# HASC Chairman Talks Defense Innovation, Technological Leadership During Visit and Lecture at NPS

*By MC2 Tom Tonthat*

Congressman Adam Smith, 17th Chairman of the House Armed Services Committee (HASC), visited the Naval Postgraduate School (NPS), July 13, to participate in the university's Secretary of the Navy Guest Lecture (SGL) program. Smith discussed the critical role of creativity, innovation and emerging technology in U.S. national security during his presentation, "Advancing Our Defense Technological Leadership," offered live to students, faculty and staff in NPS' King Auditorium and broadcast online.

Smith represents the 9th District in the state of Washington, and was the youngest state senator in the nation when he took office in 1991. He has served on the HASC since '97, and with his current and former committee assignments, developed keen insight into critical national security issues and challenges. Smith shared some of these insights into how the nation can leverage emerging technologies for defense, recognizing the important role of officers and DOD civilians, well-educated in relevant studies, in achieving these goals.

Smith began his time on campus with a tour and briefings in NPS' Large Experimentation Annex, a highlight of which is the first-of-its-kind Xerox ElemX 3D Liquid Metal Printer. He was interested in the research that NPS students were working on, using the advanced capabilities of the printer for naval purposes.

"It is important for us to demonstrate our work to people like Congressman Smith, because NPS is unique in that it has young officers like myself with fleet experience," said U.S. Navy Lt. Jacob Magnusson, a Mechanical Engineering student who presented his thesis. Magnusson is using the ElemX printer to build hollow parts that could potentially be used in submarines to detect noise above the sound layer.

> *"I think we are still the best, most capable country in the world. When you look at our universities and our capital markets, we have incredible strengths that we can use to meet the challenges that we face. We just have to understand what those challenges are and how to get better at it, specifically how to get better at the innovation and capabilities game."*
>
> *–17th Chairman of the House Armed Services Committee, Congressman Adam Smith*

"We can use this fleet experience to identify problems and tailor our studies at NPS to help fix these problems and make the Navy and other Armed Service branches stronger," Magnusson said.

With his 20+ years of service with, and subsequent leadership of, the HASC and its jurisdiction over defense policy, ongoing military operations and acquisitions, Smith said he believes the U.S. has the resources to remain a global leader in tech innovation.

To read the full story, please visit our website.




UPDATE NPS

NAVAL POSTGRADUATE SCHOOL


**Women's Equality Day Aug. 26th**


August 2021

# New Certificate Program Develops Skills to Implement Emerging Tech

*By Matthew Schehl*

The Naval Postgraduate School (NPS) just took a big step forward in cultivating leaders' ability to bring emerging technologies to the Fleet.

The university launched a new certificate program called "Implementing Technological Change" this academic quarter to hone the essential skillsets necessary for technology professionals to spearhead policy development and drive organizational change. With an emphasis on empowering leaders, the certification seeks to synchronize intellectual, communication and policy skills with complex technological change.

"Developing, educating and managing talent for the emerging technology and cyber workforce are foundational themes in the Secretary of the Navy's [strategic] documents and planning, but the impact of that investment depends on technology professionals also having the skillsets to communicate, strategize, and lead from those domains," noted Dr. Britta Hale, an assistant professor in the NPS Department of Computer Science, and architect of the new certification. "NPS is stepping ahead of this challenge, empowering technological leaders and not just technologists."

*NPS launched a new certificate program called "Implementing Technological Change" to hone essential skillsets for the advocacy for emerging technologies and for future leaders to help drive policy development and organizational change using those technologies.*

In an era defined by the rapid technological advances and emerging capabilities of our peer adversaries, an aggressive technological and cyberspace response is paramount. In this, the capacity to bring not only "beans and bullets" but intellectual capital to bear will be the deciding factor in maintaining the strategic advantage of the United States.

NPS' Implementing Technological Change certificate furthers this by inculcating students' ability to advocate their highly-specialized knowledge to a wide audience, both up and down decision-making ladders.

"NPS has a stellar track record for designing, analyzing and customizing innovative technological solutions for the DOD in all domains, and in the current era that extends to topics such as cyber, artificial intelligence and space systems," said Hale. "However, the value of developing know-how is neutralized if there is no transition for effect. Impact requires not only knowledge but effective communication and domain-customized leadership."

To help achieve this, the new certificate program requires two core courses: Communication for Managers (GB3012) and a new course – Advocating Emerging Technologies (CS4926). This new course offering allows for a deeper dive into effectively communicating subject matter expertise in a way that is immediately accessible to a non-technical audience.

Additionally, two elective courses are required from Cyber Policy and Strategy (CY4410), Innovation Leadership (CS4925), Militaries and Technological Change (DA4101) as well as either Managing Planned Change in Complex Organizations (MN4125) or Management of Change (GB4015).

Taken together, the certificate program is truly multi-disciplinary in nature and intentionally designed to support students of any technological discipline. The need for this stemmed from witnessing a student struggle to explain his work to a professor from outside his discipline, Hale explained.

"The student gave a very nice and authoritative presentation, but it was ineffective: the professor clearly had no idea why he, or the DON, should care about it," she said. "Meanwhile, as someone familiar with the quality and consequences of the student's research, I would have advocated it to the highest levels for mandated reading. It was that important. It had the potential to have a critical impact on the cybersecurity posture of the DOD."

The fact that the presentation didn't have the intended results was based not on the quality or potential impact of the science, Hale stressed, but simply on how it was conveyed.

