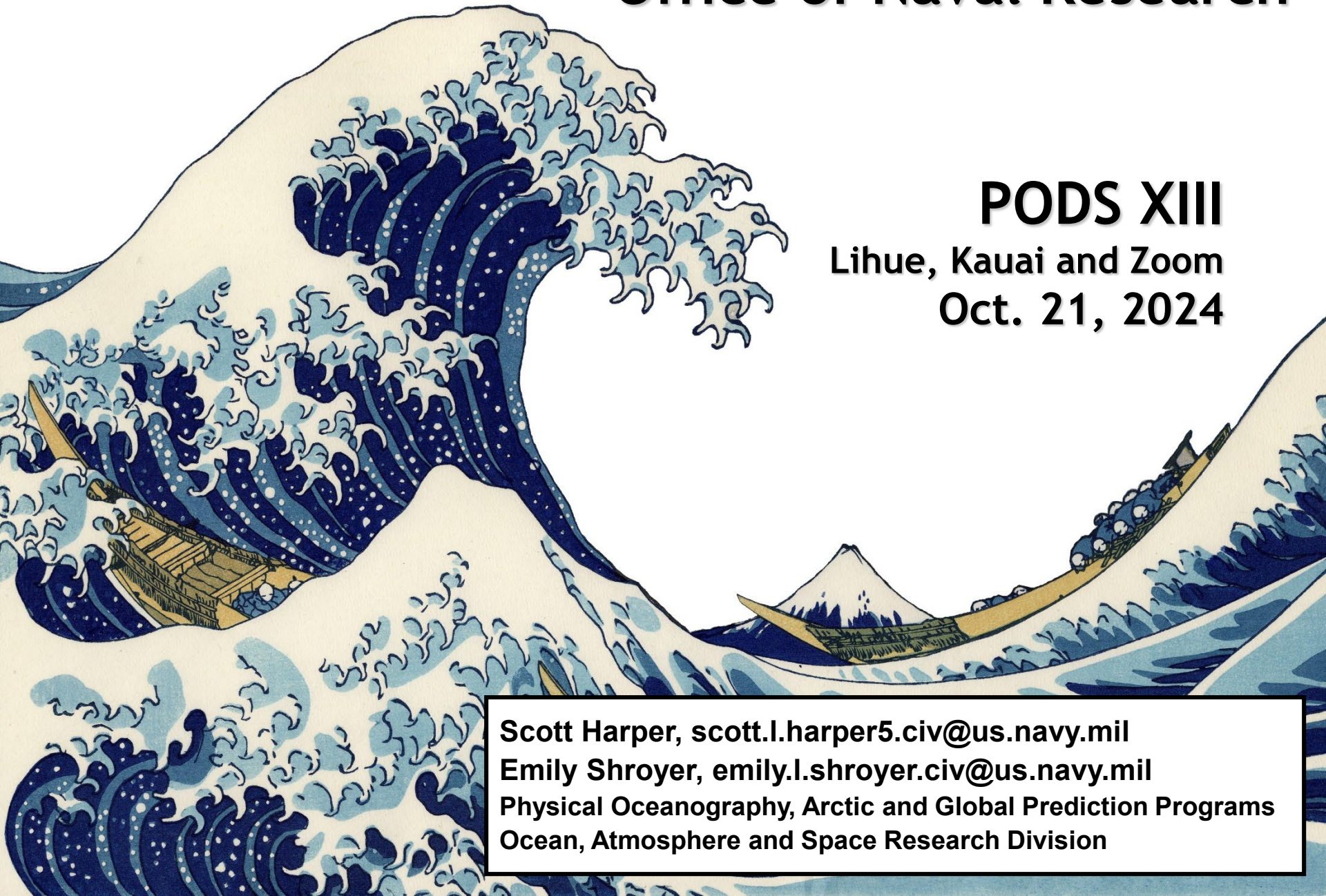
Office of Naval Research



PODS XIII

Lihue, Kauai and Zoom

Oct. 21, 2024

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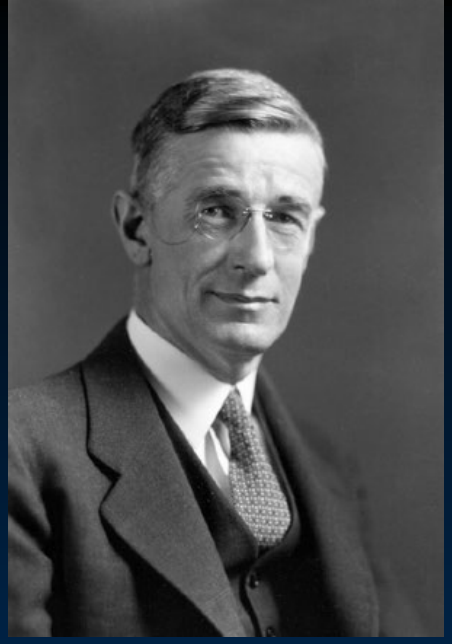
Physical Oceanography, Arctic and Global Prediction Programs
Ocean, Atmosphere and Space Research Division

The Office of Naval Research

- Founded in **1946**, ONR was the first permanent US federal agency devoted to the support of scientific research.
- ONR was the model for the National Science Foundation (established in 1950).



Vannevar Bush
"Science: The Endless Frontier"

ONR is a **"mission agency"** as is NOAA and NASA (and really, NSF as well).

The mission of the **Office of Naval Research**:

"…to **foster, plan, facilitate and transition scientific research** in recognition of its paramount importance to enable future naval power and the preservation of national security."

