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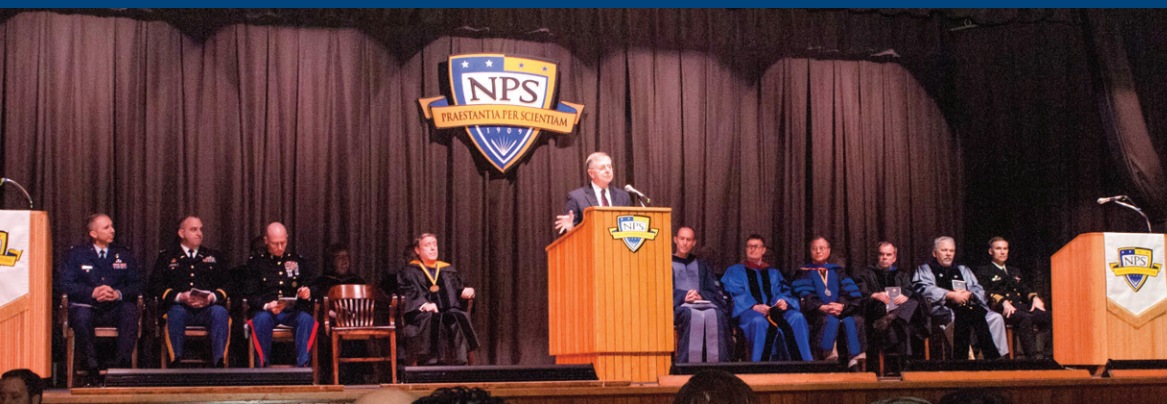
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(U.S. Navy photo by MCI Lewis Hunsaker)

NPS Honors Fall Quarter Graduates

by Kenneth A. Stewart

NPS said farewell to 331 graduates earning 333 degrees from every U.S. branch of military service and from 29 countries during its fall Quarter Graduation Ceremony at King Auditorium, Dec. 18.

Retired Vice Adm. Lee Gunn, who is plenty familiar with NPS in his role as chair of the university's advisory body, the NPS Board of Advisors, and as a graduate of the Department of Operations Research offered the keynote address during the ceremony.

"I would like to speak on behalf of the thousands of graduates of NPS around the world. We would like to be a part of your life, and a part of your conversations," he said. "You already know what it means to lead people. Imagine what your people will expect of you in your next assignment."

Throughout Gunn's address, he offered the graduating class a series of recommendations that he gleaned from his long naval career and from his life-long association with Sailors and the Navy.

"I grew up loving and respecting Sailors, but not just Sailors ... All men and women that put on the cloth of their nations."

— NPS Board of Advisors Chairman retired Vice Adm. Lee Gunn.

From those service members, Gunn learned the importance of "people, competence, humility, paying attention and staying ahead."

Gunn illustrated the importance of humility by pointing to the winners of the Stockdale Award from both the Pacific and the Atlantic oceans – line officers nominated by their peers who, according to Gunn, give credit to their subordinates and rarely talk about themselves. And while Gunn stressed the importance of humility he also stressed the need for competence.

"It's tough to follow someone who is not at the top of their game," he noted.

Finally, Gunn challenged the graduating students to be involved in the immediate world around them.

"There is nothing more important than paying attention, nothing more vital than staying engaged and staying in the moment," said Gunn. "... [And] you must continue to anticipate problems and prepare for risk."



NAVAL POSTGRADUATE SCHOOL

UPDATE
NPS

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HAPPY NEW YEAR

January 2016

NPS Combats Terrorism With Education

By Kenneth A. Stewart

NPS Department of National Security Affairs (NSA) Chair Dr. Mohammad Hafez is on the frontlines of NPS' counter terrorism efforts. His contributions to understanding and combatting terrorism include more than 15 years of research into and teaching about political and religious violence.

"For the past 15 years I have been really interested in the broader issues of why people kill each other for political reasons, and why they are increasingly killing themselves and innocent civilians. More recently, I have focused on domestic extremism," said Hafez.

