RETURN TO DOMINANCE

WHAT WAS ONCE A POWERFUL ADVANTAGE FOR THE U.S. FADED WITH THE END OF THE COLD WAR. BUT DOMINATION IN THE UNDERSEA DOMAIN IS BACK, AND NPS’ 40 YEARS IN USW EDUCATION IS PAYING OFF NOW MORE THAN EVER.

INSIDE:
- Ph.D. Student Researches Privatization of Peacekeeping
- University Advances Materials Research on Campus
- New Educational Programs Focus on Civil Affairs Officers
In short, every certificate and short course … In short, in everything we do. NPS is deeply rooted in advancing the combat effectiveness of the U.S. Armed Forces, and of our closest allies. This sentiment is the anchor of the NPS mission, and it is the single, guiding vision in every curriculum, every research program, every certificate and short course. In short, in everything we do.

Periods of great fiscal challenge, however, lead to advanced scrutiny, and it is a well-deserved examination for any organization placed in the honored position of the public trust. Our institution must be held to the highest of standards, and while the answer to that question may very well be everything we do, it’s the follow-up that is indeed much more potent. Prove it.

Fortunately, proof is something we are not short of when it comes to relevance, and one need to look no further than the pages of this edition of “In Review” for definitive, undeniable evidence that the Naval Postgraduate School is truly providing educational and research programs that no other institution can.

For example, a collaborative effort between key faculty and leadership from the NPS Departments of Mechanical and Aerospace Engineering, and Physics, has led to the rapid deployment of a very sophisticated, robust effort in the critical field of materials sciences. The addition of a core group of top faculty, along with their advanced research and expertise, has provided the university and our students with an immense bounty in this critical field. The subsequent establishment of our Center for Materials Research has completed the effort, providing the facilities and technology needed to truly advance knowledge in this discipline for decades to come.

Another effort in a very unique educational space is paying great dividends to a critical officer community. The Naval Postgraduate School’s Undersea Warfare curriculum has been in operation since the 1970s, and has rapidly advanced the university’s education and research in this field.

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The undersea domain had been forever dominated by the United States, and following the close of the Cold War. But domination in the undersea domain cannot be taken equal anywhere in the world, but dominance in the undersea domain cannot be taken for granted. For America to maintain, and fully realize the vast advantage of strategic dominance in United Nations operations in the undersea domain, our students come from all domains – surface warriors, aviators and the like, because dominance in the undersea domain is a team effort.

The Naval Postgraduate School’s Undersea Warfare curriculum has been in operation since the 1970s, and has been gaining momentum as defense leadership, especially within the Navy, realize that undersea warfare, the Naval Postgraduate School is always ready to demonstrate our worth.

Relevance is a key trait of NPS, and demonstrating this is simply second nature to our institution. Whether it is in the development of critical programs for emergent officer communities, advanced research in critical defense fields, or providing the means to retain American superiority in a domain of warfare, the Naval Postgraduate School is always ready to demonstrate our worth.

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NPS students, faculty and alumni showcase university during fleet week

Navy Lt. Michael McCormick, an NPS mechanical engineering student, meets with students and faculty at the Golden Gate Junior Marines while working at an NPS outreach booth during San Francisco Fleet Week (SFFW) 2012. McCormick, along with students and faculty representing NPS’ Consortium for Robotics and Unmanned Systems Education and Research (CRUSER), operated an NPS outreach booth to showcase ongoing NPS projects to members of the San Francisco community.

This year’s festivities included the third annual Senior Leadership Seminar (SLS), which brought together leaders from the military along with local, regional, state and federal agencies and the private sector to discuss their capabilities to respond to a natural disaster in the Bay Area. As part of the SLS’ Cyber Security discussion panel, Dr. Cynthia Irvine, Chair of NPS’ Cyber Academic Group, took on the role of moderator, leading a group of experts in the field on a discussion focused on the operational relevance of the research conducted at NPS, Hernandez complimented students and faculty alike on their efforts in the cyber domain.

“The research I’ve seen presented here at NPS has been first class,” noted Hernandez. “Most important is the operational relevance of all the subjects I’ve seen. It’s things that military officers have learned over the last 11 years of war that they have been able to bring back to the educational system and examine.”

NPS interns pay it forward to local middle school students

NPS summer interns recently served as mentors for Monterey County youth in a summer camp to help grow interest in science, technology, engineering and mathematics (STEM). The camp, “Cyber Adventurers — The Magic and Beauty of Computer Science,” was a pilot program offered to 20 8th graders from Salinas, California, who facilitated the activities and mentored the younger students, who were part of the Community College of the Monterey Peninsula’s Institute of Ocean Science and Technology, performed robotics for a group of local middle school students.

Lt. Gen. Rhett A. Hernandez, Commanding General of U.S. Army Cyber Command/U.S. 2nd Army, spent two days at NPS for an exploratory visit to the university. Oct. 1-2, the visit provided Hernandez and his staff an opportunity to build partnerships between NPS and NPS. “This visit provided an opportunity for our command to look hard at the educational capability of NPS, to understand how we can leverage the power of what the university is already doing from a cyber perspective,” noted Hernandez. “I was very impressed with the passion and energy from the faculty and students here.”

According to Army Maj. Joshua Bundt, an NPS student who was handpicked to deliver a brief to Hernandez and his staff, the opportunity to provide an overview of his research to a senior military commander was an honor. “I was selected by members of the Cyber Academic Group to deliver my thesis topic, and it was an absolute honor to present my research idea to the commander and future naval applications.”

The model was built in response to a request from U.S. Navy Lt. Cmdr. Ryan Kluesch of the U.S. Marine Corps’ Combat Development Command in Quantico, Va. Kluesch approached NPS’ operations research department looking for a “wargame” to explore Mass Atrocity Prevention and Response Options. NPS students focus on kinetic operations, army vs. army, but the work we are doing with NPS is helping us to plan for mass atrocities,” said Kluesch. “We are trying to teach our planners to successfully conduct conflict resolution efforts only if that gets through education.”

NPS students recently presented their wargaming model at the annual International Association of Peace Training Centers in Helsinki, Finland.

German Army Capt. Danny Heerlein and U.S. Navy Lt. Cmdr. Matt Powers presented the Abrey Peace Gaming Model on behalf of their development team. The model is a tool that developers hope will improve the capabilities of civilians, military and non-profit agencies to respond to mass atrocities.

Sub Group Commander Returns to Alma Mater to Talk Undersea Warfare

Commander, Submarine Group 2 (SUBGRU 2) returned to his alma mater, Aug. 1-3, to deliver keynote talks to Naval Postgraduate School Undersea Warfare students, and to strengthen the bond between the university and the operational submarine community.