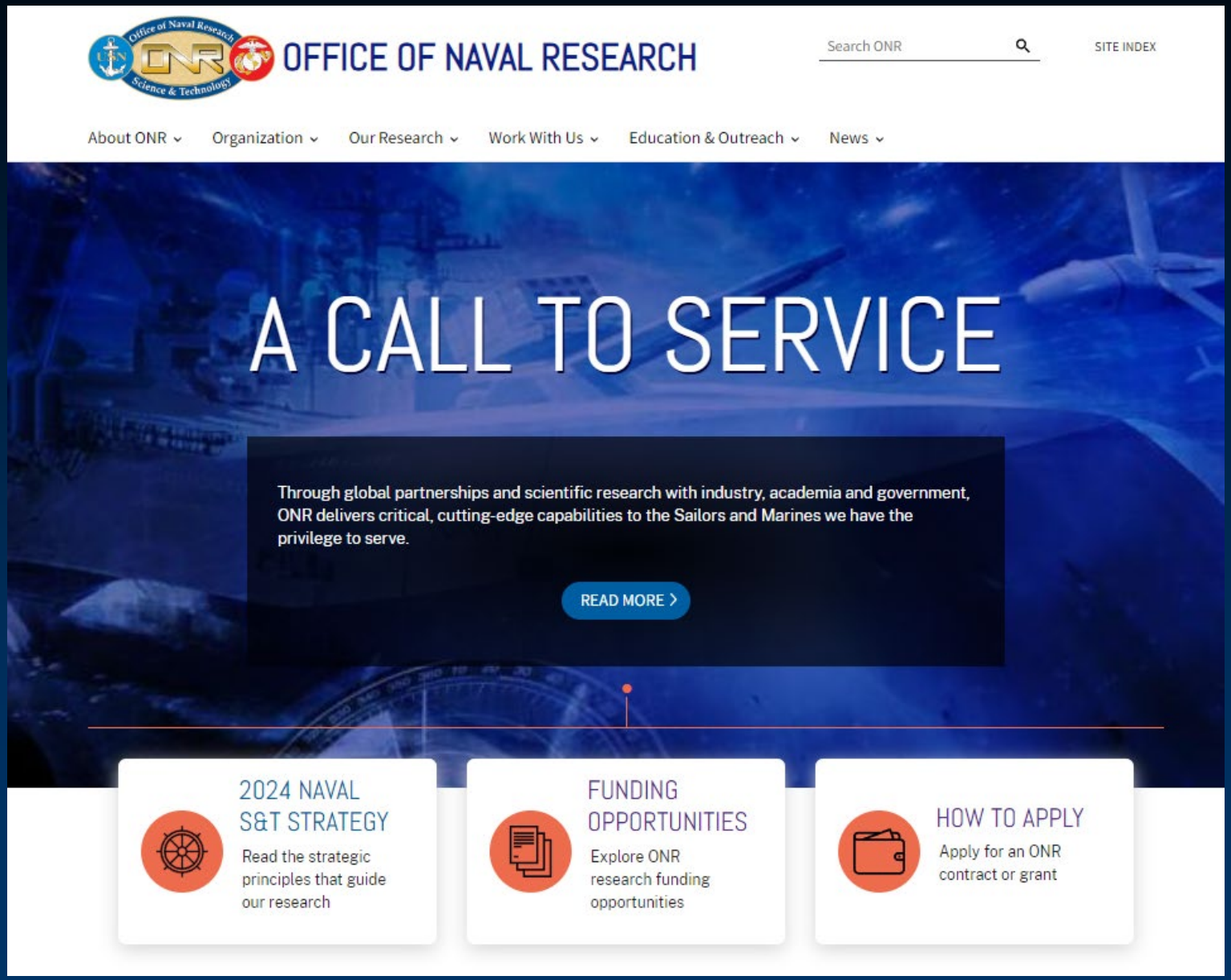
U.S. DoD Research Funding Definitions

- 6.1 funds: Basic Research
- 6.2 funds: Applied Research
- There are higher funding levels that support transition into Navy operations.

Oceanographic Research at ONR is about **85%** 6.1 and **15%** 6.2

Overall, the annual ONR budget is ~$2 billion, with about $650M in Basic Research funding distributed over all scientific research areas.

http://www.onr.navy.mil



http://www.onr.navy.mil

DEPARTMENTS

From the development of sophisticated computer algorithms for aircraft and ship electronics to the fielding of lightweight armor for the Marine Corps, ONR's five science and technology departments coordinate and execute naval research investment priorities.

Command, Control, Computing, Communications, Cyber, Intelligence, Surveillance, Reconnaissance and Targeting (C5ISRT) (Code 31)

Code 31 supports research in Mathematics, Electronics, Computer & Information Sciences and their applications in Command & Control, Communications, Cyber, EW, Intelligence, Surveillance and Reconnaissance.

Ocean Battlespace Sensing (Code 32)

