The Office of Naval Research – University Science and Technology

Reginald G. Williams, PhD
Office of Naval Research
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The Office of Naval Research
The S&T Provider for the Navy and Marine Corps

- 4,000+ People
- 23 Locations
- $2.1B / year
- >1,000 Partners

Discover ➔ Develop ➔ Deliver ➔ Technological Advantage
Partnering with the S&T Community

Government

Academia
1000 Universities/Colleges
Domestic/International

Industry
Small/Medium/Large Companies

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## ONR Workforce

### Civilian Employees - 3036
- Nearly 1022 PhDs
- More than 515 Master’s Degrees
- 160 Fellows

### Military Personnel - 111
- Intergovernmental Personnel Act (IPA) - 10
- Detailees - 90

### Contractors - 501

### Scientists & Engineers (S&E)

<table>
<thead>
<tr>
<th>Aerospace Engineering</th>
<th>Engineering Research Psychologist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Astrophysicist</td>
<td>Research Biologist</td>
</tr>
<tr>
<td>Chemical Engineer</td>
<td>Physiologist</td>
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<tr>
<td>Computational Research Linguist</td>
<td>Geologist</td>
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<tr>
<td>Computer Engineer</td>
<td>Materials Research Engineer</td>
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<tr>
<td>Computer Scientist</td>
<td>Mathematician</td>
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<tr>
<td>Electrical Engineer</td>
<td>Mechanical Engineer</td>
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<tr>
<td>Electronics Engineer</td>
<td>Metallurgist</td>
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### Oceanographer
- Physical Scientist
- Physicist
- Research Biologist
- Research Chemist
- Social Scientist

### Administrative/Non-S&E positions

<table>
<thead>
<tr>
<th>Accounting</th>
<th>Budget</th>
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<tbody>
<tr>
<td>Contract Specialist</td>
<td>Grants Specialist</td>
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<tr>
<td>Human Resources</td>
<td>Management &amp; Program Analyst</td>
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<tr>
<td>Safety</td>
<td>Security, Supply</td>
</tr>
<tr>
<td>Technical Information</td>
<td>Technicians and Trades</td>
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<tr>
<td>Public Affairs</td>
<td>Administrative Officers</td>
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Accelerating S&T Process Through Partnership

ONR's Global Offices are the Bridge to International Partnership; S&T Diplomacy in More than 60 Countries

Co-located with other Service S&T components
- London (USA/USAF)
- Tokyo (USA/USAF)
- Santiago (USA/USAF)
- Singapore (USA)
- Sao Paulo (USA)
A Guiding Vision

ALIGN
To Shared R&D Priorities

ACCELERATE
Technology-Enabled Capabilities

ALLOCATE
Resources to Speed Results

We must be “First to Field Decisive Capabilities”
Applying the Framework

- Six priority-driven research Portfolios
- Smarter, earlier risk-taking
- Faster, agile, flexible business processes
## Framework Priorities

