A GUIDE TO
EDUCATION & WORKFORCE
NAVAL STEM

EDUCATION AND WORKFORCE
NAVAL STEM
2019
Table of Contents

INTRODUCTION
Naval STEM Welcome pg. 3
Naval STEM Overview pg. 4
Naval STEM Stakeholder Organizations Map pg. 6
Naval STEM Stakeholder Organizations Overview pg. 8

THE NAVAL STEM COMMUNITY
Navy Bureau of Medicine and Surgery [BUMED] pg. 12
Commander, Navy Installations Command [CNIC] pg. 16
Marine Corps Systems Command [MCSC] pg. 20
Naval Air Systems Command [NAVAIR] pg. 22
Naval Facilities Engineering Command [NAVFAC] pg. 24
Naval Postgraduate School [NPS] pg. 26
Naval Sea Systems Command [NAVSEA] pg. 28
Office of Naval Research [ONR] pg. 30
Space and Naval Warfare Systems Command [SPAWAR] pg. 32
Strategic Systems Program [SSP] pg. 34
United States Naval Academy [USNA] pg. 36
United States Naval Research Laboratory [NRL] pg. 38
United States Naval War College [NWC] pg. 40
From the Director...

The Navy and Marine Corps have a mission: deter our adversaries from picking a fight. But as threat environments are ever-changing, there is no guarantee the U.S. will be able to discourage everyone from trying, so we must be ready to engage and win the fight.

Our warfighters need access to the latest scientific and technological innovations. And who better to develop those advances than the diverse, talented and dedicated workforce of scientists and engineers at our naval laboratories?

These Navy and Marine Corps personnel work to ensure a constant and reliable supply of advanced and innovative solutions that meet the national security challenges of today and tomorrow. However, to guarantee they are ready for these challenges, it is critical for the Department of the Navy to foster initiatives and collaborations that inspire, engage and constantly develop not only the current workforce, but the future workforce as well.

It is through deliberate and strategic investments in naval STEM education, outreach and workforce initiatives, that the U.S Navy and Marine Corps has the workforce to meet challenges, while advancing and maintaining our technological superiority.

This Guide to Education and Workforce/Naval STEM highlights some of those initiatives, and provides a synopsis of the naval STEM stakeholder commands and organizations involved with these enterprises. Stakeholders come together as a community to inspire, accelerate and continuously develop the current and future workforce—and they ensure their programs attract, employ, develop and retain scientists and engineers with superior knowledge and expertise.

While each command has specific workforce needs that influence the programs offered to the current and future workforce, each ensures it contributes to the overall development of needed naval capabilities.

Through student internships and scholarships, as well as employee education programs, these commands increase awareness of naval-relevant STEM opportunities and careers. These activities and programs inspire current workers by connecting them to potential members of the next workforce, and by building on the excitement of current knowledge and success. They create a research and development community that will be vibrant and productive for generations.

Sincerely,
Dr. Michael M. Simpson
Director of Education and Workforce
Office of Naval Research

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The Department of the Navy (DoN) is dedicated to maintaining the U.S. Navy and Marine Corps’ technological maritime superiority through cultivation of a world-class science technology, engineering and math, or STEM, workforce. Our community of diverse and dedicated naval scientists and engineers is essential to meeting current and future warfighting challenges. Through a diverse portfolio of initiatives and investments, the Education & Workforce/Naval STEM Coordination Office (NSCO) supports strategic education and outreach opportunities that inspire, educate, employ, accelerate, retain and constantly develop the current and future workforce.

As gaps and inefficiencies in current capabilities are identified, the NSCO finds opportunities to connect education and outreach efforts to meet current and future DoN needs. A STEM-proficient workforce lives at the heart of this innovation process. Through a network of naval STEM scientists and engineers—and collaboration with other federal government agencies and the broad STEM community—the DoN provides support via funding resources and mentorship, to all education-workforce transitions and career stages.

NAVAL STEM STAKEHOLDER ORGANIZATIONS

<table>
<thead>
<tr>
<th>EDUCATION INITIATIVES</th>
<th>WORKFORCE INITIATIVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-8</td>
<td>9-12</td>
</tr>
</tbody>
</table>

**INSPIRE**

**ENGAGE**

**EDUCATE**

**ATTRACT & EMPLOY**

**DEVELOP & RETAIN**

Local STEM efforts are managed and executed at the command or organization level. These organizations implement STEM education, outreach and workforce activities within their respective communities. This guide provides an overview of these stakeholder’s STEM efforts and programs.

