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# Naval Postgraduate School Annual Report 2012

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NAVAL POSTGRADUATE SCHOOL  
2012 ANNUAL REPORT



THE MISSION OF THE NAVAL POSTGRADUATE SCHOOL IS TO PROVIDE  
RELEVANT AND UNIQUE ADVANCED EDUCATION AND RESEARCH PROGRAMS TO INCREASE  
THE COMBAT EFFECTIVENESS OF COMMISSIONED OFFICERS OF THE NAVAL SERVICE  
TO ENHANCE THE SECURITY OF THE UNITED STATES.

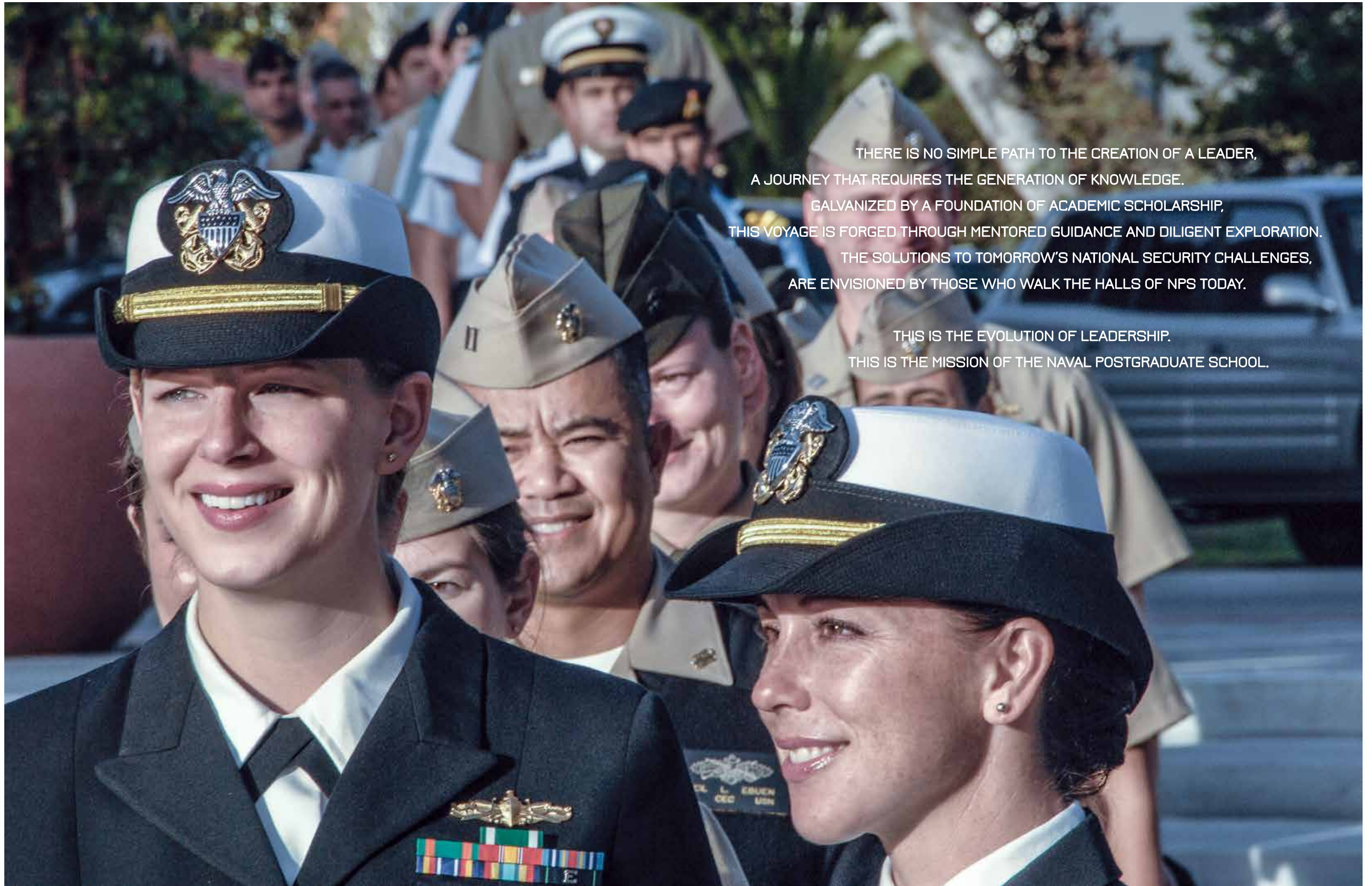
IN SUPPORT OF THE FOREGOING, AND TO SUSTAIN ACADEMIC EXCELLENCE,  
FOSTER AND ENCOURAGE A PROGRAM OF RELEVANT AND MERITORIOUS RESEARCH  
WHICH BOTH SUPPORTS THE NEEDS OF NAVY AND DEPARTMENT OF DEFENSE  
WHILE BUILDING THE INTELLECTUAL CAPITAL OF NAVAL POSTGRADUATE SCHOOL FACULTY.



NAVAL POSTGRADUATE SCHOOL  
**2012 ANNUAL REPORT**



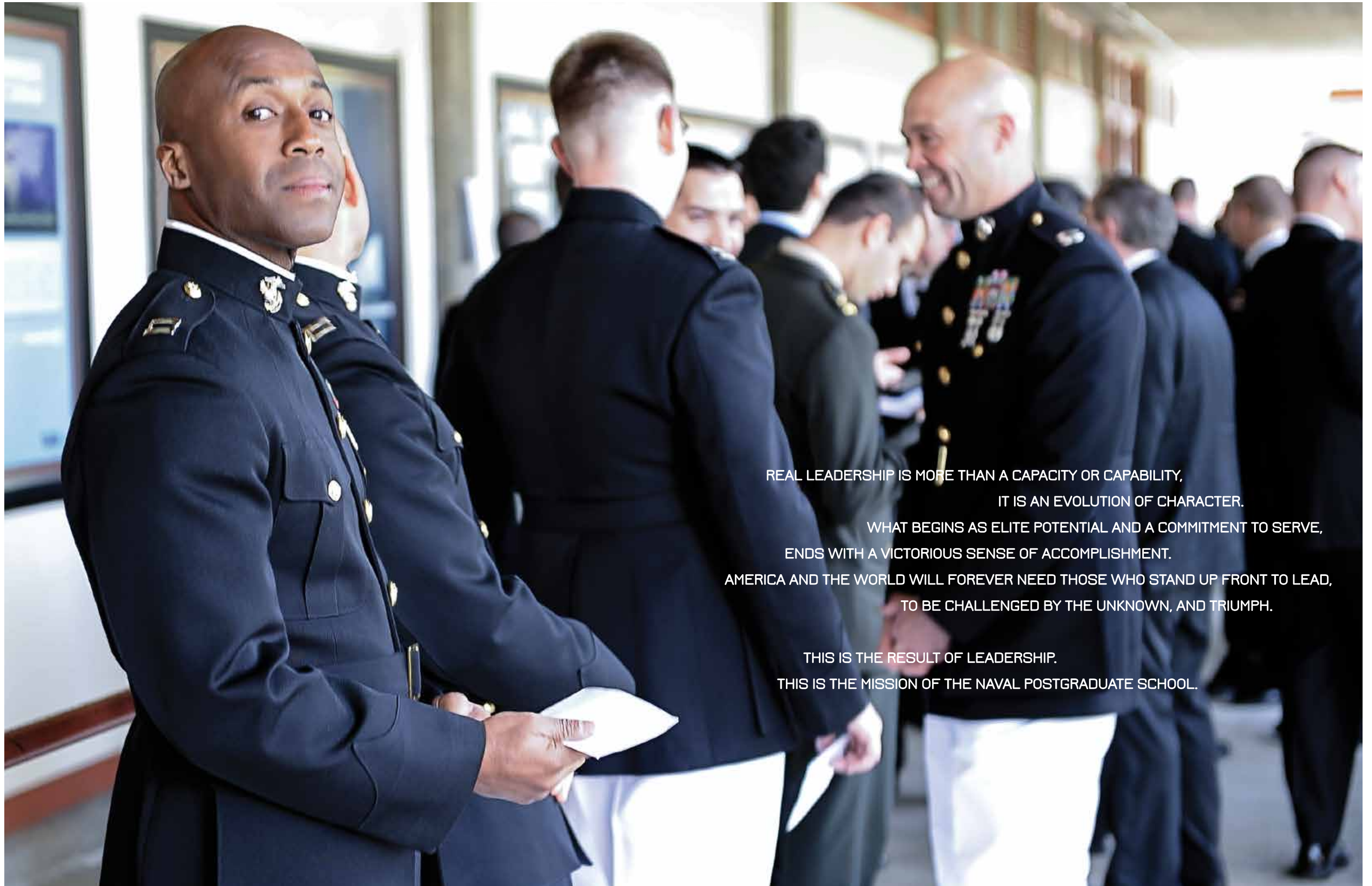
From left to right, Chilean Navy Lt. Carlos Zuniga, U.S. Army Capt. Fadji Kumapley, U.S. Navy Lt. Cmdr. Jay Furman Jr., U.S. Marine Corps Capt. Jennifer Giles, U.S. Air Force Capt. Keith Philaphandeth



THERE IS NO SIMPLE PATH TO THE CREATION OF A LEADER,  
A JOURNEY THAT REQUIRES THE GENERATION OF KNOWLEDGE.

