# Index to Charts: Guide to Defense Basic Research Funding

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Revised Aug 2017
# Index to Charts: Guidance to Defense

Selected Applied Research and Exploratory Development Funding

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## Supplementary Information

Charts 252+
Vision:

Ensure that fundamental scientific and engineering knowledge and understanding continue to yield both evolutionary and revolutionary technical options required to maintain preeminent warfighting capabilities and a superior national defense capability - i.e. use inspired research.

Mission:

- Provide a strong Science & Engineering (S&E) basic research foundation for the discovery and enhancement of new and future technologies.
- Assist in the development of revolutionary military capabilities and systems.
- Keep DOD informed of worldwide technological developments and opportunities that might affect US defense.
DOD RDT&E Taxonomy - Primer

Science and Technology ($13B in FY18 PBR)

**BA1 6.1 Basic Research (TRL 0-1)**  
greater knowledge of fundamental aspects of phenomena – largely use inspired

**BA2 6.2 Appl Research (TRL 2-3)**  
determine means by which a specific need may be met

**BA3 6.3 Adv Technol Development (TRL 4-6)**  
development / integration of hardware for field expt

Development ($70B in FY18 PBR)

**BA4 6.4 Demonstration & Validation (TRL 6-7)**  
evaluate integrated technology in realistic environment

**BA5 6.5 Engn and Manuf Development**  
for projects without approval for full rate production

**BA6 6.6 RDT&E Management Support**  
program managers, ranges, test facilities,…

**BA7 6.7 Operational Sys Development**  
support of development acquisition programs or upgrades

**Congressionally Directed Medical Research**

SBIR / STTR – 3.2% / 0.35% tax on R&D funding

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**Abbreviations:**

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<tr>
<th>BA</th>
<th>Budget Activity</th>
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<tr>
<td>RDT&amp;E</td>
<td>Research, Development, Test &amp; Evaluation</td>
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<td>SBIR</td>
<td>Small Business Innovation Research</td>
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<td>STTR</td>
<td>Small Business Technology Transfer</td>
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<td>TRL</td>
<td>Technology Readiness Level</td>
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<td>PBR</td>
<td>President’s Budget Request</td>
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FOR INDIVIDUALS AND ORGANIZATIONS INTERESTED IN PARTICIPATING IN DoD BASIC RESEARCH

How can I find out if my program area is one that DoD Basic Research (6.1) might support?

1. Explore web sites of DoD organizations that award 6.1 funding to review the basic research or research related educational areas that they support. The offices' web sites:
   - have information about their 6.1 programs and research interests in general; and
   - usually include archives of previously open program announcements in addition to ones that currently are open for submission of proposals. Looking at previous and current announcements likely will give you a more complete picture of an office's interests rather than looking only at current ones.

2. To review only announcements that are currently open, you need not visit each office's web site individually. You will find all of the offices' announcements posted at:
   - Grants.gov (http://www.grants.gov/) for programs under which grants or cooperative agreements may be awarded;
   - Fedbizopps.gov (https://www.fbo.gov/) for programs under which procurement contracts may be awarded; or
   - Both sites, for any program announcement under which an office may award procurement contracts, as well as grants or cooperative agreements.

3. After reviewing the areas an office supports, talk to the scientific or technical program managers responsible for any research or related educational areas with which you judge your interests overlap.
   - Program managers regularly work with potential proposers to help define areas of mutual interest.
   - Proposals written after discussions with program managers are more likely to be of interest to the sponsor and to be funded.
   - Pre-proposal discussions therefore can help you make a more informed decision about whether to write and submit a particular proposal, potentially saving time and effort that might otherwise be spent writing a proposal in an area less likely to be funded.
Principal DOD Basic Research Funding Offices

Service Research Offices (OXR’s)
- Army Research Office (ARO)  www.aro.army.mil/
- Office of Naval Research (ONR)  www.onr.navy.mil/

Army Medical Research and Materiel Command
- CDMRP (Congressional adds, fully open competition)  cdmrp.army.mil/
- DMRDP (Defense Medical / Defense Health Program)  dmrdp.amedd.army.mil

DARPA
- Biological Technologies (BTO)  www.darpa.mil/about-us/offices/bto
- Information Innovation Office (I2O)  www.darpa.mil/about-us/offices/i2o

Defense Threat Reduction Agency (DTRA)  www.dtra.mil/

CBDP (Joint program managed by DTRA )  www.dtra.mil/

AMRMC  Army Medical Research and Material Command
DARPA  Defense Advanced Research Project Agency
DTRA  Defense Threat Reduction Agency
CBDP  Chemical and Biological Defense Program
CDMRP  Congressionally Directed Medical Research Program
DMRDP  Defense Medical Research and Development Program
TATRC  Telemedicine and Advanced Technology Research Center
### FY2018 DOD Basic Research (6.1, $M)

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<td>432</td>
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<td>43 Basic Operational Medical Science</td>
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<td>7 Basic Operational Med Res Sci (BOMRS, 6.1)</td>
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<td>CDMRP</td>
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CBDP: Chemical / Biological Defense Program  
CDMRP: Congressionally Directed Medical Res Program  
DRS: Defense Research Sciences  
DTRA: Defense Threat Reduction Agency  
GDF: Guidance for the Development of the Force (in Def Health Program - DHP)  
NDEP: National Defense Education Program  
URI: University Research Initiative  

The CDMRP handles Congressional adds and is largely appropriated in Title VI Defense Health Programs, Research and Development, not in Title IV RDT&E.  
S&T funding goals can be found in the R-2s (formerly the Research and Development Descriptive Summaries (RDDS)) at http://www.dtic.mil/dodinvestment/#/home
# DOD FY18 Basic Research Open to University PIs, By Discipline

(Murday Best Estimate)

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Defense Research Sciences (DRS)

What: Largest source of DOD funding for University research
Mostly invested in single investigator efforts (as opposed to MURI)
OXR Broad Area Announcements (BAA) are relatively generic
OXR Program Officer (PO) key to success (assuming convincing proposal)
Each PO has focused interests, coupling science with some military need
Each Service has specifically identified program interests

How Much: typically $100 – 200K/yr for three years (with continuation possible)
OXR programs typically have ~20% turnover each year

When: Initial “white paper” useful (sometimes required)
Proposals nominally anytime, but spring/early summer to be timely
Most funding decisions processed in fall, early winter – after appropriation bill

Where: Mix of paper and electronic (grants.gov), see for instance
http://www.onr.navy.mil/02/proposal_procedure.asp

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<td>Air Force</td>
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<td>Navy</td>
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<td>~458</td>
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<tr>
<td>DARPA</td>
<td>362</td>
<td>~432</td>
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OXR - umbrella acronym for AFOSR, ARO, ONR
1. Researchers are highly encouraged to submit short (max 2 pages) white papers by email prior to developing full proposals. White papers should briefly describe the proposed effort and describe how it will advance the current state-of-the-art; an approximate yearly cost for a three to five year effort should also be included. Researchers with white papers of significant interest will be invited to submit full proposals.

2. Prospective investigators should submit a concise summary overview of their proposed research with explicit delineation of a fundamental hypothesis with outstanding and revolutionary scientific merit, other related scientific objectives, and clear articulation of a novel and sound technical approach to surmount relevant scientific challenges. This document should be no more than four pages and is an important process for gauging program interest and/or refinement of research objectives to suit programmatic needs. Ultimately, selection for funding is highly competitive and is due to a combination of factors including reviews from both academic and government subject matter experts, the program manager, current program investment areas, research diversity and balance requirements, and availability of funds.

3. We ask you to submit a short description (not to exceed 4 typed pages including figures) of the research effort you propose to undertake. The planning letter should describe the scientific and/or technical development to be pursued; the approach to be taken; connections to other ONR, Navy, DoD, and civilian agency programs; and an estimate of the time and funds required to accomplish the objectives. The planning letter should be accompanied by up-to-date curriculum vitae of the Principal Investigator (PI), which does not count toward the 4 page limit.

The Planning Letter should include:

- Contact information for the principal and co-investigators
- A synopsis of no more than three pages for the proposed research, including a rationale, questions and/or hypotheses to be addressed, the methods to be used, and anticipated results. This is effectively an executive summary of a full proposal. The role of each investigator should be included.
- Investigators should focus on what is new, groundbreaking or potentially transformative about the proposed research and not worry so much about justifying the relevance to the Navy.
- Up to one page of relevant references to the literature
- A one-page biographical sketch for each investigator, with a focus on research activities and publications relevant to the proposed research.
Suggestions for Success

Get to know the Agency Program Officer and his/her program interests

Know the Agency’s review process

Participate in Agency activities
   Workshops, meetings
   Be a proposal reviewer (if available) - no better way to understand what constitutes a credible proposal for that agency / program officer

Collaborative efforts with a DOD lab can improve chances of success at an OXR
   DOD labs are generally well equipped and staff deficient -
      exploit ARL, AFRL, NRL - Army, Air Force and Navy respectively
   There are formal Faculty Exchange and Summer Faculty programs

As you mature in your career, consider a rotational assignment at an Agency
   Very good way to establish / cement personal relationships with other POs
   Good opportunity to broaden one’s vistas

Utilize the USC Center for Research Excellence workshops on proposal development

Use your colleagues and the DC Office staff to critique / guide your proposal
Program Officers

Know your program officer

Program officers (PO) have variable latitude at project level (depending on agency)
(DOD - DOE - NASA - NIH - NSF)
Their reputation / professional advancement is tied in part to your success
Typical program officer subprogram budget is $1-2M
Goal is a “marriage”, not a “date” - i.e., a long term relationship

Make contact with Program Officer before submitting a white paper or proposal

- Be informed - read the descriptive paragraph on the website/announcement, the MAPS PO datasheet, and information on prior awards (available from DC office for selected agencies)
- Use “elevator pitch” to open contact and gain attention, i.e., your unique idea(s) and likely impact
- Be ready for a dialogue - not monologue
- Plumb his / her current interest – website paragraphs are likely dated. This can significantly enhance your prospects by tailoring your ideas to the PO's interests
- If lukewarm / disinterested response, ask for suggestions on other POs who might be interested
- Also ask after availability of funds – his / her resources may be fully committed

Watch for new Program Officers - they will be interested in creating “their” program
What to Say - and Not Say - to Program Officers

Michael Spires, Office of Sponsored Projects, Smithsonian Institution

“most scholars and researchers would rather undergo a root canal without anesthesia than call a program officer”

Shalts
1. Do your homework
2. Be as specific as possible
   concentrate on big picture, especially outcomes
   why should they be excited by your proposed work (and its outcomes)
3. When in doubt, ask

Shalt Nots
1. Do not call at the office “just to chat”
2. Do not cold call
   send short email first, summarizing issue(s)
   ask for PO to call you (with your available dates/times) or
to email you back with suggestions on when to contact him/her
3. Do not pester - but be persistent
Project Officer Background:
Laura Kienker was a Research Biologist within the Counterterrorism and Forensic Science Research Unit of the FBI Laboratory, where she managed outsourced research projects pertaining to automating the forensic analysis of biological evidence. Prior to joining the FBI, Dr. Kienker directed a Sequencing and Microarray Core Facility for the Center for Immunology at the University of Texas Southwestern Medical Center in Dallas, where she was an Assistant Instructor in the Department of Internal Medicine.

Education
B.A. in Biology and Chemistry from Oberlin College
Ph.D. in Immunology from the University of Pennsylvania

Program:
Metabolic Engineering
The Office of Naval Research (ONR) Metabolic Engineering Program targets the fundamental understanding of metabolic processes in microbes or plants for the production of chemicals of potential utility to the Navy.

Biomaterials and Bionanotechnology
The Office of Naval Research (ONR) Biomaterials and Bionanotechnology Program supports fundamental research that enables the generation of novel, Navy relevant, nano-scale materials and devices.

