2022 VIRTUAL WORKSHOP

SCIENCE ON A SPHERE®
USERS COLLABORATIVE NETWORK

Projecting Leadership in Science Engagement

AUGUST 30 - SEPTEMBER 1, 2022

National Oceanic and Atmospheric Administration - U.S. Department of Commerce

Contents

Welcome to the 11th Science On a Sphere® Users Collaborative Network Workshop

We are delighted to welcome you to our second virtual workshop! Because we will not be convening at an SOS institution this year, NOAA will be the sole host for the workshop. We appreciate the hard work and patience of Clark Planetarium to plan with us the first stages of an in-person meeting at their institution and even providing support during the transition to a virtual format. One major advantage of having a virtual workshop is that it allows greater participation. We have 139 registrants representing almost 100 institutions and 7 countries including Japan, Australia, Germany, India, Mexico, Canada, and the United States. Attendees are also diverse in their expertise, serving as educators, visualizers, scientists, exhibit designers, movie producers, and technologists.

Our 2022 SOS Workshop organizers also represent geographic diversity. We live and work in different parts of the U.S., from Washington D.C. 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, 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:

- Share ideas and strategies for adapting to an ever-changing environment;
- Help users communicate climate change effectively in order to increase resiliency, sustainability, climate solutions, and actions;
- Showcase the versatility of the SOS technology through its unique use at sites, focusing on how these unique uses can inspire others;
- Explore tools, activities, and resources to enable better understanding of SOS data and information for both users and audiences;
- Investigate ways to leverage SOS and SOSX to compliment technologies used by educators in various learning modes, including both virtual and in-person.

Supporting these objectives, you all have submitted 39 presentations. 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 a virtual workshop.

Sincerely,

Your NOAA SOS Workshop team,
Carrie McDougall, Beth Russell, Hillary Peddicord, Juan Pablo Hurtado, and Alfonso Macias Tapia.

Things to know

For this SOS virtual workshop, 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 together 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.
- *40-minute breakout session/small-group discussion* - 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 **#SOSWorkshop2022** in social media posts about this workshop. Also follow/tag us on:

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

Program format: The Agenda-At-A-Glance shows the times of the different talks. Each section includes a given link to a Google meet room. The Detail Agenda includes further information about each talk, like presenters and the institution to which they belong and a short abstract summarizing the content of the talk.

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 Meet 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 connected 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.
- 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 the 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

TUESDAY - AUGUST 30, 2022				
1:00 PM ET	Welcome Remarks (10 minutes)	Dr. Carrie McDougall, Senior Program Manager, NOAA's Office of Education		
1:10 PM	Keynote: Welcome (20 minutes)	Dr. Stephen Volz, NOAA Assistant Administrator for Satellite and Information Services		
1:30 PM	Updates on the SOS Program (40 minutes)	SOS Team		
2:20 PM	BREAK (2:20 - 2:30 PM)			
2:30 PM	Lightning Talks (40 minutes)	Introduction to Lightning Talks (10 minutes)		
		Big Blue Marble from Geostationary Orbit		
		120 Years of Earthquakes and Their Tsunamis		
		A Regional Understanding of the Anthropocene		
		Music And SOS		
		Lightning Talks Q & A (10 minutes)		
3:10 PM	BREAK (3:10 - 3:20 PM)			
3:20 PM	Making a Map and Learning Cartography using QGIS (40 minutes)	Connecting Spaces: Integrating Climate Solutions through Storytelling (40 minutes)	Innovating Methods To Bring Real-time Data To Life (40 minutes)	Hardware, Support and Troubleshooting Tips (40 minutes)
4:00 PM	BREAK (4:00 - 4:10 PM)			

4:10 PM	Extend your SOS presentation with local storytelling using free web applications (20 minutes)	Ocean and Climate Subject Matter Experts Available for Your Institution (20 minutes)	The Creation of the Pandemic and Air Quality Live Program (20 minutes)	Moving PIPS: Tracking Breton the Great White Shark on SOS (20 minutes)
4:30 PM	END of DAY 1 - 4:30 PM ET			

Agenda At-A-Glance - Day 2

WEDNESDAY - AUGUST 31, 2022				
1:00 PM ET	Welcome Remarks (15 minutes)	SOS Team		
1:15 PM	Keynote: Visualization for science engagement and storytelling (45 minutes)	Dr. Mark SubbaRao, Lead, NASA's Scientific Visualization Studio		
2:00 PM	Panel: Visual Thinking Strategies: From Art Museums to Science Classrooms - A New Way of Seeing Science On a Sphere Visualizations (30 minutes)	Dr. Kate Semmens, Hilary Peddicord, Nick Corcoran		
2:30 PM	BREAK (2:30 - 2:40 PM)			
2:40 PM	Lightning Talks (35 minutes)	Introduction to Lightning Talks (5 minutes)		
		SOS meets Hubble		
		A Sphere for All Learners		
		Calls to Action: One Size Does Not Fit All		
		Lightning Talks Q & A (15 minutes)		
3:15 PM	Transition time (3:15 - 3:20 PM)			
3:20 PM	Using the Science on a Sphere to Connect Communities to Resiliency (20 minutes)	Amplifying your work with SOS (20 minutes)	Off the Planet -- An Introduction to Non-spherical data on Spherical Surfaces (20 minutes)	A Facelift for the SOS Data Spotlight in the Remote App (20 minutes)
3:40 PM	Break (3:40 - 3:50 PM)			

