

CONNECTING AT THE CROSSROADS

SCIENCE ON A SPHERE

USERS COLLABORATIVE NETWORK WORKSHOP
SCIENCE CITY, KANSAS CITY, MO 2018



naaee

North American Association
for Environmental Education



KANSAS CITY
**SCIENCE
CITY**

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Welcome to the 9th Science On a Sphere® Users Collaborative Network Workshop!

We are delighted to host this workshop in Kansas City, and in an historic train station! The 2018 workshop's theme, "Connecting the Crossroads", reflects the middle of the U.S.-location of the host site, and that we're in a time of heightened technology-driven connectivity. With Science City at Union Station as our host, we will be able to explore the ways SOS can serve as a centerpiece and become a powerful connector of content across your institution.

To further our work together to create informed global citizens, we have another great workshop for you with a mix of topics spanning technical subjects and programmatic areas. There are 56 presentations submitted by your peers. For this workshop, we have organized presentations into the following 7 "threads". These threads are based on emerging areas and feedback from past workshops about which issues the SOS Network is interested in continuing to explore.

- Creating relevance for visitors and connecting SOS to other in-house exhibits, programs, and institutional goals
- Crossroads of learning: NGSS and other opportunities for using SOS to engage formal K-12 and higher education students
- Exploring new content from NOAA and NASA and advanced technologies like VR and augmented reality
- Climate change resilience, sustainability and youth involvement
- Volunteer engagement including attracting volunteers, training programs, and script development
- Content creation - Share best practices and techniques for creating new data visualizations and narratives for the sphere
- Technical operations - Share how to integrate technology into seamless sphere presentations (includes show control, room control, iPads, clickers, lighting, kiosks, etc)

Also, we hope you'll take advantage of the less structured parts of the agenda to interact with your fellow attendees. There are 85 attendees from 4 different countries representing approximately 48 institutions, including educators, visualizers, scientists, exhibit designers, movie producers, and technologists.

Finally, as with any workshop, there are many players that have helped to create this workshop. Thank you to Jeff Rosenblatt, LeAnn Smith, Sherry Tyhurst, and Tammy Ruder from Science City and Union Station. Our sponsor, the North American Association for Environmental Education, is also an essential element that allows this Workshop to take place. Thanks to all of them for their efforts and support.

We hope you'll enjoy, be inspired by, try new things and contribute your thoughts to our workshop.

Sincerely,

Your NOAA Workshop organizers,

Carrie McDougall, Maggie Allen, Lauren Gibson, Beth Russell, and Stephen Zepecki

Things to know

Wi-Fi: Access will be provided in all workshop spaces.

- General Union Station Wi-Fi:
 - SSID: UNION STATION WIFI (no password)
- Chamber Board Room Wi-Fi:
 - SSID: KCCC GUEST
 - Password: KCCHamber

Social Media: Please use the hashtag #SOSWorkshop2018 in social media posts about this workshop. Also follow/tag us on:

- Twitter: @NOAAeducation, @ScienceCityKC and @UnionStationKC
- Instagram: @noaa.education, @sciencecitykc, and @unionstationkc

Website: You may find more information about the SOS Workshop here: <https://tinyurl.com/SOSworkshop2018>

App: Try out our free app to create a customized schedule for the workshop. Download “EventsXD” free from the App store. Once you have downloaded the app, you can find and join our event by searching for “Connecting at the Crossroads: SOS Workshop 2018.”

Meals: On Tuesday, lunch is on your own. For Wednesday and Thursday, breakfast (8-9 AM) and lunch (noon-1 PM) is provided at Science City at Union Station. On Wednesday evening there will be a reception with heavy hors d’oeuvres. There are also many options available near the Westin Kansas City.

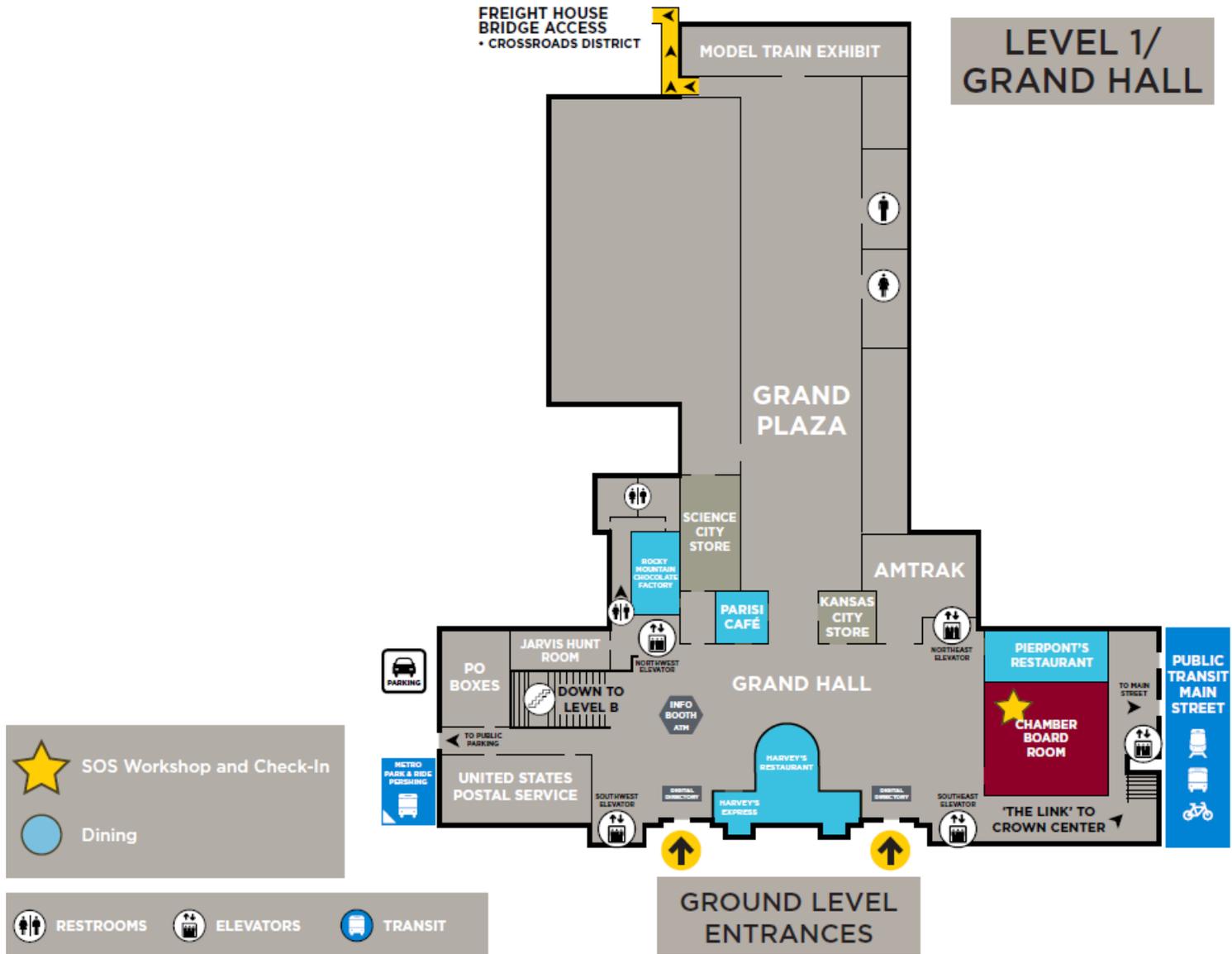
Workshop Room locations: The Science On a Sphere is located in Science City; however, two other workshop rooms, Arthur Stilwell and the Chamber Board Room, are in Union Station, located a short walk away. The Chamber Board Room is located in the main lobby of Union Station, to the right of Pierpont’s restaurant. Arthur B. Stillwell room is located on level C, near the Regnier Extreme Screen lobby. The Engineerium is located in Science City (see the floor map for reference). Museum staff will be available to assist with wayfinding or accessibility needs.

Parking: For attendees who plan to drive to Science City, the West Yards Parking Garage’s bridge entrance is accessible via Kessler Road through the Carriage Pavilion located on the west side of Union Station’s front entrance via Broadway Street. Please see this site for more information about parking: <https://www.unionstation.org/visitor>. There is also parking at the Westin.

