

MISSION IMPACT REPORT

HIGHLIGHTS

“WHERE SCIENCE MEETS THE ART OF WARFARE”

SUMMER/FALL ‘23

BY THE NUMBERS

EDUCATION:

- 2023 Enrollment: ~2,500
 - Masters: 1,856
 - PhDs: 99
 - Cert./Non-degree: 543
 - By Service:
 - Navy: 932
 - USMC: 355
 - Army: 177
 - Air Force: 95
 - USCG: 9
 - Civilian: 760
 - International: 172
 - Exec-Ed/Prof-Dev: 10,062

RESEARCH:

- FY23 Reimbursable: \$103m
- Quarterly Theses and Dissertations:
 - [September](#): 105
 - [June](#): 195
- Partnerships:
 - CRADAs: 32
 - PIAs: 3
 - TSAs: 7
 - MOU/MOAs: 47

INNOVATION:

- 6 additional [NPS patents](#) awarded, total to date this year: 10
 - Patent applications submitted: 36
- Joint Interagency Field Experimentations
 - Summer – IAS/Human Teaming: 27
 - Fall – Ops at the Edge: 24

INSTITUTION:

- FY23 Direct: \$125m
- Workforce Profile:
 - Tenure Track Faculty: 178
 - Non-Tenure Track Research: 166
 - Non-Tenure Track Instructional: 150
 - Staff/Administrative: 369
 - Military: 94



SPOTLIGHT: The Naval Postgraduate School’s (NPS) latest Warfare Innovation Continuum (WIC) Workshop, one of the key activities enabling the [Naval Innovation Center](#) at NPS, took place Sept. 18-21 in Monterey. This year’s WIC Workshop centered on “Integrated Naval Campaigning,” with participants attending panel discussions and working in teams to generate innovative solutions to challenges related to topics identified by participants. [Read more online.](#)



CNO NAVPLAN: Cmdr. Brian Curran focused his Ph.D. dissertation on shipboard high energy lasers, and his work was published in the Journal of Directed Energy (Restricted Edition). Curran didn't just achieve his Ph.D. in Applied Physics, but he also received the Navy Commendation Medal for his efforts serving as the first Executive Director of NPS' [Meyer Scholar Program](#) and was credited as lead planner for more than 100 Meyer Scholar seminars, including classified sessions, requiring close coordination DOD commands/labs, as well as UARCs and industry partners. Cmdr. Curran is now principal assistant program manager for the NATO Sea-Sparrow Surface Missile System Project.

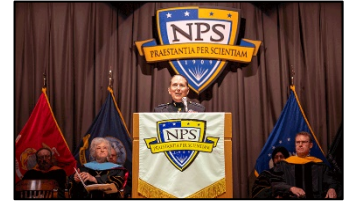


Commandant’s Planning Guidance: U.S. Marine Corps Lt. Col. Scott Humr focused his Ph.D. dissertation on trust in information generated by AI-based systems as it becomes a critical factor in enabling rapid, effective decision-making on the battlefield. As AI is more integrated into combat systems that provide key information to commanders, Humr will apply his knowledge and new technique for modeling trust in an AI that leverages quantum open system technologies at the Marine Corps Combat Development and Integration command in Quantico, Va. [Watch video.](#)



EDUCATION

- Summer Quarter:** U.S. Marine Corps Maj. Gen. Roberta L. Shea, Legislative Assistant to the Commandant of the Marine Corps, delivered the commencement speech in King Hall, Sept. 22 to the summer quarter class. **IMPACT:** 210 graduates with defense-focused advanced degree returned to operational forces: 61 U.S. Navy; 24 U.S. Marine Corps; 7 U.S. Army; 6 U.S. Air Force; 92 DOD civilian; and 20 international students representing 10 allied countries. Links to student applied research theses: [Public](#) | [Restricted](#)
- Aviation Support:** In coordination with CNATRA, NPS delivered stackable certificates in Operations Analysis and STEM courses to more than 100 Student Naval Aviators (SNAs) in the pipeline for flight school at NAS Pensacola. **IMPACT:** Pursuing full-time academic certificates optimizes the ensigns' waiting time and gives them a head start on relevant graduate-level courses that count towards their future advanced degree, which they can continue anytime in a new distance learning portal, [NPS Online](#).
- NPS Hawaii:** NPS and PACFLT [established a branch campus](#) at Pearl Harbor, known as "NPS Hawaii," which will provide relevant professional development programs for continuous learning and research to support operational needs, innovation and the intellectual advantage of servicemembers. **IMPACT:** [NPS Hawaii](#) directly supports objectives in the Secretary of the Navy's recently published Naval Education Strategy for relevant curricula and professional certificates delivered at the point of need.
- Tech Lectures:** The NPS Provost Lecture series focuses on faculty defense applied research, and the latest featured Dr. Nita Shattuck's work to advance Crew Endurance objectives for operating in the Arctic. Shattuck recently completed a seven week transit north of the Arctic circle aboard icebreaker USCGC Healy (WAGB 20). **IMPACT:** Lessons learned from this research are expected to translate to Navy applications in future ship designs, crew considerations, and Arctic CONOPS. [View online](#)
- SECNAV Guest Lectures:** NPS was pleased to host lectures by former Secretary of State [Condoleezza Rice in October](#) and former Undersecretary of the Defense for Policy Michele Flournoy in November. Both offered their perspectives on national security, innovation, current events and strategic competition. **IMPACT:** Secretary Rice left enthusiastic about expanding Stanford/NPS relations. She also met the first cohort of NPS [HBCU Scholarship-for-Service](#) civilian students who will serve in Navy labs upon graduation.