**EDUCATION INITIATIVES**

The Navy and Marine Corps STEM programs are available nationwide. For K-12 audiences, hands-on learning experiences are emphasized to encourage students and teachers to “learn by doing.” This encouragement comes in a variety of forms, including participation in expos and festivals; sponsorship of summer camps and teacher trainings; and support of STEM competitions.

**WORKFORCE INITIATIVES**

The development of the current and future naval STEM workforce is a primary concern for the naval STEM community. Numerous programs are available to students, academic faculty and naval scientists and engineers. These programs include internships and mentorships, as well as professional development opportunities.
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Naval STEM Stakeholder Organizations

- Office of Naval Research (ONR)
- The Navy Bureau of Medicine and Surgery (BUMED)
- Naval Sea Systems Command (NAVSEA)
- Naval Facilities Engineering Command (NAVFAC)
- Naval Air Systems Command (NAVAIR)
- Naval Postgraduate School (NPS)
- Marine Corps Systems Command (MCSC)
- Strategic Systems Program (SSP)
- U.S. Naval Research Laboratory (NRL)
- Space and Naval Warfare Systems Command (SPAWAR)
- U.S. Naval War College (USNWC)
- Commander, Navy Installations Command (CNIC)
- The Navy Bureau of Medicine and Surgery (BUMED)
Office of the Deputy Chief Naval Operations (Manpower, Personnel, Training and Education)

Office of the Assistant Secretary of the Navy (Manpower and Reserve Affairs) ASN (M&RA)

Office of the Assistant Secretary of the Navy (Research Development & Acquisition) ASN (RD&A)

Office of the Deputy Chief Naval Operations (Manpower, Personnel, Training and Education)

International locations can be found in the organization-specific sections.
Naval STEM Stakeholder Organizations Overview

Navy Bureau of Medicine and Surgery [BUMED]
BUMED is the headquarters command for Navy medicine. Under the leadership of the Navy Surgeon General, BUMED develops the policies and direction for the Navy medicine enterprise that ensures we keep the Navy and Marine Corps family healthy, ready and on the job.

Commander, Navy Installations Command [CNIC]
CNIC is the Echelon II command under the chief of naval operations responsible for Navy-wide shore installation management. The standup of CNIC was part of the fleet and regional shore installation alignment, which began in 1997 with the reduction of installation management claimants from 18 to eight. The intent of CNIC is to establish a single shore installation-management organization that will focus on installation effectiveness and improve the shore installation-management community’s ability to support the fleet.

Marine Corps Systems Command [MCSC]
MCSC serves as the Department of the Navy’s systems command for Marine Corps ground weapon and information technology system programs in order to equip and sustain Marine forces with full-spectrum, current and future expeditionary and crisis-response capabilities.
Naval Air Systems Command [NAVAIR]
NAVAIR provides full life-cycle support of naval aviation aircraft, weapons and systems operated by Sailors and Marines. This support includes research, design, development and systems engineering; acquisition; test and evaluation; training facilities and equipment; repair and modification; and in-service engineering and logistics support. NAVAIR has more than 37,000 military, civilian and contractor personnel stationed at eight locations across the continental United States and one site overseas.

Naval Facilities Engineering Command [NAVFAC]
NAVFAC is the systems command that builds and maintains sustainable facilities, delivers utilities and services, and provides Navy expeditionary combat force capabilities. NAVFAC delivers best-value facilities engineering and acquisition for the Navy and Marine Corps, unified commanders, and Department of Defense agencies through our six business lines: capital improvements, environmental, expeditionary, public works, asset management and contingency engineering. NAVFAC also provides program management for all aspects of the Naval Construction Force, the Seabees, and equipment/materiel management for the Naval Beach Group and other Naval Special Operating Units.

Naval Postgraduate School [NPS]
NPS provides relevant and unique advanced educational and research programs to increase the combat effectiveness of commissioned officers of the naval service to enhance the security of the United States.

