The cohort of senior enlisted Marines enrolled in Naval Postgraduate School (NPS) is growing. Driven by the Department of the Navy’s Education for Seapower study, and its recommendations to bolster education among the department’s enlisted ranks, NPS and the Marine Corps have opened up graduate education opportunities for senior enlisted non-commissioned officers (NCO).

NPS’ Master of Applied Cyber Operations (MACO) program, which has provided Navy enlisted Sailors with graduate degrees since 2012, now educates enlisted Marines to help meet the DOD’s growing need for trained cyber professionals. Three Marine NCOs are now enrolled in the 12-month program.

But they’re not the only enlisted leaders getting their education on campus … Joining them are two additional Marines attending graduate or certificate programs – one for the Foreign Area Staff NCO program, and one in the university’s defense analysis department.

The increase of senior Marine NCOs was made possible by the development and release of MARADMIN 709/18, which opens NPS programs to active duty enlisted Marines in the grades of Staff Sergeant through Master Sergeant, with at least seven years of service who have previously obtained a Bachelor’s degree.

"Historically, the Marine Corps has not had a program to select NCOs for graduate education in the same way we have had for officers," said NPS Senior Marine Corps Representative Col. Randy Pugh. "Now the Marine Corps is getting more serious about providing advanced education opportunities to enlisted Marines, because 21st century warfare is becoming more technically complex. Our service needs to be prepared, and accurately reflect the environment that we are going to fight in."

Pugh stated this is only the beginning as the Navy and Marine Corps team continues to raise the importance of education across all ranks.

"I would like to see the undergraduate side of the Marine Corps go towards a similar model so that instead of getting training, you’re getting an education and earning credits," said Pugh. "Then by the time you reach the rank of Staff Sergeant or Gunnery Sergeant you already have your bachelor’s degree. This drastically expands the pool of talent to choose from when bringing in senior enlisted to NPS."

"Educating our force is about capability rather than rank. By getting an education, our Marines can then contextualize it for what they’re expected to do, and although the role of an officer and NCO may be different, they both require the foundational understanding that education provides."

—NPS Senior Marine Corps Representative Col. Randy Pugh
NPS researchers lead innovations in phase change materials

By Dr. Jessica Neasbitt

A team of Naval Postgraduate School (NPS) researchers recently published the results of their successful experimentation using phase change materials (PCMs) to develop a formulation with potential to regulate the temperature of living and storage spaces via thermal energy storage (TES). Professor and Associate Chair of Mechanical and Aerospace Engineering (MAE) Claudia Luhrs, Associate Professor of MAE Emre Gunduz, National Research Council (NRC) postdoctoral research associate Richa Agrawal, and recent NPS graduate Ensign Joshua Hanna conducted the research, which appeared in the May 2019 journal “Molecules” and marks another in a long line of innovations in materials science at NPS.

Luhrs initially conceived of the idea while on a recent sabbatical at the Spanish Naval Academy, where she was asked by faculty about materials that could control temperatures inside buildings. Looking into the topic, she became interested in PCMs due to their ability to function without external energy inputs, present reversible phase transformations over multiple cycles and be added to the walls of existing structures. Additionally, Luhrs recognized that PCMs formulations, if optimized, could be used in high temperature locations where NPS students conduct operations, lowering the energy costs of maintaining temperatures at a comfortable range and helping to maintain electronic equipment at ideal temperatures.

“When we talk about development of engineering materials, we need to target the formulations and processing routes to what the application is,” Luhrs said. “We determine what properties are needed, and then devise what materials and microstructures will help us achieve them.”

After careful consideration, Luhrs proposed the use of epoxy-PCMs systems, described in the NPS group’s article as “substances that absorb/release thermal energy during a phase transformation, which is typically melting/solidification.”

One thing that Luhrs and her colleagues were looking for was a way to take existing PCMs technology to the next level—specifically, to use PCMs in a more easily transportable, self-contained system conducive to military needs. “Many buildings already use phase change materials, but they have them in big containers [necessary to store them when in their melted phase],” Luhrs said. “It’s difficult to transport them, and we wanted something that we could use as a coating and have it either readily applied or transported.”