Illustrative Publications Reflecting Project Officer Research Interests:
Both V(D)J recombination and radio resistance require DNA-PK kinase activity, though minimal levels suffice for V(D)J recombination
Kienker LJ; Shin EK; Meek K
NUCLEIC ACIDS RESEARCH 28(14), 2752-2761 JUL 15 2000
Suggestions on working with DOD Basic Research

Use-inspired basic research predominates in DOD, but
Breakthrough ideas (like nano and chaos 30 yrs ago) can be a trump card
DOD has traditionally opened up new areas of S&E

Provide new ideas for a program (for which you are competitively positioned)
Program officers look for ways to grow their portfolio
Participate in program defining workshops (especially with DARPA)

Provide ideas for MURI topic(s)
Topics first competed inside OXRs (there tends to be a “fair share system”)
Then validated / approved by OSD
MURI provides “new” money to POs as well as to the PIs

Provide ideas for SBIR / STTR topic(s)
SBIR / STTR provide a transition pathway for POs, as well as for the PIs

MURI  Multidisciplinary University Research Initiative
SBIR  Small Business Innovative Research
STTR  Small Business Technology Transfer
Faculty Exchanges and Summer Facility Positions In DOD

Navy Summer Faculty Research Program and Sabbatical Leave

http://www.onr.navy.mil/Education-Outreach/Summer-Faculty-Research-Sabbatical.aspx

Air Force Visiting Scientist Program

http://www.wpafb.af.mil/Welcome/Fact-Sheets/Display/Article/842058

Air Force Summer Faculty Fellowship Program

http://www.wpafb.af.mil/Welcome/Fact-Sheets/Display/Article/842058
Sources to Identify Potential DOD Research Collaborators
(and positions for graduating PhDs)

National Research Council Postdoctoral Fellowship Program
http://nrc58.nas.edu/RAPLab10/Opportunity/Programs.aspx

Air Force
AFRL Air Force Research Laboratory

Navy
NMRC/NHRC Navy Medical Research Center / Naval Health Research
NPS Naval Postgraduate School
NRL Naval Research Laboratory
http://nrc58.nas.edu/RAPLab10/Opportunity/Opportunities.aspx?LabCode=64

Army
ARL Army Research Laboratory
http://nrc58.nas.edu/RAPLab10/Opportunity/Opportunities.aspx?LabCode=76
US Army Medical Research and Materiel Command
Natick Soldier Research, Research, Development and Engineering Center
Night Vision Research, Development and Engineering Center
USACE (Corp of Engineers)
http://nrc58.nas.edu/RAPLab10/Opportunity/Program.aspx?LabCode=35&ReturnURL=%2fRAPLab10%2fOpportunity%2fPrograms.aspx%3fLabCode%3d35
Keys to a Compelling Proposal

adapted from
George Hazelrigg, NSF Program Officer
Paul Ronney, USC AME, Active Researcher and Reviewer
S. Joseph Levine, Michigan State, Emeritus Professor

Hazelrigg

Know the program you are engaging
Pay attention to program requirements
Know the review process

Frame your project around others work
Formulate an appropriate objective
State your research objective clearly Develop a viable research plan

Know Yourself

Appropriate experience/resources - but don’t dwell on your past work
Format and brevity are important
Grammar and spelling count
Proofread your proposal before it is sent
Submit on time and confirm its correct transmission

Ronney

What has been done / its deficiencies
At least one really novel, clever idea
Don’t say “just trust me”
Pose specific, testable hypotheses
Avoid kitchen sink mentality - what is key
Where’s the beef
Explain your end game - outcome(s)

Levine

How extend prior work
Needs an original idea
Strong rationale
Focused Proposal

Problem must be important
Well defined outcomes

A picture is worth a thousand words

DO YOU HAVE AN IDEA FOR YOUR GRANT YET?
NO, I'M WAITING FOR INSPIRATION.

YOU CAN'T JUST TURN ON CREATIVITY LIKE A FAUCET. YOU HAVE TO BE IN THE RIGHT MOOD.

WHAT MOOD IS THAT? LAST-MINUTE PANIC.
Proposal Development
NSF Vice Mission Agencies

NSF
1a. Interest in most S&E
   most proposals will “fit somewhere”

1b. Knowledge inspired - Bohr Quadrant
   more funding in science than in engineering
   (but can include Pasteur when
   addressing topics of societal importance)

1c. Basic monies only, with tweaks such as
   I-CORP, I/UCRC, GOALI, SBIR/STTR

1d. Impact on S&E knowledge
   addressing national/Intl priorities useful

2. Additional requirements for:
   - broadening participation
   - education, underrepresented
   - wider-scale Impact, International
   - data management
   - Post Doc nurturing

3. Program officer triage for rule compliance
   except for EAGER, RAPID, INSPIRE

4. Review by panel

Mission Agency - Basic Research
  Interest restricted to S&E pertinent to mission need
  a proposal must interest the program officer

  Use inspired (agency mission) - Pasteur Quadrant
  likely more funding in engineering than in science

  Basic, but applied monies may be also available
  (applied tends to have milestones and deadlines)

  Impact on S&E knowledge and
  addressing agency mission priorities essential

  Generally none - perform the promised research

  Program officer triage on basis of content / interest

  Review by program officer with possible input from others

I/UCRC Industry University Cooperative Research Program
GOALI Grant Opportunities for Academic Liaison with Industry
I-CORP Innovation Corp
SBIR/STTR Small Business Innovative Research / Small Business Technology Transfer
EAGER Early Concept Grants for Exploratory Research
RAPID Rapid Response Research Grants
INSPIRE Integrated NSF Support Promoting Interdisciplinary Research and Education
The Heilmeyer Catechism
Questions New Program Pitches Must Answer

■ What are you trying to do? Articulate your objectives using absolutely no jargon
  - Example: “take anthrax off the table as a threat to our forces”
  - What is the new military capability that Semantic Web Services could provide?

■ How is it done today, and what are the limits of current practice?
  - Why is this specifically a technology problem?

■ What's new in your approach and why do you think it will be successful?
  - All software is Turing-equivalent, so software methodology is usually not relevant
  - What is your argument/analysis that a 10x difference in a technology will result in a new capability?

■ Who cares? If you are successful, what difference will it make?
  - Who is the customer for the new idea, and what evidence do you have that any transition will be successful?

■ What are the risks and the payoffs?

■ How much will it cost? How long will it take?

■ What are the midterm and final exams to check for success?
  - Metrics and experimentation plans defined up front
Defense Basic Research Programs / Program Officers
by Academic Discipline

Mathematics
Computer and Information
Life and Biological Sciences
Chemistry
Physics
Electronics
Materials
Mechanics - Solid, Fluid
Environmental Sciences - Space, Atmosphere Terrestrial, Ocean
Social Sciences
## Computer, Mathematics, and Information Sciences

### Mathematics - ARO

<table>
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<th>Field</th>
<th>Name</th>
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<tbody>
<tr>
<td>Biomathematics</td>
<td>Virginia Pasour</td>
<td>919 549 4254</td>
<td><a href="mailto:virginia.b.pasour.civ@mail.mil">virginia.b.pasour.civ@mail.mil</a></td>
</tr>
<tr>
<td>Modeling of Complex Systems</td>
<td>Joe Myers</td>
<td>919 549 4245</td>
<td><a href="mailto:joseph.d.myers8.civ@mail.mil">joseph.d.myers8.civ@mail.mil</a></td>
</tr>
<tr>
<td>Probability and Statistics</td>
<td>Joe Myers</td>
<td>919 549 4245</td>
<td><a href="mailto:joseph.d.myers8.civ@mail.mil">joseph.d.myers8.civ@mail.mil</a></td>
</tr>
<tr>
<td>Numerical Analysis</td>
<td>Joe Myers</td>
<td>919 549 4245</td>
<td><a href="mailto:joseph.d.myers8.civ@mail.mil">joseph.d.myers8.civ@mail.mil</a></td>
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### Math and Information Sciences - AFOSR

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<tbody>
<tr>
<td>Computational Mathematics</td>
<td>Jean-Luc Cambier</td>
<td>703 696 1141</td>
<td><a href="mailto:jean_luc.cambier@us.af.mil">jean_luc.cambier@us.af.mil</a></td>
</tr>
<tr>
<td>Optimization and Discrete Math</td>
<td>Jean-Luc Cambier</td>
<td>703 696 1141</td>
<td><a href="mailto:jean_luc.cambier@us.af.mil">jean_luc.cambier@us.af.mil</a></td>
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### Mathematics, Computers and Information Research - ONR

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<tr>
<td>Appd &amp; Computational Analysis</td>
<td>Reza Malek-Madani</td>
<td>703 696 4314</td>
<td><a href="mailto:reza.malekmadani@navy.mil">reza.malekmadani@navy.mil</a></td>
</tr>
<tr>
<td>Mathematical Optimization</td>
<td>Don Wagner</td>
<td>703 696 4313</td>
<td><a href="mailto:don.wagner@navy.mil">don.wagner@navy.mil</a></td>
</tr>
<tr>
<td>Mathematical Data Science</td>
<td>Pedrag Neskovic</td>
<td>703 696 4304</td>
<td><a href="mailto:predrag.neskovic@navy.mil">predrag.neskovic@navy.mil</a></td>
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### Mathematics – DARPA DSO

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<tr>
<td>Applied and Computational Math</td>
<td>Reza Ghanadan</td>
<td>571 218 4526</td>
<td><a href="mailto:reza.ghanadan@darpa.mil">reza.ghanadan@darpa.mil</a></td>
</tr>
<tr>
<td>Complex Sys, Networks, Big Data</td>
<td>Fariba Fahroo</td>
<td>703 526 4168</td>
<td><a href="mailto:fariba.fahroo@darpa.mil">fariba.fahroo@darpa.mil</a></td>
</tr>
<tr>
<td>Math Tools to Design Materials</td>
<td>Jan Vandenbrande</td>
<td></td>
<td><a href="mailto:jan.vandenbrande@darpa.mil">jan.vandenbrande@darpa.mil</a></td>
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*Chart updated Jan 2017*
# Computer, Mathematics, and Information Sciences

## Computing Sciences - ARO

<table>
<thead>
<tr>
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<tr>
<td>Comp Architecture &amp; Visualization</td>
<td>J. Michael Coyle</td>
<td>919 549 4256</td>
<td><a href="mailto:joseph.m.coyle14.civ@mail.mil">joseph.m.coyle14.civ@mail.mil</a></td>
</tr>
<tr>
<td>Info &amp; Software Assurance</td>
<td>Cliff Wang</td>
<td>919 549 4207</td>
<td><a href="mailto:cliff.x.wang.civ@mail.mil">cliff.x.wang.civ@mail.mil</a></td>
</tr>
<tr>
<td>Info Processing and Fusion</td>
<td>Liyi Dai</td>
<td>919 549 4350</td>
<td><a href="mailto:liyi.dai.civ@mail.mil">liyi.dai.civ@mail.mil</a></td>
</tr>
<tr>
<td>Social informatics</td>
<td>Edward Palazzolo</td>
<td>845 938 4234</td>
<td><a href="mailto:edward.t.palazzolo.civ@mail.mil">edward.t.palazzolo.civ@mail.mil</a></td>
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## Network Sciences - ARO

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<tr>
<td>Comms &amp; Human Networks</td>
<td>Robert Ulman</td>
<td>919 549 4330</td>
<td><a href="mailto:robert.j.ulman.civ@mail.mil">robert.j.ulman.civ@mail.mil</a></td>
</tr>
<tr>
<td>Intelligent Networks</td>
<td>Purush Iyer</td>
<td>919 549 4204</td>
<td><a href="mailto:purush.iyer@us.army.mil">purush.iyer@us.army.mil</a></td>
</tr>
<tr>
<td>Multi-agent Network Control</td>
<td>Samuel Stanton</td>
<td>919 549 4368</td>
<td><a href="mailto:samuel.c.stanton2.civ@mail.mil">samuel.c.stanton2.civ@mail.mil</a></td>
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<tr>
<td>Social and Cognitive Networks</td>
<td>Edward Palazzolo</td>
<td>919 549 4234</td>
<td><a href="mailto:edward.t.palazzolo.civ@mail.mil">edward.t.palazzolo.civ@mail.mil</a></td>
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## Math and Information Sciences - AFOSR

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<tr>
<td>Comput Cognit and Machine Intell</td>
<td>James Lawton</td>
<td>703 696 5999</td>
<td><a href="mailto:james.lawton.1@us.af.mil">james.lawton.1@us.af.mil</a></td>
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<tr>
<td>Dynamics and Control</td>
<td>Frederick Leve</td>
<td>703 696 7305</td>
<td><a href="mailto:DyControl@afosr.af.mil">DyControl@afosr.af.mil</a></td>
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<tr>
<td>Dyn Data Driven Appl Systems</td>
<td>Frederica Darema</td>
<td>703 588 1926</td>
<td><a href="mailto:frederica.darema@us.af.mil">frederica.darema@us.af.mil</a></td>
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<tr>
<td>Information Op &amp; CyberSecurity</td>
<td>Tristan Nguyen</td>
<td>703 696 7796</td>
<td><a href="mailto:tristan.nguyen@afosr.af.mil">tristan.nguyen@afosr.af.mil</a></td>
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<tr>
<td>Science of Info, Comp and Fusion</td>
<td>Doug Riecken</td>
<td>703 696 9736</td>
<td><a href="mailto:ICF@afosr.af.mil">ICF@afosr.af.mil</a></td>
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<tr>
<td>Systems and Software</td>
<td>James Lawton (acting)</td>
<td></td>
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<tr>
<td>Trust and Influence</td>
<td>Benjamin Knott</td>
<td>703 696 1142</td>
<td><a href="mailto:benjamin.knott.2@us.af.mil">benjamin.knott.2@us.af.mil</a></td>
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*chart updated Jan 2017*
# Computer, Mathematics, and Information Sciences - continued