Naval Sea Systems Command [NAVSEA]
NAVSEA, the largest of the Navy’s systems commands, designs, builds and maintains ships, submarines and combat systems that meet the fleet’s current and future operational requirements. NAVSEA has 33 sites in 16 states throughout the U.S. that strive to be an efficient provider of defense resources for the nation and play an important role in the Navy enterprise.
Office of Naval Research [ONR]

ONR is an executive branch agency within the U.S. Department of the Navy under the leadership of the chief of naval research, who also serves as the naval STEM executive. It was established to plan, foster and encourage scientific research in recognition of its paramount importance to the maintenance of future naval power and the preservation of national security. Its mission is to manage the Navy’s basic and applied research and advanced technology development portfolios for the U.S. Navy and Marine Corps.

Space and Naval Warfare Systems Command [SPAWAR]

Over the last decade, information has emerged as a warfighting domain—joining land, sea and air as a critical contested battlespace. As the Navy’s information warfare systems command, SPAWAR is the Navy acquisition command that develops, delivers and sustains communications and information warfare capabilities for warfighters, keeping them connected anytime, anywhere. With a space support activity and two research and development system centers, and through partnerships with three program executive offices, SPAWAR provides the hardware and software needed to execute Navy missions. The team consists of more than 10,000 active-duty military and civil service professionals located around the world and close to the fleet to keep SPAWAR at the forefront of research, engineering and acquisition to provide and sustain information capabilities to the fleet.

Strategic Systems Program [SSP]

Since 1960 the U.S. Navy has provided the cornerstone for our nation’s strategic deterrence mission. That legacy continues today, led by our fleet of OHIO class submarines and their TRIDENT II D5 missile systems. The deterrence mission, led by the Navy’s SSP office, is expected to continue for many decades to come. Effective deterrence depends on submarine and missile systems that demonstrate their effectiveness, reliability and creditability. But technology is not enough. At the core of SSP’s success is the excellence of our team of active duty and civilian personnel.
U.S. Naval Academy [USNA]

As the undergraduate college of the naval service, the United States Naval Academy prepares young men and women to become professional officers in the U.S. Navy and Marine Corps. After four years of undergraduate study and military training, midshipmen graduate with bachelor of science degrees and reserve commissions.

U.S. Naval Research Laboratory [NRL]

NRL operates as the U.S. Navy and Marine Corps full-spectrum corporate laboratory. The lab conducts a broad range of scientific research and advanced technology development. These programs concentrate on innovative maritime materials, techniques, equipment and systems, as well as ocean, atmospheric and space science technologies. NRL provides the advanced scientific capabilities necessary to strengthen our country’s position of naval leader across the globe. NRL is home to some of the nation’s best scientists and engineers. They are inspired and encouraged to pursue their passion in an environment of proven excellence—each are focused on research that yields immediate and long-range applications in the defense of the United States.

U.S. Naval War College [NWC]

The U.S. Naval War College’s mission is to educate and develop future leaders by building strategic and cultural perspectives and enhancing the capability of graduates to advise senior leaders and policy-makers. In support of that mission, the college offers outreach programs to engage with the public on the missions of the U.S. Navy and Marine Corps, and to promote opportunities for service to the nation. In 2012, the Naval War College joined other Navy commands to respond to the challenge of inspiring students to pursue education and careers in STEM. There is a national security imperative to grow STEM professionals for the Navy military and civilian workforce as we enter an era of accelerating adoption of technology.
**STEM:** Navy Medicine is a successful enterprise spanning research and development, battlefield medicine, at sea medicine, wounded warrior care, humanitarian assistance/disaster relief and medical support to the Navy and Marine Corps family. To sustain our legacy in biomedical research and development, we look to the future, and that means reaching out to our nation’s young people and inspiring them to pursue a productive and meaningful career in medicine and research. Through partnerships with local schools and collaborative efforts with other naval organizations, BUMED’s STEM program offers students real-world experience in patient care areas, panel discussions, hands-on medical applications, workshops, job shadowing, and engagement with researchers and clinicians (physicians, surgeons, nurses, physician assistants, pharmacists and psychologists).
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* Navy Environmental Preventive Medicine Unit
See page 14 - 15 for BUMED international locations
Navy Bureau of Medicine & Surgery (BUMED) - International Sites

- Sigonella, Italy
- Naples, Italy
- Rota, Spain
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Commander, Navy Installations Command (CNIC) - U.S. Sites

STEM: A guiding principle of Vice Adm. Mary Jackson, commander, Navy Installation Command, is that “CNIC represents Navy to the surrounding communities; installations are the face of the Navy. It’s about relationships...and service through action: customer-focused, efficient, effective and responsive.” One way regional and installation commanders build these relationships is through the Partnerships-In-Education (PIE) initiatives to provide numerous STEM activities at all Navy installations:

- CNIC’s daily interaction with our partnered communities will reflect the commitment to these guiding principles.
- Values: citizenship, respect for diversity, teamwork, honesty and caring.

