



SUMMER 2014

# STEM

UNITED STATES NAVAL ACADEMY



**Remote  
STEM**

**Summer  
STEM  
Program**

**Girls  
Tech  
Camp**

**STEM  
Educator  
Training**

**STEM OFFICE**

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# Remote STEM: May 2014

Midshipmen Zachary Dannelly, Max Goldwasser and Rylan Tuohy spent six days in Louisville, KY, working with more than 300 sixth- and seventh-graders at three different schools. Dannelly, a cyber-operations major and Stamps Scholar, developed a lesson in cybersecurity to engage and educate students, with support from Prof. Angela Moran and Sarah Durkin in the STEM Office. They explored a variety of topics including cryptography, electrical circuits and engineering. “I want kids to say, ‘Wow, I didn’t realize computers affected the lights turning on— how does that happen?’” said Dannelly. “And then the more they delve into that, that is how kids really get a fire behind them and instead of *having* to learn, they *choose* research.”



The USNA STEM Office and Oceanography Department sponsor an annual Severe Weather In-Field Training (SWIFT) program to teach midshipmen about forecasting, observing and verifying severe convective storms. The program is led by USNA faculty member, Prof. Brad Barrett. Nine midshipmen on the SWIFT team—Dantaun Bernstein, Anthony Borrego, Rebecca Chamberlin, Bailey Colon-Waite, Merrill Dean, Walter Glenn, Alexis Kelm, John Marino and Lawrence Wilson—spent a day at Stevens High School in Rapid City, S.D., speaking to students about weather science and majoring in STEM fields. They also worked together on homemade catapults.



Two midshipmen traveled to New Jersey to work with sixth-graders at Sisters Academy, an all-girls school, as part of a joint internship piloted by the USNA STEM Office and the Leadership, Development and Research Department. Paige Rutkoske and Allyssa Randell trained with LT Erica Reid-Dixon of the Leadership Department, and Prof. Angela Moran and Sarah Durkin from the STEM Office, then spent nearly three weeks working closely with students to spark their interest in all areas of STEM. “Working with the girls, I have been challenged to explain concepts to them in a way that they can understand,” said Randell. “It’s been really cool seeing them learn and better appreciate STEM and how it’s a positive part of all their lives.” Activities ranged from strategy games that help to develop logical reasoning to engineering challenges that strengthen problem-solving skills, all while developing their own leadership abilities.



# Summer STEM Program



Launching rockets. Hacking computer passwords. Engineering aquatic habitats. Dissecting a sheep heart. Synthesizing soap. These are just a few of the engaging activities that students participated in during the Summer STEM Program at the Naval Academy.

650 rising 8<sup>th</sup>– to 11<sup>th</sup>-graders attended the week-long overnight program, held over the course of 3 weeks in June. Activities were developed and led by 35 faculty & staff members. 95 midshipmen facilitated the program by assisting in modules and supervising students.

24 different modules and 15 electives were offered, as well as engineering design competitions and student project presentations. Students were introduced to STEM career fields and real world applications, while developing their technical and problem-solving skills.

## Land, Air & Sea:

### Exploring Navy Technology on All Fronts



“Land” modules: Robosense, Fighting for Freedom, Cyber Attack, Where’s Waldo, Searching for Unobtainium, I ♥ My Heart, Codebreakers, Bioterrorism, Bioloids, Build Your Own, 3D Simulation

# Summer STEM Program



## Land, Air & Sea:

### Exploring Navy Technology on All Fronts

“ Going to STEM at the Naval Academy was a great opportunity for me and I am so grateful that I was chosen to go. The classes taught me a lot about different fields of engineering, and the Professors explained everything and helped us when we had trouble grasping a concept. I met a lot of great people who have the same interest as I do.

—Missy Snyder, Summer STEM Program participant



“Air” modules: Spinning Wings, Weather & Climate, The Need for Speed, In Control, Extreme Engineering, Weathering the Wind, Countdown to Launch

