



CNO Explores Future Warfare at the Naval Postgraduate School

By MC3 James Norket

In an effort to explore current research related to key naval priorities, Chief of Naval Operations (CNO) Adm. Mike Gilday visited the Naval Postgraduate School, Dec. 17, to assess the university's latest research and experimentation regarding unmanned systems and space engineering, as well as gain an appreciation for what NPS' faculty and students are doing for the future of warfare.

With NPS being host to 1,500 resident students offering nearly 70 different defense-focused curricula, the visit allowed Gilday the firsthand opportunity to see the university's interdisciplinary education and applied research in action as NPS researchers discussed innovative solutions to real operational problems. The Navy's senior uniformed leader also toured multiple laboratories during his visit, including the Center for Autonomous Vehicle Research Lab and the Space Systems Lab.

"NPS is the Navy's applied research university. There are functions that occur here that [the Navy] can't get anywhere else in the world. The surplus of experience and knowledge partnered with the ability to work on classified material on a secure campus makes NPS an invaluable asset to the fleet."

-CNO Adm. Mike Gilday

During the tour, Gilday learned about the newly-commissioned Wayne P. Hughes, Jr. Naval Warfare Studies Institute (NWSI), a program developed to provide fleet operational commands front-door access to NPS and coordinate the university's interdisciplinary response to their warfighting needs.

As NWSI Director and Professor of Practice retired Navy Capt. Jeff Kline explained to Gilday, the ultimate purpose of NWSI echoes NPS' ultimate purpose, which is to be a vital link between the institution and the naval forces in the development of concepts, wargaming and experimentation that leads to the rapid prototyping of emerging technologies.

"The NPS mission hasn't changed since its inception," said Kline. "Our job is to take a look and capture emerging tech and provide both the education and research environments so that officers can assess those emerging technologies and learn how to apply them in future conflict. That was our mission when we first started at the naval academy with mechanical engineering and radars, and it's our mission today as we take a look at artificial intelligence, machine learning and quantum sensing capabilities."

Lt. Timothy Howarth, an NPS student who is applying machine learning to develop better terrain navigation, was one of three students who presented their research to Gilday.

"I think seeing students who are motivated to change the Navy for the better will show [Gilday] just how crucial NPS is," said Howarth. "This is the perfect place for Sailors to learn. It lets us further our education and continue to make connections that will make tomorrow's Navy better than today's."

Overall, the brief visit provided Gilday with just enough information to peak his interest, noting he was very interested in the presentations and looking forward to seeing what comes out of NPS next.

"NPS is effectively creating the future leaders of the future Navy," he said.

NAVAL POSTGRADUATE SCHOOL

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NPS

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Happy
New Year!

January 2021

Marine Corps Commandant, Senior Leaders Commend Fall Quarter Graduates

By MC2 Taylor Vencill

Honoring the outstanding achievements of a new graduating class amidst many challenges, the Naval Postgraduate School (NPS) celebrated its latest class of new alumni with a virtual celebration of the Fall Quarter Graduation, Dec. 18. The newly-minted alumni rose above the evolving challenges of COVID-19 having swiftly adapted to remote learning in early 2020, demonstrating resolve personally and professionally, and completing the requirements of their rigorous academic and research programs.

In commencement remarks recorded prior to graduation day, 38th Commandant of the Marine Corps Gen. David H. Berger congratulated the 340 graduates, including 27 international students from 13 countries, highlighting the intellectual power and critical thinking present in NPS alumni. He emphasized the value of adapting to a changing environment, and to overcome challenges that only intellectual capability can master.

“In the future, the joint force can no longer expect to win on technical capabilities alone,” said Berger. “Your ability to rapidly process information will seize the initiative against a peer adversary. The future fight will be fluid with an ever-changing environment, and it will demand that Sailors, Soldiers, Airmen, Marines and our civilian workforce have the intellectual rigor to make sense of the environment, decide and act.”

Berger noted the military profession is a “thinking profession” where intellectual capabilities are imperative as the joint services look to future operating environments characterized by peer level competition and conflict.

“Although the environment and equipment will change, what must remain constant is our ability to understand, decide and act faster and more effectively than our competitors,” stated Berger. “We need leaders like you, who can think through multiple layers of the problem then quickly provide key operational solutions.”

According to Berger, NPS graduates, through their studies, receive the critical thinking tools required to leverage the power of information by analyzing a problem, making sense of the information, and responding effectively in the form of their thesis.

“The Fleet needs people who can accurately recognize cues, quickly make sense of information, and respond effectively,” said Berger. “In the end, it will not be technology that wins the next conflict, but the force with the intellectual edge.”

Acting Secretary of Homeland Security Chad Wolf, who also recorded a special

congratulatory message for the graduates, noted that an NPS education is an investment for the nation.

“The education you received at NPS not only improves you all as individuals, but it also allows you to use your knowledge on behalf of national defense and the American people,” said Wolf. “The department of homeland security specifically relies on NPS to produce the next generation of homeland security professionals and leaders. Investing in our leaders of tomorrow is an investment worth making.”