Educational Programs: PIE installations use Sailors and civilian employees to serve as volunteers, mentors, tutors and role models. The following are a few suggestions for school academic support: Provide career awareness involvement with career-focused activities and educational programs;

- PIE installations use Sailors and civilian employees to serve as volunteers, mentors, tutors and role models.
- Support academic improvement workshops and guest lecturers.
- Facilities for special occasions and tours.

* Non-base CNIC supported location

Workforce Programs: CNIC uses postsecondary preparation in military-associated communities. In addition to high school course work, extracurricular activities, sports and leadership roles, family attitudes and practices regarding careers help shape a student’s postsecondary options. Role modeling by parents and parent expectations and support can contribute significantly to helping a teen make decisions which will create a positive postsecondary experience.

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- NSA Washington, D.C.
- NAS Patuxent River, MD
- NRC Solomons, MD*
- NSA Annapolis, MD
- NSA Bethesda, MD
- NSF Thurmont, MD
- NSA South Potomac, VA
- NSF Dahlgren, VA*
- NSF Indian Head, MD*

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- NAS Jacksonville, FL
- NAS Orlando, FL
- NAS Pensacola, FL
- NAS Whiting Field Milton, FL
- NAVSTA Mayport, FL
- NSA Panama City, FL
- SUBASE Kings Bay, GA
- NSA Charleston, SC*
- NAS JRB New Orleans, LA
- NAS Meridian, MS
- CBC Gulfport, MS
- NSF Beaufort, SC
- NSA Mid South, Millington, TN
- NAS Corpus Christi, TX
- NAS JRB Fort Worth, TX
- NAS Kingsville, TX
- NAVSTA Guantanamo Bay, Cuba

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- SUBASE New London, CT
- NAVSTA Great Lakes, IL
- NSA Crane, IN
- NSY BOS Portsmouth, NH
- WPNSTA Earle/Colts Neck, NJ
- NSA Lakehurst, NJ*
- NSA Saratoga Springs, NY
- NSA Mechanicsburg, PA
- NSA Philadelphia, PA*
- NAVSTA Newport, RI
- JEB Little Creek-Fort Story, VA
- SCSC Wallops Island, VA*
- NAS Oceana, VA
- Dam Neck Annex, VA*
- NAVSTA Norfolk, VA
- NSA Hampton Roads, VA
- NSA Northwest Annex, VA*
- NSS Norfolk Naval Shipyard, VA
- WPNSTA Yorktown, VA
- Cheatham Annex, VA*

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- NAVBASE Kitsap Bremerton, WA
- NAVMAG Indian Island, WA
- NAVSTA Everett, WA
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- NAS Fallon, NV
- NAS Lemoore, CA
- NAVBASE Coronado San Diego, CA
- NAVBASE Point Loma, CA
- NAVBASE San Diego, CA
- NAVBASE Ventura County/Point Mugu, CA
- NAWS China Lake, CA
- NSA Monterey, CA
- WPNSTA Seal Beach, CA

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- Joint Base Pearl Harbor-Hickam, HI
- PMRF Barking Sands, HI

See page 18 - 19 for CNIC international locations
CNIC - International Sites
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- NAS Sigonella, Italy
- NAVSTA Rota, Spain
- NSA Naples, Italy
- NSA Bahrain
- NSA Souda Bay, Greece
- NSF Deveselu, Romania
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- CFA Yokosuka
- NAF Atsugi
- NSF Diego Garcia
- NAF Misawa

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Region 12: Singapore
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Marine Corps Systems Command (MCSC)

**STEM:** MCSC has more than 500 engineers, scientists and IT professionals who support the design, development, testing and fielding of Marine Corps systems supporting more than 180,000 Marines. MCSC is dedicated to promoting the development of its future workforce through hands-on engagement with students in competitions, camps and festivals.

