The Challenge

Capability = Technology + People
MISSION

Provide defense-focused graduate education, including classified studies and interdisciplinary research, to advance the operational effectiveness, technological leadership and warfighting advantage of the Naval service.

FOR DECISIVE ADVANTAGE
Who we are

We are who we serve:

NPS is a Navy command and a defense graduate university. We are military leaders, defense-expert educators and staff serving those who serve our nation.

What we do

Defense education & research:

NPS develops warrior talent and research solutions through Master’s and Ph.D. programs for the Department of the Navy, DoD, U.S. Government, partners and our allies.

Why it matters

For decisive advantage:

NPS ensures the technological leadership of the future force. Our graduates have the technical and intellectual edge to deter and prevail in the all-domain battlespace.
Where science meets the art of warfare...

- **NPS transforms leaders who will transform warfighting.** Electrical engineering alumnus Marine Corps Maj. Michael Wade studied high-electron mobility transistors for his thesis and directly applied his research to USMC radar systems, including the counter UAS, Light Marine Air Defense Integrated System (LMADIS).

- **Industry partnerships bring emerging technology to campus.** Xerox chose NPS to install its first liquid metal 3D printer, the ElemX, to collaborate on shipboard use cases through students-faculty research. The NPS-Xerox team and CNSP will install the second ElemX aboard USS TRIPOLI (LHA-7).

- **Relevant research delivers solutions.** LCDR Austin West was selected for the “Rear Admiral William S. Parsons Award for Scientific and Technical Progress” for his thesis research on compensating for air turbulence on the High Energy Laser Weapon System (HELWS), delivering tactical decision aids and fire control guidance.
Mission

Our students are the catalyst

Operationally experienced students apply their academics to solve real operational problems.

- ~2,500 resident and distance students, many with combat experience (~13k more through certificates, workshops, and Exec Ed)
- Ever-refreshed, students bring real-time recognition of needs/threats
- Student research co-discovers and disseminates new knowledge
- Graduates apply their solutions and learning upon returning to the Fleet
Deep faculty expertise in defense matters

Defense-focused faculty provide deep intellectual capital applied to Naval missions, functions and tasks

- Active recruiting from top Ph.D. programs
- Diverse mix of tenured, research, instructional, and military faculty
- Military faculty possess academic credentials and operational expertise
- Graduate instruction integrates teaching with research
- Develops cutting-edge technology solutions and relevant applications
The NPS difference

Only NPS synchronizes student *operational experience* and *graduate education* with *applied research* and *faculty expertise*, to deliver twice the return on education investment:

Relevant warfighting **solutions**...

...and **leaders** educated to employ them.

- NPS is **Responsive** to operational needs through tailored education and research.
- NPS complements the Naval research community through **Interdisciplinary** education and **Applied** research producing **Innovative** solutions to relevant problems.
- NPS offers **Classified** coursework and research in controlled laboratories on our **Secure** campus.
Responsive: to the needs of the Fleet/Force

Program and curricular reviews ensure NPS meets the current and emerging needs of operational forces.

- Curriculum reviews with direct participation by flag officer sponsors.
- Detailed reviews scrutinize educational deliverables.
- Curricular educational outcomes match Fleet sponsors’ input.
- Naval leaders demand responsiveness and ongoing relevance.
- Seasoned Warfare Chairs infuse operational relevance at every level.
Interdisciplinary: solutions aligned to priorities

**Decision Sciences**
- Ops Analysis
- Contracting, Acquisition
- Wargaming, Simulations
- Resource Management
  - OR, DM, MOVES
  - **TF Sea Control**

**Great Power Competition**
- Regional Studies
- Irregular Warfare
- Information Warfare
  - DA, NSA
  - **TF Maritime Gray Zone**