Rear Adm. Rick Breckenridge, a 1989 graduate of NPS’ electrical engineering and acoustic engineering programs, returned to NPS to tour research laboratories and faculty, meet with key NPS faculty, and deliver two lectures to undersea warfare students, as part of the university’s Menneken lecture series. “For me, and in the undersea forces, we’re looking at a lot of new capabilities from the undersea domain and NPS is doing a lot of work in those fields,” noted Breckenridge during the visit. “If you’re not improving, you’re falling behind. We’re a Navy that is always looking to constantly improve, and you must be prepared to respond.”

Breckenridge was a fulfilling experience. According to Lt. Scott Millhouse, an NPS student in mechanical engineering who attended undergraduate programs, returned to NPS to deliver remarks and future naval applications. “My thesis involved wave front analysis, I learned my first and second-year courses, I learned my first and second-year courses, and my first-and-second-year courses, I learned my first-and-second-year courses through those programs. I have learned over the last 11 years of war that they have been able to bring back to the educational system and examine.”
Shuttle Endeavour Passes NPS During California Flyover

The Space Shuttle Endeavour, fixed atop a 747 jumbo jet, made its way across the Monterey Peninsula on Friday, Sept. 21, on route to the California Science Center in Los Angeles. There, the retired shuttle will be put on public display as one of five working crafts built for NASA’s 30-year Space Shuttle Program. The shuttle program ended in 2011, but not before Endeavour flew 25 missions and a total of 12,881.15 miles. The shuttle Endeavour flew her final mission, STS-134, in June 2011, commanded by NPS alumnus Mark Kelly. That mission was the second-to-last for the shuttle program, which ended later that year with the success of STS-135 aboard the shuttle Atlantis commanded by NPS alumnus Chris Ferguson. The two commanders were among the 40 NASA astronauts to have attended NPS since 1959.

For more images of the shuttle flyover, check out the official NPS Facebook site at www.facebook.com/NPSMonterey.

Key Player in Maersk Alabama Hostage Rescue Addresses Students During University News

NPS alumnus and former USS Bainbridge (DDG-96) commanding officer, Navy Capt. Frank Castellano, addressed NPS students, faculty and staff during a Secretariat of the Navy Guest Lecture, Oct. 16 in King Auditorium. The Bainbridge caught the public’s attention after it led the dramatic rescue operation that freed Maersk Alabama Capt. Richard Phillips and Somali pirates in 2009.

“This is a ‘sea story’, my sea story,” said Castellano in beginning his recollection of the dramatic even. “My story is about teamwork. ... It’s a human story about ordinary people doing extraordinary things,” Castellano continued.

On April 8, 2009, Castellano was ordered to investigate a distress call from a man identified as Richard Phillips. The call came from the shore. And the Bainbridge was used to conceal a water landing zone for special operations teams who parachuted in to the cover of darkness. Snipers were able to target the pirates from the Bainbridge’s fantail, killing three and ending Phillips’ ordeal.

“The Monterey County Business Council (MCBC) is an alliance of businesses, government, education and community leaders from myriad backgrounds work together on countywide initiatives,” said Dr. Doug Garrison, president of the MCBC. "The MCBC reflects local recognition of the economic impact of higher education through the Monterey Peninsula. "Education is the second largest economic cluster in the Monterey crescent, “ said Garrison.

Congressman Sam Farr, left, and NPS Professor Dan Oliver

“Dan Oliver and I served as co-chairs of the Monterey County Business Council’s Higher Education and Research Cluster, and are bringing together the various educational institutes to identify and collaborate on projects and economic activities,” said Monterey Peninsula College President Dr. Doug Garrison.

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Defense Analysis Professor Selected for Inaugural Cyber Security Hall of Fame Class

NPS Department of Defense Analysis (DA) Distinguished Professor, Dorothy Denning, has been inducted into the National Cyber Security Hall of Fame of America's first class. The group of 11, honored during an official ceremony on Oct. 17, were nominated and selected based on criteria that, among other things, distinguished them as leaders and innovators within the cyber security community.

“Dorothy Denning’s induction is as one of the first members of the National Cyber Security Hall of Fame,” said DA Professor Dr. John Arquilla. “Having her on the faculty is a major addition to the department. In addition to her academic and professional contributions, her work is having a critical impact on students because of her tremendous knowledge and ability to share it with students.”

Denning is known for her work in the field of cyber security, particularly in the areas of defense and national security. Her research has focused on the development of security policies and strategies for military and government agencies. She has also contributed to the field through her teaching and mentorship, inspiring the next generation of cyber security professionals.

Denning’s work has been recognized with numerous awards and honors, including being named a Fellow of the Association for Computing Machinery (ACM) in 2008. She has also been selected as a member of the National Academy of Public Administration and the National Academy of Engineering.

In addition to her academic contributions, Denning has also been involved in government and military service. She has served as a consultant to the Department of Defense and the National Security Agency, and has provided advice to government agencies on cyber security issues.

Denning’s achievements in the field of cyber security have earned her a place in the National Cyber Security Hall of Fame, where she will be honored alongside other leaders and innovators in the field. The induction ceremony took place in Washington, D.C., on October 17, 2012. During the ceremony, Denning was presented with a plaque and a certificate acknowledging her contributions to cyber security.

Denning is currently a professor at the Naval Postgraduate School, where she teaches courses in cyber security and defense analysis. She is also a member of the scientific advisory board for the National Cyber Security Research Institute, a non-profit organization dedicated to advancing research in the field of cyber security.

Denning’s work has had a profound impact on the field of cyber security, and her contributions continue to shape the way we think about and approach this complex and rapidly evolving field.

\[\text{In Review • October 2012}\]
Assistant Professor Dr. Dragoslav Grobvic calibrates advanced research and educational effort in the material sciences field. New talent in the materials research field and partner them with seasoned naval force faculty and administrators to meet the materials challenges of a modern era. They rely upon materials research to survive, to build ships and repair cracks on ship structures and monitor the efficiency of composite patches.

The reason that the CMR has coalesced in the manner that it has, is our desire to bring together top breed researchers from across the academic spectrum to create the CMR. The need for sensors and new materials is very important in the fleet,” said Hae gel. “The Navy’s needs drove our desire to hire new researchers from a variety of disciplines that could work across the varied fields that encompass materials research.”

The emergence of the center has enabled us to work across department boundaries and we have managed to strengthen materials activities here at NPS,” said McNelley. “We no longer work in isolation, we have managed to strengthen materials activities and we are receiving excellent sponsorship as we seek solutions to the Navy’s most pressing material needs,” said McNelley.