**Educational Programs:** MCSC participates in various activities to enhance the education and awareness of students in STEM disciplines and careers. These include participation in various festivals, such as the U.S. Science and Engineering Festival held biannually at the Washington Convention Center; a yearly one-week STEM Robotics Camp at the Quantico Middle/High School composed of challenges, displays, demonstrations, design activities and career briefings; participation in specialized school days set aside for STEAM activities (STEM with arts included); and regional science fairs as judges for students in grades five through 12. Furthermore MCSC is involved in STEM outreach to local schools and sponsors STEM activities at other Marine Corps facilities, such as Science Week at the Marine Corps Tactical System Support Activity at Camp Pendleton in California.

**Workforce Programs:** All MCSC education programs require close collaboration with other STEM teaching professionals, engineering and scientist mentors. The command hosts days-long training events for robotics camp teams in conjunction with The College of William and Mary. MCSC engineers and scientists train on Marine Corps equipment used for displays and hands-on demonstrations at festivals, camps and in classrooms. They also participate in refresher training provided by the Naval Academy (best practices for STEM outreach) and collaborate with “Marine Corps Females in Technology,” a group started by MCSC women engineers, scientists and IT professionals.

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**Marine Corps Tactical System Support Activity**
Camp Pendleton, California
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Left: Marine Corps Tactical Systems Support Activity Science Week SumoBot. Photo by David Yergensen.
Naval Air Systems Command (NAVAIR)

STEM: Approximately 40 percent of NAVAIR’s 30,000-person civilian workforce has either an engineering or a science degree. Our ability to support the development of systems for use by operational Sailors and Marines depends on our ability to cultivate a highly educated, technical workforce. Connecting with today’s science and engineering students is vital.

Educational Programs: NAVAIR’s STEM outreach programs include several education components. NAVAIR scientists and engineers reach out to local teachers to help them prepare to teach science and engineering disciplines. This includes assistance with curriculum development as necessary. We also help them in the classroom by addressing students’ challenging science and engineering questions. And we bring students to our facilities to perform hands-on activities in our laboratories and to show them how we apply science and engineering concepts to real life.

Workforce Programs: NAVAIR engages with the community in many STEM workforce programs. These include:

■ Mentoring local high school students who participate in high school engineering classes and robotics/engineering clubs.
■ Providing apprenticeship, internship and research opportunities for high school and undergraduate students.
■ Providing opportunities for several hundred summer hires who assist in a wide variety of science and engineering activities.
■ Participating in the Office of the Secretary of Defense Science Math and Research for Transformation scholars program.
■ Supporting large national diversity organizations by sponsoring their recruiting events.
■ Supporting current workforce development by sponsoring research projects proposed and conducted by the workforce, and by supporting our employees pursuing advanced degrees.

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Teams of students from 18 schools across Ventura County descended upon Point Mugu for the Tri-Warfare Center Middle School Challenge. The challenge? Build a bridgehead out of spaghetti, epoxy, and your own engineering know-how. Students, their teachers and mentors from Naval Air Warfare Center Weapons Division, Naval Surface Warfare Center Port Hueneme Division, and Naval Facilities Command Engineering and Expeditionary Warfare Center had two hours to design, build and test their creations before judging. The bridge with the highest weight-to-load-bearing ratio would be declared the winner. Photo by Kimberly Brown.
Naval Facilities Engineering Command (NAVFAC)

STEM: NAVFAC supports STEM outreach efforts through its Echelon IV Facilities Engineering Commands (FEC), which provide products and services throughout the world—with more than 99 service points; its Civil Engineer Corps (CEC) accessions officers; and its CEC officers attending graduate school at civilian institutions. STEM outreach is a priority for building future leaders and recruiting the best and brightest to work at NAVFAC.

Educational Programs: NAVFAC supports educational programs at the local FEC level—at multiple schools and organizations—by involving both our military and civilian workforces. Programs include partnerships with local schools, participation in local science and math competitions and involvement in speaking engagements.

Workforce Programs: NAVFAC participates in partnerships with local universities and colleges through its Naval Expeditionary Warfare Center. Its research and development programs provide opportunities for mutual partnerships. NAVFAC also utilizes the PATHWAYS intern program to develop promising young engineers for future full-time employment with the command.

