

United States Naval Academy STEM Center for Education and Outreach

Fall 2019

STEM

UNITED STATES NAVAL ACADEMY

Contact us:
usnastem@usna.edu
410.293.5461

Follow us:
usna.edu/stem
facebook.com/usnastem
twitter.com/USNASTEMCenter



Midshipmen Involvement



Inside this Issue:

Over 60 midshipmen lead STEM activities throughout the academic year as part of the STEM Education and Outreach Class and in support of the STEM Center activities, in numerous collaborations and in support of local and national communities.

www.usna.edu/STEM

Midshipmen Spotlight

DoD STEM Advocate of the Quarter Second Quarter of Fiscal Year 2019 presented to the Midshipmen STEM Outreach Cadre

Demonstrating exemplary science, technology, engineering, and mathematics (STEM) education and outreach advocacy to local and national communities in support of the Department of Defense's (DoD) STEM mission of inspiring the next generation of young Americans. The support of education and outreach programs focused on Navy and DoD applications and technology, specifically the Girls Only STEM Day, the Summer Heroes Youth Program, and the Girls Tech Camp, has paved a significant pathway towards motivating and securing future workforce talent. Additionally, the dedicated efforts to inspire educators to embrace new STEM teaching methods have made a meaningful impact in incorporating more project-based learning in classrooms. The Cadre have gone above and beyond in their dedication to STEM outreach and advocacy on behalf of the DoD. The Midshipmen STEM Outreach Cadre are truly deserving of this honor. They competed with defense commands across the nation for this award.



1/C Midshipmen Cadre Leadership

from the STEM Education and Outreach Course offered by the STEM Center faculty



MIDN 1/C Dustin Carwile

Major: Ocean Engineering
Service Selection: Navy Pilot
Favorite STEM Event: Remote STEM Workshops

"I participate in STEM outreach because I enjoy working with kids and I enjoy

being able to work with people from many different walks of life. I also learn things when doing the activities with the kids, which is always awesome."



MIDN 1/C Annie Dunigan

Major: Aerospace Engineering
Service Selection: Navy Pilot
Favorite STEM Activity: Strategy Games

"I participate in STEM outreach because it feels good and meaningful to give back

to the community. I wish there had been programs like this to participate in when I was growing up, and so I pay it forward to the next generation."



MIDN 1/C Joshua Engler

Major: Ocean Engineering
Service Selection: Submarines
Favorite STEM Event: Science Expos

"I participate in STEM because it provides valuable personal opportunities and the ability to give back in a meaningful way."



MIDN 1/C Pablo Flores

Major: Robotics and Control Engineering
Service Selection: Marine Ground
Favorite STEM Event: SeaPerch

"I participate in STEM outreach to give back to the community and spread STEM awareness."



MIDN 1/C Katherine Marapese

Major: Chemistry
Service Selection: Medical Corps
Favorite STEM Event: Girls Only STEM Day

"I participate in STEM outreach because I enjoy sharing my love of science and encouraging young people to see the infinite possibilities of a STEM career."



MIDN 1/C August Will

Major: Ocean Engineering
Service Selection: Navy Pilot
Favorite STEM Activity: Water Chemistry

"I enjoy teaching kids the concepts that it took so long for me to learn. I have spent many hours studying and it feels as though they pay off when I am able to teach what I learned to eager students. The surprise on their faces when a module works is priceless."

Midshipmen Spotlight

1/C Midshipmen Cadre Leadership

from the STEM Education and Outreach Course offered by the STEM Center faculty



MIDN 1/C Lani Davis

Major: Computer Science and Information Technology
Service Selection: Cryptologic Warfare
Favorite STEM Activity: Demonstrating chemical reactions

"We need to encourage kids to realize how cool STEM fields are and to use life skills like creativity and perseverance. I can make a positive impact by explaining things I am passionate about."



MIDN 1/C Ladavish Dorn

Major: Chemistry
Service Selection: Submarines
Favorite STEM Event: Girls Only STEM Day

"I participate in STEM because of the opportunities to reach underprivileged communities. There's so much joy that

comes out of exposing people to things they never thought were possible and seeing the awe as they discover the unknown is priceless!"



