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2011 NAVAL STEM FORUM

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## WELCOME NAVAL STEM FORUM PARTICIPANTS

The Office of Naval Research is pleased to host the first Naval STEM Forum. On behalf of the Secretary of the Navy, welcome to this event and thank you for your valuable time as we collaborate on science, technology, engineering and math, or STEM – a topic critical to ensuring Sailors and Marines have the technological edge they need, and also to our nation’s future.

The U.S. Navy and Marine Corps have a history of leadership in leveraging technology to defend our great country. Naval innovation dates back to superior ship design in the War of 1812, radar that provided a significant advantage in World War II, nuclear submarines for strategic deterrence during the Cold War and modern intelligence tools for the fight against terrorism, today.

Investments by the Department of the Navy (DoN) in science and technology help maintain the vitality of our nation’s STEM workforce. Based on expected significant increase in future demand, as well as looming retirements, we must act decisively now so that tomorrow’s scientists and engineers will be there when we need them.

The DoN’s STEM strategy aims to increase the talent pool from which the next-generation of great Sailors, Marines, naval engineers and scientists will come. At this Forum, I invite you to explore STEM issues and solutions across three key focus areas: K-12 Education, Higher Education and Research in STEM Education Technologies.

Over the next two days, you will hear directly from our naval leadership as well as STEM experts and leaders from across industry, academic and non-profit organizations. Their views, together with your contributions, will help us shape effective initiatives for helping increase quantity and quality of our country’s STEM professionals.

Again, thank you for coming and thank you for your continued commitment to the brave men and women of the Navy and Marine Corps.

Sincerely,

NEVIN P. CARR, JR.  
Rear Admiral, U.S. Navy  
Chief of Naval Research

## Goals for the Naval STEM Forum

- Share effective Science, Technology, Engineering and Mathematics (STEM) education strategies and state-of-the-art educational technology research
- Prioritize a list of STEM recommendations and best practices that support Department of the Navy (DoN) STEM efforts
- Identify potential partnerships among government, private industry, academia and the nonprofit sector to address future DoN STEM workforce needs

This forum will provide multiple opportunities for engagement and dialogue, and together we will explore STEM challenges and solutions across three key focus areas: **K-12 Education, Higher Education, and Research in STEM Education Technologies.**

**PLENARY ROOM:** These sessions offer participants a chance to hear from distinguished keynote speakers and interact with expert panelists.

**STEM DEMONSTRATIONS:** In the foyer, we invite you to meet some extraordinary people and learn more about what they are doing to promote STEM education and forge new partnerships.

**PITCH-A-PRINCIPAL:** Requested and made in advance, these appointments provide an opportunity for participants to interact with ONR subject-matter experts on STEM-related research.

**POSTER SESSION:** At the reception, you will have a chance to interact with conference participants who will share what they are doing in STEM education.

**BREAKOUT SESSIONS:** This is your chance to contribute directly to the outcomes of this forum. Your participation is critical. Each day, we will set aside time for facilitated discussion to hear your ideas. The facilitators will help each breakout group come to consensus (K-12 Education, Higher Education, and Research in STEM Education Technologies) on its top recommendations for ways the Navy and Marine Corps can collaborate with Naval stakeholders to increase the impact and reach of STEM programs. Group leads will report out to Naval leadership in the plenary room at the end of the second day. A conference report will be published later in the year summarizing these recommendations.

**\$1 MILLION:** Be sure to submit your white papers in response to the \$1 million “Sponsoring Scholars in Science” program. You could receive a \$100,000 grant for a novel idea to promote and deliver STEM education in your community (see the STEM Forum Web site at [www.onr.navy.mil](http://www.onr.navy.mil) for more details). To be eligible for an award, you must attend the forum in person and deliver your white paper to the ONR.

## SECRETARY OF THE NAVY

### The Honorable Ray Mabus



The honorable Ray Mabus is the 75th United States secretary of the Navy. As secretary, he leads America's Navy and Marine Corps and is responsible for an annual budget in excess of \$150 billion and almost 900,000 people.

The secretary of the Navy is responsible for conducting all the affairs of the Department of the Navy, including recruiting, organizing, supplying, equipping, training and mobilizing. Additionally, he oversees the construction, outfitting and repair of naval ships, equipment and facilities, and he is responsible for the formulation and implementation of policies and programs that are consistent with the national security policies and objectives established by the President and the Secretary of Defense.