RESEARCH

- Quantum:** Chair of the NPS Physics Department, Dr. Frank Narducci, received a Defense University Research Instrumentation Program (DURIP) [award to build an Atomic Tower](#), perhaps the most precise of its kind, for applications of quantum sensing experiments in navigation and timekeeping. **IMPACT:** One of 14 OSD Critical Defense Technologies, quantum investments build the research infrastructure necessary to develop new capabilities, and graduate leaders educated to employ it.
- Aviation:** Ensign Nate Macdonald, a USNA grad and Shoemaker Scholar, conducted his NPS applied research on an innovative detonation-piloted afterburner, a novel engine design that uses less fuel, reduces weight and can increase the speed and range of tactical missiles. **IMPACT:** The prototype was fabricated in the NPS Rocket Lab as part of an Office of Naval Research (ONR) project that could reduce engine sizes giving engineers options on parameters such as fuel, payload capacity, or internal sensors.



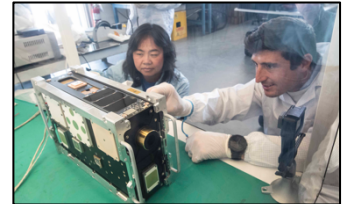


- Cybersecurity:** Dr. Britta Hale leads the [Applied Cryptography Engineering \(ACE\)](#) research team at NPS, and with her students, researched/tested Messaging Layer Security (MLS) on networks, UxVs, and lightweight devices in drone swarms with NIWC Pacific. **IMPACT:** MLS is the first internationally standardized, end-to-end group communication-supporting encryption protocol and Hale is leading applications to MLS-enabled C2 for denied/contested environments and space systems applications.
- Climate Security:** NPS [real-world solutions](#) are being adopted by Marine Corps Base Hawaii (MCBH) and the State of Hawaii Emergency Management Agency (HI-EMA) and influencing planning about emergency power, supplies and evacuation routes for naval installations and surrounding communities. **IMPACT:** U.S. Navy Lt. Felicia Goodell's award-winning Operations Research thesis modeled optimal positioning of emergency refueling generators for MCBH and Kaneohe Bay neighborhoods.
- Additive Manufacturing:** Marines deployed on the island of Pohnpei in Micronesia, 3D printed a MK7 shaped charge which was used to destroy a World War II 500 pound bomb threatening the State Legislature building. **IMPACT:** The 3D printer used by Combat Logistics Battalion 11, Regiment 17 (I MEF) leveraged technology developed in a partnership between NPS' [Consortium for Additive Manufacturing Research and Education \(CAMRE\)](#) and NIWC PAC to support INDOPACOM operational forces.



INNOVATION

- Hybrid Force:** NPS students successfully demonstrated their prototype for USV targeting at LSE Gray Flag '23, in collaboration with PMW 170/A and NSWG-4, that enabled real-time OTH C2 via proliferated Low-Earth Orbit (pLEO) architecture. **IMPACT:** Further tests at NPS JIFX confirmed OTH efficacy at a distance of 1600+ miles and final testing will be done at PACFLT UxS Integrated Battle Problem 24.1, completing an innovative concept-to-capability transition within a year.
- Space:** NPS [Space Systems Academic Group](#) delivered its first Five Eyes (FVEY) CubeSat, called Mola, to Rocket Lab's Launch Complex 2 in Wallops Island, Va., where it will be launched aboard an Electron rocket. **IMPACT:** Led by faculty Dr.'s Wenschel Lan and Gio Minelli with support from Alex Savattono, and student Lt. Col. Robert Debeneadto, USMC, the work advances interoperability between with FVEY nations' namely the Mobile CubeSat C2 and the International Small Satellite Command and Control Network (ISC2N).
- Energy Security:** Sponsored by NAVFAC and ONR, an NPS faculty/student team is leading applied research with Navy installations in Spain and Italy for a project focused on [designing and using microgrids](#) to increase resilience. **IMPACT:** Since the effort began, nearly 100 NPS students have contributed to the overall research, and their work has become a library of lessons and solutions to build upon for increasing energy readiness goals in support of the Secretary of the Navy's Climate Action 2030.
- Contracting Innovation:** Defense Management professor U.S. Air Force Lt. Col. Daniel Finkenstadt, Ph.D. who created the Simulation and Ideation Lab for Applied Sciences (SILAS) to develop innovative gaming and simulations to train contracting officers, accepted the [2023 Innovation in Contracting Award](#) from the National Contract Management Association. **IMPACT:** The SILAS lab enables DEVSECOPS with warfighter students where each project builds on the last for rapid validation/implementation.
- Directed Energy:** Under the Directed Energy Joint Technology Office (DEJTO), NPS Mechanical and Aerospace Engineering Distinguished Professor Dr. Brij N. Agrawal lead a faculty/student team to develop/successfully test AI algorithms for autonomous Aim Point Control using High Energy Laser (HEL) systems. **IMPACT:** NPS and NSWC-Dahlgren now have a joint project funded by DEJTO to implement the algorithms in Navy HEL platforms.