NPS President retired Vice Adm. Ann E. Rondeau lauded the graduates on their ability to persevere and overcome challenges in the COVID-19 environment.

“You have adapted, you have persevered, and you have performed in an outstanding manner amidst all the challenges, completing your research, your theses, your projects and your capstones that will lead to key warfighting solutions for our nation,” said Rondeau. “The accomplishments we celebrate today have empowered you to become committed innovators, adaptive thought leaders, and professional warfighters, more valued to your service and to your nation than ever before.

“We will be challenged again by forces well outside our nation’s control,” continued Rondeau. “But take solace, confidence and comfort in all that we do, in that we have the future leaders in place to champion the next challenge that lies before us.”

For more information on the Fall Quarter class, visit the [NPS Graduation website](#).



In addition to the 340 university graduates from across the U.S. military and DOD civilian workforce, international partner militaries, and homeland security organizations at all levels, the Fall Quarter graduating class also included three doctoral graduates, from left to right: Ben McGlasson (Applied Physics), Lt. Cmdr. Jamie Safar (Electrical Engineering), and William Anderson, Jr. (Systems Engineering). (U.S. Navy photo by Javier Chagoya)

Marine Corps Assistant Commandant Explores Emerging Concepts, Capabilities at NPS

By MC2 Tom Tonthat

On a trip to observe emerging technologies in practice, Assistant Commandant of the Marine Corps (ACMC) Gen. Gary Thomas, accompanied by five other general officers, visited NPS, Dec. 9, to engage directly with university faculty and students from key labs and institutes about the implications of their research on future concepts and capabilities for the Marine Corps.

The visit to NPS was part Thomas' West Coast innovation trip which allowed him and other senior leaders – including the Deputy Commandant of Information Lt. Gen. Loretta Reynolds and Assistant Deputy Commandant for Combat Development and Integration Maj. Gen. Kevin Liams – to see firsthand how organizations are leveraging technological advances in innovative ways that hold promise for the future force of the Marine Corps.

The key focus at NPS was to examine advances within the information environment including cyber, space, machine learning, artificial intelligence and data analytics.

Investing in research and education, the Marine Corps sends more than 150 students a year to NPS to work on key operational Marine Corps challenges. Therefore, nearly 40 Marine Corps students from all four of NPS' graduate schools had the chance to engage with Thomas and the cohort of senior leaders, presenting their research and getting feedback from the highest levels of Marine Corps leadership about how their research could be implemented.

“We greatly value the education that is made available here [at NPS] because it makes us better as a warfighting organization,” Thomas told the students. “We greatly appreciate a lot of the hard work that goes into your efforts as you complete your degree programs. How can we make the master's program even better? It's about making sure that we are aligning and leveraging the work that you are doing here.”

During the presentations, NPS student Marine Corps Capt. Molly Dundon described her thesis, “Information Warfare in the High-End Fight.” Thomas immediately acknowledged the relevance of her research due to information being a high priority focus area within Great Power Competition.

“It's a unique thing to the Marine Corps to be able to do such high-level research here with so many professionals,” said Dundon. “Getting such direct feedback helps us capitalize our time to make [our time] here most beneficial to the Marine Corps so we can make a big impact.”

According to Col. Randy Pugh, NPS Senior Marine Corps Representative, the USMC is looking at new capabilities and has a host of questions, all of which should be answered by people who have an excellent grasp on military operations, significant technical expertise, and critical thinking abilities.

“All NPS students have this rare combination,” Pugh said. “And when it combines with our world-class operationally-focused faculty, we have the ability to generate literally hundreds of studies or other kinds of research each year in support of realizing the vision in the Commandant's Planning Guidance.”



Assistant Commandant for the Marine Corps Gen. Gary Thomas talks with Naval Postgraduate School Information Warfare student Marine Corps Capt. Matt Dunovant during a visit to the university, Dec. 9, to observe the implications of student research on future concepts and capabilities of the Marine Corps. (U.S. Navy photo by Javier Chagoya)

In addition to engaging students, Thomas and his accompanying leaders got acquainted with NPS' Modeling, Virtual Environments and Simulation (MOVES) program, one of a handful of academic programs at NPS that is exclusively sponsored by the Marine Corps.

“This institute is perfectly suited to quickly think about something, prototype it in a virtual sense, and test it to see if it has merit or not before investing in it for the field,” explained Pugh.

NPS President retired Vice Adm. Ann Rondeau noted that the university is positioned to be a place of modeling and simulation (M&S) for the Navy and the Marine Corps.

“We can help the Navy and Marine Corps understand that M&S can happen here, and we can look at challenges that need M&S to solve them,” said Rondeau. “NPS is a place for growth and potential and there are no other places at this level of integration.”

Thomas also visited NPS' Center for Autonomous Vehicle Research (CAVR) where faculty and students demonstrated ongoing research on improving artificial intelligence parameters to produce better combat simulations, advancements in autonomous vehicles, and partnerships with 5G companies to encourage further developments through the broadband network.