<table>
<thead>
<tr>
<th>Framework Priority</th>
<th>Objectives</th>
<th>Research Sub Topics</th>
<th>*Future Force Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Augmented Warfighter</td>
<td>• Enhance decision-making speed and quality</td>
<td>Algorithmic phenomenology; autonomy; artificial intelligence; machine reasoning; cognitive science; decision-making; human systems design; human-machine interaction; and training and education</td>
<td>Adaptive, Agile, Autonomous, Connected, Distributable, Interoperable, Lethal, Trained, Fast</td>
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<td></td>
<td>• Improve human-machine interfaces and teaming</td>
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<td>• Mitigate tactical-level risk to our people and command, control and communications degradation</td>
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<td>Integrated &amp; Distributed Forces</td>
<td>• Enhance dynamic, synchronized actions across forces</td>
<td>Autonomous platforms; communications and networks; networked sensors and weapons; positioning, navigation and timing; and coordinated spectrum and signature management</td>
<td>Adaptive, Agile, Autonomous, Connected, Distributable, Interoperable, Scalable, Fast</td>
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<td></td>
<td>• Support collaboration spanning geography, domains, platforms and joint partners; leverage satellite and Precision Navigation and Timing advancements</td>
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<td>• Increase flexibility and reach of the naval force through incorporation of autonomous and disaggregate systems</td>
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<td>Operational Endurance</td>
<td>• Enable maneuverability, efficiency, and resiliency for sustained operations by warfighters, systems and platforms (regardless of the threat or operating environment)</td>
<td>Power generation, storage, energy efficiency; survivability, endurance and availability; security/protection; platform affordability; high-performance materials; biomedical; and logistics and sustainment</td>
<td>Adaptive, Agile, Defensible, Distributable, Efficient, Sustainable</td>
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<td></td>
<td>• Improve platform-level energy storage/efficiency for propulsion and weapons systems</td>
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<td>• Develop wide-area and force wide disinformation deception and decoys</td>
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<td>Sensing &amp; Sense-Making</td>
<td>• Transform vast data into timely knowledge</td>
<td>Multi-domain and multi-spectral sensors; digital algorithms and data sciences; quantum information sciences; and modeling, simulation and forecasting of the operational environment</td>
<td>Adaptive, Agile, Autonomous, Connected, Distributable, Interoperable, Scalable, Fast</td>
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<td>• Enable persistent awareness and understanding, and optimized operation (regardless of the threat or operating environment)</td>
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<td>• Integrate artificial intelligence into CAISR networks scalable to theater wide</td>
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<td>Scalable Lethality</td>
<td>• Enable offensive and defensive actions that are multi-domain, integrated, cost-effective, and kinetic and non-kinetic</td>
<td>Cyber/algorithmic effects; countermeasures and decoys; counter-weapons, threat neutralization and explosive ordnance disposal; targeting sensors; directed energy and electric weapons; energetics; and lower cost, higher performance weapons</td>
<td>Adaptive, Agile, Autonomous, Connected, Defensible, Distributable, Efficient, Fast, Interoperable, Lethal, Scalable, Sustainable</td>
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<td></td>
<td>• Deliver directed energy and low cost, high probability of kill stand-off strike</td>
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https://www.onr.navy.mil/our-research/naval-research-framework

*Future force attributes derived from OPNAV and HQMC assessments
From Basic Science to the Fleet!

Basic Research

- Cavitation Erosion Resistant Coating and Matrix Materials
- Hydro-Elasticity Effects of Composite Materials
- Large-Eddy Simulation of Crashback loads

FNC

Pitch-adapting composite submarine propeller for enhanced performance with reduced weight, less maintenance and substantial acquisition and life cycle cost savings

Acquisition POR

- SEA 073R Advanced Submarine Systems Development
- PEO SUB Virginia and Follow-on class submarines

Academia  ONR’s Unique Mission  Industry
ONR Enables Capability

Fleet

Warfighting Requirement

S&T Programs

Basic Research

ONR sponsors S&T research:

a) Creating new knowledge to ...
b) Develop technology that will ...
c) Fill a capability gap, and ... Deliver results
Investments Across a Wide Spectrum of S&T

- Environmental Surveillance
- CYBER
  - Full Spectrum Cyber Operations
  - Electronic Warfare
  - Communications & Networks
  - Advanced Electronics, Sensing & Response
  - Computational & Information Construct
- EM MANEUVER WARFARE
  - Spectrum Dominance
  - Electronic Warfare
  - Autonomous & Unmanned Vehicle Mobility
  - Achieve & Maintain Undersea Dominance
- DIRECTED ENERGY / ELECTRIC WEAPONRY
  - Integrated Layered Defense Across the Entire Detect-to-Engage Continuum
  - Extended Threat Neutralization Capabilities
  - Future Naval Fires
- Ux$ MANEUVER WARFARE
  - Scalable & Robust Distributed Collaboration
  - Autonomous & Unmanned Vehicle Mobility
- SYNTHETIC BIOLOGY
  - Environmental Surveillance
  - Warfighter Enhancement
  - Microbial Electronics

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Research Opportunities at ONR


Who should I talk to?

ONR Codes

Solicitations

* Broad Agency Announcements (BAAs): A BAA announces an agency's research interests including criteria for selecting proposals and soliciting the participation of all offerors capable of satisfying the government's needs. See current BAAs

* Requests for Information (RFIs): An RFI is used when a government agency does not presently intend to award a contract, but wants to obtain price, delivery, other market information or capabilities for planning purposes. Responses to these notices are not offers and cannot be accepted by the government to form a binding contract. See current RFIs

* Requests for Proposals (RFPs): An RFP is used in negotiated acquisitions to communicate government requirements to prospective contractors and to solicit proposals. See current RFPs

* Requests for Quotes (RFQs): An RFQ is a solicitation that provides in exacting detail a list or description of all relevant parameters of the requirement. RFQs are best suited to commercial products and services. See current RFQs

* Special Notices: These notices provide information about Industry Days, other events and other information that, while not captured in one of the other funding announcements, may be relevant to a given opportunity. See current Special Notices

* Multiple-Award Task Order Contracts (MATORCs): MATORCs were previously used by ONR for acquiring support services. As of Oct. 1, 2009, ONR now uses SeaPort-e for acquiring support services.