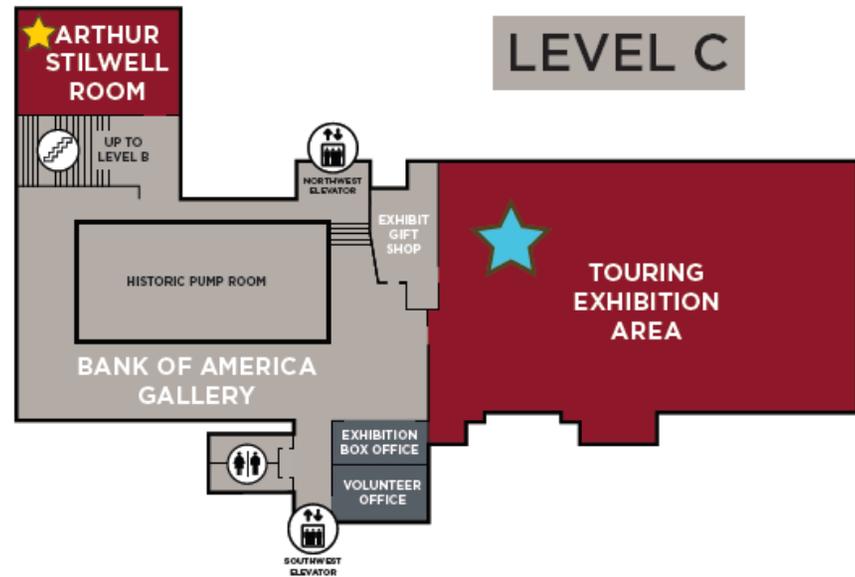
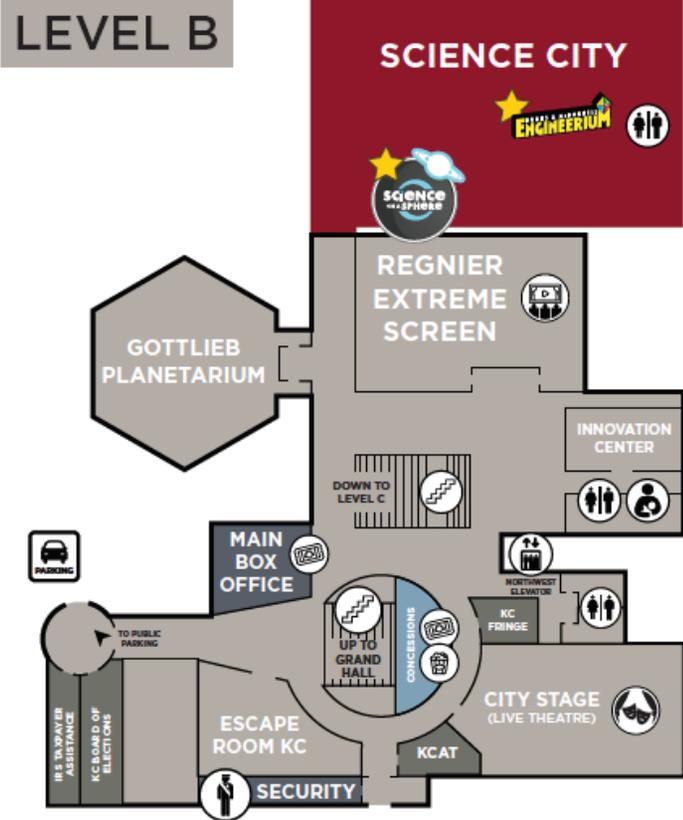
“Threaded” tracks: In the Agenda-At-A-Glance, we have color-coded and clustered presentations based on the primary workshop “thread” they address. These threads are based on emerging areas and feedback from past workshops about which issues the SOS Network is interested in continuing to explore. Please note the legend is at the top of the Agenda for the first day.

Program format: All presentation titles in the Agenda-At-A-Glance and the Daily Schedule are hyperlinked to the talk description

Map of Level 1 of Kansas City's Union Station



Map of Levels B and C of Kansas City's Union Station



 Workshops
  Evening Event

 RESTROOMS
  ELEVATORS
  TRANSIT

Extra Workshop Opportunities

Evening reception

Wednesday, November 28 from 6:00 – 8:30 pm

The evening reception will take place in the Bank of America Reception Hall. A science-themed food display, featuring a variety of heavy hors d'oeuvres, and drinks will be provided. Alcoholic beverages will be available at a cash bar.

Field Trip

Friday, November 30 from 8:00 AM --10:30 AM

The optional field trip to the National Weather Service Central Region Headquarters will allow participants to gain an understanding of how NOAA collects and transforms weather data into forecasts that are issued to protect lives and property in the crossroads of the United States. We will learn about how weather forecasts are made and then follow the data through to dissemination to the public and to aviation services.

The bus will depart the Westin hotel promptly at 8 AM and drop guests off at the airport at 10:45 AM, returning to the hotel at 11:30 AM.

Science City Tour

Wednesday, November 28 from 3:15-4:00 PM

Museum staff will lead guided tours of Science City during this afternoon break session. This is optional.

Agenda At-A-Glance - Day 1

Agenda Color Legend			
Plenary	Engaging Visitors	Content Creation	Crossroads of Learning
Creating Relevance	Technical	Climate Change and Youth	

Tuesday, November 27, 2018				
	Chamber Board Room	SOS	Arthur Stilwell	Engineerium
12:00 PM	Arrival and check-in (Outside Chamber Board Room)			
12:15 PM				
12:30 PM				
12:45 PM				
1:00 PM	Welcome Remarks			
1:15 PM				
1:30 PM				
1:45 PM	Updates from the SOS Boulder Team			
2:00 PM				
2:15 PM				
2:30 PM				
2:45 PM	BREAK (30 min) - drinks and snacks (Chamber Board Room)			
3:00 PM				
3:15 PM	Keynote			
3:30 PM				
3:45 PM				
4:00 PM		Augmented reality on the Sphere	How to write a script that people will want to listen to and that others can deliver	
4:15 PM				
4:30 PM		Become a power presenter using the iPad SOS Remote App	Spanning the generations	Extracting and using WorldView images
4:45 PM				
5:00 PM		Unique Overlay Ideas		Working with the Science on a Sphere
5:15 PM				
5:30 PM	Adjourn for day			
5:45 PM				
6:00 PM				

Agenda At-A-Glance – Day 2

	Wednesday, November 28, 2018			
	Chamber Board Room	SOS	Arthur Stilwell	Engineerium
8:00 AM	Arrival and breakfast (Chamber Board Room)			
8:15 AM				
8:30 AM				
8:45 AM				
9:00 AM	Welcome			
9:15 AM	Lightning talks			
9:30 AM				
9:45 AM	Keynote			
10:00 AM				
10:15 AM				
10:30 AM	BREAK (30 min) - tea and coffee (Chamber Board Room)			
10:45 AM				
11:00 AM		Spotlighting the Spotlight	Connecting teachers to climate change	Sphere and Now
11:15 AM				
11:30 AM		SOS Nuggets from Goddard		Convection Connection
11:45 AM				
12:00 PM	12:00 - 1:00 PM LUNCH - food will be provided (Chamber Board Room)			
12:15 PM				
12:30 PM				
12:45 PM				
1:00 PM				
1:15 PM		Tectonically Speaking		
1:30 PM				
1:45 PM				
2:00 PM		Story on a Sphere – Part 2 <i>(SOS Demonstration)</i>		
2:15 PM				
2:30 PM				
2:45 PM		Integrating Scientific Demonstrations to the SOS format	Story on a Sphere – Part 3	
3:00 PM				
3:15 PM	BREAK (45 min) - drinks provided (Chamber Board Room) Tour of Science City			
3:30 PM				
3:45 PM				
4:00 PM		Climate change. What is it, what does it mean, and what we are doing about it	Modeling and moving around the sphere with K-2	Making Beautiful Maps for Education
4:15 PM				
4:30 PM		Shirt made in ...? Exploring global to local connections interactively on the Sphere		
4:45 PM				
5:00 PM		Silk Roads	Engaging Visitors and volunteers alike	
5:15 PM				
6:00-8:30 PM	6:00 - 8:30 PM Reception - hors d'oeuvres provided (Bank of America Exhibit Hall)			
			Dr. David Burnham (7:00-7:45 PM)	