“From my perspective, the highlight of the trip was the opportunity for the general officers to talk directly with the NPS students,” said Pugh. “I hope that the ACMC and the other generals validate what I am sure they already suspect—that NPS students represent incredible potential to solve many of today's tough challenges and to provide the 21st century leadership our 21st century force will require.”

“This trust should result in NPS students getting the first crack at really hard operational problems,” continued Pugh. “And, as our alumni progress through the ranks, they will be uniquely qualified for the most demanding leadership jobs in the Marine Corps.”

NPS Researchers Developing the Defensive Playbook Against Large-Scale Drone Swarms

By Rebecca Hoag

The 2018 Winter Olympics in PyeongChang, South Korea stunned the world when they put on a dazzling light show made up of a record-breaking 1,218 drones, all dancing in harmony. In the Department of Defense (DOD), though, the display reinvigorated interest in counter-swarm tactics research, for drones and swarming tactics can have applications in all warfighting domains.

Through funding provided by the DOD to the Naval Postgraduate School (NPS), Professors Isaac Kaminer and Abe Clark will lead the development of a counter-swarming analysis toolbox. The program is supported by NPS' Consortium for Robotics and Unmanned Systems Education and Research (CRUSER), a group that responds directly to Fleet and Force research needs. This effort builds upon previous research funded by the Office of Naval Research (ONR) Science of Autonomy program. It enables Kaminer's group to establish a multi-university, multi-year effort to develop an operational planning simulation for defense against an attacking drone swarm.

"We're looking for mathematical representation or frameworks that we can use to model these scenarios as accurately as possible," Kaminer explains.

Their project involves partnering with the Marine Corps Systems Command (MCSC), the Program Executive Office (PEO) Land Systems and Ground-Based Air Defense (G-BAD) to add input regarding real-world threats.

To model how all these objects behave collectively, Clark and colleagues in the soft matter field use discrete-element method (DEM) simulations. In these simulations, it sometimes takes a long time for the computer to determine the interaction between every grain of sand.

Similarly, a swarm is a group of individuals that work in-sync to achieve the same goal, but it can be made up of dozens or thousands of individual agents that are interacting with each other. Most swarming tactics nowadays involve autonomous vehicles (AV) and artificial intelligence (AI), but swarming is also conducted by manned vehicles. Several countries have already developed the technology to attack through drone swarms that can be shot out of ground-based or underwater launching systems into the air. NPS' own Advanced Robotic Systems Engineering Laboratory (ARSENL) has conducted a great deal of drone research and experimentation, including setting a record years ago for launching and flying 50 UAVs simultaneously.

Swarms can be directed by either following one leader or multiple, and the leader(s) can be physically there or virtual. And slowly, the commands are becoming more advanced and able to adapt to changes. There's also different types of flying patterns and different weapon possibilities.

With so many variables to consider, no prediction software packages currently available can keep up because it can take a while to go through all the possible avenues for every agent to take. Kaminer and Clark have joined with several other NPS and academic colleagues – Drs. Wei Kang, Johannes Royset and Sean Kragelund at NPS; Dr. Claire Walton at the University of Texas at San Antonio (UTSA); and Dr. Qi Gong from UC Santa Cruz – to find mathematical representations of all the different scenarios.



Building upon previous research exploring strategies to counter nefarious drone swarms, NPS researchers recently received funding for a new project to develop a comprehensive defensive playbook on how to defeat these broadly-utilized autonomous systems.

Clark brought his expertise in making simulations faster and more efficient. Kang and Gong, who teach in the math departments of their respective universities, help provide the theoretical backbone for these algorithms. Gong designs algorithms for large-scale optimization and Kang brings his expertise in the mathematical theory of Observability, which looks at how well internal workings of a system can be determined by one's understanding of external observations of the system's behavior.

"You can see velocity and location and based on what you can infer where the leader is and what coordination strategy they follow," Kang explains.

Royset, who teaches in the Operations Research (OR) Department, brings his understanding of random and deterministic optimization, or how resources can be used most effectively in cases of random or pre-programmed agents. In addition, Walton and Kragelund bring more experience and understanding of the theory of optimal control, like Kaminer.

The team will use the optimization protocols to build a "playbook" of best tactics for different kinds of scenarios. They have adapted the mathematical theory of optimal control to include uncertainty, meaning they are allowing room for the unknowns while still providing feedback to officers for decision-making.

"We want to make a framework that can model any particular kind of drone with any particular kind of weapons capabilities and also have some other ground-based weapons included," Clark explains. "Then we can hopefully just change a few lines of code, and we can still push play on the whole framework."

As demonstrated by the NPS innovation ecosystem of researchers, fleet partnerships and operationally-experienced students, this project has fully utilized the different intellectual and interdisciplinary facets of NPS to work towards a unified goal ... Advancing concepts to capabilities for an increasingly complex maritime battlespace.