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<td>Assured Cybereffects</td>
<td>Gary Toth</td>
<td>703 696 4961</td>
<td><a href="mailto:gary.toth@navy.mil">gary.toth@navy.mil</a></td>
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<tr>
<td>Command and Control</td>
<td>Gary Toth</td>
<td>703 696 4961</td>
<td><a href="mailto:gary.toth@navy.mil">gary.toth@navy.mil</a></td>
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<tr>
<td>Communications and Networking</td>
<td>Santanu Das</td>
<td>703 588 1036</td>
<td><a href="mailto:santanu.das@navy.mil">santanu.das@navy.mil</a></td>
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<tr>
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<td>Information Integration</td>
<td>Predrag Neskovic</td>
<td>703 696 4304</td>
<td><a href="mailto:predrag.neskovic@navy.mil">predrag.neskovic@navy.mil</a></td>
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<td>Automated Image Understanding</td>
<td>Behzad Kamgar-Parsi</td>
<td>703 696 5754</td>
<td><a href="mailto:behzad.kamgar-parsi@navy.mil">behzad.kamgar-parsi@navy.mil</a></td>
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<tr>
<td>Resource Optimization</td>
<td>Don Wagner</td>
<td>703 696 4313</td>
<td><a href="mailto:don.wagner@navy.mil">don.wagner@navy.mil</a></td>
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<tr>
<td>Cyber Security/Complex Software</td>
<td>Sukarno Mertoguno</td>
<td>703 696 0107</td>
<td><a href="mailto:sukarno.mertoguno@navy.mil">sukarno.mertoguno@navy.mil</a></td>
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<tr>
<td>Machine Learning and Intelligence</td>
<td>Behzad Kamgar-Parsi</td>
<td>703 696 5754</td>
<td><a href="mailto:behzad.kamgar-parsi@navy.mil">behzad.kamgar-parsi@navy.mil</a></td>
</tr>
<tr>
<td>Quantum Information Science</td>
<td>Tommy Willis</td>
<td>703 696 4214</td>
<td><a href="mailto:richard.t.willis@navy.mil">richard.t.willis@navy.mil</a></td>
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<tr>
<td>Automation in Ship Systems</td>
<td>Anthony Seman</td>
<td>703 696 5992</td>
<td><a href="mailto:anthony.seman@navy.mil">anthony.seman@navy.mil</a></td>
</tr>
<tr>
<td>Science of Autonomy</td>
<td>Marc Steinberg</td>
<td>703 696 0703</td>
<td><a href="mailto:marc.steinberg@navy.mil">marc.steinberg@navy.mil</a></td>
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**Information Innovation Office – DARPA I2O**

see Charts 108-111

chart updated Jan 2017
Life Sciences / Biology

ARO
Molecular Genetics  Micheline Strand  919 549 4343  micheline.k.strand.civ@mail.mil
Biochemistry  Stephanie McElhinny  919 549 4240  stephanie.a.mcelhinny.civ@mail.mil
Microbiology  Robert Kokoska  919 549 4342  robert.j.kokoska2.civ@mail.mil
Neurophys & Cognitive Neurosci  Frederick Gregory  919 549 4318  frederick.d.gregory5.civ@us.army.mil
Biomathematics  Virginia Pasour  919 549 4254  virginia.b.pasour.civ@mail.mil

AFOSR
Human Performance and Biosys  Patrick Bradshaw  703 588 8492  patrick.bradshaw@afosr.af.mil
Trust and Influence  Benjamin Knott  937 938 3599  info@us.af.mil
Natural Materials and Systems  Sofi Bin-Salamon
Biophysics  Sofi Bin-Salamon  703 696 8411  sofi.bin-salamon@us.af.mil

Ocean, Atmosphere, and Space Research - ONR Code 322
Marine Mammals & Biology  Michael Weise  703 696 4533  michael.j.weise@navy.mil

Human and Bioengineered Systems - ONR Code 341
Affordable Human Behavior Modeling  Harold Hawkins  703 696 4323  harold.hawkins@navy.mil
Bio Robotics  Thomas McKenna  703 696 4503  tom.mckenna@navy.mil
Cognitive Science of Learning  Ray Perez  703 696 4986  ray.perez@navy.mil
Computational Neuroscience  Thomas McKenna  703 696 4503  tom.mckenna@navy.mil
Command Decision Making  Jeffrey Morrison  703 696 4875  jeffrey.g.morrison@navy.mil
Human Robot Interaction  Thomas McKenna  703 696 4503  tom.mckenna@navy.mil

ONR (cont) and DARPA next page  (chart updated Jan 2017)
Life Sciences / Biology - continued

Warfighter Protection and Applications Div – ONR Code 342

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<tr>
<td>Basic Biomedical</td>
<td>Brian Andrews-Shigaki</td>
<td>703 696 2575</td>
<td><a href="mailto:brian.andrewssshigaki@navy.mil">brian.andrewssshigaki@navy.mil</a></td>
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<tr>
<td>Capable Manpower</td>
<td>William Krebs</td>
<td>703 696 4054</td>
<td><a href="mailto:william.krebs@navy.mil">william.krebs@navy.mil</a></td>
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<tr>
<td>Biomaterials &amp; Bionanotechnology</td>
<td>Laura Kienker</td>
<td>703 696 4054</td>
<td><a href="mailto:linda.kienker@navy.mil">linda.kienker@navy.mil</a></td>
</tr>
<tr>
<td>Marine Mammal Health</td>
<td>Laura Kienker</td>
<td>703 696 4054</td>
<td><a href="mailto:linda.kienker@navy.mil">linda.kienker@navy.mil</a></td>
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<td>Metabolic Engineering</td>
<td>Laura Kienker</td>
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<td>703 696 4504</td>
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<td>Linda Chrisey</td>
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<td>Linda Chrisey</td>
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<td><a href="mailto:linda.chrisey@navy.mil">linda.chrisey@navy.mil</a></td>
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<tr>
<td>Noise Induced Hearing Loss</td>
<td>Kurt Yankaskas</td>
<td>703 696 6999</td>
<td><a href="mailto:kurt.d.yankaskas@navy.mil">kurt.d.yankaskas@navy.mil</a></td>
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<tr>
<td>Force Health Protection</td>
<td>Timothy Bentley</td>
<td>703 696 4251</td>
<td><a href="mailto:timothy.b.bentley@navy.mil">timothy.b.bentley@navy.mil</a></td>
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<tr>
<td>Undersea Medicine</td>
<td>William D’Angelo</td>
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<td><a href="mailto:william.dangelo@navy.mil">william.dangelo@navy.mil</a></td>
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Expeditionary Warfare and Combating Terrorism - ONR Code 30

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<td>Human Perf: Training &amp; Educ</td>
<td>Peter Squire</td>
<td>703 696 0407</td>
<td><a href="mailto:peter.squire@navy.mil">peter.squire@navy.mil</a></td>
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Biology – DARPA BTO

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<td>703 526 2189</td>
<td><a href="mailto:justin.sanchez@darpa.mil">justin.sanchez@darpa.mil</a></td>
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<tr>
<td>Prosthetic, Sensors</td>
<td>Phillip Alvelda</td>
<td>571 218 4674</td>
<td><a href="mailto:phillip.alvelda@darpa.mil">phillip.alvelda@darpa.mil</a></td>
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<td>Agric and Biosecurity</td>
<td>Blake Bextine</td>
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(chart updated Jan 2017)
Chemistry

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<td>Dawanne Poree</td>
<td>919 549 4238</td>
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<tr>
<td>Electrochemistry</td>
<td>Robert Mantz</td>
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<tr>
<td>Molecular Structure &amp; Dynamics</td>
<td>James Parker</td>
<td>919 549 4293</td>
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<tr>
<td>Biochemistry</td>
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<td>703 696 7781</td>
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<td>Theoretical Chemistry</td>
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<td>Organic Materials Chemistry</td>
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<td>Michelle Anderson</td>
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<td>Marine Antifouling</td>
<td>Steve McElvany</td>
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<td>Solid/Liquid Waste Treatment</td>
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<td>703 696 4315</td>
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<td>Kenny Lipkowitz</td>
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<td>Propulsion Materials</td>
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<tr>
<td>Combat Safe Insensitive Munitions</td>
<td>Cliff Bedford</td>
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<td>Energetics</td>
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<tr>
<td>High energy, dense oxidizers</td>
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(chart updated Jan 2017)
# Physics

## Physics - ARO
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<tr>
<td>Atomic and Molecular Physics</td>
<td>Paul Baker</td>
<td>919 549 4202</td>
<td><a href="mailto:paul.m.baker4.civ@mail.mil">paul.m.baker4.civ@mail.mil</a></td>
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<tr>
<td>Condensed Matter Physics</td>
<td>Marc Ulrich</td>
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<tr>
<td>Quantum Information Science</td>
<td>TR Govindan</td>
<td>919 549 4236</td>
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<tr>
<td>Optics &amp; Fields</td>
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## Physics - AFOSR
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<td>Atomic and Molecular Physics</td>
<td>Tatjana Curcic</td>
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<td><a href="mailto:tatjana.curcic@afosr.af.mil">tatjana.curcic@afosr.af.mil</a></td>
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<td>Quantum Electronic Solids</td>
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<td>Chaos/Non-linear Physics</td>
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<td>703 696 5339</td>
<td><a href="mailto:mike.shlesinger@navy.mil">mike.shlesinger@navy.mil</a></td>
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<td>Deborah van Vechten</td>
<td>703 696 4219</td>
<td><a href="mailto:deborah.vanvechten@navy.mil">deborah.vanvechten@navy.mil</a></td>
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<td>Free Electron Laser</td>
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<td>703 696 3873</td>
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## Physical Sciences – DARPA DSO
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<td>Photonics</td>
<td>Prem Kumar</td>
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<td>Quantum, Photonics</td>
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chart updated Jan 2017
Electronics

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Electromagnetics and RF Elect  Joe Qiu  919 549 4297  joe.x.qiu.civ@mail.mil

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Optics and Fields  Richard Hammond  919 549 4313  richard.t.hammond10.civ@mail.mil

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Quantum Electronic Solids  Harold Weinstock  703 696 8572  harold.weinstock@afosr.af.mil
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Electronics - ONR
Microsystems Technology - DARPA MTO
see DARPA MTO - charts 112 - 116

(chart updated Jan 2017)
# Electronics - continued

**Electronics ONR Code 322**

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<tr>
<td>Anti-Tamper Electronics</td>
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<td>Electromagnetic Materials</td>
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<td>Electronic Devices/Materials</td>
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<td>EO/IR Sensor &amp; Processing</td>
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<td>Mixed Signal Processing</td>
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<td>RF Surveillance/Signal Process</td>
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(chart updated Jan 2017)
## Materials Science

### Materials Sciences - ARO

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<td>Mechanical Behavior of Matr</td>
<td>David Stepp</td>
<td>919 549 4329</td>
<td><a href="mailto:david.m.stepp.civ@mail.mil">david.m.stepp.civ@mail.mil</a></td>
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<tr>
<td>Syn &amp; Processing of Materials</td>
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<tr>
<td>Physical Properties of Materials</td>
<td>Pani Varanasi</td>
<td>919 549 4325</td>
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<tr>
<td>Materials by Design</td>
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<td><a href="mailto:john.t.prater.civ@mail.mil">john.t.prater.civ@mail.mil</a></td>
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### Materials Sciences - AFOSR