Agenda At-A-Glance – Day 3

	Thursday, November 29, 2018			
	Chamber Board Room	SOS in Science City	Arthur Stilwell	Engineerium
8:00 AM	Arrival and breakfast (Chamber Board Room)			
8:15 AM				
8:30 AM				
8:45 AM				
9:00 AM	Final Day Remarks			
9:15 AM	Lightning Talks			
9:30 AM				
9:45 AM				
10:00 AM	Keynote			
10:15 AM				
10:30 AM	BREAK (30 min) - tea and coffee (Chamber Board Room)			
10:45 AM				
11:00 AM		Phenomena[] Storytelling	360 videography for spherical film and VR headsets	How to talk climate on the sphere
11:15 AM		Animals on the Move		
11:30 AM		Shark tags and tales		Teaching climate with SOS visualizations
11:45 AM				
12:00 PM	12:00-1:00 pm LUNCH - food will be provided (Chamber Board Room)			
12:15 PM				
12:30 PM				
12:45 PM				
1:00 PM				
1:15 PM		Student-Produced Content for the SOS	SOS Product Suite	Scientists like sharing and visualizing their data
1:30 PM				
1:45 PM				
2:00 PM		At the Crossroads of Earth's Systems		
2:15 PM				
2:30 PM	BREAK (30 min) - drinks provided (Chamber Board Room)			
2:45 PM				
3:00 PM		NOAA's Mission	Amazing world: how SOS can promote positive emotions and involve visitors to take care of our planet	Crossroads of SOS for K-12: Formal education in an informal environment
3:15 PM		Developing global tide animations		
3:30 PM		Your favorite datasets	Connecting communities and stakeholders through SOS	
3:45 PM		New additions to the SOS data catalog		
4:00 PM				
4:15 PM				
4:30 PM	Closing remarks and field trip details			
4:45 PM				
5:00 PM	Workshop ends at 5:00 PM			

Daily Schedule

Day 1 – Tuesday, November 27

12:00 PM	Check in	<i>Chamber Board Room</i>
1:00 PM	Welcome & Introductory Remarks from the Science City at Union Station and NOAA Workshop hosts	<i>Chamber Board Room</i>
1:45 PM	Updates from the Boulder SOS Team SOS Development Team	<i>Chamber Board Room</i>
2:45 PM	BREAK – Drinks and snacks served	<i>Chamber Board Room</i>
3:15 PM	KEYNOTE: The Science of Public Transportation David Johnson, Kansas City Area Transportation Authority	<i>Chamber Board Room</i>
4:00-5:30 PM	SOS Showcase Augmented Reality on the Sphere Eric Hackathorn Become a power presenter using the iPad SOS Remote App Shilpi Gupta, Hilary Peddicord, Beth Russell Unique overlay ideas & SOS Content in Planetariums Patrick Hess	<i>SOS in Science City</i>
4:00 PM	How to write a script that people will want to listen to and that others can deliver Kathryn Semmens	<i>Arthur Stilwell</i>
4:30 PM	Spanning the generations Nicholas Corcoran	<i>Arthur Stilwell</i>
4:30 PM	Extracting and using WorldView images Maurice Henderson	<i>Engineerium</i>
5:00 PM	Working with the Science on a Sphere Matthew Hamel	<i>Engineerium</i>
5:30 PM	Adjourn for day	

Day 2 – Wednesday, November 28

8:00 AM	Check-in- breakfast provided	<i>Chamber Board Room</i>
9:00 AM	Welcome	<i>Chamber Board Room</i>
9:15 AM	Lightning Talks	<i>Chamber Board Room</i>
	Breaking into SOS: Training Solutions for Entry-Level Staff Luke Richmond	
	Beyond the Sphere: Impacts of SOS Training on Institution-Wide Practices Staci Wong	
	Plants to Planets: Using SOS as a Teaching Tool Justin McAfee	
	A New Perspective on the Sphere: Using the Power of Art to Explore Science Kathryn Semmens	
	At the Crossroads of Science and Literacy: Connecting Early Learners to Science on a Sphere Janet Stern and Courtney Lair	
9:45 AM	KEYNOTE: A big storm's a-comin: informal education, big data, and cultural collisions Cynthia Sharpe, Thinkwell Group	<i>Chamber Board Room</i>
10:30 AM	BREAK – tea and coffee provided	<i>Chamber Board Room</i>
11:00 AM- 12:00 PM	SOS Showcase	<i>SOS in Science City</i>
	Spotlighting the Spotlight Beth Russell	
	SOS Nuggets from Goddard Maurice Henderson	
11:00 AM	Connecting teachers to climate change using SOS Michael Trumbower	<i>Arthur Stilwell</i>
11:00 AM	Sphere and Now: SOS at the NOAA Center for Weather and Climate Prediction Jan Thomas and Arialimis Myers	<i>Engineerium</i>
11:30 AM	Convection Connection Michael McConnell	<i>Engineerium</i>
12:00 PM	LUNCH – food provided	<i>Chamber Board Room</i>

1:00-3:15 PM	<p>SOS Showcase</p> <p>Getting the most out of PIPs in your presentations Shilpi Gupta and Beth Russell</p> <p>Tectonically Speaking Walter Smith</p> <p>Story on a Sphere – Part 2 (SOS Demonstration) Marissa Jones, Bekkah Lampe</p> <p>Integrating Scientific Demonstrations to the SOS format James Beck</p>	<i>SOS in Science City</i>
1:00 PM	<p>Story on a Sphere – Part 1 Marissa Jones, Bekkah Lampe</p>	<i>Arthur Stilwell</i>
2:15 PM	<p>Extend your SOS Presentation beyond the Sphere with Story Maps Dan Pisut</p>	<i>Engineerium</i>
2:45 PM	<p>Story on a Sphere – Part 3 Marissa Jones, Bekkah Lampe</p>	<i>Arthur Stilwell</i>
3:15 PM	<p>BREAK – tea and coffee provided Tour of Science City (optional)</p>	<i>Chamber Board Room</i>
4:00-5:30 PM	<p>SOS Showcase</p> <p>Climate change. What is it, what does it mean, and what we are doing about it Tom Di Liberto</p> <p>Shirt made in ...? Exploring global to local connections interactively on the Sphere Kathryn Semmens</p> <p>Silk Roads Sam Lei</p>	<i>SOS in Science City</i>
4:00 PM	<p>Modeling and moving around the sphere with K-2 Annette Brickley and Hannah Hamilton</p>	<i>Arthur Stilwell</i>
5:00 PM	<p>Engaging Visitors and volunteers alike Dustin Perry</p>	<i>Arthur Stilwell</i>
4:00 PM	<p>Making Beautiful Maps for Education Dan Pisut</p>	<i>Engineerium</i>
6:00 PM	<p>Evening Reception Bank of America Exhibit Hall</p>	
7:00 PM	<p><i>David Burnham's Hunt for T-Rex</i></p>	<i>Arthur Stilwell</i>

Day 3 – Thursday, November 29

8:00 AM	Check in –breakfast served	<i>Chamber Board Room</i>
9:00 AM	Final Day Remarks	<i>Chamber Board Room</i>
9:15 AM	Lightning Talks	<i>Chamber Board Room</i>
	NOAA’s Newest Generation of Geostationary Weather Satellites Rafael de Ameller	
	New Technologies and SOS Eric Hackathorn	
	SOS Isn't the Only Cool Thing Going at NOAA in Boulder Jebb Stewart	
	#projectphenomena—more good stories for your sphere Hilary Peddicord	
9:45 AM	KEYNOTE: Sorry about the Orange Roughy, why you should care about the bottom of the ocean, and other adventures from satellite oceanography Dr. Walter H F Smith, NOAA’s Laboratory for Satellite Altimetry	<i>Chamber Board Room</i>
10:30 AM	BREAK – tea and coffee provided	<i>Chamber Board Room</i>
11:00 AM- 12:00 PM	SOS Showcase	<i>SOS in Science City</i>
	Phenomena[!] Storytelling: Will humans and animals evolve to have longer extremities? Hilary Peddicord	
	Animals on the Move: A story of migration and dispersal over land and under sea Annette Brickley, Stace Beaulieu	
	Shark Tags and Tales Hannah Hamilton, Tighe Ratcliffe, Annette Brickley	
11:30 AM	360° videography for spherical film and VR headsets Ian McGuire	<i>Arthur Stilwell</i>
11:00 AM	How to talk climate on the sphere Tom Di Liberto	<i>Engineerium</i>
11:30 AM	Teaching climate with SOS visualizations Stephen Zepecki	<i>Engineerium</i>
12:00 PM	LUNCH – food will be provided	<i>Chamber Board Room</i>