Code 32 is responsible for Navy and Marine Corps S&T in ocean and meteorological science, undersea warfare, mine warfare, space technology and marine mammals.

Sea Warfare and Weapons (Code 33)

Code 33 develops and delivers technologies that enable superior warfighting and energy capabilities for naval forces, platforms and undersea weaponry.

Warfighter Performance (Code 34)

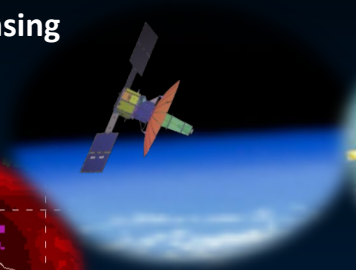
Code 34's mission is to enhance warfighter effectiveness and efficiencies through bioengineered and biorobotic systems, medical and behavioral technologies, improved manpower, personnel, and training and systems design.

Naval Air Warfare and Weapons (Code 35)

Code 35 supports the Navy's air warfare and weapons needs, fostering the technology development of naval aviation platforms, kinetic weapons, directed energy and electric weapons.

Ocean Battlespace Sensing Department (Code 32)

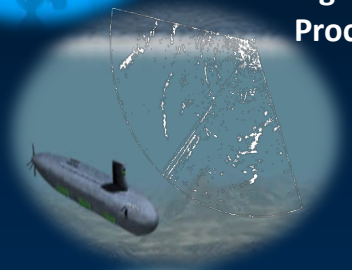
Remote Sensing



Anti-Submarine Warfare

Mine Warfare & Ocean Engineering

Undersea Signal Processing

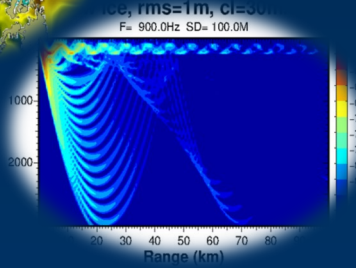


Unmanned Systems Technology & Autonomy

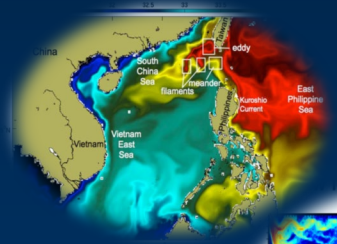
Research Facilities

Marine Mammals & Biology

Ocean Acoustics (NNR)