EVENTS & PARTNERSHIPS

- Ukraine Cyber Support:** In July, NPS provided an intensive cyber/network security course in Poland for more than 50 members of the Ukrainian Armed Forces. The five-day program was conducted in partnership with the NATO School Oberammergau at the Lithuanian Polish-Ukrainian (LITPOLUKR) Brigade in Lublin, Poland. **IMPACT:** Well received, the course led to a second cohort in October focused on critical energy infrastructure protection, and expanded to include Polish and Lithuanian military students.
- International Reunion:** More than 100 international NPS alumni gathered in Singapore for the [first Regional Alumni Symposium](#), coordinated by the NPS' International Graduate Programs Office and sponsored by the Department of State. **IMPACT:** 14 nations participated in three days of plenary sessions and panels covering a range of regional security topics, research in emerging technologies, and innovation initiatives [important to PACFLT](#) Indo-Pacific partnerships. [Watch video.](#)
- Industry Partnerships:** NPS Cooperative Research and Development Agreements ([CRADA](#)) with industry help bring leading defense talent and technologies to enhance the mission. RTX (formerly Raytheon) partners with NPS on AI, hypersonics, advanced materials. **IMPACT:** Kim Caruso, Vice President for Global Engineering at RTX, visited NPS with her team to hear updates on the NPS-RTX CRADA and interact with students studying advance combat systems to include radars and missiles produced by RTX.
- Experimentation:** Summer and Fall quarter [Joint Interagency Field Experimentation](#) (JIFX) events drew more than 350 participants from industry, DOD and other agencies such as NASA and DHS to join NPS operationally-experienced students and defense faculty at field test sites to demonstrate, observe and evaluate cutting-edge technologies focused on autonomy/human-machine teaming and Computing at the Edge. **IMPACT:** Held quarterly, JIFX accelerates defense technology innovation and applications.
- Modeling and Simulation (M&S):** NPS [MOVES Institute](#) supported the NATO M&S Group symposium hosting experts from the U.S. and other NATO countries to engage with students, faculty and industry representatives. **IMPACT:** With support from the NPS Foundation and retired Vice Adm. Timothy (TJ) White, NPS DON CIO Chair, the event included "M&S Tech Day" allowing students, faculty and staff a chance to see relevant emerging technologies and talk to representatives from the companies. [Learn more.](#)



PUBLICATIONS

- Middle East:** Dr. Afshon Ostovar, Associate Professor of National Security Affairs and a leading expert on Iran, published "[Iran, Israel, and War in the Middle East](#)" in War on the Rocks.
- Computing:** ONR-funded work by Applied Mathematics Professor Dr. Frank Giraldo was presented at Lawrence Livermore National Laboratory, and published in HPC wire, "[Exascale Challenges Met with Innovative Advanced Math Solutions.](#)"
- Dual-Use Technology:** NPS Defense Analysis professor Dr. Tristan Volpe published "[Dual Use Deception: How Technology Shapes Cooperation in International Relations](#)" in the journal International Organization, of Cambridge University Press.
- Simulation:** A collaboration between faculty and students in Physics, MOVES and Computer Science led to "[Output Force Density Saturation in COMSOL Simulations of Biometric Artificial Muscles](#)," being published in Applied Sciences.
- Force Design:** Jeff Kline, Operations Research department, published "[Revamping Fleet Design and Maritime Strategy: An Integrated Naval Campaign for Advantage](#)" in the Center for International Maritime Security.
- Autonomy:** NPS student Captain Karl Flynn, USMC, published "[Make Every Marine a Drone Killer](#)" in Proceedings, which earned third prize in the U.S. Naval Institute's essay contest.