



NAVAL POSTGRADUATE SCHOOL

UPDATE
NPS



Courtesy Photo

NPS, NASA Collaborate on Human-Robot Interaction in Extreme Environments

By Kenneth A. Stewart

Students and faculty at the Naval Postgraduate School are working with NASA scientists 60 feet beneath the ocean's surface at Florida International University's Aquarius Habitat on a novel effort that seeks to fundamentally transform the possibilities of human-robot collaboration.

Envision a team of Navy divers, or astronauts, arriving at a previously unexplored location. Their objective is to successively map and explore identified areas of interest. But the explorers do not work alone, they work in conjunction with autonomous robots that are capable of "reasoning," problem solving and assisting their human counterparts.

"Diver operations are inherently dangerous ... A robotic diver assistant system can provide autonomous support to dive teams and has the potential to significantly enhance underwater operations." – NPS Research Associate Professor Noel Du Toit

NPS' E3 (Exploration in Extreme Environments) and NASA's Sea Test II programs aim to facilitate this sort of human-robot interaction, ultimately improving diver and astronaut safety and enhancing mapping, navigation and exploration in the undersea and space domains.

"Diver operations are inherently dangerous. Physiological effects limit dive duration and frequency and necessitate a large support crew, thereby increasing operational costs. The sensory-deprived underwater environment also makes navigation, communication and documentation challenging. A robotic diver assistant system can provide autonomous support to dive teams and has the potential to significantly enhance underwater operations," said NPS Research Associate Professor Noel Du Toit.

"The E3 project is aimed at providing utility to the diver team without burdening the team with vehicle command and control, thereby augmenting the diver team and allowing more effective, efficient and safer operations," continued Du Toit. "This work seeks to go beyond co-inhabitation of man and machine — our aim is to fundamentally enable the transformative capability of robots."

NPS Research Associate Professor Doug Horner insists that the ongoing experiments are breaking new ground, because the combined team is not interested in replacing human-controlled operations, but rather augmenting them in a way that enhances human capabilities.

"A human set of eyes brings a contextual perspective and excitement to exploration that is largely absent in robotic exploration," said Horner. "Unmanned systems are the basic tools for the next generation of explorers and we want to ensure increased productivity through these human-machine collaborations."

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NOVEMBER 2013

NPS Alumnus, Mercury 7 Astronaut M. Scott Carpenter Passes

NPS Public Affairs

Mercury 7 astronaut and NPS alumnus retired Navy Cmdr. M. Scott Carpenter passed away Thursday, Oct. 10, from complications related to a recent stroke. A graduate of NPS' General Line School in 1959, Carpenter was the first university alumnus selected to be a NASA astronaut, and became the second American to orbit the Earth aboard the Aurora 7 in 1962.

"Scott Carpenter embodies the perseverance and determination of America's early manned space flight program, and I believe the unending resolve to send Americans into orbit during this era is nearly as remarkable as the achievement itself," said NPS Space Systems Academic Group Chair Dr. Rudy Panholzer.



Left: NPS alumnus and retired Navy Cmdr. Scott M. Carpenter. Right: Pictured clockwise from top left are the seven astronauts of NASA's Mercury program: Alan Shepard Jr., Virgil Grissom, Leroy Gordon Cooper Jr., Scott Carpenter, John Glenn Jr., Deke Slayton and Walter Schirra. (Photos courtesy of NASA)

On May 24, 1962, Carpenter would cement his place in national history forever when he piloted the second American manned orbital space flight aboard the craft he dubbed the Aurora 7 through three revolutions of the Earth, reaching a maximum altitude of 164 miles.

"It was a cherished experience," said Carpenter in a past interview. "I got the chance to see the inner workings of the grand order of things. In the overall scheme of things, it proves that men can do about anything they want to if they work hard enough at it."

"Carpenter was at the heart of the beginning of a new era in space – human space flight," said NPS National Reconnaissance Office Chair Professor Dan Bursch, a fellow NASA astronaut completing four missions in space. "This represented an important crossroads in our space program when we didn't fully understand the implications and possibilities of launching humans into orbit."