3:50 PM	Using NOAA Data in Planetariums to Enhance the Education Experience (40 minutes)	Let's talk about Climate change: IPCC Assessment Report edition (40 minutes)	Workshop for Creating And-But-Therefore Earth Stories Using SOS Datasets (40 minutes)	Experimental Methods of Visualization and Their Educational Uses (40 minutes)
4:30 PM	END of DAY 2 - 4:30 PM ET			

Agenda At-A-Glance - Day 3

THURSDAY - SEPTEMBER 1, 2022				
1:00 PM ET	Welcome (10 minutes)	SOS Team		
1:10 PM	Keynote: Designing Natural User Interactions that Do Not Interfere with Learning (45 minutes)	Dr. Nikita Soni, Assistant Professor, Department of Computer Science, University of Illinois at Chicago		
1:55 PM	Lightning Talks (35 minutes)	Introduction to Lightning Talks (5 minutes)		
		Extending the benefits of a NOAA Educational Grant		
		Engaging Audiences Using Data in the Classroom		
		Exploring Global Environmental Health Challenges and the UN SDGs with First Year University Students on SOS		
		SOS in a K-12 Environment		
		Lightning Talks Q & A (10 minutes)		
2:30 PM	BREAK (2:30 - 2:40 PM)			
2:40 PM	Unique Methods in Education & Storytelling for Planetariums, Spheres & Beyond (30 minutes)	Create Local Climate Resilience Maps (45 minutes)	SOS Showcase Leveraging SOS Flexibility To Support Focused Exhibit Experiences (15 minutes)	
			SOS Showcase Conceptualizing Climate Change: The story of sea-level rise in Hawaii (15 minutes)	
3:10 PM	Transition Time (3:10 - 3:15)		SOS Showcase POLLINATION -- Foundation of the Food Supply (15 minutes)	
3:15 PM	Panel: Planetariums, SOS & Education (35 minutes)			
3:25 PM		Transition Time (3:25- 3:30 PM)		
3:30 PM		Visualizing Datasets from "Our World in Data" using Python (20 minutes)	SOS Explorer Mobile - The magic of SOS in your pocket! (20 minutes)	Alignment Do's and Don'ts (20 minutes)

3:50 PM	Transition Time (3:50 - 3:55 PM)
3:55 PM	Vision for the SOS Program - SOS team (45 minutes)
4:40 PM	Closing Remarks - NOAA team (20 minutes)
5:00 PM	END OF DAY 3 - 5:00 ET

Detailed Agenda

Day 1 - Tuesday, August 30, 2022

Note: all times shown are Eastern DaylightTime (EDT = UTC - 4 hours)

Welcome Remarks (1:00 - 1:10 pm)

Dr. Carrie McDougall, Senior Program Manager, NOAA Office of Education

Join this Session: meet.google.com/orx-jddg-jup

Keynote (1:10 - 1:30 pm)

Welcoming Remarks

Dr. Stephen Volz, NOAA, Assistant Administrator for Satellite and Information Services

Join this Session: meet.google.com/orx-jddg-jup

Updates on the SOS Program (1:30 - 2:20 pm)

NOAA SOS team

Join this Session: meet.google.com/orx-jddg-jup

Break (2:20 - 2:30 pm)

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

Join this session: meet.google.com/orx-jddg-jup

Introduction to Lightning Talks

NOAA SOS team

Big Blue Marble from Geostationary Orbit

Rick Kohrs (University of Wisconsin - Madison)

The first Big Blue Marble images came from NASA's Terra and Aqua satellites, more recently, with data from Suomi NPP, with the launch of NOAA's GOES-17 satellite. Big Blue Marble images can now be created using geostationary satellites. On February 12th 2019, NOAA declared GOES-17 operational completing constellation of five geostationary satellites capable of creating natural true color images of the earth. Included in the constellation are GOES-16, Himawari from the Japanese

Meteorological Agency and both MSG satellites from the European Space Agency. The upside to using geostationary satellites is that data is available for local noon whereas the polar orbiting data is offset by approximately 90 minutes. A downside is geostationary satellites are limited to scanning from ~73N to 73S. A total of 250 images are stitched together to create a single local noon image. A year-long animation requires more than 90,000 images. The animation shows seasonal changes of sunlight, vegetation and thawing and refreezing of polar and other ice masses . Long lived large storms and even hurricanes can be tracked in sequential images. The most abstract of features is the Analemma showing how geographical location of local noon shifts throughout the year. Individual images (https://bin.ssec.wisc.edu/pub/earthnow/local-noon/)

120 Years of Earthquakes and Their Tsunamis

Nathan Becker (NOAA/NWS/Pacific Tsunami Warning Center)