MIDN 1/C Leah Gordon

Major: Mechanical Engineering
Service Selection: Civil Engineering Corps
Favorite STEM Activity: Bell Jar Pressure Demonstration

"I participate in STEM outreach to

spread joy and intellectual curiosity to younger generations."



MIDN 1/C John Lee

Major: Aerospace Engineering
Service Selection: Nuclear Surface Warfare
Favorite STEM Event: Girls Only STEM Day

"I have had so many mentors in the past

and participating in STEM is one way that I give back to my community. I love sharing my knowledge with students and seeing them get super excited about the STEM activities."



MIDN 1/C Jemaira Mathis-Sertic

Major: Cyber Operations
Service Selection: Surface Warfare
Favorite STEM Activity: Lather Prints to explain water properties

"If I could say I helped one young person

see themselves in the STEM field and gave them the motivation to look into it more and even graduate college with a STEM degree, I would be more than happy!"



MIDN 1/C Noah Rodman

Major: Mechanical Engineering
Service Selection: Submarine
Favorite STEM Event: SeaPerch

"I participate in STEM outreach to help spark an interest in engineering and the Naval Academy, since coming to the

Summer STEM Program in High School is what brought me here."



MIDN 1/C Joel Smith

Major: Chemistry
Service Selection: Nuclear Surface Warfare
Favorite STEM Event: Summer STEM Program

"I knew growing up I did not really have

these opportunities and I know how impactful something like this could have been on me when I was younger. In turn I hope to have an impact that incites a love for learning."



MIDN 1/C Jessika Stanback

Major: Naval Architecture and Marine Engineering
Service Selection: Surface Warfare
Favorite STEM Activity: Straw Rockets

"I participate in STEM outreach to give

back to the community and set an example for young kids who look like me."

Community Outreach



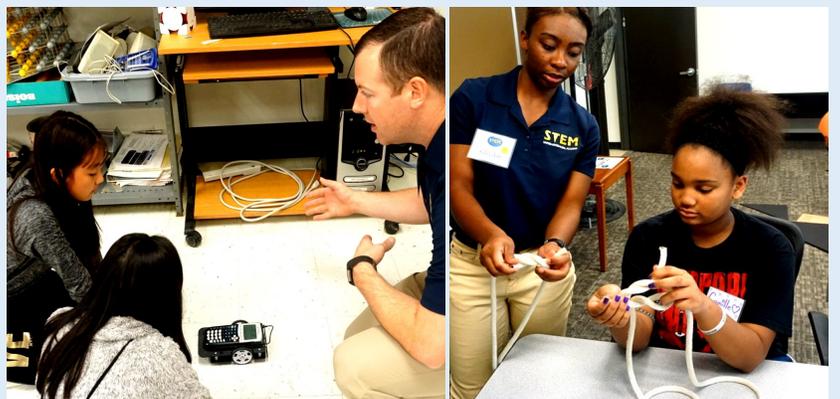
Family STEM Night & Star Party

The annual Family STEM Night was a Star Party, in collaboration with the Physics Department and Astronomy Club, on October 25. The event, held to raise awareness of STEM Center activities and goals, included space-themed STEM activities and two planetarium showings. STEM activities were led by 16 STEM midshipmen and 4 STEM faculty, and Capt PJ Moran presented the planetarium show. Hands-on activities included explorations of space science and technology, flight, electricity, structures, and materials properties. On November 1, a stargazing session was held at the USNA Observatory, presented by CAPT John Higbee and Physics Department faculty, Jeff Larson, Jamie Lomax, and Capt PJ Moran. The events were attended by more than 220 USNA staff members with their families, and midshipmen.