GALVANIZED BY A FOUNDATION OF ACADEMIC SCHOLARSHIP,  
THIS VOYAGE IS FORGED THROUGH MENTORED GUIDANCE AND DILIGENT EXPLORATION.  
THE SOLUTIONS TO TOMORROW'S NATIONAL SECURITY CHALLENGES,  
ARE ENVISIONED BY THOSE WHO WALK THE HALLS OF NPS TODAY.

THIS IS THE EVOLUTION OF LEADERSHIP.  
THIS IS THE MISSION OF THE NAVAL POSTGRADUATE SCHOOL.



REAL LEADERSHIP IS MORE THAN A CAPACITY OR CAPABILITY,  
IT IS AN EVOLUTION OF CHARACTER.  
WHAT BEGINS AS ELITE POTENTIAL AND A COMMITMENT TO SERVE,  
ENDS WITH A VICTORIOUS SENSE OF ACCOMPLISHMENT.  
AMERICA AND THE WORLD WILL FOREVER NEED THOSE WHO STAND UP FRONT TO LEAD,  
TO BE CHALLENGED BY THE UNKNOWN, AND TRIUMPH.

THIS IS THE RESULT OF LEADERSHIP.  
THIS IS THE MISSION OF THE NAVAL POSTGRADUATE SCHOOL.



“STUDIES AT NPS ALLOWED ME TO APPLY CRITICAL THINKING AND MENTAL DISCIPLINE, THE ABILITY TO APPROACH PROBLEMS IN A METHODOICAL MANNER... IT WAS VERY CONGRUENT WITH WHAT WE REQUIRE OF OUR CONTROL GRADE OFFICERS, I THINK THAT NPS’ ROLE IN THAT WAS VERY IMPORTANT.”

**CMDR. CHASE D. PATRICK**  
OPERATIONS RESEARCH, 1998

# LEADERSHIP... TODAY AND TOMORROW

**E**ffective organizations are built upon a single foundation... leadership. Government, military, industry, business — regardless of size or mission, they are fundamentally defined in success by the leaders that guide them. And it is not only the leader at the top, it is also the men and women who make day-to-day decisions, and execute strategies at every level, that are absolutely critical players in organizational success.

At the Naval Postgraduate School, leaders are not short in supply, for every student who walks these halls and fills these classrooms has already been designated to lead. Our impact, however, is in ensuring they are superiorly prepared to do so.

NPS students become more effective leaders because they are challenged by leaders in every capacity. Regardless of curriculum or program, some of the finest minds in critical fields are the very same individuals who dictate the challenge.

Examples of excellence abound, for this past year marked impressive achievements by some of the university’s senior faculty. Distinguished Professor Dr. Dorothy Denning was a member of the inaugural class of 11 inductees into the Cyber Security Hall of Fame, a testament of her iconic status in the cyber domain. And Distinguished Professor Emeritus Donald Gaver was also honored for a lifetime of achievement, earning the Military Applications Society of the Institute for Operations

Research and the Management Sciences J. Steinhardt Prize. The prestigious honor is given for a lifetime of contributions to the operations research field, and remarkably, represents the third time in a row, and fourth time overall, that it has been awarded to a member of the NPS faculty.

Faculty are not the only recipients of these remarkable honors, for it is NPS students themselves that are applauded, past and present, for their leadership and contributions to defense, security and ul-

timately mankind. Perhaps this is no more evident than in the Navy’s selection of Cmdr. Chase D. Patrick for the prestigious Vice Adm. James Bond Stockdale Award for Inspirational Leadership, awarded in November 2012. The award is given to just two officers, Navy-wide, O-5 and below, who exemplify the qualities of exceptional leadership as outlined by their peers. Patrick was honored for his tour as Commanding Officer of the *USS Chafee* (DDG-90).



# THE EVOLUTION OF SPECIAL OPERATIONS

The year 2012 marked the 50th anniversary of the commissioning of the U.S. Navy SEALs. And now Special Operations forces are playing vital roles in the successful execution of Department of Defense priorities and strategies across the world. Members of the United States Special Operations Command, of all services, operate in more than 70 countries across the globe.

Adm. William H. McRaven, a strong

supporter and graduate of the Naval Postgraduate School, would be quick to point out that his vision for the future of Special Operations is not about headlines and Hollywood movies, it's about peace-keeping, conflict resolution, and capacity building. These are the missions that a majority of his forces are executing on nearly every continent on Earth.

McRaven emphasizes the core objectives of developing his future force, with concepts like extending the global Special



Operations network by engaging with international peers, sharing lessons learned and enhancing domestic security capabilities and postures.

He emphasizes the role of advanced critical thinking skills, noting that his forces must be effective problem solvers, capable of making the right decisions at the right time. He encourages innovation, educating his forces through the empowerment of thought and ideas to create a culture of innovation.



There is a purposeful similarity between educational programs of the Naval Postgraduate School, and the strategic goals a visionary leader like Bill McRaven defines for his organization. Since 1993, when he became the first graduate of the Special Operations/Low Intensity Conflict curriculum that he himself helped to create, nearly 900 graduates have come through this program, now known as Defense Analysis.

At every leadership level of his orga-

nization, from team and platoon leaders to himself and even his predecessor at USSOCOM, exist graduates of the Naval Postgraduate School. And those leaders are largely all products of an evolved educational program that he helped define in an eerie foreshadowing of what his forces would need to be successful.



“I THINK MY TIME AT THE POSTGRADUATE SCHOOL WAS INVALUABLE, BECAUSE IT GAVE ME AN OPPORTUNITY TO THINK. THE MILITARY TRAINS YOU WELL, BUT RARELY DO YOU HAVE THE TIME AS AN OFFICER TO DO THAT CRITICAL THINKING ... FROM THE TIME I LEFT THE SCHOOL, IT DIDN'T TAKE ME LONG TO REALIZE THAT WHAT I HAD BEEN TAUGHT — THE CONCEPTS, THE WAYS OF EXAMINING PROBLEMS — HAS BEEN EXCEEDINGLY VALUABLE TO ME.”

**ADM. WILLIAM H. MCRAVEN**  
 COMMANDER, U.S. SPECIAL OPERATIONS COMMAND  
 NATIONAL SECURITY AFFAIRS,  
 SPECIAL OPERATIONS/LOW INTENSITY CONFLICT, 1993



# THE RETURN OF UNDERSEA DOMINANCE

**N**early 40 years ago, a group of faculty and administration at the Naval Postgraduate School had the foresight to create a curriculum in undersea warfare. At the time, it was called Operational Systems Technology (Anti-Submarine Warfare), but the 1974 university catalog in which it first appears states the “objective of this unique interdisciplinary curriculum is to enhance operational and command competence, afloat and ashore” in the “subcate-

gory of Anti-Submarine Warfare.” Remarkably, it is quite similar to the approach in use by the university’s current Undersea Warfare (USW) Academic Group in guiding a select group of students through a “rigorous, interdisciplinary, and technical graduate program with a focus on Navy USW priorities,” as stated in the group’s current mission.

Undersea warfare is a Navy game, and students in the USW curriculum represent a spectrum of relevant Navy offi-

cers ... Surface warriors, aviators and naval flight officers, in addition to submariners, make up each cohort of students. And even international navies have recognized the value of the program, sending their officers to Monterey for advanced degrees.

The USW program is rigorous indeed. Students enrolled in the curriculum do not earn degrees in undersea warfare, rather in conventional programs like physics, math, electrical engineering and others. But that also means students have



completed all of the requirements for that degree, in addition to a diverse portfolio of USW-specific courses and Joint Professional Military Education. While challenging, the program has also become widely applauded from USW leadership, from the Pentagon to operational commanders.

Rear Adm. Rick Breckenridge, SUBGROUP 2 Commander and a 1989 NPS graduate, applauded the campus’ education and research efforts in the USW domain during a visit in August. Vice Adm.