The Pacific Tsunami Warning Center (PTWC) has created a new SOS animation that shows both earthquakes and tsunamis in sequence as they occurred over a period of 120 years from 1901 through 2020. PTWC previously created a catalog of ten SOS animations, each showing a specific historic tsunami propagating through the world's oceans and its coastal impacts. PTWC also created two SOS animations showing all recorded earthquakes over a given time interval. One of these covers the 20th Century while the other covers the first 15 years of the 21st Century. The newest animation presented here combines data from all 12 of these animations and adds five more years of earthquakes and seven more noteworthy tsunamis. It reveals not only how often significant earthquakes occur, but also the frequency of dangerous tsunamis. The animation concludes with summary maps showing the relationship of earthquakes to tectonic plate boundaries.These maps highlight those earthquakes that caused tsunamis and thus show their relation to subduction zones, the plate boundaries that generate the megathrust earthquakes that are most responsible for causing dangerous tsunamis. As with PTWC's previous SOS contributions, PTWC also hosts a Mercator-projection version of this new animation on its YouTube channel: https://youtu.be/ilFEKSZQv5o

A Regional Understanding of the Anthropocene

John Snell (Royal Saskatchewan Museum in Canada)

On April 22, 2022 the Royal Saskatchewan Museum opened a new 200 square meter gallery titled 'Home: Life in the Anthropocene'. The exhibit takes a regional and global look at understanding the Anthropocene in four sections: 1. Definition (extinction, endangered, changes and issues); 2. Focus (climate, energy, pollution, biodiversity, justice and health); 3. Globalization (industrialization and problems); 4. Nature (reclamation, support, actions, resiliency and appreciation). Using the SOS system the Museum was able to make complex concepts understandable for a local audience by creating six 5 minute pre recorded videos. The exhibit is trilingual in English, French and Cree, discussing larger world issues, but ultimately focusing on community actions & solutions, and appreciation of the environment.

Music And SOS

Joe Witte (Aquent-JPL-NASA in Pasadena, California)

Audience Target: SOS Lesson Designers, and SOS Outreach Event Managers. Can we use music to reach more diverse audiences and enhance the public engagement? Have you used recorded or live music with a SOS video presentation? Have you used your SOS space for a live music performance? The NIH-Kennedy Center recently launched the Music and the Mind project: "Shaping Our Children's Lives Through Music Engagement". Can we utilize some of their audio best practices with our visual tools?

Lightning Talks Q & A

NOAA SOS team

Break (3:10 - 3:20 pm)

Concurrent Sessions #1 (3:20 - 4:00 pm EDT)

Making a Map and Learning Cartography using QGIS

Presenters: Amanda Tickner (Michigan State University)

Join this session: meet.google.com/oyz-wpmc-cgm

This workshop will show you how to make a custom point map for the SoS using QGIS, a table of latitude and longitude data, and a jpeg image. QGIS is a free, open-source Geographic Information System (GIS) software that was first released in 2002 and has been updated regularly ever since. Unlike ArcGIS Pro, the commercial GIS software, QGIS will run on MacOS, in addition to Windows and Linux and is completely free. While making the map, you will learn some basic cartographic ideas for good map making. Introductory geospatial data literacy concepts will also be presented.

Connecting Spaces: Integrating Climate Solutions through Storytelling

Presenters: Nick Corcoran (The Wild Center in New York)

Join this session: meet.google.com/ahm-swon-dfi

Are you excited about the exhibits in your institution? Do you make connections from those exhibits to Science on a Sphere? Although we may have amazing spaces within our institutions, it's not always natural or easy to integrate them into SOS. Hear about The Wild Center's new exhibit focusing on Climate Solutions and how we connected this action based exhibit to climate change science, impacts, justice, and solutions in an accessible way for our visitors. In order to connect these spaces, The Wild Center relies on storytelling methods to build empathy and connection alongside science and data. After hearing about what we are doing we will have breakouts to brainstorm ways to connect this awesome technology of SOS. to other aspects of your space that you may not have considered.

Innovating Methods To Bring Real-time Data To Life

Presenters: Thomas Quayle (Clark Planetarium in Utah)

Join this session: meet.google.com/dwg-jhvh-jtf

Developing and using methods to bring real-time data to life can help provide a path to wonder and curiosity to others. Leadership in science engagement is an outcome many educational institutions work to achieve but can sometimes be challenging. Informal educators can use SOS to connect guests with both local and global data. In this session, I will describe methods used to collect and display data in new and innovative ways. Several methods will be demonstrated to leverage NOAA-provided real-time and custom datasets alike to provide a greater sense of connection to the world of science and how to promote being the "go-to" for public information on SOS topics. Participants will also receive a selection of presentations and materials used at Clark Planetarium (Salt Lake City, UT) to engage both schools and public with a variety of scientific and astronomy topics.