* SeaPort-e: This portal is the Navy's electronic platform for acquiring support services in 22 functional areas including
ONR establishes and maintains scientific relationships with its investigators.

- Six Departments: Click on each of the Codes 30 through 35 to find areas that might fit your research.
- Subclick to get to programs and program managers.
  > All Programs > Divisions > Program Listings > Contacts
- Send them an email explaining your research ideas.

## ONR Program Managers

<table>
<thead>
<tr>
<th>Program Manager</th>
<th>Program(s)</th>
<th>Contact Info</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michele Anderson</td>
<td>Electrochemical Materials</td>
<td><a href="mailto:michele.anderson1@navy.mil">michele.anderson1@navy.mil</a></td>
</tr>
<tr>
<td>Brian Andrez Shigaki</td>
<td>• Basic Biomedical: Circadian, Sleep and Fatigue</td>
<td><a href="mailto:brian.andrezshigaki@navy.mil">brian.andrezshigaki@navy.mil</a></td>
</tr>
<tr>
<td></td>
<td>• Basic Biomedical: Physiological Modeling</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Basic Biomedical: Biological and Physiological Sensors and Monitoring</td>
<td></td>
</tr>
<tr>
<td>Paul Armistead</td>
<td>• Capacitors for Pulsed Power Applications</td>
<td><a href="mailto:paul.armistead@navy.mil">paul.armistead@navy.mil</a></td>
</tr>
<tr>
<td></td>
<td>• Dielectric Films for Capacitors</td>
<td></td>
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<tr>
<td></td>
<td>• Organic Photovoltaics</td>
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<td></td>
<td>• Polymeric Organic Materials</td>
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<td></td>
<td>• Water Desalination and Purification</td>
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</tr>
<tr>
<td>Ravindra Athale</td>
<td>EO/IR Sensors and Sensor Processing</td>
<td><a href="mailto:ravindra.athele@navy.mil">ravindra.athele@navy.mil</a></td>
</tr>
<tr>
<td>Chagasan Bastar</td>
<td>Nanoscale Computing Devices and Systems</td>
<td><a href="mailto:chagasan.bastar@navy.mil">chagasan.bastar@navy.mil</a></td>
</tr>
</tbody>
</table>

Who should I talk to?
Get to know Program Officers at the Office of Naval Research
Follow “Contacts” in each Code

Who should I talk to?

CODE 33 CONTACTS
People by Department

A
- Acoustic Transduction Materials and Devices
- Advanced Naval Power Systems
- Alloys and Joining
- Anti fouling and Fouling Release Coatings

C
- Cellular Materials
- Computer Aided Materials Design

D
- Dielectric Films for Capacitors

Cellular Materials
- Name: Dr. David Shifer
- Title: Program Officer
- Department: Code 33
- Division: Code 33
- Phone: [Redacted]
- Email: david.shifer@navy.mil

Office of Naval Research
675 N. Randolph Street, Suite 1425
Arlington, VA 22203

Program Areas of Responsibility:
Cellular Materials, Structural Materials
## Where Does My Research Fit?

### Code 30
**Expeditionary Warfare & Combating Terrorism**
Develops and transitions technologies to enable the Navy-Marine Corps team to win and survive on the battlefield, today and tomorrow.

**S&T Programs:**
- Command, Control, Computers and Communication (C4)
- Fires
- Force Protection
- Human Performance Training and Education
- Intelligence, Surveillance and Reconnaissance
- Logistics
- Maneuver

### Code 31
**C4ISR**
Supports research in Math, Electronics, Computer & Information Sciences and their applications in Command & Control, Communications, Cyber, EW, Intelligence, Surveillance and Reconnaissance.

**S&T Programs:**
- Applied & Computational Analysis
- Communications and Networking
- Computational Methods for Decision Making
- Electronic Warfare
- EO/IR Sensors and Sensor Processing
- Integrated Topside
- Machine Learning, Reasoning and Intelligence
- Mathematical Optimization
- Precision Navigation & Timekeeping

### Code 32
**Ocean Battlespace Sensing**
Explores S&T in the oceanographic and meteorological observations, modeling/prediction in the battlespace environment; submarine detection/classification; and mine warfare.