John Richardson, Commander, Submarine Forces, as well as Commander, Submarine Forces Atlantic and Commander, Allied Submarine Command, offered similar praise for NPS’ strategic value.

But it is the Director of Undersea Warfare in the Pentagon, OPNAV N97, currently held by Rear Adm. Barry Bruner, who keeps the closest watch on the USW program, and has himself marveled at the impact of the program. Of course, Bruner would know, for he is also an NPS alumnus.



“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 ACOUSTICS, WILL OPEN UP DOORS FOR ME IN THE FUTURE THAT WOULD BE OTHERWISE CLOSED AS I ADVANCE IN MY NAVAL CAREER.”

**LT. STEVE YANG**  
ENGINEERING ACOUSTICS, 2012  
USW GRADUATE





“THROUGH THE MASTER’S PROGRAM AND THE EXECUTIVE ENERGY SERIES, NPS WILL ENSURE THAT ENERGY IS A FULLY-INTEGRATED AWARENESS INTO STRATEGY, TACTICS AND OPERATIONS. AS A RESULT, NPS STUDENTS WILL GUIDE THE NAVY AND THE NATION TOWARD A BETTER, MORE SECURE ENERGY FUTURE.”

**THE HONORABLE RAY MABUS**  
SECRETARY OF THE NAVY

## DEFINING A NEW NAVY CULTURE

**I**t began with a request. In 2011, during a campus visit following the announcement of Department of the Navy Energy Security efforts and efficiency goals, Secretary of the Navy Ray Mabus made a request of his service’s graduate school. Mabus knew the kinds of objectives he set would require a cultural swing in the Navy and Marine Corps, and in how the services as a whole view energy in every capacity.

The Naval Postgraduate School’s

charge was to assist with that change by educating select officers on all facets of energy and its impact on the service. Through this past calendar year, the university would respond to that call through the tireless efforts of faculty, senior staff and officials in the nation’s capitol. Knowing this cultural change would require an approach beyond a single curricula, program or field of expertise, these visionaries looked across the entire campus and beyond to achieve their goals.

In the end, the result was a broad portfolio of educational deliverables, along with the research facilities and faculty expertise to back them up. Four individual and diverse curricula were infused with coursework to build specialized energy tracks—from technical programs like mechanical and electronic systems engineering to the analytical prowess of operations analysis and financial management. Multiple cohorts of students are making their way through the programs,

and the first are set to graduate in 2013.

A robust guest lecture series developed throughout the past year continues to build momentum, and the creation of multiple graduate-level certificate programs round out an effort that broadens the Defense Energy program to reach students across the entire campus. The continued development of new courses, as well as executive education opportunities, through the coming year will add both depth and customization to an already

impactful program.

Transitions in culture take time, but through the advanced education and a spectra of existing, relevant research efforts, NPS was able to swiftly respond to the Secretary’s call. As the Navy and Marine Corps culture continues its evolutionary process, the university will be standing by, ready to answer the next challenge.



# BUILDING THE CYBER WARRIOR

The Fifth Domain... coined to imply the strategic placement of the era of cyber warfare. A domain of warfare is not created on a whim, and it is challenging to conceptualize an equal to the domains of space, air, surface and undersea — they are physical environments that extend throughout our world. But strategists have indeed placed that level of significance on cyberspace, recognizing that everyone — from well-financed

operators of prominent states to shadowy figures in otherwise inconsequential places — can wreak havoc on the U.S. in this era of cyberwar. Like the first-rate Soldiers, Sailors, Airmen and Marines that execute the missions of commanders across all other domains, so too are operators within the cyber domain. They are digital troops with the power to protect the nation and exert will should they be called upon to do so. And these well-trained troops need

well-educated leaders to guide them, to strategize and make decisions in the heat of battle. This is the domain of the Naval Postgraduate School. For many years, NPS has produced a great many of these well-educated leaders through technically deep courses of study in electrical and computer engineering, computer science, and information warfare degree programs. One of our newest additions to the range of cyber education offered at NPS is the cyber systems and

operations degree, in which a cadre of officers is being educated in the requisite disciplines of offensive and defensive cyber mission planning, information assurance, and cyber policy, among many others. In addition, a master's degree program in applied cyber operations has been developed to provide another layer of leadership to the operating community within the Fifth Domain. Capitalizing on available capacity, the curriculum allows senior enlisted personnel to gain an advanced,

graduate level education in this critical area, as they are also critical leaders in the operating workforce of cyber warriors. As the calendar turns to 2013, the continued expansion of the university's cyber battle lab will usher in a new era in applied research, that will perfectly complement what has already been a robust cyber research enterprise, and a rapidly deployed effort in advanced education.



“THE CYBER SYSTEMS AND OPERATIONS DEGREE IS AN EXCELLENT PROGRAM TO PREPARE STUDENTS FOR FUTURE LEADERSHIP POSITIONS THAT SUPPORT CYBERSPACE OPERATIONS ... THE RISE IN RELIANCE ON CYBERSPACE BY PRIVATE CITIZENS, COMMERCE AND GOVERNMENT REQUIRES A LARGER WORKFORCE CAPABLE OF SECURING, DEFENDING, AND SUSTAINING THE INFORMATION SYSTEMS THAT EXIST IN CYBERSPACE. THE NPS CSO CURRICULUM IS A STRONG RESPONSE TO THIS REQUIREMENT.”

LT. CMDR. AARON LITTLEJOHN  
CYBER SYSTEMS AND OPERATIONS, 2013



# DATA TELL THE STORY

Across the spectrum of business, industry, education and defense, an invaluable lesson has been learned. Organizations have become vastly more competent at capturing data about the people and processes that are important to them. The challenge was, however, what to do with it. Over the past handful of years, the focus of advanced research and development across these spectra has intended

to resolve that challenge. And when resolved, it turns out data have extraordinary stories to tell. Nowhere is this more apparent than in a few rooms on the first floor of Root Hall on campus, where students, faculty, researchers and staff in the Common Operational Research Environment Lab, or CORE Lab, are gleaning significant insights based on careful analyses of data sets, creating a new paradigm to traditional intelligence analysis.

One of the most well known efforts is titled IEDNA, or Improvised Explosive Device Network Analysis. Navy Lts. Deak Childress and John Taylor knew all too well what was happening with the vast amounts of information collected in Iraq and Afghanistan from detonated IEDs... And it wasn't enough. Upon arriving at NPS, they learned about a tool called Lighthouse developed by two former students that employed the use of smart phones to collect socio-cultural



data. But Lighthouse doesn't just collect data, it unifies it, making it easy to analyze in a variety of capacities, right away. Turns out, IEDs can tell quite a story about the networks behind them when their intricate components and characteristics are analyzed in detail. The lab's innovative analysis techniques have been applied across a broad spectrum of impactful uses. Techniques developed in the CORE Lab have been used to study social networking data during the

Arab Spring through a program titled Dynamic Twitter Network Analysis. A Colombian studying at NPS utilized CORE Lab techniques to locate Revolutionary Armed Forces of Colombia, or FARC, camps along the border between his nation and Venezuela. And Massachusetts State Troopers used CORE Lab analysis techniques and products to map gang activity in a high-crime suburb.



"THE VALUE FOR ME WAS IN TYING THE POTENTIAL OPERATIONAL IMPACT OF OUR PROJECT TOGETHER WITH [USSOCOM] ADM. MCRAVEN'S COMMENTS... THE ADMIRAL STATED THAT THE REAL VALUE OF CORE LAB EFFORTS WAS IN DOING RESEARCH AND DEVELOPMENT THAT WOULD IMPACT OPERATIONS, NOT JUST 'SCIENCE PROJECTS THAT BRIEF WELL.' BASED ON HIS FEEDBACK FROM OUR BRIEFING, WE ARE CONFIDENT THAT HE SAW THE VALUE IN WHAT WE ARE DOING."

**LT. DEAK CHILDRESS**  
DEFENSE ANALYSIS, 2012



“THE NEED FOR SENSORS AND NEW MATERIALS IS VERY IMPORTANT TO THE FLEET, AND 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... MATERIALS, PHYSICS AND ENGINEERING ARE NOW INTERCONNECTED, ESPECIALLY NOW THAT WE ARE WORKING WITH MATERIALS AT THE NANOLEVEL.”

**DISTINGUISHED PROFESSOR NANCY HAEGEL**  
DEPARTMENT OF PHYSICS

## ADVANCED SCIENCE, RAPID DEPLOYMENT

**M**aterials science is critical to the Navy and Department of Defense. On every inch of every Navy vessel lies a component of materials sciences. From what the ship is made of, to how it withstands the ravages of war and sea, materials research and maritime operations are intrinsically linked forever.