Hardware, Support and Troubleshooting Tips

Presenters: Alex Kirst (NOAA SOS team)

Join this session: meet.google.com/pyr-pytb-bdh

This session will be split into three segments, all of which are related to the successful upkeep and maintenance of your SOS system. The first section will detail the hardware layout of your system, including servers, cabling and the general layout of SOS. The support section will go in depth about our changes to our support system, the best way to contact us, and details that you should include in your support request. The final section will go over some general troubleshooting tips if your hardware or software do not seem to be working properly, and some steps you can take before reaching out

to support. There will be a chance to ask questions about any of these topics at the end. This session will be great for new locations or for anyone involved in the upkeep of SOS that may not be familiar with the system, or for any returning sites that may want a refresher on how SOS works behind the scenes.

Break (4:00 - 4:10 pm)

Concurrent Sessions #2 (4:10 - 4:30 pm, EDT)

Extend your SOS presentation with local storytelling using free web applications

Presenters: Dan Pisut (Esri Living Atlas)

Join this session: meet.google.com/ttq-jfzk-csu

The SOS is amazing at telling global and regional stories, but sometimes we need to get down to a very local area to really connect with our audiences. That's where some of the highly detailed applications from the Living Atlas of the World can help. In this session we'll cover a series of free to use web applications that provide compelling visualizations and analysis capabilities that allow you to go local and tell the story of impact. Topics covered will include understanding future climate at the neighborhood level, wildfire, drought, coastal shipping, air quality, and hurricanes.

Ocean and Climate Subject Matter Experts Available for Your Institution

Presenters: Alfonso Macias Tapia (NOAA Office of Education)

Join this session: meet.google.com/noy-ygvb-acw

Knauss fellows are recent graduate students qualified in an array of ocean, coastal, and Great Lakes areas including science, management, policy, and law. Fellows come from multiple universities around the US to spend one year working in Executive and Legislative federal offices with interests or equities in marine policy. This group gets renewed every year with new recent graduate students eager to participate in outreach and education activities. It would be mutually beneficial to create a connection between the Knauss fellows and the SOS collaborative network. It would provide fellows with specific projects to help with, while giving SOS members access to experts whose goal for a year is precisely to do these types of collaborations. During the presentation, we will show short videos of fellows describing different SOS datasets to give an idea of the type of products that can be created.

The Creation of the Pandemic and Air Quality Live Program

Presenters: Hilary Peddicord, Beth Russell, Eric Hackathorn, Juan Pablo Hurtado (NOAA SOS team)

Join this session: meet.google.com/fvr-evrs-tkr

The SOS Education Team is proud to release the Live Program "The Pandemic & Air Quality." The program seeks to convey the relationships between a health emergency such as the pandemic, with the societal response, and its implications for Air Quality. During this session, we'll highlight the challenges we faced in visualizing change effectively and communicate the decisions that were made, as a result, in creating the visualizations and the story line. It's also available as an ESRI StoryMap and an SOS Explorer mobile app version is coming soon!

Moving PIPS: Tracking Breton the Great White Shark on SOS

Presenters: Shilpi Gupta (NOAA SOS team)

Join this session: meet.google.com/gyo-acby-ooe

Moving PIPs is an SOS feature that allows you to attach a simple path file of geographic coordinates to a PIP (supplementary image, video, or text displayed on top of an SOS dataset) so that as the dataset is playing, the PIP will automatically move along the sphere. Moving PIPs are a simple and flexible way to show tracking data on the sphere without having to embed it in the global imagery. Join this session to learn how we created the July 2022 SOS iPad Spotlight dataset featuring Breton the Great White Shark!

Day 2 - Wednesday, August 31, 2022

Note: all times shown are Eastern DaylightTime (EDT = UTC - 4 hours)

Welcome (1:00 - 1:15 pm)

NOAA SOS team

Join this session: http://meet.google.com/orx-jddg-jup

Keynote (1:15 - 2:00 pm)

Visualization for science engagement and storytelling

Dr. Mark SubbaRao, Lead, NASA's Scientific Visualization Studio

Join this session: http://meet.google.com/orx-jddg-jup

Panel (2:00 - 2:30 pm)

Visual Thinking Strategies: From Art Museums to Science Classrooms - A New Way of Seeing Science On a Sphere Visualizations

Kate Semmens (Nurture Nature Center in Pennsylvania), Hilary Peddicord (NOAA SOS in Colorado), Nick Corcoran (The Wild Center in New York)

Join this session: http://meet.google.com/orx-jddg-jup

Break (2:30 - 2:40 pm)

Lightning Talks (2:40 - 3:15 pm)

Join this session: http://meet.google.com/orx-jddg-jup

Introduction to Lightning Talks

NOAA SOS team

SOS meets Hubble

Maurice Henderson (NASA Goddard in Maryland)

You have the wonderful responsibility to tell NASA stories using SOS, and the Hubble Traveling Exhibit. Opportunity: You are given an SOS system to deploy. Problem: How can we incorporate SOS in the Hubble exhibit and tell the Hubble story without needing additional space. Solution: We will discuss the exhibit design changes to incorporate SOS and the program content to tell the Hubble space science story.

