

STEM

USNA STEM
CENTER

UNITED STATES NAVAL ACADEMY



EDUCATORS

SET Sail STEM Educator Training
USNA/NOAA Educator Workshops



STUDENTS

Girls Only STEM Day
MESA Days

MIDSHIPMEN

Family STEM Day
GM Tech Center STEM Day

FACULTY

Best Practices in STEM Outreach Workshop
SeaPerch Workshop, Charleston, SC



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USNA STEM CENTER

The USNA STEM Center reaches approximately 17,000 students and 800 teachers annually, with over 75 events held during the academic year and summer, providing STEM education and outreach.

Over 200 midshipmen participate in STEM activities during the academic year, with an additional 100 midshipmen facilitating the Summer STEM Program.

The MSTEM ECA was created in 2012 to facilitate midshipman involvement in STEM activities. In addition to promoting STEM education and outreach activities, MSTEM serves as an umbrella ECA that encompasses 19 additional STEM-related clubs.

EX481S and 482S are STEM education and outreach courses developed to provide academic credit to select midshipmen willing to provide 15 hours or more of leadership support to the academic year STEM activities.

TOP STEM MIDSHIPMEN, FALL 2014

MIDN	STEM Hours, Fall 2014
Rachel Busiek	51
Megan Hough	48
Mark Hackworth	45
Zac Dannelly	45
Clay Petty	41
Jennifer Pendleton	38
Aldrin Racelis	38
Emily Lamanna	35
Whitney Heer	34
Max Goldwasser	29
Heather Nearing	26
Peter Guo	25

FALL SEMESTER EVENTS

Sept 5, Sept 19, Oct 17, Nov 7	Candidate Visit STEM Tours and Panel Discussions
Sept 6	Rubiks Cube Team Competition Participation
Sept 13	SET Sail STEM Educator Training Fall Workshop, USNA
Sept 16-17	USNA/NOAA Workshop AACPS
Sept 26-27	USNA/ONR Best Practices in STEM Outreach Workshop
Oct 10	STEM Educator Training Workshop, Florida
Oct 10, Nov 11, Nov 24	OPINFOs with STEM twist
Oct 11	USNA Family STEM Day
Oct 14	Summer STEM Alumni Midshipmen Reunion
Oct 18	Girls Only STEM Day
Oct 23	SeaPerch Workshop, Charleston, SC
Oct 23	Remote STEM Day at GM Tech Center, Michigan
Nov 5, Dec 4	MESA Days at JHU-APL
Nov 14	High School Visits and MiniSTEM at USNA
Nov 15	Navy League SeaCadet SeaPerch launch
Dec 1-2	USNA/NOAA Workshop PGCPs

USNA STEM TEAM

Angela Moran, Odgers Professor for STEM, Mechanical Engineering Faculty, STEM Director

Sarah Durkin, Professor of the Practice in STEM, Associate STEM Director

Mark Murray, Mechanical Engineering, STEM Faculty Associate

Jennifer da Rosa, Instructor for Practical Applications in STEM

Rachel Hetlyn, Instructor for Practical Applications in STEM

Beth Mutch, Academic Center, STEM Faculty Associate

CDR Janice Rice, Ocean Engineering, O-Rep MSTEM Div 1

LCDR Timothy Shivok, Physics, O-Rep MSTEM Div 2

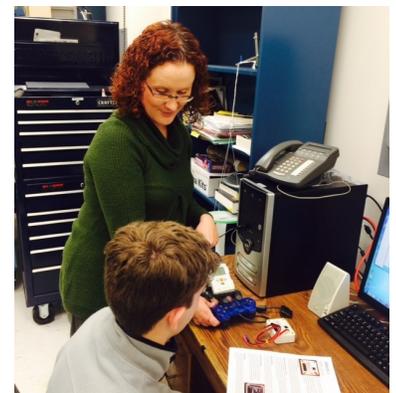
ATCS Jovan Gates, E-Rep MSTEM

MEET OUR NEW STAFF



Rachel Hetlyn joined the Center for STEM Education as an instructor this past September. In 2013, Rachel graduated from Boston University with a B.A. in Geophysics and Planetary Sciences, and Mechanical Engineering. In previous years, she has interned with NASA working on a climate satellite and worked at the Boston Museum of Science as an outreach educator bringing museum workshops and assemblies to schools all throughout New England. Currently at USNA, Rachel is looking forward to developing STEM curriculum focused around astronomy, physics, and engineering and bringing that curriculum to local and national audiences of teachers and students.

Jennifer da Rosa, instructor of STEM Education, comes to us from the Anne Arundel Community College faculty. Jenn's background is in the geosciences (geology and oceanography), and she formerly worked as an oceanographer, satellite image analyst for the Naval Oceanographic Office at Stennis Space Center, MS. She is currently working on her doctorate in education at Northeastern University, and her research interests include science misconceptions among K-12 teachers and students, STEM education policy, informal education learning, and STEM curriculum development. She is excited to join the STEM education team at USNA!