But materials sciences are not limited to structural components... Advance-

ments in nanomaterials are bringing an entirely new world of possibilities, from sci-fi inspired propulsion to ultra-efficient energy storage and much more. Recognizing these advancements, and capitalizing on how they can be applied to Navy and DOD operations, meant new life needed to be infused into materials research on campus.

A core group of senior faculty saw this need quite clearly. Physicists and mechanical engineers by title, advanced

materials researchers in practice, these prominent mentors set forth on an effort to rapidly advance materials research at the institution. The result is a compelling example of how multiple departments on campus, partnering with the NPS Research Office, can collaborate and rapidly deploy an advanced capability in a relevant field.

Five aggressive, young, award-winning faculty were brought on campus, each with an impressive portfolio of research and dynamic capabilities in the classroom.



The congruent establishment of the NPS Center for Materials Research and the facilities to support it completed the trifecta. The university now has several students working through advanced thesis research thanks to the enabling power of this effort.

A few examples... Distinguished Professor Young Kwon and a small cadre of students and faculty are examining advanced composite materials along with nanostructures to repair cracks in Navy vessels, and monitor them. Similar work also examines

the use of lighter, stronger composites for structural purposes. Associate Professor Sebastian Osswald is also researching the use of composite materials for advanced armor structures. And in an effort straight out of science fiction, student-driven research is examining the potential of ion charged nanotubes to serve as thrusters for small spacecraft and autonomous vehicles.

# 50 YEARS OF BUSINESS EDUCATION

**W**hile process efficiencies and fiscal accountability have been overarching themes of modern government, the education of management has been a focal point of the Naval Postgraduate School for some time. In fact, the university's Graduate School of Business and Public Policy (GSBPP) began celebrating its 50th year of business education at NPS in 2012. Although the initial award of M.S. in

Management degrees began in the early 1960s, advanced education at the most prominent business school in the DOD has evolved greatly. The university now boasts degree programs in acquisition management, contract management, financial management and manpower systems analysis, just a few among a dozen curricula all accredited by dual agencies... one of few universities anywhere to boast this distinction. GSBPP has driven their educational enterprise further, however, turning ad-



vanced studies and research into practice. For example, GSBPP faculty helped develop the official "Contingency Contracting Handbook" — a product that has been distributed DOD wide to all contingency contracting personnel to unify the efficient and ethical processes that allow operators to acquire and succeed in the operational field, and in emergencies. And once again, GSBPP's Acquisition Management Program continues to set the standard in defining the body of knowledge



of DOD acquisition. The prestigious symposium, which now enters its 10th year, has become the de facto exchange of policy and knowledge across the entire DOD. In its second 50 years, GSBPP now begins to evolve the second area of its distinctive mission — public policy. With the addition of the Global Public Policy Academic Group, GSBPP will now partner its advanced education and research in business with an imminently advanced expertise in policy.

One of the immediate successes of this confluence is a developing effort in educational deliverables to the Civil Affairs officer community. Two robust graduate certificate programs are educating these critical leaders as they are placed into the asymmetric world of modern warfare and post-conflict stability and development. The programs have been very well received with students and senior leaders alike across the Civil Affairs community, and are poised for further growth over the coming years.



"GSBPP OFFERS AN EXTRAORDINARY CONFLUENCE OF STUDENTS WITH OPERATIONAL MILITARY EXPERTISE, A WORLD-CLASS FACULTY INVOLVED IN DEFENSE-RELEVANT MANAGEMENT RESEARCH, AND FLAG-LEVEL SPONSORS THAT OVERSEE OUR CURRICULUM AND RESEARCH, AND EMPLOY OUR GRADUATES AND RESEARCH RESULTS. THIS DISTINCTIVE CONGRUENCE OF INTEREST BETWEEN STUDENTS, FACULTY AND SPONSORS UNIQUELY POSITIONS GSBPP TO IMPROVE DEFENSE SECTOR MANAGEMENT BY CAPITALIZING ON THE BEST PUBLIC AND PRIVATE SECTOR MANAGEMENT PRACTICES."

**DR. WILLIAM R. GATES**  
DEAN, GRADUATE SCHOOL OF BUSINESS AND PUBLIC POLICY



## PROVIDING THE EXAMPLE

**A** tried and true method in developing skills is to simply mirror those who excel in the desired capabilities one wishes to emulate. At the Naval Postgraduate School, in addition to an advanced graduate education in diverse fields of study, there are equally critical capabilities that all students must advance during their studies here... leadership, critical thinking and rapid decision-making in the heat of conflict.

Through the long-standing Secretary of

the Navy Guest Lecture program, managed through the institution's Office of the Dean of Students, a steady stream of some of our nation's most prominent history makers and leaders are invited to campus to share their own experiences in leadership, making decisions under duress, and thought innovation.

A hallmark of the SGL program is the quality of presenters who address our students in the intimate setting of King Auditorium. Senior leaders across the spectrum of defense participated this past year — such as

Commander of the U.S. Southern Command Air Force Gen. Douglas Fraser, Commander of the U.S. Special Operations Command Adm. William McRaven, and Vice Chief of Naval Operations Adm. Mark Ferguson — the latter two of those are also NPS graduates.

The SGL program, however, reaches beyond the active duty services to bring advanced thought leaders onto campus. Individuals such as Assistant Secretary of Defense for Homeland Defense and Americas' Security Affairs Dr. Paul Stockton,



and Under Secretary of the Navy Robert Work have also presented — coincidentally, Stockton spent 15 years on campus as a member of the NPS faculty, and Work is himself an NPS alumnus.

But one of the most compelling factors of the SGL program is that it places prominent figures from some of the most well-known events in modern American history in front of our students. This past year, former Commanding Officer of the *USS Cole*, retired Cmdr. Kirk Lippold, recount-

ed the tragic events of the ship's terrorist attack in the Gulf of Aden. And Capt. Frank Castellano, former Commanding Officer of the *USS Bainbridge*, offered his own heroic sea story when his vessel played a key role in rescuing *Maersk Alabama* Capt. Richard Phillips from Somali pirates in 2009.

There are countless ways the educational experience creates characteristics in its students, one of the most effective happens every few weeks on a Tuesday afternoon in King Auditorium.



"I KNOW THAT SOME MAY NOT HAVE AGREED WITH THE POINT OF VIEW ... BUT I HOPE IT WILL INSPIRE SOME MORE THOUGHT INTO THE ISSUES THAT ARE PLAGUING OUR COUNTRY. AS THE FUTURE LEADERS OF THE NAVY, IT IS IMPORTANT TO HAVE KNOWLEDGE OF THE MANY METHODS TO FIND SOLUTIONS. DIFFERENT POINTS OF VIEW HELP TO FIND THESE SOLUTIONS."

**LT. JESSIE HALLAN**  
SPACE SYSTEMS ENGINEERING, 2013



“THE EDUCATIONAL AND RESEARCH PROGRAMS WITHIN THE SCHOOL OF INTERNATIONAL GRADUATE STUDIES PREPARE OUR STUDENTS TO BE ACTIVE PLAYERS IN THE GLOBAL STRATEGIES OF NAVY AND DEFENSE LEADERSHIP. BY DEVELOPING AN INTIMATE KNOWLEDGE OF THE REGIONS IN WHICH OUR SERVICES OPERATE, THEY ARE COMPETENT, ASTUTE DECISION-MAKERS IN LEADING OUR NATIONAL SECURITY EFFORTS AROUND THE WORLD.”

**DR. JAMES WIRTZ**  
DEAN, SCHOOL OF INTERNATIONAL GRADUATE STUDIES

# WARRIOR DIPLOMACY

The complexities of modern day U.S. national security challenges require solutions that extend far beyond the borders of the nation. While this is certainly no recent trend, the rapid globalization of today’s society has only expanded the need for a global approach to the intricate security challenges of the day.

This requirement means that officers must be astute leaders not only within the confines of their direct commands,

but savvy diplomats as well. Across the services, certainly in the Foreign Area Officer and Civil Affairs communities, but throughout ship and squadron leadership as well, officers are placed into positions where their skills in respectful diplomacy are equally critical to their knowledge of their ship’s weaponry. Once reserved for the FAO community, in the modern Armed Forces, warrior diplomacy is required at many levels.

Students in the Naval Postgraduate

School’s various national security studies programs are well-prepared to answer this call. Each program focuses on a specific region on the global stage, or in specific capacity-building areas, but each program is also grounded in a common thread... warrior diplomacy. Students understand the cultural nuances of the regions in which they will represent the nation, and their interactions with these communities are enriched with a deep understanding of the underlying histories and factors that

define their counterparts’ cultures.