A Sphere for All Learners

Maddy Philipp (Science City in Missouri)

In a setting such as a science museum, audiences range anywhere from ages 0-100. Informal education often leaves us feeling like we're flying by the seat of our pants, trying to adapt to our varying audiences. With this in mind, it's important to know how to reach out to not only all ages, but also all learning types. "A Sphere For All Learners" shows an example of one presentation at Science City's Science on a Sphere exhibit and how different people learn in different ways! This talk will show how the sphere can be used to reach those who absorb information best through visual cues, auditory information, and kinesthetic learning.

Calls to Action: One Size Does Not Fit All

Lori Thorn (Conservancy of Southwest Florida)

Deciding on takeaways and calls to action is a challenge when giving an SOS climate change presentation to an all-ages audience. This lightning talk frames those challenges, briefly describes what I have currently landed on, and opens the door for conversations with other SOS educators and facilitators who are having a similar experience.

Lightning Talks Q & A

NOAA SOS team

Transition Time (3:15 - 3:20 pm)

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

Using the Science on a Sphere to Connect Communities to Resiliency

Presenters: Kate Semmens (Nurture Nature Center)

Join this session: meet.google.com/zdq-uejb-rjv

As the impacts of climate change become more apparent, especially for vulnerable communities, creating opportunities for education and connection to the local environment is needed. Combining three strands - science, art, and community - the CREATE Resilience project, led by the Nurture Nature Center (Easton, PA), increased knowledge of weather and climate science, the risks from local hazards, and strategies for hazard mitigation and adaptation in three communities in the Lehigh Valley, PA. CREATE sought to educate the community and foster civic engagement, while including the community in co-creating a vision for resilience. CREATE used the regional hazard mitigation plan as a starting point for education, communication, and discussion about hazards and mitigation strategies. The CREATE process and its results will be informative for other communities in efforts to become resilient to hazards and for organizations interested in being leaders in connecting community and the environment. This presentation will show a new SOS video that describes the approach taken for CREATE, focusing on efforts to include science, art, and community in education and civic engagement around climate resiliency. The video will be available for other SOS centers to use.

Amplifying your work with SOS

Presenters: Alfonso Macias Tapia (NOAA Office of Education)

Join this session: meet.google.com/psh-ghuz-yro

One of my tasks as a Knauss fellow in the NOAA Office of Education is to help prepare briefings to members of congress. Gathering information about SOS installations in or near the member region is one of my activities for those briefings. Doing this task I have come across incredible content that your institutions have created around SOS. Sharing can bring multiple benefits for all of us. Among many other ways, NOAA can use this content to create stories to show on education forums, social media, accomplishments reports, and share during congress briefings. This will give your institution higher exposure

and show interested parties the work you are doing. On the other hand, sharing content will allow your site the possibility of updating some of the content you already have, reach out to new audiences, adapt new content, solve problems that others have figured out, etc.

Off the Planet -- An Introduction to Non-spherical data on Spherical Surfaces

Presenters: Michael Starobin (1AU Global Media)

Join this session: meet.google.com/wiz-vpmy-gdx

Spherical displays like SOS make immediate sense for depicting spherical data sets. Most topics do not appear natively as spheres, however, provoking the inevitable question: what's a producer to do about visualizing non-spherical data on spherical screens? In this presentation, we'll explore several strategies for utilizing spherical surfaces for presenting non-spherical data in visually compelling ways. Demonstrations will include depictions of non-contiguous data; use of changes in velocity to represent changes in distance; graphing options for quantitative or range comparisons; and strategies for highlighting objects of interest.

A Facelift for the SOS Data Spotlight in the Remote App

Presenters: Beth Russell, Hilary Peddicord (NOAA SOS team)

Join this session: meet.google.com/ica-vbkn-cpe

We began publishing spotlight datasets in January of 2018 and since that time we've featured many different datasets and topics. We've shown staff picks, new datasets, current event datasets, and datasets all related to a theme. The Spotlight feature can be found in the SOS Remote app and is a great way to mix up your presentations and learn about datasets you probably aren't using. In this session we'll cover how to access and use the spotlight, provide our motivation for what we've been doing, and then turn to you for suggestions on what we should spotlight in the future.

Break (3:40 - 3:50 pm)

Concurrent Session #4 (3:50 - 4:30 pm)

Using NOAA Data in Planetariums to Enhance the Education Experience

Moderator: Shilpi Gupta

Presenters: Nickolas Conant, Briana Ingermann (Fiske Planetarium), and Thomas Quayle (Clark Planetarium)

Join this session: meet.google.com/iuy-bdyd-xck

NOAA's collection of data is one of the largest in terms of Earth and space observations. Science On a Sphere (SOS) compiles these data alongside many other scientific institutions to create datasets that represent observations from the surface of the sun to the depths of the ocean. In this session, two institutions with both planetariums and SOS installations will demonstrate how they leverage these datasets in their planetariums while also covering the benefits and challenges of this novel use of NOAA data.

