 as the Oceanographer of the Navy. In his current position, Rear Admiral Gallaudet leads NOAA's Blue Economy activities that advance marine transportation, sustainable seafood, ocean exploration and mapping, marine tourism and recreation, and coastal resilience. He also directs NOAA's support to the Administration's Indo-Pacific Strategy, oversees NOAA's Arctic research, operations, and engagement, and is leading the execution of the NOAA science and technology strategies for Artificial Intelligence, Unmanned Systems, 'Omics, Cloud, Data and Citizen Science. Additionally, Gallaudet chairs or co-chairs several interagency bodies, including the US Coral Reef Task Force, the Alaska Mapping Executive Committee, and the Ocean Resources Management Subcommittee (ORM) under the White House Ocean Policy Committee (OPC), of which he is also a member. Other committees on which he serves include the National Science and Technology Council's (NSTC) Select Committee on Artificial Intelligence, the NSTC Committee on STEM Education, the Policy Coordination Committees (PCCs) under the National Security Council (NSC) on Pacific Island Countries, the Arctic, and Maritime Security, and the Executive Steering Group of the National Space Based Positioning, Navigation, and Timing (PNT) Executive Committee. Rear Admiral Gallaudet has a Bachelor's Degree from the U.S. Naval Academy and a Master's and Doctorate Degree from Scripps Institution of Oceanography, all in oceanography.



Ken Graham

Director, National Hurricane Center, NOAA's National Weather Service

2020 Hurricane Season and Top Things to Take Away

Tuesday, December 1, 1:35 - 2:20 PM EST

Biography: Ken Graham is the Director of the NOAA National Hurricane Center in Miami, Florida. He received his Bachelor of Atmospheric Science Degree at the University of Arizona, and earned a Master of Science Degree in Geosciences from Mississippi State University. While in Mississippi, he was a broadcast meteorologist for a CBS affiliate and was an agricultural meteorologist for the Mississippi Network Radio.



Ken began his career with NOAA in 1994 as an Intern Forecaster at the National Weather Service (NWS) in New Orleans. His career took him to the agency's Southern Region Headquarters in Fort Worth, Tex., as the Marine and Public Program Manager during National Weather Service Modernization in the early 1990s. He became the Meteorologist-in-Charge (MIC) at NWS forecast offices in Corpus Christi, Tex., and Birmingham, Ala., where the office was awarded the Department of Commerce medal each year (2001-2005) for innovative services, such as Instant Messaging with television stations during critical events such as the Veteran's Day Tornado Outbreak.

He has served as Systems Operations Chief at Southern Region Headquarters where he won a Bronze Medal for leading a team to make critical repairs in New Orleans following Hurricane Katrina. He moved to Washington D.C. to be Chief of Meteorological Services where he worked closely with partners to improve services and briefed Congressional Committees. He then served as the MIC at the NWS New Orleans/Baton Rouge office, during which time the office won the Department of Commerce Bronze medal for innovative services during Hurricane Gustav and Ike, the National Weather Association's Operational Meteorology Award, and was included in the Department of Commerce Gold Medal Award for Decision Support Service that was presented to NOAA for the Deepwater Horizon oil spill. Ken received the National Weather Museum's Weather Hero Award for 2010.

Ken has extensive experience working directly with emergency managers during numerous high impact events, including nearly two decades along the U.S. coast. He has deployed to emergency operations centers, provided Impact Based Decision Support Briefings for emergency managers and elected officials, and delivered numerous training sessions and exercises related to tropical weather. Ken was elected a board member of the Louisiana Emergency Preparedness Association, is a member of the National Weather Association and the American Meteorological Society, and is a licensed HAM Radio Operator. He is also Chair of the World Meteorological Organization RA-IV.

Lars Jan

Director, Artist, Writer and Activist

SOS: How the choreography of our contemplation completes a portrait of our distress

Wednesday December 2, 1:45 - 2:25 PM EST

Biography: The son of émigrés from Afghanistan and Poland, Lars Jan is a director, artist, writer, and activist known for visually striking, genre-bending performance and



installation works exploring emerging technologies, live gatherings, and unclassifiable experience. Jan's original works — including *The White Album*, *Holoscenes*, *The Institute of Memory (TIME)*, *Abacus*, and *Slow Moving Luminaries* — have been presented by BAM Next Wave Festival, Whitney Museum, Sundance Film Festival, Art Basel, CAP UCLA, Center Theatre Group, Under the Radar Festival, PICA's TBA Festival, ICA Boston, YBCA, Wexner Center, On the Boards, Toronto Nuit Blanche, London's Burning Festival, Poland's Boska Komedia Festival, NYU Abu Dhabi, Istanbul Modern, and The Sydney Festival.

He is a recipient of 2008 Sherwood and 2016 YBCA100 Awards, and is the winner of the 3rd Audemars Piguet Art Commission. His climate change-themed installation, *Holoscenes*, created a sensation in Times Square, coinciding with the U.S. withdrawal from the Paris Climate Accords. His recent staging of Joan Didion's seminal essay *The White Album* culminates with a Quaker-style conversation around themes of protest. He is a TED Senior Fellow and Sundance New Frontier Story Lab advisor. Lars is represented by Charlie James Gallery and on faculty at CalArts. Visit his website here: <https://earlymorningopera.com/> Lars is also the director and writer of the SOS movie *HOLOSCENES / Little Boxes*.

Lars will walk through several projects which address the climate crisis in public space, as he tries to understand how the tactical disempowerment of artists may foreshadow the relegation of scientists.

Dr. Alexander “Sandy” MacDonald

Inventor of Science On a Sphere

Retired Director of NOAA’s Earth System Research Laboratory

Science On a Sphere: The Creation Story

Thursday December 3, 1:05 - 1:50 pm EST

Biography: Alexander MacDonald retired from a professional career that spanned over 50 years in July 2020. He lives in Boulder, Colorado where he is writing a book on the global solution to the climate crisis. He started his career as a US Air Force officer. His BS is in Math and Physics, and has a MS and PhD in Meteorology, and a minor in Computer Science. He had a 42-year career in NOAA and was a Senior Executive for 25 years. He led NOAA’s largest research lab, Earth System Research Laboratory, from 2006 to 2016.

He was the first Director of the GLOBE Program, a global education program. During his federal career he received four Presidential Rank Awards. He holds two US Patents. He was President of the American Meteorological Society in 2015.

He is the inventor of NOAA’s Science On a Sphere, an educational museum display of the Earth that is now in 180 venues worldwide and is seen by 40 million people a year.

Dr. MacDonald was leader of the weather program at Spire Global from 2016 to 2020. He retired as Chief Science Officer of the satellite company.