Future Advantage: CRUSER Funds FY21 Robotics and Autonomous Systems Research

By MC2 Nathan K. Serpico

Key to the nation's future advantage in autonomous systems, the Naval Postgraduate School's (NPS) Consortium of Robotics and Unmanned Systems Education and Research (CRUSER) approved FY21 funding for novel research in robotics and autonomous systems through its Seed Research Program. This program provides NPS faculty and researchers with funding intended to "seed" important research projects devoted to advancing autonomous solutions from the NPS campus.

Established in 2011, CRUSER supports the Navy's goals and objectives in developing maritime applications of robotics, automation and unmanned systems as well as shaping the next generation of naval officers through education, research, concept generation and experimentation. Aiding in these goals, the CRUSER Seed Research Program supports research toward the maritime application of robotics and autonomy thereby fostering a rich, relevant research opportunity for faculty and students.

According to CRUSER Associate Director Dr. Carl Oros, the Seed Research Program is a key component of how CRUSER fosters an environment for students, faculty and staff to collaborate, both internally and externally, with the common goal of developing and fielding unmanned systems across the Department of the Navy.

"CRUSER views the [robotics and autonomous systems] field as inherently transdisciplinary and CRUSER-sponsored research spans disciplines from physics, engineering, computer science, cognitive science, as well as the other human-social implications of autonomy involving ethics, trust, law, policy and acquisitions," said Oros. "This seed research funding helps NPS researchers working on a variety of challenging problems associated with integrating [robotics and autonomous systems] in naval tactical and operational concepts.

"Our motto is 'from technical to ethical, from concept generation to experimentation,'" Oros added.

The critical research areas include advancement of acoustic sensing, swarming, autonomous behaviors and navigation, C2 architectures, human-machine teaming and trust, counter unmanned aerial systems, and meteorological research to improve unmanned systems sensors and weapons systems.

Each year, research proposals are submitted by NPS faculty based on research themes related to the Warfare Innovation Continuum (WIC) workshops, with this year's themes evolving through discussions with CRUSER's funding sponsor, the Office of Naval Research. A selection committee, comprised of the CRUSER Director and previous directors, the NPS Dean of Research, and NPS senior military service representatives and multiple warfighting chairs then meet to discuss and provide input for selecting the top funding priorities.

The current fiscal year funding will provide financial support for a variety of robotics and autonomous systems projects that aim to address key warfighter challenges, including understanding the ethics involved with these various capabilities.

"The on-going focus on autonomous multi-vehicle systems implicitly requires consideration of not only technical and operational aspects

of these systems, but also the legal and ethical aspects," noted seed funding recipient Navy Cmdr. Kathleen Giles, NPS Permanent Military Professor in the Systems Engineering Department.

Along with the development of these robotic and autonomous systems, operating these vehicles to their full capabilities is multifaceted with both the autonomous system and their human operator needing to work in a cohesive manner. This human-machine interaction is just one of the multiple aspects that Giles and her team will be addressing during their experimentation.

In order to progress in the technical and ethical domains of robotics and autonomous systems, collaboration is essential. A few groups are using a collaborative effort between NPS faculty and research partners from other academic institutions, such as University of Alabama – Huntsville and Arizona State University. The most integral collaboration, however, will occur between field disciplines.

"The nature of human-robot interaction is inherently multidisciplinary," said Assistant Professor Robert Semmens, also a funding recipient from NPS' Systems Engineering Department. "On the technology side, you need engineers and computer scientists to make the system work and make the capability even come around. On the human side, it calls for psychology and human factors. Further, there are the broader sociological and ethical considerations that surround the interaction between the human and the technology."

According to Oros, CRUSER will continue advocating for robotics and autonomous systems education and research on campus and is always looking for collaborative stakeholders to advance the Secretary of the Navy's autonomous systems goals.

"I'm glad that CRUSER exists," noted Semmens. "I think it's a great asset to our research base to have an organization that is supporting us. It's certainly advantageous for the faculty and principal investigators, but also for the students. And it makes sure our work is relevant to the force."



NPS' CRUSER Seed Research Program provides funding intended to 'seed' novel research in robotics and autonomous systems, fostering a rich, relevant research opportunity for faculty and students to advance maritime applications of robotics and unmanned systems. (U.S. Navy graphic by MC2 Nathan K. Serpico)

NPS Researchers, Marines Explore the Trust Factor in Human-Machine Teaming

By Javier Chagoya

Trust in autonomous systems to do what they are designed to do, and meant to do, is paramount before these systems can be confidently employed as an operational capability. In an era of Great Power Competition, where those who can field autonomous capabilities the fastest will have a distinct advantage, researchers at the Naval Postgraduate School (NPS) are exploring many of the fundamentals of autonomous systems, especially in the trust and confidence arena.

On the eve of the COVID-19 pandemic, NPS researchers conducted a novel experiment with an autonomous robot in a simulated environment – with real Marines – seeking to understand just how confident the Marines were in the robot to complete its tasks in a combat environment.