Not only do NPS security studies empower graduates to excel in their leadership roles around the world, the students themselves are innovators through detailed research. Cmdr. Dan Straub, for example, was compelled to examine the complex and critical implications of privatization. For his doctoral thesis research, he studied one of the few security arenas where privatized security has yet to be utilized—peacekeeping operations under the auspices of the

United Nations. The intricacies of legitimacy and ethical justice only begin to scratch the surface of Straub’s work, which has been well-received in strategic circles.

With an ongoing focus on the latest developments in nations and governments across the world, NPS students are well positioned to continue providing a bounty of knowledge, driving not only their own leadership development, but providing a strong foundation for solutions to the global challenges of the future.



# INNOVATION ABOVE ALL

The foundation of the graduate education function is developing the ability to add to the collective human knowledge... to innovate, analyze what is known on a very specific topic, determine what is unknown, then seek the answer to that very unknown. To discover is a natural symptom of the human condition, and it is an act that occurs at institutions of advanced education across the world.

While innovating is a natural occur-

rence, it is not without need of critical enablers — supporting elements that provide not only the environment, but the physical tools as well. Like many universities, it is the faculty at NPS that are the single most critical enabler of innovation. They carefully guide students through the process of understanding existing knowledge, determining questions, and answering them.

But there are other critical factors as well. At NPS, the institution has made a



firm commitment to providing students with the resources to empower their acts of discovery. High-performance computing technologies enable intricate analyses of vast amounts of data and calculations, and cutting-edge collaborative tools allow students to interact with DOD colleagues, faculty and each other in their efforts of discovery.

With a vigilant desire to constantly improve and empower, and at the most efficient means possible, the university



is constantly envisioning what can be accomplished in the realm of technology and resources provided to its Academic Quad. And 2012 brought an honor in recognition of this culture, when the Corporation for Education Network Initiatives in California presented NPS with the 2012 Innovations in Networking Award for Educational Applications for its Team Monterey academic network initiative with the nearby Defense Language Institute Foreign Language Center.

Although one small piece, it's indicative of a cultural approach to collaboration that exists at the university. And the above award is just one part of extending that culture throughout all DOD assets in the Monterey region, an approach entitled Team Monterey pioneered by local Congressman Sam Farr, that leverages the power of defense institutions across the county to better serve the nation.



“THE ADVANCED EDUCATION OF OUR OFFICER STUDENTS IS A RESPONSIBILITY THAT CAN ONLY BE HONORED BY ENSURING THEIR OPPORTUNITIES TO CREATE KNOWLEDGE CAN FLOURISH. OUR GRADUATES ARE THE THOUGHT-LEADERS OF THE FUTURE, AND OUR ABILITY TO EMPOWER THEIR INNOVATION IS OUR SOLEMN SERVICE TO THE NATION.”

**DR. CHRISTINE HASKA**  
VICE PRESIDENT, INFORMATION RESOURCES  
AND CHIEF INFORMATION OFFICER



# 2012 IN REVIEW

## JANUARY

NPS establishes the Sea Web and Wave Glider Laboratory, welcoming the arrival of two new unmanned surface vehicles entitled SHARCs, or Sensor Hosting Autonomous Remote Crafts, from the Office of Naval Intelligence.

The School of International Graduate Studies becomes home to the Project on Advanced Systems and Concepts for Countering Weapons of Mass Destruction, or PASCC, a multi-million dollar program directing research and strategic dialogues on behalf of the Defense Threat Reduction Agency.



Researchers at the NPS Center for Interdisciplinary Remotely-Piloted Aircraft Studies receive a decommissioned A-10 Thunderbolt that will be extensively renovated for use in atmospheric science field experiments, particularly for flight into dangerous thunderstorms.



Commander of the U.S. Southern Command, Air Force Gen. Douglas Fraser, briefs students in the National Security Affairs Western Hemisphere curriculum and regional Foreign Affairs Officers on the current state of the U.S. Southern Command.

Following an exploratory visit by the Chief of Staff of the Army, Gen. Raymond Odierno, in September 2011, Lt. Gen. David Perkins, the Commanding General of the esteemed Combined Arms Center, known as the 'intellectual center' of the Army, visits NPS for a series of briefings and meetings.

## FEBRUARY

A 30,000-pound slab of granite is installed in the Spacecraft Design and Robotics Lab in the basement of Halligan Hall to support advanced research in high-precision, spacecraft control simulations and experimentation.

Richard Serino, Deputy Administrator of the Federal Emergency Management Agency, gives opening remarks at the NPS Center for Homeland Defense and Security Alumni Professional Exchange Continuing Education Conference.

Retired Rear Adm. Moira N. Flanders becomes director of the NPS National Capital Region outreach office in Washington, D.C., responsible for assisting university leadership on special initiatives in developing, managing and coordinating a variety of academic activities and relationships in the nation's capital.

## MARCH

The NPS Dudley Knox Library launches Calhoun, an extensive online institutional archive containing a searchable collection of scholarly and instructional publications and research products authored by students and faculty within the NPS community.

At the invitation of the Consulate General of Japan Hiroshi Inomata, NPS students and staff officers from the Navy, Marine Corps and Air Force are honored for their participation in relief efforts following the earthquake and tsunami that devastated Japan a year prior.

The 50th class graduates from the Naval War College Monterey partnership with NPS for Joint Professional Military Education. Through the partnership's 12-plus years, a total of 2,825 officers have earned this certification.

Vice Adm. John M. Richardson, Commander, Submarine Forces, Commander, Submarine Force Atlantic and Commander, Allied Submarine Command serves as keynoter speaker for the winter quarter graduation ceremony.



## APRIL

For her work in near-field scanning and optical microscopy, Distinguished Professor of Physics Dr. Nancy Haegel is awarded a Fulbright scholar award to conduct research with world-renowned expert Professor Aaron Lewis at Hebrew University in Israel.

During a special alumni event, a small group of NPS graduates tour the floor and witness the opening bell at the New York Stock Exchange hosted by Marshall Carter, Chairman of the Board of NYSE Euronext and an NPS alumnus.



Adm. Cecil Haney, Commander of the U.S. Pacific Fleet, is named a Distinguished Alumnus of the Naval Postgraduate School during a visit to the university, recognized for his extraordinary leadership and accomplished career as a naval officer.

Rear Adm. Joseph P. Mulloy, Deputy Assistant Secretary of the Navy for Budget and Director, Fiscal Management Division, OPNAV (N82), presents the Navy's budget for fiscal year 2013 to financial management students during a campus visit.

# 2012 IN REVIEW

## MAY

Secretary of the Army John McHugh spends a day at NPS and is briefed by university leadership and faculty on several research and education programs — of special interest to the Secretary were NPS' cyber systems and operations, and defense analysis, degree programs.



NPS welcomes more than 2,200 guests from the local community onto campus for the 23rd Annual Memorial Day Concert on the Lawn featuring the Monterey Bay Symphony.

NPS alumnus, Under Secretary of the Navy Robert O. Work, discusses the "State of the Navy" during a special Secretary of the Navy Guest Lecture, emphasizing that the current Navy and Marine Corps are arguably the best they have ever been in the nation's history.

Hosted by NPS, more than 350 children from over 40 schools attend the Monterey County's 44th Annual "Mathletics" competition with countless volunteers from the university's student, faculty and staff.

## JUNE

Retired Adm. Gary Roughead, 29th Chief of Naval Operations, serves as guest speaker during the 2012 Battle of Midway Dining-Out, marking the anniversary of the key battle that turned the tide of the war in the Pacific against the Japanese Imperial Naval Fleet.



Professor and founding Chair of the NPS Department of Defense Analysis, Dr. Gordon McCormick, is presented with the prestigious USSOCOM Medal by Commander of the U.S. Special Operations Command Adm. William McRaven.



Defense analysis graduate Master Sgt. Jim Monroe becomes the first non-commissioned officer to be awarded the university's Association of the U.S. Army Gen. Joseph W. Stillwell Chapter Award for Outstanding Army Student.

Assistant Professor of Operations Research Dr. Ned Dimitrov is honored by the United States European Command (EUCOM) Civic Engagement Program for a lengthy research effort analyzing authorities and methods of transporting donated goods into EUCOM's Area of Responsibility.

## JULY

On Sunday, July 1, a tragic accident off the coast of Pensacola, Fla., claims the life of NPS Dean of Students and Executive Director of Programs Capt. Alan "Dex" Poindexter.

A 1995 aeronautical engineering graduate from NPS, Dex came to the university following a long, distinguished career with the Navy and NASA as a pilot, shuttle astronaut and executive. Poindexter was a participant in two shuttle missions, commanding one of the final flights of the space shuttle *Discovery* in April 2010 prior to the program's official retirement just over a year later.