She began to observe students – and warfare center professionals – with this potential problem in mind. Time and again she watched them dedicate all their effort to advancing technology, but only to face pushback on technological change, and in some cases, even disregard.

From this, Hale developed the Advocating Technological Change course and later combined efforts with strategy and leadership faculty to formalize the Implementing Technological Change certificate. In all, the process took nearly a year to ensure that the right topics and coverage, as well as study flexibility for students, could be achieved.

"We provide the Navy not just with talent, but actionable talent," said Hale.

# NPS Launches Center on Combating Hybrid Threats to Address Hybrid Warfare

*By Matthew Schehl*

On November 25, 2018, a Russian commercial cargo ship suddenly parked itself across the narrow Kerch Strait on the Crimea, blocking three Ukrainian Navy vessels sailing in international waters from reaching the port of Mariupol on the Sea of Azov. When they tried to turn back, the ships were rammed and fired on by Russian military forces, then boarded and seized. The event sparked international outrage at the time, but the deed was done: through obfuscation and brute force, Russia had asserted de facto dominance over the strategic passage into the Black Sea and beyond.

The incident has since been seen as a textbook example of a new generation of hybrid warfare, blurring the lines between military and unconventional conflict. Operating just below the threshold of war, state and non-state actors are increasingly employing hybrid methods to attain their objectives. Their intentional use of disinformation, prevarication, cyberattacks, economic pressure and the deployment of irregular armed groups presents a critical challenge to the world's democracies.

It's a challenge that the Naval Postgraduate School (NPS) is taking on directly.

The university's new Center on Combating Hybrid Threats (CCHT), officially formed in early 2021 to meet this growing threat, is part of an international effort to detect, deny, disrupt, degrade, defeat and ultimately deter the use of hybrid threats by our adversaries. Drawing on NPS' immense intellectual capital, the CCHT serves as a locus for interdisciplinary research, education programs and outreach for partners near and far.

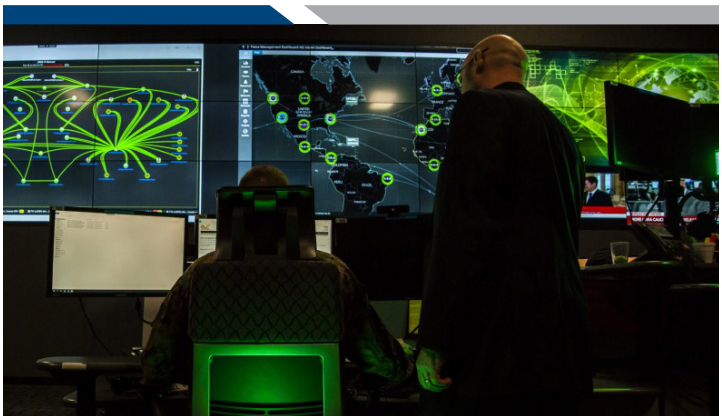
"The CCHT is an opportunity for us to tackle the problem of hybrid threats from a comprehensive, 'whole-of-discipline' approach in order to better confront these challenges in the future," explained Larry Walzer, CCHT's deputy director. "We work both domestically and with allies and partner nations as a forum to exchange ideas to better confront these challenges together. Certainly, a more comprehensive approach is required if we're going to get to a position where we can actually deter our adversaries."

The center has already forged new partnerships to explore ways to identify and counter hybrid threats. In May, for example, the CCHT met with Argonne National Laboratory's Hybrid Threats Division to establish future collaboration in areas of mutual interest. In addition to addressing national level interagency coordination, they looked at holding mutually beneficial training events in the future.

The CCHT has similarly partnered with the DoD Information Strategy Research Center, the Institute for Security Governance, Defense Security Cooperation Agency and the Hybrid Centre of Excellence for Countering Hybrid Threats in Helsinki, Finland.

Through NATO's Energy Security Centre of Excellence, they've also supported NATO Coherent Resilience (CORE), a series of tabletop exercises dedicated to bolstering energy systems resilience in partner nations. Through CORE, the CCHT will head to Ukraine and Lithuania this September to focus building energy sector resilience to Russian hybrid threats in these regions.

NPS, under the auspices of the Energy Academic Group, has supported CORE since 2017, but collaboration with partner nations in the realm of hybrid threats actually goes back further, according to Tahmina Karimova, CCHT's Business Development and Operations manager.



*NPS' new Center on Combating Hybrid Threats provides technical expertise, supports critical research and education programs, and fosters collaboration across and beyond campus in a comprehensive effort to support the development of the strategic, operational and technological means necessary to detect, disrupt and deter hybrid threats by both state and non-state actors.*

"Our international work started back in 2009 under the umbrella of the United States Partnership for Peace Training and Education Center (USPTC)," she said. "We worked across the [Combatant Commands], engaging partners on different topics, hybrid threats being one of them, but we lacked one cohesive center that would join all the faculty and students to continue the work through an interdisciplinary angle and serve as a force multiplier.

"Now we are better prepared to tackle this critical subject area through closer collaboration with expert faculty and students across several disciplines," Karimova added.

Such fusion potentially offers NPS students hands-on, practical participation with key stakeholders in this critical domain.

The CCHT is currently assessing several academic venues such as new certification, joint master's and executive education programs, and research sponsors have already proposed a number of fully-funded thesis topics, including Combating Malign Behavior at Sea, Kinetic and Non-Kinetic Hybrid Threats on Critical Infrastructure, Artificial Intelligence and Machine Learning in Manipulating Adversarial Posture in Combating Hybrid Threats, and several others.