NPS Injects New Life Into Advanced Materials Research

By Kenneth A. Stewart

We envisioned a center where we could bring together dynamic, new talent in the materials research field and partner them with seasoned researchers. The creation of this competitive new center demonstrates NPS’ on-going commitment to defense-centered scientific research in a time when demand for innovative Navy materials solutions has never been greater. Distinguished Professor Emeritus Dr. Terry R. McNelley and Distinguished Professor Dr. Nancy Haegel spearheaded an effort to bring together top young scholars from across the academic spectrum to create the CMR.

The need for sensors and new materials is very important to the fleet,” said Hae gel. “The Navy’s needs drove our desire to hire new researchers from a variety of disciplines that could work across the varied fields that encompass materials research.”

“We envisioned a center where we could bring together dynamic, new talent in the materials research field and partner them with seasoned researchers,” said Dr. Leonard A. Ferrari. NPS Executive Vice President and Provost. “The creation of this competitive new center demonstrates NPS’ on-going commitment to defense-centered scientific research in a time when demand for innovative Navy materials solutions has never been greater.”

NPS’ on-going commitment to defense-centered scientific research in a time when demand for innovative Navy materials solutions has never been greater.

In microscopic detail, nanotubes grown in NPS’ Center for Materials Research lab are being used in the study of several diverse projects, from monitoring composite ship patches to the development of miniature satellite propulsion systems. Assistant Professor Dr. Dragoslav Grobvic is engineering micro- electromechanical systems. These micro-sized machines, the width of a human hair, will harvest wasted energy for use in other applications. He is also developing micro-sized sensors and actuators for use in infrared and THz imaging.

Dr. Claudia Luhrs is working to build lightweight metals that could potentially protect U.S. service members in the field from the shock forces generated by explosives and other weapons. She came to NPS after completing work at Intel and Toyota North America and holds five patents for innovative energy storage technologies.

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Operations Adm. Jonathan Greenert, himself a submariner, for evidence of that. “Undersea dominance is critical to the security of the nation. It is a warfare area assigned, uniquely, to ‘Navy alone,’ he noted in a recent communication. “Our advantage in this domain, as a minimum, provides us assured access to deter and defeat, reassure allies and partners, and better understand the environment and our potential adversaries. This is the one domain in which the United States has clear maritime superiority — but this superiority will not go unchallenged.”

Responding to these challenges, like every critical area of national security strategy, requires highly-competent, well-educated leaders. And the Naval Postgraduate School (NPS) has a dedicated educational program in Undersea Warfare (USW) positioned to produce them. The Undersea Warfare Academic Group, or USWAG, was created to develop and guide students through a rigorous curriculum of interdisciplinary coursework and research in the disciplines that impact USW, and they are studies clearly needed in the modern defense landscape.

“We can look around the world and see that our significant threats are going to require anti-submarine warfare, mine warfare, etc. There are nations rapidly developing their submarine fleet, and their mine warfare capabilities, and it’s very clear to Navy leadership that undersea warfare is critical,” said Dr. Clyde Scandrett, Chair of the Undersea Warfare Academic Group. “There are about 400 submarines in the world and it’s growing,” added retired Rear Adm. Jerry Ellis, USW Chair and Director of the USW Research Center at NPS. “A lot of countries have chosen this to be the weapon of choice, because it has a tremendous disproportionate impact. A few hundred million dollar submarine can shoot a torpedo that takes out a multi-billion dollar warship,” he added. Ellis spent 36 years on active duty, with tours on six separate subs including two as commanding officer, and he commanded the U.S. Pacific Fleet Submarine Force in his final sea tour.

One of the initial courses in the USW matrix is retired Rear Adm. Jerry Ellis’ course matrix is Dr. Daphne Kapolka, a retired Navy engineering duty officer who completed her own doctoral studies at NPS in 1997. In her role as the Academic Associate for Undersea Warfare, Kapolka integrates a careful balance of coursework to the USW program. “The knowledge gained here will undoubtedly assist me as a submarine officer in the undersea domain. Obtaining a master’s, with undersea warfare, and specializing in engineering as my curriculum, but after taking a few academic classes, I found engineering acoustics very interesting,” notes Navy Lt. Steve Yang, a September 2012 graduate of the program. “The lessons that are learned here at the Naval Postgraduate School put the officers in great step for the future... it teaches them how to think and how to approach problems and it’s going to provide a phenomenal return on investment for the Navy and for the county both.”

Rear Adm. Barry Bruner
DIRECTOR OF UNDERSEA WARFARE

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One of the key players in designing the course matrix is Dr. Daphne Kapolka, a retired Navy engineering duty officer who completed her own doctoral studies at NPS in 1997. In her role as the Academic Associate for Undersea Warfare, Kapolka integrates a careful balance of coursework to the USW program. “We are taking advantage of the expertise of several departments in a variety of very Navy relevant ways,” said Kapolka. “Our students take courses in mathematics, physical oceanography, and engineering acoustics, physics, electrical engineering, operations research, and mechanical engineering... These core courses ensure that, when they go out the door, they possess a fundamental understanding of the principles of undersea warfare.”

Not only does USW require an interdisciplinary academic approach, it requires an equally diverse group of students. “They earn them in conventional programs like mechanical engineering, operations research, engineering acoustics, physics, electrical engineering, physical oceanography and math. And while that means they have to complete the requirements for that degree — on top of the USW technical curriculum and Joint Professional Military Education — the dividends returned to the students are striking.”

USW is a very unique program because it offers the student the ability to choose his or her field of study... This was advantageous for me because originally I chose electrical engineering as my curriculum, but after taking a few academic classes, I found engineering acoustics very interesting,” notes Navy Lt. Steve Yang, a September 2012 graduate of the program.

What was once a powerful advantage for the United States began to lose prominence with the end of the Cold War. But domination in the underwater domain is back to the forefront, and NPS’ 40 years in USW education is paying off now more than ever.
THE SILENT WARRIOR

The U.S. Navy first developed submarines more than 100 years ago, and today, the service owns and operates the world’s most powerful fleet of nuclear-powered strategic deterrents. With the next generation class of submarines in development and the Ohio-class conversion program underway, the United States is positioned to maintain dominance in the underwater battle space for several decades to come. But that will not be without a need for scientific discovery. At NPS, award-winning student research impacts every inch of the modern Virginia-class boat. A few of them are highlighted here.