"Dex was not just the senior Naval officer here at NPS, he was an accomplished man of extraordinary character, a devoted husband and father, and a true professional — precisely the kind of man that could serve as a true mentor to all of our students," said then NPS President Dan Oliver.

"Our student body consists of countless men and women who all have one thing in common — the responsibility to lead in their respective services and communities," he continued. "It takes a special kind of individual to command the respect of these students — Dex was that kind of man. Our deepest sympathies are extended to his wife, Lisa, and their two sons."

Over the next month, the university would honor the life and service of its most senior Naval officer through a series of tributes and memorials.

## AUGUST

DOD Chief Information Officer Dr. Teri Takai visits NPS for a tour, briefings and presentations with campus leadership about how the institution plays a lead role in educating and developing the future cyber workforce.

Distinguished Visiting Professor of Applied Mathematics Dr. Arthur J. Krener is honored with the 2012 Richard E. Bellman Control Heritage Award from the American Automatic Control Council. Krener joined NPS in 2006 after 35 years at the University of California, Davis.

The Monterey Peninsula Chamber of Commerce presents NPS with the 2012 Business Excellence Award in the education category, recognizing the university's important role within the region.

NPS' Modeling, Virtual Environments and Simulation (MOVES) Institute holds its 12th Annual MOVES Research and Education Seminar, fostering collaboration on modeling and simulation education in the domains of military, health care and homeland security.



# 2012 IN REVIEW

## SEPTEMBER

Navy Capt. David Tyler, Assistant Chief of Staff for Concepts at the Navy Warfare Development Command, opens the Consortium for Robotics and Unmanned Systems Education and Research (CRUSER) Warfare Innovation Workshop focusing on undersea warfare innovation.

Distinguished Professor Emeritus Dr. Donald Gaver is the recipient of the 2012 Military Applications Society of the Institute of Operations Research and Management Sciences J. Steinhardt Prize for his achievements in the field of operations research.

Rear Adm. Jonathan White, Oceanographer and Navigator of the Navy, and Rear Adm. Brian Brown, Commander, Naval Meteorology and Oceanography Command, perform a curricular review of the university's meteorology and oceanography programs. Both flag officers are alumni of NPS.



NPSCuL, a university designed and built custom CubeSat payload platform, is launched aboard an Atlas V rocket from Vandenberg Air Force Base in Southern California. Inside NPSCuL are nine individual CubeSats set for varied missions in space including advanced systems of tracking space debris.

## OCTOBER

Lt. Gen. Rhett A. Hernandez, Commanding General of U.S. Army Cyber Command/U.S. 2nd Army, holds a two-day exploratory review of the university's cyber education and research programs, providing an opportunity to build partnerships between his command and NPS.



NPS opens the Advanced Robotics Systems Engineering Laboratory, which in collaboration with the Unmanned Systems Lab provides an advanced multidisciplinary approach to the design, employment, future concept development and operational testing of robotic and unmanned systems.

Vice Adm. Scott H. Swift, Commander, U.S. 7th Fleet, discusses sea strategy and needs, and advanced education plans with iconic NPS faculty Professor of Practice retired Navy Capt. Wayne Hughes.

Senior Lecturer E. Cory Yoder of the Graduate School of Business and Public Policy co-authors the fourth edition of the "Defense Contingency Contracting Handbook," an authoritative guide to contingency contracting used by contracting officials from across the uniformed services.

## NOVEMBER

Cyber systems and operations student Lt. Jason Hughes is honored with the Vice Adm. Richard W. Mayo Award presented annually to an Information Professional officer who demonstrates vision, innovation and exceptional performance.

Dr. David Titley, a master and doctoral graduate of NPS, discusses his role as Deputy Under Secretary of Operations at the National Oceanic and Atmospheric Administration following the organization's critical role in preparedness management preceding Hurricane Sandy.

Rear Adm. Jan E. Tighe is appointed Interim President of the institution by Secretary of the Navy Ray Mabus. Tighe earned a master's degree in applied mathematics, as well as a Ph.D. in electrical engineering from NPS in 2001.



Retired Adm. Eric Olson, former USSOCOM Commander, and Mr. Walt Havenstein, former Chief Executive Officer of Science Applications International Corp., are inducted into the NPS Hall of Fame during a formal ceremony.

## DECEMBER



Assistant Secretary of the Navy for Manpower and Reserve Affairs Juan Garcia and Interim President Rear Adm. Jan E. Tighe hold the first of several community focus meetings, strengthening the institution's ties with regional leaders.

Retired Army Lt. Gen. Robert L. Ord III, a former Dean of the NPS School of International Graduate Studies, honors nearly 300 graduates during NPS' Fall Graduation ceremony in King Auditorium.

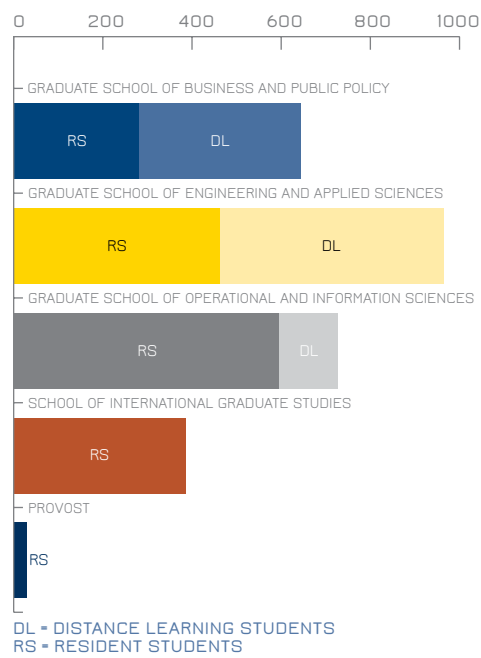
Interim President Rear Adm. Jan E. Tighe welcomes local Congressman Sam Farr onto campus for discussions on the school's transition of leadership, and to express the Navy's commitment to the institution and to the Monterey Peninsula.

Oceanography Research Assistant Professor Dr. Timothy Stanton travels to the remote Pine Island Glacier in Antarctica to participate in critical research in undersea ocean processes.

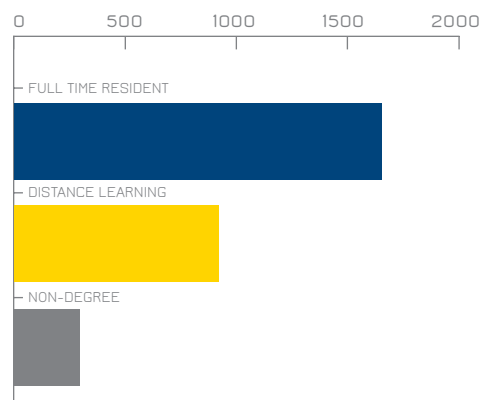
# STUDENTS AT THE NAVAL POSTGRADUATE SCHOOL

NPS had approximately 1,760 resident degree students in 2012, with an ongoing expansion in students attending via distance learning programs, totaling 999 this past year. More than 91% of resident students at NPS achieve graduation, with an average time to degree of approximately 20.2 months.