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Naval Postgraduate School (NPS)

STEM: The Naval Postgraduate School’s interdisciplinary faculty and student expertise are harnessed to engage and inspire youth to explore STEM fields through a number of special programs. NPS faculty and students are vital and sought-after members of local and national STEM efforts. The collective program supports academic and research projects of excellence, as well as NPS student thesis work.

Educational Programs: NPS educational activities include resident astronauts and faculty visiting K-12 classes, inspiring students to consider a STEM career. During 2018, NPS hosted more than 2,000 K-12 students at “Discover NPS Day,” where everyone had the opportunity to explore naval research being done in our community. Additionally, NPS faculty and students engage in local STEM efforts, including FIRST Robotics Competitions, Monterey County Science and Engineering Fair and Monterey Peninsula College Marine Advanced Technology Education.

Workforce Programs: NPS works closely with community scientists, educators and professionals to expand our STEM reach. We host robust STEM internship programs, including partnerships with several Hispanic Serving Institutions accessing our local underrepresented population. NPS interns are introduced to female scientists and military officers during “PhDs + Polka Dots.” The National Naval Officers Association, a student-run program, works with local middle and high schools to offer free, one-on-one tutoring and mentoring, student scholarships and other STEM outreach activities.

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Above: Summer 2018 Naval Postgraduate School (NPS) STEM interns. Photo courtesy NPS.
Naval Sea Systems Command (NAVSEA)

STEM: NAVSEA works to expose students to STEM activities and the command’s vast talent pool of STEM professionals. Students who participate in these programs interact with scientists, engineers and technicians to acquire valuable skills that can be applied to their future academic and vocational endeavors.

Educational Programs: NAVSEA educational program activities span from early elementary school science labs through university graduate-level-directed research, providing students a continuous thread of STEM experiences. Students work side-by-side with engineers, scientists and technicians on a variety of challenging, hands-on activities—which not only reinforce the basics tenets of engineering and physics, but also show students the importance of these principles in the work the Navy does every day. In sum, educational outreach provides NAVSEA’s 21st-century future workforce with a progressive, integrated path aimed at building a rewarding professional career and a lifetime of service to our nation.

Workforce Programs: NAVSEA offers student employment opportunities at various sites. Students team with engineers, scientists and technicians to work on real-world problems and projects. NAVSEA offers STEM scholarships, internship positions and co-op positions.
Office of Naval Research (ONR)

STEM: Ensuring access to skilled scientists and engineers, ONR’s STEM Education and Workforce Grants Program sponsors projects that provide game-changing and innovative solutions, while establishing a diverse pipeline of U.S. citizens interested in uniformed or civilian Navy and Marine Corps careers. The STEM Education and Workforce Grants Program focuses on students at the secondary and post-secondary levels, as well as the current naval science and technology professional workforce.

Characteristics of the grant program include:
- Helping to create innovative educational programs targeting naval science and engineering workforce needs.
- Providing grants up to $750,000 over three years to academic, educational and non-profit organizations.
- Cultivating and strengthening the STEM disciplines across all naval activities, and improving the naval technician talent pipeline.
- Supporting efforts that may involve military dependents, veteran initiatives and education systems integral to naval science and technology.

Educational Programs: ONR STEM initiatives encourage, promote and coordinate naval science and technology efforts. Through participation in expos and other outreach events, ONR highlights naval-relevant STEM content, skills and career paths to K-12 and older students. ONR also supports students at STEM fairs and competitions, providing hands-on activities and an introduction to naval applications related to subject matter and skills taught in school. Specifically, ONR supports many DoD STEM events, such as the USA Science and Engineering Festival, the Junior Science and Humanities Symposia, the Naval Science Awards program and the Intel International Science and Engineering Fair.

Workforce Programs: ONR’s workforce programs raise awareness of naval career opportunities, attract and nurture the future talent pool, and foster the continued development of the current naval STEM workforce. Laboratory workforce initiatives provide students and faculty with opportunities to participate in research programs at Department of the Navy labs through internships, fellowships and sabbatical leave programs. Some of these programs include the Science and Engineering Apprenticeship Program and the Naval Research Enterprise Internship Program.