Walzer noted, "We're also looking to establish some events in the near term, such as virtual seminar programs, that will help our students become better aware of both the inherent challenges of hybrid threats and of the center itself in order to interact with faculty that they may not be exposed to in their individual fields. We're certainly looking to bring our diverse disciplines and research areas together to increase the sharing of information and gain greater perspective and understanding."

For more information on the CCHT, visit https://nps.edu/web/ccht.

# Experts Explore Information Defense, Strategy During NPS Symposium

*By Javier Chagoya*

In today's environment of 'alternative facts' and false narratives propagated over social media, along with masterful campaigns of disinformation shaped by both China and Russia, effective information and political warfare strategies are as critical as ever. This is the domain of the DOD's Information Strategy Research Center (ISRC) on the Naval Postgraduate School (NPS) campus, which brought together a community of experts for the Symposium on Information Strategy and Political Warfare (SISPoW), June 22-24, to examine China and Russia's infiltration of mass media and how it has affected democracies.

NPS Associate Professor of Defense Analysis and symposium panelist Dr. Camber Warren led off the discussion, describing how subversive and malign messaging emanating from China or Russia has leveraged existing social divisions to trigger violent responses by segments of Americans that find themselves increasingly disenfranchised.

"These segregated echo chambers pose a national security problem because it creates vulnerabilities and fosters violent divisions among the populace," said Warren. As new communication technologies are reshaping the information environment to facilitate targeting of narrower audiences, Warren noted, incentives arise for many actors to engage in messaging "on social media platforms like Twitter, [and] that feeds divisions."

It's no secret these attacks emanate from cyber criminals shielded within the borders of nation-states, many supported by those peer adversary governments, according to FBI investigations on cyber attacks and intrusions. The SISPoW previously tackled cyber and information strategies and tactics in the post-Cold War environment. Now, this year's session is focused on strategies within the context of Great Power Competition (GPC) for Geographic and Strategic Reach.

Symposium coordinator, NPS Defense Analysis department Assistant Professor Ryan Maness, describes these nefarious cyber practices by both large and small nation-states as being guided just beneath the threshold of what is considered the international law of armed conflict.

"The symposium panelists discussed how rapid technological change has forever altered the information space, where instant access to information via the Internet has made the world's liberal democracies, including the United States, very vulnerable," said Maness.

"As we shift our grand strategy to Great Power Completion, we know that our authoritarian adversaries are taking advantage of prolific instant access in free societies and have been attacking us in the cognitive space.

"These cyber intrusions also imply that competition outside of the warfighting domains is just as salient, as China's tech sector aggressively spreads its influence through their Belt and Road Initiative, and Russia continues to utilize technology to sow discord and chaos in democratic societies," Maness continued.

This year's symposium covered crucial topics in the cyber domain and the information environment with discourse on 'free speech versus disinformation' and 'how public and private sectors can better work together' for national interests in thwarting attacks.

International cyber information experts Marc Lanteigne of the University of Tromso and Dr. Whitney Lackenbauer of the North American and Arctic Defence and Security Network, agree that China is attempting to gain a foothold in the Arctic by several means.

*Gabrielle Lim of the Harvard Kennedy School, left, joins NPS' Defense Analysis Associate Professor Camber Warren, center, and Joint Special Operations University faculty member at U.S. Southern Command Dr. Joseph Long, during a symposium panel session on Free Speech versus Disinformation in NPS' Glasgow Hall.*

"China wants to legitimize its future in the Arctic by creating businesses around it and as part of a long-term tactical strategy in the region, like in so many other parts of the world, and will continue to shape their narrative," said Lanteigne.

Russia's narrative is to create the idea that U.S. and NATO are threatening Russian sovereignty. Both China and Russia have attempted to distract its people regarding human rights issues, Lackenbauer noted, pointing to eight elements of strategic distraction.

"Russia is about disruption – China's ambition is to build stability and to be perceived as providing a 'win-win' situation to gain access with help from Arctic states. China does not share a border with Arctic territory but wants to put on a face of benevolence to push back for an Arctic presence. China is also excluded from the region's ocean governance policies," added Lackenbauer.

NPS Distinguished Professor of Defense Analysis Dr. John Arquilla and Wittenberg University Professor Emeritus of Political Science Dr. Bin Yu wrapped up the symposium with a discussion on the future of U.S., Russia, China relations and what can be done.

Yu's recent article, "Empire Strikes Back at Moscow and Beijing," says that the changing of the guard at the White House did not reset ties with Washington. Instead, the Biden administration has turned up the heat by re-joining with its alliances with a strong message of 'America is back.'

"China sees Putin as a jigsaw puzzle because he has distanced himself from China. Both China and Moscow have created a sense of danger and threat from each other. These are polarized misrepresentations," said Yu.

For more information about the DOD Information Strategy Research Center at NPS, visit https://nps.edu/web/isrc.

# NPS Cybersecurity Expert Explores 'Weapons of Mass Disruption' in New Book

*By MC2 James Norket*

The German War Machine of World War II utilized a military tactic, known as Blitzkrieg, to create psychological shock and disorganization of enemy forces through surprise, speed and superiority in firepower. The German concept, which translates to "lightning war," has been around – though under the earlier name Schwerpunktprinzip – since the Prussian military in the early 19th century.