# Summer STEM Program

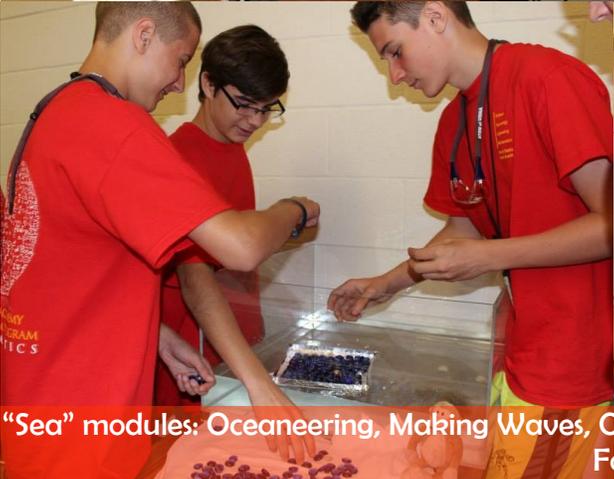


## Land, Air & Sea:

### Exploring Navy Technology on All Fronts

#### Summer STEM Faculty Support

Bradford Baker, Brad Barrett, Oscar Barton, Louise Becnel, Jay Benson, Meredith Botnick, Christopher Brown, Dane Brown, Kristen Castonguay, Patrick Caton, Elena Cimpoiasu, Scott Davids, Debra Dillner, Dave Durkin, Sarah Durkin, Andy Gish, Gwen Gray, Gina Henderson, Tom Lusby, Christine Maceo, Paul Mikulski, Aurelia Minut, Angela Moran, Patrick Moran, Mark Murray, Beth Mutch, Donald Needham, Charles Nelson, Richard O'Brien, Janice Rice, Gillian Richards, Kristina Rohlin, John Schedel, Joel Schubbe, Hite Spencer, Cecily Steppe, Louise Wallendorf, Sophoria Westmoreland, Currie Wooten



"Sea" modules: Oceanering, Making Waves, Operation Wash-up, Corrosion, Aquaculture Engineering, Fluid Force Phenomena

# Girls Tech Camp



Engineering is all about creating, building, and making things better. It is working in teams to solve problems facing our world today. Middle school girls had the opportunity to experience life as an engineer at the Girls Technology Camp held at the Naval Academy in June.

The theme for this year's camp was "Design Like Da Vinci", exploring the science and technology of art and music. Engaging projects included the technology of paper making, physics of sound, and music and art designed with electronics and Arduino.

44 rising 7<sup>th</sup>-, 8<sup>th</sup>-, and 9<sup>th</sup>-graders attended the week-long day camp which included design challenges and competitions, team building, hands-on activities, tours of labs and research areas, and networking with professional female engineers.

Support for the camp was provided by faculty members: Louise Becnel, Elena Cimpoiasu, Sarah Durkin, Paul Mikulski, Angela Moran, Mark Murray, Beth Mutch, Janice Rice, Louise Walendorf and Currie Wooten.

The camp is designed not just to encourage girls to pursue engineering and technology in high school and college, but to provide the tools and motivation for girls to engage in engineering as a life long career.



“Camp helped me a lot to understand the job that scientists do and the many applications that science has in every day activities. It was also very encouraging to meet women that have successful careers and are making a difference.

- Girls Tech Camp Participant, 2014

# STEM Educator Training



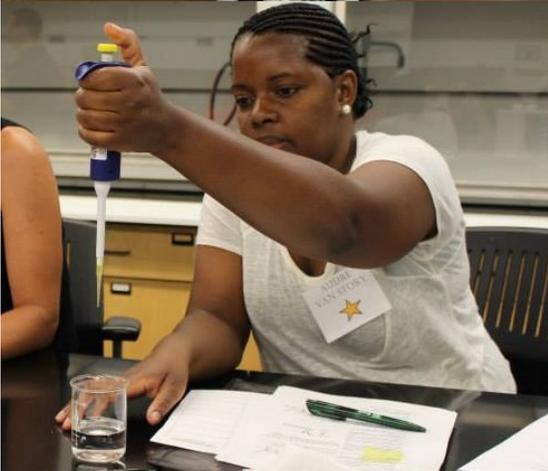
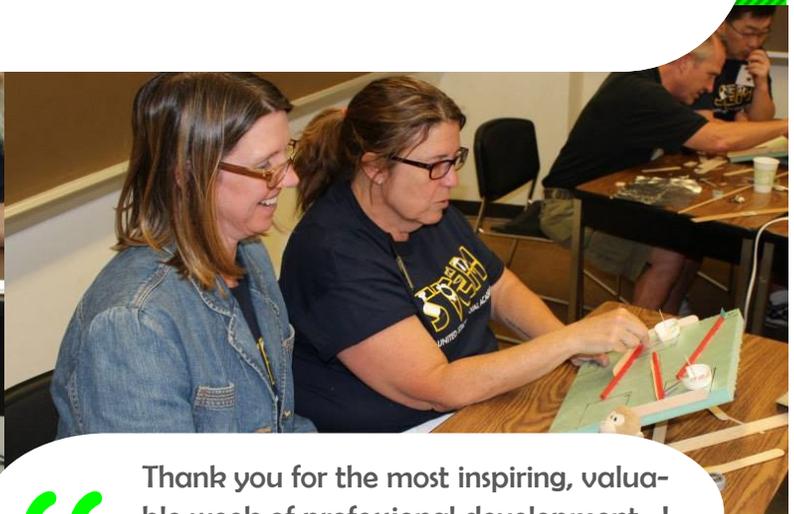
Each summer, the USNA STEM Office hosts SET-Sail: STEM Educator Training, a week-long summer workshop for K-12 educators. The workshop allows teachers the opportunity to discover, explore, and test ideas and, most importantly, learn how science and technology impact real-world research and challenges.