1:00-2:30 PM	<p>SOS Showcase</p> <p><i>SOS in Science City</i></p> <p>Science in the Stratosphere: Connecting kids to the atmospheric art of high altitude ballooning Chris Pait and Chris Ortiz</p> <p>Student-Produced Content for the SOS Darik Velez</p> <p>At the Crossroads of Earth's Systems Patrick Rowley</p>	
1:00 PM	<p>What's new with SOS Explorer Hilary Peddicord and Eric Hackathorn</p>	<i>Arthur Stilwell</i>
1:30 PM	<p>SOS Product Suite Keith Searight, Shilpi Gupta, Ian McGinnis</p>	<i>Arthur Stilwell</i>
1:30 PM	<p>Scientists like sharing and visualizing their data Annette Brickley, Hannah Hamilton, Stace Beaulieu</p>	<i>Engineerium</i>
2:30 PM	<p>BREAK –tea and coffee provided</p>	<i>Chamber Board Room</i>
3:00-4:00 PM	<p>SOS Showcase</p> <p><i>SOS in Science City</i></p> <p>NOAA's Mission: From the Surface of the Sun to the Depths of the Ocean Rafael de Ameller</p> <p>Developing global tide animations for Science On a Sphere Marissa Jones</p> <p>Your favorite datasets Stephen Zepecki</p> <p>New additions to the SOS data catalog Beth Russell</p>	
3:00 PM	<p>Amazing world: how SOS can promote positive emotions and involve visitors to take care of our planet Jimena Echegollen and Marta Pineyro</p>	<i>Arthur Stilwell</i>
3:30 PM	<p>Connecting communities and stakeholders through SOS Thomas Quayle</p>	<i>Arthur Stilwell</i>
3:00 PM	<p>Crossroads of SOS for K-12: Formal education in an informal environment Patrick Rowley, Hilary Peddicord, Annette Brickley, Darik Velez</p>	<i>Engineerium</i>
4:00 PM	<p>Positioning teens as advocates for environmental literacy and resilient communities Bryan Wunar</p>	<i>Engineerium</i>

4:30 PM **Closing Remarks and Field Trip Details**

Chamber Board Room

5:00 PM **Workshop Adjourns**

Plenary Descriptions

Welcome and Introductory Remarks from Science City and NOAA

George Guastello II, President and Chief Executive Officer, Science City at Union Station

Louisa Koch, Director of Education, NOAA

Carrie McDougall, Senior Program Manager, NOAA Office of Education

Jeff Rosenblatt, Director of Exhibits & Arvin Gottlieb Planetarium, Science City at Union Station

1:00 – 1:45 pm, Tuesday, November 27 – Chamber Board Room

Workshop hosts will provide welcoming remarks and context for this workshop.

Updates from the NOAA SOS Boulder Team

John Schneider, Chief, Advanced Technology and Outreach

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 Hardy, Software Engineer

Evan Sheehan, Web Developer

Jebb Stewart, Informatics, Visualization, and Outreach Section Chief

1:45 – 2:45 pm, Tuesday, November 27 – Chamber Board Room

Hear about the latest and greatest from the Boulder SOS team! In this session we'll overview the state of SOS and future directions like Augmented Reality, go through what's new in the 5.4 SOS release, recap the 5.3 release, highlight great new content added since the last workshop, and summarize the latest version of SOS Explorer including Virtual Reality. We'll also leave time at the end for your questions.

Keynotes

David Johnson

Chief Strategy Officer, Kansas City Transportation Authority

The Science of Public Transportation

Tuesday November 27, 3:15-4:00 PM – Chamber Board Room

In an age of autonomous vehicles, Uber, and shared electric scooters, is there even room for public transportation? The answer is GEOMETRY and YES. Cities don't have room to expand from within, so the space we have is the space we have and larger vehicles with lots of people in them reign supreme when it comes to space efficiency. Hear David talk about how the geometry of public transportation will ensure its survival well into the future.



Biography: A rural Kansas native, David discovered the benefits of public transportation in 2004. A 2006 light rail victory (and 2008 failure) triggered him to start kclightrail.com, the city's top platform for transit news and urban core advocacy. David laid the groundwork for passage of the 2012 streetcar election -- educating and registering voters; putting signs in storefronts; notarizing ballots; and representing residents in court, at City Hall, and on the Kansas City Streetcar Authority. He is now Chairman of the Kansas City Regional Transit Alliance, which is spearheading a streetcar extension through Midtown to UMKC, as well as the Chief Strategy Officer for the Kansas City Area Transportation Authority, where he is responsible for developing, implementing, and sustaining a new corporate strategy to guide the Authority into the future of transportation.

Cynthia Sharpe

Principal of Cultural Attractions and Research, Thinkwell Group

A big storm's a-comin: informal education, big data, and cultural collisions

Wednesday November 28 9:45-10:30 AM –Chamber Board Room

The world of science has changed radically in the past 50 years. The romantic fiction of the isolated researcher at the bench has been relegated to the mothballs of history. As our ability to produce, manipulate, analyze, leverage, and present increasing volumes of data advances, audiences can get easily overwhelmed – or lead astray. At the same time, the world of experience design has changed. Here at the crossroads of the country *and* of science and experience, we'll explore how these things link



together, and how merging big data, informal education, and new ways of visualization and engagement can reduce barriers to equity.

Biography: As Principal of Cultural Attractions and Research for Thinkwell Group, Cynthia is responsible for bringing museum and education perspectives to Thinkwell projects. Her twenty years of experience spans from permanent and traveling museum shows to multi-use destination resort planning, ranging from creative exhibition development and project management to business and master planning. She has gained a reputation for combining creative approaches to exhibition and education development with a keen understanding of early childhood education, social networking and new media, and visitor behavior. Prior to Thinkwell, Cynthia worked for the Museum of Science & Industry.

A respected leader in the industry, Cynthia has spoken at a variety of conferences and is widely published. She is past chair of the Traveling Exhibition Network of AAM, served on the Museum and Science Center Committee of IAAPA, and currently serves on the TEA's Eastern North American board. She is the 2018 recipient of ASTC's Roy L. Shafer Leading Edge Award, non-CEO, from ASTC. Cynthia Sharpe and Nicola Rossini are the cofounders of Harriet B's Daughters. HBD is dedicated to changing the face of themed entertainment one woman at a time through mentorship, coaching, speaking opportunities, IDEA materials for universities and employers, and more.

Dr. David Burnham

Paleontologist, KU's Biodiversity Institute

The Hunt for T-Rex

Wednesday November 28, 7:00-7:45 PM –Arthur Stilwell Room

Dr. David Burnham is a Paleontologist at KU's Biodiversity Institute and specializes in dinosaur research and public outreach. He has travelled around the globe documenting the natural history of dinosaurs and has published extensively on raptors and *T. rex*. This past summer, his lab at the KU Natural History Museum, worked on a *T. rex* during an excavation in Montana.

Dr. Burnham loves to share his expertise with those who are interested in natural history and he welcomes students, volunteers, and visitors to learn about the hands-on technical expertise used to excavate and prepare dinosaur fossils.

During the evening reception, he will speak about the latest discoveries regarding the lifestyle of these monstrous predators.



Dr. Walter H F Smith

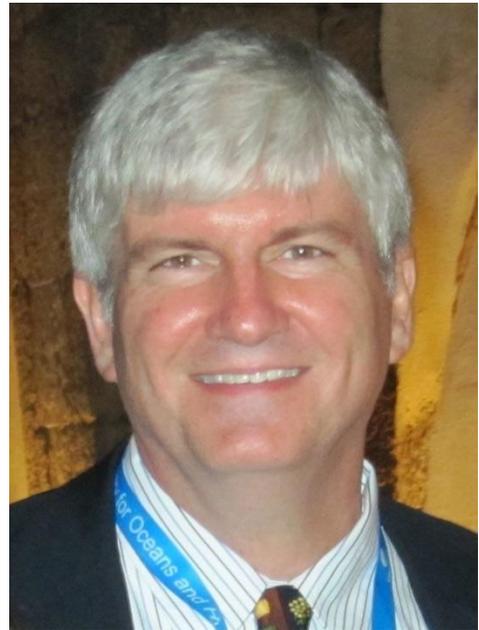
Geophysicist, NOAA's Laboratory for Satellite Altimetry

Sorry about the Orange Roughy, why you should care about the bottom of the ocean, and other adventures from satellite oceanography

Thursday November 29, 9:45-10:30 AM –Chamber Board Room

Radars on satellites observe changes in sea level, with applications as diverse as climate change, tsunami studies, hurricane intensification forecasts, submarine warfare, and mapping the shape of the ocean floor. This talk will present a few highlights of this work, and explain why Science On a Sphere is the ideal forum for presenting ocean science.

Biography: For more than 25 years, Walter H F Smith has been a Geophysicist at NOAA, doing research to improve satellite radar systems and apply their measurements to a broad array of topics in weather forecasting and ocean science. He has published more than 60 peer-reviewed articles on diverse subjects ranging from the lubrication of plate tectonics to the climatology of Earth's ionosphere, and his papers on mapping the seafloor from space are the most cited articles in oceanography. In 2017 the American Geophysical Union named him an Honorary Fellow for his "fundamental contributions to marine geodesy, especially applying satellite altimetry to bathymetry, physical oceanography, and oceanic tectonics". He has produced content for teaching plate tectonics and seafloor geology on Science On a Sphere, and he enjoys using the Sphere to bring basic ocean and climate science to a general audience.