## STUDENTS BY SCHOOL



## STUDENTS BY TYPE

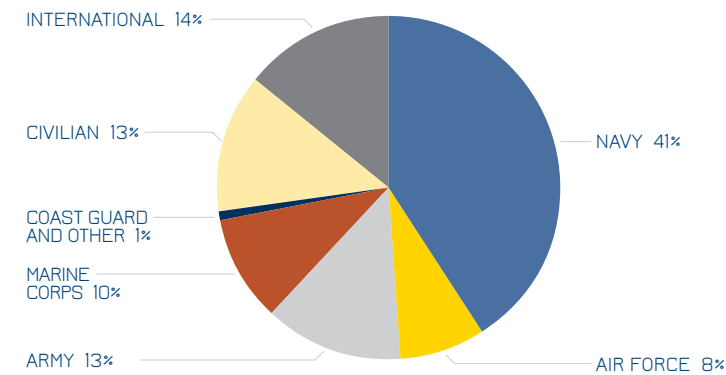


## DEGREES CONFERRED

DEGREE CONFERRED	NUMBER OF STUDENTS	DEGREE CONFERRED	NUMBER OF STUDENTS
<b>MASTER OF ARTS</b>		INFORMATION TECHNOLOGY MANAGEMENT.....	28
SECURITY STUDIES (COMBATING-TERRORISM: POLICY AND STRATEGY).....	7	INFORMATION WARFARE SYSTEMS ENGINEERING.....	9
SECURITY STUDIES (MID-EAST, SOUTH ASIA, SUB-SAHARAN AFRICA) .....	57	MANAGEMENT.....	34
SECURITY STUDIES (CIVIL-MILITARY RELATIONS) .....	7	MECHANICAL ENGINEERING .....	45
SECURITY STUDIES (DEFENSE DECISION-MAKING AND PLANNING) .....	44	METEOROLOGY .....	13
SECURITY STUDIES (EUROPE AND EURASIA).....	25	METEOROLOGY AND PHYSICAL OCEANOGRAPHY .....	16
SECURITY STUDIES (FAR EAST, SOUTH EAST ASIA, THE PACIFIC) .....	28	MODELING, VIRTUAL ENVIRONMENTS AND SIMULATION.....	11
SECURITY STUDIES (HOMELAND SECURITY AND DEFENSE) .....	87	OPERATIONS RESEARCH.....	58
SECURITY STUDIES (STABILIZATION AND RECONSTRUCTION).....	5	PHYSICAL OCEANOGRAPHY .....	8
SECURITY STUDIES (WESTERN HEMISPHERE).....	17	PHYSICS.....	5
<b>MASTER OF SCIENCE</b>		PROGRAM MANAGEMENT .....	13
APPLIED MATHEMATICS .....	6	REMOTE SENSING INTELLIGENCE.....	20
APPLIED PHYSICS.....	20	SOFTWARE ENGINEERING .....	2
MS ASTRONAUTICAL ENGINEERING .....	9	SPACE SYSTEMS OPERATIONS .....	17
COMBAT SYSTEMS TECHNOLOGY .....	6	SYSTEMS TECHNOLOGY (COMMAND, CONTROL AND COMMUNICATIONS).....	12
COMPUTER SCIENCE .....	45	SYSTEMS ENGINEERING .....	165
CONTRACT MANAGEMENT .....	9	SYSTEMS ENGINEERING ANALYSIS.....	9
DEFENSE ANALYSIS (FINANCIAL MANAGEMENT).....	1	SYSTEMS ENGINEERING MANAGEMENT .....	10
DEFENSE ANALYSIS (INFORMATION OPERATIONS).....	2		
DEFENSE ANALYSIS (IRREGULAR WARFARE).....	64	<b>OTHER MASTERS</b>	
DEFENSE ANALYSIS (NATIONAL SECURITY AFFAIRS).....	6	EXECUTIVE MASTER OF BUSINESS ADMINISTRATION .....	120
DEFENSE ANALYSIS (TERRORIST OPERATIONS AND FINANCING).....	20	MASTER OF BUSINESS ADMINISTRATION .....	145
ELECTRICAL ENGINEERING.....	33	MASTER OF SYSTEMS ANALYSIS.....	28
ELECTRONIC WARFARE SYSTEMS ENGINEERING.....	7	<b>ENGINEER</b>	
ENGINEERING ACOUSTICS .....	4	ELECTRICAL ENGINEER .....	3
ENGINEERING SCIENCE (ELECTRICAL ENGINEERING) .....	1	MECHANICAL ENGINEER .....	2
ENGINEERING SCIENCE (MECHANICAL ENGINEERING) .....	6	<b>DOCTORATE</b>	
ENGINEERING SYSTEMS .....	38	APPLIED PHYSICS.....	1
HUMAN SYSTEMS INTEGRATION .....	9	ASTRONAUTICAL ENGINEERING .....	2
INFORMATION OPERATIONS .....	9	COMPUTER SCIENCE .....	2
INFORMATION SYSTEMS AND OPERATIONS .....	2	MECHANICAL ENGINEERING .....	3
		METEOROLOGY .....	3
		MODELING, VIRTUAL ENVIRONMENTS AND SIMULATION.....	1
		PHYSICAL OCEANOGRAPHY .....	1
		PHYSICS.....	1
		SOFTWARE ENGINEERING .....	2
		<b>GRAND TOTAL .....</b>	<b>1,379</b>

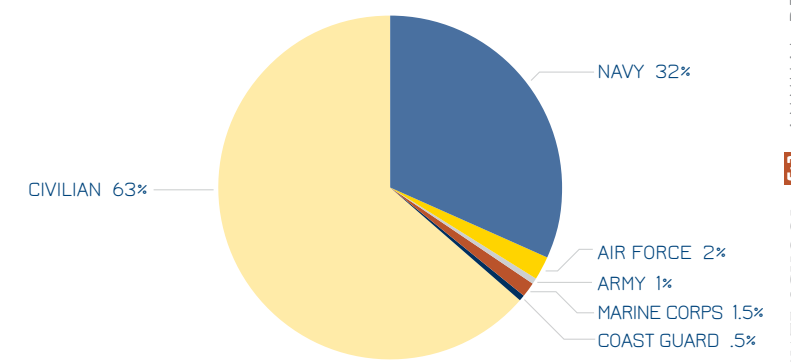
## RESIDENT STUDENT ENROLLMENT

2012 Average on Board by Service



## DISTANCE LEARNING STUDENT ENROLLMENT

2012 Average on Board by Service



## STUDENTS BY SERVICE AND COUNTRY

Resident and Distance Learning

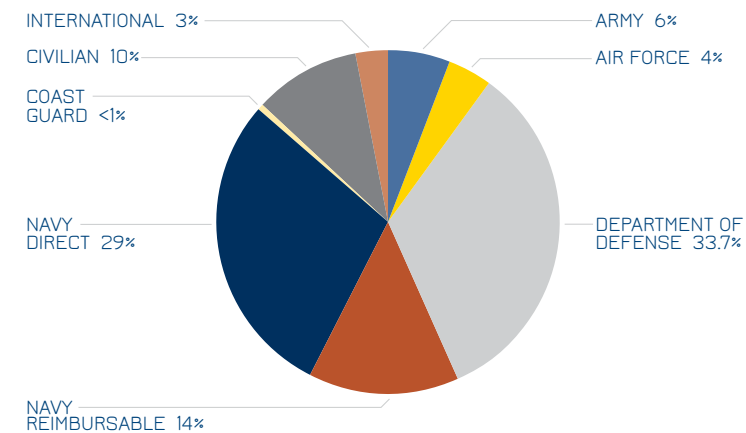
TYPE OF STUDENT	NUMBER OF STUDENTS	TYPE OF STUDENT	NUMBER OF STUDENTS	TYPE OF STUDENT	NUMBER OF STUDENTS
U.S. NAVY.....	1,062	GERMANY.....	13	PAKISTAN.....	14
U.S. ARMY.....	236	GREECE.....	23	PHILIPPINES.....	1
U.S. MARINE CORPS.....	254	HUNGARY.....	1	ROMANIA.....	1
U.S. AIR FORCE.....	131	INDIA.....	2	SAUDI ARABIA.....	6
CIVILIAN.....	804	ISRAEL.....	1	SEYCHELLES.....	1
OTHER.....	22	JAPAN.....	1	SINGAPORE.....	41
AUSTRALIA.....	6	JORDAN.....	1	SLOVAKIA.....	1
ALBANIA.....	1	KENYA.....	1	SRI LANKA.....	3
ALGERIA.....	1	KOREA.....	4	SWEDEN.....	3
ARGENTINA.....	2	LATVIA.....	1	TAIWAN.....	14
BRAZIL.....	4	LITHUANIA.....	1	TANZANIA.....	1
BULGARIA.....	1	MALAYSIA.....	1	THAILAND.....	1
CAMEROON.....	1	MALDIVES.....	1	TUNISIA.....	10
CANADA.....	3	MEXICO.....	1	TURKEY.....	58
CHILE.....	2	MOLDOVA.....	1	UGANDA.....	1
COLOMBIA.....	4	NEPAL.....	1	UKRAINE.....	2
CROATIA.....	1	NETHERLANDS.....	1	YEMEN.....	1
EGYPT.....	1	NIGERIA.....	1		
GEORGIA.....	1	NORWAY.....	7		

## FISCAL INFORMATION

The total operating budget for the Naval Postgraduate School during fiscal year 2012 was \$368.6 million. Funding for NPS comes from two primary sources, direct funds are provided by the Department of the Navy for the university's core teaching mission. Reimbursable funds are provided from a variety of sponsors for the implementation of research or other unique educational programs.

