MAMEA Concurrent Sessions
At-A-Glance

Time:	Space:				
	Palmetto 1 & 2	**Palmetto 3**	**Palmetto 4**	**Palmetto 5**	**Mako**
8:30-9:15am	**Plenary Speaker**				
Concurrent Session I **9:30-10:15am**		**Christopher Petrone;** Dawn Sherwood; Mariah Eisman **BREAKOUT of your regular lesson plans and programs: Gamify!**	**Hannah Mawyer; Mallory Munden Evaluating Equity, Learning, and Attitudes in Marine Education Programs**	**Lisa Wu;** Scott Sveiven **Lionfish, Tiger Groupers, and Brown Bears, Oh My! Involving Students in Authentic Conservation Research**	**Dr. Ryan Walker Antarctica and Sea Level Rise: Sharing the Science**
Concurrent Session II **10:30-11:15am**		**Pat Harcourt The Ocean and Climate Change by the Number**	**Andy Gould Marine Science: Let's play and Learn**	**Lindsay Laughner Expedition Education with Sharks, and S.T.E.M.**	**Carol Hopper Brill Earthquakes, Sediments and Glaciers, Oh My!**
11:30-12:15pm	**Plenary Speaker**				
12:30-2:00pm	**Lunch *(and business meeting)***				
Concurrent Session III **2:15-3:00pm**		**Lisa Tossey**; Christopher Petrone **Showing Your Work-Visual Scientific Storytelling**	**Catherine Roberts C is for Climate Change**	**Jolvan Morris SCUTES: Students Collaborating to Undertake Tracking Efforts for Sturgeon**	**Kristi Walters Pirate Science Camp**
3:00-3:15pm	**Networking Break/Snack**				
Concurrent Session IV **3:30-4:15pm**		**Stephanie Dohner;** Christopher Petrone **It's a bird! It's a plane! No, it's super cool science!**	**Allie Toomey Explore Our Dynamic Planet with Earth Science Resources from PBS Learning Media**	**Maggie Pletta Creating Workforce Ready Students: Develop transferable, interactive software designed to encourage free-choice learning**	**Susan Walker; Sue Engelbert Being a Voice for Dolphins: Animal trainers and professional educators working together to inspire ocean conservation**
5:00-6:00pm		**Poster Sessions /Share-a-thon/Sand Swap/Book Sale**			

Concurrent Session I
9:30-10:15am

Palmetto 3:

BREAKOUT of your regular lesson plans and programs: Gamify!
Christopher Petrone, *Delaware Sea Grant / Univ. of Delaware;* **Dawn Sherwood**, *Highland Springs High School, Virginia &* **Mariah Eisman**, *West Springfield High School, Virginia*

Session Type: Hands-on Workshop
Track: Indoor Lesson
Audience Type: Elementary, Middle School, High School, College, Other

Description: Featured at MAMEA16, BreakoutEDU offers classroom and nonformal educators the opportunity to break into "game-i-fying" their normal lesson/programs, making them more engaging, stickier, and fun! BreakoutEDU also helps students build the 4C "soft skills," Critical thinking, Communication, Collaboration, and Creativity. We will also explore other ways of gamifying your lessons, such as repurposing classic board games and Project WET activities. The presenters will demonstrate games they have created (e.g. climate change, wind energy, watersheds, and zooplankton) and that are freely available from BreakoutEDU and other sources. Participants will also learn about less expensive alternatives and ways to fund gamification activities (gofundme, donorschoose, etc.).