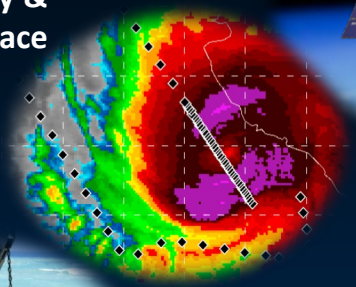


Physical Oceanography



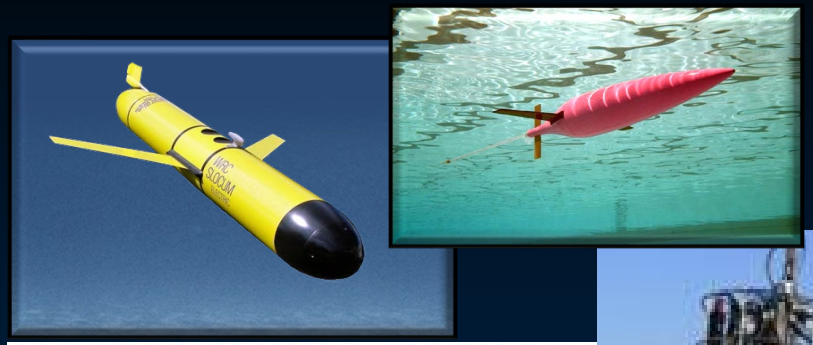
Littoral Geosciences

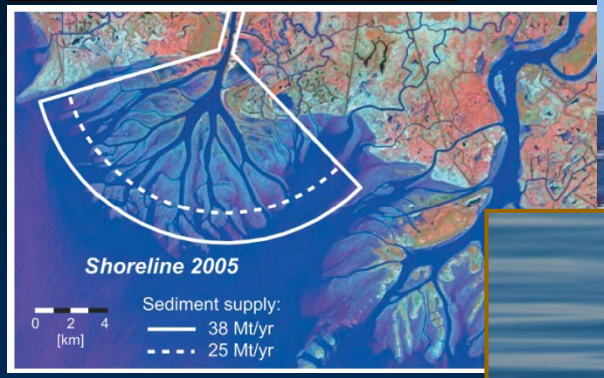
Marine Meteorology & Space

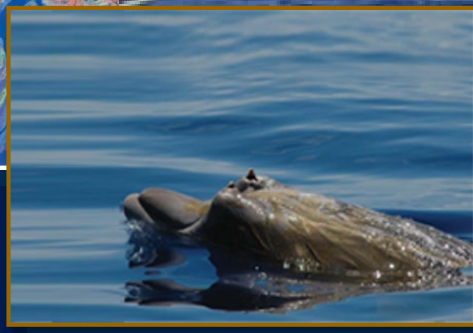


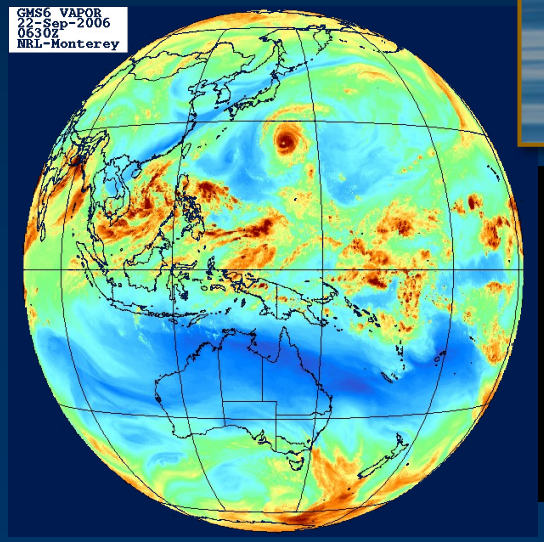
Ocean, Atmosphere, and Space Research Division

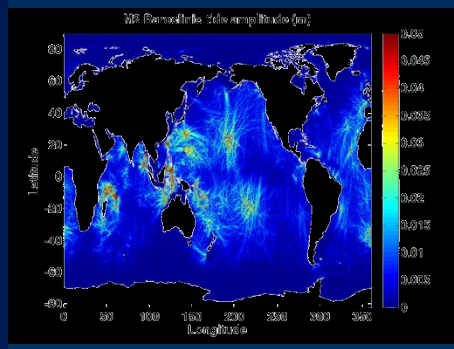
- Physical Oceanography
- Coastal Geosciences
- Marine Meteorology
- Marine Mammals
- Ocean Acoustics
- Arctic and Global Prediction











General Theme of ONR Oceanographic Research

Achieve a better understanding of the processes that impact and govern the logistics of operating above, on, or in the ocean environment:

- *waves, temperature, density structure, sea surface height, tides, fog, sea ice, strong currents, internal waves, visibility, coastal river plumes, …*

To develop knowledge that may eventually improve predictive models of the environment that provide forecasts on time scales on the order of hours to weeks.