Prior to joining the administration of President Barack Obama, Mabus served in a variety of top posts in government and the private sector. In 1988, Mabus was elected governor of Mississippi. As the youngest governor of Mississippi in more than 100 years at the time of his election, he stressed education and job creation. He passed B.E.S.T. (Better Education for Success Tomorrow), one of the most comprehensive education reform programs in America and was named one of Fortune Magazine's top 10 education governors. He was appointed ambassador to the Kingdom of Saudi Arabia for the Clinton Administration in 1994. During his tenure as ambassador, a crisis with Iraq was successfully averted, and Saudi Arabia officially abandoned the boycott of United States businesses that traded with Israel. He also was chairman and CEO of Foamex, a large manufacturing company, which he led out of bankruptcy in less than nine months, paying all creditors in full and saving equity. Prior to becoming governor, he was elected state auditor of Mississippi and served as a surface warfare officer in the U.S. Navy aboard the cruiser USS Little Rock.

Mabus is a native of Ackerman, Miss., and received a bachelor's degree from the University of Mississippi, a master's degree from Johns Hopkins University and a law degree from Harvard Law School. He has been awarded the U.S. Department of Defense Distinguished Public Service Award, the U.S. Army's Distinguished Civilian Service Award, the Martin Luther King Social Responsibility Award from the King Center in Atlanta, the National Wildlife Federation Conservation Achievement Award, the King Abdul Aziz Award from the Kingdom of Saudi Arabia and the Mississippi Association of Educators' Friend of Education Award.

## CHIEF OF NAVAL OPERATIONS

### Admiral Gary Roughead



Admiral Gary Roughead is a 1973 graduate of the United States Naval Academy.

Among his six operational commands, Roughead was the first officer to command both classes of Aegis ships, having commanded USS Barry and USS Port Royal.

As a flag officer, Roughead commanded Cruiser Destroyer Group 2, the George Washington Battle Group; and U.S. Second Fleet/NATO Striking Fleet Atlantic and Naval Forces North Fleet East.

Ashore, he served as commandant, United States Naval Academy, the Department of the Navy's chief of legislative affairs and as deputy commander, U.S. Pacific Command.

Roughead is one of only two officers to have commanded the Fleets in the Pacific and Atlantic, commanding the U.S. Pacific Fleet and Joint Task Force 519, as well as serving as commander, U.S. Fleet Forces, where he was responsible for ensuring Navy forces were trained, ready, equipped and prepared to operate around the world, where and when needed.

Roughead's awards include the Defense Distinguished Service Medal, Navy Distinguished Service Medal, Defense Superior Service Medal, Legion of Merit, Meritorious Service Medal, Navy Commendation Medal, Navy Achievement Medal, and various unit and service awards.

Roughead became the 29th Chief of Naval Operations on Sept. 29, 2007.

## CHIEF OF NAVAL RESEARCH

### **Rear Admiral Nevin P. Carr, Jr.**

Chief of Naval Research

Director, Test and Evaluation and Technology Requirements



Rear Adm. Nevin P. Carr, Jr. has spent his Navy career at sea in cruisers and destroyers, deploying to the Mediterranean Sea, Black Sea, Indian Ocean, Persian Gulf, North and South Atlantic, South Pacific, Baltic, Caribbean and Red Seas. Shipboard tours included USS King (DDG 41); USS McCandless (FF 1084); USS Thomas S. Gates (CG 51); USS Vella Gulf (CG 72); Cruiser/Destroyer Group 8 staff embarked in USS Dwight D. Eisenhower (CVN 69); and the 2nd Fleet staff embarked in USS Mt. Whitney (LCC 20). He commanded USS Arleigh Burke (DDG 51) and USS Cape St. George (CG 71), winning Battle E's and Golden Anchors in both tours. While in command of Cape St. George, the ship

participated in combat operations in support of Operation Iraqi Freedom in both the European and Central Command theaters.

Ashore, Carr has served in the Office of the Secretary of Defense where he worked on the Arleigh Burke, Ticonderoga and Seawolf programs and several Ballistic Missile Defense programs. He later served in the Office of the Chief of Naval Operations as requirements officer for the Aegis Cruiser and Destroyer programs and was executive assistant to the commander, U.S. Fleet Forces Command. Following promotion to flag rank in 2006, he was assigned as deputy director of Surface Warfare for Combat Systems and Weapons and later as deputy assistant secretary of the Navy (International Programs) and director, Navy International Programs Office.

Carr graduated in 1979 from the U.S. Naval Academy with a Bachelor of Science Degree in naval architecture. He received his Master of Science in operations research from the Naval Postgraduate School and completed the Advanced Management Program at Harvard Business School.

In December 2008, he became the 22nd chief of naval research, with additional duties as director, Test and Evaluation and Technology Requirements.