While Carpenter is more than a half-century removed from his current student peers, SSAG leadership point to his commitment and resolve as important lessons of the iconic astronaut's legacy.

"Our university has seen more than 40 alumni go on to become NASA astronauts, spanning every space program from the original Mercury 7 through the final flights of the Space Shuttle," said Panholzer. "Throughout that time, the focus of our education and research programs has evolved to match the needs of the Navy and the Department of Defense.

"But as our current students apply this very different education, Carpenter and his Mercury program colleagues serve as outstanding examples of what can be accomplished when we commit to those ideals," continued Panholzer.

More than 47 years following his historic flight, Carpenter shared memories of his time at NPS during a teleconference with current students and faculty from NPS' space systems operations and engineering curricula.

"Academia is a great place to be, which is what made my time at the Line School among the most pleasant memories I have of the Naval service and one that I will always treasure," he recalled.

Bursch notes that he sees a correlation between the space program of Carpenter's era, and the current transition of American space exploration.

"In a similar fashion, our space program faces another crossroads today," Bursch said, pointing to the emergence of commercial space flight, the evolution of small spacecraft and cubesats, for which NPS has a highly-active research program, and the emphasis of looking beyond Low Earth Orbit.

"What remains a constant, however, is the importance of graduate education as a key to navigating these crossroads," Bursch added. "The Space Systems Academic Group remains committed to educating future leaders in space, whether they be future astronauts, or program managers, in National Security Space Strategy."

In addition to his travels in outer space, which President John F. Kennedy coined "The Other Ocean," Carpenter was the first NASA astronaut to explore the depths of the ocean as an aquanaut for the Navy. On leave from NASA, Carpenter spent a month living and working on the deep sea floor with the Navy's SEALAB II program in 1965, for which he received the Legion of Merit Award.

Warfare Innovation Workshop Explores Innovative New Technologies

By Kenneth A. Stewart

Students at the Naval Postgraduate School recently participated in a warfare innovation workshop designed to challenge their ability to analyze a series of scenarios wherein U.S. forces were drawn into a conflict in the South China Sea.

The university's warfare innovation workshops, led by the Consortium for Robotics and Unmanned Systems Education and Research (CRUSER), explore advanced problems as directed by naval commands and researchers at NPS. The most recent workshop directly supported the efforts of the Navy Warfare Development Command and the Office of Chief of Naval Operations (OPNAV).

"The warfare innovation workshop is actually a series of workshops that occur about once every six months, allowing our faculty and sponsors to leverage the operational experience of our students," said NPS Department of Operations Research Professor of Practice, retired Navy Capt. Jeff Kline.

Workshop attendees sought to answer questions posed in recent years by Navy leadership regarding the manner in which the sea service should respond to emerging technologies that may potentially limit the abilities of naval forces to either communicate or navigate.

Also sought was the answer to questions about the Navy's ability to mitigate the targeting risk posed by large vessels that due to their size and capabilities are high-value enemy targets. Students explored small flotillas of manned and unmanned systems that could operate in a manner, and with the capabilities associated with, larger fleets or air wings under a concept known as the Distributed Air Wing and Surface Capabilities.

"We challenged our students to explore advanced concepts that will allow the U.S. and its allies to operate under the Anti-Access

Area Denial (A2AD) umbrella on and over the sea, in an emission-controlled environment, by using the distributed air wing capabilities concept and flotillas with small missile-equipped ships," said Kline.

"The concepts are a response to robust A2AD development efforts underway in countries like China and Iran who have developed asymmetric responses to counter our ability to operate freely throughout the world's oceans," continued Kline. "These na-



Warfare Innovation Workshop student and faculty participants explored the distributed air wing and surface capabilities concept where small flotillas of manned and unmanned systems were designed to replicate the operational force and capabilities associated with traditional Naval forces. (U.S. Navy photo by MC3 Shawn Stewart)

tions are using small boat swarms, missile boats, and mini-submarines. We are thinking about how we can augment our capabilities to counter these tactics."