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<tr>
<td>Aerospace Mater for Extreme Envir</td>
<td>Ali Sayir</td>
<td>703 696 7236</td>
<td><a href="mailto:ali.sayir@afosr.af.mil">ali.sayir@afosr.af.mil</a></td>
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<tr>
<td>Mechanics of Multifunctional Matrs</td>
<td>Les Lee</td>
<td>703 696 8483</td>
<td><a href="mailto:les.lee@afosr.af.mil">les.lee@afosr.af.mil</a></td>
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<td>Space Propulsion and Energy</td>
<td>Mitat Birkan</td>
<td>703 696 7234</td>
<td><a href="mailto:mitat.birkan@afosr.af.mil">mitat.birkan@afosr.af.mil</a></td>
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<tr>
<td>Multiscale Structural Mechanics</td>
<td>Jamie Morrison(acting)</td>
<td>703 696 7926</td>
<td><a href="mailto:structural.mech@us.af.mil">structural.mech@us.af.mil</a></td>
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<tr>
<td>Low Density Materials</td>
<td>Joycelyn Harrison</td>
<td>703 696 6225</td>
<td><a href="mailto:joycelyn.harrison@afosr.af.mil">joycelyn.harrison@afosr.af.mil</a></td>
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<tr>
<td>Ultra-short Pulsed Laser/Materials</td>
<td>Enrique Parra</td>
<td>703 696 8571</td>
<td><a href="mailto:enrique.parra@afosr.af.mil">enrique.parra@afosr.af.mil</a></td>
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<tr>
<td>Natural Materials and Systems</td>
<td>Pat Roach</td>
<td>703 588 8302</td>
<td><a href="mailto:william.roach.4@us.af.mil">william.roach.4@us.af.mil</a></td>
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<tr>
<td>Dynamic Materials/Interactions</td>
<td>Martin Schmidt</td>
<td>703 588 8302</td>
<td><a href="mailto:dynamimaterials@us.af.mil">dynamimaterials@us.af.mil</a></td>
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### Materials – ONR and DARPA DSO

See next page (chart updated Jan 2017)
## Materials Science - continued

### Materials Sciences - ONR

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<td>Acoustic Transduction</td>
<td>Wally Smith</td>
<td>703 696 0284</td>
<td><a href="mailto:wallace.smith1@navy.mil">wallace.smith1@navy.mil</a></td>
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<td>Bulk Nanostructured Materials</td>
<td>Antti Makinen</td>
<td>703 696 0238</td>
<td><a href="mailto:antti.makinen@navy.mil">antti.makinen@navy.mil</a></td>
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<tr>
<td>Capacitors for Pulsed Power</td>
<td>Paul Armistead</td>
<td>703 696 4315</td>
<td><a href="mailto:paul.armisted@navy.mil">paul.armisted@navy.mil</a></td>
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<tr>
<td>Cellular Materials</td>
<td>David Shifler</td>
<td>703 696 0285</td>
<td><a href="mailto:david.shifler@navy.mil">david.shifler@navy.mil</a></td>
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<td>Computer Aided Mater Design</td>
<td>Kenny Lipkowitz</td>
<td>703 696 0707</td>
<td><a href="mailto:kenny.lipkowitz@navy.mil">kenny.lipkowitz@navy.mil</a></td>
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<tr>
<td>Energetic Materials</td>
<td>Cliff Bedford</td>
<td>703 696 0437</td>
<td><a href="mailto:clifford.bedford@navy.mil">clifford.bedford@navy.mil</a></td>
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<tr>
<td>NDE Fracture and Fatigue</td>
<td>Ignacio Perez</td>
<td>703-696-0688</td>
<td><a href="mailto:ignacio.perez1@navy.mil">ignacio.perez1@navy.mil</a></td>
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<tr>
<td>NDE Sensors</td>
<td>Ignacio Perez</td>
<td>703-696-0688</td>
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<td>Polymer Matrix Composites</td>
<td>Ignacio Perez</td>
<td>703-696-0688</td>
<td><a href="mailto:ignacio.perez1@navy.mil">ignacio.perez1@navy.mil</a></td>
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<td>Propellor Materials</td>
<td>KiHan Kim</td>
<td>703 696 4305</td>
<td><a href="mailto:kihan.kim@navy.mil">kihan.kim@navy.mil</a></td>
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<td>Propulsion Materials</td>
<td>David Shifler</td>
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<td><a href="mailto:david.shifler@navy.mil">david.shifler@navy.mil</a></td>
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<td>Solid Mechanics</td>
<td>Yapa Rajapakse</td>
<td>703 696 4405</td>
<td><a href="mailto:yapa.rajapakse@navy.mil">yapa.rajapakse@navy.mil</a></td>
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<td>Structural Materials</td>
<td>William Mullins</td>
<td>703 696 0487</td>
<td><a href="mailto:william.mullins@navy.mil">william.mullins@navy.mil</a></td>
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<td>Ultra-high Temperature Materials</td>
<td>Eric Wuchina</td>
<td>703 227 3949</td>
<td><a href="mailto:eric.wuchina@navy.mil">eric.wuchina@navy.mil</a></td>
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### Materials - DARPA DSO

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<td>EM wave/matter interactions</td>
<td>Michael Fiddy</td>
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<td>Chemical approaches to technol</td>
<td>Anne Fischer</td>
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<tr>
<td>Instrumentation /Tools</td>
<td>John Main</td>
<td>703 526 2809</td>
<td><a href="mailto:john.main@darpa.mil">john.main@darpa.mil</a></td>
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<tr>
<td>Novel Optical Materials</td>
<td>Predrag Milojkovic</td>
<td>571 218 4685</td>
<td><a href="mailto:predrag.milojkovic@darpa.mil">predrag.milojkovic@darpa.mil</a></td>
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<tr>
<td>Design 3D Products</td>
<td>Jan Vandenbrande</td>
<td>571 218 4293</td>
<td><a href="mailto:jan.vandenbrande@darpa.mil">jan.vandenbrande@darpa.mil</a></td>
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(chart updated Jan 2017)
## Mechanics – Solid, Fluid

### Mechanical Sciences - ARO

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<tr>
<td>Fluid Dynamics</td>
<td>Matthew Munson</td>
<td>919 549 4284</td>
<td><a href="mailto:matthew.j.munson6.civ@mail.mil">matthew.j.munson6.civ@mail.mil</a></td>
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<tr>
<td>Solid Mechanics</td>
<td>Asher Rubinstein</td>
<td>919 549 4244</td>
<td><a href="mailto:asher.a.rubinstein.civ@mail.mil">asher.a.rubinstein.civ@mail.mil</a></td>
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<tr>
<td>Complex Dynamics &amp; Systems</td>
<td>Samuel Stanton</td>
<td>919 549 4225</td>
<td><a href="mailto:samuel.c.stanton2.civ@mail.mil">samuel.c.stanton2.civ@mail.mil</a></td>
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<tr>
<td>Propulsion &amp; Energetic Sci</td>
<td>Ralph Anthenien</td>
<td>919 549 4317</td>
<td><a href="mailto:ralph.anthenien2.civ@mail.mil">ralph.anthenien2.civ@mail.mil</a></td>
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### Mechanical Sciences - AFOSR

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<tr>
<td>Unsteady Aerodynamics</td>
<td>Doug Smith</td>
<td>703 588 1779</td>
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<tr>
<td>Aerothermodynamics</td>
<td>Ivett Leyva</td>
<td>703 696 8478</td>
<td><a href="mailto:Aerothermodynamics@afosr.af.mil">Aerothermodynamics@afosr.af.mil</a></td>
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<tr>
<td>Mechanics of Multifunctional Matr</td>
<td>Les Lee</td>
<td>703 696 8483</td>
<td><a href="mailto:les.lee@afosr.af.mil">les.lee@afosr.af.mil</a></td>
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<td><a href="mailto:mitat.birkan@afosr.af.mil">mitat.birkan@afosr.af.mil</a></td>
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<tr>
<td>Multiscale Structural Mechanics</td>
<td>Jaimie Tiley</td>
<td>703 588 8316</td>
<td><a href="mailto:structural.mech@us.af.mil">structural.mech@us.af.mil</a></td>
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<tr>
<td>Test and Evaluation</td>
<td>Michael Kendra</td>
<td>703 588 0671</td>
<td><a href="mailto:michael.kendra@afosr.af.mil">michael.kendra@afosr.af.mil</a></td>
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### Ship Systems and Engineering Research – ONR Code 331

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<tr>
<td>Surface Hydrodynamics</td>
<td>Tom Fu</td>
<td>703 588 7486</td>
<td><a href="mailto:thomas_fu@navy.mil">thomas_fu@navy.mil</a></td>
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<tr>
<td>Surface Hydromechanics</td>
<td>George Stimak</td>
<td>703 696 0616</td>
<td><a href="mailto:george.stimak@navy.mil">george.stimak@navy.mil</a></td>
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<tr>
<td>Structural Reliability</td>
<td>Paul Hess</td>
<td>703 696 9776</td>
<td><a href="mailto:paul.hess@navy.mil">paul.hess@navy.mil</a></td>
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<tr>
<td>Energy Conversion &amp; Power Mgmt</td>
<td>H. Scott Coombe</td>
<td>703 696 1291</td>
<td><a href="mailto:harold.coombe@navy.mil">harold.coombe@navy.mil</a></td>
</tr>
<tr>
<td>Platform Design</td>
<td>Kelly Cooper</td>
<td>703 696 0869</td>
<td><a href="mailto:kelly.cooper@navy.mil">kelly.cooper@navy.mil</a></td>
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<tr>
<td>Thermal Management</td>
<td>Mark Spector</td>
<td>703 696 4449</td>
<td><a href="mailto:mark.spector@navy.mil">mark.spector@navy.mil</a></td>
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<td>Compact Power Conversion</td>
<td>Joseph Borraccini</td>
<td>703 696 7828</td>
<td><a href="mailto:joseph.borraccini@navy.mil">joseph.borraccini@navy.mil</a></td>
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<td>Next Gen Integrated Pwr Sys</td>
<td>Lynn Petersen</td>
<td>703 696 1291</td>
<td><a href="mailto:lynn.j.petersen@navy.mil">lynn.j.petersen@navy.mil</a></td>
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*chart updated Jan 2017*
Environmental Sciences
Space, Atmosphere, Ocean, Terrestrial

Environmental Sciences - AFOSR
Space Sciences  Julie Moses  703 696 9586  julie.moses@afosr.af.mil

Ocean Sensing and Systems Applications – ONR Code 321
Maritime Sensing  Mike Wardlaw  703 588 2427  mike.wardlaw@navy.mil
Ocean Engineering & Marine Sys  Jason Stack  703 696 2485  jason.stack@navy.mil
Undersea Signal Processing  John Tague  703 696 4399  john.a.tague@navy.mil

Ocean, Atmosphere, and Space Research – ONR Code 322
Arctic and Global Prediction  Scott Harper  703 686 4721  scott.l.harper@navy.mil
Arctic Mobile Observing System/Science
Littoral Geosciences & Optics  Reginald Beach  703 696 6523  reginald.beach@navy.mil
Marine Meteorology & Atmos  Ron Ferek  703 696 0518  ron.ferek@navy.mil
Ocean Acoustics  Robert Headrick  703 696 4135  bob.headrick@navy.mil
Physical Oceanography  Terri Paluszkiewicz  703 696 6680  terri.paluszkiewicz@navy.mil
Space Environment  Ron Ferek  703 696 0518  ron.ferek@navy.mil
Marine Mammals and Biology  Michael Weise  703 696 4533  michael.j.weise@navy.mil

(chart updated Jan 2017)
### Social Sciences

**ARO**
- **Cultural and Behavioral Science**: Lisa Troyer, 919 549 4230, lisa.l.troyer.civ@mail.mil
- **Institutional and Organizational**: Lisa Troyer, 919 549 4230, lisa.l.troyer.civ@mail.mil
- **Social Informatics**: Edward Palazzolo, 919 549 3234, edward.t.palazzolo.civ@

**ARI**
- **Foundational Science**: Stefanie Plemmons, 703 545 2346, stefanie.a.plemmons.civ@

**AFOSR**
- **Trust and Influence**: Benjamin Knott, 703 696 1142, benjamin.knott.2@us.af.mil

**ONR**
- **Human Performance**: Peter Squire, 703 696 0407, peter.squire@navy.mil
- **Affordable Human Behavior Modeling**: Harold Hawkins, 703 696 4323, harold.hawkins@navy.mil
- **Command Decision Making**: Jeffrey Morrison, 703 696 4875, jeffrey.g.morrison@navy.mil

**DARPA**
- **Predictive Behavior**: Adam Russell, 703 526 2232, adam.russell@darpa.mil

**DTRA**
- **Network Sciences**: Paul Tandy, 703 767 4097, paul.tandy@dtra.mil

**MINERVA**
- **S&T Point of Contact**: David Montgomery, OSD, david.w.montgomery61.ctr@mail.mil
- **Sociality, Security and Interconnectivity**: David Montgomery, OSD, david.w.montgomery61.ctr@mail.mil
- **Understanding Social Impact of Autonomy**: Benjamin Knott, AFOSR, benjamin.knott.2@us.af.mil
- **Societal Resilience and Sociopolitical Stability**: Lisa Troyer, ARO, lisa.l.troyer.civ@mail.mil
- **Power and Deterrence for Shaping Operations**: Martin Kruger, ONR, martin.kruger1@navy.mil
- **Military Cyber Defense**: Harold Hawkins, ONR, harold.hawkins@navy.mil