In today's day and age, Dr. John Arquilla, Distinguished Professor of Defense Analysis at the Naval Postgraduate School, believes Blitzkrieg is alive and well, but has evolved into a different form.

In his latest book, "Bitskrieg: The New Challenge of Cyberwarfare," Arquilla talks about how the art of warfare has changed over the past decade. He believes that the next generation of combat will be won with bits and bytes guiding the bullets and bombs.

"New technologies are changing how we protect our citizens and wage our wars," said Arquilla. "Among militaries, everything taken for granted about the ability to maneuver and fight is now undermined by vulnerability to 'weapons of mass disruption:' cutting-edge computer worms, viruses, and invasive robot networks."

Arquilla, a world-renowned expert in cybersecurity, has spent the last 30 years researching all things cyber warfare. Nearly three decades ago, he wrote an article dubbed "Cyber War is Coming," and now, he says it is upon us.

"We're dealing with it every single day in terms of ransomware attacks, the theft of intellectual property, infrastructure vulnerability, as well as increasing impact on the potential for military effectiveness," he continued.

The book covers a wide array of topics, from the potential weaknesses in cybersecurity to how we, as a nation, can improve our defenses against any cyberattacks.

"I spent quite a bit of time and research to get to the subjects that the book addresses, which include not only the military dimensions of cyber war, but also these questions of what I call strategic crime - ransomware, and intellectual property theft - but also the use of cyberspace or political warfare, as in trying to disrupt elections not just in the United States, but in any liberal and democratic societies.

"In fact, I think of cyber war as a kind of a 'weapon of mass disruption'. We spent many decades worrying about the mass destruction of nuclear weapons. Now we have to worry about mass disruption with cyber weaponry," he continued.

Arquilla believes his time at NPS has been invaluable, and thinks everyone, not just the Department of Defense, benefits from the work being done at the university every day.

"We have just tremendous opportunities for those of us on faculty here at NPS to be in a university research setting in which virtually every professor is thinking about the questions that bear upon national security," he said. "I can talk to an information scientist or computer scientist or an electrical and computer engineering faculty member about any question I might have."

NPS has "proved that it is on the leading edge in virtually every aspect of cyber affairs," he added.


*NPS Distinguished Professor of Defense Analysis Dr. John Arquilla just released his latest book, "Bitskreig: The New Challenge of Cyber Warfare." (Courtesy photo)*

## CAMPUS news & notes

Greetings from the NPS RoboDojo, your FREE community tinkering space for learning about robotics, electronics, and emerging technologies!

We offer tools, equipment, hands-on workshops, competitions, and user groups for all you NPS makers-at-heart and garage project warriors. We support your class/thesis project work and individual learning, and we encourage you to visit our space in Root 125 A/B.

As we all emerge as beautiful butterflies from our COVID cocoons, know that we are here to support you with:

**RoboDojo Open Hours**
- where: Root 125 A/B
- when: M-F 0900-1500
- who: The lab team can be pulled away for other duties from time to time, so please do make an appointment if need individual help. Email our very capable PO2 Bryan Milligan at robodojo@nps.edu for more info.

**Workshops** are led by any student, faculty, or staff member who would like to share what they know. We've had workshops covering Combat Robots, Linux, Cosplay, and much more. Workshops are led by anyone who would like to share what they know, and volunteers have represented all departments here at NPS. Email us at robodojo@nps.edu and tell us what you would like to learn, and we also welcome volunteers who would like to share their expertise with campus.

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

# NPS Student Wins Prestigious National Award for High-Energy Laser Research

*By MC2 James Norket*

"Lasers are the future of U.S. Navy shipboard defense."

A straightforward statement, but it was all the motivation U.S. Navy Lt. Cmdr. Austin West needed to tackle a highly-challenging research topic for his master's degree on Meteorology and Oceanography from the Naval Postgraduate School.

A member of the 2021 Spring Quarter graduating class, West's thesis examined the atmospheric effects of the maritime environment on the Navy's High Energy Laser Weapons System (HELWS), and how adaptive optics could compensate for those effects making the futuristic weapons system more effective.

As a METOC officer (Meteorology and Oceanography) West combined his operational specialty with NPS' cutting-edge curricula to deliver impactful research with immediate application to one of the Navy's high-priority defensive capabilities under development for the Fleet.

And he was recognized, significantly, for his efforts … Announced just before graduation, the Navy League of the United States awarded West with the prestigious Parsons Award for Scientific and Technical Progress.

"The Navy League of the United States is honored to sponsor the 2020 Rear Admiral William S. Parsons Award for Scientific and Technical Progress," said Navy League CEO Mike Stevens, who previously served as 13th Master Chief Petty Officer of the Navy. "We are proud of Lt. Cmdr. West for the receipt of this award. We are also grateful for his contributions to the scientific community. He is an outstanding example and what makes NPS and U.S. Naval forces second to none."

The Navy League first awarded this honor in 1957, and has been on the quest to honor the Navy's top scientists ever since. The award is given every year to a U.S. Navy or Marine Corps officer, enlisted or civilian who has made an outstanding contribution in any field of science that has furthered the development and progress of the Navy or Marine Corps.

*U.S. Navy Lt. Cmdr. Austin West was awarded the Rear Admiral William S. Parsons Award for Scientific and Technical Progress for his research in the field of adaptive optics on high energy laser weapons systems performance.* *(U.S. Navy photo by Javier Chagoya)*

"My research focused on modeling how different types of atmospheric effects impact the laser propagation, such as environmental absorption, scattering, and turbulence," described West. "The Fleet is starting to see these weapons systems arrive aboard ships, and they need to understand when and how they can operate, and how atmospheric conditions will impact their system performance. So I looked at how lasers perform under these effects, and researched how much adaptive optics can correct for them."