Students explored tactics through a notional escalation of force between the navies of the People's Republic of China (PRC), Indonesia, the Philippines and the Socialist Republic of Vietnam. In the scenario, Chinese attempts to lay claim to resources beneath the South China Sea led to increasing international tensions and finally to all out warfare between Western governments allied with Indonesia, the Philippines and Vietnam against the PRC.

In the envisioned scenario, allied forces must operate in an environment that limits traditional intelligence and navigation systems — known as an emissions-controlled environment. Faced with the prospect of limited intelligence and navigation systems, students were forced to think outside the box and consider both currently obsolete and future technologies to overcome these challenges.

FACULTY news & notes

Journal of Cognitive Engineering and Decision Making Editor-in-Chief Amy Pritchett presented the journal's first-ever Best Article Award to recent NPS graduate Army Maj. **Daniel Hall**, NPS Senior Lecturer **Dr. Larry Shattuck**, and Wright State University Professor Kevin Bennett at the Human Factors and Ergonomics Society's annual meeting.

Congratulations to OR Professors **Tom Lucas, Chris Nannini, Susan Sanchez, Paul Sanchez and Hong Wong** for their receipt of the 2013 Koopman Prize for outstanding publication in military operations research. The award was announced and presented at the recently completed INFORMS annual meeting.

The National Science Foundation has awarded NPS Assistant Professor of Philosophy **Bradley "BJ" Strawser** and Professor of Computer Science **Neil C. Rowe** a three-year, \$500,000 grant to explore the ethics of cyberwarfare. Strawser and Rowe with co-principal investigators Western Michigan University Professor Fritz Allhoff and California Polytechnic State University Professor Patrick Lin will use the grant to explore "Safeguarding Cyberspace with Ethical Rules for Cyberwarfare."

NPS Department of Information Sciences Lecturer **Brian Steckler** recently volunteered to help train Cal Fire and the Monterey County Sheriff's communications staff on their own mesh networking equipment. Steckler is a volunteer with the Monterey County Office of Emergency Services (OES) Communications Task Force, and he has made it his goal to ensure that local police, fire and state agencies get hands-on training with the all-too-familiar equipment they've acquired through federal and state grants. He has been in the middle of some of the world's most catastrophic natural disasters as part of his research with the Hastily Formed Networks group.



NPS electrical and computer engineering student Lt. Ashley McAbee. (Photo illustration by Javier Chagoya)

New Research Center Seeks Intel Analysis Revolution

By Kenneth A. Stewart

A promising new academic center has been created to encourage research into the emerging field of intelligence integration, often referred to as multi-INT or multiple intelligence. The evolving field takes an interdisciplinary approach to understanding how the integration of data from disparate sources and associated systems can improve the results gleaned from current and future intelligence systems.

“We want to revolutionize the intelligence cycle,” said Center for Multi-INT Studies (CMIS) Co-Director Dr. Jim Scrofani. “We are looking at the intelligence cycle, and integrating technologies across it.”

“The multi-INT approach seeks to develop the theoretical foundations, models and algorithms that make timely, robust and optimal situational awareness and decision making possible,” continued Scrofani.

CMIS was born of a growing realization, by Scrofani and others, that the ability to collect data has outpaced the ability of technology and analysts to make sense of available information and that traditional reliance upon existing intelligence processing methods is no longer adequate.

“All Department of Defense and intelligence organizations use data sets from disparate sources to extract information about targets, such as geolocation, identity, behavior and intent. In their unprocessed forms, these data convey only partial information,” said Scrofani. “Translating this information into knowledge requires an understanding of macro and micro relationships between the data, and converting that knowledge into effective, actionable intelligence.”

“CMIS seeks to transform the methodologies for integrating and synthesizing data from disparate data sources in order to provide military users with operationally-relevant information in a timely manner,” added CMIS Co-Director Dr. David Garren.

Scrofani and Garren point to the “stove-piped” nature of traditional intelligence activities as a hindrance that muddies the intelligence picture and impedes the integrated intelligence gathering methodologies they feel are necessary in the modern era.

“We need to synthesize all of these disparate, often stove-piped, intelligence sources into a single picture that can be given to warfighters, intelligence analysts, and the national leadership,” said Scrofani.