Seed funding from the NPS Foundation and additional funding by the Office of Naval Research’s (ONR) Energy System Technology Evaluation Program (ESTEP) allowed her to take the next step: working with Agrawal and Hanna to develop a material that could hold large amounts of PCMs while producing homogeneous distributions. The team then tested the PCMs that had the best chance of successfully fulfilling the required specifications.

For their study, Luhrs, Hanna and Agrawal tested two alkane hydrocarbons/paraffins for TES applications, and found that n-nonadecane exhibited thermal activity within the desired temperature ranges (30 to 42°C). An epoxy resin was added as a support matrix material (alleviating paraffin leakage), with Carbopol being utilized in order to minimize any phase separation that might occur during synthesis, thus ensuring that when the resin cured, the PCMs would be spread throughout it.

After testing various conductive agents, the NPS researchers found that adding boron nitride (BN) was the best choice to enhance thermal conductivity of the epoxy-paraffin composite.

“We added thermal enhancers,” Luhrs said, “which will make it melt or solidify a little bit faster.”

Moving forward, Luhrs also wants to explore the possibilities of storing the energy produced during the PCM’s phase change—perhaps for use in powering small electronic devices. In the immediate future, however, she and her colleagues plan to apply for more funding in order to move ahead with further testing and development.

This will include the important step of conducting testing on the life cycle of the material for a full picture of how it will behave “from cradle to grave.”
NPS, MIIS partnership hosts inaugural security dialogue

By MC2 Patrick Dionne

The Naval Postgraduate School (NPS) and the Middlebury Institute of International Studies (MIIS), two institutions focused on global security challenges, furthered their partnership by hosting a day of dialogue on their respective campuses to present student research, Nov. 16.

Titled MIIS/NPS In Dialogue, the event focused on inhibiting the spread and use of nuclear, biological, and chemical weapons. Both MIIS and NPS students presented research on proliferation threats, deterrence, and arms control before dialogue shifted to the NPS campus.

“This is only the beginning of an enormously terrific, enduring conversation about the things that affect security not only for the nation but around the globe,” said NPS President retired Vice Adm. Ann Rondeau. “Everything from the environment, to military operations, to cyber, is our obligation to bring our students and faculty together to be part of this national dialogue.”

The genesis of this event, according to Rondeau, was as early as the beginning of her tenure as NPS President which began in January. One of her first acts as President was to establish a strong working relationship with MIIS President Laurie Patton.

“Both of our institutions have been focused on security studies from the beginning, and both are uniquely equipped to address the security challenges of the 21st century,” said Patton. “Together, I think we have no rival in our potential for making a safe and secure world, and our current challenges demand nothing less than this kind of institutional cooperation to share our distinctive strengths and expand the options for our students. ... With our students and faculty cross pollinating about the big questions that need to be discussed.”

NPS Department of National Security Affairs student Army Maj. Whitney Cissell, a nuclear nonproliferation officer who presented research during the dialogue event, focused her study on issues at the intersection of U.S. policy, nuclear counter-proliferation and deterrence, specifically in reference to Russian strategy and gray zone (sub-conventional) conflict.

“Russia and the U.S. are very stable at the nuclear and conventional level but it is at the sub conventional level is where we are seeing the most competition and conflict, which is typical of great power competition,” said Cissell. “MIIS does a lot of great work in the realm of nonproliferation, which made my research a perfect fit for this dialogue. Due to this overlap, we were able to approach this from a lot of different perspectives.”

The MIIS/NPS In Dialogue program will continue throughout the upcoming year. Current slated events include a discussion on the “Use of Chemical Weapons in Syria: Lessons in U.S. Policy” on Feb. 4; “Lessons Learned from Organized Crime for Disrupting Illicit Nuclear Procurement Networks” on Feb. 11; and, “The Detention Detectives: Using Technology to Investigate Nuclear and Missile Programs Worldwide” on Mar. 31.


“The vision for this series is to provide information on the latest research and concepts coming from NPS that will influence the future of naval warfare,” said Professor of Practice retired Navy Capt. Jeff Kline, a key figure behind the effort. “We hope to inspire thought on new concepts and technologies through these videos that will affect the way we fight in the future, and the best way to do that is through the minds of junior and mid-career officers.”