Hafez, along with former NPS student U.S. Air Force Maj. Creighton Mullins, recently explored this issue in an article titled, "The Radicalization Puzzle: A Theoretical Synthesis of Empirical Approaches to Homegrown Extremism."

"We came up with the idea that the only pattern that links episodes of radicalization are grievances, networks, ideologies and enabling structures," said Hafez. "But the most critical variable in radicalization is small group networks. We often focus on individual motivations for extremism, but we should really be focused on small group dynamics."

NPS has been at the forefront of research into small, extremist organizations, groups that NPS Associate Professor Sean Everton calls "dark networks." His ground breaking work titled, "Disrupting Dark Networks" was a major contribution to the counter terrorism effort. And while Everton and his colleagues at NPS' Common Operational Research Environment (CORE) Lab have offered important insights into the tracking and disrupting of dark networks, Hafez is focused on the process that leads people into the arms of radical groups in the first place.

"Not all radicalization is the same, you get lone wolves who kill people. You also have instances like the Paris, Charlie Hebdo and London bombing attacks or even 9/11, but what makes radicalization into this very effective form of terrorism are its enabling structures," said Hafez.

The primary enabling structure that Hafez is referring to is the presence of training camps in failed and failing states like Iraq, Syria, Libya, Yemen and parts of North Africa.

"There has to be an effort to destroy those camps, but as long as they exist, they are universities that produce terrorists," said Hafez. "Something has to be done about a group like ISIS ... But how does one achieve that without getting involved in costly foreign entanglements?"

This is a world problem and we need a coalition of countries to confront it."

Former Navy intelligence officer turned academic, NPS Associate Professor Erik Dahl teaches for both NPS' NSA Department and the Center for Homeland Defense and Security (CHDS). He is also contributing to the university's counter terrorism education efforts. Dahl is focused largely on domestic security, and what he describes as the "balance between security and liberty" that is found at "the intersection of intelligence, terrorism and homeland security."

"We are trying to develop the intellectual abilities of the next generation of homeland security leaders in this country," said Dahl.



NPS students gather data and collect intelligence while participating in a counter terrorism exercise with a Polish Army Special Forces unit in Northern Poland. The exercise combined counter terrorism operations with the use of NPS developed mobile networks. (U.S. Navy photo by Kenneth A. Stewart)

The NPS/CHDS partnership brings together working professionals for an 18-month hybrid program that combines on-line course work with a series of two-week residency periods at NPS. It is designed to offer advanced homeland security and counter terrorism education to homeland security professionals at the federal, state, and local level, especially those unable to leave their jobs to pursue full-time graduation education.

"They are learning about the broader aspects of how America conducts homeland security and how it integrates military and civilian capabilities," said Dahl.

To that end, CHDS faculty members recently took a CHDS class to Levi's Stadium in Santa Clara, California, where they saw firsthand the lengths to which law enforcement and counter terrorism experts are going to ensure safety during Super Bowl 50. Salinas City

"Update NPS" is a monthly publication for students, faculty and staff of the Naval Postgraduate School produced by the Public Affairs Office. For additional copies, comments, or to suggest story ideas, contact the editorial staff at pao@nps.edu.

Council woman Kimbley Craig was one of those students.

"It's unbelievably impressive what they have going on up there. As a spectator it's impressive, behind the scenes as a person going through a masters in homeland security, it's really impressive," said Craig.

Craig is completing her second semester at CHDS where she is studying unconventional threats to national security. She hopes to apply what she has learned to her city and some of the challenges that it faces.

"It's not just about terrorism, it's also about natural disasters and other issues. This sort of education is important for local officials who work with state and federal authorities," said Craig. "It's important to have that level of communication going on between local, state and federal agencies. It's about opening the lines of communication and not siloing information at times when it is critical to share it."

Craig also points to the importance of thinking outside the box when it comes to countering terrorism and other complex problems. She says that her NPS/CHDS education has gone a long way toward helping her to think about the problems that Salinas faces.