AGENDA · DAY 1 | Wednesday, June 15

Time	Topic	Presenters
7:00 – 7:45 am	Badge pickup and continental breakfast	
7:45 – 8:00 am	Welcome and Intro: Dr. Walter Jones, Executive Director, ONR	
8:00 am	Color Guard presents colors	
8:00 – 8:30 am	Rear Adm. Nevin P. Carr, Jr., Chief of Naval Research	
8:30 – 9:00 am	Dr. Charles Vest, President, National Academy of Engineering	
9:00 - 9:30 am	Dr. Clifford Stanley, Under Secretary of Defense for Personnel and Readiness	
9:30 – 10:00 am	Coffee break and demos in foyer	
10:00 – 10:30 am	Ray Mabus, Secretary of the Navy	
10:30 – 12:00pm	Panel 1: STEM in the Field – Best Practices From Across the Pipeline (Moderator: Brian Persons, Executive Director, NAVSEA )	Panelists: - Dr. Oscar Porter, Executive Director for Mathematics, Engineering, Science Achievement - Dr. Vince Bertram, Project Lead the Way - Dr. Freeman A. Hrabowski III, President, University of Maryland, Baltimore County - Dr. Mary Ann Rankin, University of Texas - Dr. Reagan Flowers, Executive Director, CSTEM
12:00 – 1:00 pm	Lunch	
1:00 – 1:30 pm	Dean Kamen, CEO, DEKA Research & Development Corporation and Founder of FIRST Robotics	
1:35 – 3:30 pm	Breakout Session 1 (facilitated): Challenges and Opportunities in STEM (identify top recommendations in each area below)	
	<b>K-12 Education</b> Lead: Dr. Carl Mack, NSBE <ul style="list-style-type: none"> <li>• Tara Chklovski, Iridescent</li> <li>• Susan Nelson, SeaPerch</li> <li>• Diane Miller, YES</li> <li>• Deborah Yourick, Army GEMS</li> <li>• Dianna McAtee, Infinity Project</li> </ul>	<b>Higher Education</b> Lead: Dr. Michael Tietelbaum, Sloan Foundation <ul style="list-style-type: none"> <li>• Joan Ferrini Mundy, National Science Foundation</li> <li>• Maria Medeiros, University Lab Initiative</li> <li>• Deborah Shifflett, SMART</li> <li>• Greg Murphy, Tuskegee</li> </ul>
	<b>Research in STEM Education Technologies</b> Lead: Thomas Kalil, OSTP <ul style="list-style-type: none"> <li>• Eva Baker, UCLA</li> <li>• Ray Perez, ONR</li> <li>• Cori Lathan, AnthroTronix</li> <li>• Rohit Prasad, Raytheon</li> </ul>	
3:35 – 3:45 pm	Coffee break and demos in foyer	
3:45 – 5:15 pm	Panel 2: Industry Perspective – Workforce Needs and Potential Solutions (Moderator: Rear Adm. Patrick Brady, Commander Space Warfare Systems Command)	Panelists: - Brian Fitzgerald, CEO, Business Higher Education Forum - Doug Coffey, Vice President, BAE Systems - Dr. Linda Rosen, CEO, Change the Equation - Deborah Wince-Smith, President and CEO, Council on Competitiveness
5:15 – 6:30 pm	Reception, demos and poster session	

AGENDA · DAY 2 | Thursday, June 16

Time	Topic	Presenters
7:00 – 7:45 am	Badge pickup and continental breakfast	
7:45 – 8:00 am	Recap: Dr. Walter Jones, Executive Director, ONR	
8:00 – 8:30 am	Adm. Gary Roughead, Chief of Naval Operations	
8:30 – 9:00 am	Dr. Carl Wieman, Associate Director for Science, White House Office of Science and Technology Policy	
9:00 - 9:30 am	Student perspectives – four graduates of naval STEM initiatives	
	<ul style="list-style-type: none"> <li>Grace Magdamo</li> </ul>	<ul style="list-style-type: none"> <li>Nathan Hagan</li> </ul>
	<ul style="list-style-type: none"> <li>William Shepherdson</li> </ul>	<ul style="list-style-type: none"> <li>Genaro Sanchez</li> </ul>
9:30 – 10:00 am	Coffee break and demos in foyer	
10:00 – 11:30 am	Panel 3: STEM Technologies – Real World Examples of Applying New Technologies in the Field (Moderated by Karen Cator, Director Office of Education Technology, Department of Education)	Panelists: - Lucien Vattel, Executive Director, Game Desk - Ntiedo Etuk, Chief Executive Officer, Tabula Digita - Lt. Cmdr. Joseph Cohn, Ph.D., Program Officer, ONR - Mary Skipper, Principal, TechBoston Academy
11:30 – noon	Coffee break and demos in foyer	
12:00 – 1:00 pm	Lunch	
12:30 – 1:00 pm	Dr. Nancy B. Jackson, President, American Chemical Society	
1:05 – 2:05 pm	Breakout Session 2 (facilitated): Confirm solutions and strategies for collaboration in naval STEM	
2:05 – 2:15 pm	Coffee break and demos in foyer	
2:15 – 2:45 pm	Bill Nye “The Science Guy” and Planetary Society Executive Director	
2:45 – 3:45 pm	Breakout Session report-outs with Mr. Sean Stackley, Assistant Secretary of the Navy, Research, Development & Acquisition, Chief of Naval Research, Director of Research, Executive Director	
3:45 pm	Rear Adm. Carr, final remarks	