*chart updated Jan 2017*
Air Force Office of Scientific Research (AFOSR)
http://www.wpafb.af.mil/afrl/afosr

What: AFOSR manages the Air Force Defense Research Science portfolio described in subsequent charts

How much: typically $100 – 200K/yr for single investigator projects

When: Various, need watch for program announcements
Unsolicited proposals accepted any time – early spring better

Where: Program information at:
http://www.wpafb.af.mil/Welcome/Fact-Sheets/Display/Article/842026

Presentations and contact mechanisms with program officers
https://community.apan.org/afosr/p/presentations.aspx
https://community.apan.org/afosr/w/researchareas/default.aspx

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~30% goes to AFRL
AFOSR Organization Chart

Engineering and Information Science Branch
Dr. Stargel, Chief

  Engineering and Complex Systems Team
    lead: Dr. David Stargel

  Information and Networks Team
    lead: Dr. James Lawton

Physical and Biological Science Branch
Dr. William (Pat) Roach, Chief

  Chemical/Biological Sciences
    lead:

  Physical Sciences
    lead: Dr. Tatjana Curcic
Acquiring AFOSR topic/PO information

Go to http://www.wpafb.af.mil/Welcome/Fact-Sheets/Display/Article/842026
Scroll down and click on appropriate Research Area on the left side
Click on desired program officer / topic – get info, illustrated here by:

**Optoelectronics and Photonics**
This program supports U.S. Air Force requirements for information dominance by increasing capabilities in image capture; processing, storage, and transmission for surveillance, communications and computation; target Dr. Gernot S. Pomrenke, Complex Material and Devices Department (RTD)
AFOSR
(703) 696-8426
gernot.pomrenke@afosr.af.mil

See also current opportunities at:
http://www.wpafb.af.mil/Welcome/Fact-Sheets/Display/Article/842050
### Air Force Office of Scientific Research: Engineering and Complex Systems Team RTA1


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<tbody>
<tr>
<td>Team lead</td>
<td>David Stargel</td>
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<tr>
<td>Dynamic Materials and Interactions</td>
<td>Martin Schmidt</td>
<td>703 588 8436</td>
<td><a href="mailto:dynamicmaterials@us.af.mil">dynamicmaterials@us.af.mil</a></td>
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<tr>
<td>GHz-THz Electronics and Materials</td>
<td>Ken Goretta</td>
<td>703 696 7349</td>
<td><a href="mailto:kenneth.goretta@us.af.mil">kenneth.goretta@us.af.mil</a></td>
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<tr>
<td>Energy, Combustion and Non-equilibrium Thermo</td>
<td>Chiping Li</td>
<td>703 696 8574</td>
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<td>Unsteady Aerodynamics and Turbulent Flows</td>
<td>Doug Smith</td>
<td>703 586 1779</td>
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<td>High-speed Aerothermodynamic</td>
<td>Ivett Leyva</td>
<td>703 696 8478</td>
<td><a href="mailto:aerothermodynamics@us.af.mil">aerothermodynamics@us.af.mil</a></td>
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<td>Low Density Materials</td>
<td>Ken Goretta (acting, was Jocelyn Harrison)</td>
<td>703 696 8574</td>
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<td>Multiscale Structural Mechanics and Prognosis</td>
<td>Jaimie Tiley</td>
<td>703 588 8316</td>
<td><a href="mailto:structural.mech@us.af.mil">structural.mech@us.af.mil</a></td>
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<td>Space Propulsion and Energy Storage</td>
<td>Mitat Birkan</td>
<td>703 696 7234</td>
<td><a href="mailto:mitat.birkan@afosr.af.mil">mitat.birkan@afosr.af.mil</a></td>
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<tr>
<td>Test and Evaluation</td>
<td>Michael Kendra</td>
<td>703 588 0671</td>
<td><a href="mailto:michael.kendra@afosr.af.mil">michael.kendra@afosr.af.mil</a></td>
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(chart updated Jul 2017)
Air Force Office of Scientific Research:  
Information and Networks RTA2

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<td>Team lead</td>
<td>James Lawton</td>
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<td>Computational Cognition and Machine Intelligence</td>
<td>James Lawton</td>
<td>703 696 5999</td>
<td><a href="mailto:machine.itel@us.af.mil">machine.itel@us.af.mil</a></td>
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<tr>
<td>Computational Mathematics</td>
<td>Jean-Luc Cambier</td>
<td>703 696 1141</td>
<td><a href="mailto:jean_luc.cambier@us.af.mil">jean_luc.cambier@us.af.mil</a></td>
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<td>Dynamics and Control</td>
<td>Frederick Leve</td>
<td>703 696 7309</td>
<td><a href="mailto:DyControl@afosr.af.mil">DyControl@afosr.af.mil</a></td>
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<tr>
<td>Dynamic Data Driven Application Systems</td>
<td>Frederick Leve (was Darema)</td>
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<tr>
<td>Information Operations and CyberSecurity</td>
<td>Tristan Nguyen</td>
<td>703 696 7796</td>
<td><a href="mailto:tristan.nguyen@afosr.af.mil">tristan.nguyen@afosr.af.mil</a></td>
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<tr>
<td>Optimization and Discrete Mathematics</td>
<td>Cambier (acting)</td>
<td>703 696 8429</td>
<td><a href="mailto:odmath@us.af.mil">odmath@us.af.mil</a></td>
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<tr>
<td>Science of Info, Computation, Learning and Fusion</td>
<td>Doug Riecken</td>
<td>703 696 9736</td>
<td><a href="mailto:ICF@afosr.af.mil">ICF@afosr.af.mil</a></td>
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<tr>
<td>Systems and Software</td>
<td>James Lawton</td>
<td>703 696 5999</td>
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<tr>
<td>Trust and Influence</td>
<td>Benjamin Knott</td>
<td>703 696 1142</td>
<td><a href="mailto:benjamin.knott.2@us.af.mil">benjamin.knott.2@us.af.mil</a></td>
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(chart updated Jul 2017)
### Air Force Office of Scientific Research: Physical Science - RTB1

http://www.wpafb.af.mil/Welcome/Fact-Sheets/Display/Article/842036/afosr-physical-sciences

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<td>Aerospace Materials for Extreme Environ</td>
<td>Ali Sayir</td>
<td>703 588 7236</td>
<td><a href="mailto:ali.sayir@afosr.af.mil">ali.sayir@afosr.af.mil</a></td>
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<td>Tatjana Curcic</td>
<td>703 696 6204</td>
<td><a href="mailto:tatjana.curcic@afosr.af.mil">tatjana.curcic@afosr.af.mil</a></td>
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<td>Electromagnetics</td>
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<td>Plasma and Electro-Energetic Physics</td>
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<td>Quantum Electronic Solids</td>
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<td>Quantum Information Sciences</td>
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(chart updated Jul 2017)
Air Force Office of Scientific Research:
Chemical and Biological Sciences RTB2

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<td>Team lead</td>
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<tr>
<td>Biophysics</td>
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<tr>
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(chart updated Jul 2017)
Last BAA was for FY2013
AFOSR 2012-0006
Satellite Launch Jul 22 2014

Cycle Repeats every 2 Years – Minimum 2 Cycles running at any point in time
Army Research Office (ARO)
Part of the Army Research Laboratory

What: Budget in the Defense Research Sciences
ARO manages only the Single Investigator Basic Research (H57) part of the Army DRS S&T portfolio
ARO also manages other agency S&T funds

How much: typically $100 – 200K/yr for single investigator projects

When: Various, need watch for program announcements
Unsolicited proposals accepted any time – early spring better

Where: Proposal information at:

Annual “ARO in Review XXXX,” a publication listing the actions of ARO, including the funded efforts during the past year.
ARO Organization Chart

**Engineering Sciences Directorate**
- Dr. David Stepp, Director
  - Mechanical Sciences Division
    - Dr. Ralph Anthenien
  - Materials Sciences Division
    - Dr. David Stepp
  - Electronics Division
    - Dr. William Clark
  - Photonics Division
    - Dr. William Clark

**Information Sciences Directorate**
- Dr. Randy Zachery, Director
  - Computing Sciences Division
    - Dr. Cliff Wang
  - Mathematical Sciences Division
    - Dr. Joseph Myers
  - Network Sciences Division
    - Dr. Purush Iyer

**Physical Sciences Directorate**
- Dr. Hugh De Long
  - Physics Division
    - Dr. Marc Ulrich
  - Chemical Sciences Division
    - Dr. Robert Mantz, acting

**Life Sciences Directorate**
- Dr. Douglas Kiserow
  - Biological Sciences
  - Social Sciences
Acquiring ARO topic/PO information


Click on appropriate S&T heading in the left margin

Scroll down to Research Programs, click on appropriate topic

Scroll to research area, illustrated here by:

Communications & Human Networks
Dr. Robert Ulman
Research in this area is concerned with the application of communications and network theory, signal processing, and mathematics to enable the fast, accurate, reliable, and efficient transmission of information for the wireless digital battlefield. Due to their low probability of interception, anti-jam, and multiple access characteristics, spread spectrum techniques are important to Army communications, intelligence, surveillance, and target acquisition systems. ...

See also current solicitations at:
www.arl.army.mil/www/default.cfm?Page=8#ARO
ARO Proposal Process

1. **Development of Ideas**
   - Program manager interactions with potential PIs

2. **White Papers**
   - Evaluate fit to program goals and quality of proposal

3. **Receive Proposals**

4. **Science Peer Review**
   - NSF-like peer-review by university S&Es – evaluates scientific merit

5. **Analysis of Evaluations**
   - Scores/comments of Army and external reviewers are assessed

6. **PM Recommendation Management Assessment**
   - Funding decision based on balancing needs and opportunities, program portfolio, Army objectives

7. **Active Involvement in Execution**
   - Approximately one in three proposals is funded
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<tr>
<td><strong>Electronics Division</strong></td>
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<td>Earth Materials and Processes</td>
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(chart updated Dec 2017)
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<td>Computing Architectures and Visualization</td>
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Website and Solicitation do not match (chart updated Dec 2017)
# Army Research Office: Physical Sciences Directorate


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<td>Polymer Chemistry</td>
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<tr>
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<td>Human Dimension (International Program)</td>
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(Not listed in Solicitation W911NF-17-S-0002, Amendment 2, but is on website)

(chart updated Dec 2017)
What: objectives of the STIR program are to provide rapid, short-term investigations to assess the merit of innovative new concepts in basic research.

Who: Research proposals are sought from educational institutions, nonprofit organizations, and commercial organizations. Prospective offerers of a STIR proposal are encouraged to contact the appropriate ARO Technical Point of Contact (TPOC/ Program Manager) to ascertain the extent of interest in the specific research project.

How Much: Proposals in the amount of $50K or less

What: Research instrumentation is designed to improve the capabilities of U.S. universities to conduct research and educate scientists and engineers in areas important to national defense. Of the funds available to acquire ARO research described in this BAA, funds may be provided to purchase instrumentation in support of this research or in the development of new research capabilities.

Eligibility and Areas of Interest. It is highly recommended that potential offerors contact the appropriate ARO Technical Point of Contact (TPOC/Program Manager) for advice and assistance before preparation of an instrumentation proposal.

How Much: A budget that addresses equipment to be purchased, cost per item, and total cost. Indicate the proposed source of the equipment and the name and telephone number of a contact at that source. The budget should indicate the amount of funds to be contributed by other sources toward the purchase of the instrumentation.

Engineering Research and Development Center (ERDC)
US Army Corps of Engineers (USACoE)
(largely in-house effort)
http://www.erdc.usace.army.mil/

What: The ERDC is responsible for conducting research in the broad fields of hydraulics, dredging, coastal engineering, instrumentation, oceanography, remote sensing, geotechnical engineering, earthquake engineering, soil effects, vehicle mobility, self-contained munitions, military engineering, geophysics, pavements, protective structures, aquatic plants, water quality, dredged material, treatment of hazardous waste, wetlands, physical/mechanical/chemical properties of snow and other frozen precipitation, infrastructure and environmental issues for installations, computer science, telecommunications management, energy, facilities maintenance, materials and structures, engineering processes, environmental processes, land and heritage conservation, and ecological processes.

Basic and/or applied research

When: open continuously. Send a pre-proposal (not exceed 5 pages). Should ERDC evaluation indicate a need for a full proposal, one will be requested from the offeror.