Lightning Talks

These are “rapid-fire” 5-minute presentations on topics of broad appeal to the majority of workshop attendees. There will be time for Q&A at the end of the session

Breaking into SOS: Training Solutions for Entry-Level Staff

Luke Richmond, Creative Arts in Science Education Supervisor, Aquarium of the Pacific
9:15-9:45 am, Wednesday, November 28 – Chamber Board Room

Beyond the Sphere: Impacts of SOS Training on Institution-Wide Practices

Staci Wong, Interpretation Manager, Aquarium of the Pacific
9:15-9:45 am, Wednesday, November 28 – Chamber Board Room

Plants to Planets: Using SOS as a Teaching Tool

Justin McAfee, Technology Programs Manager, Science Central
9:15-9:45 am, Wednesday, November 28 – Chamber Board Room

A New Perspective on the Sphere: Using the Power of Art to Explore Science

Kathryn Semmens, Science Director, Nurture Nature Center
9:15-9:45 am, Wednesday, November 28 – Chamber Board Room

At the Crossroads of Science and Literacy: Connecting Early Learners to Science on a Sphere

Janet Stern and Courtney Lair, Educators, Science City at Union Station
9:15-9:45 am, Wednesday, November 28 – Chamber Board Room

NOAA’s Newest Generation of Geostationary Weather Satellites

Rafael de Ameller, NOAA Environmental Visualization Lab Leader, NOAA NESDIS
9:15 – 9:45 am, Thursday, November 28 – Chamber Board Room

New Technologies and SOS

Eric Hackathorn, Developer, NOAA SOS Boulder
9:15 – 9:45 am, Thursday, November 28 – Chamber Board Room

SOS Isn’t the Only Cool Thing Going at NOAA in Boulder

Jebb Stewart, Informatics, Visualization, and Outreach Section Chief, NOAA SOS Boulder
9:15 – 9:45 am, Thursday, November 28 – Chamber Board Room

#projectphenomena - more good stories for your sphere

Hilary Peddicord, Education Specialist, NOAA SOS Boulder
9:15 – 9:45 am, Thursday, November 28 – Chamber Board Room

Session Descriptions

SOS Showcase

These sessions will use SOS to feature new content or docent presentations, either complete or in development. The SOS showcase is an opportunity for presenters to share and discuss new work. Presentations are generally limited to 20 minutes, including time for discussion.

Augmented Reality on the Sphere

Eric Hackathorn – NOAA SOS Boulder

4:00 – 4:30 pm, Tuesday, November 27 – SOS

Augmented reality is an interactive experience where objects that reside in the real-world are "augmented" by computer-generated information. This presentation will demo a new mobile application under development by the SOS team that allows augmented reality to be used with Science On a Sphere. Examples include the rings of Saturn, a cutaway of the Earth's interior, the Sun's corona, and the Earth's magnetic field. There will be time for hands on testing, feedback on the approach, and discussion of how it might be used at particular sites and audiences.

Become a Power Presenter using the iPad SOS Remote App

Shilpi Gupta, Hilary Peddicord, and Beth Russell – NOAA SOS Boulder

4:30 – 5:00 pm, Tuesday, November 27 – SOS

Most of us are familiar with the basics of loading datasets onto SOS and playing and orienting a dataset, but do you know the ins and outs of the iPad app? The iPad SOS Remote app for Science On a Sphere® (SOS) is a multi-featured app that is the primary way to control the SOS system during an SOS presentation. In this demo, we will go into depth about all of the numerous features available on the app so that you can get the most use out of it during your SOS presentations!

Unique overlay ideas & SOS Content in Planetariums

Patrick Hess – Science City at Union Station

5:00 – 5:30 pm, Tuesday, November 27 – SOS

See some interesting custom overlays and how they can enhance a live presentation in creative ways. Also learn how to create your own unique overlays from content found online. You will also see different ways in which Science on a Sphere content can be presented in a planetarium setting, and the advantages and disadvantages to presenting SOS data in this medium.

Spotlighting the Spotlight

Beth Russell, Hilary Peddicord, and Shilpi Gupta – NOAA SOS Boulder

11:00 – 11:30 am, Wednesday, November 28 – SOS

The 5.3 release included the brand new Spotlight feature on the iPad, which provides a place for the SOS team to highlight datasets. Have you used it? What do you think? If you were in charge of the Spotlight datasets, what would you post? We want to hear from you! In this discussion, we're looking for your feedback on how to improve this new feature that holds a lot of great opportunity.

SOS Nuggets from Goddard

Maurice Henderson – NASA Goddard

11:30— 11:50 am, Wednesday, November 28 –SOS

Throughout the year, we develop content for our scientists to use in SOS presentations. We will update the community on additions to our Site-Custom folder since we were last together. The clips will cover a full range of topics.

Getting the most out of PIPs in your presentations

Shilpi Gupta and Beth Russell – NOAA SOS Boulder

1:00 – 1:30 pm, Wednesday, November 28 – SOS

Looking to customize your datasets? Use PIPs! A PIP, or Picture in a Picture, is an image, image sequence, movie, or text that can be overlaid on top of any Science On a Sphere® (SOS) dataset. A PIP provides additional context for a dataset - for example, colorbars, close-up views of a region, or text to annotate a feature or concept. In this demo, we will demonstrate different types of PIPs and their use-cases on SOS, as well as reveal our latest PIP feature - moving PIPs. In addition, we will use the SOS Visual Playlist Editor to demonstrate how you can quickly add your own PIPs to your SOS datasets!

Tectonically Speaking

Walter H F Smith -- NOAA's Laboratory for Satellite Altimetry

1:30 – 2:00 pm, Wednesday, November 28 – SOS

An exploration of Earth's energy from the surface to the core, from one of NOAA's leading scientists.

Story on a Sphere

Marissa Jones and Bekkah Lampe – NOAA Office of Education

2:00 – 2:45 pm, Wednesday, November 28 – SOS

Note: This is Part 2 of a 3 part series. Recommended to attend the other 2 sessions in Arthur Stillwell. Also please bring your laptop if you have one.

Science communicators are constantly encouraged to tell stories. Stories are the ultimate tool of engagement, the language we use to relate to one another and connect with our world. But the process of telling a great story is often left to inspiration and intuition, leaving would-be storytellers at a loss to know when they're on the right track. In this two-part workshop, we demystify the storytelling process by examining the underlying structure of narratives. In Part 1, participants will discuss and practice storytelling techniques using advice from creative nonfiction, interpretation, and personal experiences. Working in groups, we will develop short, compelling narratives about datasets in the SOS catalog. During Part 2, we will showcase our work on the sphere and share feedback. This workshop is appropriate for veteran and novice storytellers alike.

Integrating Scientific Demonstrations to the SOS format

James Beck – Science City at Union Station

2:45– 3:15 pm, Wednesday, November 28 – SOS

This presentation focuses on a method of using SOS as tool for scientific demonstrations. I initiate with a broad scope introduction of multiple SOS slides to emphasize the connectedness of the global SOS community. By integrating physical demonstrations with the SOS format, educators can reach a wider variety of audiences and have a greater impact. The hands-on demonstrations will provide an enhanced educational experience. I will

focus on “weather” and “atmospheric gases” to show global connectedness and then provide a hands-on demonstration for an enhanced educational impact. One of the specific areas of integrating physical demonstrations with the SOS format to be exhibited will be world connections of weather and atmospheric gases with a physical model of the water cycle. By using a model of evaporation (mister), a condensation area (water bath), I will create a demonstration that would accentuate the “Clouds Real Time” SOS feature. The integration of other technology could be done also by having guests use “flight tracker”, other satellite images, or remote sensing in conjunction with the SOS features.

Climate Change. What it is, what does it mean, and what we are doing about it?

Tom Di Liberto – NOAA Climate Program Office

4:00 – 4:30 pm, Wednesday, November 28 – SOS

Human-caused climate change has already and will continue to have a major impact on society and ecosystems across the globe. This talk will try to answer some major questions. How is our climate changing and why? What does it mean for us and our future? And what is being done already in communities across the United States (and globe) to solve this gargantuan problem? All simple questions with complex answers. Answers that we will tackle together using the latest science from the Climate Science Special Report issued in 2017 by the U.S. Global Change Research Program.