"As a councilwoman for the city of Salinas, we have a lot of issues. We have a gang contingency and drug trafficking that we are dealing with as well as human trafficking ... My job as a policy maker, is to identify the city's vulnerabilities and address them ... being in this class has been incredibly insightful in regard to understanding the vulnerabilities of our city and it has led to a realization that we need to change our policies toward our residents. We need to be looking at homeland security from a much more comprehensive approach," said Craig.

Associate Professor Michael E. Freeman with NPS' Department of Defense Analysis (DA) teaches courses on international terrorism, terrorist financing and the targeting of terrorist leadership. He is also the lead for the Global Ecco Project, which develops games aimed at sharpening students' counter terrorism skills. NPS developed games like "Guerilla Checkers," "Contagion," and "Follow the Money" help students to develop advanced counter-terrorism strategies.

"Two sides play against each other. The games are strategically interactive with both positive and negative consequences for decisions," said Freeman.

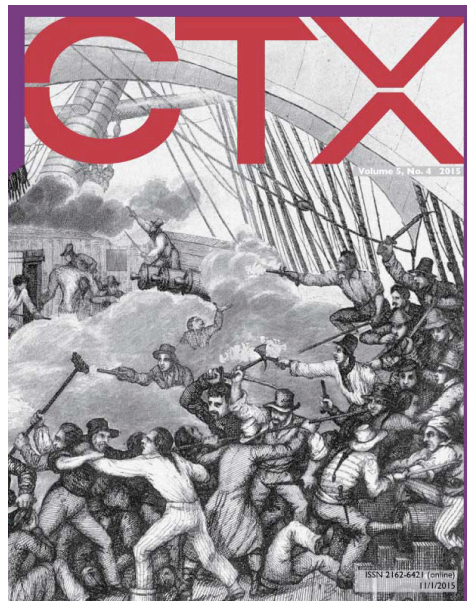
Freeman notes that his games and the aca-

demic work that accompanies them, help his students to combine a scholarly understanding of terrorism and counter terrorism with the real-world experiences they have gleaned during deployments to places like Afghanistan and Iraq.

U.S. Army Special Forces Maj. Tim Burton, a veteran of multiple military campaigns, participated in one of Freeman's counter terrorism games.

"It was a really good game. It worked very well because when you played either the state or the terrorists, policies that you made in the first round affected what you could or could not do in the second round.

"Being from a special forces background, it was good to be able to apply things that I had learned during my previous deployments in a controlled, simulated environment. The games allowed us to test different strategies without real-world risk and provided us with instantaneous feedback," said Burton.



Join the discussion and explore the latest in counter terrorism research at <https://globalecco.org>.

Freeman's Global Ecco project also publishes the CTX journal where students and alumni can exchange ideas and lessons-learned from the field of counter terrorism. The publication is available on-line and is offered free of charge to the public.

And while Freeman, Hafez, Dahl and Everton's work is contributing to efforts on the front lines of U.S. counter terrorism campaigns, their efforts are really just the tip of the NPS driven counter terrorism education iceberg.

FACULTY news & notes

NPS President retired Vice Adm. Ronald A. Route and Director of Undersea Warfare retired Rear Adm. Jerry Ellis presented the Superior Civilian Service Award to NPS Senior Lecturer of Physics Dr. Daphne Kapolka in Spanagel Hall, Dec. 3. Route shared his thoughts on Kapolka's numerous contributions to the university with the many students and faculty in attendance.

"Throughout her 12-year career at NPS, Kapolka has been a positive force across campus, serving as the academic associate for the undersea warfare curriculum, involving mentoring and nurturing students throughout their stay," said Route.

NPS Department of Systems Engineering Professor David Olwell was awarded the Navy Superior Civilian Service Medal, Dec. 21.

Olwell was recognized for his leadership efforts both on campus and within the systems engineering discipline.

Department of Defense Analysis and Graduate School of Business and Public Policy Professor Nancy Roberts. Roberts was presented with the Superior Civilian Service Award for her near 30 years of dedicated service to the university.

Roberts holds a dual appointment to NPS' Graduate School of Business and Public Policy and the Graduate School of Operational and Information Sciences. She is well known for her recent efforts to champion the Design Thinking problem solving methodology across campus.