## GUEST SPEAKERS

### Dr. Charles M. Vest

President of the National Academy of Engineering and President Emeritus of the Massachusetts Institute of Technology



Dr. Charles M. Vest earned a bachelor's degree in mechanical engineering from West Virginia University in 1963 and master's and doctorate degrees in mechanical engineering from the University of Michigan in 1964 and 1967, respectively. He joined the faculty of the University of Michigan as an assistant professor in 1968. He became an associate professor in 1972 and a full professor in 1977.

In 1981, Dr. Vest turned much of his attention to academic administration at the University of Michigan, serving as associate dean of engineering from 1981-86 and dean of engineering from 1986-1989, when he became provost and vice president for academic affairs. In 1990, he became president of the Massachusetts Institute of Technology and served in that position until December 2004. He then became professor and president emeritus.

He was a director of DuPont for 14 years and of IBM for 13 years; was vice chair of the U.S. Council on Competitiveness for eight years; and served on various federal committees and commissions, including the President's Committee of Advisors on Science and Technology during the Clinton and Bush administrations, the Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction, the Secretary of Education's Commission on the Future of Higher Education, the Secretary of State's Advisory Committee on Transformational Diplomacy and the Rice-Chertoff Secure Borders and Open Doors Advisory Committee.

### Dr. Clifford L. Stanley

Under Secretary of Defense for Personnel and Readiness



Dr. Clifford L. Stanley was sworn in as the Under Secretary of Defense for Personnel and Readiness on Feb. 16, 2010. He is the senior policy adviser to the Secretary of Defense on recruitment, career development, pay and benefits for 1.4 million active-duty military personnel, 1.3 million Guard and Reserve personnel, 680,000 DoD civilians, and he is responsible for overseeing the overall state of military readiness.

Before assuming his current position, Dr. Stanley was president of Scholarship America, the nation's largest nonprofit, private-sector scholarship organization. Prior to assuming this position at Scholarship America, he served on the senior leadership team of the University of Pennsylvania as the executive vice president. In that capacity, he was responsible to the president for the non-academic functions of the university, such as business, finance, facilities maintenance and campus security.

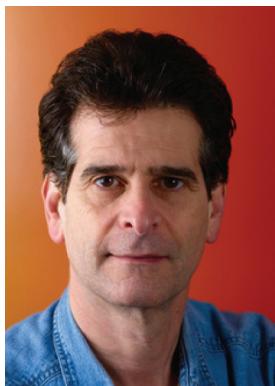
Dr. Stanley, a retired United States Marine Corps infantry officer, served 33 years in uniform, retiring as a major general. His last position was as the deputy commanding general, Marine Corps Combat Development Command, Quantico, Va.

Dr. Stanley is a graduate of South Carolina State University. He received his master's degree from Johns Hopkins University. His formal military education includes Amphibious Warfare School, the Naval War College, Honor Graduate of Marine Corps Command and Staff College, and National War College. Dr. Stanley earned his doctorate degree from the University of Pennsylvania and holds doctor of laws degrees from South Carolina State University and Spalding University.

## GUEST SPEAKERS

### Dean Kamen

Chief Executive Officer, DEKA Research and Development Corporation



Dean Kamen is an inventor, an entrepreneur and a tireless advocate for science and technology. His roles as inventor and advocate are intertwined—his own passion for technology and its practical uses has driven his personal determination to spread the word about technology’s virtues and by so doing to change the culture of the United States.

As an inventor, he holds more than 440 U.S. and foreign patents, many of them for innovative medical devices that have expanded the frontiers of health care worldwide. While still a college undergraduate, he invented the first wearable infusion pump, which rapidly gained acceptance from such diverse medical specialties as chemotherapy, neonatology and endocrinology. In 1976, he founded his first medical device company, AutoSyringe, Inc., to manufacture and market the pumps. At age 30, he sold that company to Baxter Healthcare Corporation. By then, he had added a number of other infusion devices, including the first wearable insulin pump for diabetics.

### Dr. Carl Wieman

Associate Director for Science, White House Office of Science and Technology Policy



Dr. Carl Wieman was confirmed by the United States Senate to serve as the associate director for science at the White House Office of Science and Technology Policy in September 2010. Dr. Wieman previously divided his time between the University of British Columbia and the University of Colorado, where he served as both the director of Collaborative Science Education Initiatives aimed at achieving improvement in undergraduate science education and as a professor of physics. From 1984 through 2006, he was a Distinguished Professor of Physics and Presidential Teaching Scholar at the University of Colorado. In Colorado, he was a Fellow of JILA (a joint federal-university institute for interdisciplinary research in the physical sciences), and he served as the chairman of JILA from 1993-95.