**Cyber and Info Science**
- Cyber and Info Systems
- Electronic Warfare
  - IS, CS, ECE, Physics
  - **TF OVERMATCH**

**Meteorology**
- Oceanography
- Space Domain
- Undersea Domain
  - METOC, Space, USW
  - **TF Arctic**

**Decision Sciences**
- Ops Analysis
- Contracting, Acquisition
- Wargaming, Simulations
- Resource Management
  - OR, DM, MOVES, DRMI
  - **TF Blue-Green Integration**

**Interdisciplinary:** solutions aligned to priorities

**Weapon, Platforms**
- Autonomous Systems
- Material Science
- Systems Integration
- Undersea Domain
  - Physics, Mech Eng, Sys Eng, ECE
  - **TF Hybrid Fleet 2045**

**Commander’s Planning Guidance**
- **Great Power Competition**
- Regional Studies
- Irregular Warfare
- Information Warfare
  - DA, NSA
  - **TF Maritime Gray Zone**

**Problem Solving**

**Response:**
- Interdisciplinary
- Applied
- Innovative
- Classified
- Secure
Applied: 100% defense focused

A fully accredited, graduate university with expert defense faculty and relevant research programs

- Student focused... Transforming leaders to think critically and solve complex warfighting problems.
- Applied research... Delivering solutions through interdisciplinary curricula and relevant student-faculty research.
- A capability to optimize... Defense-relevant graduate degree programs, research and Exec-Ed combine to deliver operational outcomes.

Graduate Programs:

- Applied Mathematics
- Computer Science
- Cyber
- Defense Analysis
- Defense Management
- Electrical and Computer Engineering
- Energy
- Information Sciences
- Mechanical and Aerospace Engineering
- Meteorology
- National Security Affairs
- Oceanography
- Operations Research
- Physics
- Space Systems
- Systems Engineering
- Undersea Warfare
Innovative: a location to leverage

Proximity to the Silicon Valley, top research universities and labs creates dynamic opportunities for faculty and students.

- Internships give uniformed students experience at the speed of industry, insights into commercial best practices and technical breakthroughs.
- Ecosystem: Stanford, UC Berkeley, UCSC, Fleet Numerical Meteorology and Oceanography Center, Naval Research Laboratory, Defense Language Institute
- Open ocean ranges (Monterey Bay), One-of-a-Kind facilities (SLAMR) and full access to controlled airspace (Camp Roberts Field Lab)
Maintain the facilities, clearances and infrastructure to provide classified research and educational programs.

- Cyber Battle Lab / Electric Weapons Lab / NPS Field Labs / Prototyping
- Sensitive Compartmented Information Facility (SCIF) and the Systems Technology Battle Lab (STBL)
- Classified and secure collections in the Dudley Knox Library
- Opportunities to expand

**NPS Mission Metrics**

"Provides defense focused graduate education ..."

- 68 graduate resident and distance learning programs in technical and engineering fields (2020 graduates: 305)
- 32 graduate resident and distance learning programs in defense management and security studies (2020 graduates: 203)
- 16,066 total student engagement (resident, distance, certificate, Exec-Ed)
- 82 continuous learning, certificate, short courses, special seminars, MIEs (2020 454 participants)

"... including classified and interdisciplinary research ..."

- More than 1,000 research thesis and capstone projects delivered every year
- In 2020 over 150 interdisciplinary education, research, and field experimentation programs executed
- In 2020 30% of all sponsored research was approached with interdisciplinary teams
- In 2020 over 120 classified/restricted research and education activities were conducted (25% of all sponsored research)
- In 2021 60% of NPS Naval Research programs directly support CNO Key Operational Problems"
Secure: on-base campus & labs

- 4 FLEX classrooms of the Future (reconfigurable)
- Cyber and Electric Weapons labs
- Adaptive Optics lab, a National Center of Excellence
- 3 Classified facilities (SCIF, STBL, Library)
- 12 Systems engineering labs (Robotics, M&S)
- 68 Mechanical & Aerospace labs (Autonomy, 3D printing)
- 9 Space Systems labs (CubeSats, Spacecraft robotics)
- 62 baseline classrooms and 4 Auditoria
The Business of NPS:

- NPS utilizes a **University Operating Model (OUM)** with reimbursable operations for education and research leverage in a resource-constrained environment.
- Reimbursable operations, while complex, deliver diverse grad-ed and research results.
- High value: Twice the school for half the price. ~$100m direct funding augmented by ~$100m from sponsored reimbursable education and research.
Advanced relevant education
Resident, Distance and Non-degree

Graduate Program Students
By Type of Enrollment

Total Engagement in AY2020
16,066
1,480 Resident Degree
866 Distance Degree
425 Certificate/Non-degree
13,295 EE/PD*

*EE/PD is Executive Education and Professional Development
Diverse by Design: educating our global partners

International Resident Degree Students – 48 countries

<table>
<thead>
<tr>
<th>Degree Students</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>5</td>
</tr>
<tr>
<td>Caribbean, Central &amp; South America</td>
<td>16</td>
</tr>
<tr>
<td>Central/East Asian &amp; Middle East</td>
<td>8</td>
</tr>
<tr>
<td>Europe</td>
<td>40</td>
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<tr>
<td>Far/Near East</td>
<td>45</td>
</tr>
<tr>
<td>Australia &amp; New Zealand</td>
<td>6</td>
</tr>
<tr>
<td>North America</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>126</strong></td>
</tr>
</tbody>
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Data from AY2020.
Reaccredited in 2020 for max: 10-years

**WSCUC**  Western Association of Schools and Colleges
Senior College and University Commission

- **ABET**  Accreditation Board for Engineering and Technology

- **AACSB**  Association to Advance Collegiate Schools of Business

- **NASPAA**  Network of Schools of Public Policy, Affairs, and Administration
Navy components sponsor about ½ of the research, but that’s not sufficient or comprehensive.

Support from other government agencies is also critical, especially in areas such as intelligence and unmanned systems.

Mission positive, budget neutral:
- Operational relevance through resource sponsors
- Faculty recruitment, retention & relevance with competitive proposals and peer-reviewed publications to maintain skill sets and expertise
- Leveraging reimbursables doubles the value of the NPS graduate education
Research connects people, enables solutions

- Our ecosystem of research and facilities includes:
  - Consortium for Robotics and Unmanned Systems Education and Research (CRUSER)
  - Sea Land Air Military Research Initiative (SLAMR)
  - Joint Field Interagency Experimentation (JIFX)
  - Consortium for Intelligent Systems Education and Research (CISER)
  - MOVES (Modeling, Virtual Environments and Simulation) Institute
  - The Common Operational Research Environment (CORE) lab

Additional expertise in: (see all: nps.edu/web/research/research-facilities)
  - Additive Manufacturing and Materials
  - Infrastructure Defense and Wargaming
  - Crew Endurance and Human Systems Integration
  - AI/ML Data Science and Cyber Security/Operations
  - Spacecraft Research and Design
  - Directed Energy Weapons and Defense
  - Center for Executive Education

- NavalX Central Coast Tech Bridge connects to industry
In the Naval R&D Establishment (NR&DE)  
**NPS complements Naval Warfare Center R&D**

65+ Joint Research Projects

Shared Learning  
Monthly Lectures by a NAVSEA Centers

Workforce STEM many NRDE staff enrolled at NPS for degrees and certificates
Naval Warfare Studies Institute

A front door to NPS interdisciplinary education and research solutions.
A comparative and competitive advantage

**Immediate Impact:**
- 100% focused on the Naval mission and national security
- 1,000’s of research solutions from student-faculty applied research
- Graduates return to employ education for warfighting advantage

**Future Advantage:**
- University Operating Model delivers a $200M+ program for half the cost
- A nexus of world-class academia, research and innovation to draw upon
- Naval Warfare Studies Institute aligns and accelerates warfighting outcomes

**Enduring Leadership:**
- Executive, distance and continuing education ensures our edge stays sharp
- Reservoir of defense-focused faculty are irreplaceable intellectual capital
- Interservice, interagency and international campus builds lasting partnerships
Transforming Leaders.
Delivering Solutions.
BACK-UP
GSEAS

Graduate School of Engineering and Applied Sciences

GSEAS prepares military leaders to be transformational technology agents of change, leveraging and managing change in tomorrow’s complex and technically challenging world.