This year, 90 teachers attended two sessions offered in July at the Naval Academy in Annapolis, MD. Educators and administrators attended from schools around the country, as well as DoDEA schools overseas, including Europe and the Pacific.

Teachers experienced intense training in project-based learning, covering topics including engineering, math, chemistry, biology, materials science, electricity and energy, thermodynamics, corrosion, fluids, physics, robotics, programming and more.

Support for the workshop was provided by faculty members: Oscar Barton, Dane Brown, Sarah Durkin, Angela Moran, Patrick Moran, Mark Murray and Beth Mutch.

Participants focused on how to bring hands-on activities into all areas of instruction. They explored first-hand the engineering design process, by working in teams on several design and build challenges.



“

Thank you for the most inspiring, valuable week of professional development. I have worked for 15 years in the teaching field and this past week at [SET Sail] was brilliant. I'm working on lesson plans and projects for full on implementation. You have made a difference in the way I will teach.

- Marisa Dittmer, middle school science teacher at Menwith Hill, a DoDEA school in England

# Recent Publications & Presentations

## HOT OFF THE PRESS

“Digital Freedom Fighting: An Interdisciplinary Science and Engineering Education Module”, Nicholas S. Rosasco and Dane Brown. ASEE 2014 Zone I Conference, University of Bridgeport, April 3-5, 2014.

“Defining a Partnership: USNA/NOAA Collaborative Workshop on Ocean Exploration”, Janice Rice, Sarah Durkin, Beth Mutch, Gwen Gray and Angela Moran. National Marine Educators Association, Annapolis, MD, July 21-25, 2014.

“USNA Electrochemistry/Corrosion STEM Efforts”, Beth Mutch, Sarah Durkin and Patrick Moran. Annual Technical Corrosion Collaboration Review Meeting for the Office of the Secretary of Defense Corrosion Policy and Oversight Office, University of Akron, Aug 12-14, 2014.

“Meteorology Meets Engineering: an Interdisciplinary STEM Module for Middle- and Early Secondary-School Students”, Bradford S. Barrett, Angela L. Moran, John E. Woods. International Journal of STEM Education, in press.



# Upcoming Events

## **SET-Sail Teacher Workshop**

Sept. 13, 2014

The USNA STEM Office hosts STEM Educator Training (SET) Sail Workshops on-site at the Naval Academy. Training focuses on the use of project-based learning in topics such as design, chemistry, physics, applied math, computer programming and simulation, biology, and engineering. These one-day workshops, led by USNA faculty and staff, offer K-12 teachers an opportunity to engage more fully in their educational fields by exploring and testing ideas in a creative and hands-on environment. Teachers are encouraged to share best practices and application methods.

## **SeaPerch/NOAA Teacher Workshop**

Sept. 16-17, 2014

The USNA STEM Office hosts SeaPerch training and related curriculum workshops for teachers, in collaboration with NOAA's Underwater Exploration Program. The workshop includes building a SeaPerch and an expanded engineering design curriculum. A workshop in September will be held for teachers from Anne Arundel County Public Schools, and an additional workshop will be held later in the year for teachers from Prince George's County Public Schools.

## **Best Practices in STEM Outreach: A Workshop for Naval Scientists & Engineers**

Sept. 26-27, 2014

The USNA STEM Office and the Office of Naval Research will host "Best Practices for STEM Outreach", a workshop for Naval scientists and engineers. Attendees are scientists and engineers from Naval research centers around the nation, who will share knowledge and resources for successful implementation of STEM outreach activities and programs. The two-day workshop will be held at the Naval Academy. The focus will be on project-based learning, Navy-relevant curriculum, and use of age-appropriate, hands-on educational activities.

## **MANY THANKS TO OUR SPONSORS....**

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