Girls Only STEM Day

"I learned how different engineers help different problems that people have. Also that math is a big part in many people's everyday lives," commented one of about 200 girls who attended USNA Girls Only STEM Day on Oct19 in Rickover Hall. Sponsored by the Office of Naval Research and Naval Academy Foundation, this event was updated with a new format and a higher level of midshipmen leadership responsibility than in past years, but still with a focus on highlighting the many diverse technical career opportunities as well as providing interaction with female faculty and midshipmen. Students came from 71 different schools in MD, VA, DC, DE, NJ, NY, PA, and MA. "Make it Better" was the theme of the October event, as students discovered how engineers and scientists make the world a better place. Students attended midshipmen led interactive sessions in energy, strategy and logic, website design, sports engineering, fluids and flight, severe weather, human physiology, cyber, and robotics. Over 50 mids supported the event with faculty facilitation by LCDR Kevin Solem, LCDR Melissa Szurovy, LCDR Larry Ungar, LCDR Jonathan Vance, Lou Cox, Christine Maceo, Pat Meinhold, Jim Cowart, Adina Crainceanu, Gina Henderson, Aurelia Minut, Mark Murray, and Navy Medical personnel. A program was held for parents on nutrition and health, college opportunities, and student success.



Community Commitment



MESA Day

In partnership with Maryland Mathematics Engineering Science Achievement (MESA) and in support of under served populations throughout Maryland, the USNA STEM Center provided two days of interactive STEM activities at Johns Hopkins Applied Physics Laboratory in Laurel, MD. Over 400 4th and 5th graders from 22 schools in Anne Arundel, Calvert, Charles, Prince George's, Montgomery, and Baltimore Counties attended on November 7 and 13. An opening auditorium session was presented by Prof Mark Murray on fluids principles. About 30 midshipmen volunteered each day to lead sessions in topic areas including robotics, chemistry, physics, and engineering. With midshipmen STEM majors as role models and real world applications as the curriculum basis, the events promoted student interest in STEM-related careers. Additionally, teachers from participating schools attended an educators' workshop provided by Prof Angela Moran on engineering design for all grade levels. Supporting STEM Center faculty and staff included Sarah Durkin, Christine Maceo, Lou Cox, and Pat Meinhold.



Maryland STEM Fest at the Library

Visitors to Anne Arundel County's Library at Annapolis Mall on Oct 21 participated in "Challenge the STEM Mids", an event provided in support of Maryland STEM Fest 2019 and as part of the STEM Center's commitment to the local community. MIDN JP Anyansi, Quinton Cooper, Lani Davis, Christina Domanowski, Annie Dunigan, Mack Eshleman, Denis Enga-Kwaye, Pablo Flores, Leah Gordon, Cory Harding, Elana Kozak, Gabby Leonard, Nate O'Neal, and Shaun Rodock facilitated the event, along with STEM faculty Angela Moran and Christine Maceo. During the two-hour event, the midshipmen presented hands-on activities to the participants on topics including geometry, material properties, sound and optics, extreme weather, forces and motion, and robotics.



Collaborative Efforts



STEM Outreach Trips

On Oct 5, the USNA Office of Admissions and the STEM Center collaborated with the John Daniel Scholars Laboratory, the Louisiana State University, and Baton Rouge Community College Upward Bound programs to provide an interactive STEM program for 75 students in Louisiana. Ms. Yetanda Massey and Prof Beth Waitkus along with midshipmen Jess Stanback, August Will, John Lee, Josh Engler, Noah Rodman, Kam Chumley-Soltani, Christina Domanowski, and Jemaira Mathisertic represented USNA. Interactive activities included robotics, engineering design, applied chemistry, and cybersecurity. Similar outreach endeavors included MIDN August Will and JP Anyansi's trip on Nov 7-10 to Pensacola with students from Pascagoula and Midshipmen Amy Hoang, Lani Davis, Cory Harding, Dustin Carwile, Pablo Flores' trip to Dallas on Nov 15-17.

St. Louis Navy Week

The Navy Office of Community Outreach (NAVCO) presents Navy Week programs at about 15 cities each year, bringing awareness of America's Navy to cities around the nation. This year's St. Louis event on Sept 6-8 included a STEM Expo, showcasing Naval STEM research, technology, careers, and educational outreach. The USNA STEM Center, in collaboration with the Office of Naval Research and the Office of Admissions provided hands-on activities for hundreds of attendees including students from local schools, families, veterans and dignitaries. Activities covered a range of STEM topics including engineering design, logic, cyber, electrochemistry, motors, and biomechanics. Vice Admiral Thomas Moore, USNA '81 and Commander, Naval Sea Systems Command spent time at the booth, participating in activities and conversing with the STEM midshipmen. The group from USNA included MIDN Annie Dunigan, Josh Engler, and August Will along with ENS Julian Brown, Capt P.J. Moran, and Prof Pat Moran. Additional support was provided by personnel from the Office of Naval Research and the USNA Office of Admissions.