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Above: Winners of the Junior Science and Humanities Symposium oral presentations.
Space and Naval Warfare Systems Command (SPAWAR)

STEM: The goal of SPAWAR outreach is to foster a culture that celebrates STEM education by empowering our professionals to enrich their communities.

Educational Programs: SPAWAR is dedicated to cultivating a zest for STEM among today’s youth, with the intent of developing future STEM professionals and a more informed and interested citizenry. SPAWAR is building a robust K-12 and post-secondary pathway that reflects the demographics of each community, leading to future STEM employment, preferably at our command.

Workforce Programs: SPAWAR delivers comprehensive human resource services in support of a mission-ready workforce. This includes numerous programs that develop future STEM professionals via career fairs, internships, faculty research programs, work co-ops, and Science, Mathematics and Research for Transformation (SMART) scholarships. It continues through to employment via the New Professionals program and engages our current scientists and engineers through various retention programs.

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Strategic Systems Program (SSP)

**STEM:** During FY18, SSP commands began working with local schools to determine which schools could benefit from our support and involvement in their K-12 STEM programs. This year is our first working in this capacity, so much of the time has focused on program implementation. As we progress through FY19, we hope to garner more interest in STEM by regularly supporting our local communities through STEM initiatives for students.

**Educational Programs:** SSP employees throughout the command have been working with educators and students of kindergarten though 12th-grade schools local to their facilities, in order to incorporate new, or support current, STEM programs for students. In addition to supporting STEM education in the K-12 arena, SSP also promotes the development of our own STEM professionals, by offering them tuition assistance to participate in STEM-related undergraduate, graduate and certification programs.

**Workforce Programs:** Through our Develop Integrate Value and Engage (DIVE) and Leadership Attained through Unified Mentorship, Coaching and Hard Work (LAUNCH) programs SSP offers student employment opportunities for STEM students throughout our headquarters and field activities. The DIVE program is conducive to those student interns who live within reasonable commuting distance of their worksites, and through synchronized travel opportunities, the LAUNCH program benefits students who live outside reasonable commuting distance to their worksites.

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Above: Participants show off their hovercrafts.
United States Naval Academy (USNA)

**STEM:** The USNA STEM education and outreach program provides opportunities to engage and educate K-16 students and teachers in critical engineering and science areas, promoting a growing STEM workforce with skillsets to meet future national and Department of Defense (DoD) challenges. Emphasis is placed on reaching underrepresented populations, empowering educators through teacher training and leveraging resources to build sustainable community networks. Hundreds of USNA midshipmen participate each year in the center’s outreach activities, which provide them with opportunities to lead in the classroom, to strengthen creative problem-solving skills, to enhance innovative thinking and to mentor youth.

**Educational Programs:** USNA STEM Educator Training programs promote effective STEM education using DoD-relevant curricula. Formal and informal educators from local, national and international communities attend one-day, two-day and week-long workshops, incorporating the use of project-based learning in engineering design, chemistry, physics, applied math, cyber and programming, robotics, biomechanics, environmental science and many engineering disciplines. Additionally, thousands of students are reached directly each year via camps, mini-camps, engineering days, competitions, festivals and fairs supported by faculty and midshipmen, utilizing DoD-oriented activities based on real-world applications.

**Workforce Programs:** High school and college students participate in various paid and unpaid internships, including the Office of Naval Research Science and Engineering Apprenticeship Program and the USNA/Pathways internships. Faculty members serve as mentors in a wide range of applied science and engineering research and development areas. Midshipmen and faculty-supported outreach events inspire and excite potential workforce members nationwide. Professional development for STEM educators provides teachers with the training and resources needed to engage and develop the next generation of scientists and engineers. Midshipmen involvement in STEM outreach encourages retention of STEM majors at USNA by engaging them in project-based learning and youth mentorship. The USNA STEM Center acts as a resource available to help midshipmen STEM majors become leaders in the fleet. Additionally, the STEM Center acts outside USNA in assisting other DoD commands with best practices in educational outreach for workforce development.

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U.S. Naval Research Laboratory (NRL)

**STEM**: The goals of NRL’s STEM outreach is to inspire students to pursue STEM academics and careers, share the Navy’s mission with various communities and hire the nation’s best and brightest talent as part of our naval STEM workforce.