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

Renowned Energy Authority Dr. Amory Lovins Presents Latest Defense Energy Seminar

By MC2 Michael Ehrlich

Rocky Mountain Institute CEO Dr. Amory Lovins offered NPS students, faculty and staff his views on the rapidly changing environment of the energy industry, during the latest Defense Energy Seminar in Glasgow Hall, Dec. 4.

Lovins compared the impact of today's renewable energy sources on the oil, gas and electricity industries, with the impact of the invention of the light bulb on the whaling and kerosene industries of more than 150 years ago.

"Back in 1850 when there were no cars and no oil wells, ships ran by sail and most homes were lit by oils extracted from whales ... making whaling America's fifth largest industry," said Lovins. "In a single century it grew to world dominance, and then suddenly disappeared."

Strong demand and global hunting made whales shy and scarce, driving costs higher as fleets got bigger albeit less productive. But when Edison's light bulb hit the marketplace, the whaling industry eventually lost more than 80 percent of its lighting market because it was running out of customers, not running out of whales.

Lovins has been an innovator and practitioner in energy and its links to security, development, environment and the economy for

more than 40 years. In 2009, Time magazine named him one of the 100 most influential people in the world, and Foreign Policy pinned Lovins as one of the 100 top global thinkers.

In the energy sector, Lovins explained, falling prices may create great challenge, but it is ultimately the shift in demand that is forcing change in the industry. Energy efficiency plus structural shifts in the economy have changed today's energy demand significantly.

"In the past five years, the meteorite strike of photovoltaics has fatally disrupted utilities by making solar power cost less than gas lines.

"Wind power is so cheap that it makes old coal, gas and nuclear plants shut down, as [they are] uneconomic to run," said Lovins.

Added Lovins, "Oil companies are even more at risk for market competition than from climate regulation."

Lovins also discussed how breakthrough design methods in business and financial models are establishing solid foundations for emerging energy industries. They seek to reinforce themselves with innovative policies, crowdfunding and crowdsourcing, and new development patterns, all of which are able to keep pace with shifting values and the Silicon Valley's culture.



Rocky Mountain Institute CEO Dr. Amory Lovins lectures to NPS students, faculty and staff on the rapidly changing environment of the energy industry in Glasgow Hall, Dec. 4. His lecture, "Disruptive Oil and Electricity Futures," focused on several factors that are forcing the oil, gas and electricity industries to change their business models. (U.S. Navy photo by MC2 Michael Ehrlich)

International Graduates Bid Farewell to NPS During Student Luncheon

By MC2 Michael Ehrlich

NPS President retired Vice Adm. Ronald A. Route wished 'fair winds and following seas' to the Fall Quarter's international graduates during the International Graduate Programs Office Student Luncheon in the McNitt Ballroom, Dec. 10.

The fall quarter's global class boasted 48 new NPS alumni from 28 different countries.

Route recalled his own experience interacting with international colleagues as a junior officer on his first deployment. "For me, it was a real privilege to be operating at sea with our naval partners," he said.

Route concluded his address to the graduates with grounded optimism and best wishes, as the officers return to their home countries and militaries.

"I know our cultural work together will be enriched from your experiences here at NPS.

"Our work will be difficult and challenging because of the difficult and challenging world we live in, but we will succeed, as you have succeeded here, by learning more about each other and facing our challenges together," he said.

NPS Student Examines Changing Arctic's Impact on Acoustics

By Javier Chagoya

NPS Department of Oceanography doctoral student Lt. Cmdr. Dominic DiMaggio and Research Assistant Professor John Joseph will soon participate in the Navy's biannual



NPS Department of Oceanography doctoral student Lt. Cmdr. Dominic DiMaggio, left, and Research Assistant Professor John Joseph, right, are pictured with instrumentation they will deploy in the arctic during ICEX 2016. (U.S. Navy photo by Javier Chagoya)

Ice Exercise 2016 (ICEX) at a mobilized ice camp laboratory on the Arctic Ocean in March of next year. The two NPS researchers

will have 12 days to deploy instrumentation and collect vital acoustical data while on the ice floe.