Shirt made in ...? Exploring global to local connections interactively on the Sphere

Kathryn Semmens – Nurture Nature Center

4:30 – 5:00 pm, Wednesday, November 28 – SOS

Our lifestyles - the way we live, the things we buy and the things we do everyday – are supported by many global systems and our local choices impact those global systems. This SOS showcase program will show how something we use everyday, our clothes, can be connected to a variety of earth systems. Did you know that less than 5% of the clothes we buy in the US were made here? We will interactively explore where your shirt was made, the transportation needed to deliver the clothing, and the environmental impacts of that transportation. We will also discover how positive change can reduce such impacts. Participants will learn about these global to local links by working together to create chains of connections, while a post-activity worksheet provides an additional opportunity to explore connections. SOS partners looking for interactive ways to engage visitors will find inspiration, ideas, and relevant content, and can adapt the program for different age groups.

Silk Roads

Sam Lei – Macao Science Center

5:00 – 5:30 pm, Wednesday, November 28 –SOS

The theme of this work is based on 'Silk', and integrated into 'Chinese Calligraphy', representative of Chinese art. Animation shows that both 'Silk' and 'Chinese Calligraphy' are the symbols of Chinese civilization, representing the long history and splendid culture of China. This presentation also brings out the relationship of 'Silk' and the China's ' Belt & Road' initiative, which has enhanced China's influence on promoting world cultural exchanges.

Phenomena[!] Storytelling: Will humans and animals evolve to have longer extremities?

Hilary Peddicord – NOAA SOS Boulder

11:00 – 11:20 am, Thursday, November 29 –SOS

Fennec foxes have ears nearly twice their body size, in fact, animals that live near the equator tend to have larger extremities and longer limbs because the larger surface area allows heat to escape quicker. This trend is known as Allen's rule. Where would we look for these animals? If the tropics are expanding and temperature rising, will

we see this in the evolution of animals, and of people? Not all questions are meant to be answered... just start generating them.

Scientific phenomena are occurrences in the natural or man-made world that cause one to wonder and ask questions. Anchoring a lesson around a concept that is inherently engaging opens the door of fascination to providing accurate, evidence-based explanations for how and why interesting things occur. We think this progressive education engagement practice is a perfect fit for Science On a Sphere. As such we have put together about 20 of these wow-cool! stories as another tool to help you reinvent your presentation.

Animals on the Move: A story of migration and dispersal over land and under sea

Annette Brickley – STEMming the Gaps Consulting/Buttonwood Park Zoo/Woods Hole Oceanographic Institution, Stace Beaulieu – Woods Hole Oceanographic Institution

11:20 – 11:40 am, Thursday, November 29 – SOS

When the environment changes some animals stay, but others need to move to new locations. Some animals migrate with the seasons of the year, over land and in the ocean, too. Sometimes the environment can change drastically, and abruptly, and this, too, can even happen in the ocean. In this presentation developed for the Science On a Sphere, we'll see how different animal species - from birds in the air to tubeworms in the deep sea - migrate or disperse to new locations as part of the dynamics and resilience of animal populations on Earth.

Shark Tags and Tales

Hannah Hamilton – Buttonwood Park Zoo, Tighe Ratcliffe – University of Massachusetts Dartmouth, and Annette Brickley – STEMming the Gaps Consulting/Buttonwood Park Zoo/ Woods Hole Oceanographic Institution

11:40 – 12:00 pm, Thursday, November 29 – SOS

In the western North Atlantic, historical fisheries-dependent catch records portray the Great white shark as a shelf-oriented species that moves north and south seasonally. With long-lasting satellite-based tags, researchers have found that white sharks are more broadly distributed from near-coastal, shelf-oriented habitat to the open ocean with frequent excursions to significant depths. These recent findings extend the white shark habitat in the North Atlantic beyond existing protection from practices such as shark-finning, which has considerable implications for the future of these megafish.

Science in the Stratosphere: Connecting kids to the atmospheric art of high altitude ballooning

Chris Pait and Chris Ortiz - South Florida Science Center and Aquarium

1:00 – 1:30 pm, Thursday, November 29 – SOS

In 2017 we started a program called the Young Scientist Space Program. The goal was to introduce a group of elementary/middle school students to climate science in a way that would be both captivating and impactful. We decided to use balloons. Yes, balloons. Weather balloons have been used since the late 18th century to gather information on wind, temperature, barometric pressure, and many other useful points of weather data. While weather satellites give atmospheric scientists the big picture, they don't give them a complete picture. To fill in the details, scientists use things like ground-based observations, radar, and weather balloons. High altitude ballooning (HAB) is one of the oldest methods used to collect atmospheric data, it's surprisingly accessible, and it had the potential to be a very hands-on method for introducing atmospheric and climate science concepts to our group of students. They built payloads, programmed data-collecting electronics, and ultimately launched an 8-ft diameter weather balloon to an altitude of over 100,000 ft. Along with measurements of temperature, pressure, and wind speed/direction, our students also captured awe-inspiring images and video resulting in a truly incredible learning experience for both our students and our educators. We would like to share that experience

with the SOS community in a program designed to engage audiences and introduce some basic concepts in atmospheric science.

Student-Produced Content for the SOS

Darik Velez - St. Paul's School

1:30 – 2:00 pm, Thursday November 29 – SOS

Allowing high school students complete access to our SOS has unleashed a level of creativity and interdisciplinary projects that have shattered the walls of the traditional classroom. This presentation will highlight some of our student work including both the process and challenges of student-led content creation. From traditional presentations to experimenting with 360-degree video and direct live streaming onto the SOS, students have begun to solidify our SOS as a major "crossroad of learning" in our school.

At the Crossroads of Earth's Systems

Patrick Rowley -- James E. Richmond Science Center, CCPS

2:00– 2:30 pm, Thursday, November 29 – SOS

This presentation will highlight two of the facilitated interactive programs we offer during field trips, both of which showcase the interconnectedness of Earth's systems. First, the Earth Systems program uses global datasets to view the atmosphere, hydrosphere, geosphere, and biosphere, but more importantly has the students physically become connected when discussing how these systems interact with each other. We'll also take a look at our updated plate tectonics and Pangaea SOS experience, with custom animations and puzzle pieces.

NOAA's Mission: From the Surface of the Sun to the Depths of the Ocean

Rafael de Ameller – NOAA NESDIS

3:00 – 3:20 pm, Thursday, November 29 – SOS

NOAA's mission is to understand and predict changes in the Earth's environment: From the Surface of the Sun to the Depths of the Ocean

Developing global tide animations for Science On a Sphere

Marissa Jones – NOAA Office of Education

3:20 – 3:40 pm, Thursday, November 29 – SOS

Mariners, philosophers, and observers of the natural world have puzzled over the tides for millennia. The forces that create tides – gravitational attractions between the Earth, moon, and sun – are deceptively simple in theory, but the results are notoriously complex. Predicting tides and currents has been an important part of NOAA's mission since the days of the Coast and Geodetic Survey. Furthermore, tides have the hallmarks of an ideal Science On a Sphere dataset: they're global and dynamic, familiar but surprising. However, datasets that explain and visualize the tides are notably absent from the Science On a Sphere data catalog. In this showcase, we explore global tidal animations for spherical displays. We pilot the use of props and seek feedback on visualization techniques. With the help of Science On a Sphere, we hope to do what the philosophers, seafarers, and mathematicians of yore could not: watch the tides play out in a synchronized global performance.

Your favorite datasets

Stephen Zepecki – NOAA Office of Education
3:40 – 4:00 pm, Thursday, November 29 – SOS

Come take a more in-depth look at some of the science behind NOAA headquarter's favorite SOS visualizations. Science On a Sphere at NOAA headquarters is in a unique position to have scientists who create SOS content, speak to the SOS catalog with authority. SOS manager at NOAA headquarters, Stephen Zepecki, will share his insight with the creation of these data sets, as well as highlight some of the nuances of some of SOS's most information-rich datasets, to help SOS docents become speaking authorities of SOS content.

New additions to the SOS data catalog

Beth Russell – NOAA SOS Boulder
4:00 – 4:20 pm, Thursday, November 29 – SOS

The SOS data catalog is continually growing! We will be presenting some of the best datasets and live programs that have been added since the last workshop.

Breakout Sessions

These sessions provide opportunities for more focused discussions or working groups. Topics in this category can include instructional sessions, working groups, small-group discussions, or presentations with a narrower focus.