CMIS seeks to accomplish this by, amongst other things, using advanced algorithms to automate time-consuming intelligence operations that tend to bog down analysts and take time away from cognitive analysis, tasks that human beings accomplish best. “We need to allow humans to critically think and focus on the cognitive work, while leveraging the power of automation, where machines excel,” said Scrofani. “For example, using algorithms that can tip and cue sensors.”

Algorithms may also prove useful as analysts seek to separate benign activities from potentially lethal threats. “By understanding what constitutes normal behavior — for example, cargo ships traveling on predetermined shipping lanes — we can find points of departure or anomalous behaviors. We can then automatically tip and cue sensors for additional information or to alert operators,” Scrofani said.

Navy’s 238th Birthday Celebration

NPS servicemembers and civilians came together to celebrate the Navy’s 238th Birthday at the Barbara McNitt Ballroom, Oct. 4.

“This is my first Navy Ball in my 13 years [of service] and I must say, I was pleasantly surprised at the pageantry, tradition and esprit de corps it stirred,” said Information Systems Technician 2nd Class Wesley Griffin.

The ball included a POW/MIA spotlight, the traditional toasts in honor of all services and the Defense Language Institute’s choir and drill team.

“Without these traditions and honors observed, young sailors would not truly understand what the Navy is about,” said Flag Admin Leading Chief Petty Officer Sosthenes Henry.

In 1972 Chief of Naval Operations (CNO) Admiral Elmo R. Zumwalt authorized recognition of Oct. 13 as the Navy’s birthday. Since 1972, each CNO has encouraged a Navy-wide celebration of this occasion “to enhance a greater appreciation of our Navy heritage, and to provide a positive influence toward pride and professionalism in the naval service.”

Longtime HR Director Honored for Nearly Four Decades of Federal Service

By Dale M. Kuska

NPS Director of Human Resources Julie Carpenter was honored with the Navy's Superior Civilian Service Award during a surprise dinner in her honor, Oct. 29. Carpenter will be retiring from the university following 21 years in the human resources office (HRO), and 38 years of federal service.

"It has been a true honor to serve as the Director of the NPS HRO," said Carpenter. "I am extremely proud of the staff in the HRO and their ability to be resilient in the face of constant change."

Carpenter's early background and education focused on guidance and counseling. She began her human resources career in employee and labor relations working as a mediator ... A "really good fit with my background," she noted. While employed with the Army at the former Fort Ord, Carpenter says she began to take notice

of NPS, and was intrigued by the Navy's graduate education institution.

"I was aware of the mission of NPS, so when I saw a job announcement for a position in the HRO, I was immediately interested," she recalled.



NPS Director of Human Resources Julie Carpenter

Much has changed since Carpenter first saw that job announcement, but her commitment to NPS' mission has not. In addition to her recent receipt of the Superior Civilian Service Award, Carpenter is also a past recipient of the Navy's Civilian Meritorious Service Medal, the second highest honor the service can bestow on a civilian.

Two NPS Alumni Honored with Coveted Stockdale Award

By Kenneth A. Stewart

Naval Postgraduate School alumni, Navy Cmdrs. Richard N. Massie and Leif E. Mollo were recently honored with the Navy's coveted Stockdale Leadership Award.

Following Navy tradition, both men were nominated by peers who themselves were eligible for the Stockdale Leadership Award.

Massie, the Pacific Fleet winner, is currently deployed aboard the *USS Maine* (SSBN 741-Gold) where he serves as commanding officer. He was recognized for his commitment to command excellence and his attempts to integrate women into the submarine force. Writing from "somewhere beneath the Pacific," Massie discussed the need to meet with each of his Sailors individually and the three principles that he shares with them.

"First, treat every person with dignity and respect ... we all need to pull together toward our common goals. Alienating an individual for some perceived difference is counter to these goals," said Massie. "Second, everybody must act with integrity. Our business is too difficult and too dangerous to have anything less — we must be able to trust each other 100%."

"Finally, we all must be focused on the mis-

sion ... Everything we do contributes to the larger mission and the security of the United States," continued Massie.