Let's talk about Climate change: IPCC Assessment Report edition

Presenters: Tom DiLiberto (NOAA Climate Program Office)

Join this session: meet.google.com/pxv-odsa-bjb

This past year saw the release of several different reports from the Sixth Assessment Report of the Intergovernmental Panel on Climate Change focusing on the science, adaptation, and mitigation (to name a few). These thousand page reports contain a ton of really useful material on the state of climate science. This presentation/session will focus on covering what's the big deal with these reports including covering what they actually said and highlighting particularly newsworthy

conclusions.

Workshop for Creating "And-But-Therefore" Earth Stories Using SOS Datasets

Presenters: Ka Chun Yu (Denver Museum of Nature and Science), Shilpi Gupta and Juan Pablo Hurtado (NOAA SOS team)

Join this session: meet.google.com/gbm-wmvi-ngb

Storytelling is a fundamental way in which humans have transmitted cultural knowledge. Despite the fact that we appear to be wired to be receptive to this narrative form, it is little practiced in science education. Instead, the usual methods for disseminating information are often not effective for retention, because they involve listing one fact after another, which is not memorable to a listener. This workshop will present the alternative And-But-Therefore framework where the tools of storytelling are used to create more compelling narratives. This workshop will allow participants to break out into teams to create their own A-B-T Earth systems stories using Science On a Sphere datasets, and share them with each other.

Experimental Methods of Visualization and Their Educational Uses

Presenters: Eric Hackathorn (NOAA SOS team)

Join this session: meet.google.com/tmf-euon-dks

Have you ever struggled with incorporating highly localized data into stories on a global sphere? In this presentation we will explore alternatives for mixing city and street level data with global datasets from the SOS catalog. Examples will be shown using Adobe After Effects, digital twins, and virtual reality. Material will be provided so that with follow-up training you can try some of these techniques on your own.

Day 3 - Thursday, September 1, 2022

Note: all times shown are Eastern DaylightTime (EDT = UTC - 4 hours)

Welcome (1:00 - 1:10 pm)

NOAA SOS team

Join this session: http://meet.google.com/orx-jddg-jup

Keynote (1:10 - 1:55 pm)

Designing Natural User Interactions that Do Not Interfere with Learning

Dr. Nikita Soni, Assistant Professor, Dept. of Computer Science, University of Illinois Chicago

Join this session: http://meet.google.com/orx-jddg-jup

Lightning Talks (1:55 - 2:30 pm)

Join this session: http://meet.google.com/orx-jddg-jup

Introduction to Lightning Talks

NOAA SOS team

Extending the benefits of a NOAA Educational Grant

Margaret Mooney (NOAA's Cooperative Institute for Meteorological Satellite Studies)

NOAA's Cooperative Institute for Meteorological Satellite Studies received a NOAA Education Grant in 2011 to utilize the Science on a Sphere (SOS) Network to enable meaningful interpretation of real-time weather and climate data. And although the grant period has long since ended, SOS content development continues. This lightning talk will elaborate on ways CIMSS has leveraged skills, lessons learned and partnerships developed during the period of funding to produce educational content for SOS, most recently a new video on the 2022 Hunga Tongo volcano eruption.

Engaging Audiences Using Data in the Classroom

Amy Dean (NOAA Data in the Classroom Partner)

Data in the Classroom is designed to engage educators and students in the use of scientific data to understand the impact of environmental events on a regional and global scale. In this video, participants will be given a brief tour of the Coral Bleaching Module to explore how various data products are used to help learners understand scientific concepts associated with bleaching.

Exploring Global Environmental Health Challenges and the UN SDGs with First Year University Students on SOS

Amanda Bodle (James Madison University)

At James Madison University, most first-year students complete a course on personal wellness, in which they are introduced to the environmental dimension of wellness. For many years, our institute, along with other university units, has been a partner of a complementary program to the course and delivered supplemental programs on a range of topics, from bicycle safety to pollinator migration. Ongoing challenges with those programs included unpredictable attendance and interest, varied content delivered to students by many partners, and differing levels of engagement across presentations. In 2021, an idea to bring more consistent environmental content to general education courses, our institution's signature on the University Global Coalition agreement (https://universityglobalcoalition.org/declaration/), and a goal to increase visitors to our Science On a Sphere site all converged. We reimagined our environmental wellness program to create a single presentation delivered to all participating students in the course at our Science On a Sphere site, focusing on global environmental health problems and introducing students to the 17 United Nations Sustainable Development Goals working toward solutions. The program, "JMU Students Making a Difference in Environmental Health," explores human impact on the environment and global health challenges such as marine debris and air pollution using SOS visualizations and engages students in discussions around how we might address these challenges.

SOS in a K-12 Environment

Patrick Rowley (James E. Richmond Science Center)

The James E. Richmond Science Center is a Charles County Public Schools resource for every school in the school system. Our field trips are designed around and are part of the CCPS curriculum. This lightning talk will review how we integrate standards with our SOS, planetarium, and discovery lab for field trips that are designed and led by certified teachers.