The tactical advantage of adaptive optics is significant, West explained, capable of accounting for and correcting the impact of a constantly-changing atmospheric environment near the surface.

"[The research] was such a cognitively tactile experience," said West on working with high energy lasers, and working with his faculty advisor, Dr. Qing Wang. "I thank Dr. Wang, and the entire NPS faculty and staff who helped me develop the conceptual model that I applied to this research. You were the foundation that was the nexus necessary to understand the complexities of such a multi-disciplinary field such as high energy lasers through the atmosphere."

West also thanked the METOC community for supporting higher education so that officers like him can perform critical research, and develop critical skills, that provide a high-return on the educational investment.

"Having just graduated, I am prepared to return and relieve the watch," said West. "Hopefully I'm armed with more than just memorized equations and formulas, but creative and structured critical thinking skills that will allow me to not just tackle the problems that are emerging on the horizon, but those unforeseen ones that are coming tomorrow."

West joins a highly-accomplished community of Parsons Award winners, many of whom are also NPS graduates. Parsons himself graduated the university with a degree in ordnance engineering, and was instrumental in developing the variable time fuse which is still in use today, as well as making notable contributions to the Manhattan Project in World War II.

Retired Adm. John H. Sides, considered to be the father of the Navy's guided missile program, and Rear Adm. Wayne E. Meyer, coined the Father of the AEGIS program, are also NPS graduates who have received the award.

University leaders noted these accomplishments are an indicator of how NPS develops the Navy's future technology, and the Navy's future thought leadership.

"[West's] research reflects one of the unique aspects of NPS," said NPS Dean of Students U.S. Navy Capt. Markus Gudmundsson. "Students bring their own operational experience to classrooms and laboratories to collaborate with defense-focused faculty to solve key, operational problems with technical solutions. This produces two critical products … New capabilities for the fleet, certainly, but even more importantly, naval leaders who are exceptionally well qualified to acquire and deploy advanced naval warfare capabilities."

# NPS Researchers Use Predictive Analytics to Improve Military Retention

*By Rebecca Hoag*

Many top industry names like Google, Cisco and Sprint are starting to use predictive analytics to aid in critical workforce management functions, like hiring, retention and salary decisions. So why not the Navy? Every day the Navy must make the decision of either training a pre-existing employee for a needed task or hiring someone new for the position.

For two Naval Postgraduate School (NPS) researchers, Dr. Amilcar Menichini and Dr. Thomas Sae Young Ahn, who teach in the university's management programs and support the Acquisition Research Program (ARP), thinking about analytics and these types of decisions began a few years back. As the ARP expanded over the years as a platform for improving analytical effectiveness and problem-solving for Department of Defense (DOD) acquisition strategies, it helped inspire a five-year Acquisition Workforce Strategic Plan initiated in 2016 to help address retention of mid-career employees in the DOD.


*In development by NPS researchers Dr. Amilcar Menichini and Dr. Thomas Sae Young Ahn, the Dynamic Retention Model (DRM) uses predictive analytics to create a hypothetical workforce of individuals that will help employers understand the impact of critical workforce decisions such as recruiting, promotion and retention in greater detail, in addition to understanding the impact of challenging events, such as a pandemic, on the workforce.*

Menichini and Ahn think predictive analytics can help maintain a stable workforce. The two formed an interdisciplinary partnership, with Menichini bringing experience in finance and Ahn in econometrics. With funding by the Naval Research Program (NRP), the pair is now in the middle of creating the Dynamic Retention Model (DRM), a predictive analytics model designed to create a hypothetical office full of individuals with different motivations, skills, experience, etc., that is then introduced to different scenarios, such as a pandemic or high turnover. Not only would a Navy command be able to look at the workforce quality as a whole, but they could also narrow down to look at how each employee might respond to different scenarios.

"[The employer] can come up with their own little experiments and the simulation will run it and give them the tools they can use to set personnel policy in the future," Ahn explains. "It's going to allow them to, in some sense, look forward and sort of wargame it out by introducing shocks and changes to pay structure."

In the case of a pandemic, for example, the employer could plug into the system a spike in the civilian sector unemployment rate. Then the program would probably determine the employees will stick around in the government job because it's not a good time to look for work. But when the pandemic nears to an end, the employer might be more at risk of losing some employees. Then the question is, would a bonus or pay raise do better at ensuring retention? How much for how long? These answers can change depending on the employee's length of employment and experience level, among many other factors.

The Dynamic Retenion Model would look at all the options based on different speeds of economic recovery to determine the likelihood of retaining employees. Not only will employers be able to monitor the retention rate of individuals, but personnel policy leaders would be able to determine the quality of the workforce as a whole, and how diverse it is in age, race and sex.

"If you've got a menu of items that you want to maintain and grow about your organization, then using a model like ours will not just drill down to a particular aspect, but actually look at how the whole workforce moves and evolves," Ahn says.

Menichini and Ahn hope Navy employers could come to DRM when making any recruiting, promoting or personnel decisions, and personnel policy leaders could use it before adjusting policy to better see the long-term impacts of these large decisions. The code won't make the decisions, but it willll help inform decision-makers.