In-Situ Study of the Formation of Graphene and Nitrogen-Doped Graphene from Graphite Oxide/Air Plasma Mixture

Thermophotovoltaic Energy Conversion in Submarine Nuclear Power Plants
Lt. John Fendler Electrical Engineering, Sept. 2011 Submarine Force Award for Excellence in Undersea Warfare

Tri-Level Optimization for Anti-Submarine Warfare Mission Planning
Lt. Adam Charles Operations Research, Sept. 2008 CNHO USN Award: CHN Award for Excellence in Operation Research: With Distinction; Outstanding Thesis: Monterey, Calif.; Navy League Award for Highest Academic Achievement

Velocity Estimation Using Forward Looking Sonar
Lt. Michael Delbec Engineering Science (Mechanical Engineering), March 2007 National Academy of Engineering Award for Excellence in Undersea Warfare Technology

Linear and Adaptive Plane Wave Beamforming with Towed Array of Acoustic Vector Sensors
Lt. Eric Banerjee Engineering Acoustics, June 2007 NPS Outstanding Thesis: The Submarine Force Award for Excellence in Undersea Warfare

Localization of Surface or Near-Surface Drifting Mines for Unmanned Systems in the Persian Gulf
Lt. Cmdr. Yong Won You Republic of Singapore Navy Physical Oceanography, June 2012 Outstanding Academic Achievement Award for International Students: With Distinction; NWC Division Navalist Award for Excellence in Undersea Warfare Technology

Expert System for Mine Burial Prediction
Lt. Christopher Beuligenmeier Physical Oceanography, Sept. 2011 Surface Warfare Award: Award for Academic Excellence in Surface Warfare

Effect of Hydro-Reaction during Hypervelocity Impact and Penetration of Reactive Projectiles Against Submerged Targets
Lt. Abraham (Nigel) Waddsworth Applied Physics, June 2010 Submarine Force Award for Excellence in Undersea Warfare

SONAR FOR THE 21ST CENTURY

Virginia-class submarines have vastly improved sonar capabilities and acoustic sensors. Using a combination of over 10 arrays in the bow, along the flanks and towed from behind, the Virginia-class sub will accurately map the ocean floor and minefields in addition to providing quick target location information. The high sonic frequency active sonar mounted on the sail is ideal for undersea ranging and maneuvering; and mine detection, while a medium-sonic frequency active sonar helps target ranging and incoming object sensing.

UNDER THE ICE

As the melting of the Arctic ice sheet opens up new land and sea for shipping lanes and natural resource extraction, countries with claims to the region are stepping up their military presence. Russia is planning to build a string of new naval bases in the Arctic Circle, and Canada is planning a billion-dollar drone buy to protect its Arctic territories. The U.S. is increasing its coast guard and naval exercises and patrols in the Arctic Circle as well. Companies that can cruise below the ice sheets have long been used as petrol and protection of U.S. waters as well as those of our important allies.
to execute. For this reason, officers from a number of communities attend the program.”

Ellis defines four “pillars of undersea warfare”... Submarine warfare, anti-submarine warfare, mine warfare, and sub-sea warfare, a collective for unmanned systems, deep sea infrastructures and certain weapons systems. All of them are required to have a certain level of education, training and will help all submariners, submarine warfare, “Hilger said. “For me, and all submariners, it is very important to understand the expectations set by the National Defense Strategy.”

Hilger said. “For me, and all submariners, it is very important to understand the expectations set by the National Defense Strategy.”

Hilger, however, is capitalizing on the time at the university by completing USWAG’s anti-submarine warfare certificate program and plans on completing a second certificate in national security studies as well.

“I believe, as a submariner, that spending the additional time to learn the theoretical foundations of my systems, procedures, tactics, etc., is crucial for my professional development and will help me better execute my role in the ‘Defense of Undersea Warfare’ and live up to the expectations set in national security as well.”

Michael Mowry, a graduate, Lt. Commander, Submarine Warfare, for example, which requires ships, submariners, air assets — and officers that are educated to lead them.

“Anti-submarine warfare is probably one of the most important subjects we teach, and it truly is a joint effort. The days when we could use a single surface ship, or a single submarine or aircraft to locate and track a submarine are long gone. We have to work together as a team, and when we do, it’s pretty powerful,” Ellis noted.

Lt. Ryan Hilger is a submariner in his first year of studies in the mechanical engineering curriculum. Hilger, however, is capitalizing on his time at the university by completing the USWAG’s anti-submarine warfare certificate program, and plans on completing a second certificate in national security studies as well.

“It’s going to require thinking by the military, and collaborative part... for his current position in 2009 is to ensure resilience, meaning that even in the event of a natural or manmade catastrophe that disables critical infrastructure, the missions of the department can be still executed. ‘At the end of the day, that’s my focus. It’s part of my responsibility for homeland defense to ensure that no matter what, the Department of Defense can execute the missions that the president assigns to it, even if, for example, the electric grid goes down.’

Amid campus meetings and department briefings, Stockton was particularly pleased with the work being done in the university’s defense analysis and homeland security programs.

“The Naval Postgraduate School has a national treasure, here in the defense analysis curriculum, that supports the special operations and low intensity conflict community,” Stockton said. “It’s absolutely first rate what is being done here, both in research and education.

‘Also, especially important to me, is the homeland security curriculum here, sponsored by FEMA and the Department of Homeland Security,’ he added. ‘It has students from across the nation as well as many state and local students from fire, police and other professions that are going to be on the cutting edge of saving lives. That program is thriving. It’s an example of how the faculty here make it possible to meet emerging security challenges. That’s what makes NPS a national treasure.’

SIGS, CHDS Founder Paul Stockton Returns to NPS for Briefings, SGL

By Amanda D. Stein

A FAMILIAR FACE: returned to campus, Sept. 25, as NPS welcomed Assistant Secretary of Defense for Homeland Defense and Americas’ Security Affairs Dr. Paul Stockton for a campus visit, meetings with faculty and students, and a special Secretary of the Navy Guest Lecture (SGL). Stockton is familiar with NPS, joining the institution’s faculty in 1988 in the national security affairs department. Stockton would later serve as founder and acting dean of the School of International Graduate Studies (SIGS), and established the Center for Homeland Defense and Security (CHDS) in 2002.

‘I’ve had a chance to talk with many students and faculty over the last couple of days,’ Stockton said. ‘It’s so impressive how NPS is staying at the cutting edge of emerging security challenges for the United States, both in terms of having the curricula that the nation needs for its future leaders and the kind of research that you actually have to conduct in order to know what to teach these students.’

‘The thing that impresses me most after having been away for many years is not the NPS that used to exist, but the NPS that exists today,’ he added. ‘Being on the leading edge of emerging security challenges where the nation most needs us.’

Dr. Paul N. Stockton addresses NPS students, faculty and staff during a Secretary of the Navy Guest Lecture, Sept. 25. Stockton left a significant mark on the community during his five plus years on campus, founding both the School of International Graduate Studies, and the Center for Homeland Defense and Security.

sigs.chds.fpl.nasa.gov
NPS Evolves Security, Stability and Development Studies for the Civil Affairs Community

By Kenneth A. Stewart

THE NAVAL POSTGRADUATE SCHOOL has embarked upon an ambitious program designed to educate members of the military’s civil affairs community.