Hour of Code

The inaugural USNA Hour of Code was held on December 6, in honor of Computer Education Week and Grace Hopper's 113th birthday. Organized by Dennis Dias, ONR Chair for Cyber Science, along with the Department of Computer Science, the Center for Cyber Studies, and the STEM Center. More than 40 midshipmen participated in an hour of coding including HTML, Java, Assembly Language, and Python. Professors Adina Crainiceanu and Kevin Martin (Computer Science), Dane Brown, John Doherty and Brian Kiehl (Cyber Science) and Christine Maceo (STEM/Mathematics) facilitated the event, with support from MIDN Jon Goohs, Kade Heckel, Caroline Sears, Seharsh Baxi, Mark Humes and Kendell Louis.





Professional Development

Fall SET Sail STEM Educator Training

On September 21, the USNA STEM Center offered the semi-annual SET Sail STEM Educator Training, a day-long workshop held at USNA. About 115 teachers from 90 different schools in Maryland, Virginia, District of Columbia, Delaware, Pennsylvania, and Georgia attended. The program has an extended secondary impact as teachers return to their classrooms with training in Navy-relevant project-based learning. Collectively, these teachers reach about 29,000 students per year, based on teacher-reported estimates.

The program was facilitated by 18 faculty and staff including Andrew Muller, Brad Barrett, LT Kevin Martin, Chris Brown, Capt P.J. Moran, LCDR Larry Ungar, Will Traves, Mark Murray, Scott Drayton, Samar Malek, Beth Waitkus, Pat Moran, Sarah Durkin, Christine Maceo, Pat Meinhold, Lou Cox, Donna Weber, and Angela Moran. About 30 midshipmen also supported the event. Teachers attended hands-on, engineering-focused sessions in topics including Mechanics, Astrophysics, Chemistry, Flight, Programming, Data Science, and Climate.

Tulsa Educators SeaPerch Training

In collaboration with Tulsa Regional STEM Alliance and in support of underserved populations nationwide, USNA STEM faculty Angela Moran and Pat Moran provided a STEM educator workshop in Tulsa, OK on November 5. Sponsored by the Office of Naval Research and the Naval Academy foundation, the workshop was attended by 27 teachers from 16 different schools in the Tulsa region and surrounding areas.

Teachers built and launched SeaPerch remotely operated vehicles (ROVs). Educators gained technical skill sets to bring engineering projects into their classrooms. Additional hands-on activities were shared with the educators in topics including chemistry, physics, circuits, motors, hydraulics, robotics, sound and light, and engineering design.



Pre-Service Teacher Workshop at Bowie State

Sarah Durkin, Christine Maceo, and Angela Moran provided a STEM educator workshop to 43 pre-service teachers at Bowie State University on October 31. The program was part of an initiative to deliver training to pre-service and early-service teachers in project-based learning methodology for engaging students in STEM subjects. This workshop and others have been held in collaboration with the Maryland Historically Black Colleges and Universities (HBCUs). Others have been offered to support the Philadelphia Regional Noyce Partnership.



Attendees tested hands-on activities in different STEM topic areas including cyber and coding, optics and sound waves, chemistry and hydraulics. Participants learned effective teaching practices to present engineering and science content with an emphasis on real-world applications and engagement techniques. Activities are designed to be readily integrated into the classroom, using common, inexpensive supplies in short or extended lessons. The workshop “gave me different methods to incorporate STEM in the classroom,” commented Kyrie DeGruttola, Bowie State pre-service teacher.

Workforce Development



STEM Outreach Workshop and Educator Training, Keyport, WA

STEM faculty and staff Mark Murray, Sarah Durkin, Pat Moran, Lou Cox, Donna Weber, and Angela Moran traveled to Keyport, WA to provide workshops for formal and informal educators in the Bremerton, WA area on October 4-5 at the U.S. Naval Undersea Museum. Over 30 informal educators from 8 different command and partner sites including Naval Sea Systems Command, Naval Facilities Engineering Command, National Oceanic and Atmospheric Administration, and the USS Turner Joy Museum Ship attended the first day as part of a program sponsored by the Office of Naval Research to train DoD personnel in best practices for STEM outreach. On the second day, 25 educators from 17 different local schools attended training as part of an effort to build the local Naval STEM community.