"It's really about providing simulations and best guesses for the future so that decision-makers can have a full quiver of arrows and aren't just shooting in the dark," Ahn explains.

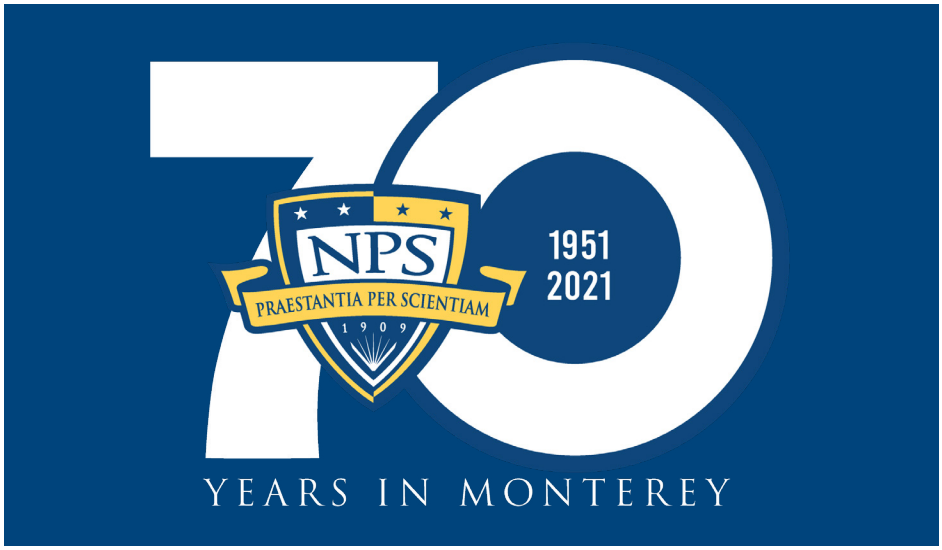
The researchers see this tool as a way for the Navy, and DOD as a whole, to analyze every acquisition and retention decision holistically, which is especially important for the government to do because it's slower to change than a private entity. They think it will help different departments proactively adjust rather than just react.

The NPS pair is now in the process of coming up with all the variables for the model to play with and coding in data (using MATLAB). The more data from past scenarios the program has to work with, the better the model can work.

"We're proud of this research and it has academic value, but it would be a tragedy if it just ends up in a journal somewhere," Ahn stresses. "We envision this research agenda as not retrospective, but prescriptive. We did this research because we thought this can really contribute, in our own small way, to national security."

# NPS Celebrates 70 Years in Computing

*By MC2 James Norket*




The Naval Postgraduate School's rich history in computing and information technology illustrates the university's leadership role in pursuing cutting-edge computing capabilities. Graduating nearly 1,500 students a year, these technologies also enable NPS' ability to deliver graduate education and prepare the miltary's future technological leaders for the high-end fight.

For context, NPS has about 600 faculty and researchers, approximately 1,500 students on campus, dozens of research centers and institutes, offers 164 distinct graduate courses, and brings in about $100 million in overall reimbursable funding. NPS also operates in both the .edu and .mil domains and has classified and unclassified networks. To support all of this, NPS' Information Techology and Communications Services (ITACS) department, through today's high performance computing (HPC), enables 741 HPC super computer users and more than 5,000 processors with a disk space of 6.5 petabytes.

"People today have more complex computers in their cell phone than the first Apollo space missions had," said ITACS Director of Research Computing Dr. Jeff Haferman. "That's how fast the technology is evolving."

"We now have thousands of computer cores that our researchers are using to solve very large, complex problems in a matter of weeks," continued Haferman. "Just in the last few months, we had a researcher run a million jobs in just a few weeks. A decade ago, that same thing would've taken several years."

While the world has made great strides in the field of computer science over the last century, NPS began its computing journey 68 years ago. In 1953, U.S. Navy Lt. Cmdr. Warren Church, the "Father of NPS Computing" and Chairman of the Department of Mathematics, purchased for the department the first electronic digital computer, a National Cash Register 102A, which launched NPS on a trajectory of understanding computing empowers the academic environment. As computing technology changed, so did NPS, often at forefront of innovation and capability supporting its unique mission of graduate education and research.

70 Years of NPS Computing Highlights

•1960's – Church replaced the National Cash Register with the world's first all-solid-state computer, Control Date Corp.'s CDC 1604 Model 1, No. 1. It was designed, built and tested by the legendary Seymour Cray. The first ten of his "super computers" were purchased by the Navy's Bureau of Ships for Operational Control Centers Worldwide. Originally, the CDC1604 was used by the Naval Numerical Weather Project, but they later got their own super computers.

•1970s – NPS professor of Computer Science Gary Kildall wrote the world's first high-level programming language for Intel's microprocessor, and then the first microprocessor operating system, soon to be run on ninety percent of all PCs. Later that decade, NPS established its first Computer Science Group, and two years later it was the third California node to connect to the Advanced Research Projects Agency Network, or ARPANET, which is known as the technical foundation of the Internet. By the end of the decade, NPS had a dedicated Department of Computer Science.

•1980s – NPS purchased an IBM 3033AP mainframe, marking a major shift from punched card to online terminals. Then, Learn-ing Centers were set up around campus, making workstations widely available.