Produced in partnership with the university’s Graduate Education Advancement Center, Seapower Conversations is currently available on the NPS YouTube channel.

Have a story to share? Public Affairs is constantly seeking interesting news and stories for Update NPS. Send your tips to pao@nps.edu.
**New CRADA between NPS, General Atomics focused on advanced space technologies**

By MC2 Tom Tonthat

NPS and General Atomics Electromagnetic Systems (GA-EMS), provider of a diverse portfolio of aerospace and energy systems to the DOD, finalized a Cooperative Research and Development Agreement, or CRADA, to conduct both classified and unclassified research in the area of advanced space technologies.

The three-year partnership between the university and GA-EMS, which currently supplies electromagnetic aircraft launch and recovery systems and electromagnetic rail gun technology to the U.S. Navy, has the potential to expand into additional technology areas of mutual interest.

Top executives from GA-EMS, including President Scott Forney, visited the university, Nov. 14, to provide a first-hand introduction on the company’s capabilities to interested students and faculty, and offered insight on available research opportunities made possible through the CRADA.

“We are really excited to be working with the Naval Postgraduate School and getting this CRADA in place to allow students to come down to our facilities to do their theses,” said Forney. “There are a lot of cool things that we’re going to be doing in the next few years.”

While NPS has entered into several similar types of research agreements with industry partners over the years, the ability to conduct research in the classified space makes the university, and this particular CRADA, a bit unique.

“Once private companies start researching and developing technology for defense applications, there’s a good chance it will become classified,” said Dr. Todd Weatherford, a professor in NPS’ Department of Electrical and Computer Engineering and a key figure in the agreement’s genesis.

“We at NPS have deep technical and academic knowledge of what we need, and defense contractors have the engineers,” Weatherford continued. “Together, we can guide the research and development of newly-proposed systems, and the flexibility of having different classification levels allows us to explore more application for our research.”

The operational experience and drive of NPS’ professional student body, and you have the perfect combination of expertise, relevant experience and resources to advance defense technologies. Teaming up with defense contractors through CRADAs not only benefits the university and the DOD, but the partnering company as well.

**NPS student, alumnus honored with Naval Submarine League Literary Awards**

By MC2 Taylor Vencill

Naval Postgraduate School (NPS) alumnus Lt. Cmdr. Ryan Hilger and current student Lt. Bryan Lowry were awarded top honors in the Naval Submarine League’s Literary Awards competition, presented during the organization’s annual symposium in Washington, D.C., Nov. 7.

For the active duty category, Hilger earned first place for his article, “Part the Seas,” while Lowry earned second place for his article, “Submarine Warfare in the 1971 Indo-Pakistani War and the Falklands War and the Implications for the U.S. Navy Today.”

The Naval Submarine League (NRL) Literary Awards are intended to encourage critical thinking and discourse, sharing innovative thought on key issues facing the submarine community.

Retired Navy Rear Adm. Jerry Ellis, NPS Undersea Warfare Chair, expressed his own pride in having the university well represented in the competition.

“I’m very proud of both of these great students … I think this is a big plus for this institution to have two active duty awards go to current and past students,” Ellis said. “As we look towards the future, the submarine force will continue to play a significant role in our nation’s current and future conflicts.”
Kennedy Space Center Director shares NASA’s future of exploration during latest SGL

By MC2 Patrick Dionne

Director of NASA’s John F. Kennedy Space Center and former Astronaut, retired U.S. Marine Corps Col. Robert D. Cabana presented NPS students, faculty and staff with an in-depth overview of NASA’s current missions and goals during the latest Secretary of the Navy Guest Lecture (SGL) in King Auditorium, Oct. 22.

Cabana, who has spent a total of 37 days, 22 hours and 42 minutes in space, was invited to NPS by the university’s own Space Systems Academic Group Chair Dr. Jim Newman, who served with Cabana as an Astronaut aboard STS-88, the first Space Shuttle Mission to the International Space Station.

In opening his remarks, Cabana addressed the challenges faced by Kennedy Space Center throughout his 11-year tenure as its director, with the center experiencing massive downsizing throughout the early years of the decade.

