

United States Naval Academy STEM Center for Education and Outreach

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UNITED STATES NAVAL ACADEMY

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Summer 2019

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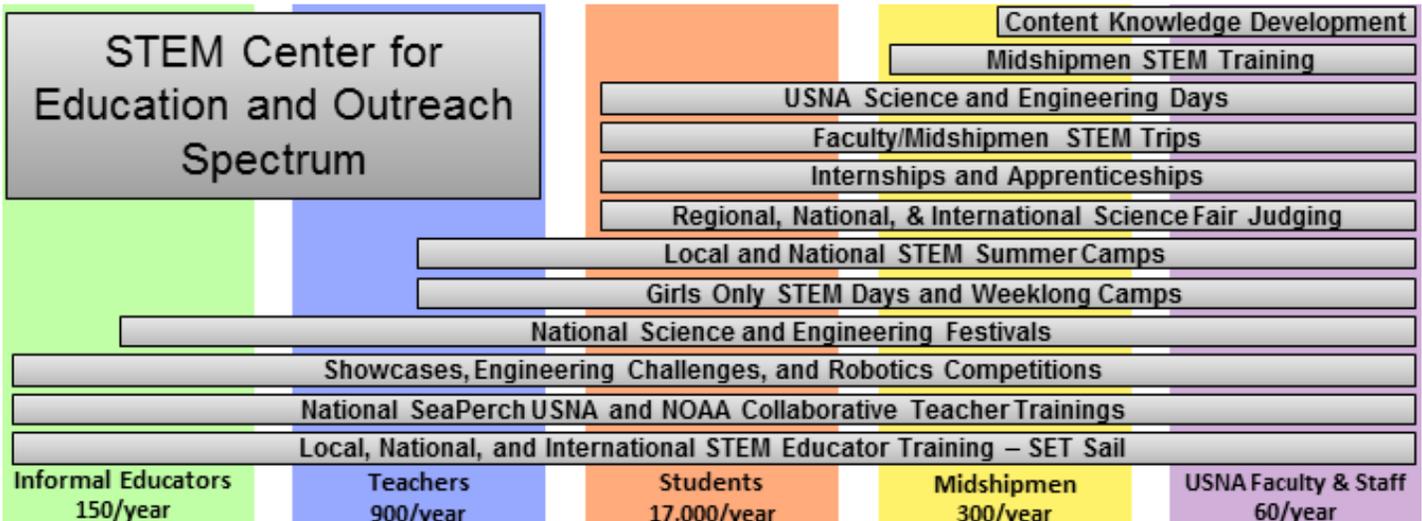
Mission of the STEM Center

The USNA STEM Center addresses an urgent Navy and national need for more young people to pursue careers in science and engineering, particularly in technical areas of interest to the military. The Center faculty and midshipmen, using defense related activities, provide outreach to local and national communities, including those that are currently underserved, to influence students and teachers in engineering and science studies, and to facilitate the engagement of USNA candidates with an interest in STEM careers.

The Center supports the recruitment and retention of USNA candidates with an affinity towards STEM majors as well as the development of the midshipmen attributes such as leadership in the classroom, creative problem-solving skills, innovative thinking, and the ability to adapt to unanticipated situations. Participation in STEM events prepares midshipmen to interface with multiple technologies, exposes them to the interdependence of different disciplines in STEM military technologies, and enhances their technical proficiency and communication skills.

USNA STEM Center for Education & Outreach

- Angela Moran, Volgenau Chair and Director
- Sarah Durkin, Associate Director for Assessment
- Christine Maceo, Associate Director for Program Development
- Mark Murray, Associate Director for Institutional Programs
- Patricia Meinhold, Instructor of Practical Applications
- Lou Cox, Instructor of Practical Applications
- Donna Weber, Administrative Officer
- LCDR Melissa Szurovy, Officer Representative, Faculty, Mathematics
- LCDR Larry Ungar, Officer Representative, Faculty, Mathematics
- Brad Barrett, Faculty, Oceanography
- Gina Henderson, Faculty, Oceanography
- Patrick Moran, Faculty, Mechanical Engineering
- Beth Waitkus, Faculty, Academic Center, Chemistry
- 35 additional USNA Faculty and Staff



Summer STEM Program



In June, the USNA Office of Admissions and the STEM Center presented the twelfth annual Summer STEM Program, a week-long residential program held for high school students from around the country, held in three sessions at the U.S. Naval Academy.

35 Faculty & Staff
36 Academic Midshipmen

838 Students



Create, Build & Explore

Students attended hands-on academic modules covering diverse, defense-relevant STEM topics. The modules, designed and led by USNA STEM faculty, with support from midshipmen, introduced students to STEM career fields and real-world applications, while developing their technical and problem solving skills.