•1990s – NPS implemented a five-year computer infrastructure master plan, "Support of Graduate Education in the 1990s". The program purchased an AMDAHL 5995-700A and a Cray X/MP (E98) supercomputer, Sun servers to support the campus network, 150 Sun Sparc10 workstations in faculty offices and clusters throughout campus, StorageTek mass-storage silos accessible via the network, Learning Resource Centers; a Scientific Visualization Laboratory, a War Laboratory for secure classified thesis production, the first Web browser; and a robust, high-speed, flexible, centrally managed campus network. By the end of the decade, the speed of the NPS network had increased from 10 to 100 megabits per second. In 1997, the AMDAHL was replaced by an IBM 9672 mainframe, followed in 1998 by a move to PC standardization implementing the Navy's Information Technology for the 21st Century (IT-21) Strategic Plan.

•2000s – NPS deployed the Microsoft Exchange server for the secure e-mail services across the Navy. Later that decade, the school's first virtual Learning Resource Center was set up in Root Hall, and the Supercomputer "Hamming", manufactured by Sun Microsystems, was unveiled.

*[Story continued on next page]*

•2010s – The first Classified Computing Program Division was created. The Data Analytics of Real-Time Streams (DARTS) was installed and used to process big data received from around the Navy and DOD. NPS signed a Network subscription service contract with AT&T, resulting in a total refresh of all the NPS network infrastructure for both wired and wireless connectivity, which supported greater provisioning for network capacity throughout campus.

•2020 – All user profiles were migrated to OneDrive. The Development and Operations arm of ITACS was heavily engaged in supporting the Sea Land Air Military Research Initiative (SLAMR) and their efforts to enable all-domain solutions across the DoD, improve the DoD's ability to make quicker, more informed decisions, and perform collaborative cross-organization research and development.

•In the COVID-19 environment, ITACS converted systems to allow for teleworking without compromising security. Utilizing the software program Sakai, ITACS created 1,432 courses in two instances: NPS' traditional courses and "DoD Learn," a place for non-NPS entities of the DoD to host courses. Utilizing ZOOM video conferencing, ITACS facilitated 49,696 meetings with almost 440,000 participants. With Microsoft Teams, they saw 62,000 calls and 3.5 million messages.


*From the first computer purchased by the Naval Postgraduate School in the 1950s, to the high-powered computers used today, NPS has been a leader in the field of computer science for the last 70 years. (U.S. Navy graphic by MC2 James Norket)*

## Celebrating 70 Years in Monterey

This year marks the 70th anniversary of the Naval Postgraduate School (NPS) relocating from the Naval Academy grounds at Annapolis to the former Hotel Del Monte grounds in Monterey, Calif. The relationship built between NPS and the Monterey Peninsula community has created an environment for military officers, DoD employees and first responders from across the nation to come together to receive top-tier defense-focused graduate education.

To read more stories about NPS' anniversary, please visit our website.

# COVID-19 update

## COVID-19 Update

On 31 July 2021, the County of Monterey seven day average of new COVID-19 diagnosed cases exceeded 50 cases per 100,000 people.

Based on Centers for Disease Control (CDC) guidance and definitions, the County of Monterey is now an area of **substantial transmission** of COVID-19. In accordance with the Secretary of Defense's mandate, which requires mask usage on DoD installations regardless of vaccination status in areas with "substantial" or "high" community transmissions, NPS will now require that all personnel at NPS wear a face covering, regardless of vaccination status.

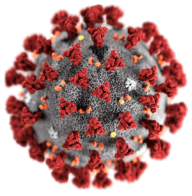
**Summary of Requirements:**
NPS Requires: Masks to be worn by all regardless of vaccination status. Physical distancing for unvaccinated and partially vaccinated.

Distancing requirements remain the same, in accordance with HPCON level. We are currently in HPCON A Expect to go to HPCON B soon, and a return to 6-feet social distancing.

Current Level of Community Transmission in Monterey County, California: **SUBSTANTIAL**

*Data is current as of August 2, 2021*

For more information, visit https://covid.cdc.gov/covid-data-tracker/#county-view



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

# NPS Financial Analyst Receives Navy-wide Financial Management Award

*By MC2 Lenny Weston*

Naval Postgraduate School (NPS) Supervisory Financial Management Analyst Airyn O'Brien is the winner of the Department of the Navy's (DON) Financial Management Award, Budget Category, for the 2020 calendar year. O'Brien was recognized for individual achievement in budget execution for Navy Echelon II and above commands.

The DON's Financial Management Award program recognizes the high caliber and creativity of the financial management (FM) workforce. O'Brien was selected by a group of financial management and comptroller (FM&C) subject matter experts that recognize outstanding accomplishments made in the DON FM community by individuals and teams.

"I am truly honored and grateful to be the recipient of this award," said O'Brien. "I was so surprised when I received the congratulatory e-mail … saying that I was selected, and I am thankful for this opportunity that was given to me."

The Office of the Assistant Secretary of the Navy (Financial Management and Comptroller), or ASN FM&C, manages the awards program, recognizing a variety of FM&C professionals. The Budget Execution achievement recognizes excellence in review and execution, both in hands-on efforts and supervisory responsibilities, within the overall budgetary process.

"Ms. O'Brien was nominated for this award as her performance in 2020 supporting budget execution was nothing short of phenomenal," claimed Mike Ward, NPS Comptroller and Director of Financial Management. "She distinguished herself in 2020 by going above and beyond her assigned duties to solve extraordinary complex problems in the [Standard Accounting, Budgeting, and Reporting System] and [Command Financial Management System-Consolidated] accounting systems while providing extensive, vital assistance in funds execution to Comptroller and command departments during an extremely challenging calendar year."