"The Arctic Ocean has been undergoing significant changes with respect to sea ice coverage and ocean properties, like temperature and salinity," said DiMaggio. "What we are trying to understand is how these oceanographic changes are affecting acoustic conditions."

With significant changes to the Arctic environment, DiMaggio seeks to compare and validate earlier data with his own on this next trip to the ice in an effort to understand how these changes impact acoustics.

"Underwater sound is vitally important to undersea warfare, so naturally the Navy is curious to know how these acoustic conditions are changing. The experiment we designed for ICEX aims to directly observe ocean and acoustic conditions as they are now. We can compare these data to the historical conditions from several decades ago, when conditions were different," explained DiMaggio.

University Prepares for IG Visit

By Kenneth A. Stewart

In March NPS will undergo a scheduled visit by members of the Navy's Inspector General's (IG) Office. NPS Deputy Inspector General Dahnelle Payson weighed in on the visit and what it means to the university.

"Unlike the 2012 off-cycle inspection, the March 2016 visit is a standard command inspection," said Payson. "We are expecting a team of 40 IGs and subject matter experts. They will be here to do a job. Be open and cooperative, they are people just like you and me."

"The March 2016 IG is a routine inspection that gets us back on the regular cycle, with inspections every four years, which is normal for a command such as NPS," added NPS Chief of Staff Anthony Parisi.

"While there are sure to be some findings that we will have to address come March, in the end, the process makes NPS better, more transparent and hopefully more efficient at executing its mission of providing 'relevant

and unique advanced education and research programs to increase the combat effectiveness of commissioned officers of the naval service," he continued.

The official IG inspection team will arrive in March, but the IG will host a survey from Jan. 6- Feb. 5, and NPS will answer the first data-call in late January.

"They will be asking for our top issues of concern by priority and will look at the results of our command climate survey," said Payson. "The IG will also do focus groups, March 7-8."

In the meantime, the NPS IG office will be working with supervisors and employees to complete a self-assessment composed of 15 different checklists and will review findings from past inspections.

"We are about 61 percent through the issues we identified as things to look at in preparation for the inspection," said Payson.

CAMPUS news & notes

Students from the 65th graduating class of the Naval War College (NWC) Monterey partnership with NPS were honored during a graduation ceremony in Herrmann Hall, Dec. 10.

NPS partners with NWC Monterey to provide Joint Professional Military Education (JPME) Phase 1 certification to select students while they are on site for their graduate degrees.

NWC Monterey Chairman Professor Fred Drake presided over the ceremony where a total of 97 U.S. Navy, Marine Corps, and Army officers earned their NWC Command and Staff diploma with JPME Phase I certification. Through the NWC and NPS partnership, 4,244 officers have earned this certification since the program's inception in 1999.

NPS Student Lt. Forrest N. Bush was honored with the Navy League Awards for Outstanding Academic Achievement during the 2015 Fall Graduation Awards Ceremony in Herrmann Hall, Dec. 8.

Also receiving awards during the 2015 fall quarter awards ceremony were:

NPS Outstanding Academic Achievement Award for International Students recipient Chilean Navy Lt. Cmdr. Oscar Garcia; Association of the U.S. Army, General Joseph W. Stillwell Chapter, Award for Outstanding Army Student recipient Army Maj. Rustin Jessup; NPS Superior Service Award recipient Lt. Cmdr. Carrie Paben; USMC Superior Service Award recipient Marine Corps Maj. Joshua Gregory and Military Officer's Association of America Award recipient Air Force Maj. Karen A. F. Landale.

Do you have an important news item to share with the campus?
Send your campus news and notes to update@nps.edu.

Big Ideas Exchange Highlights Cyber Security

By Kenneth A. Stewart

NPS Distinguished Professor and Cebrowski Institute Director Dr. Peter Denning welcomed attendees to NPS' Big Ideas Exchange in Ingersoll Hall, Dec. 4. Inspired by the hugely successful "Ted Talks" lecture series, the goal of the exchange was to convey insights from faculty and students that change the way we see defense problems.