Palmetto 4:

Evaluating Equity, Learning, and Attitudes in Marine Education Programs
Hannah Mawyer, Chesapeake Bay National Estuarine Research Reserve & College of William & Mary & **Mallory Munden**, CBNERR & UNC Wilmington; Sponsors: Sarah Nuss & Kristen Sharpe, CBNERR

Session Type: Lecture
Track: Research
Audience Type: Professionals

Description: Big Data and Equity are topics of intense study in education, and they can work hand-in-hand to improve any marine education program. Well-developed evaluative tests can diagnose concepts or lessons that are not working optimally and help identify concepts your students already understand. These evaluations can also be combined with attitudinal surveys that address self-efficacy and confidence to determine the extent to which your program is developing advocates for the environment. In addition to these short-term outcomes, assessing long-term outcomes can also show how effective your program is. Viewing these data through the lens of diversity can help show areas for improving accessibility and equity in your programs. Come learn how CBNERR-VA evaluates our campers' short and long term educational outcomes and attitudes about marine science,

how to evaluate and potentially improve the equity of your programs, and how to prepare an IRB. We will be providing a handout with key points for note taking.

Palmetto 5:

Lionfish, Tiger Groupers, and Brown Bears, Oh My! Involving Students in Authentic Conservation Research
Lisa Wu, Thomas Jefferson HS for Science and Technology & **Scott Sveiven**

Session Type: Lecture
Track: Research
Audience Type: High School, College, Professionals

Description: Summer is an ideal time to introduce students to field research in pristine environments. Scientists swarm to field sites to collect data during their summer research windows. Take a glimpse through these windows with Operation Wallacea, a conservation research group with teams of students working on real-world programs. Teams of scientists, academics, postgraduates, specialists in biodiversity, with student researchers venture to 22 sites around the world. Students work on projects alongside field specialists using state of the art survey techniques. My students took several protocols learned in the field and adapted them for further exploration where they evolved into science fair projects, Regeneron STS, and college research topics. During the expedition, lectures are tied to many concepts in biology, geography, environmental science courses, AP and IB curricula. Research from these expeditions results in publications in peer-reviewed journals each year. For most students this is completely different from anything they have experienced. They discover real field work and if they wish to pursue it further, all while being part of a legacy-leaving project.
Critical in the student's experience is the active engagement in developing ways to study new species, in concert with knowledge of known protocols. In fact, OpWall's research has led to the discovery of a number of new species in recent years, on a par with top research institutions.
Research opportunities with Operation Wallacea will be highlighted with insight about putting together your own research group to some of the most biodiverse locations in the world.

Mako:

Antarctica and Sea Level Rise: Sharing the Science
Dr. Ryan Walker, NASA Goddard Space Flight Center
Session Type: Lecture
Track: Research
Audience Type: Professionals

Description: For over a decade, I have studied glaciers and am extremely enthusiastic about my work. I focus primarily on the creation of computer models to help predict how specific glaciers may change over time. I have also done field work in Antarctica to collect data to input into computer models to improve their accuracy. In addition, I work with other scientists who collect data via satellites and in different field sites.

This research has direct implications on climate change and sea level rise. Typically, I publish scientific papers in peer-reviewed journals and present at related scientific conferences. As scientists, this is the main avenue for sharing our findings.
I have a strong interest in reaching a broader audience about our research. Who better to share our current research with than professional marine educators? You are the ones who communicate the messages to the general public and to our young folks. You have knowledge of how best to present climate related messaging to the public in a way that will inspire change. You have done the work to determine the best avenues for disseminating this information effectively.
My presentation will include an overview of some of the current research with which I am involved at NASA. Following my talk, I would be happy to serve as a point of contact for interested educators to provide new and relevant information on climate science.

Concurrent Session II
10:30-11:15am

Palmetto 3:

The Ocean and Climate Change by the Number
Pat Harcourt, UMCES

Session Type: Hands-on Workshop
Track: Indoor Lesson
Audience Type: Middle School, High School

Description: Math is power! In this session we'll look at the numbers on how climate change impacts the ocean. We will examine the ocean's role in absorbing heat, calculate how much energy is in a hurricane, look at wind speeds around the Mid Atlantic coasts, and share resources for ocean math.

This session will focus on several activities that integrate math into lessons about climate change and the ocean. Topics will include calculating the amount of heat energy the ocean has absorbed from the atmosphere in the past 50 years; looking at the specific heat of water and how it relates to the heat energy released in a hurricane; examining the average wind speeds in Mid Atlantic coastal areas and which locations might serve best as wind energy resources; and look at how warming temperatures affect dissolved oxygen and salinity levels.

