

STEM June 2011



STEM

At the United States Naval Academy

*Science * Technology * Engineering * Mathematics*

The USNA STEM office is focused on addressing an urgent national priority—persuading more young people to pursue careers in science, technology, engineering, and mathematics while engaging our own midshipmen in quality STEM programs and outreach to the community.

The Odgers Professorship was established in 2010 by a private testamentary gift to the US Naval Academy Foundation from the Carol and Ralph E. Odgers Family Trust.

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LCDR John Woods and MIDN (now ENS) Brugler present their travels to the Arctic to Annapolis City school kids during a recent Science and Engineering Day.

ISEF 2011

Midshipman Jonathan Monti, along with six faculty members from USNA participated as judges at the 2011 International Science and Engineering Fair (ISEF). This year the conference was held in Los Angeles from the 8th through the 13th of May. The seven additions from USNA were part of a 45 member ONR sponsored Navy judging team. By the end of the week that team had awarded over \$150,000 in scholarship money to 22 deserving high school students.



Mitch, the STEM office mascot, makes it to ISEF 2011

ISEF is the peak example of the high school science fair structure, where participants from all over the world compete for scholarship money from a variety of groups, including private corporations and government agencies. Every student that competes has to have previously placed highly in one or more local fairs.



USNA Judges at ISEF 2011

Back Row (left to right): *LT Michael Zundel, LT Brian Cummings, Assoc Prof Mark Murray, CDR ED Tucholski*
Front Row (left to right): *LT Greg Bodemer, MIDN Jonathan Monti, CAPT Jack Nicholson*

STEM CAMPS

Admissions SUMMER STEM

Summer 2011

Of the 4400 applicants from a national and international pool this year, 375 were selected for the USNA Summer STEM program with the USNA Admissions Office. Summer STEM camps focused on multidisciplinary activities in all of the STEM majors offered at USNA with specific projects in forensics, mechanics, robotics, fabrication, programming, aviation, electronics and more. Tours of labs and research areas, hands-on activities, and design challenges and competitions were included. Midshipmen participation was key to the success of the camps. Academic midshipmen trained with the faculty and assisted in classroom instruction, projects and demos. Squad midshipmen facilitated the academic learning process, supervised the attendees on the field trip to the science museums in D.C, and during sports and social activities.



Biometrics module-iris scans, facial recognition, fingerprints and more with midshipmen led activities under the guidance of expert faculty.



TiBots module - student teams programming a calculator robot to maneuver a path.



Learning about fluid dynamics.

STEM CAMPS

Admissions SUMMER STEM

Summer 2011



Students, mids and faculty present their area of expertise to parents and friends at the Saturday Technology Fair, the highlight of the week.



Above: A demonstration and description of the concrete ships students designed and fabricated. Left: The pride of the fleet.



Left: The closing awards ceremony.

GET IT GIRLS' CAMP

This year the focus of, Girls Experiencing Technology Through Innovative Topics (GET IT), was biomedical engineering. For the 5th year running, this one week camp introduced middle school girls from around Maryland to the fast-paced and exciting world of engineering. Although always focused on engineering, each year a new focus is introduced to highlight another application of the various kinds of engineering within the Biomedical field.



DAY 4
Arduino Boards



DAY 1
Model Hearts
NXT Robots



DAY 3
SeaPerch Missions



DAY 4
Biometrics/
Robotics



DAY 2
SeaPerch
Mazes

Interning with STEM

This summer there are four high school interns working behind the scenes of the STEM program. Caroline Cameron, Joanna Guth, Megan Renner, and Kelly Becnel were each introduced to engineering at the Academy through participating in the GET IT Camp. Now as interns, they are tasked with various projects, from initial troubleshooting of camp experiments to co-running of modules. Each intern was asked to give her thoughts on this unique internship opportunity and the STEM program:

"It's because of Professor Moran's girls' camp that I now want to go into engineering in college. The girls' STEM camp engaged and increased my interest in technology and math. Interning with Professor Moran is a great way to introduce me to the engineering I'll be doing in college."

-Megan Renner



"I like STEM. STEM is neat and I'm super happy to have been involved. Engineering looks like it might make a big impact on my future."

-Kelly Becnel

"I love STEM at the Naval Academy because every year I've been able to get involved in different ways! Back in middle school I was a camper, then I was a counselor for two years, and now I get to work behind the scenes with Professor Moran. Maybe next year I'll be studying STEM in college!"

-Joanna Guth

"I have now been involved in STEM for five years. It is because of the girls' camp at USNA that I want to study engineering. I encourage all girls to try to learn as much as possible about science, technology, engineering, and mathematics."

-Caroline Cameron

SeaPerch 2011

Another successful SeaPerch Showcase was held at USNA on May 13 for 5th graders throughout Anne Arundel County. Over 300 students rotated through hands on activities in the Engineering and Weapons, Fluids and Aerospace labs, launched their SeaPerch in the Hydromechanics Lab and listened to tales of Titanic Discovery provided by Mike Mayre, one of the Naval officers involved in the discovery of the sunken vessel. Midshipmen, faculty and technical support staff were all involved in making it a great day for the county kids.