**S&T Programs:**
- Advanced Sea Platforms
- Naval Engineering
- Acoustic Transduction
- Electrochemical Materials
- Nanomaterials
- Organic Photovoltaics
- Propulsion Materials
- Structural Materials
- Antifouling/Fouling Release Coatings
- NDE & Prognostics Sensors
- Polymer Matrix Composites
- Cellular Materials
- Water Desalination and Purification
- Corrosion Control
- Undersea Weapons

### Code 33
**Sea Warfare & Weapons**
Develops and delivers technologies that enable superior warfighting and energy capabilities for naval forces, platforms and undersea weaponry.

**S&T Programs:**
- Command, Control, Computers and Communication (C4)
- Fires
- Force Protection
- Human Performance Training and Education
- Intelligence, Surveillance and Reconnaissance
- Logistics
- Maneuver

### Code 34
**Warfighter Performance**
Enhances warfighter effectiveness and efficiency through bioengineered and biorobotic systems, medical technologies, improved manpower, personnel, training and system design.

**S&T Programs:**
- Applied Instructional Research
- Biorobotics
- Capable Manpower
- Future Capability
- Command Decision Making
- Force Health Protection
- Human-Robot Interaction
- Marine Biofouling
- Neural Computation
- Undersea Medicine

### Code 35
**Air Warfare & Weapons**
Supports the Navy’s power projection needs, fostering the technology development of naval aircraft, structures, propulsion, autonomy, energetics, directed energy and electric weapons.

**S&T Programs:**
- Directed Energy
- Electromagnetic Railgun
- Energetic Materials
- Maritime Weapons of Mass Destruction
- Science of Autonomy
- Turbine Engine Technologies
The Defense University Research Instrumentation Program (DURIP) supports university research instrumentation essential to high-quality Department of Defense-relevant research. DURIP funds are used for the acquisition of major equipment to augment or develop research capabilities of interest to the DOD. These awards also improve educational opportunities available to students. They are funded by ONR, ARO, and AFOSR.

- Allows universities to purchase high-cost research equipment
- Equipment to be used for research of interest to the DOD, funded by
- Advantageous to identify an interested research program or program manager
- Available to U.S. institutions of higher learning with degree granting programs in science, math or engineering
- $50,000 — $1.5 million award

A new DURIP FOA is published each year on grants.gov. The timing is generally in late spring but may vary. The previous FOA came out in March 2017 and closed July 2017.

Multidisciplinary University Research Initiative (MURI) projects fund a team of researchers (at the same or different universities) to investigate high priority topics and research problems that intersect more than one traditional technical discipline.

- Intended for teams investigating the topics specified in each year’s announcement
- Available to U.S. universities granting degrees in science or engineering
- $1.5 million for three years, plus two option years.
- 4 to 6 collaborating investigators/ universities with a lead Principal Investigator

Topics:

- Each topic has a topic description with title, background, objectives, research concentration areas, and resources.
- Each topic has a “Topic Chief”, with contact information
- About 20 separate topics total each year from the three services (ONR, ARO, AFOSR)

A new FOA is published each year on grants.gov. The timing is generally in spring but may vary. The previous FOA came out in March 2017 and closed November 2017.

The Vannevar Bush Faculty Fellowship Program (formerly NSSEFF) provides extensive, long-term financial support to university faculty, staff scientists, and engineers to conduct bold and ambitious “blue sky” basic research on topics of interest to DOD.

- Tenured faculty and full time research staff at Ph.D.-granting educational institutions are eligible
- Single-investigator research grants, although collaboration is encouraged
- Up to $3M in total costs over the 5 year awards
- Foster long-term relationships between STEM faculty members, their students, and DOD organizations.
- Technical subject categories of interest to the DoD are specified in each year’s announcement
- Sponsored by the Basic Research Office of the Assistant Secretary of Defense for Research and Engineering and funded by the Office of Naval Research

A new FOA is published each year on grants.gov. The timing is generally in early summer but may vary. The previous FOA came out in June 2017 and will closed January 2018.