Core Strengths – Engineering (MAE, ECE, SE), METOC, Space, USW, Math, Physics

Research Thrusts/Capabilities – Cyber Warfare • Electronic Warfare • Multi-INT Studies Sensors • Directed Energy • Nanotechnology • Systems Engineering • Numerical Analysis Discrete Mathematics • Climate Science • Air-Sea Interaction • Modeling and Visualization Coastal Dynamics • Arctic/Antarctic Processes • Undersea Acoustics
GSOIS

Graduate School of Operational and Information Sciences

GSOIS prepares future senior military leaders to succeed in an uncertain, rapidly changing, and information intensive environment through research and educational programs that address real-world operational problems.

Core Strengths – Computer Science, Operations Research, Defense Analysis, Information Sciences, Cyber Academic Group, Data Science and Analytics

Research Thrusts/Capabilities – Artificial Intelligence • Machine Learning • Cyber Security • Information Warfare • Political Warfare • Modeling and Virtual Environments • Software Engineering • Irregular Warfare • Network Operations • Cyber Operations • Data Analytics • Human Systems Integration • Operations Analysis
GSIDS
Graduate School of International Defense Studies

GSIDS conducts research and provides advanced graduate education opportunities in international security studies to prepare leaders for tomorrow’s international security challenges.

Core Strengths – National Security Studies, Civil-Military Relations, Homeland Security Studies

Research Thrusts/Capabilities – Great Power Competition • Regional Studies • Partnership and Capacity Building
Interdisciplinary: matrixed curricula and courses

Curriculum x Department x Courses... this type of instruction drives critical thinking and diversity of thought and cross-discipline applications

- All NPS curricula require courses from multiple departments
- The majority of courses (~80%) serve multiple curricula and degrees
- Faculty teach multiple courses and students from across multiple curricula

| Department Providing Courses | Resident DM  | ECE  | MAE  | MA  | MAE/OC | PH  | SE  | SP  | USW | EAG | CS  | DA  | IS  | OR  | NSA | Total | %   |
|-----------------------------|-------------|------|------|-----|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-------|-----|
| DM                          | 3522        | 9    | 143  | 44  | 1      | 2   | 16  | 21  | 8   | 28  | 3   | 32  | 105 | 25  | 3737 | 94%  |
| ECE                         | 18          | 866  | 117  | 176 | 1      | 7   | 2   | 1   | 2   | 29  | 5   | 32  | 1143| 76% |
| MA                          | 176         |      |      |     | 1      |     |     |     | 1   |     |     |     |     | 211 | 83% |
| MAE                         | 16          | 29   | 2    | 41  | 1      | 4   | 2   |     | 1   | 4   | 1   | 1   | 2   | 810 | 86% |
| METOC                       | 15          | 2    | 54   | 220 | 93    | 14  | 310 |     | 1   | 2   | 18  | 22  | 454 | 11% |
| PH                          | 3522        | 9    | 143  | 44  | 1      | 2   | 16  | 21  | 8   | 28  | 3   | 32  | 105 | 25  | 3737 | 94%  |
| SE                          | 18          | 866  | 117  | 176 | 1      | 7   | 2   | 1   | 2   | 29  | 5   | 32  | 1143| 76% |
| SP                          | 1            | 114  | 90   | 5   | 1      | 2   | 11  |     | 2   | 2   | 2   | 2   | 1904 | 4  | 234 | 22  | 806 | 38% |
| CUS                        | 155          | 114  | 90   | 5   | 1      | 2   | 11  |     | 2   | 2   | 2   | 2   | 1904 | 4  | 234 | 22  | 806 | 38% |
| DA                          | 176         |      |      |     | 1      |     |     |     | 1   | 4   | 1   | 1   | 2   | 810 | 86% |
| IS                          | 154         | 86   | 91   | 3   | 2      | 2   | 11  |     | 2   | 2   | 2   | 2   | 1904 | 4  | 234 | 22  | 806 | 38% |
| OR                          | 135         | 220  | 3    | 1   | 2      | 2   | 11  |     | 2   | 2   | 2   | 2   | 1904 | 4  | 234 | 22  | 806 | 38% |
| NSA                         | 5            | 2    | 2    | 2   | 4      | 2   | 11  |     | 2   | 2   | 2   | 2   | 1904 | 4  | 234 | 22  | 806 | 38% |
| Total                       | 4273        | 1214 | 1127 | 607 | 945    | 986 | 444 | 56  | 45  | 220 | 1216 | 2233 | 3445 | 21839 | |
University operating model