The Stability, Security and Development in Complex Operations (SSDCO) is a graduate certificate program born from the realization that civil affairs studies are central to the prevention of conflicts.

“We are starting to understand that the civil affairs community is central to our strategies abroad,” said program founder, Assistant Professor Dr. Karen Guttieri. “It is important to think beyond war … After the experience in Afghanistan and Iraq, and the Balkans before that, we’ve learned the hard way how to manage civil military operations. We need to capture the lessons of that experience and build institutional knowledge for the future.”

The security and development program is designed to expose civil affairs, psychological operations and legal specialists to advanced legal, socio-political and behavioral concepts.

“Our military professionals work in complex environments with diverse civilian actors, including governmental and non-governmental agencies. Soldiers must understand the dynamics of the human domain, what measures are effective to prevent conflict and to respond when disaster strikes,” said Guttieri.

The SSDCO program prepares its students for these complex environments by combining “boots-on-the-ground” experience with advanced graduate studies — which the group hopes will eventually lead to a modular master’s in public policy with a focus on civil affairs and psychological operations.

“When the students graduate, they will be able to speak the language of other military professionals and understand the ways in which we can be helpful,” said Guttieri. “They’ll be able to speak the language of a policy maker, an attorney, a human behavior specialist.”

The SSDCO program has been designed to meet the needs of both active-duty and reserve officers. The program is a “bridge course” that combines both in-house and off-site instruction. Classes are delivered in both traditional and non-traditional formats including distance learning, teleconferencing and hybrid courses that combine both in-house and off-site instruction.

“My colleagues and I believe that advanced studies in governance, rule of law and stability operations are the keys to success in areas like Iraq and Afghanistan. We are passionate about the education they are receiving and the challenges they face.”

“Reservists were at a disadvantage due to their needs to juggle civilian careers and military education. The modular nature of Guttieri’s program seeks to overcome this disadvantage while offering world-class graduate instruction. Classes are delivered in both traditional and non-traditional formats including distance learning, teleconferencing and hybrid courses that combine both in-house and off-site instruction,” said U.S. Army Reserves Lt. Col. Michelle Haberlach.

“Traditional training programs are designed to develop problem-solving skills within existing fixed and defined systems of knowledge,” said Guttieri. “This type of training is useful, but researchers must move beyond traditional training paradigms if they are to have a significant impact in troubled regions.”

“U.S. Army Reserve Lt. Col. Michelle Haberlach believes that advanced civil-operations-focused education will benefit commands working in complex environments, particularly those environments where the actions of a few bad actors have had strategic-level consequences.”

“If we as leaders are not educated, how can we show our commanders how the actions of their service members can have strategic-level impact on the ground?” said Haberlach. “This kind of education can have a lasting impact on our ability to actually conduct stability operations more effectively and efficiently.”

U.S. Army Reserve Maj. Staus Scantlin shares Haberlach’s assessment and calls upon historical evidence to support the need for advanced civil affairs education.

“We got through WWII in Europe in good shape, because the Germans treated us like we treated them in WWII,” said Scantlin. “I believe in the military as a profession of arms, we are professionals … We have to understand that war is a reality and that we are going to mitigate the effects of war through our conduct.”

“Lt. Col. Bill Kelly

Civil Affairs, U.S. Army Reserves

Few Lessons from Arab Spring

We talk of the Arab Spring all year long, but Haberlach and Scantlin believe that advanced studies in governance, rule of law and stability operations are the keys to success in areas like Iraq and Afghanistan. They are passionate about the education they are receiving and the troubled regions they assist.

“There are places in the world that do not share the liberties and comforts that we have here,” said Haberlach. “We are able to go to those places and help them to enjoy the liberties that we share.”
New NPS Professor Applies Philosophy, Ethics to the Complexities of War

By Amanda D. Devin

THE NAVAL POSTGRADUATE SCHOOL Department of Defense Analysis (DA) welcomed a new face to the department — an ethicist and philosopher whose fresh perspective has students talking about the ethical implications of warfare.

Assistant Professor Dr. Bradley Strawser helps students think critically about the important ethical questions surrounding war. Strawser, a former member of the Air Force, served as a professor at the Air Force Academy and the University of Connecticut before finding his way to the Naval Academy’s Stockdale Center as a postdoctoral research fellow.

And now since joining NPS, Strawser has begun teaching classes in critical thinking and ethical decision making, where students explore ethical challenges in an applied way, drawing from case studies and real-world examples to get to the bottom of tough questions.

“I view my job as to push them, challenge them, and get them to wrestle over these deep questions. I hate war — war is a horrible thing. But I do think in some contexts war can be morally justified,” Strawser explained. “And wrestling through that is a complicated, difficult task. I think my main role is trying to push the students to engage in that process of taking the moral questions of what they do for a living seriously.”

Strawser’s classes seek to empower students in their ethical decision making by giving them the tools and resources to explore a number of scenarios — such as the use of unmanned systems to deploy lethal force, or the facets of irregular warfare.

“We are very pleased that Bradley Strawser chose to join NPS,” said DA Chairman and Professor, Dr. John Arquilla. “As a philosopher, he adds to the diversity of the DA department faculty. As someone interested in the ethics of going to war, justly, and waging war in a moral manner, his expertise is much needed.

“It’s crucial for our students to have an opportunity to explore the ethical implications of their decisions, especially as they practice their profession in an era of protracted warfare against shadowy opponents. Professor Strawser will challenge our students — Americans and internationals — to look at a range of issues objectively and carefully from an ethical perspective.”

Dr. John Arquilla
Professor and Chair, Defense Analysis

EACH YEAR, SELECT students from the Naval Postgraduate School travel to the U.S. Naval War College in Newport, R.I., to become Chief of Naval Operations Strategic Studies Group (CNO SSG) Director Fellows.

Established in 1981, the CNO SSG is a concept generation team, tasked by and accountable to the Chief of Naval Operations, to explore and innovate revolutionary naval warfighting concepts at the operational level of war. Each year, the CNO gives the SSG a new research theme and tasks them to prepare one final report that summarizes the year’s findings and recommendations. Past SSG work includes conceptualizing ForceNet, developing synthetic fuels, and integrating the rail gun into naval tactics. NPS students have been involved in the effort since 1995 with SSG XXV.

The CNO SSG is comprised of diverse groups of fellows that represent technologists, operators and analysts. The six Technology Fellows are mostly non-military researchers with experience in applied science and engineering. The 10 CNO Fellows are senior officers with about 20 years of service. And finally, the 14 Director Fellows are mid-grade officers with about 10 years of service. Director Fellows matriculate with roughly equal numbers from the Naval War College and NPS, with selection overseen by CNO SSG Director retired Adm. James Hogg.