The program increases student interest in STEM majors and careers, showing them how STEM applies to critical needs. Since 2008, 6682 students have attended the program. A total of 444 Summer STEM Program participants have been inducted as USNA midshipmen, continuing their STEM education at the Naval Academy.

STEM Modules for Rising 9th-11th Graders

RoboSense	Searching for Unobtainium
Math Challenge	Operation Wash Up
Spinning Wings	Aquaculture Engineering
Engineering Design	Countdown to Launch
Making Waves	Platonic Solids
Cyber Attack	Autonomous Aid
Weather & Climate	Bioterrorism
3D Programming	Biolooids: Robots in Action
Build Your Own	Storm Chasing

“Through teaching, midshipmen gain a greater understanding coupled with practical application in the various STEM disciplines, while taking on the leadership challenge of teaching technical subjects.” - MIDN 1/C Joel Smith, Summer STEM Academic Company Commander

“The STEM program is an exceptional early leadership opportunity for midshipmen that allows them to take charge of individual modules and share their passion for STEM with high school students.” - LCDR Andria Jones, Mechanical Engineering, “Spinning Wings”

“Seeing so many young people from such diverse backgrounds being so interested in STEM was an extremely rewarding experience.” - LCDR Kevin Solem, Mathematics, “Countdown to Launch”

“I liked being able to do independent, hands-on, relevant STEM modules as well as getting a further look into opportunities in the military.”- Summer STEM participant

“My interest in engineering grew a lot this week because it made me realize that engineering is a great way to combine creativity, scientific principles, and math.” - Summer STEM participant

Summer Heroes Youth Program

The USNA Summer Heroes Youth Program (SHYP), led by midshipmen mentors, engages middle school students in engineering and science activities. In June 2019, the program reached 970 students in Baltimore City, MD, Prince George's County, MD, and Washington, DC.



6 schools
970 students
6 midshipmen

Summer Heroes Youth Program raised excitement about engineering, science and math at middle schools in the region, through school visits led by midshipmen mentors, MIDN McKenzie Eshkeman, Elizabeth Grimmig, MaryEmma Hughes, Katerina Kennedy, Elana Kozak, and Ariona Mayo, with support from STEM faculty and a TAD ensign. Additional support was provided by NHC Annapolis, with three corpsmen volunteers who assisted in health science activities at schools. Visits to six middle schools including Harlem Park, Franklin Square, Eliot-Hine, Kelly Miller, Thomas Johnson, and Oxon Hill, reached diverse students in underserved areas of Baltimore City, Prince George's County, and Washington, DC. Midshipmen led hands-on sessions in the classroom or a fair setting in topics including mechanics, chemistry, robotics, bioengineering, environmental engineering, encryption and coding, engineering design, strategy and logic, and flight. Along with science and math content, students learned real-world applications and strengthened science and engineering practices and problem solving skills.

"Students were engaged and were able to learn that there are great opportunities for students in the STEM field. Students said that it created a big change in the class and it made the class exciting and made them more interested in STEM. The interaction between midshipmen facilitators and our students was very impressive."
- Teacher coordinator

"It was great for students to be able to connect STEM activities with the real world and see how they are able to ensure a future academic/job placement through STEM connections." - Teacher coordinator

"Working with students in a new environment each day with varied material was challenging and forced me to be adaptable to the needs of students. What resonated most was how when the students were encouraged and took up the task, doubtful at first but eventually eager to complete and show their project, they completed much more than they thought they could. At every school we went to, we left those students with more knowledge, in a way that interested and challenged them." -Midshipman mentor, SHYP



Midshipmen Internships

Midshipmen gain leadership skills and mentoring experience through summer outreach opportunities, including internships at **Sisters Academy** and **Severe Weather In-Field Training (SWIFT)**.

Mentor & Lead

MIDN 3/C Karolyn Batista and Katie Baier spent four weeks mentoring 5th-7th grade students at Sisters Academy, an all-girls school serving disadvantaged youth in Asbury Park, NJ. Serving

as role models, midshipmen work closely with students using STEM activities as opportunities for academic success and career awareness.