“In July of 2011, the Space Shuttle Atlantis flew its final mission,” said Cabana. “It landed on a Thursday and on Friday, 2,000 contractors got pink slips and walked out the door. We went from a center where everything was paid for by the Space Shuttle to having not enough money to maintain the facilities that we had. We had to define what we wanted our future to be.”

During this time, Kennedy Space Center adapted to the future by implementing several policies including repurposing several of its capabilities to better suit the needs of the modern world, including utilizing excess capabilities and launch pads to better support NASA’s mission of supporting commercial space operations.

In total, Cabana said, 90 separate agencies have entered agreements with the center representing a wide range of partners – academia, industry and government agencies.

“In all of human history, three nations have sent humans to orbit, the United States, Russia and China,” said Cabana. “Today in the United States we have three U.S. companies building orbital spacecraft, Lockheed Martin, with the Orion spacecraft for deep space, as well as Boeing and SpaceX with the Starliner and Crew Dragon for commercial access to the International Space Station.

“People talk about government space and commercial space, but there is only one space up above us,” he continued. “If we want to be successful as a nation, we need government and commercial space integrated together, because that only makes us stronger.”

Cabana then played a short video for the crowd celebrating the rich history of the Apollo space program and introducing the Artemis program, whose namesake is the twin sister of the Greek God Apollo. The Artemis program will see NASA return to the moon in 2024, where the first woman and next man on the moon will use innovative technologies to explore more of the lunar surface than ever before.

Unlike the Apollo mission, Artemis will be a multinational collaboration between NASA and both its corporate and international partners.

“There are all kinds of things that we can learn by having people on the moon in a sustained way, from lunar surface power, to solar electric propulsion. The sooner we can get back to the moon with our international partners and stay there, the sooner we can get to Mars,” said Cabana. “We have an outstanding future in space and as great as the last 50 years of space exploration was, I have a feeling that the next 50 years will be even better.”

Cabana’s complete presentation to the university is available on the NPS YouTube Channel.
Mentoring event allows NPS leaders to shape next
generation, strengthen officer association

By MC2 Tom Tonthat

A group of Naval Postgraduate School (NPS) students embarked on an effort to invigorate the university’s student body with professional development and mentoring opportunities by forming a National Naval Officers’ Association (NNOA) Monterey interest group, with the goal of becoming an official chapter of the association. In their first major effort, the group held an inaugural NNOA Speed Mentoring event, hosting 11 senior NPS leaders for mentoring sessions with 25 junior officers on campus, Nov. 5.

The NNOA’s vision is to support the Sea Services by strengthening a diverse senior officer corps to enhance operational readiness.

“NPS is a great place for mentorship, for you have all the services and even international officers who have something to give back to the next generation of officers,” said Marine Corps Maj. Bruce Manuel, one of the interest group organizers. “Senior leaders here recognize they can pour out their knowledge and experience on so many things, from professional development to personal ethics to leadership honesty – these things are the framework of this association.”

The mentors consisted of NPS senior officers from all military branches, including NPS President retired Vice Adm. Ann Rondeau, NPS Chief of Staff Navy Capt. Philip Old, and Senior Marine Corps Representative Col. Randy Pugh to name a few.

“This is a wonderful opportunity to ‘pay it forward,’” said Rondeau during her opening remarks. “These younger officers we pay forward will pay it forward tomorrow. One of the absolute precious parts of our profession is investing in those who come after us who are our reliefs. If we teach good culture it creates a healthy profession that can lead the country.”

According to Lt. Cmdr. Shamire Branch, interim president of the NNOA Monterey interest group, the interest group thought that if junior officers could take the advice and wisdom of senior officers, they would likely develop into senior officers who could become mentors themselves.

“I did the calculation; we have 330 years of experience here in this room,” said Branch in his initial event remarks. “We as the student body are really hungry for what these senior officers can teach us in furthering our professional development and careers, so this event is about getting every bit of information we can from their leadership so we can use it for the rest of our careers.”

The speed mentoring sessions were designed to be a brisk 10 minutes each with the junior officers introducing themselves, summarizing their educational paths and any immediate plans upon returning to the fleet, before receiving advice from the mentors.