How to write a script that people will want to listen to and that others can deliver

Kathryn Semmens - Nurture Nature Center

4:00 – 4:30 pm, Tuesday, November 27 – Arthur Stilwell

One cannot develop a Science on a Sphere program in a vacuum. Collaboration is key to a successful script development effort, as is lots of test runs! This session will share best practices for creating narratives for docent-led Sphere programs. Specifically, we will explore how to utilize student and teacher feedback to improve script development, how to reach out to and include information from experts in the field, and how to work with a team of interns or volunteers to collaborate on program development. Nurture Nature Center recently completed a scripted SOS and creative program called '6 Degrees of Connection' (funded by a grant through NASA's CP4SMP) that was developed in a collaborative and iterative process to improve effectiveness and success. Several interns helped with the development of the program and feedback/evaluation from students and teachers informed revisions to the ultimate program. NNC will share lessons learned from this project and facilitate a discussion with session participants about others' experiences and concerns.

Spanning the generations: Lessons learned building a training program for teens to retirees that promotes success and growth

Nicholas Corcoran - The Wild Center

4:30 – 5:30 pm, Tuesday, November 27 – Arthur Stilwell

Many institutions rely heavily on volunteers, docents, and interns to assist in programming. We faced initial challenges getting volunteers and staff to use the sphere - older volunteers was concerned about the technical aspects and younger interns were nervous about talking to large crowds. Everyone was concerned that they had to memorize all 500+ datasets. We have worked to overcome these challenges and have had staff and volunteers as young as 12 and as old as 80 try their hand at a sphere program. In this session we will share how to overcome fears, work with youth engaging visitors for the first time (a new teen program at The Wild Center) and train them lead high quality informal, public programs. We will end by sharing out ideas and tips used by all institutions for training so that we can keep the momentum going.

Extracting and using WorldView images

Maurice Henderson - NASA Goddard

4:30 – 5:00 pm, Tuesday, November 27 – Engineerium

This talk will introduce a series of techniques to access the wide range of Earth Science data that is available through NASA WorldView. We will examine high resolution data products at the native resolution of the missions, demonstrate them with the SOS zoom feature. WorldView time series will be demonstrated to build stories from a changing planet over time. Finally, we will demonstrate transporting these data products to SOS, and a nice feature for sharing the data.

Working with the Science On A Sphere

Matthew Hamel - Millersville University/NOAA

5:00 – 5:30 pm, Tuesday, November 27 – Engineerium

This presentation covers my experience working with the Science On a Sphere (SOS) during my internship with the National Centers for Environmental Prediction (NCEP) at their National Centers for Climate and Weather Prediction offices in College Park, Maryland. Having no prior experience with the SOS, I was challenged to learn how to operate the SOS. During this process, I had to create methods to make working with the Sphere more user-friendly. To do this, I developed manuals and video tutorials on how to manage the SOS using the remote app on the iPad. Furthermore, this presentation covers how to create visualizations from a beginner's perspective. The audience that this presentation will target are people who would like to become more familiar with the SOS as well as create visualizations for it.

Connecting Teachers to Climate Change using Science on a Sphere

Michael Trumbower - The Wild Center

11:00 am – 12:00 pm, Wednesday, November 28 – Arthur Stilwell

The Wild Center's Teacher Climate Institute aims to empower teachers with the tools and skills needed to address climate change in the classroom. Utilizing NOAA's Science on a Sphere Technology and the best of available climate education curriculums, the Teacher Climate Institute serves as a comprehensive introduction to climate change education and resources available to teachers. Science on a Sphere is utilized to introduce global climate concepts and bring data to life for participating teachers. Educators then explore a suite of additional NOAA web-assets (including the U.S. Climate Resilience Toolkit, and New York State Climate Change Clearinghouse) to further draw connections between global change and local impacts. Teachers participate in and are provided with hands-on workshops and activities, aligned to Next Generation Science Standards and Common Core, for implementation in the classroom and continued learning.

Sphere and Now: SOS at the NOAA Center for Weather and Climate Prediction

Jan Thomas and Arialmis Myers – NOAA

11:00 – 11:30 am, Wednesday, November 28 – Engineerium

The NOAA Center for Weather and Climate Prediction (NCWCP) had its Sphere installation in the fall of 2017. NCWCP is a non-traditional location for Science On a Sphere. The Sphere is located behind the security perimeter

of a federal building, thus it is not available to the general public. This unique setup has presented a number of challenges for its utilization and day-to-day operations. In addition, it has been challenging to generate interest in presentations rather than in content creation from the various NOAA line offices in the building.

Our presentation will focus on how we have crafted a policy and a reservation system for our unique user group. We will also talk about how we have utilized the Sphere so far, what has worked and what has not. Because the Sphere is located in the library, we will also discuss how the Sphere has altered the landscape and services provided at NCWCP.

Convection Connections

Michael McConnell - Science Central

11:30 am – 12:00 pm, Wednesday, November 28 – Engineerium

The focus of the workshop will be the multitude of ways in which convection plays a role in phenomena on earth and in space. (hurricanes, tornadoes, ocean currents, plate motion, storms and currents in gas giants, etc.) I will start with a demonstration visualizing convection. I will then discuss the SOS maps that this can be paired with.

Story on a Sphere

Marissa Jones and Bekkah Lampe – NOAA Office of Education

1:00 – 1:30 pm & 2:45 – 3:15 pm, Wednesday, November 28 – Arthur Stilwell

Note: This session has multiple parts and participants are recommended to attend their SOS Showcase as well. Also please bring your laptop if you have one

Science communicators are constantly encouraged to tell stories. Stories are the ultimate tool of engagement, the language we use to relate to one another and connect with our world. But the process of telling a great story is often left to inspiration and intuition, leaving would-be storytellers at a loss to know when they're on the right track. In this two-part workshop, we demystify the storytelling process by examining the underlying structure of narratives. In Part 1, participants will discuss and practice storytelling techniques using advice from creative nonfiction, interpretation, and personal experiences. Working in groups, we will develop short, compelling narratives about datasets in the SOS catalog. During Part 2, we will showcase our work on the sphere and share feedback. This workshop is appropriate for veteran and novice storytellers alike.

Extend Your SOS Presentation Beyond the Sphere with Story Maps

Dan Pisut - Esri Living Atlas of the World

2:15 – 3:15 pm, Wednesday, November 28 – Engineerium

Note: Laptop recommended

Story Maps are becoming increasingly popular technologies for sharing visual and textual information. This demonstration and Q&A session will give an intro to using Story Maps, tips and tricks, and best practices. We'll also focus on how to take SOS imagery and related data and integrate them into interactive maps that can be used in presentations, kiosks, or on your institution's website. The companion presentation on Making Beautiful Maps for Education will also provide some context for creating custom maps and publishing them online.

Modeling and Moving Around the Sphere with K-2

Annette Brickley – STEMming the Gaps Consulting/Buttonwood Park Zoo/ Woods Hole Oceanographic Institution,
Hannah Hamilton – Buttonwood Park Zoo

4:00 – 5:00 pm, Wednesday, November 28 –Arthur Stilwell

When the average age of your primary school year audience is 6 and you're basically "given" a sphere, you get creative in your thinking about how to integrate the incredible SOS into your preK-g2 field trip programs. At the Buttonwood Park Zoo in New Bedford, MA, we have kids modeling and moving to increase their engagement and understanding of the NGSS content their teachers want and tap into the playfulness and curiosity that they bring. You'll experience Kinesthetic Astronomy as a 5 year old and as a 7 year old and learn why they are different experiences. You'll see an example of the teacher guide we've created to inform pre-, during, and post-visit activities. And you'll share what you've done in similar circumstances.

Engaging Visitors and Volunteers Alike: Our Custom Kiosk at The Lawrence Hall of Science

Dustin Perry - Lawrence Hall of Science

5:00 – 5:30 pm, Wednesday, November 28 –Arthur Stilwell

The Lawrence Hall of Science has been evaluating and iterating upon our own custom interactive SOS kiosk for several years. Throughout the evolution of our SOS exhibit as piloted by the kiosk, we have maintained a special attention to accessibility, building user narratives, engaging the widest possible audience, and ensuring the integration of our active volunteer population (trained docents, staff facilitators, and youth volunteers).

This presentation will briefly outline the recent history of our kiosk through three major phases, turning toward a focus on the contemporary version of our interactive touch-screen controls. I will also highlight our current design goals, derived from the learning activation model: simplicity, engagement, and prompting questions.

Additionally, I will reflect on our kiosk as a tool to empower educators rather than overshadow them, especially where our volunteers are concerned, and share experiences of (and training for) volunteers and visitors using our kiosk to discover the SOS collaboratively.

This breakout session, with 20 minutes of guided presentation and 10 minutes of discussion, is designed for an audience of educators, public program developers, and those interested in volunteer support. It will touch on specialized technical notes only where necessary, and is not intended for deep technological dialogue.