SeaPerch 2011

Saturday, 30 April 2011, 250 youth from 17 schools around Maryland participated in the first annual SeaPerch Regional Competition hosted at USNA. The explicit objective of the SeaPerch program is to teach students how to build their own underwater Remotely Operated Vehicle (ROV), and the purpose of the



Regional Competition was to create a platform for students to test their vehicles and compete against other teams from the Maryland region. The vehicles were first judged technically on innovative design and engineering; this was followed by six timed and judged underwater tests, where the vehicles had to perform certain tasks with the students maneuvering them remotely.



As exciting as this competition was the implicit lessons extended much further. One teacher, who participated with SeaPerch in the past, spoke about the change in the attitude of his students between the initial design of their ROVs to the experience of meeting all the other competitors and trouble-shooting the vehicles. The competition itself naturally stimulates conversations about teamwork and problem solving, both skills that are necessary to a successful future not only within the sciences and technology, but within any educational or career path. Throughout Richover Hall these conversations could be heard happening between the Midshipmen who volunteered to help with the competition and the participants. And although there is always some frustration when something doesn't work according to plan, some of the best lessons were learned during the timed tests when a SeaPerch failed to complete a test. Students came up with immediate solutions, adjusted designs, and utilized the help of the volunteers to engineer better vehicles. It was an exciting day for all of those involved, volunteers and students alike, which was filled with lessons of collaboration and the energy that comes from success.

NCSSSMST

During the week of June 1st, USNA hosted the 2011 Student Research STEM Conference for schools representing the National Consortium of Specialized Secondary Schools for Mathematics, Science and Technology (NCSSSMST). Students participated in “Extreme Technology” themed STEM workshops on topics such as: Energy and Light, Infrastructure, Transportation, and Cyber-Security. Each workshop included a lecture by a faculty member followed by hands on projects. Students also provided presentations and posters on their own areas of research.



NCSSSMST participants demonstrated many talents at the dinner dance and awards ceremony.

What is NCSSMST?

The primary goal of the Consortium is to promote and support the efforts of those specialized schools whose main function is to attract and prepare students for academic pursuits or careers in mathematics, science, and technology. Established in 1988, the NCSSSMST provides forums such as this conference for schools to exchange information and ideas and collaborate on additional events. There are over 100 affiliate members (colleges, universities, summer programs, foundations, and corporations) who share the same STEM goals.

For more information, please visit: www.ncssmst.org

SWIFT Storm Chasers



SWIFT group on Oklahoma state line

SWIFT 2011 was funded, in part, by the USNA STEM Office and the Odgers Fund, Naval Academy Foundation. The mission of the US Naval Academy Oceanography Department's Severe Weather In-Field Training (SWIFT) activity is to engage midshipmen in forecasting, observing, and verifying severe convective storms and develop them professionally with visits to and briefings at NOAA and military operational and research facilities.

LCDR John Woods and Professor Brad Barrett traveled with 10 midshipmen from Annapolis to the Great Plains and back, through 12 states covering close to 6,000 miles. In total the group witnessed 5 tornadoes on 3 different chase days, the closest being an EF-3 tornado approximately 2 miles away. They also stopped in Joplin, MO on the return trip and participated in two Search and Rescue missions 2 days after the deadliest tornado in half a century destroyed a majority of the city.



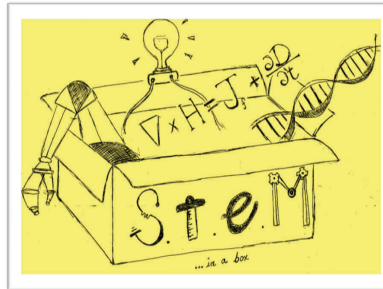
One of the many highlights of the trip was the midshipmen participating in a school visit to Perryton HS in the Texas panhandle, where they briefed over 50 students about USNA Summer Programs and their experiences at USNA.



Left: EF-3 Tornado in Western Oklahoma.

STEM in a Box

“The STEM office at USNA has recently begun efforts to establish a ‘STEM in a Box’ curriculum for K-5 students in the local area. This unique curriculum was designed by USNA faculty and staff. Schools that participate in the program will be able to attend the ‘STEM Day’ at the Naval Academy where they can see interesting demos and other activities that will continue to increase their interest in science, technology, engineering, and mathematics.”



- Beth Mutch
(*STEM in a Box curriculum coordinator*)

Editors note: The curriculum gains its name from being an entire lesson – from textual examples to hands on experiments – contained within a box. This allows for greater efficiency in the classroom, which in turn creates more time for the important part, engaging students in an enjoyable and effective learning environment.

COMING SOON:

JULY

S(tem)E(ducator) Training Sail Annapolis
SeaPerch Instructor Training
Summer Visits to/from Outreach Camps

AUGUST

STEM Mids Reactivate

SEPTEMBER

MESA "Math in A Box" Clubs Launch