EDUCATORS

SET Sail STEM Educator Training

The teachers became students for the day at USNA on Saturday, September 13, 2014.

86 K-12 teachers from 67 public and private schools in 11 counties in Maryland and beyond attended the one-day workshop. 13 faculty and staff including Tom Lusby, Dane Brown, Don Needham and Hite Spencer facilitated the event along with 17 midshipmen.

Teachers participated in hands-on training using project-based learning in a variety of topics, including Chemistry, Physics, Programming and Robotics, Applied Math, and Engineering Design.

“This training was perfect as the projects were easy to learn, so I can take them back and use them right away.”
-Karin Coburn, Bush Hill Elem., Fairfax County

The teachers discovered it’s great to be a student when you are learning by doing. The workshop was an ideal setting for teachers to discover, explore and test ideas for STEM education. Teachers found the activities to be highly applicable to their curriculum and easy to use.

Jane Cerza, a technology specialist from Stratford Elementary in Fairfax County described, "[The training] gave me some great hands-on experiences and a new passion for project-based learning."

The next SET Sail Training will be held on February 21, 2015.

USNA/NOAA Educator Workshops

USNA, with NOAA’s Office of Ocean Exploration and Research, presented “Engineering to Explore the Ocean”, a STEM professional development workshop for K-12 teachers, held at the STEM Lab at Old Mill Middle School South on September 16-17, 2014.

36 teachers from 23 Anne Arundel County Public Schools attended the two-day workshop, led by six USNA STEM faculty and staff, along with NOAA educator, Melissa Ryan. In this integrated workshop, teachers learn how scientists explore the ocean using an underwater remotely operated vehicle (ROV), while also building their own SeaPerch ROV.

SeaPerch is a national underwater ROV program sponsored by the Office of Naval Research (ONR) and Association for Unmanned Vehicle Systems International (AUVSI).

Workshop participants learn the necessary skills to start a SeaPerch program at their own schools. Teachers receive SeaPerch supplies along with activities and lesson plans, equipping them to bring innovative classroom investigations into their schools, with an emphasis on real-world applications for underwater exploration.

The next USNA/NOAA Educator Workshop will be held on December 1-2, 2014 for teachers from Prince George’s County Public Schools.



STUDENTS

Girls-Only STEM Day

A Girls-Only STEM Day was held at USNA on Saturday, October 18, 2014, as part of an on-going effort to encourage young women to pursue education and careers in STEM.

250 middle school girls of diverse backgrounds attended, from 78 different schools in Maryland, Virginia, Washington D.C., and surrounding area. A wide range of hands-on activities were offered including: Aquaculture Engineering, Biomedical Engineering, Biometrics, Bioterrorism, Navigation, Physics, Robotics, and Rockets. Students competed in an engineering design competition to create an amphibious or aviation vehicle. A workshop was provided for par-

ents, targeted at raising a girl in a competitive world.

Activities were led by faculty and associates including Meredith Botnick, Elena Cimpoiasu, Christine Maceo, Cynthia Macri, Aurelia Minut, Charles Nelson, Cecily Steppe, Nicole Treeman and Currie Wooten, along with 40 midshipmen. MIDN Rachel Busiek, Montana Geimer and Jennifer Pendleton led the midshipman effort.

The event encourages young women to pursue careers in STEM fields by providing engaging activities and the opportunity to interact with women, both civilian and Navy, who are leaders and role models in these fields. The next Girls-Only STEM Day will be held on March 7, 2015.

MESA Day

Friday, November 5, 2014 was not a typical school day for 240 assorted elementary school students gathered together from local counties and Baltimore City at Johns Hopkins University Applied Physics Laboratory in Laurel, MD.

These 4th and 5th graders spent the day participating in science and engineering activities hosted by USNA STEM faculty and midshipmen, in collaboration with Maryland Mathematics Engineering Science Achievement (MD MESA).

35 midshipmen and four faculty staged a full day of

“You all made a difference in the lives of 240 students today by sharing your knowledge and giving your time. Above all showing them that learning is fun.”

-Paula Shelton, Executive Director of MD-MESA

hands-on activities focused on Navy-relevant topics such as robotics, hull design, underwater gliders, cryptography, materials properties, biofuels, polymers, properties of water, electrical circuits, and more, as well as mini-engineering design competitions. MIDN Peter Guo, Megan Hough and Kevin Norris led the midshipman effort.

Following the lead of the midshipman role models, the students were excited to learn about science and engineering through experimentation and directed inquiry.

The next MESA Day will be held on December 4, 2014.



MIDSHIPMEN

Family STEM Day

The annual Family STEM Day was held on Saturday, October 11, 2014. This engaging event was open to Naval Academy faculty/staff and their families, so that they could experience interactive STEM activities and explore the engineering lab spaces in Rickover Hall.

With a large crowd of 200 people attending, the event was facilitated by a busy group of three faculty members and 33 midshipmen, led by MIDN 2/C Megan Hough. The event provided a great opportunity for midshipmen to fine-tune their leadership and

communication skills.