“Adm. Hogg believes some of the most innovative ideas come from mid-grade officers because they have recent operational experiences and have benefitted from the exceptional educational opportunities at NPS and NWC,” said Marine Corps Maj. David Coté, who recently completed participation with the SSG XXXII Director Fellows.

“As a newly-designated member of the SSG, I will be working with my colleagues, experienced and distinguished senior officers, and hand-picked scientific experts in order to develop revolutionary new concepts to shape future naval strategy. That is not just a byline, it is our mission and that excites me because it will have a measurable impact on how we light in the future,” said Navy Lt. Edward Tremblay, a space systems engineering student in NPS’ Graduate School of Engineering and Applied Sciences who is participating with the current SSG XXXII.

Coté says his experiences and studies as a student at NPS were immediately applicable to participation in SSG XXXI. He noted, “As an NPS operations research student, I am surrounded by critical thinkers from every service and warfare designation. When I joined the SSG, I felt equipped with a unique skillset to help our team think critically about how to integrate a systematic approach to generate, ideate and assess warfighting concepts that focused on some of our most intractable and revolutionary warfighting problems.”

All of the branches of service and warfare communities have been represented in the SSG, supporting the idea that a diverse team benefits the process of innovation.

“This past year, our SSG team focused on protecting the electromagnetic environment as a primary warfighting arena, and reducing the U.S. Navy’s reliance on the electromagnetic spectrum,” Coté said. “Too often, our security failures have been the result of a lack of imagination — about the enemy, our friends, and our own military.”

As a part of the governance and policy concept team, Coté’s SSG research led him to visit Harvard Law School, Massachusetts Institute of Technology, Microsoft and Qualcomm to name a few.

“As an SSG Fellow, I was able to apply my expertise in applied mathematics to my desire to redefine the way the Navy fights... The CNO SSG was a tremendous experience. I think my refined ability to prioritize, analyze and optimize will most certainly benefit my remaining work at NPS, but I am also confident that it will help me with future decision-making challenges as an officer, analyst and leader, especially in a resource-constrained environment.”

NPS Students Impact Future Navy Through Strategic Studies Group

By Rachel Davian

Chief of Naval Operations Strategic Studies Group (CNO SSG) Director retired Adm. James Hogg, center, addresses the NPS contingent of Director Fellows for CNO SSG XXXI on the day of their final selection for the fellowship.
Researchers Apply the Latest Battery Chemistries to Power the Fleet

By Kenneth A. Stewart

Students and faculty at the Naval Postgraduate School are planning to design and build a battery using technologies that have already been called a potential game-changer.

Doctoral student U.S. Army Capt. Andrew “Drew” Johannes, along with thesis advisors Assistant Professor Sebastian Osswald of the NPS mechanical and aerospace engineering, and physics departments, and Visiting Professor Joseph Farmer of Lawrence Livermore National Laboratory, have begun working on a Semi-Solid Flow Cell (SSFC) battery, which they believe has the potential to radically change the way the military powers everything from forward operating bases in Afghanistan to warships at sea.

“I am an Army combat engineer by trade. I was building FOBs [Forward Operating Bases] in Afghanistan in 2004 and 2005,” said Johannes. “The Army runs on generators, they are loud and they often run all night. What if you could have an energy storage mechanism where you could run generators during the day, but turn them off at night and still have power?”

The SSFC battery system in development could make this clear advantage for FOBS a reality, allowing the bases to maintain a more tactical posture at night. Its implications to Navy ships are just as advantageous, allowing for efficient energy storage that can be used when needed to power critical ship systems.

What makes SSFC batteries work is a substance cleverly dubbed, “Cambridge Crude,” because of its development by researchers at the Massachusetts Institute of Technology (MIT). Initially created utilizing lithium-based chemistry, the NPS team sought to utilize a similar concept, but based it on traditional, low cost battery chemistries found in the majority of batteries used today.

“We are using a different chemistry than the Cambridge guys, which requires different hardware and a modified design. They were really shooting for the moon, we are essentially dumbing things down to create a simpler application,” said Johannes.

Whether based on lithium, lead or nickel, the crude is an electro-active material, part liquid and part solid, consisting of small pieces of battery anodes and cathodes suspended in an electrolyte solution. When this slurry of positive and negatively charged materials flows over an electrode, electricity can be stored or created.

And beyond a new method of energy storage, SSFC technologies are also much more efficient as well, especially when the batteries are not in use. While efficient energy on the battlefield is one of OOD’s most pressing issues, the implications of this research go far beyond traditional military operations to power storage grids, and much more.

NPS Researchers Evaluate Biofuels for Powering the Fleet

By Amanda D. Stein

AS THE LARGEST consumer of fuel in the United States, the Department of Defense has recognized the need to reduce its own dependence on foreign oil, and explore cheaper, safer alternatives. In support of those efforts, Secretary of the Navy Ray Mabus announced in 2009 a number of energy initiatives for the Navy, culminating in, among other things, a 50 percent reduction in petroleum-based fuel consumption in the fleet by 2020.

A team of researchers at the Naval Postgraduate School, in collaboration with various other research institutions — including the Office of Naval Research, the U.S. Naval Academy and the University of Wisconsin — are applying their experience in combustion to help the Navy meet Mabus’ goals.

NPS Department of Mechanical and Aerospace Engineering (MAE) Associate Professor Dr. Christopher Brophy, and MAE Professor and Chairman Dr. Knot Millsaps, are working to help the Navy understand how alternative fuels will perform in existing gas turbine and diesel engines. The goal is to seamlessly transition to the biofuel blends without having to change any of the engines’ components.

“The Naval Postgraduate School’s part in this is really helping with certification, to give the Navy confidence through fundamental measurements that the fuels look, smell and taste the same, so to speak,” Millsaps explained. “These fuels should have the form, fit and function to serve as direct drop-in replacements. They don’t want to modify any of the systems to accommodate these fuels.

“Our research focuses on the fundamental combustion and engine-use part of the fuels, and not the production of them. Once it’s in an engine, does it physically spray the same as a regular fuel? Does it burn the same? Does it have the same emissions characteristics? We have seen that biofuels actually tend to burn cleaner,” he added.

The NPS team is testing the combustion of the alternatives to the Navy’s current JP-5 and F-76 fuels — algae-based, hydro-reformed diesel (HRD), and camelina-based, hydro-reformed jet (HRJ) fuel blends. The 50/50 blends would incorporate half of the petroleum-based fuels currently being used, and half of either the algae or camelina fuels. The blending of the fuels will make the transition easier on the engines, and help the Navy reduce the amount of petroleum-based fuels needed to run the fleet.

“We know you can’t go 100 percent biofuel because, in aviation or ground-based systems, existing seals rely on particular ingredients found in conventional petroleum fuels which causes them to swell and provide proper sealing,” explained Brophy. “If you put them in biofuel, they tend to swell only a fraction of what is expected.”