Mollo, the Fleet Forces Command winner, is the former commander of the Navy's elite Seal Teams Four and Eight.

"It is a great honor and also extremely humbling to receive this award. The example and standard of leadership that Admiral Stockdale set is one we can only hope to live up to," said Mollo.

"This may be an individual award, but in my case, I believe the real recognition and credit should go to the members of the commands that I was fortunate enough to lead," continued Mollo. "Their dedication, courage, and perseverance were absolutely inspiring to me and it was an honor and privilege to be their commander."

"My time at NPS gave me valuable perspective; whether it be perspective on life and family, or perspective about the world and environment I would deploy to in our nation's service. As a leader and person, this perspective has been priceless and I will forever treasure the time I had at NPS," continued Mollo.

CAMPUS news & notes

NPS welcomed Boeing Phantom Works Senior Defense Analyst Michael Horn to Glasgow Hall for a discussion with students and faculty on Russia's growing interest in the Arctic, Oct. 22. Horn's presentation detailed the increasing accessibility of Arctic resources and their value, with a focus on how and when Russia's ambitions in the polar region may affect the interests of the U.S. and its allies.

Members of the Central Coast Chapter of Federally Employed Women (FEW) are working to raise awareness about breast cancer. Recently FEW volunteers manned a table outside the El Prado Room, where they handed out literature and signed up students, faculty and staff to participate in the Relay for Life, an annual event held in support of National Breast Cancer Awareness month.

James E. Lenz with the John Deere Technology Innovation Center visited the Space Systems Academic Group, Oct. 22. Lenz discussed the methods corporations like John Deere currently use, or are looking to implement, to drive innovation, the creation of new products and the reinvention of old ones. According to Lenz, innovation is critical to the future success of his 175-year-old company.

THIS MONTH ON

INSIDE NPS

- Interview with NPS Professor of Practice, retired Navy Capt. Jeff Kline. Kline will discuss NPS' most recent warfare innovation workshop.
 - Interview with CRUSER Director, Dr. Ray Buettner. Buettner will talk about robo-ethics and recent attempts by NPS faculty and guest lecturers to explore this important topic.
 - Dessi Matel-Anderson will talk about FEMA's recent participation at the Joint Interagency Field Experimentation (JIFX) event and her work with FEMA Corps.
 - Interview with Center for Interdisciplinary Remotely Piloted Aircraft Studies' (CIRPAS) Mr. Ray Jackson who will talk about CIRPAS' involvement in BLACK DART Operations.
- "INSIDE NPS" AIRS WEEKLY ON THE PENTAGON CHANNEL

NPS Professors Leads UAV Innovation Effort

By Kenneth A. Stewart

NPS Research Associate Professor Kevin Jones, along with Professor Isaac Kaminer and Research Associate Professor Vladimir Dobrokhodov, are pushing the limits of what is possible in the realm of Unmanned Aerial Vehicle (UAV) engineering and development.

Several of their most intriguing concepts — the Tactical Long Endurance Unmanned Air System (TaLEUAS), a tethered hex-rotor, and their Air Mobile Buoy Platform seek to fill information gaps by placing advanced, endurance-focused and renewable energy powered aircraft into the sky.

If successful, their TaLEUAS aircraft will be capable of extremely long endurance operations.

“I want it to be a ‘back packable’ system that can stay up for days or months autonomously, humans interact with it, but do not control the aircraft,” said Jones.

NPS student, Mexican Navy Lt. Nahum Camacho has been working with the team to improve the “energy budget” that will help make their TaLEUAS performance goals a reality. “It’s essentially a glider that harvests energy from the sun in two ways,” said Camacho. “We rely on thermal soaring ... and use solar cells to gather energy.”

Jones is working with the makers of TaLEUAS’ airframe to incorporate solar cells into the wing of the aircraft. “We are embedding solar cells into the wing of the aircraft during original manufacture rather than adding them on to the exterior of the wing,” said Jones.

Also of interest to Jones is the use of hex-rotors for sensing and sur-

veillance. “There is a lot of interest in the law enforcement and intelligence communities because a tethered hex-rotor gives near immediate eyes in the sky,” said Jones.