Where: BAA W912HZ-17-BAA-01

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<td>T23 Basic Research Military Construction</td>
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<td>T24 Signature Physics and Terrain State</td>
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Army Medical Research and Materiel Command

http://mrmc.amedd.army.mil/index.cfm

What: Solutions to medical problems of importance to the warfighter at home and abroad

- Military Infectious Diseases Research Program (MIDRP)
- Combat Casualty Care Research Program (CCCRP)
- Military Operational Medicine Research Program (MOMRP)
- Clinical & Rehabilitative Medicine Research Program (CRMRP)
- Medical Chemical & Biological Defense Research (via DTRA)
- Medical Simulation and Information Sciences Research Program
- Radiation Health Effects Research Program

Congressional Special Interest Programs (CSI)
- Congressionally Directed Medical Research Program (CDMRP)

How Much:

Congressionally Directed Medical Research Program (CDMRP)

When: Open continuously from Oct 2017 to Sep 2022
send preproposal, followed by proposal if invited to do so


USAMRMC W81XWH-18-S-BAA1 Oct 2017

DRS 6.1 ($M) FY17
S13 Sci BS/Med Res Inf Dis 11
S14 Sci BS/Cbt Cas Care 6
S15 Sci BS/Amry Op Med 7
T64 Sci BS/System Bio/Network 3
ET6 Basic Res Clinical/Rehab Med 4
A. Research Areas of Interest

1. Military Infectious Diseases Research Program
   Research and Development toward Preventive Measures for Infectious Diseases
   Research and Development of Therapeutic Measures for Infectious Diseases

2. Combat Casualty Care Research Program
   Damage Control Resuscitation
   Extremity Trauma Pain Control
   Combat Casualty Care Engineering Craniomaxillofacial Injury
   Advanced Capabilities for Emergency Medical Monitoring

3. Military Operational Medicine Research Program
   Injury Prevention and Reduction
   Psychological Health and Resilience
   Physiological Health and Performance
   Environmental Health and Protection

4. Clinical and Rehabilitative Medicine Research Program
   Neuromusculoskeletal Injury Rehabilitation
   Vision Restoration and Rehabilitation
   Hearing Loss/Dysfunction, Balance Disorders, and Tinnitus
   Pain Management Regenerative Medicine and Composite Tissue Engineering
5. Medical Biological Defense Research Program
   a. Viral, Toxin, and Bacterial Studies
   b. Drug Development
   c. Identification and Diagnosis
   d. Biosurveillance (BSV)

6. Medical Chemical Defense Research Program
   a. Maintain the technologic capability to meet present requirements and counter future chemical
      warfare agent threats
   b. Provide medical countermeasures for the individual Service member to maintain combat
      effectiveness and prevent or reduce injury from chemical warfare agents
   c. Provide medical management of chemical casualties to enhance survival and expedite the RTD of
      chemical warfare agent casualties through definitive therapies and life support technologies:

7. Medical Simulation and Information Sciences Research Program
   http://mrmc.amedd.army.mil/index.cfm?pageid=medical_r_and_d.msis.overview
   a. The Medical Modeling Simulation and Training Technologies Portfolio
      • Combat Casualty Training Initiative (CCTI)
      • Medical Readiness Initiative (MRI)
      • Health-Focused Initiative (HFI)
      • Tools for Medical Education (TME)
   b. The Health Informatics and Health Information Technology Portfolio
      • Military Healthcare Services
      • Theater/Operational Medicine
      • IT Infrastructure and Data Management
      • Medical Resourcing

B. Research and Development of Devices or Technologies
The USAMRMC may provide financial support for research and development related to medical
devices or technologies. Such projects should be for scientific study and experimentation directed
toward advancing the state of the art or increasing knowledge or understanding rather than focusing on
a specific system or hardware solution
The Armed Forces Institute of Regenerative Medicine (AFIRM) is a multi-institutional, interdisciplinary network working to develop advanced treatment options for our severely wounded servicemen and women. The AFIRM is managed and funded through the US Army Medical Research and Materiel Command (MRMC).

Two University based consortium were funded in 2008 in AFIRM I. Each of consortia was awarded $42.5 million over a five-year period.

AFIRM II was kicked off in December 2013. AFIRM II is led by the Wake Forest University School of Medicine (Wake Forest Baptist Medical Center) and funded through a cooperative agreement with USAMRMC, the Office of Naval Research, the Air Force Medical Service, the Office of Research and Development - Department of Veterans Affairs, the National Institutes of Health, and the Office of the Assistant Secretary of Defense for Health Affairs.
Army Research Institute
for the Behavioral and Social Sciences
https://sslweb.hqda.pentagon.mil/ari/

What:  Basic, Applied and Advanced Scientific Research addressing
a. Training
b. Leader Development
c. Team and Inter-O rganizational Performance in Complex Environments
d. Soldier and Personnel

Topics of interest for Basic Research include:
  Training in Complex Environments
  Leader Development and Team Performance
  Identifying, Assessing and Assigning Quality Personnel
  Organizational Behavior and Network Science

Basic Research and Applied Research/Advanced Development

The recommended four-step sequence is: a telephone call, informal two to four page
white paper, proposal, and award for selected projects.

How Much:  ~$200K/yr for 3 years  DRS 6.1 ($M)
            Enacted  Proposed
            74F Pers Perf & Train  5.5  5.5

When:  Open Continuously

Where:  W911NF-13-R-0001 open from 6 Feb 2013 - 5 Feb 2018
Warfighting Capabilities Enabled by S&T Investments

CNR's S&T Investment Priorities
- Directed Energy/Electric Weaponry
- Cyber
- Electromagnetic Maneuver Warfare
- UxS Maneuver Warfare
- Synthetic Biology/Bio-Inspired Technologies

Portfolio is balanced across near, mid and long term S&T investments
Partnering with the Best Performers
April 2017 NDIA S&T Conference - Walter Jones Presentation

Key Criteria:
• Technical Quality
• Relevance / Responsiveness
• Cost & Affordability

Driving Innovation and Fostering Partnerships

---

Navy Labs & Warfare Centers
Universities and Nonprofits
Industry

Basic Research
- Navy Labs & Warfare Centers: 27%
- Universities and Nonprofits: 63%
- Industry: 10%

Applied Research
- Navy Labs & Warfare Centers: 23%
- Universities and Nonprofits: 31%
- Industry: 46%

Advanced Technology Development
- Navy Labs & Warfare Centers: 20%
- Universities and Nonprofits: 21%
- Industry: 59%
Office of Naval Research (ONR): Organizational Structure

Expeditionary Warfare and Combating Terrorism Department, Code 30
  Dr. John Pazik

C4ISR Department, Code 31
  Dr. Wen Masters
  Mathematics, Computers, and Info Research Div, 311
  Dr. Don Wagner
  Electronics, Sensors and Network Research Div, 312
  Dr. Michael Pollock
  Applications and Transitions Div, 313
  Cmdr. Bobby Hand

Ocean Battlespace Sensing Department, Code 32
  Dr. Frank Herr
  Ocean Sensing and Systems Applications Div, 321
  Ocean Atmosphere and Space Research Div, 322
  Dr. Thomas Drake

Naval Research Laboratory
  Dr. Bruce Danly

Sea Warfare and Weapons Department, Code 33
  Dr. Richard Carlin
  Ship Systems and Engineering Research Div, 331
  Dr. Thomas Fu
  Naval Materials Div, 332
  Dr. Julie Christodoulou
  Sea Platforms and Weapons Div, 333
  Dr. David Drumheller

Warfighter Performance Department, Code 34
  Dr. Patrick A. Mason
  Human and Bioengineered Systems Div, 341
  Dr. John Tangney
  Warfighter Protection and Application Div, 342
  Capt Matthew Swiergosz

Naval Air Warfare and Weapons Department, Code 35
  Dr. Thomas Beutner
  Aerospace Science Research Div, 351
  Dr. Thomas Beutner
  Air Warfare and Naval Weapons Application Div, 352
  Mr. Kenneth Heeke

Chart updated Jan 2017
What: ONR manages the entire Navy/Marine Corps S&T portfolio
   Defense Research Sciences (6.1) program in subsequent charts

How much: Typically $100 – 200K/yr for single investigator projects

When: Unsolicited proposals for long range BAA accepted any time – early spring better
   Various special programs, such as the Basic Research Challenges, need watch for program announcements

   BAA NOOO14-18-S-B001

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<td>6.1</td>
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Chart updated Jul 2017
Acquiring ONR topic/PO information

Go to www.onr.navy.mil

Click on S&T Organization and select the appropriate Directorate

Click on All Programs and select appropriate Division category

Click on desired topic(s) – get info, illustrated here by:

Applied Computational Analysis (Code 311)
Submission Date: ongoing
Note: Proposers are encouraged to contact the Program Officers to discuss their research interest prior to the submission of formal proposals.
Program develops and exploits methods in modern and classical mathematical analysis with emphasis on mathematical and computational models of physical phenomena.
Points of Contact  Reza Malek-Madani  703-696-0195  E-mail: reza.malikmadani@navy.mil


For topics with program officer information http://www.onr.navy.mil/Science-Technology/Contacts.aspx
### Office of Naval Research: Expeditionary Warfare and Combating Terrorism


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<th>Topic</th>
<th>Program Officer</th>
<th>Phone</th>
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<tbody>
<tr>
<td>Code 30</td>
<td>John Pazik</td>
<td>703 696 5031</td>
<td><a href="mailto:john.pazik@navy.mil">john.pazik@navy.mil</a></td>
</tr>
<tr>
<td>Command Control Computers &amp; Coms (C4)</td>
<td>Ben Pimentel</td>
<td>703 696 4840</td>
<td><a href="mailto:benjamin.a.pimentel1@navy.mil">benjamin.a.pimentel1@navy.mil</a></td>
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<tr>
<td>Fires</td>
<td>Dan Simons</td>
<td>703 696 3073</td>
<td><a href="mailto:dan.simons@navy.mil">dan.simons@navy.mil</a></td>
</tr>
<tr>
<td>Force Protection</td>
<td>Lee Mastroianni</td>
<td>703 696 0407</td>
<td><a href="mailto:lee.mastroianni@navy.mil">lee.mastroianni@navy.mil</a></td>
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<tr>
<td>Human Performance Training and Education</td>
<td>Peter Squire</td>
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<td><a href="mailto:peter.squire@navy.mil">peter.squire@navy.mil</a></td>
</tr>
<tr>
<td>Intelligence, Surveillance &amp; Recon (ISR)</td>
<td>Martin Kruger</td>
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<td><a href="mailto:martin.kruger1@navy.mil">martin.kruger1@navy.mil</a></td>
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<tr>
<td>Logistics</td>
<td>Billy Short</td>
<td>703 588 2552</td>
<td><a href="mailto:billy.short@navy.mil">billy.short@navy.mil</a></td>
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<tr>
<td>Manuever</td>
<td>Jeff Bradel</td>
<td>703 696 5339</td>
<td><a href="mailto:jeff.bradel@navy.mil">jeff.bradel@navy.mil</a></td>
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<tr>
<td>Nonlinear Dynamics</td>
<td>Mike Shlesinger</td>
<td>703 696 5031</td>
<td><a href="mailto:mike.shlesinger@navy.mil">mike.shlesinger@navy.mil</a></td>
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(chart updated Jan 2017)
Office of Naval Research: C4ISR  
(Mathematics, Computers, and Information)  

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<td>Math, Computers &amp; Info Research (311)</td>
<td>Dr. Don Wagner</td>
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<tr>
<td>Applied and Computational Analysis</td>
<td>Reza Malek-Madani</td>
<td>703 696 0195</td>
<td><a href="mailto:reza.malekmadani@navy.mil">reza.malekmadani@navy.mil</a></td>
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<tr>
<td>Assured Cyber Effects</td>
<td>Gary Toth</td>
<td>703 696 4961</td>
<td><a href="mailto:gary.toth@navy.mil">gary.toth@navy.mil</a></td>
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<tr>
<td>Command and Control</td>
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<td><a href="mailto:gary.toth@navy.mil">gary.toth@navy.mil</a></td>
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<tr>
<td>Communications and Networking</td>
<td>Santanu Das</td>
<td>703 588 1036</td>
<td><a href="mailto:santanu.das@navy.mil">santanu.das@navy.mil</a></td>
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<td>Computational Methods for Decision Making</td>
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<tr>
<td>Information Integration Thrust</td>
<td>Predrag Neskovic</td>
<td>703 696 4304</td>
<td><a href="mailto:predrag.neskovic@navy.mil">predrag.neskovic@navy.mil</a></td>
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<tr>
<td>Automated Image Understanding Thrust</td>
<td>Behzad Kamgar-Parsi</td>
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<td><a href="mailto:behzad.kamgar-parsi@.navy.mil">behzad.kamgar-parsi@.navy.mil</a></td>
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<tr>
<td>Resource Optimization Thrust</td>
<td>Don Wagner</td>
<td>703 696 4313</td>
<td><a href="mailto:don.wagner@navy.mil">don.wagner@navy.mil</a></td>
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<tr>
<td>CyberSecurity and Complex Software</td>
<td>J. Sukarno Mertoguno</td>
<td>703 696 0107</td>
<td><a href="mailto:sukarno.mertoguno@navy.mil">sukarno.mertoguno@navy.mil</a></td>
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<tr>
<td>Machine Learning and Intelligence</td>
<td>Behzad Kamgar-Parsi</td>
<td>703 696 5754</td>
<td><a href="mailto:behzad.kamgar-parsi@.navy.mil">behzad.kamgar-parsi@.navy.mil</a></td>
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<td>Mathematical Data Science</td>
<td>Predrag Neskovic</td>
<td>703 696 4304</td>
<td><a href="mailto:predrag.neskovic@navy.mil">predrag.neskovic@navy.mil</a></td>
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<tr>
<td>Mathematical Optimization and Operations Research</td>
<td>Don Wagner</td>
<td>703 696 4313</td>
<td><a href="mailto:don.wagner@navy.mil">don.wagner@navy.mil</a></td>
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C4ISR  Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance

(chart updated Jan 2017)
Office of Naval Research: C4ISR
(Physics and Electronics)
http://www.onr.navy.mil/sci_tech/31/312/

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<tr>
<td>Electronics, Sensors &amp; Networks Research (312)</td>
<td>Michael Pollock</td>
<td>703 696 4219</td>
<td><a href="mailto:michael.a.pollock@navy.mil">michael.a.pollock@navy.mil</a></td>
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<tr>
<td>Active Aperture Array</td>
<td>Deborah Van Vechten</td>
<td>703 696 4219</td>
<td><a href="mailto:deborah.vanvechten@navy.mil">deborah.vanvechten@navy.mil</a></td>
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<tr>
<td>Anti-tamper Electronics</td>
<td>Betsy Delong</td>
<td>703 588 0069</td>
<td><a href="mailto:betsy.delong@navy.mil">betsy.delong@navy.mil</a></td>
</tr>
<tr>
<td>Atomic, Molecular &amp; Quantum Physics</td>
<td>Tommy Willis</td>
<td>703 696 4214</td>
<td><a href="mailto:richard.t.willis@navy.mil">richard.t.willis@navy.mil</a></td>
</tr>
<tr>
<td>Electromagnetic Materials</td>
<td>Brian Bennett</td>
<td>703 696 4220</td>
<td><a href="mailto:brain.r.bennett@navy.mil">brain.r.bennett@navy.mil</a></td>
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<tr>
<td>Electronic Devices.Semiconductors and Amplifiers</td>
<td>Paul Maki</td>
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<td><a href="mailto:paul.maki@navy.mil">paul.maki@navy.mil</a></td>
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<td>Electronic Warfare</td>
<td>Bradley Binder</td>
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<tr>
<td>EO/IR Sensors and Sensor Processing</td>
<td>Ravindra Athale</td>
<td>703 588 1916</td>
<td><a href="mailto:ravindra.athale@navy.mil">ravindra.athale@navy.mil</a></td>
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<tr>
<td>Integrated Topside</td>
<td>Betsy Delong</td>
<td>703 588 0069</td>
<td><a href="mailto:betsy.delong@navy.mil">betsy.delong@navy.mil</a></td>
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<tr>
<td>Mixed Signal Processing</td>
<td>Deborah Van Vechten</td>
<td>703 696 4219</td>
<td><a href="mailto:deborah.vanvechten@navy.mil">deborah.vanvechten@navy.mil</a></td>
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<tr>
<td>Nanoscale Computing Devices and Systems</td>
<td>Chagaan Baatar</td>
<td>703 696 0483</td>
<td><a href="mailto:chagaan.baatar@navy.mil">chagaan.baatar@navy.mil</a></td>
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<tr>
<td>Navigation and Timekeeping</td>
<td>Tommy Willis</td>
<td>703 696 4214</td>
<td><a href="mailto:richard.t.willis@navy.mil">richard.t.willis@navy.mil</a></td>
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<tr>
<td>Quantum Information Sciences</td>
<td>Tommy Willis</td>
<td>703 696 4214</td>
<td><a href="mailto:richard.t.willis@navy.mil">richard.t.willis@navy.mil</a></td>
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<tr>
<td>RF Surveillance and Signal Processing</td>
<td>Kevin Rudd</td>
<td></td>
<td><a href="mailto:kevin.w.rudd@navy.mil">kevin.w.rudd@navy.mil</a></td>
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<tr>
<td>Superconducting Technologies</td>
<td>Deborah Van Vechten</td>
<td>703 696 4219</td>
<td><a href="mailto:deborah.vanvechten@navy.mil">deborah.vanvechten@navy.mil</a></td>
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<tr>
<td>Applications and Transitions (313)</td>
<td>Cmdr. Bobby Hand</td>
<td>703 696 4825</td>
<td><a href="mailto:bobby.hand@navy.mil">bobby.hand@navy.mil</a></td>
</tr>
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(chart updated Jan 2017)
### Office of Naval Research: Ocean Battlespace Sensing
(Ocean, Atmosphere, and Space)


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<td><strong>Ocean Sensing and Systems Applications (321)</strong></td>
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<tr>
<td>Maritime Sensing</td>
<td>Mike Wardlaw</td>
<td>703 588 2427</td>
<td><a href="mailto:mike.wardlaw@navy.mil">mike.wardlaw@navy.mil</a></td>
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<tr>
<td>Navy Research Facilities</td>
<td>Robert Schnoor</td>
<td>703 696 4530</td>
<td><a href="mailto:tim.schnoor@navy.mil">tim.schnoor@navy.mil</a></td>
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<tr>
<td>Ocean Engineering &amp; Marine Sys</td>
<td>Jason Stack</td>
<td>703 696 2485</td>
<td><a href="mailto:jason.stack@navy.mil">jason.stack@navy.mil</a></td>
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<tr>
<td>Undersea Signal Processing</td>
<td>John Tague</td>
<td>703 696 4399</td>
<td><a href="mailto:john.a.tague@navy.mil">john.a.tague@navy.mil</a></td>
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<td>Arctic and Global Prediction Program</td>
<td>Tom Drake</td>
<td>703 696 1206</td>
<td><a href="mailto:tom.drake@navy.mil">tom.drake@navy.mil</a></td>
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<tr>
<td>Arctic Mobile Observing Systems Science (AMOS)</td>
<td>Scott Harper</td>
<td>703 696 4721</td>
<td><a href="mailto:scott.l.harper@navy.mil">scott.l.harper@navy.mil</a></td>
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<td>Sea State and Boundary Layer Physics of the Emerging Arctic Ocean</td>
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<td>Littoral Geosciences and Optics</td>
<td>Reginald Beach</td>
<td>703 696 6523</td>
<td><a href="mailto:reginald.beach@navy.mil">reginald.beach@navy.mil</a></td>
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<tr>
<td>Marine Mammals and Biology</td>
<td>Michael Weise</td>
<td>703 696 4533</td>
<td><a href="mailto:michael.j.weise@navy.mil">michael.j.weise@navy.mil</a></td>
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<tr>
<td>Marine Meteorology &amp; Atmos Effects</td>
<td>Ron Ferek</td>
<td>703 696 0518</td>
<td><a href="mailto:ron.ferek@navy.mil">ron.ferek@navy.mil</a></td>
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<tr>
<td>Ocean Acoustics</td>
<td>Robert Headrick</td>
<td>703 696 4315</td>
<td><a href="mailto:bob.headrick@navy.mil">bob.headrick@navy.mil</a></td>
</tr>
<tr>
<td>Oceanography</td>
<td>Terri Paluszkiewicz</td>
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(chart updated Jan 2017)
### Office of Naval Research: Sea Warfare and Weapons

*(Mechanics, Chemistry, and Materials)*


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<td>Energy Conversion and Power Mgmt</td>
<td>H. Scott Coombe</td>
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<td><a href="mailto:harold.coombe@navy.mil">harold.coombe@navy.mil</a></td>
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<td>Automation in Ship Systems</td>
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<td>703 696 0869</td>
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<td>Underwater Signatures</td>
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<td>Surface Hydromechanics</td>
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<td>Turbulence</td>
<td>Ronald Joslin</td>
<td>703 696 2363</td>
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(chart updated Jun 2017)
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<td>Julie Christodoulou</td>
<td>703 696 0953</td>
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<td>Acoustic Transduction</td>
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<td>Antifouling/Fouling Release</td>
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<td>Bulk Nanostructured Materials</td>
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<td>Capacitors for Pulsed Power</td>
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<td>Cellular Materials</td>
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<td>Computer Aided Materials Design</td>
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<td>Electrochemical Materials</td>
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<td>NDE - Fatigue and Fracture</td>
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<td>Ultra high Temperature Materials</td>
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(chart updated Jan 2017)
Office of Naval Research: Sea Warfare and Weapons  
(Mechanics, Chemistry, and Materials)  

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<th>David Drumheller</th>
<th>703 696 4711</th>
<th><a href="mailto:david.drumheller@navy.mil">david.drumheller@navy.mil</a></th>
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<td>Energetic Materials</td>
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<td><a href="mailto:daniel.tam1@navy.mil">daniel.tam1@navy.mil</a></td>
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<td>Advanced Electrical Power Systems</td>
<td>Terry Ericsen</td>
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<td>703 588 2216</td>
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<td>Biologically Inspired Underwater Propulsion</td>
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<td><a href="mailto:robert.brizzolara@navy.mil">robert.brizzolara@navy.mil</a></td>
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<td><a href="mailto:david.drumheller@navy.mil">david.drumheller@navy.mil</a></td>
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University Laboratory Initiative  
Navy laboratories engaged in undersea weapons research and development and universities are encouraged to seek out graduate students that are interested in pursuing thesis or post-doctoral research in one or more of the Undersea Weaponry Core Technology Areas. Each ULI project includes a student, an academic advisor and a laboratory mentor. A single white paper outlining a potential project may be submitted to ONR. To formally propose a project for funding under ULI, separate proposals must be received from the soliciting Navy laboratory and the university.
Office of Naval Research: Warfighter Performance  
(Biology, Cognitive, and Neural Science)  

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<td>Human &amp; Bioeng Systems (341)</td>
<td>John Tangney</td>
<td>703 696 4505</td>
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<td>Affordable Human Behavioral Modeling</td>
<td>Harold Hawkins</td>
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<td><a href="mailto:harold.hawkins@navy.mil">harold.hawkins@navy.mil</a></td>
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<td>Biorobotics</td>
<td>Thomas McKenna</td>
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<td>Cognitive Science of Learning</td>
<td>Ray Perez</td>
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<td>Command Decision Making</td>
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<td>Computational Neuroscience</td>
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<td>Human Robot Interaction</td>
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(chart updated Jan 2017)
## Office of Naval Research: Warfighter Performance  
**(Biology, Cognitive, and Neural Science)**


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<td>Capt Matthew Swiergosz</td>
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<td>Basic Biomedical</td>
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<td>Capable Manpower (FNC)</td>
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(chart updated Jan 2017)
Office of Naval Research: Naval Air Warfare and Weapons