“The question was how much biofuel can the engines handle,” he explained. “We don’t really know the demarcation line between what fraction of biofuel you can run, but 50/50 is what the Navy has selected to date because we know it works.”

One of the challenges with biofuels is that the scarcity of the product makes it more expensive than the fuels the Navy currently uses. To harden algae and camelina, a member of the mustard family, in quantities large enough to fuel the fleet is a challenge, and one that has driven up the cost of production for the biofuels. For the three-day Great Green Fleet exercise that took place during the 23rd Rim of the Pacific Exercise in July, the Navy purchased 450,000 gallons of biofuel to run the blend in two destroyers and several dozen planes for two to three days.

The cost per barrel of the biofuels led to questions on the Great Fleet exercise at a time when the defense department’s expenses are being scrutinized. Mabus addressed them in the Navy’s “Currents” magazine, explaining the importance of finding alternatives to fossil fuels.

“Throughout the Navy’s history, we have pioneered the way we fueled the fleet. In the 1850s, we moved from sail to coal. In the early 20th Century, we left coal to transition to oil and we led the way to nuclear power in the 1950s,” Mabus wrote. “At the time of each energy transformation, there were doubters and naysayers who said trading a known source of energy for an unknown one was too risky and too costly. But the Navy pursued innovation because it improved the capability of the fleet and made us better warfighters.”

Mabus visited the Naval Postgraduate School in 2011 to tour the biofuels lab, and learned about the university’s new energy degree program and ways that students are helping address the energy challenges facing the Navy.

Since NPS has become involved in biofuels research, the team has had three recent mechanical engineering graduates explore the topic in their theses research, and three more are currently involved — Navy Ens. Warren Fischer, Coast Guard Lt. j.g. Adam Paz, and National Oceanic and Atmospheric Administration (NOAA) Corps Lt. j.g. John Petersen.

“This research will not only greatly benefit the Navy but our entire nation,” Petersen explained. “Supplementing our use of conventional fossil fuels with renewable fuels will significantly increase our energy independence and energy security. In addition to the tactical benefits, there are many environmental benefits that renewable fuels have over the use of fossil fuels. As an NOAA Corps officer, I am proud to be working on a project that will have a positive impact, not only on the Navy, but on our nation and the global environment overall.”

NPS Postgraduate School students Coast Guard Lt. j.g. Adam Paz and National Oceanic and Atmospheric Administration Lt. j.g. John Petersen hold beakers of blended fuels that will be tested in various engines. The two students are collecting fuel efficiency data to determine the best blend for various biofuels that can run in conventional and modified diesel and jet engines.
Student Dissertation Explores Privatization of Global Security

By Amanda D. Stein

IT MAY NOT be immediately obvious how a focus in environmental resource policy could lead one to ask the tough questions about the privatization of global security, but for Naval Postgraduate School national security affairs (NSA) doctoral student Cmdr. Dan Straub, the privatization of any number of things—from water to security—brings with it potentially critical implications.

“The privatization issue is really important to me,” said Straub. “I started out looking at water scarcity. And what I saw was that real conflicts were occurring throughout the privatization of scarce resources.”

After consulting with professors in the NSA department, Straub began to see a bigger picture of privatization issues emerging. In his dissertation, he explores the idea of using private global security companies in peacekeeping efforts, and what kinds of complications arise when doing so.

“This dissertation deals with an extremely important topic…As Cmdr. Straub demonstrates, private security contractors, or PSCs, have been used for all imaginable security roles and missions but for one—peacekeeping under United Nations auspices,” explained Distinquished Professor Thomas Bruneau, Straub’s thesis advisor. “He analyzes one—peacekeeping under United Nations auspices, ‘He analyzes the positive and negative dimensions of these possible outsourcing, and provides a tremendous amount of new data. The dissertation is based on both a thorough analysis of all available documents as well as extensive interviews with informed experts and practitioners.”

One key issue, Straub says, is the possibility of criminal activity or misuse of power by privatized security companies while overseas, noting that security contractors are not held as strictly accountable for their actions as military personnel are. He also points to a sense of distrust that may arise between local populations and privatized security if the individuals are not military representatives of the global community.

“Companies like Blackwater have created major problems, not only for the company itself, but for the United States, the hiring state,” Straub noted. “That’s not to say that peacekeepers themselves, UN peacekeepers, don’t commit crimes and human rights abuses either. The difference is that UN peacekeepers are accountable to a specific nation, not a company: When a peacekeeper gets sent back to his or her nation, that person is divided by [his or her] own country. And there is legitimacy to that process.”

What Straub concludes is that the proper mechanisms are not yet in place for private security companies to be routinely used in peacekeeping operations.

“What I concluded, based on the pros and cons, is that until a unitary policy with regard to the use of private security companies and peacekeeping is developed—and vetted through all of the member states of the United Nations, and approved—private security companies should not be used for peacekeeping.”

He stressed that both sides are still trying to figure out the extent to which privatization can be successful, but that it’s not something that will simply go away. “The policies need to be explored and established if contractors and armed forces are to safely and effectively execute peacekeeping operations.

“Where does the service member’s job end, and where does the contractor’s job begin,” Straub asked. “Is it a continuum, and finding a place on that continuum is right now a moving target.”

Mathematics Faculty, Researchers Develop Candidate Model for Multi-Agency Weather Prediction

By Amanda D. Stein

WITH A FLEET constantly on the move, and a commitment to securing the world’s waterways, it’s no wonder the U.S. Navy relies on highly accurate weather prediction models to operate safely and efficiently. For that, the Office of Naval Research has turned to Naval Postgraduate School Applied Mathematics Professor Frank Giraldo and his team of researchers, students and interns who have worked tirelessly for the last three years to provide what could be the best possible model for weather prediction yet.

Giraldo’s hard work has paid off, as the Navy has now adopted the Nonhydrostatic Unified Model of the Atmosphere (NUMA) as a candidate for use as the multi-agency global model. If selected, the model would then be used by, among others, the U.S. Air Force, Department of Energy, and the National Oceanic and Atmospheric Administration. The agencies clearly have stringent requirements for what the adopted model must be able to do, and the decision will likely not be made until around the time the project is slated for completion in 2020.

“I think the idea is that every agency wants to have a hand in the decision, so they all put forth a model that they think has the best chance of being adopted,” said Giraldo. “Having our model chosen as the U.S. agency model, I think it would just be too much to ask for. I’m just happy that the Navy wants to use the model for their operations. And that’s my number one concern, to be sure that I deliver on the job that I was asked to do.”

Giraldo’s model draws on existing mathematical Galerkin methods, but uses them in an innovative way, ultimately developing a model that runs longer than current ones available. As Giraldo explained, the model will aim to run “from 30 seconds to 30 days.” Traditional large-scale weather models run up to seven days on average.