NPS Research Associate Professor Kevin Jones is pictured with his tethered hex-rotor. Working with his research partners from the National Security Agency and Lawrence Livermore National Laboratory, Jones is developing a hex-rotor that overcomes the fuel economy problem associated with rotary aircraft by offering a tethered alternative. (U.S. Navy photo by Javier Chagoya)

Perhaps the team’s most novel UAV concept is their Air Mobile Buoy system. “The key idea is to build a low-cost and agile autonomous multi-rotor capable of lifting a significant payload of computational, acoustic detection and communications equipment powered by high-performance solar panels,” said Jones.

NPS’ Consortium for Robotics and Unmanned Systems Education and Research (CRUSER) recently accepted a proposal to fund research into the platform.

“The Air Mobile Buoy Platform concept offers us the opportunity to explore a system that can operate in all three maritime domains [air, surface and sub-surface],” said CRUSER Director Ray Buettner.

“If successful, the Air Mobile Buoy concept could fill operational gaps pertaining to sea-based, non-persistent surveillance and could also provide a needed all-weather UAV capability,” added Buettner. “It also shows promise in the areas of enemy deception, detection and signal intelligence [SIGINT] gathering without the potentially identifiable sound signatures associated with traditional airborne SIGINT gathering platforms.”

While these systems are at various stages of research and development, their potential utility and the educational and research opportunities that their development presents have generated a great deal of interest at NPS and beyond.

Focus On ... Business School Accreditation

A Monthly Look at Names and Faces on Campus

Valentina Palazzetti has worked with the Graduate School of Business and Public Policy (GSBPP) for more than three years. Recently she was named GSBPP’s Faculty Associate for Assessment and Accreditation.

“I manage, organize and review the curricula and process evaluations relative to the accreditation of the institution,” said Palazzetti.

GSBPP is accredited via the Association to Advance Collegiate

Schools of Business (AACSB) and the National Association of Student Personnel Administrators (NASPA) accrediting agencies.

“I don’t do it by myself, I take care of the assessment aspect,” said Palazzetti. “There are a lot of rules, regulations and standards. It’s really is a team effort.”

Palazzetti, who holds a Masters of Business Administration, appreciates the time and effort it takes to create quality curricula

for students pursuing advanced education here at NPS.

“I enjoy interacting with the faculty here, they are great people,” said Palazzetti. “There’s a lot to learn from this position and while it can be challenging, it’s something I enjoy.”

“What we do ensures that the students are learning at the necessary level to receive quality education and it ensures that they’re learning in accordance with the mission of the school,”



GSBPP Faculty Associate for Assessment and Accreditation Valentina Palazzetti

added Palazzetti.

Any Day at NPS ...



Lt. Cmdr. Chris Straessle and Lt. Chris Pandey pictured with the Segmented Mirror Space Telescope (SMT) imaging satellite testbed attempt to calibrate a satellite during a laser calibration evolution. (U.S. Navy Photo by MC3 Shawn Stewart)

Babatunde "Tunde" Ridley, NSAM's Fitness and Sports Director, was awarded 1st place in the 100 and 200 meter dashes during the Masters Athletics Championship in Porte Alegre, Brazil, Oct. 19. Ridley holds the American record for his age bracket in the 60-meter indoor track event. (U.S. Navy Photo by MC3 Shawn Stewart)



NPS students returned en masse to their classes last month in spite of the ongoing government shutdown. With the approval of the Pay Our Military Act, the Department of the Navy was able to authorize most civilian Navy personnel to return to work allowing university classes to resume as scheduled. (U.S. Navy photo by MC3 Danica M. Sirmans)

NPS students, faculty and staff, along with their families, got into the Halloween spirit during Morale, Welfare and Recreation's Freaky Family Friday held in NPS' Barbara McNitt Ballroom, Oct. 25. (U.S. Navy photo by MC2 Chablis J. Torrence)



NPS Provost Douglas Hensler, above right, meets with Dudley Knox Library staff members at the library's conference room, Oct. 16. University Librarian Eleanor Uhlinger, left, introduced Hensler to the staff and discussed library operations. (U.S. Navy Photo by MC3 Shawn Stewart)



STUDENT voice

By Lt. j.g. Barry Scott, Chairman President's Student Council



I would like to draw your attention to several important dates: Nov. 12 is Warrior Day! Support your service by wearing combat uniforms or flight suits. The next student council meeting is Nov. 20. All students are welcome to participate and share an idea, check the muster page for time and location.