Central Budget
- Resources for staff & academic departments to execute core mission
- Direct & Reimbursable Funding Pots
  - Direct
  - Indirect (Reimbursable)
  - Tuition (Resident, FMT - Reimbursable)
- Centralized budgeting & oversight; decentralized execution

Research Portfolio
- Reimbursable Research
  - DON, DOD, Non-DOD, Civilian (non-federal)
- Direct Research
  - Naval Research Program (NRP)
  - Gift Fund (Foundation)
- Centralized proposal review & approval and funds receipt & acceptance; decentralized execution

![Diagram showing distribution of resources and budgets across central and research portfolios.](chart.png)
Research and programs driven by DON/DOD needs
A rich history of education and impact

11 decades of affirming that Seapower rests upon science. Established at USNA in 1909, moved to Monterey in 1951.

- 1910-20: Four members of first class make flag, two become 4-star
- 1920-30: LT Hyman Rickover completes studies in electrical engineering
- 1930-40: With WWII looming, Admiral Nimitz boosts enrollment at NPS
- 1940-50: Antisubmarine Warfare Operations Research Group established
- 1950-60: Seymour Cray installs CDC 1064 computer serial #1 at NPS
- 1960-70: Aero dept. opens Turbopropulsion laboratory at MRY airport
- 1970-80: Dr. Kildall builds first operating system for microcomputers
- 1980-90: Pioneering small satellite design program established
- 1990-00: LCDR Hearing’s classified thesis enables Challenge Athena
- 2000-10: Center for Homeland Defense and Security established
- 2010-20: Admiral McRaven credits his NPS thesis as the basis for the successful planning of the Osama bin Laden raid (and quite a few others)
From Ensigns to Admirals

50,000+ Alumni deliver Decisive Advantage

- 1/3 of all U.S. Navy active-duty Flag Officers
  - 70% of Navy flag officers are Center for Executive Education grads
- More than 6,000 int’l officers from 110+ countries
- 42,000+ strong on Linked-In:
  - 1/3 occupy “senior” positions, 40% work in military/defense
- Naval and National leaders:
  - Senator Mark Kelly, CAPT USN, Space Shuttle Commander
  - Adm. Mike Mullen, USN, former Chairman, Joint Chiefs of Staff
  - Adm. Mark Ferguson, USN, former Commander, U.S. Naval Forces Europe
  - Adm. William McRaven, USN, former Commander, U.S. SOCOM
  - Adm. Cecil D. Haney, former Commander, U.S. Strategic Cmd
  - Gen. Keith Alexander, USA, former Director, National Security Agency
  - Gen. Michael Hagee, USMC, former Commandant
  - Vice Adm. Jan Tighe, PhD, USN, former 10th FLEET / Cyber Command
“NPS is the Navy’s applied research university. There are functions that occur here that we can’t get anywhere else in the world. NPS is effectively creating the future leaders of the future Navy.”

Admiral Michael Gilday, USN
Chief of Naval Operations

“It will not be technology that wins the next conflict. The winning force will be the one who is faster with more effective decision-making processes that can out-think and out-operate with technology in new ways. It will be the force with the intellectual edge.”

General David Berger, USMC
Commandant of the Marine Corps