Dr. Wieman has conducted extensive research in atomic and laser physics. His research has been recognized with numerous awards, including sharing the Nobel Prize in Physics in 2001 for the creation of a new form of matter known as “Bose-Einstein condensation.” Dr. Wieman has also worked on research and innovations for improving science education. He was the founding chairman of the National Academy of Sciences Board on Science Education. His awards include the National Science Foundation’s Distinguished Teaching Scholar Award, the Carnegie Foundation’s U.S. University Professor of the Year Award in 2004 and the American Association of Physics Teachers’ Oersted Medal. Dr. Wieman received his bachelor’s degree in physics from the Massachusetts Institute of Technology in 1973 and his doctorate from Stanford University in 1977.

## GUEST SPEAKERS

### Dr. Nancy B. Jackson

President of the American Chemical Society



Dr. Nancy B. Jackson is manager of the International Chemical Threat Reduction Department in the Global Security Center at Sandia National Laboratories, which assists the U.S. Department of State and other federal agencies in solving problems related to international chemical security.

With the U.S. Department of State, Dr. Jackson has developed the Chemical Security Engagement Program, an international effort to raise awareness of chemical safety and security among chemical professionals and to enable the practice of safety and security in the research, teaching and commerce of chemicals.

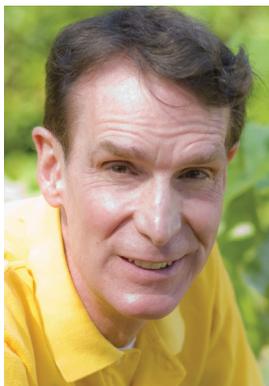
Previously, Dr. Jackson was deputy director of Sandia's International Security Program, where she assisted the director in fulfilling its mission to create technology-based solutions through international cooperation to reduce the threat of weapons of mass destruction proliferation and terrorism. Over the past four years, Dr. Jackson was responsible for leading the Laboratory Directed Research and Development program for Global Security.

Dr. Jackson is a National Affiliate of the National Academies, where she has served on several boards and chaired studies. She is a Fellow of the American Association for the Advancement of Science and the International Union of Pure and Applied Chemistry and was recipient of the 2005 American Indian Science and Engineering Society Professional of the Year Award.

She is a research associate professor at the Chemical and Nuclear Engineering Department of the University of New Mexico. Dr. Jackson has a bachelor's degree in chemistry from George Washington University and a doctorate in chemical engineering from the University of Texas at Austin.

### Bill Nye

Executive Director of the Planetary Society



Bill Nye, scientist, engineer, comedian, author and inventor, is a man with a mission: to help foster a scientifically literate society and to help people understand and appreciate the science that makes our world work.

His fascination with how things work led him to Cornell University, where he earned a degree in mechanical engineering.

After graduation, he headed for Seattle and worked as an engineer at Boeing. In Seattle, he combined his love of science with his flair for comedy when he won a Steve Martin look-alike contest and developed dual careers as an engineer by day and stand-up comic by night. He later transitioned to a night job as a comedy writer and performer on Seattle's comedy show "Almost Live," which gave birth to "Bill Nye the Science Guy."

The show "Bill Nye the Science Guy" he won seven national Emmy Awards for writing, performing and producing. Between shows, he wrote five children's books about science, including his latest, "Bill Nye's Great Big Book of Tiny Germs." He is the host of three television shows: "The 100 Greatest Discoveries"; "The Eyes of Nye"; and his latest project "Stuff Happens."

For the past few years, Mr. Nye has served as vice president of the Planetary Society, the world's largest space-interest group. He is currently the executive director of the Planetary Society. An inventor, Mr. Nye has two patents on educational products—a magnifier made of water and an abacus that does arithmetic similar to a computer.