We will share reliable sources of data and a list of resources to support teaching about the ocean and climate change.

Palmetto 4:

Marine Science: Let's play and Learn
Andy Gould, North Carolina Aquarium at Fort Fisher

Session Type: Hands-on Workshop

Track: Indoor Lesson

Audience Type: Elementary, Middle School, High School, College

Description: Play is a great way to learn and motivate students of any age. Using adaptations of familiar games allows you to spend minimal time explaining rules and jump into learning experiences. During this hands on demonstration, we will play several adapted games that cover topics such as food chains, invasive species, hurricane tracking, and amphibian information. Games are great for classrooms and informal learning environments.

Palmetto 5:

Expedition Education with Sharks, and S.T.E.M.
Lindsay Laughner OCEARCH

Session Type: Lecture
Track: Indoor Lesson
Audience Type: Elementary, Middle School

Description: During this presentation, educators will have the opportunity to hear about current research projects and participate in some of OCEARCH's free lesson plans and activities while we explore the ocean and learn about sharks with S.T.E.M. Nothing captivates students like a white shark. Connecting them to shark research and tracking data allows them to see S.T.E.M. applied in real world settings and demonstrates to them how these skills and shark research can be used to conserve these apex predators. We hope you'll join us as we go on an education expedition and see why we "don't fear the fin."

Mako:

Earthquakes, Sediments and Glaciers, Oh My!
Carol Hopper Brill, Virginia Institute of Marine Science

Session Type: Hands-on Workshop
Track: Indoor Lesson
Audience Type: Middle School, High School, College

Description: Developed by a VIMS graduate student, this hand-on activity is based on recent marine geological research. The lesson reviews how sediments are delivered to the coast by rivers, how glaciers create sediments that are released via icebergs and outburst floods, and how scientists can tell the difference. After explaining how sediment layers form patterns that tell a story, this lesson reveals how processes that disturb layers reveal important geological events. Some of these events, like earthquakes, are catastrophic and some, like glacial melting, are evidence of long-term changes. Both require study so that human populations can be prepared for future occurrences.

Mock sediment profiles, made of home-made playdoh, replicate research results from five locations in Prince William Sound, Alaska. Students work in teams, using maps to identify the location of their study site and potential sediment sources. They take a core sample, collect data and analyze the profile to identify likely sediment sources. When teams share data and compare their profiles they see how scientists put together a complex picture of regional geological events over time.

This lesson is part of a larger collection of educational resources developed by marine science graduate students at VIMS and other Virginia institutions through the Virginia Scientists & Educators Alliance (VA SEA). Educators at VIMS help graduate students hone their communication skills as they generate a lesson based on their research project. Lessons have been classroom tested and will be available online.

Concurrent Session III
2:15-3:00pm

Palmetto 3:

Showing Your Work - Visual Scientific Storytelling
Lisa Tossey, *Salisbury University* & **Christopher Petrone,** *Delaware Sea Grant / Univ. of Delaware*

Session Type: Hands-on Workshop
Track: Research
Audience Type: Elementary, Middle School, High School, College, Professionals

Description: Beautifully designed information can help us understand the world. But in the sciences and education we are often struggling to convey complex ideas, new research findings, and/or detailed data. How can we do that in a visually appealing way that both engages our audiences and conveys information in an easy-to-understand way? By embracing digital tools!

There are many wonderful and easy-to-use apps and websites that are now available to help you distill data and transform concepts into beautiful and useful graphics and diagrams. Best of all, many of them are very inexpensive or free. We'll take a look at the options and how to incorporate them into your workflow.