Lightning Talks Q & A

NOAA SOS team

Break (2:30 - 2:40 pm)

Concurrent Sessions #5 (2:40 - 3:25 pm)

Unique Methods in Education & Storytelling for Planetariums, Spheres & Beyond

Moderator: Juan Pablo Hurtado (NOAA/SOS team)

Presenters: Ka Chun Yu (Denver Museum of Nature and Science), Juan Pablo Hurtado (NOAA/SOS team), and Nickolas Conant, Briana Ingermann (Fiske Planetarium)

Join this session: meet.google.com/soi-rjyd-ggc

Storytelling, one of the oldest methods of sharing knowledge, has been proven to be a powerful tool to convey science and other education to audiences of all ages using simple but effective methods. Storytelling provides a unique entry point for accessing information and inspiring awareness. In this session, three different storytelling concepts are explored that can provide additional educational value when presenting NOAA and other data in planetariums and in institutions in general.

Create Local Climate Resilience Maps

Presenter: Dan Pisut (Esri Living Atlas)

Join this session: meet.google.com/xrv-ckyr-ddb

We have all heard the stories of global climate change and the impacts it will have on local communities. But what do we do about it? We know that maps are a way to start conversations within our community and engage in a process to enable change. In this workshop we'll talk about how to create customized maps for your local community that identify where potential resilience interventions would be the most successful. You'll learn to customize maps and data using GIS software and publish them for use on the SOS or online. We will be using ArcGIS Pro software, which is freely available at most government agencies and universities, and is extensively discounted for non-profit organizations. You can download free trial versions at https://www.esri.com/en-us/lg/training-and-services/learn-arcgis-education-trial.

SOS Showcase (2:40 - 3:25 pm)

Join this session: meet.google.com/jsz-gryi-xew

Leveraging SOS Flexibility To Support Focused Exhibit Experiences

Presenter: Thomas Quayle (Clark Planetarium)

Taking advantage of the unique and customizable ways Science On a Sphere delivers information can be leveraged to support other exhibits within our facilities. In this showcase session we will highlight the full-size scale model of NASA's Perseverance Rover, a traveling exhibit on loan, and demonstrate how a series of customized datasets and other visuals are able to support this temporary exhibit in engaging ways. Additionally, the SOS kiosk is used to give guests control over their experience and is an integrated part of this showcase. Participants will also receive a selection of presentations and materials used at Clark Planetarium (Salt Lake City, UT) to engage both schools and public with a variety of scientific and astronomy topics.

Conceptualizing Climate Change: The story of sea-level rise in Hawaii

Presenter: Rosie Bailey (University of Rhode Island)

As climate change continues to rapidly change the environment around us, it is important to understand those changes and how they will affect our future. This presentation aims to tell the story of rising sea levels and what life could look like in the Hawaiian islands with alarming new rates of sea-level rise. Topics discussed in this presentation include greenhouse gasses, carbon emissions, thermal expansion, albedo, sea-level rise, saltwater intrusion, and citizen science-based solutions. Discussions of climate change often have a negative tone or leave audience members with a feeling of hopelessness, the main objective of this story is to educate and empower. This narrative highlights the methods by which citizens can come together to help scientists combat climate change. This presentation also includes questions that stimulate critical thinking and hands-on activities to engage audience members and support students' understanding of the topics discussed. This family-friendly presentation relays a realistic narrative that encourages students from middle school to high school to think critically about what they know about climate change. Though the discussion is oriented toward older children, the content can be altered to fit younger audiences and cater to families with young students.

POLLINATION -- Foundation of the Food Supply

Presenter: Michael Starobin (1AU Global Media)

Pollination powers the great, global engine of food production. At an industrial scale, pollination defines the potential for modern industrialized societies to grow and thrive. It's also a natural process, something that cannot be easily replicated by artificial means, even though it has critical implications for billions of people who may have no direct interactions with agriculture. This short film explores the basics about how pollination works, why farmers rely on pollinators to put the whole process in motion, and how pollination plays a vital role in the global food supply.

Break (3:25 - 3:30 pm)

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

Panel: Planetariums, SOS & Education

Moderators: Juan Pablo Hurtado and Shilpi Gupta

Panelists: Nickolas Conant (Fiske Planetarium), Thomas Quayle (Clark Planetarium), Ka Chun (DMNS), Carter Emmart (American Museum of Natural History)

Join this session: http://meet.google.com/soi-rjyd-ggc

During this workshop we have explored the innovative use of NOAA data on planetariums, educational techniques that allow us to use storytelling as an science educational tool, and the awe and wonder we can spark for our visitors. In this panel we wish to explore the intersection between these subjects, its applications with diverse audiences, and its application in different educational settings. This panel aims to create a dynamic space where questions and ideas about these fundamental topics are shared and exchanged between panelists and our community.

Visualizing Datasets from "Our World in Data" using Python

Presenter: Tim Hurt (Lawrence Hall of Science)

Join this session: meet.google.com/dpe-unwy-bqv

We created visualizations for our SOS using csv datafiles from the "Our World in Data" website; namely datasets related to how different countries around the world were responding to COVID-19. To create SOS compatible images from the csv datafiles, we wrote a Python script that utilized the plotly graphing libraries. Since the data we were visualizing was at the country level, our visualizations used color gradients so that visitors could compare countries to one another, or look at individual countries over time. In this presentation, we will share the process we went through to write our code and the affordances and limitations of using our code to create these types of visualizations.