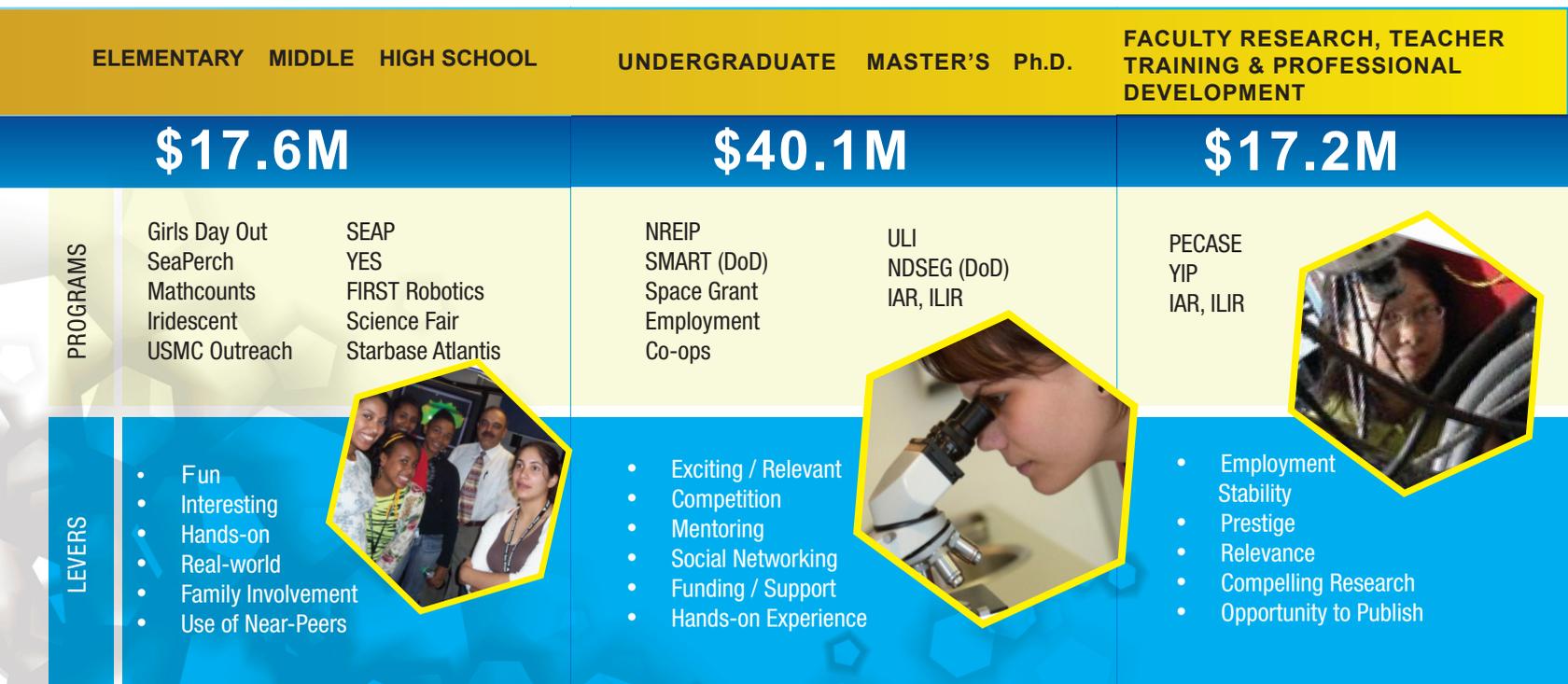
## ABOUT STEM2STERN

The U.S. Naval Service currently enjoys an extraordinary level of technological superiority across the full spectrum of its missions. Maintaining this technological edge requires a dynamic portfolio of scientific research and technology development, a culture of innovation and the capacity to draw upon diverse ideas and approaches. The Navy's science, technology, engineering and mathematics (STEM) workforce is at the heart of this innovation process.

Under the leadership of the chief of naval research, STEM2Stern has worked with the System Commands, Naval Laboratories, Warfare Centers and other research and education institutions to assess the Navy's baseline STEM education portfolio, identify program gaps and future support opportunities, and take initial steps to strengthen the Navy's STEM portfolio.

In fiscal 2010, the Department of the Navy portfolio included 180 STEM programs and initiatives across 31 commands, reaching over 69,000 participants from across the country and leveraging a \$74 million investment. An additional \$108 million is invested annually to support domestic graduate students and research assistants under research grants to academic institutions. As the chart below illustrates, these investments support a wide variety of STEM educational offerings, ranging from activities designed to spark younger students' interest in STEM careers, to more in-depth hands-on learning opportunities for middle and high school students, to internships and research fellowships for older high school and post-secondary students, to professional development opportunities for naval STEM professionals and faculty.

## Naval STEM Landscape



## THE STEM CHALLENGE

### 1. STEM Professionals Are in High Demand

Employment in STEM occupations continues to outpace other occupations, and median salaries for STEM workers are more than double the median earnings for all occupations. [NSF, 2010]

The number of workers in science and engineering occupations grew from about 182,000 in 1950 to 5.5 million in 2007. This represents an average annual growth rate of 6.2 percent, nearly four times the 1.6 percent growth rate for the total workforce older than age 18 during this period.

### 2. DoN Must Rely on U.S. Citizens

There are many potential pathways into STEM, and the key to having a viable STEM workforce for the Department of Defense will be the extent to which U.S. young people can be attracted and retained in the STEM fields. In 1999, there were 4,000,000 9th-graders in U.S. high schools. Eight years later, in 2007, just under a half million U.S. citizens and permanent residents had earned a four-year STEM degree, a yield rate of about one in 16. There were just 66,443 bachelor's degrees in engineering awarded in 2009 to U.S. citizens and permanent residents, which represents just 1.7 percent of the 4,000,000 9th-graders in 1999.