Please join the student council along with the Monterey Bay Commandery of the Naval Order of the United States and the Armed Forces Communications and Electronics Association's Monterey Bay Chapter as we remember the attack on Pearl Harbor, Dec. 6. A remembrance dinner will be held. Ticket sales are available through the MWR ITT office and online at www.nps.edu/pearlharbor.

Thanks to the increased participation from the student body, nominations for the Secretary's Guest Lecture series have steadily increased. While attending the recent student council session, President Route expressed strong support for the SGL series. With the combined interest of NPS' leadership and the student body, we are looking forward to renewing this enriching campus program.

The time has come to recognize those active duty military faculty and staff members who contribute the most to the professional and military success of our student body. The next awardee of the First Command Military Leadership Award will be announced during the winter graduation ceremony. Check the muster page for the announcement, or contact your student council representative to nominate a leader who has made a difference in your education.

Lt. j.g. Barry Scott is the Chairman of the President's Student Council. Visit the PSC on the intranet at <http://intranet/psc/index.html>.

On Campus this Month

November 6

Maj. Gen. Todd Stewart (Ret.)
Director and Chancellor, AFIT
POC Lt. Jon Volkle, (831) 656-2466

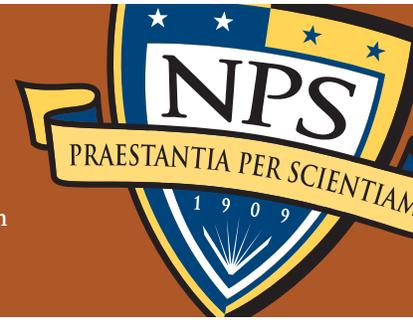
November 9

Marine Corps Ball
Guest Speaker Maj. Gen. Anthony L.
Jackson, USMC (Ret.)
POC Capt. Alex Cole
alcole@nps.edu



November 15

Defense Energy Seminar
The Science and Technology
of Materials for Energy
POC Dr. Daniel A. Nussbaum
(831) 656-2387



November 20

Secretary of the Navy Guest Lecture
Vice Adm. William F. Moran, USN
Deputy Chief of Naval Operations
(Manpower, Personnel, Training
and Education)
POC Lt. Jon Volkle, (831) 656-2466



November 11

Veterans Day



November 28

Thanksgiving

buy and sell your textbooks

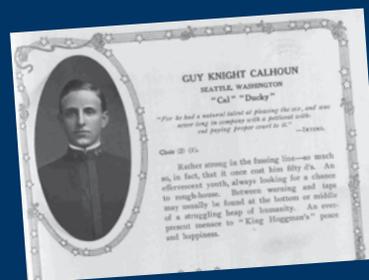
www.nps.edu/CurStudents/BookExchange

STUDENT BOOK EXCHANGE
NAVAL POSTGRADUATE SCHOOL



Historical Highlights

The first NPS class reported for studies in November 1909, when the program was called the School of Marine Engineering. The first appointed faculty was Lt. Guy K. Calhoun, a mathematician whose first publication, "Products of Arcs and Sines of 15-Degree Rhumbs," would soon be issued by the Government Printing Office in 1910.



Calhoun's monograph is still in print today and the NPS Department of Applied Mathematics continues the tradition of research and publication initiated by Calhoun. The department annually identifies "The Hot 5," which lists the five most heavily cited works and computes a five-year impact index by ranking these papers. This data is accessible on the department's website.

Calhoun's legacy can also be seen in the Dudley Knox Library's institutional repository, which adopted Calhoun as the repository's name. The archive was created to make NPS-created scholarly content visible, searchable and freely available to the public. Currently, more than 23,000 NPS theses are accessible via Calhoun.

Historical Highlights are provided by the Dudley Knox Library.