The NPS research team, comprised of Assistant Professor Mollie McGuire, Research Associate Christian Fitzpatrick and NPS student Marine Corps Maj. Dan Yurkovich, traveled to Camp Lejeune, N.C., to research Yurkovich's thesis, titled "Human-Machine Teaming," using Camp Lejeune's Combat Town Range and nearby Marines from the Advanced Infantry Training Battalion (AITB) as part of a testbed. This research was directly responsive to the Marine Corp's 2018 Science and Technology Strategic Plan which has a key objective to pursue advanced robotic systems to support ground maneuvers.

The experiment put the robot in an urban environment in the Combat Town Range, calling for the robot to conduct room clearing, which is one of the most common of tasks in an urban warfare environment, but also one of the most dangerous.

For the experiment, the researchers employed the 310 Small Unmanned Ground Vehicle (SUGV), a man-portable robot intended for use by soldiers, combat engineers and mobile explosive ordnance disposal (EOD) technicians to gather data for situational awareness in critical conditions. The Marines interfaced with the robot through a virtual gaming environment, created by NPS' Modeling Virtual Environments and Simulations Institute, where they "trained" the robot in its specific room clearing tasks and could then evaluate its effectiveness in accomplishing them from a "safe room" nearby.

"The experiment aimed to see if introducing and training with the robot in a virtual environment would aid in developing trust with the actual robot," said McGuire, who served as thesis advisor. "The experiment explored ways to develop trust in robotic teammates in a more efficient manner by using virtual environments instead of having Marines spend hours training with the robot itself."

McGuire noted that the objective was then to see if the Marines that "trained" the robot within the gaming environment had higher trust in the actual robot due to the potential forming of a "team dynamic" between man and machine – the robot learning human preferences, and the human learning robot capabilities.



A Model 310 Small Unmanned Ground Vehicle (SUGV) like this one was used at Camp Lejeune, N.C., to test Marine's reactions within a virtual environment, working in tandem with the robot, followed by a live execution and utilization of the same SUGV, influenced by two types of machine learning for autonomous actions. (U.S. Marine Corps photo by Sgt. Anthony L. Ortiz)

"The young Marines in our experiment had a high level of technical competence especially in the understanding of machine learning," said Fitzpatrick. "Some Marines [had questions about] our processes in the transfer of gaming data to the robot which indicated they were closely observing us as we were observing them."

According to Fitzpatrick, the team was able to collect good data across a range of measurements.

"Gauging human-robot interaction with actual users was invaluable," said Fitzpatrick. "Our conclusion was that if Marines are involved in the development and integration process from the start, they would trust the unmanned capability to a greater extent when using them during real-world operations."

McGuire explained that if this trend continues, it might suggest a positive relationship between training time and trust development between humans and their robot teammates.

Yurkovich recently discovered that his original sponsor for this project, the Office of Naval Research, has incorporated some of his results into larger projects. He noted that other researchers are exploring the concept of rehearsals in virtual environment and how it transfers to live execution.

The experimentation appears to be promising as developers and researchers are evolving models to a next generation virtual environment game play and further resolving it to the real-world, he added.

NPS Creating Virtual Undersea Environments to Advance Underwater Autonomy

By MC2 Tom Tonthat

With undersea warfare remaining a key domain for U.S. defense strategies, the ability to map and navigate the depths of the world's oceans becomes increasingly essential to maintaining an advantage. Responsive to the Navy's emerging technological needs, the Naval Postgraduate School (NPS) is partnering with private academia to develop a virtual undersea environment to assist with the research and development of autonomous underwater vehicles (AUV) so they can conduct marine mapping of the world's oceans.

Partnering with the Woods Hole Oceanographic Institution (WHOI) – a private, nonprofit research and higher education organization dedicated to the study of marine science and engineering – NPS is capitalizing on its interdisciplinary curricula and innovative faculty and students. Through the partnership with WHOI and its relevant expertise, NPS researchers will deliver real-world naval solutions in the form of new underwater autonomous capabilities.

“The general area of this research is to provide authentic virtual environments for developing and evaluating autonomous systems, specifically ocean robotics systems,” said Associate Professor Brian Bingham, Director of NPS' Consortium for Robotics and Unmanned Systems Education and Research (CRUSER). “We're trying to create these virtual environments for a variety of underwater meteorology and oceanography platforms, as well as autonomous underwater vehicles (AUVs), to test their operations and be able to develop the autonomous software before doing real-world tests.”

According to Dr. Michael McCarrin, Research Associate in the NPS Department of Computer Science, reliable mapping has recently become widely available for land applications which has greatly modernized land-based transportation.

“Almost everything is made easier and more efficient with a good map,” said McCarrin. “The ocean is a challenging environment, and our reach using current technologies is relatively limited, even assuming an unlimited budget. As AUV technologies improve, the hope is that we will both extend our [mapping] capabilities while simultaneously reducing risk to human operators.”

For WHOI, partnering with NPS to create a virtual undersea environment can be used as

a testbed for AUVs under development. For a virtual undersea map to be a reality, it will be autonomous systems that are exploring the ocean depths, and at lesser risk and expense than their manned counterparts.