Participants were trained in hands-on curriculum from a range of DoD-relevant topic areas including energy transformations, alternative fuels, optics and sound, electricity, electrochemistry, mechanics, hydraulics, space and earth technology, and engineering design. "Very good workshop," commented Chris Stone, Engineering Technician, Puget Sound Naval Shipyard, "[I] really learned a lot and I have been doing STEM outreach for decades."

Historic Naval Ships Training

USNA Professors Patrick Moran and Angela Moran presented a workshop for informal educators at the 53rd Historic Naval Ships Association Annual Conference held on September 17-20 at the Wisconsin Maritime Museum in Manitowoc, WI. Attendees came from 16 different Naval museums and museum ships including the USS Lexington Museum, the USS Albacore, the USS Midway, the USS Bowfin, the USS Cobia, and the Battleship Texas. Hands-on activities were presented in topics related to technology found on board Navy vessels, including electricity, circuits, batteries, sensors, hydraulics, gears, mechanical systems, fluids, flight, acoustics, and optics. Educational programs onboard museum ships highlight the technical history of the Navy and reach hundreds of thousands of students each year.

USAF Outreach Workshop

As part of the USNA Best Practices in STEM Outreach Workshops supported by ONR and DOD, the STEM Center held a workshop at USNA for 28 Air Force personnel from 18 commands around the country. The Oct 22-23 workshop, sponsored by Air Force STEM, provided specialized training to Air Force personnel in support of STEM outreach efforts at their commands. The event was facilitated by faculty and staff members Donna Weber, Pat Meinhold, Lou Cox, Sarah Durkin, Christine Maceo, Pat Moran, Mark Murray, Capt P.J. Moran, LCDR Larry Ungar, and Angela Moran.

Participants explored methodology for engaging audiences using defense applications in defense-related topics including robotics, electricity and magnetism, optics and waves, materials and polymers, fluids and flight, space technology, and engineering design. Activities were updated and modified for this group. On the second day of the workshop, Air Force participants put their training into action by implementing an outreach event for 50 students at the Naval Academy Primary School which serves a large number of military children. One Air Force participant shared, "There are many more activities I feel I can do with students now. This workshop has been extremely helpful and I am excited to apply what I have learned."



Thank You to our
Sponsors & Partners

Volgenau Chair
for Education and
Outreach



UNITED STATES NAVAL ACADEMY
Alumni Association and Foundation



UPCOMING EVENTS SPRING 2020

| | |
|-----|---|
| Jan | <ul style="list-style-type: none"> FIRST Tech Challenge Robotics Tournament, USNA, Jan 10-12 Remote STEM Event, Bronx, NY, Jan 17-18 Remote STEM Event, Atlanta, GA, Jan 24-25 Girls STEM Event, Meade Middle School, Fort Meade, MD, Jan 28 |
| Feb | <ul style="list-style-type: none"> STEM Educator Workshop, USNA, Feb 22 High School Girls Day & Astronaut Convocation, USNA, Feb 27 Mini-STEM Event, USNA, Feb 28 National Eagle Scouts Association Jamboree, USNA, Feb 28-Mar 1 |
| Mar | <ul style="list-style-type: none"> Girls Only STEM Day, USNA, Mar 7 Mini-STEM Event, USNA, Mar 13 |
| Apr | <ul style="list-style-type: none"> Maryland Regional SeaPerch Challenge, USNA, Apr 4 Bowie Baysox STEM Day, Bowie, MD, Apr 15 Junior Science & Humanities Symposia (JSHS), Norfolk, VA, Apr 15-18 ONR Pre-Service Teacher Workshop, Philadelphia, PA, Apr 18 USA Science & Engineering Festival, Washington, DC, Apr 25-26 |
| May | <ul style="list-style-type: none"> Intel International Science & Engineering Fair (ISEF), Anaheim, CA, May 10-15 |

Schedule subject to change