What topics are we less interested in funding?

- Typically *not* climate scales or climate processes
- ONR often studies processes in the regions where the US Navy operates, so historically not much research in the Southern Hemisphere at the moment, but there is potential future interest

ONR Physical Oceanography Program

Program officers: Scott Harper, Emily Shroyer, Kipp Shearman

Primary Thrust Areas

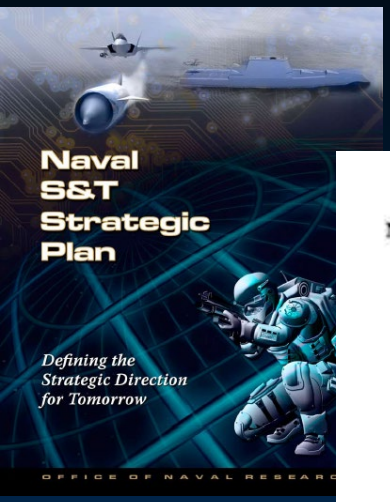
- **Ocean Physics**: Processes and Observations
  - frontal variability, internal waves, energy cascade processes, wave breaking, turbulence, mixing processes, other field studies
- **Coupled Boundary Layer Physics**
  - air/sea interactions, mixed layer dynamics, bottom boundary-layer processes, flow interactions with topography, surface waves
- **Ocean Modeling and Prediction**
  - ocean forecasting, model development, data assimilation
- **Ocean Sensing Technology Development**
  - new / improved sampling platforms and oceanographic sensors

ONR Arctic and Global Prediction Program

Primary Thrust Areas

- **Sea Ice**
  - better understand of sea ice dynamics, interactions between sea ice and the ocean/waves/swell/atmosphere, evolution of sea ice
- **Autonomous and Remote Sensing**
  - new sensors, platforms, and techniques for collecting in situ Arctic data, environmental Arctic parameters from aircraft and satellites (SAR, etc)
- **Arctic System Model Development**
  - improved forecasts for the Arctic environment, data assimilation, and incorporation of the Arctic system in global earth system prediction models
- **Arctic Ocean Structure and Circulation**
  - emerging processes that impact the vertical stratification or circulation and heat transport of the Arctic Ocean

Core programs do not use a peer review system… How do ONR program officers decide what to fund?

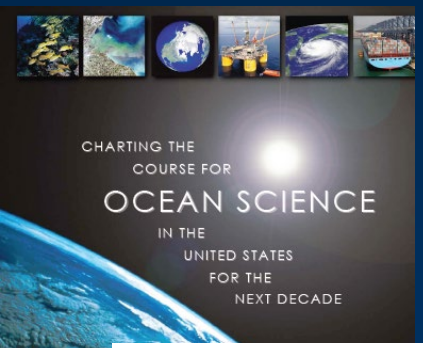


Top-level Navy Vision

Overall ONR guidance

Customer guidance

- NAVO
- FNMOC
- OPNAV



National Academy and other scientific recommendations

Individuals and workshops

Integration of all of these, as well as other factors…

- current ONR efforts
- other agency efforts
- local input
- fiscal constraints
- quality of proposals

Proposing to ONR Phys)/Arctic Core Programs

ONR can accept proposals at any time (under the "Long Range Broad Agency Announcement (BAA) for Navy and Marine Corps Science and Technology") **but** it is easier to plan our budget if we adhere to an **annual funding cycle**.

The ONR website will *usually** have the most up-to-date information about program interests and funding opportunities. You can access it to learn about any changes to programs, focus areas, or new DRI opportunities.

Summer: **Planning letters for the Core Program** due (*Planning letters are 2-3 page summaries of the research you would like to do. We try to provide honest feedback as to whether or not we feel that idea has a chance to be funded by ONR.*)

Late Fall: Some planning letters encouraged for full proposals

Early in the calendar year: Proposals due

When congress passes the budget: Proposal decisions made

October: Start of new fiscal year – money available for new and ongoing grants (contingent on Congress and federal budget approval)

ONR MURI Programs

Multidisciplinary University Research Initiatives are also five-year efforts, focused on a particular science topic. The MURI provides funds for a *self-assembled team* of scientists to address a scientific problem. Teams are typically composed of 5-6 investigators and MURIs are funded at $7.5M over the 5-year efforts. MURI white papers and proposals are panel reviewed.