“It's about us recognizing opportunities to help our defense department and academic partners to create these kinds of solutions and innovations,” said Bingham. “Our stakeholders rely on us for domain expertise, and we rely on them for setting priorities ... that creates a partnership.”

Bingham and McCarrin credit NPS' relationships and collaborative efforts with others in private industry and academia for the shared resources that should ultimately lead to a successful virtual undersea environment, and ultimately better autonomous systems.

Bingham noted there are some really hard problems in the maritime domain involving autonomy and robotics, including getting people to think beyond the mainstream.

“We're trying to create an environment that would attract our students to think about careers in these areas and realize autonomy is not just self-driving cars,” said Bingham. “For our NPS students, they're getting to work with industry engineers to create the playing field, to come up with the physical environment simulation and infrastructure that will lead to interoperability between NPS, industry, even other Department of Defense agencies, that will live beyond them.”



An unmanned underwater vehicle (UUV) is deployed by an operator to search for possible objects of interest using side-scan sonar. A new partnership between NPS and Woods Hole Oceanographic Institution to create a virtual undersea environment could advance future UUV development, leading to an entirely new set of critical naval missions for these emerging systems. (U.S. Navy photo)

CAMPUS news & notes

The following is a short selection from the list of students recognized as winners of the Fall Quarter 2020 NPS Awards:

- **Monterey Peninsula Council of the Navy League LCDR Tom Winant Highest Academic Achievement Award**—Ensign Rachel Seeberger
- **Military Operations Research Society Stephen A. Tisdale Graduate Research Award**—Ensign Rachel Seeberger
- **Naval Postgraduate School Outstanding Academic Achievement Award for Department of Defense Student**—Mr. Peter J. Pommer
- **Naval Postgraduate School Outstanding Academic Achievement Award for International Students**—Major Romulo Dimayuga, Philippine Marines
- **Naval Postgraduate School Superior Service Award**—USAF Capt. Daniela Carchedi
- **Marine Corps Association Superior Service Award for Outstanding U.S. Marine Student**—USMC Staff Sgt Derek Ward Sharp
- **Association of the United States Army, General Joseph W. Stilwell Chapter, Award for Outstanding Army Student**—US Army Maj. Richard T. Hill
- **Air Force Association Award for Outstanding U.S. Air Force Student**—USAF Maj Temesha R. Christensen
- **Naval Sea Systems Command Award for Excellence in Systems Engineering**—Lt. Christopher Hevey
- **Naval Sea Systems Command Award for Excellence in Combat Systems**—Lt. Cmdr. Leland McCarty

Congratulations to all the students for their outstanding achievements!

Send your campus news and notes to update@nps.edu.

TLC Guides NPS Teaching and Learning through the Pandemic

By Matthew Schehl

In March 2020, a virulent global pandemic swept across America, bringing daily life to a standstill virtually overnight. However, Naval Postgraduate School (NPS) hardly missed a beat. It seamlessly transitioned to nearly total [distance learning](#) (DL), ensuring the university remained steadily on course to continue delivering excellence in advanced education to the nation's military officers.

Prior to the COVID-19 outbreak, approximately one third of NPS faculty taught via DL; over the course of the Spring Quarter, this figure had risen to one hundred percent. Propelling this remarkable transformation was the university's [Teaching and Learning Commons](#) (TLC), a relatively new cross-campus consortium dedicated to enhancing the quality of NPS education. Although less than two years old, the TLC was able to draw on the extensive inroads, partnerships and open lines of communication it had cultivated in that short time to rapidly and effectively adapt to the unfolding crisis.

“When the transition to DL was first announced, the TLC played a ‘boots on the ground’ role, meeting with faculty one-on-one or with school departments,” explained Dr. Raluca Gera, TLC director and Associate Provost for Graduate Education. “Our goal was to provide the necessary information required to empower faculty who had never taught DL before or who had never used DL technology. What distinguished our support was our proactive approach with regard to anticipating challenges, identifying resources, and then reaching out to faculty to work with them on finding personalized solutions that meet their instructional needs.”

The TLC was born of a recognized need to bring people and ideas together from across campus. Since its inception in the Spring of 2018, it has functioned as a collaborative community of practice at NPS: the [Office of the Associate Provost for Graduate Education](#) (OAP-GE) partnered with the [Dudley Knox Library](#) (DKL) and Information and [Technology Communications Services](#) (ITACS) to coordinate a wide range of specialized services and resources. By joining forces, these entities were able to serve as a catalyst for the creation of new teaching and learning environments at NPS specifically geared towards the school's unique student population.

“Think of the TLC as a cohesive, virtual umbrella organization over existing centers — nobody belongs to the TLC, but we bring together faculty and student perspectives as well as the technology to support their requirements,” Gera said. “Our focus is to enhance teaching and learning and instill awareness of the resources that faculty and students have for that.”

When the coronavirus struck and NPS President, retired Vice Adm.

Ann Rondeau, mandated all residential unclassified classes [immediately transition to DL](#) for the start of the academic quarter on March 30, these efforts had laid an effective groundwork for the TLC to act as a central hub for communication, information, web-based resources and tools to support the transition.