### 3. Aging DoN Science and Engineering Workforce

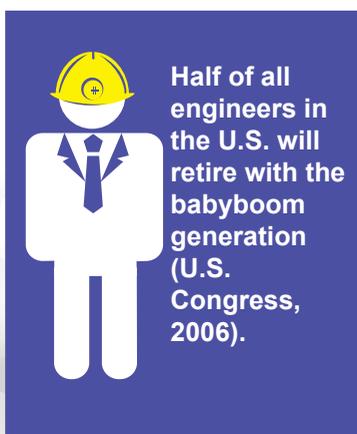
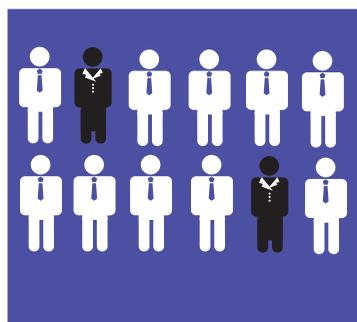
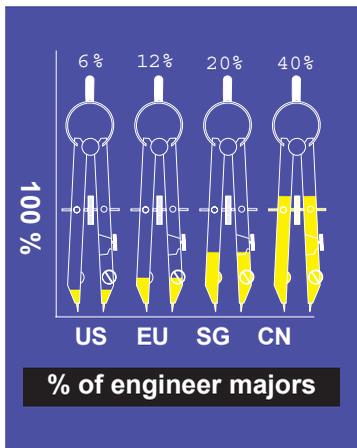
Nearly 65 percent of DoN science and engineering professionals are over age 40, and more than 50 percent will be retirement-eligible by 2020. By 12th-grade, only 16 percent of high school students are both math-proficient and interested in a STEM career.

## INVESTMENT PRIORITIES

To dramatically increase the reach and impact of the Navy's STEM investments, Secretary of the Navy Ray Mabus has committed to doubling the Navy's investment in STEM over five years. Investment priorities include:

- **Hands-on learning programs for middle and high school students, which build their interest and confidence in STEM disciplines**
- **Programs in urban and rural areas**
- **Programs that encourage retention at the freshman/sophomore undergraduate level**
- **Teacher training**
- **Programs that transition the Navy's cutting edge educational technologies into real-world settings for students of all ages**