"We want to find insights with the potential to bloom into something big and beautiful that the Navy can use," said Denning. "Innovation doesn't happen with a snap of the fingers, it takes time. It starts with a seed that doesn't look like much, then it unfolds."

This year's exchange showcased the work of Distinguished Professor Dorothy Denning, Professor John Arquilla, Associate Professor Dave Alderson and Navy Cmdr. Zachary Staples. Each presenter was chosen for his or her innovative work and insight into the realm of cyber security.

Dorothy Denning discussed the varied dimensions of cyber security: people, economics and the law, among other things, as well as the rapid growth in computer technology, particularly networked computer technology, which has led to the "Internet of things."

She also walked attendees through the complexities of software systems that many take for granted, noting the "millions of lines of code" contained in modern operating systems. This complexity, she argues, has led her to think of "not the Internet of things, but the Internet of vulnerabilities."

Alderson also discussed vulnerabilities, focusing on the vulnerabilities that complexity poses to critical infrastructure, as well as strategies to increase system robustness. He likened the robustness of cyber

systems to both living and inanimate things noting that of the 4,747 genes found in an E. coli bacterium, only 302 are essential.

"The rest, like in an automobile, make the organism more robust," said Alderson. But he cautions that the same set of characteristics that make both organisms and automobiles robust, may lead to fragility.

Staples discussed cyber system vulnerabilities as well. He focused on what he called the rise of cyber physical systems – cyber systems that interact with the physical world in a manner that makes the massive urbanization of the earth's growing population possible.

"You cannot feed 10 billion people without complex machines working together to generate the food [and infrastructure services] necessary to keep that many people alive," said Staples.

For Arquilla, warfare in the cyber realm is the continuation of a process whereby over time, innovative warriors used information to make better use of weapons that project mass and energy.

"The group with the information advantage wins ... You have to think of weapons systems in terms of their information content not

just mass and energy.

"Up until 20 years ago, [the goal of] warfare was to turn people into automatons ... Today, the big idea is the reverse. We are now trying to pour human judgment into intelligent machines," said Arquilla.

In closing the exchange, Peter Denning emphasized that while the presenters had showcased many powerful ideas, innovation, at its core, is really about people.



NPS Distinguished Professor Dorothy Denning offers a "framework for cyber security" during NPS' Big Ideas Exchange at Ingersoll Hall, Dec. 4. (U.S. Navy photo by MC1 Lewis Hunsaker)

Focus On ... Physical Fitness

A Monthly Look at Names and Faces on Campus

NPS Command Fitness Leader, Lt. Cmdr. Vince Naccarato, is in charge of ensuring that Physical Fitness Assessments (PFA) are conducted properly at NPS.

"My goal is to make sure we have a good program and people who want to get in shape," said Naccarato. "I'll provide all of the resources I can to keep people in shape."

Naccarato enjoys getting into the gym with Assistant Command Fitness Leaders (ACFL) and would like to see more people from across the NPS campus join in.

"We're going to implement a lot of new things like bands and medicine balls and we'll hit some of those muscles that you didn't know you had," said Naccarato.

Naccarato is pleased with the programs provided at both the Monterey Bay Athletic Club and NPS.

"We're lucky to have some really good certified physical trainers that work for Morale Welfare and Recreation (MWR) Fitness, and they work close with us to run the fitness enhancement program together," said Naccarato.



Lt. Cmdr. Vince Naccarato

Academic Year 2015 in Pictures ...



NPS alumnus and retired Navy Cmdr. Everett Alvarez Jr., unveils his photograph at a ceremony welcoming him to NPS' distinguished hall of fame. Alvarez was the first Navy aviator shot down during the Vietnam war. (U.S. Navy photo by MC2 Shawn J. Stewart)



NPS Spring quarter graduating class members march into King Auditorium for their graduation ceremony, June 19. (U.S. Navy photo by MC2 Michael Ehrlich)



Members of NPS Advanced Robotics Systems Engineering Laboratory (ARSENAL) launch one of 30 autonomous unmanned aerial vehicles (UAVs) setting a new record at Camp Roberts, Calif., July 16. (U.S. Navy photo by MC2 Michael Ehrlich)