“If COVID were to have hit NPS prior to the formation of the TLC, the campus organizations would have been able to respond in their own way, but in silos,” observed D’Marie Bartolf, Coordinator of Education Innovation at NPS. “Because the TLC was created 18 months prior to COVID, the communication bridges were in place that allowed NPS to be uniquely positioned to respond to COVID in a collaborative manner.”

The OAP-GE, DKL and ITACS all stepped up to ensure these bridges were solid, and that the needs of students, faculty and staff continued to be met. One of the initial challenges in realizing this was making sure an adequate information technology infrastructure was in place. For this, ITACS had the right tools for the job.

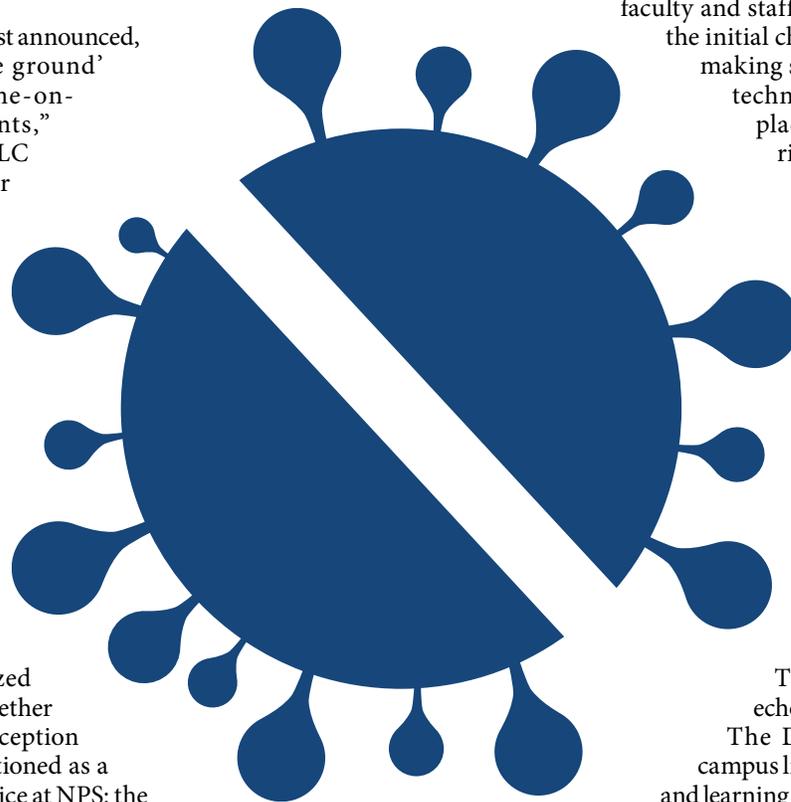
“We were fortunate to have most of the tools in place prior to COVID,” noted retired Capt. Scott Bischoff, NPS CIO and Information Technology Director. “We made the decision years ago to invest in Microsoft 365. It is cloud based and suits remote work well, not only as a system of productivity applications, but also the security apparatus behind the scenes.”

This spirit of collaboration echoed throughout the university. The DKL, long the epicenter of campus life, remained a hub of teaching and learning through continuously working with the NPS community. Virtual town halls through the TLC, according to University Librarian

Tom Rosko, provided the opportunity not only to communicate services to students and faculty, but for the library to listen to — and meet — their needs.

The TLC continues to provide comprehensive support as COVID conditions continue and students provide feedback on their needs and the challenges they experience. Underlying this success is a current of community in the truest sense of the term, and the TLC's recognition that community engagement is not only a pedagogical but also a psychological imperative.

“Our goal,” Gera said, “is to continue to support a diverse population of faculty who continue to deliver quality online education, supporting their flexible teaching styles enabling distinctive learning experiences.”



Any Day at NPS



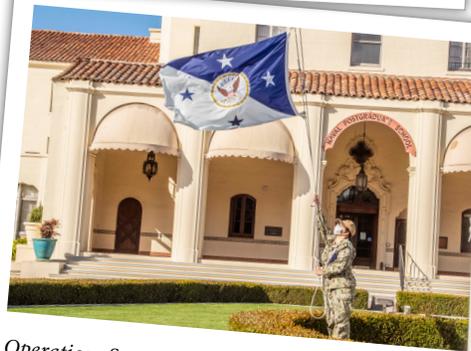
NPS President retired Vice Adm. Ann Rondeau, center, signs the charter document commissioning the Naval Warfare Studies Institute (NWSI), which will help expedite the Navy and Marine Corps' ability to access the university's immense talent and resources across campus for solving warfighting issues. NPS Professor of Practice Jeff Kline, left, looks on as NPS Acting Provost Rob Dell, right, witnesses the momentous signing in the school's Dudley Knox Library, Dec. 11. (U.S. Navy photo by Javier Chagoya)