“While teaching STEM classes and activities, the midshipmen hone their communication and leadership skills, and also become trusted mentors to the students. Even in just a few weeks, the positive impact that the midshipmen are able to have is visible in the Sisters Academy girls as they engage with the class material more confidently, become increasingly excited about learning, and expand their knowledge of STEM-related fields and opportunities.” - CAPT Audrey Graber, program co-ordinator



“For me, Sisters Academy was one of the best experiences I could have had because of the interactions that I had with both children and adults, increased understanding of other societies, and the opportunity to grow as a public speaker and leader. I know the girls are capable of being successful in everything they do when they put their mind to it. I hope that as midshipmen mentors, we taught them that no challenge is too big to overcome.” - MIDN 3/C Katie Baier, Sisters Academy intern



The Severe Weather In-Field Training (SWIFT) internship brings mids to the mid-west to forecast and chase severe weather. In partnership with Tulsa Regional STEM Alliance, the trip included a STEM visit to Hale Junior High School in Tulsa, allowing midshipmen to run STEM activities with 147 8th graders in an underserved region. “To be able to learn about severe storms and tornadoes, and then apply everything we learned in the field, was life changing. The atmosphere is always doing amazing things.” - Tyler Bradley, 2/C Oceanography Honors Major

“The longstanding partnership of the USNA STEM Center has engaged and inspired thousands of Oklahoma educators and students. TRSA’s partnership with the USNA STEM Center has been a force multiplier for the work of the Tulsa Regional STEM Alliance.” - Xan Black, Executive Director, Tulsa Regional STEM Alliance

“Ten years of SWIFT has reinforced, for me, the incredible value of project-based learning in STEM disciplines. I have taken over 80 midshipmen into the field to chase tornadoes and severe convective storms. In the process, I teach them how to tackle complex problems. Couple that with defined leadership roles that the students rotate each day, and you start to get an idea of what the SWIFT training entails.” - Prof Brad Barrett, Oceanography

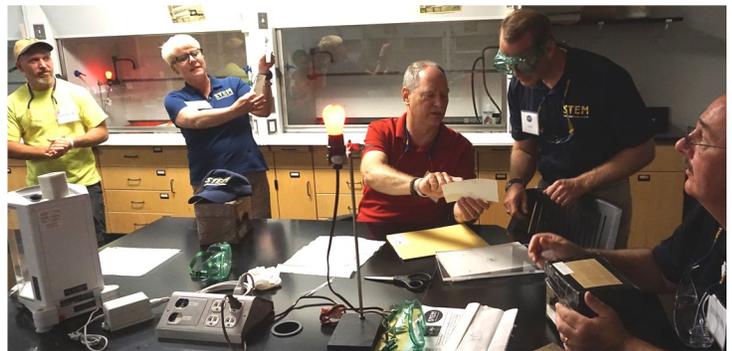


SET Sail STEM Educator Training

SET Sail STEM Educator Training, held at USNA in July, is a week-long residential summer program providing professional development for K-12 educators.



SET Sail STEM Educator Training encourages teachers to discover, explore and test ideas, while learning real-world applications of science, math, and engineering concepts. Two sessions were held in July at USNA for 85 teachers from 73 schools in 26 states and 8 overseas countries, including 39 DoDEA teachers. Through hands-on sessions using project-based learning strategies, teachers learned how to incorporate engineering design and emerging technologies with a cross-disciplinary approach, while aligning with new standards in the next generation classroom. Topics included applied math, engineering design, bioterrorism, chemistry, corrosion, hydraulics, physics, materials properties, fluids, energy transformation, cyber security, sensors and coding. An extra session was offered in collaboration with NOAA, covering ocean exploration resources for the classroom and including skillsets for a SeaPerch underwater ROV build. Sponsored by DoDEA, the Naval Academy Foundation, the Office of Naval Research, and the OSD Corrosion Policy & Oversight Office, teachers were provided with curriculum and materials to take back to their schools, allowing them to reach over 25,000 students a year, based on teacher-estimated impact.



"[SET Sail] was energetic, informative, and filled with activities to take home and use in my classroom. I feel recharged and empowered to teach students about a variety of STEM topics with authentic, engaging and uncomplicated activities." - Sue Engelsman, Harding School, New Jersey



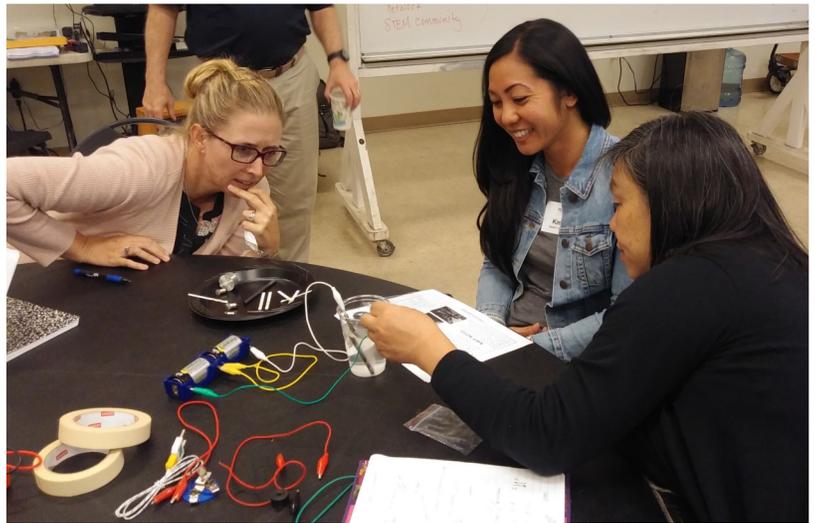
"I am leaving with a renewed excitement to integrate STEM in my classroom I cannot wait to use the activities and share with my colleagues. This is a fantastic program!" - Wanda Wilds, Fort Rucker Elem, DoDEA Americas Southeast