This career milestone is a testament to O'Brien's hard work, dedication and outstanding contribution through NPS' Financial Management Directorate, Ward noted, which she has been a part of for more than five years.

"This is clearly one of the most significant events of my professional career," noted O'Brien. "The award is motivation to continue doing the hard work that I have done so far, and a reminder of the skills and career progression that I have already accomplished. This award will boost my morale and drive to continue what I am doing, and to become a better leader in the future."

Awardees will be recognized virtually during a financial management virtual training session in August, after which O'Brien will receive a plaque and certificate in recognition of the award.

# NWC-at-NPS Awards Academic Honors for Spring AY'2021 Quarter Class

*By Naval War College Monterey*

The Naval War College (NWC) Monterey program for Joint Professional Military Education (JPME) recognized 20 graduates from its latest class earning academic honors for the Spring AY'2021 Quarter.

Graduates earning "with Highest Distinction" honors by completing the JPME program in the top five percent of their class are Marine Corps Majs Mathieu P. Amirault, and Wesley Dyson; Marine Corps Capt Gabriel A. Benjamin; Army Maj Benjamin A. Arbitter; Navy Lt. Joseph C. Hanisko.

Graduates earning "with Distinction" honors by completing the JPME program in the top 15 percent of their class are Army Majs John F. Bassette, Jr., John S. Berger, Travis M. Florio, and Christopher S. Pinkerton; Marine Corps Majs John S. Behrmann, and Liam O'Lone; Marine Corps Capts Christopher J. Leisring, and Luke D. Stockman; Navy Lt. Cmdrs. Sean C. Croghan, Mabi Morgan, and Aaron K. Smith; Navy Lts. Thomas E. Carter, Christopher T. Chavez, Kenneth A. Fletcher II, and Fritz W. Hain.

Through the NPS-NWC partnership, a total of 6,079 officers have earned their Joint Professional Military Education Phase I certification since the program's inception in September 1999.

# Any Day at NPS

*NPS President retired Vice Adm. Ann E. Rondeau, right, awards NPS Dean of Students U.S. Navy Capt. Markus Gudmundsson, with a Legion of Merit medal, July 30.* (U.S. Navy photo by MC2 Tom Tonthat)

*Mass Commincation Specialist 1st Class Nathan K. Serpico, center, enjoys the moment as he is pinned as a 1st Class Petty Officer by his wife Abby, left, and Culinary Specialist 1st Class Joshua Garnsey during a frocking ceremony, July 15.* (U.S. Navy photo by MC2 Tom Tonthat)

*Capt. Thomas Moneymaker, left, and Capt. Christi Montgomery at the Fleet Numerical Meteorology and Oceanography Center's 23rd Change of Command ceremony. Capt. Christi Montgomery relieved Capt. Thomas Moneymaker at the FNMOC campus, July 15.* (U.S. Navy photo by Javier Chagoya)

*Yeomen 2nd Class Corey Liechti enjoys the moment as he is pinned as a 2nd Class Petty Officer by his father during a frocking ceremony, July 30.* (U.S. Navy photo by MC2 Tom Tonthat)

*NPS Chief of Staff Capt. Philip Old, right, awards Mass Communication Specialist 2nd Class Lenny Weston as the Blue Jacket of the Quarter, July 30.* (U.S. Navy photo by MC2 Tom Tonthat)

*NPS' Mechanical Engineering student Lt. David Magno, foreground, shares his thesis topic with Washington state's 9th District Representative and 17th Chairman of the House Armed Services Committee Adam Smith, center, in the institution's turbo propulsion lab, July 13.* (U.S. Navy photo by Javier Chagoya)

## STUDENT voice

*Maj. Domoniqué Hittner, U.S. Army*

Hello new and current students,

It has been great seeing you all on campus and in virtual classes this summer. The President's Board for Student Affairs (PBSA) is the communication bridge between the staff and students at the Naval Postgraduate School. As the summer quarter progresses, keep us informed of any changes or challenges that you may be experiencing. Also, if you have any recommendations, concerns, or see anything that needs improvement that you would like brought up to the Staff, please email me directly at domonique.hittner@nps.edu or use our Student Recommendations Link.

Did you know the NPS mascot is a Peacock? This month we will be hosting a Peacock design and motto contest. Students can draw, design, or create a Peacock graphic with a motto for use around campus and graduation farewell gifts. Email your entries from Sunday, 1 August 2021 until 2359 on 11 August 2021 to pbsa@nps.edu.

We hold a general student body meeting the 2nd Thursday of every month from 1200-1300 on campus outside of the Dudley Library/Starbucks and on MS Teams. This month's meeting is on Thursday, 12 August 2021 from 1200-1300. Please join us, or if you are unable to attend, please email for a recap of this meeting.

The PBSA is here to support you on your journey here at NPS. You may contact us at pbsa@nps.edu. It is our pleasure to be a part of your team, and we look forward to seeing you soon.

Here to serve,

**Domoniqué Hittner, Chair, PBSA**

https://nps.edu/group/pbsa

# On campus this month

## August 5

**Hybrid Force 2045 / Bi-Model Navy Vision**

*Microsoft Teams - Link will be shared with NWSI Members*

## August 9-13

**Center for Executive Education NSL Seminar**

*Online*

## August 23-28

**Joint Interagency Field Experiment (JIFX) 21-4**

JIFX
Joint Interagency Field Experimentation