Children of all ages enjoyed trying different hands-on activities including operating SeaPerch underwater remotely operated vehicles, playing with TIBot calculator robots, designing underwater gliders and aluminum foil boats, testing out rockets, and making a variety of sticky, slimy polymers.

STEM Family Day created a wonderful opportunity to highlight the great STEM resources at USNA, which includes not just our lab spaces, but especially our faculty, staff, and midshipmen. The families that attended spent an enjoyable morning seeing some of what USNA has to offer and getting a taste of STEM.

GM Tech Center STEM Day

USNA Professors Mark Murray and Patrick Moran, along with ten midshipmen, traveled to the GM Tech Center in Warren, MI to host a STEM day on October 23, 2014 for Detroit-area high school students.

One-hundred and twenty high school students engaged in a range of hands-on activities highlighting Navy-relevant technology, with an emphasis on electrochemistry, hydraulics, robotics, fluids, and thermodynamics. The curriculum, developed by USNA faculty and presented by midshipmen, demonstrates the real-world applications of science and engineering principles.

“Working with the students is always rewarding when you see the look of amazement when they realize how an airplane works or how to generate electricity from heat.”

-MIDN 2/C Megan Hough

"The partnership between USNA and General Motors created a great blend of interactive demonstrations of scientific and engineering fundamentals and the application of these concepts in the manufacturing of vehicles," said MIDN 2/C Megan Hough.

"The event was a great learning experience for the kids, giving kids who lack science exposure a chance to spark their curiosity and have fun participating in a variety of experiments," said MIDN 2/C Mark Hackworth, "It was also

a learning experience for me being able to tour the GM technical center and talk to the engineers about their involvement and tasks as an engineer."



FACULTY

Best Practices in STEM Outreach Workshop

Interest in STEM outreach comes from the heart for Naval scientists and engineers. This was apparent at the Best Practices for STEM Outreach Workshop, hosted by USNA STEM faculty and sponsored by the Office of Naval Research.

Over thirty STEM program coordinators from Naval commands around the nation joined together at the Naval Academy on September 26-27, 2014 to share knowledge and resources for successful implementation of STEM outreach activi-

“The depth and breadth of experience brought thoughtfully to bear on Naval STEM interests was clearly evident.”

Craig Hughes, Deputy Director of Research, Office of Naval Research

ties and programs.

Discussion forums focused on a range of topics including sustainability and leveraging, identifying and establishing partnerships, utilization of volunteers, assessment, outreach methods and venues.

USNA STEM faculty, including Pat Moran, Hite Spencer and Scott Davids, led hands-on educational modules focused on project-based learning methodology, engineering design, Navy-relevant curriculum, and practical take-away activities. The workshop embodied a collaborative spirit for the Naval STEM outreach community.

SeaPerch Workshop, Charleston, SC

USNA STEM presented a SeaPerch Build Workshop for educators and mentors, held at the West Ashley High School in Charleston, SC on October 24, 2014. New USNA STEM faculty, Jennifer da Rosa and Rachel Hetlyn, traveled to Charleston to lead an all-day SeaPerch workshop for nine teachers from South Carolina schools and three scientists and engineers from the Space and Naval Warfare Systems Command (SPAWAR) facility.

SeaPerch is an innovative robotics program sponsored by the Office of Naval Research and the Association for Unmanned Vehicles Systems International (AUVSI), challenging educators, mentors, and students to build a fully functioning,

underwater remotely operated vehicle (ROV).

USNA STEM faculty instructed workshop participants in the necessary skills to construct their own SeaPerch structurally, mechanically, and electronically. In groups, participants built and tested their own SeaPerch ROVs, and were able to take a finished SeaPerch and additional unbuilt kit back to their own schools.

All participating educators and mentors received SeaPerch supplies and tools, as well as resources and curriculum ideas for their classes. These educators and mentors are now prepared to share real-world science and engineering applications for underwater exploration with their classes and afterschool programs.



UPCOMING EVENTS

Jan 9-10	First Robotics League Competition, USNA
Jan 17	NESA Merit Badge Jamboree, USNA
Jan 23, Mar 27	High School Visits and MiniSTEM at USNA
Jan 30, Feb 20, Mar 6. Apr 24	Candidate Visit STEM Tours and Panel Discussions
Feb 2	STEM Educator Training Workshop, Falls Church, VA
Feb	Remote STEM Day (TBD)
Feb 21	SET Sail STEM Educator Training Spring Workshop, USNA
Feb 27-28	Remote STEM Day at USS Hornet Museum, San Francisco, CA
Mar 7	Girls Only STEM Day
TBD	USNA/ONR Best Practices in STEM Outreach Workshop
Mar 14-22	STEM Spring Break trips (TBD)
Mar 21-23	San Diego Festival of Science and Engineering
Apr 11	SeaPerch Regional Competition at USNA
Apr 13-15	Navy League Sea, Air, Space Exposition
Apr	Remote STEM Day (TBD)
May 1	SeaPerch Showcase at USNA
May 2	STEM-ING event for girls at St Mary's College of Maryland

* dates subject to change

THANKS TO OUR SPONSORS

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