Current and Recent PhysO and Arctic MURI Projects:

- Stay tuned for FY26 announcement
- Coastal Processes & Permafrost Erosion, FY25-FY29 (proposals being reviewed now)
- BIOMIX- Investigating biogenic mixing through eDNA and turbulence sampling FY23-FY27
- Climate Risks and Decision Superiority (two teams) FY23-FY27
- Combining Disparate Environmental Data Into a Common Framework, FY20-FY24

National Oceanographic Partnership Program

Partnership between fifteen federal agencies to provide leadership and coordination on national oceanographic research and education initiatives.

Established by Congress in 1997 to improve knowledge of the ocean to:

- Assure national security
- Advance economic development
- Protect quality of life
- Strengthen science education and communication

Two FY24 Topics in ONR BAA Announcement #N00014-24-S-B003 (Nov 22, 2024):

- A Global Multi-agency Experiment on Internal Wave Energy, Mixing and Interactions in the Ocean and Their Representation in Global Ocean Models and Operational Forecasts
- Low-Cost, Air Deployable 400m Profiling CTD Floats for investigating submesoscale eddies – Design Study and Demonstration

Proposing to NOPP, MURI, and DRI programs

These opportunities pop up at different times throughout the year – please check the ONR and NOPP websites occasionally for new opportunities. Your sponsored research office at your institution *may* send out notices when new Funding Announcements are released.

The **NOPP** and **MURI** proposal processes are quite formal with firm deadlines, and may involve a single collaborative proposal submitted by a lead PI with subcontracts to co-PI's at other institutions.

The **DRI** teams are usually put together by the program officers at ONR, with individual grants to each PI, so the proposal process is more similar to proposing to our core program.

- Working on these projects can be useful for getting exposure and collaborating on what is often an interesting interdisciplinary problem, but you'll have to get your foot in the door somehow – networking is important.

ONR Young Investigator Program (YIP)

Awarded annually by ONR (5 per year from ONR Code 32)

Awards are **$250,000 / yr for three years**, with the possibility of additional support for capital equipment or collaborative research with a Navy laboratory. YIP proposals are reviewed across the department.

Historically, a few of the applicants receiving an ONR Young Investigator award will also be selected to receive a Presidential Early Career Award for Scientists and Engineers (PECASE).

Eligibility: This program is open to **U.S. citizens, nationals, and permanent residents** holding tenure track or permanent faculty positions at U.S. institutions of higher education, ***within their first or second tenure-track equivalent appointment and 7 years of their degree.***

Naval International Cooperative Opportunities In Science & Technology Program (NICOP)

An ONR-Global funding mechanism to encourage international collaboration in Science & Technology (S&T) for the mutual benefit of the U.S. Navy and Marine Corps and international participants.

NICOP focuses on non-U.S. complementary strengths in S&T with the intent of establishing working relationships and facilitating potential long-term collaborative programs.

ONR-Global also sponsors a **Conference Support Program (CSP)** and a **Visiting Scientist Program (VSP)**

One slide summary...

- Marine science research and applications are housed in “Code 32”. Other Codes support areas like sensor/platform engineering, autonomy, applied math, etc.
- There are several funding opportunities that may be of interest:
  - Proposals submitted to the core programs (like physical oceanography) route through the standing Long-Range Broad Agency Announcement. This process starts with an email to the cognizant program officer and planning letter process.
  - We typically welcome work that spans programs (e.g., oceanography and acoustics). If your work covers multiple disciplines, you can send an email to multiple program officers at once.
  - Many opportunities have specific funding announcements with structured timelines and processes. Programs worth tracking include:
    - Young Investigator Program (YIP)
    - Defense University Research Instrumentation Program (DURIP)
    - Multidisciplinary University Research Initiatives (MURI)
    - National Ocean Partnership Program (NOPP)
    - Small Business Technology Transfer (STTR, partners academic & industry)
    - HBCU/MI and Naval STEM programs
- Proposal review differs by program. Some announcements are competed across ONR departments (e.g., DURIP), whereas others are program specific.
- It is almost always a good idea to reach out to a program officer in your discipline area even if you are applying for funding from another source (e.g., Naval STEM).