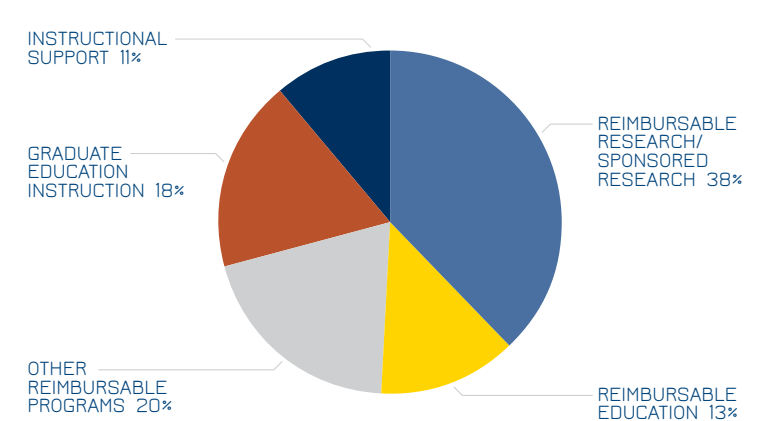
### NPS OPERATING BUDGET — REVENUES

2012 Revenues by Source, Direct and Reimbursable



### NPS OPERATING BUDGET — EXPENDITURES

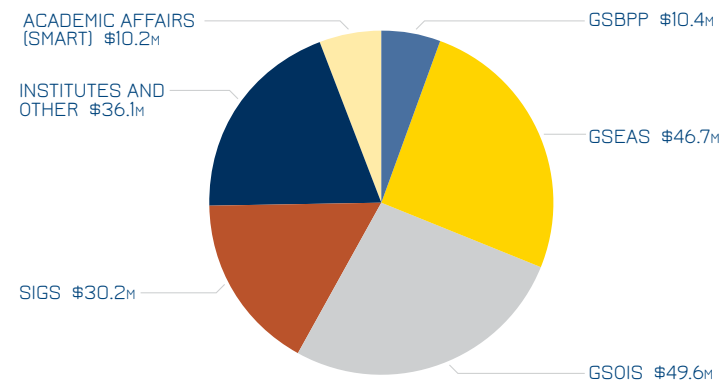
2012 Expenditures by Category, Direct and Reimbursable



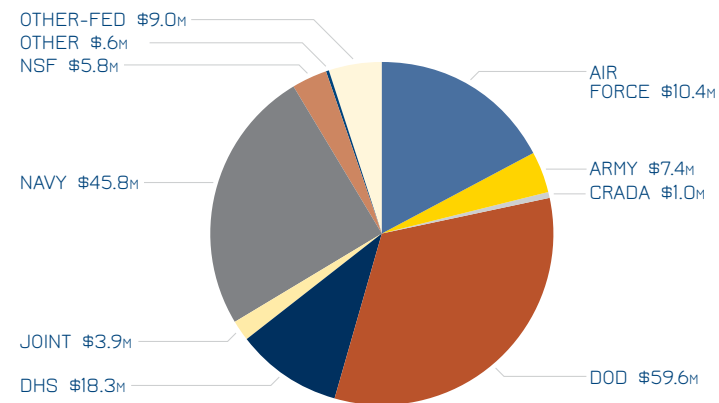
# RESEARCH AND SPONSORED PROGRAMS AT THE NAVAL POSTGRADUATE SCHOOL

Sponsored programs at the Naval Postgraduate School are an integral component of the graduate education experience. The primary purpose of sponsored programs at NPS is to conduct research, it is an imperative function to education at the postgraduate level, and its operational relevance is a hallmark of NPS. In addition to research, sponsored funding also supports educational programs as well as services.

## EXPENDITURES BY ORGANIZATION



## EXPENDITURES BY SPONSOR



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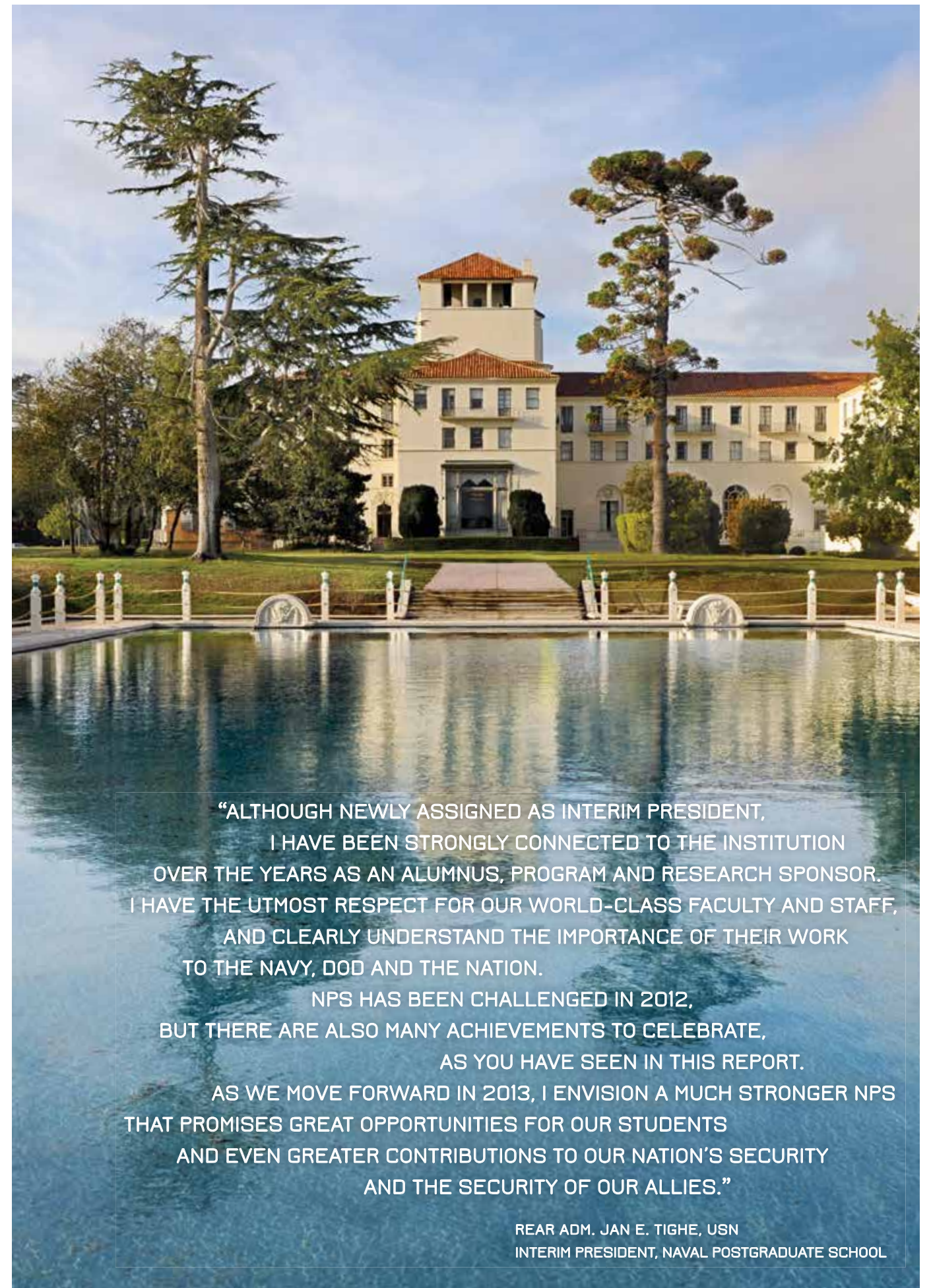
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Deputy Chief of Naval Operations  
Manpower, Personnel, Training and Education

**Honorable G. Kim Wincup**  
Consultant



“ALTHOUGH NEWLY ASSIGNED AS INTERIM PRESIDENT, I HAVE BEEN STRONGLY CONNECTED TO THE INSTITUTION OVER THE YEARS AS AN ALUMNUS, PROGRAM AND RESEARCH SPONSOR. I HAVE THE UTMOST RESPECT FOR OUR WORLD-CLASS FACULTY AND STAFF, AND CLEARLY UNDERSTAND THE IMPORTANCE OF THEIR WORK TO THE NAVY, DOD AND THE NATION.

NPS HAS BEEN CHALLENGED IN 2012, BUT THERE ARE ALSO MANY ACHIEVEMENTS TO CELEBRATE, AS YOU HAVE SEEN IN THIS REPORT.

AS WE MOVE FORWARD IN 2013, I ENVISION A MUCH STRONGER NPS THAT PROMISES GREAT OPPORTUNITIES FOR OUR STUDENTS AND EVEN GREATER CONTRIBUTIONS TO OUR NATION’S SECURITY AND THE SECURITY OF OUR ALLIES.”

REAR ADM. JAN E. TIGHE, USN  
INTERIM PRESIDENT, NAVAL POSTGRADUATE SCHOOL

OFFICE OF INSTITUTIONAL  
ADVANCEMENT

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