Making Beautiful Maps for Education

Dan Pisut - Esri Living Atlas of the World

4:00 – 5:30 pm, Wednesday, November 28 –Engineerium

Note: Laptop recommended

Making maps is quite easy. Making beautiful that can be understood by a wide variety of audiences can be challenging. But at least now, technology has greatly lowered the bar. This mini-workshop will walk you through the process of creating four types of maps: point maps, choropleths (i.e., color coded countries/states/regions), data grids (e.g., climate data), and customizing maps from data online. Each of these will also be exported for the SOS. We'll be doing the work in ArcGIS Pro. If you don't have a license, a free 21-day trial is available at <https://www.esri.com/en-us/arcgis/products/arcgis-pro/trial>

360° videography for spherical film and virtual reality headsets

Ian McGuire - Detroit Zoological Society

11:30 am– 12:00 pm, Thursday, November 29 –Arthur Stilwell

Get a primer on content creation for the sphere, the basic software and hardware you need to begin. Special focus on evaluating and comparing affordable 360° cameras, along with some of the developing best practices for videography with them. Preview of some of the ways we at the Detroit Zoological Society are beginning to implement these tools with after school program participants and high school interns.

How to talk climate on the sphere

Tom Di Liberto – NOAA Climate Program Office

11:00 – 11:30 am, Thursday, November 29 –Engineerium

While it is amazing how many different climate datasets are available on the Science on a Sphere, you might have found yourself a bit overwhelmed and intimidated when thumbing through your options. This workshop will help sphere users develop their own climate science talks for the Sphere, incorporating non-sphere datasets too, building upon connections made across datasets. Also, have you found yourself with questions about the best way of talking climate on your sphere? Then let's discuss! Time will be spent talking about best practices in presenting a charged topic as well as highlighting additional resources available to Sphere users through NOAA's Climate Program Office, Climate.gov and the Climate Resilience Toolkit among others. Let's discover ways of bringing global climate change to a local level.

Teaching Climate with SOS visualizations and other NOAA resources

Stephen Zepecki – NOAA Office of Education

11:30 am– 12:00 pm, Thursday, November 29 –Engineerium

The SOS data catalog is rich with climate change visualizations. Come see how the SOS data catalog, combined with other NOAA educational resources, can be used to facilitate and strengthen student understanding of climate change.

What's NEW with SOS Explorer

Hilary Peddicord and Eric Hackathorn – NOAA SOS Boulder

1:00 – 1:30 pm, Thursday, November 29 –Arthur Stilwell

SOS Explorer has recently been installed in 25 museums and academic institutions and has been a hit at some of the most prestigious science conferences in the U.S. So what does it do? Virtual Reality, 360 degree media, 3-D animal migrations, SOS datasets including real-time ... on any screen - from school projectors and laptops to huge video walls - and it's portable! Come check out what we're up to with this fun and versatile software cousin to Science On a Sphere.

SOS Product Suite: Feedback and Future Direction

Keith Searight, Shilpi Gupta, and Ian McGinnis – NOAA SOS Boulder

1:30 – 2:30 pm, Thursday, November 29 –Arthur Stilwell

Meet with the SOS development team in a panel discussion format for a two-way dialogue on the whole SOS product suite and where it's heading. Bring your thoughts on what aspects of our software are working well for you, what's missing or challenging, and what you'd like most to enhance SOS at your venue.

Scientists Like Sharing & Visualizing Their Data

Annette Brickley – STEMming the Gaps Consulting/Buttonwood Park Zoo/Woods Hole Oceanographic Institution,

Hannah Hamilton – Buttonwood Park Zoo, Stace Beaulieu – Woods Hole Oceanographic Institution

1:30 – 2:30 pm, Thursday, November 29 –Engineerium

Educators like scientists, particularly those with cool global data sets. Scientists like educators, particularly those with cool giant spherical projection screens, yes, with Science On a Sphere. The continued software updates for SOS are making it easier and easier to create data sets and tell data stories. It's also easier to collaborate with researching and grant writing scientists, to be a part of their Education & Outreach, their Broader Impacts. We will share several examples of successful collaborations that put new data on the Sphere, supported programming and equipment, and added a little "je ne sais quoi" to research proposals.

Amazing world: How SOS can promote positive emotions and involve visitors in taking care of our planet

Jimena Echegollen and Marta Pineyro – Museo del Acero Horno 3

3:00 – 3:30 pm, Thursday, November 29 –Arthur Stilwell

We would like to share our experience on one of our live facilitated programs for general public where we used multimedia (videos and background music) in addition to SOS. The objective of the program was to bring about amazement in order to inspire visitors to take on practical actions towards Earth's care and protection. This special program has been part of the City Festival's agenda for two years, which aims to promote awareness of positive emotions and their importance in human wellbeing.

Connecting Communities and Stakeholders Through SOS

Thomas Quayle - Clark Planetarium

3:30 – 4:30 pm, Thursday, November 29 – Arthur Stilwell

Growth and sustainability are desired outcomes for both community and industry stakeholders. Informal educators can use SOS to connect communities with industry and build productive dialogue. In this session, I will describe methods for creating local partnerships across a variety of institutions and programs and give several “success stories”. I will give examples of how to identify partners and their overlapping interests, how to invest in special events, and how to become 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 climate science.

Crossroads of SOS for K-12: Formal Education in an Informal Environment

Patrick Rowley - James E. Richmond Science Center, CCPS, Hilary Peddicord – NOAA SOS Boulder, Annette Brickley - STEMing the Gaps Consulting, Darik Vélez - St. Paul’s School
3:00 – 4:00 pm, Thursday, November 29 – Engineerium

Do you do K-12 programs with your sphere? Please attend and contribute to the conversation. Following a few short presentations, the panel will facilitate a conversation on using the SOS for K-12 programs. We will focus on aligning SOS programs with formal education standards and curricula, but in the fun informal environment of museums, zoos, aquariums and science centers.

Positioning Teens as Advocates for Environmental Literacy and Resilient Communities

Bryan Wunar - Museum of Science and Industry, Chicago
4:00 – 4:30 pm, Thursday, November 29 – Engineerium

Learn how the Museum of Science and Industry, Chicago (MSI) is engaging high school age youth in the exploration of climate and Earth systems science, and supporting cohorts of teens to become advocates for establishing resilient communities in the Midwest. Become part of a discussion to explore strategies for supporting youth facilitation of learning experiences, linkages to out of school time and summer learning programs, and connections to municipal agencies.

Fun Things to do in Kansas City:

*within walking distance or a short street car ride

BBQ

- Joe's Kansas City Bar-B-Que -3002 West 47th Avenue, Kansas City, KS 66103
- Q39 -1000 W 39th St, Kansas City, MO 64111
- *Jack Stack - 101 W 22nd St #300, Kansas City, MO 64108
- Char Bar - 4050 Pennsylvania Ave #150, Kansas City, MO 64111

JAZZ

- *Green Lady Lounge - 1809 Grand Blvd, Kansas City, MO 64108
- *The Phoenix - 302 W 8th St, Kansas City, MO 64105
- The Blue Room - 1600 E 18th St, Kansas City, MO 6410

RESTAURANTS

- *Nara-Sushi - 1617 Main St, Kansas City, MO 64108
- Empanada Madness-Latin American Cuisine - 906 Southwest Blvd, Kansas City, MO 64108
- Westside Local-Farm to Table - 1663 Summit St, Kansas City, MO 64108
- Mission Taco-West Coast Street Tacos - 409 E 18th St, Kansas City, MO 64108

VEGETARIAN

- Blue Bird Bistro - 1700 Summit St, Kansas City, MO 64108
- *Café Gratitude - 333 Southwest Blvd, Kansas City, MO 64108
- Eden Alley - 707 West 47th Street, lower level of Unity Temple, Kansas City, MO 64112
- Mud Pie Vegan Bakery and Coffeeshouse - 1615 W 39th St, Kansas City, MO 64111

BARS

- *Tom's Town - 1701 Main St, Kansas City, MO 64108
- *Manifesto-speakeasy in the basement of The Rieger restaurant - 1924 Main St, Kansas City, MO 64108
- TikiCat-Speakeasy in basement of HopCat - 401 Westport Road, Lower Level, Kansas City, MO 64111

ATTRACTIONS

- National World War I Museum and Memorial - 2 Memorial Dr, Kansas City, MO 64108
- Nelson-Atkins Museum of Art - 4525 Oak St, Kansas City, MO 64111
- Kansas City Zoo - 6800 Zoo Dr, Kansas City, MO 64132
- Boulevard Brewery Tours - 2534 Madison Ave, Kansas City, MO 64108