NPS President retired Vice Adm. Ann Rondeau, left, and NPS Professor of Practice Jeff Kline preside in a ceremonial ribbon cutting honoring the memory of late NPS Professor of Practice and Dean Emeritus retired Capt. Wayne P. Hughes Jr., in a presentation of a memorial bench dedicated at NPS' Glasgow Hall, Dec. 11, 2020. Hughes passed away Dec. 3, 2019. The inscribed marble bench, placed in the hall's courtyard, was Hughes' favorite retreat from his indoor office, where he spent hours writing and reviewing papers in his last years as a member of the faculty. Present for the ceremony was Hughes' widow Joan and daughter Nancy. (U.S. Navy photo by Javier Chagoya)



Mrs. Linda Gilday, right, speaks with School Liaison Officer for NSA Monterey Dr. Cheryl McCloud during a visit to the Naval Post Graduate School campus with Chief of Naval Operations Adm. Michael Gilday, Dec. 17. (U.S. Navy photo by MC3 Lenny Weston)



Operations Specialist 1st Class Heather Karel lowers the flag of the Chief of Naval Operations (CNO) as CNO Adm. Michael Gilday departs NPS after assessing the university's latest research and experimentation in unmanned systems and space engineering, Dec. 17. (U.S. Navy photo by Javier Chagoya)



NPS Senior Enlisted Leader Senior Chief Logistics Specialist Llord Bainco, left, and NPS Chief of Staff Capt. Philip Old, right, pin new rank on now Aviation Electronics Technician 2nd Class Ana Lugo during a frocking ceremony, Dec. 18. (U.S. Navy photo by MC3 James Norket)



NPS Junior Sailor of the Year Mass Communication Specialist 2nd Class Nathan K. Serpico, center left, and NPS Senior Sailor of the Year Yeoman 1st Class Lao Kue, center right, are happily surprised to receive their Sailor and Junior Sailor of the Year awards during an Awards at Quarters ceremony, Dec. 18. (U.S. Navy photo by MC3 James Norket)

FACULTY news & notes

The following faculty were recognized as winners of the Fall Quarter 2020 NPS Awards:

- **The Lieutenant Commander David L. Williams Outstanding Professor Award**—Professor Erik Dahl, Department of National Security Affairs
- **Carl E. and Jesse W. Menneken Annual Faculty Award for Excellence in Scientific Research (“highly meritorious”)**—Research Associate Professor Dashi Singham, Department of Operations Research and Associate Professor Mike Atkinson, Department of Operations Research
- **Carl E. and Jesse W. Menneken Annual Faculty Award for Excellence in Scientific Research (“sustained and significant”)**—Research Professor Weislaw Maslowski, Department of Oceanography, and Professor Qing Wang, Department of Meteorology
- **Meyer Award for Teaching Excellence in Systems Engineering (Distance Learning)**—Retired U.S. Navy Capt. Donald Muehlbach PhD, Department of Systems Engineering
- **The Louis D. Liskin Award for Teaching Excellence in the Graduate School of Defense Management**—Dr. Simona Tick, Graduate School of Defense Management
- **The Military Officers Association of America Joint Service Warfare Award**—Cmdr. Thor Martinsen
- **The Captain David S. Bill, Jr., Leadership Award**—Cmdr. Thor Martinsen
- **The First Command Military Leadership Award**—Cmdr. Matthew Geiser

Congratulations to all the faculty for their outstanding achievements!

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

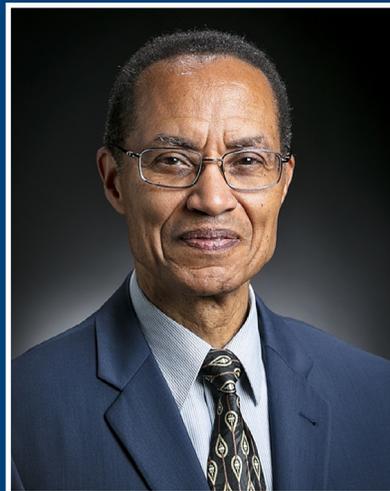
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Admiral Haney retired in January 2017 after completing 38 years of distinguished service in the United States Navy. As a 4-star Admiral, he commanded the US Strategic Command (2013-2016) responsible for strategic capabilities involving nuclear weapons, missile defense, space and cyberspace and the US Pacific Fleet (2012-2013) responsible for the manning, operations and maintenance of the US Navy fleet located in the Pacific and Indian oceans. As a career submariner, he had command of the fast attack nuclear submarine USS Honolulu (SSN-718), Submarine Squadron ONE (Pearl Harbor, HI), and Submarine Group TWO (Groton CT). He now serves on the Johns Hopkins University Applied Physics Board of Managers, the Naval Studies Board, the Aerospace Corporation Board of Trustees, and the Board of Directors for General Dynamics Corporation, Systems Planning and Analysis Inc., and the Center for a New American Security.

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On campus this month

January 1

New Year's Day



January 18

Martin Luther King Jr. Day



January 26

V-SGL with retired Adm. Cecil Haney: *Great Power Competition in the Cognitive Age*
3:00 p.m. | Online



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