Vice Chief of Naval Operations Adm. Michelle J. Howard addresses students and faculty during a Secretary of the Navy guest lecture series, April 3. (U.S. Navy photo by MC1 Lewis Hunsaker)



Deputy Secretary of Defense and NPS alumnus the honorable Robert O. Work, above right, is pictured with NPS Professor Jim Newman, above left, in the Small Satellite Test and Development Laboratory, June 19. (U.S. Navy photo by MC1 Lewis Hunsaker)



NPS student Lt. Clay Greunke demonstrates the virtual environment training system he developed to prepare inexperienced Landing Signal Officers (LSO) deploying to aircraft carriers for the first time. (U.S. Navy photo by MC3 Brian H. Abel)



STUDENT voice

**Army Special Forces officer
Maj. Tim Ball, Chairman
of the President's Student
Council**

As the new Chairman of the President's Student Council (PSC), I'd like to take the time to introduce myself. My name is Maj. Tim Ball, and I am an Army Special Forces officer. I received my commission as an Infantry officer from Texas A&M in 2004, and served in the 82nd Airborne Division. I moved to Special Forces in 2011 and recently completed tours with the 10th Special Forces Group (Airborne) in Stuttgart, Germany, and NATO Special Operations Headquarters in Mons, Belgium. My wife, Katie, and I moved to Monterey in June, and I am studying in the Defense Analysis department.

Our new Vice-Chairman is Captain Will Campbell. Will enlisted in the Army in 2004 and served as a Signal Intelligence Analyst before being selected for Officer Candidate School in 2007. He commissioned as an Armor Officer, and has since transitioned to the Military Intelligence branch. Will was selected as an Army Cyber Scholar and is enrolled in the Cyber Systems and Operations (CSO) program. Will and his wife, Kathy, have three children, Grayson (5), Ryley (4), and Payton (2).

Will and I are excited to continue the excellent work that has been done by Lt. Cmdrs. Colleen McDonald and Jesse-Larou Walsh. As we enter the new year, we will be looking for new members of the PSC to help us in expanding our community outreach efforts and recruiting volunteers from the student body to help us give back to the Monterey community. We hope everyone had a wonderful holiday, and look forward to seeing you all around campus!

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seeking interesting news and
stories for Update NPS. Send
your tips to pao@nps.edu.**

On Campus this Month

January 1

New Year's Day



January 4

First Day of Winter Quarter

January 5

Warrior Uniform Day

January 12

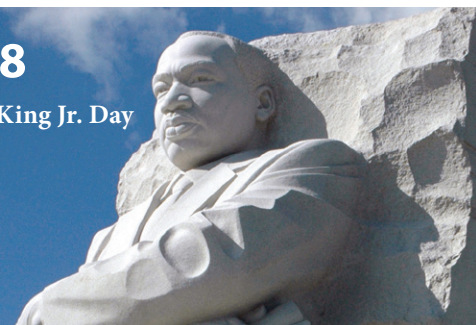
Newcomers Welcome Aboard Fair
6:00 p.m. - 8:00 p.m. at El Prado Room

January 15

Resolution Run 5K
3:00 p.m. meet in front of Herrmann Hall

January 18

Dr. Martin Luther King Jr. Day
(No Classes)



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Historical Highlights

NPS installed the 48-bit "supercomputer," Control Data Corporation 1604, Model #1, Serial #1, in January 1960. The Control Data Corporation (CDC) and engineer Seymour Cray manufactured and designed the world's fastest and most advanced computers at the time. The CDC 1604 installation was important to both the

company and NPS. Cray oversaw the installation of its first 1604 himself. Once installed in Spanagel Hall's lobby, Naval Numerical Weather Prediction (currently, Fleet Numerical Meteorology and Oceanography Center) was reassigned from Suitland, Maryland to take advantage of the computing power. The NPS Mathematics department was also interested in its power and hired its first computer programmer,



Edward Ward. Ward developed a computer program for the CDC 1604 that could properly display a three-dimensional representation in only two dimensions, which aided his research of ballistic missile interception.

Historical Highlights are provided by the Dudley Knox Library.