SOS Explorer Mobile - The magic of SOS in your pocket!

Presenter: Hilary Peddicord, Eric Hackathorn, Beth Russell (NOAA SOS team)

Join this session: meet.google.com/kxw-wkeb-zby

One of the lessons we've learned over the last few years: Access is everything. The SOSx free mobile app allows access to the SOS dataset experience to anyone, anytime! During this session, we will explore the app and supplemental resources that have been created to increase understanding of our data visualizations. We would also like to discuss what you wish for in the next version of our app!

Break (3:50 - 3:55 pm)

Vision for the SOS Program (3:55 - 4:40 pm)

Presenters: Keith Searight (SOS team)

Join this session: http://meet.google.com/orx-jddg-jup

The future is bright for the SOS program and as we consider our next steps, we find ourselves wanting to know what the users want. This is your chance to weigh in on how you want to see the SOS program continue to evolve. Have a great new idea for a feature or want some specific new datasets? Let us know! Add your ideas to our interactive Jamboard throughout the workshop or bring them to the session. We will be dividing the group into breakout sessions to allow for feedback in smaller groups. Every opinion matters and we want to hear yours!

Closing session (4:40 - 5:00 pm)

Presenters: Carrie McDougall and NOAA Office of Education Leadership

Join this session: http://meet.google.com/orx-jddg-jup

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. We will also be announcing the winner of the trivia contest!

Keynotes

Stephen Volz, Ph.D.

NOAA's Assistant Administrator for Satellite and Information Services

Welcoming Remarks

Tuesday, August 30, 1:10 - 1:30 pm EDT (Join this Session: meet.google.com/orx-jddg-jup)

Biography: Stephen Volz serves as the Assistant Administrator for NOAA's Satellite and Information Service. Dr. Volz has 35 years of professional experience in aerospace. He is a leader in the international Earth observation community, serving as the NOAA Principal both to the Committee on Earth Observation Satellites (CEOS) and to the Coordinating Group of Meteorological Satellites (CGMS). Dr. Volz is the Principal U.S. representative to the international Group on Earth Observations (GEO), and in this capacity he helps lead efforts to coordinate global satellite-based observations among international space agency partners to further the development of a Global Earth Observation System of Systems. He serves as the Co-Chair of the NOAA Observing Systems Council and is also a member of the NOAA Executive Council.

Dr. Volz has a doctorate in Experimental Condensed Matter Physics from the University of Illinois at Urbana-Champaign (1986), a master's in Physics from Illinois (1981), and a bachelor's in Physics from the University of Virginia (1980). He has more than 20 publications in peer-reviewed journals.

Mark SubbaRao, Ph.D.

Lead, NASA's Scientific Visualization Studio

"Visualization for science engagement and storytelling"

Wednesday, August 31, 1:15 - 2:00 PM EDT (Join this session: meet.google.com/kzf-uhyx-dgg)

Biography: Mark SubbaRao leads NASA's Scientific Visualization Studio, a group tasked with visualizing NASA science results for public audiences. Before joining NASA, Mark spent 18 years at the Adler Planetarium in Chicago, where he produced planetarium shows and designed museum exhibits featuring data-driven scientific visualizations. During 2019-2020 Mark served as President of the International Planetarium Society (IPS), where he spearheaded the 'Data to Dome' initiative - an effort to prepare the planetarium community for the big data era. Before that he worked at the University of Chicago where he was part of a team that created the largest 3D map of the Universe, the Sloan Digital Sky Survey.

Nikita Soni, Ph.D.

Assistant Professor, Department of Computer Science, University of Illinois at Chicago

"Designing Natural User Interactions that Do Not Interfere with Learning"

Thursday, September 1, 1:10 - 1:55 PM EDT (Join this session: meet.google.com/thi-wdry-psk)

Biography: Dr. Nikita Soni is an Assistant Professor in the Department of Computer Science at the University of Illinois Chicago (UIC). Her research interests include Human-Computer Interaction, Interaction Design, and Computer-Supported Collaborative Work. Nikita earned her Ph.D. in Human-Centered Computing from the University of Florida in 2021. Nikita's dissertation research involved studying how to design natural user interactions for multi-touch spherical displays to support collaborative learning from earth science data visualizations in museums. The learning application developed as a part of Nikita's dissertation has been used by hundreds of family groups in a natural history museum. At her newly formed research lab at UIC, Nikita is continuing to study how to design interactive experiences with museum learning technologies by investigating how children and adults naturally interact with novel and existing technologies, then leveraging this understanding to create effective learning interfaces. Nikita's work has received recognition and honorable mention in the research community at one of the top HCI conferences (Computer Supported Collaborative Work) and has led to the development of multiple actionable interaction design guidelines for designers and practitioners.

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