Palmetto 4:

C is for Climate Change

Catherine Roberts, Virginia Aquarium

Session Type: Hands-on Workshop
Track: Indoor Lesson
Audience Type: Elementary, Middle School

Description: Participants will take part in the Carbon Cycle Game and analyze the results of their modeling. They will also create a graphic organizer connecting causes and effects of climate change. The first 25 participants will receive the NOAA Activity Book, "Discovering Your Changing World" and hopefully "Cool It" cards

Palmetto 5:

SCUTES: Students Collaborating to Undertake Tracking Efforts for Sturgeon

Jolvan Morris, NOAA Fisheries Greater Atlantic Regional Fisheries Office

Session Type: Hands-on Workshop
Track: Research
Audience Type: Elementary, Middle School, High School, Professionals, Other

Description: The goal of this session is to introduce the SCUTES (Students Collaborating to Undertake Tracking Efforts for Sturgeon) program to teachers and educators, and to show them how they can use the program in their classroom.

Atlantic and shortnose sturgeon are two sturgeon species that can be found in coastal waters, estuaries, and major rivers along the East Coast. Because of population declines due to overfishing of sturgeon for the meat and eggs, which were processed into caviar, shortnose and Atlantic sturgeon have been listed throughout their range under the Endangered Species Act (ESA).

SCUTES is the collaboration between NOAA Fisheries (NMFS), sturgeon researchers, teachers, and informal educators to bring more awareness about sturgeon and the ESA to the classroom. NMFS has worked with educators to develop lesson plans and activities relating to sturgeon. These lesson plans meet the National Education Standards, and cover a variety of subjects. Teachers are invited to borrow SCUTES educational kits, that contain lesson plans and activity supplies, from NMFS, local aquariums, and informal education centers that are currently SCUTES partners. Classrooms are welcome to take part in our Adopt-a-Sturgeon program where teachers will receive sturgeon tracking data so students can map where their sturgeon goes in their local river.

During this session, teachers and educators will listen to a presentation about sturgeon, the SCUTES program, and how they can participate. Later, teachers are welcome to view the contents of the elementary-middle and middle-high school educational kits and participate in one of our sturgeon activities.

Mako:

Pirate Science Camp
Kristi Walters, Big Bear Science
Session Type: Hands-on Workshop
Track: Indoor Lesson
Audience Type: Elementary

Description: Campers were introduced to ocean topics with some pirate flare. For Marine Biology, we studied dolphins, sharks, jellies, fish and plankton. We discussed how pirates might have interacted with each type of creature. On Physical Properties of Seawater day, we discussed weather and its impact on sailing, the different layers of the ocean, water movement (tides, currents, waves, mixing, seiches, and tsunami), as well as buoyancy and its impact on building ships. Ocean Chemistry day involved activities on the different properties of saltwater versus brackish and freshwater. Including an introduction to the organic and inorganic substances found in seawater and how various organisms use those materials. The consequences of climate change were introduced in regards to the impact on ocean acidification. For Marine Geology, the students built a model of the seafloor and we discussed the different types of rocks, plate tectonics, deep-sea hydrothermal vents, cold seeps, and beach formation. Students also looked at different sand samples under a microscope. Lastly, Pirate History and the Conservation of Artifacts were introduced with assistance from the staff at the Queen Anne's Revenge Conservation Lab. Students visited the lab and were able to learn about the science of preserving items that have been on the seafloor for almost 300 years and see actual artifacts from Blackbeard's flagship during the different stages of conservation.

Concurrent Session IV
3:30-4:15pm

Palmetto 3:

It's a bird! It's a plane! No, it's super cool science!
Stephanie Dohner, University of Delaware & **Christopher Petrone**, Delaware Sea Grant / Univ. of Delaware
Session Type: Hands-on Workshop
Track: Indoor Lesson
Audience Type: Elementary, Middle School, High School, College, Professionals