**Educational Programs**: NRL’s community outreach program was established in 1985 by a presidential directive tasking government organizations to support local schools. Since then, NRL scientists and engineers have engaged the K-12 community through a set of core STEM programs, including SeaPerch, FIRST Robotics and CanSat. NRL also provides professional development to STEM educators in local school districts and systems near our laboratories and field sites. NRL field sites partner with community nonprofits and educational institutions to meet the unique STEM needs of each community—such as classroom visits, community lectures, STEM activity development, after-school tutoring or participating in STEM fairs.

**Workforce Programs**: In addition to the federal Pathways Internships Program, NRL also participates in the Science and Engineering Apprenticeship Program, aimed toward secondary students interested in STEM. NRL also nurtures undergraduate to post-doctoral students, via the Naval Research Enterprise Internship Program and the American Society for Engineering Education and National Research Council. Full-time personnel are encouraged to participate in NRL’s long-term training programs to advance subject matter expertise by pursuing advanced degrees and further certifications.

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U.S. Naval War College (NWC)

STEM: The NWC STEM program—Starship Poseidon STEM Camp—provides opportunities to New England-area high school students, with a concerted effort to include underrepresented populations, and participate in an on-base camp and follow-on mentoring program. The objective of the on-base camp program is to expose students to the application of STEM in the Navy through projects, engagement with Navy STEM professionals, and visits to Navy laboratories and ships. Our mentoring efforts connect students with Navy military and civilian professionals in follow-on STEM challenge events and through individual counseling about Navy programs. In some cases, students are paired with civilian scientists and engineers to pursue school science projects. The overall effort is to introduce students to naval STEM education opportunities. To date, select students have continued in STEM programs, earned NROTC scholarships and entered service academies.

Educational Programs: NWC STEM activities include a one-week, on-base STEM camp experience that includes classroom lectures on STEM capabilities, participation in STEM-based projects and up-close exposure to actual Navy STEM applications. Projects include computer-programmed robotics, SeaPerch underwater robot construction and operation, hydraulic mechanics, solar-powered vehicle construction and medical device-model construction. Visits include a day at the Naval Submarine School with a tour of a nuclear-powered submarine and a visit to the Naval Undersea Warfare Center with the opportunity to meet civilian engineers and scientists. A trip to the Massachusetts Institute of Technology to meet recent NROTC graduates and tour the campus promotes the idea that our students can attain STEM education. Throughout the year, NWC STEM challenges are conducted at local area colleges. Students participate in team STEM challenges and have the opportunity to meet STEM professionals.

Workforce Programs: NWC STEM program students are encouraged to apply for internships at the Naval Undersea Warfare Center in the summer before their senior year, or other programs near their homes. Additionally, our staff provides mentorship in applying for Navy STEM education opportunities, NROTC, service academies and college scholarships. The effect is that our students are inspired to pursue internships, scholarships and college education in STEM programs. Our objective is to inspire interest and careers through exposure to the unique experiences of civilian STEM professionals, Navy sailors and graduates of Navy STEM programs. Eighty students per year enter the Starship Poseidon STEM Camp.

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Above: Starship Poseidon STEM camp participants test out the wind tunnel during a tour at Naval Undersea Warfare Center Division Newport. Photo by John Vannucci.
Photo Rewind

1. Visitors to the Marine Corps Systems Command booth at the 2018 U.S. Science and Engineering Fair admire a 3D printer at work. Photo courtesy MCSC.

2. Drs. Sophoria Westmoreland and Michelle Skoorka (far right respectively) pose with SPAWAR System Center Pacific’s summer 2018 STEM interns in Hawaii. Photo by Neal Miyake.

3. Participants at the SSC Atlantic’s Girls Day Out event learn about robotics. Photo courtesy SSC Atlantic.

4. University students participate in the annual American Astronautical Society CanSat Competition. Photo courtesy NRL.

5. Participants of Naval Air Warfare Center Weapons Division STEM camp work together to engineer a marble track. Photo by Kimberly Brown.

6. Team Redbot, from Mt. Greylock Regional High School in Williamstown, Massachusetts, make adjustments to their intake and lift mechanisms at a 2018 First Robotics match. Their lift mechanism was a triumph, successfully lifting the robot a foot off the ground in over 90 percent of their matches. Photo courtesy Strategic Systems Program.