## WHY NAVAL STEM?

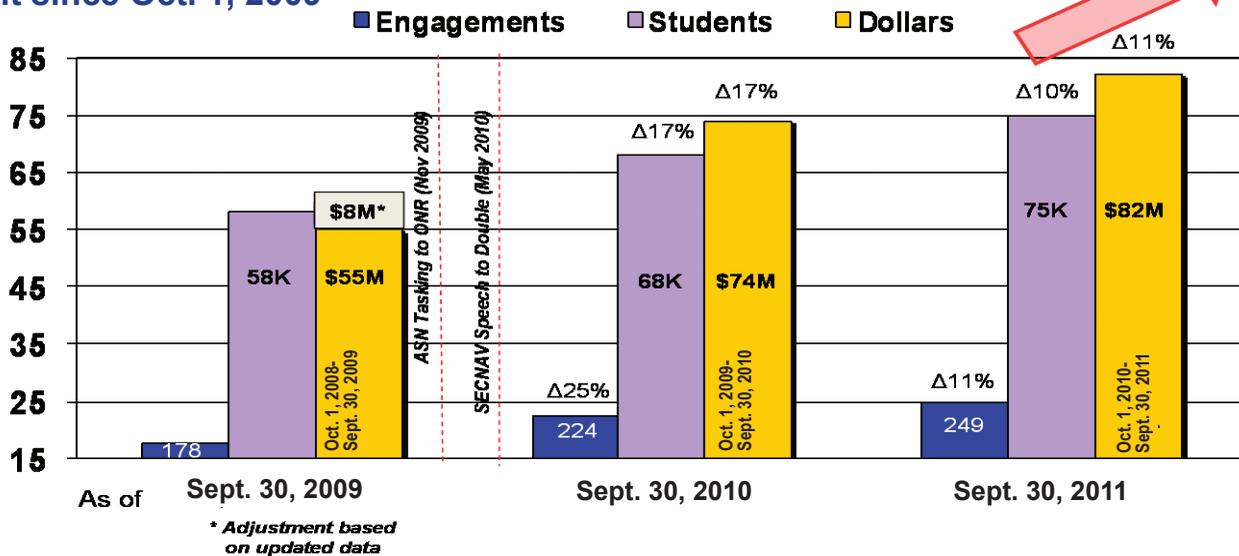


- 1 **Jobs requiring math are increasing** four times faster than overall job growth (Program for International Student Assessment test, 2004).
- 2 Only 33% of eighth graders are interested in STEM majors and careers, and only 6% of high school seniors will earn a bachelor's degree in a STEM field.
- 3 Only 18% of high school seniors are rated as science proficient and 33% as math proficient (Digest of Education Statistics, 2009).
- 4 30% of high school mathematics students and 60% of high school physical sciences students have a teacher who did not major in that subject or is not certified to teach it (National Center for Education Statistics).
- 5 The U.S. is ranked 27th (out of 29) for the rate of STEM bachelor's degrees awarded in developed countries (Organization for Economic Cooperation and Development, 2009)—6% of undergraduates major in engineering in U.S. compared with 12% in Europe, 20% in Singapore and 40% in China ("Rising Above the Gathering Storm").
- 6 In 2007, men earned a majority of bachelor's degrees awarded in engineering, computer sciences and physics (81%, 81% and 79%, respectively) (National Center for Education Statistics).
- 7 Undergraduate programs in science and engineering report the lowest retention rates among all academic disciplines, with fewer than half of undergraduates who entered college intending to major in a STEM field and completing a degree in one of those subjects (National Center for Education Statistics and National Science Board).
- 8 Students with bachelor's degrees in engineering had the highest average starting salary offers compared with students with bachelor's degrees in other subjects (National Association of Colleges and Employers). The median salary of STEM workers is more than double the median salary of the total U.S. Workforce (NSF, 2010).
- 9 89% of middle school students would rather do their chores than their math homework (Raytheon Survey, 2010).
- 10 More than 30% of current DoD science and technology professionals are expected to retire by 2020 (Seng, Institute for Defense Analysis, 2009). For security reasons, DoN must rely on U.S. citizens for classified technology work, which presents a unique challenge.
- 11 More S&P 500 CEOs obtained their undergraduate degrees in engineering than in any other field ("2004 CEO Study: A statistical Snapshot of Leading CEOs," 2005).
- 12 Technological innovation has produced roughly half of all U.S. economic growth over the past 50 years (NSF, 2004).

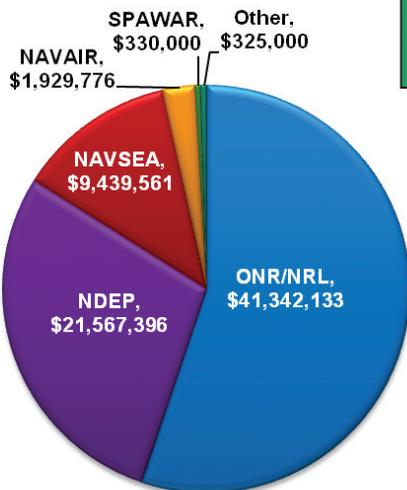
# THE NAVAL STEM INITIATIVE

Overall portfolio has grown more than 30 percent since Oct. 1, 2009

**“Double STEM investments by 2015”**  
—Secretary of the Navy Ray Mabus

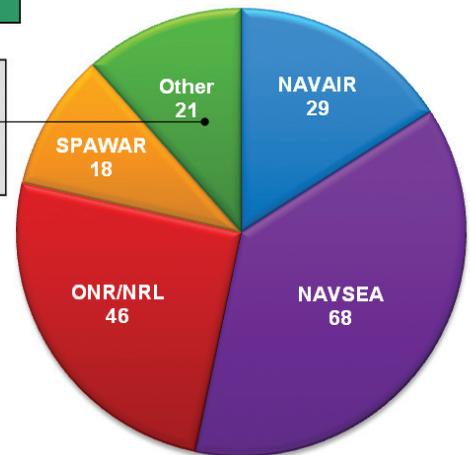


### Investment Summary

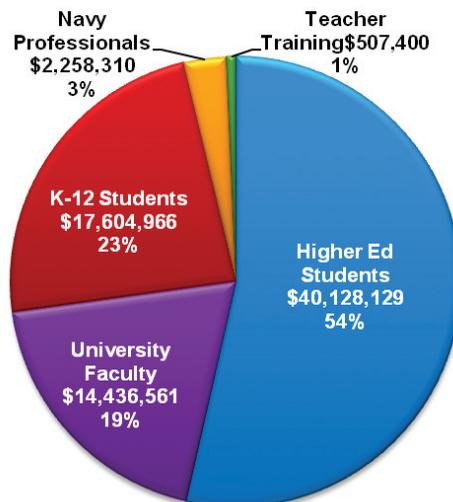


**Total Investment: \$74,935,366**  
**182 Programs**

### Program Summary



### Audience



**Not included:**

200,000 students at science fairs and festivals  
\$108,000,000 for domestic graduate students & research assistants sponsored by ONR

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