“It’s difficult to overstate how important it is to get feedback and guidance from folks who have done something that I was planning to do in the future,” said Lt. j.g. Jacob Garrett, an NPS electrical engineering student. “My community is a little bit smaller than the others here at NPS, so I gained a lot more perspectives today than I usually do.”

Focus On... American Indian Heritage Month

In observance of National American Indian Heritage Month, NPS held a proclamation ceremony and heritage celebration in Herrmann Hall, Nov. 20.

The ceremony featured guest speaker Dr. George Baldwin, a professor from California State University Monterey Bay (CSUMB), who focused a significant portion of his presentation on identity.

“I’m an American Indian,” said Baldwin. “People think to correct me and say, ‘Aren’t you Native American?’ I say, ‘No, I’m an American Indian.’

“There’s a generation of us that have a legal, rational relationship with the federal government,” Baldwin continued. “There are 576 tribes that have that relationship, and we call ourselves American Indians.”

Baldwin challenged the audience to think critically about their understanding of what determines an American Indian, and the role of both bloodline and respect of culture that drive it.

“Every American Indian tribe has the right to determine who their members are,” he said, referencing a 1972 Supreme Court ruling. “In fact, the Cherokee Tribe does not have a specific blood quantum requirement.”

But, he added, identity as an American Indian requires a deeper understanding of history. “Identity politics in Indian country is really important ...There’s a community, history and culture you have to join.”

Each November, recognized across the nation as Native American Indian Heritage Month, the Navy and Marine Corps take an opportunity to recognize the contributions of Native Americans to the services, and the nation.
The holiday rush will soon be upon us. My hope is that each of you will find time amidst the chaos to enjoy this time of year to the fullest. We at the President’s Board for Student Affairs have been staying busy by preparing for the turnover that will occur throughout the rest of the quarter, so be ready to see some new faces at PBSA events and meetings. Several of us were able to attend the welcome event for Vice President Mike Pence this November, and we look forward to future events throughout the rest of the quarter.

PBSA will be holding its final meeting of the year on the 5th of December, 2019, in the Dudley Knox Library, Room 138. Feel free to join us! At our last meeting, the NPS Librarian, Thomas Rosko, and Irma Fink showcased the new study rooms that will be tested in the library. We are excited to see the number of study spaces get increased on campus, and the sound-proofing in these new rooms make them excellent additions.

One area the PBSA would like to focus more of its efforts on is taking student feedback and critiques of the different areas on campus and funneling them through the proper channels to get results faster. If you have any ideas or feedback you’d like to provide, we are always here to help advocate for the changes students want to see.

The President’s Board for Student Affairs will continue striving for excellence, and our hope is to always leave things better than the way we found them. Best of luck to all in the current quarter!

With Warm Regards,
Gerald P. McLaughlin

Don’t hesitate to contact us at PBSA@nps.edu

Chair: Tech. Sgt. Gerald McLaughlin, USAF
Vice-Chair: Lt. Christina Gatti, USN
GSBPP Lead: Maj. Kevin Landreth, USAF
GSEAS Lead: Lt. Adam Waymouth, USN
GSOIS Lead: Master Sgt. Joe Scoley, USAF
SIGS Lead: Capt. Jessica Sunkamanaveonge, USAF

Have a story to share? Public Affairs is constantly seeking interesting news and stories for Update NPS. Send your tips to pao@nps.edu
Historical Highlights

Christmas at Del Monte, 1905, invitingly described in the San Francisco Call newspaper on December 17, 1905:

“...Enjoy the golf, the glass-bottom boats, hot salt water swimming, riding, driving and tennis. Special tickets, good leaving San Francisco by any train from Friday, December 22, returning any train Tuesday, December 26. Round trip rate, including four days' accomodations at DEL MONTE, only $18.00. Through train, with parlor car, leaves Third and Townsend daily at 3; returning, leaves Del Monte at 8:30 a.m....”

Is it any wonder they flocked to come to Del Monte in California’s wintertime? Enjoy your own holiday!

Historical Highlights are provided by the Dudley Knox Library.