To put the model to the test, NPS has partnered with the nearby Naval Research Laboratory (NRL), where expert researchers familiar with the desired meteorological outputs examine the model in extraordinary detail.

“We have partnered with the NRL because they are meteorologists and atmospheric scientists,” Giraldo continued. “They know what the output should be.”

Saia Gaberelek, a Meteorologist for the NRL Marine Meteorology Division, is one of the researchers ensuring Giraldo’s methods yield the desired results. He is developing test scenarios to run through the NUMA model.

“The tests are designed to highlight weather-related phenomena in nature which should be accurately depicted by NUMA,” Gaberelek explained. “I am also expanding current capabilities of NUMA by incorporating additional descriptions of physical processes that occur in nature into the model.”

Along the way in the three-year development process thus far, there have been a number of students and NRC postdoctoral fellows involved in the research. U.S. Army Lt. Col. Joseph Lindquist, a 2010 Ph.D. graduate, now serves as the Senior Operations Research Analyst at the Center for Army Analysis. As part of his dissertation, Lindquist was involved in theoretical research for NUMA.

“My work demonstrated how to apply a special class of boundary conditions to efficiently solve some of the equations that Frank and the team used in the project,” said Lindquist. “The boundary conditions that we developed and applied had never been solved using element-based Galerkin methods—a highly accurate and efficient way to solve a set of equations that cannot be solved analytically.”

Giraldo has been incredibly pleased with student participation and input, and the progress they have made, but quickly adds that the effort is far from over. The team will be diligently working on the research for the next several years, hoping that the program will be exactly what the Navy is looking for.

“I am proud of this model because it is something I have been working on for a long time,” Giraldo said. “And when I say working on it, I mean from the ground up.”
University’s Summer Graduation Class One of the Largest

By MC1 Rob Rubio

WHEN NAVAL POSTGRADUATE SCHOOL President Dan Oliver welcomed the summer graduation class to commencement ceremonies, Sept. 21, he was greeting one of the largest classes in recent history. More than 400 students earned their advanced degrees this past quarter, including nine doctoral graduates.

The ceremony’s keynote speaker offered another unique aspect to the class … Vice Adm. Mark I. Fox, Deputy Chief of Naval Operations for Operations, Plans and Strategy (N3/N5), was not only the ceremony’s premier speaker, he was also a proud parent with his own son, Lt. Collin R. Fox, a member of this quarter’s graduating class completing a master’s degree in systems analysis.

"I'm delighted to speak at the Naval Postgraduate School graduation ceremony … I had originally planned to attend the event only as a proud dad, but the opportunity to address the graduates — including one of my sons — of such a prestigious academic institution is a real honor. I completed the Aviation Safety Officer’s course at NPS in 1986, and appreciate the enduring partnership between the Navy and the local community. It's always a treat to spend time on the Central California coast."

Fox began his formal remarks noting that commencement marked the culmination of one phase of many lives, and the “beginning of a new and exciting phase filled with hope and anticipation” for the future alumni.

"First and foremost, congratulations to the graduates," he said. "It is appropriate that we pause to recognize your excellence, your discipline and your accomplishment."

He continued, citing his own entry of the graduating class and his desire to attend the institution he has so much respect for when he was a junior officer.

"Of course, all of this would be impossible without the Naval Postgraduate School, an institution which is internationally renowned for academic excellence … a world-class faculty and staff, a world-class institution and a world-class location," he noted.

He recounted the remarkable levels of change that society has seen over the past several decades, but emphasized that advanced education provides the intellectual fuel for that evolution.

"We have seen the greatest increase in prosperity in human history in our lives, how has this happened?" he posed. "Good work in hard science and engineering … tremendous growth in the analog to digital age, and information technologies have come along. But the real driver, I would submit, has been the movement of goods and services around the globe," he commented.

He focused on the global commons, and the important roles of collaboration in protecting this critical driver of human prosperity.

"There are people who wish us ill. There are terrorists, pirates, state actors who would choose to disrupt us," he noted. "Over 30 nations have come together as we speak, in the largest international mine countermeasures exercise which is going on in the 5th Fleet and NAVCENT area of responsibility, to demonstrate the ability to do strictly defensive operations, to demonstrate that we can clear mines and work together and offer a deterrent to aggressive behavior.

Fox continued by connecting these current challenges of the global commons of the sea to the commons of today, and tomorrow. Outer space, cyberspace … while there are no owners of these ‘commons,’ they are absolutely critical to society’s continued advancements, he said, and collaboration will continue to be a key in resolving the complex issues of these domains.

"We will not do things by ourselves in the future. We will work with partners, people who share our values, and work together to accomplish great things," he said.

"It would not surprise me to learn that there are future leaders here today that will take their positions around the world, and work this incredibly complicated and challenging world that we live in founded on a relationship that began in Monterey," he continued.

"Character and integrity are gardens in our lives that must be tended to every day. We are ultimately defined by our courage, character, and integrity," he concluded.

A total of 410 students graduated earning 419 degrees this past quarter, including nine Ph.D.s, one mechanical engineer and 47 international students.
Inspired Leadership

During a ceremony in the Pentagon in November, Naval Postgraduate School alumnus Cmdr. Chase D. Patrick will be officially recognized as the Pacific Fleet recipient of the Vice Admiral James Bond Stockdale Award for Inspirational Leadership.

One of the Navy's premier honors, the Stockdale Award is given annually to two naval officers below the rank of captain — one from the Pacific and the other from the Atlantic Fleet — who demonstrate exceptional leadership through recommendations by their peers.

Patrick, a 2001 operations analysis graduate, was recommended for the award following his command of the USS Chafee — an Arleigh Burke-class guided missile destroyer stationed at Pearl Harbor, Hawaii. The ship's current commanding officer, Cmdr. Justin Kubu, was responsible for his nomination.

“I felt compelled to recommend Cmdr. Patrick for the award for the record of achievement and culture of excellence on the Chafee during his tenure as commanding officer … Much of the success I have enjoyed in command is directly attributable to his lasting leadership,” said Kubu.

Patrick’s command of his ship and the crew that served on her is a concise example of leadership that serves to inspire others. He focused on individuals, ensuring his crewmembers saw themselves as professionals and were treated accordingly.

“I was committed to a work environment where everyone was treated with dignity and respect … my expectation was that our work environment would radiate professionalism,” he said. “To maximize the success of the people assigned to me, I have to make them the very best professionals that I can. If you do that, it has to make you better as an organization.”

The USS Chafee is home to approximately 350 personnel and is named for Senator John Lester Hubbard Chafee, a Marine veteran of Guadalcanal who also served as the Secretary of the Navy.