STEM Educator Training, Hawaii

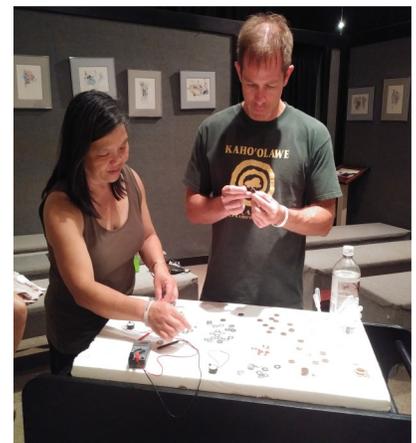
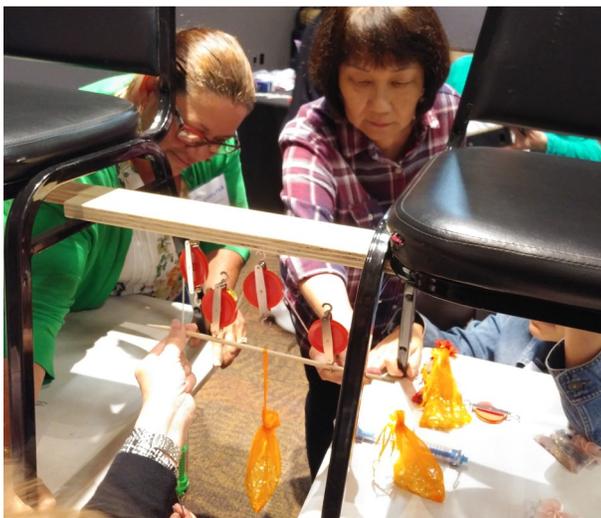


In June, USNA STEM faculty presented STEM Educator workshops in Hawaii, in collaboration with Pearl Harbor Aviation Museum, the USS Bowfin Submarine Museum & Park, and the USS Battleship Missouri Memorial on Ford Island, Honolulu. The three day program for K-12 educators in Hawaii focused on project-based learning in STEM topic areas including mechanics and motion, hydraulics, sensors and circuits, programming and robotics, corrosion and electrochemistry, aviation, space technology, physics, and engineering design. Teachers explored engineering applications related to the development of defense technology. A similar program was offered to educators in Hilo, Hawaii at the 'Imiloa Astronomy Center.



"[I learned] real world applications for all activities. We have valuable historic resources on this island that can be used to help with STEM curriculum/instruction. [The training] gave me the confidence to take my current STEM units/lessons to the next level." - Elizabeth Schowalter, Ahuimanu Elementary, Kaneohe, HI

"I am leaving with a plethora of activities connected to NGSS [Next Generation Science Standards] that I can use for any grade level." - Samantha Funes, Keonepoko Elementary, Pāhoā, HI



Thank You to Our Sponsors & Partners

Volgenau Chair
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Upcoming Events

Fall 2019

Sept

- Navy Week, St. Louis, Sept 6-7
- Historic Naval Ships Association Conference and Workshop, Bremerton, Manitowoc, WI, Sept 17-20
- SET Sail STEM Educator Workshop, USNA, Sept 21

Oct

- Best Practices in STEM Outreach Workshop, Keyport, WA, Oct 4
- STEM Educator Workshop, Keyport, WA, Oct 5
- STEM Event, Baton Rouge, LA, Oct 5
- Girls Only STEM Day, USNA, Oct 19
- STEM at the Library, Annapolis, MD, Oct 21
- Best Practices in STEM Outreach Air Force Workshop, USNA, Oct 22-23
- STEM Family Night and Star Party, USNA, Oct 25
- Pre-Service Educator Workshop, Bowie, MD, Oct 30

Nov

- STEM Event, Pensacola, FL, Nov 1-3
- MESA Day, Laurel, MD, Nov 7 and Nov 13
- STEM Event, Dallas, TX, Nov 16