The ONR Young Investigator Program was established in 1985

- There were 10 awardees in 1985
- Thru 2017 over 700 individuals have received an award
- Awards have been granted to over 140 institutions
- Typically less than 10% of all proposals receive an award – this may be less than 1% for some research areas
The ONR YIP was established to attract outstanding faculty members to the Department of Navy's basic research program by identifying individuals that show exceptional promise for doing creative research and encourage their teaching and research careers through long term support.

- First or second full-time tenure-track or tenure-track-equivalent academic appointment within the past 5 years
- U.S. citizen, national, or permanent resident (on the date proposals are due)
- U.S. Institutions of Higher Education which award degrees in science, engineering, and/or mathematics
- Typical award $510,000 over a three year period of performance
- FOA is published each year on grants.gov; timing is generally May/June
YIP Objectives

• Attract outstanding faculty members to the Department of Navy's research program

• Identify individuals that show exceptional promise for doing creative research

• Support their research interests

• Encourage their teaching and research careers (through long term support)
Am I Eligible for YIP?

- First or second full-time tenure-track or tenure-track-equivalent academic appointment

- First appointment on or after Dec. 31st five years prior

- U.S. citizen, national, or permanent resident (on the date proposals are due)

- U.S. Institutions of Higher Education which award degrees in science, engineering, and/or mathematics
• It is up to the proposer and institution to determine whether or not the appointment meets these requirements. For a position to be considered a tenure-track-equivalent position, it must meet all of the following requirements:
  – The employing department or organization does not offer tenure-track positions to any new hires;
  – The employee is engaged in research in an area of science or engineering supported by the Department of Defense;
  – The employee has a continuing appointment that is expected to last the three years of the grant;
  – The appointment has substantial educational responsibilities; and
  – The proposed project relates to the employee's career goals and job responsibilities as well as to the goals of the department or organization.

• Adjunct, Instructor, or Visiting positions are not considered YIP-eligible tenure-track-equivalent positions. Through the official submission of your YIP proposal you are indicating that your position meets the YIP-eligibility requirements. In addition, your Department Chair (or equivalent) will verify that your position is YIP-eligible in the University Letter (letter of support).
Successful Candidates

• Contact ONR Program Officer before submitting proposal
  – PO comment: “if only they would have contacted me first – this would have been a great proposal!!”

• Try to understand PO’s portfolio / interests

• Review ONR website; become familiar with Navy terminology / where your technology fits in

• A history of publishing in peer reviewed journals

• Strong letter of support from University and/or Department (for YIP)

• A complete curriculum vitae submitted with white paper and/or proposal package
1. Past performance and experience of the Principal Investigator, demonstrated by the significance and impact of previous research, publications, professional activities, awards and other recognition, etc.;

2. A creative research proposal, demonstrating the potential for making progress in an ONR research area; and

3. A long-term commitment by the University to the applicant and the research.

**OF EQUAL IMPORTANCE**
Recent Survey Results for Past Awardees (2006 – 2012 recipients)

- 79% of respondents said “receiving a YIP reward would be a significant factor in my tenure review”
- 86% “strongly agree” that a YIP award is prestigious at their university
- 83% prestigious with the scientific community
- 45% received ONR funding within the past 12 months (37% for 2000-2005 respondents)
- 41% have received a DURIP award
- 19% have received a MURI award
- 16% DARPA YIP recipient
- 17% AFOSR YIP recipient
Recent Survey Results for Past Awardees (2000 – 2015 recipients)

Primary Field of Research

- Material Science and Engineering
- Mechanical Engineering
- Computer and Computational Sciences
- Electrical Engineering
- Physics
- Biosciences
- Cognitive, Neural, and Behavior Sciences
- Mathematics
- Chemistry
- Aeronautics and Astronautical Engineering
- Chemical Engineering
- Naval Architecture and Ocean Engineering
Basic Research Proposal
Average Success

Pre - Proposal Inquiries

>6,000

Formal Proposals

~3,000

Funded Grants \ Contracts

~1000

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Top Research Areas:
ONR Publications 2009-2014

PHYSICS
ENGINEERING
MATERIALS SCIENCE
CHEMISTRY
COMPUTER SCIENCE
MATHEMATICS
OCEANOGRAPHY
MECHANICS
METEOROLOGY
OPTICS
ACOUSTICS
TELECOMMUNICATIONS
METALLURGY
LANGUAGE PATHOLOGY
NEUROSCIENCES

Over 25,000 journal articles

Academic & Industry Collaborations
Questions?

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Office of Naval Research
reginald.g.williams@navy.mil
703.696.0611