Description: Scientists and the public alike are experiencing the age of consumer-friendly, affordable robotics. Thanks to improving technology, aerial and marine robots are improving the understanding of researchers, city managers, educators, and policy makers by providing detailed and accurate maps, models, and images. Information is created utilizing decades old image processing techniques, cameras, such as those in phones and drones, to create highly detailed models of objects, buildings, the environment and much more. Aerial drones are simply a tool whose uses are still being discovered thereby making drones a great topic to introduce into the classroom for studying the environment, architecture, archeology, art, engineering, digital modeling, and more. The proposed workshop utilizes commercially available drones, lego drone kits, kinetic sand kits, drone simulator software, and freely available photogrammetry software to build teachers' confidence in using these tools. Having experienced the tools personally, discussion will commence on ways to incorporate these tools into project such as measure the growth of the school garden, digitally modeling a historic sculpture, or recording a class video to raise awareness for a beloved charity. The goal of this workshop is to inspire the creativity of the attendees with the possibilities that drones offer to the students in all subject areas. Added benefits of incorporating drones into lesson plans include exposure to cutting edge technology, both hardware and software, which builds skills and confidence in students to keep them excited for class while bolstering their creativity, problem-solving skills, and technological savvy.

Palmetto 4:

Explore Our Dynamic Planet with Earth Science Resources from PBS Learning Media
Allie Toomey, PBS Education

Session Type: Lecture
Track: Indoor Lesson
Audience Type: Elementary, Middle School, High School, College, Professionals

Description: With the release of the Next Generation Science Standards, comes a new approach to teaching Earth science. The new standards are designed to focus more on Earth systems and system models, allowing students to better understand how the Earth's atmosphere, hydrosphere, geosphere, and biosphere are all interconnected.

In this presentation, attendees will explore new ways to teach about the Earth system through media and data. Highlighted content will include new instructional modules from WGBH and PBS LearningMedia that include videos, images, data visualizations, interactives, and games from WGBH's signature programs, such as NOVA and PEEP and the Big Wide World, as well as trusted content partners, including NASA and NOAA, can be used to provide K–12 teachers with high-quality, supplemental digital media resources for teaching about Earth's systems—from weather phenomena to the development of land and water features.

Attendees will learn how to integrate, and instruct, with these resources to enrich their existing curricula and make connections to core ideas in Earth science. Resources for all grade bands are available and are available free of charge

Palmetto 5:

Creating workforce ready students that develop transferable, interactive software designed to encourage free-choice learning
Maggie Pletta, DNREC, Delaware National Estuarine Research Reserve (DNERR)

Session Type: Lecture
Track: Other
Audience Type: Professionals

Description: Technology has become an integral part of environmental education, however purchasing or producing technology can be very cost prohibitive. As part of a NERR Science Collaborative Science Transfer grant the Delaware, Guana Tolomato Matanzas, and Mission-Aransas National Estuarine Research Reserves (the clients) partnered with the University of Delaware Introduction to Software Engineering course (the consultants). As part of their coursework, students produced gesture controlled, educational computer games that promote interactive, free-choice learning opportunities. These games were designed for use on interactive screens that will be publicly available in each Reserve's educational centers. Game design allows visitors to freely navigate through different experiences that introduces them to estuarine concepts. This project will provide communities with relevant, accessible science while offering civic-minded solutions and resources.

Mako:

Being a voice for dolphins: Animal trainers and professional educators working together to inspire ocean conservation
Susan Walker, National Aquarium & **Sue Engelbert**, National Aquarium

Session Type: Lecture
Track: Research
Audience Type: Professionals

Description: Often in zoos and aquariums, animal keepers and trainers work separately from education specialists. The National Aquarium believes in having these two groups work together for the benefit of our guests and ultimately the animals in our world's oceans.

Animal trainers learn effective educational techniques by seasoned interpreters and educators. This helps us to be better voices for our animals. In turn, education professionals spend time with our animals and get to know them. This way, they can share their stories from experience having formed a personal connection with the animals.

We've collaborated on a number of programs ranging from our dolphin training demonstrations for our guests to behind-the-scenes tours to educator talks and activities around the aquarium. This talk will describe some of the ways our animal trainers partner with and work together with our education team, some specifics on some of our varied programs, and some outcomes that result from these collaborations.

POSTER SESSION
&
SHARE-A-THON
&
BOOK SALE
5:00-6:00pm; Palmetto 3, 4, 5