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<td>Combat Safe Insensitive Munitions</td>
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<td>Counter directed energy</td>
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<td>High energy, dense oxidizers</td>
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<td>Kenneth Heeke</td>
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<td>Rotor Blade Erosion Protection</td>
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<td>Aircraft Structural Parts</td>
<td>Malinda Pagett</td>
<td>703 588 1047</td>
<td><a href="mailto:malinda.pagett@navy.mil">malinda.pagett@navy.mil</a></td>
</tr>
<tr>
<td>Applied Electromagnetics</td>
<td>Sarwat Chappell</td>
<td>703 696 4224</td>
<td><a href="mailto:sarwat.chappell@navy.mil">sarwat.chappell@navy.mil</a></td>
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<tr>
<td>Aviation Mishap Indicators</td>
<td>Malinda Pagett</td>
<td>703 588 1047</td>
<td><a href="mailto:malinda.pagett@navy.mil">malinda.pagett@navy.mil</a></td>
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<tr>
<td>Counter-air AMRAAM Improvement</td>
<td>Ken Heeke</td>
<td>703 588 0431</td>
<td><a href="mailto:kenneth.heeke@navy.mil">kenneth.heeke@navy.mil</a></td>
</tr>
<tr>
<td>Counter-air Defense Improvements</td>
<td>Ken Heeke</td>
<td>703 588 0431</td>
<td><a href="mailto:kenneth.heeke@navy.mil">kenneth.heeke@navy.mil</a></td>
</tr>
<tr>
<td>Data Architecture for Aircraft Data Analysis</td>
<td>Malinda Pagett</td>
<td>703 588 1047</td>
<td><a href="mailto:malinda.pagett@navy.mil">malinda.pagett@navy.mil</a></td>
</tr>
<tr>
<td>Direct Attack Seeker Head</td>
<td>Ken Heeke</td>
<td>703 588 0431</td>
<td><a href="mailto:kenneth.heeke@navy.mil">kenneth.heeke@navy.mil</a></td>
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<tr>
<td>Directed Energy</td>
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<tr>
<td>Electromagnetic Rail Gun</td>
<td>Roger Ellis</td>
<td>703 696 9504</td>
<td><a href="mailto:roger.ellis@navy.mil">roger.ellis@navy.mil</a></td>
</tr>
<tr>
<td>Free Electron Laser</td>
<td>Ryan Hoffman</td>
<td>703 696 0553</td>
<td><a href="mailto:ryan.hoffman@navy.mil">ryan.hoffman@navy.mil</a></td>
</tr>
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<td>High Energy Laser System</td>
<td>Ken Heeke</td>
<td>703 588 0431</td>
<td><a href="mailto:kenneth.heeke@navy.mil">kenneth.heeke@navy.mil</a></td>
</tr>
<tr>
<td>High Speed Components - Radome</td>
<td>Ken Heeke</td>
<td>703 588 0431</td>
<td><a href="mailto:kenneth.heeke@navy.mil">kenneth.heeke@navy.mil</a></td>
</tr>
<tr>
<td>Hypervelocity Projectile</td>
<td>Adam Jones</td>
<td>703 588 1047</td>
<td><a href="mailto:adam.r.jones@navy.mil">adam.r.jones@navy.mil</a></td>
</tr>
<tr>
<td>Integrated Hybrid Structural Management</td>
<td>Malinda Pagett</td>
<td>703 588 1047</td>
<td><a href="mailto:malinda.pagett@navy.mil">malinda.pagett@navy.mil</a></td>
</tr>
<tr>
<td>Multi-mode Sensor Seeker</td>
<td>Ken Heeke</td>
<td>703 588 0431</td>
<td><a href="mailto:kenneth.heeke@navy.mil">kenneth.heeke@navy.mil</a></td>
</tr>
<tr>
<td>Sidewinder Optimized Kinematic Enhancement</td>
<td>Ken Heeke</td>
<td>703 588 0431</td>
<td><a href="mailto:kenneth.heeke@navy.mil">kenneth.heeke@navy.mil</a></td>
</tr>
<tr>
<td>Solid State Laser Technology</td>
<td>Peter Morrison</td>
<td>703 696 0553</td>
<td><a href="mailto:peter.a.morrison@navy.mil">peter.a.morrison@navy.mil</a></td>
</tr>
<tr>
<td>Strike Accelerator</td>
<td>Ken Heeke</td>
<td>703 588 0431</td>
<td><a href="mailto:kenneth.heeke@navy.mil">kenneth.heeke@navy.mil</a></td>
</tr>
<tr>
<td>Turbine Engine Technology</td>
<td>Knox Millsaps</td>
<td>703 588 2962</td>
<td><a href="mailto:knox.millsaps@navy.mil">knox.millsaps@navy.mil</a></td>
</tr>
<tr>
<td>UAV Heavy Fuel Engine</td>
<td>Malinda Pagett</td>
<td>703 588 1047</td>
<td><a href="mailto:malinda.pagett@navy.mil">malinda.pagett@navy.mil</a></td>
</tr>
</tbody>
</table>

(chart updated Jan 2017)
Basic Research Challenges

The ONR Basic Research Challenge (BRC) program was established to competitively select and fund promising research programs in new areas not addressed by the current basic research program. The program stimulates new, high-risk basic research projects in multidisciplinary and departmental collaborative efforts, and funds topics that foster leading edge science and attract new principal investigators and organizations. Basic Research Challenge awards are for a period of 4-5 years at up to $1.5M/yr. Topics are submitted by ONR program officers and are selected for BRC awards by ONR's director of research.

2018
Randomized Numerical Linear Algebra for Large-Scale, Efficient Matrix Computations N00014-17-S-BA13
   Reza Malikk-Madani and John Tague
Levitated Optomechanics N00014-17-S-BA13
   Richard Willis
Exploring Compositional Space to Predict and Evolve Multi-Principal Element Alloys N00014-17-S-BA13
   David Shifler and William Nickerson
Guaranteed Performance of Multibody Control Systems N00014-17-S-BA13
   Brian Hohn-Hansen

2017
Establishing a Multiscale Theory for Cavitation in Complex Soft Materials N00014-16-S-BA10
   Tim Bentley
Understanding the Phase-Resolved Bottom-side IONosphere N00014-16-S-BA10
   Dan Eleuterio
Decentralized Perception in Data-rich Dynamic Environments N00014-16-S-BA10
   Behzad Kamgar-Parsi and Marc Steinberg
A Scientific Basis for Enhanced Manufacturability with Electrical Currents N00014-16-S-BA10
   Antti Makinen, William Mullins and Kenny Lipkowitz
Distributed Sensing, Actuation and Control in Soft Materials for Flexible Appendages N00014-16-S-BA10
   Tom McKenna and Marc Steinberg
Predictive and Causal Modeling - Bridging the Gap N00014-16-S-BA10
   Predrag Neskovic
New Opportunities to Transform Wall-bounded Turbulence Understanding N00014-16-S-BA10
   Douglas Smith and Ronal Joslin

(chart updated Jul 2017)
Naval Postgraduate School

The Naval Postgraduate School (NPS) is interested in receiving proposals for research initiatives that offer potential for advancement and improvement in the NPS core mission of graduate education and research. Readers should note that this is an announcement to declare NPS’s solicitation in competitive funding of meritorious research initiatives across a spectrum of science and engineering, business, politics and public/foreign policy, operational and informational sciences, and interdisciplinary disciplines that support the NPS’ graduate education and research mission. Additional information on the Naval Postgraduate School’s graduate education mission and supporting research initiatives is available.

General Information: http://www.nps.edu/About/index.html
NPS Strategic Plan: http://www.nps.edu/About/NPSStratPlan.html
Academic Programs: http://www.nps.edu/Academics/index.html
Research Programs: http://www.nps.edu/Research/index.html

Prior to preparing proposals, potential offerors are strongly encouraged to contact an NPS point of contact (POC) whose program and research efforts best match the Offeror’s field of interest. The Academic and Research Programs links above can be used to locate an appropriate POC by exploring the information provided about the faculty members in each of NPS’s four schools, three institutes, and many interdisciplinary centers and research groups.
Multi-INT Research Initiatives at the Naval Postgrad School

**What:** The Naval Postgraduate School (NPS) is interested in receiving proposals for research initiatives that offer potential for advancement and improvement in the following multi-intelligence (Multi-INT) research topic areas:
- Representing targets as systems
- Orchestrated resource management
- Computational models for sensemaking
- Human-computer symbiosis
- New approaches for addressing the scientific underpinnings of Multi-INT
- Maritime Domain Awareness/Anomaly Detection

The Center for Multi-INT Studies (CMIS) supports research that develops theoretical foundations, models, and algorithms to enable timely, robust, and optimal sense making, situation awareness and decision making. Researchers must consider incomplete information in highly complex and dynamic intelligence, surveillance and reconnaissance (ISR) systems. These ISR systems are often comprised of centralized and distributed sensors, human observers, database management systems, and associated databases. Such systems operate in uncertain, resource-constrained environments against problems of significant complexity and urgency.

**How Much:** $50K and $150K for up to 1 year

**When:** The solicitation remains open until 30 Nov 2015

**Where:** NPS BAA Announcement # NPS-BAA-15-004 (Sept release)
Advanced Systems and Concepts for Countering WMD

**What:** This BAA’s primary objective is to attract outstanding researchers and scholars who will investigate topics of interest to the security studies community. Investigations and research will focus on expanding knowledge related to countering weapons of mass destruction and weapons of mass effect (WMD/WME). The program solicits innovative proposals for research on WMD/WME counterproliferation, nonproliferation, and strategy to be conducted during the January 2015 through September 2016 timeframe. Topics of interest:

1. Proliferation of weapons of mass destruction
2. Future technologies of mass effect
3. WMD/WME delivery systems
5. Multi-domain threats to strategic stability.

**How Much:** approximately $3.5 to $4 million per year will be available to make PASCC-approved awards. Research projects are typically funded at levels between $50K and $150K.

**When:** open until 31 MARCH 2016 or until replaced by a successor BAA

**Where:** Naval Postgraduate School BAA Announcement #15-002
NPGS
Acquisition Research Program

What: The Acquisition Research Program (ARP) at the Naval Postgraduate School is interested in stimulating and supporting scholarly research in academic disciplines that bear on public procurement policy and management. These include economics, finance, financial management, information systems, organization theory, operations management, human resources management, risk management, and marketing, as well as the traditional public procurement areas such as contracting, program/project management, logistics, test and evaluation and systems engineering management.

How Much: up to $120K for 1 year

When: White papers due 1 Jun 2016
      Full proposals due 1 Aug 2016

Where: NPS-FOA-16-001
DARPA Technical Offices

BTO - Biological Technologies Office
- Biological Complexity at Scale
- Neurotechnologies
- Engineering Biology
- Restore, Maintain and Improve Warfighter Abilities

DSO - Defense Sciences Office
- Understanding Complexity
- Applied Math and Design
- Social Systems
- Fundamental Limits
- New Foundations

I2O - Information Innovation Office
- Empower the Human within the Information Ecosystem
- Guarantee Trustworthy Computing and Information
- Localization

MTO - Microsystems Technology Office
- Electromagnetic Spectrum
- Tactical Information Extraction
- Globalization

STO - Strategic Technology Office
- System of Systems (SoS)
- Battle Management/Command and Control (BMC2)
- Communications and Networks (C&N)
- Electronic Warfare (EW)
- Intelligence Surveillance, and Reconnaissance (ISR)

TTO - Tactical Technology Office
- Positioning, Navigation, and Timing (PNT)
- System Focus Areas:
  - Ground
  - Maritime
  - Air
  - Space
- Crosscutting Themes:
  - Agile development
  - Cooperative Autonomy
  - Unmanned Systems
  - Power and Propulsion
2017 NDIA Presentation

Breakthrough Technologies for National Security
DARPA’s Portfolio Today

- Electromagnetic spectrum dominance
- Position, navigation & timing beyond GPS
- Air superiority in contested environments
- Maritime system of systems
- Robust space
- Overmatch on the ground
- Defense against mass terrorism

- Scalable cyber capabilities
- Electronics with built-in trust
- Big data tools
- Next-generation AI

- Outpacing infectious disease
- Neurotechnologies
- Synthetic biology
- Chemistry, physics, math, materials
- Understanding complexity
- Human-machine symbiosis

These focus areas are part of a broad and diverse portfolio of DARPA investments. Focus areas change over time as some succeed and others fail and as DARPA identifies new challenges and opportunities.
What: Research and technology where risk and payoff are both very high, and Success may provide dramatic advances for military roles and missions.

Defense Science Office (DSO)  Biological Technologies Office (BTO)
Information Innovation Office (I2O)  Microsystems Technology Office (MTO)
Tactical Technology Office (TTO)  Strategic Technology Office (STO)

Larger programs are available than at OXRs (some are managed by OXR POs) Focuses on 2-4 year projects run by small, purpose-built teams Industrial participation frequently desirable
**First deliverable milestone in 12-18 months; “widget” in 3-5 years**

How much: $100K – $10M/yr in DSO as example
DARPA program managers often fund studies (“seedlings”) as initial research to determine if a more extensive program is appropriate.

When: Various, need watch for program topic announcements, requests for information toward topic development, and announcements of proposer days

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Where: http://www.darpa.mil/Opportunities/Universities/
http://www.darpa.mil/Opportunities/Universities/Young_Faculty.aspx
Acquiring DARPA topic/PO information

Go to www.darpa.mil

Click on “About Us” tab at the top of the page and choose Offices

Click on appropriate Technical Office Program

Click on appropriate “Program” or “Program Manager”

Click on desired research topic(s) – get info, illustrated here by:

Program Manager: Dr. Tyler McQuade
Battlefield Medicine
DARPA’s Battlefield Medicine program seeks to address this capability gap through two integrated research thrusts: the Pharmacy on Demand (PoD) and Biologically-derived Medicines on Demand (Bio-MOD) initiatives....

See also current solicitations at:
The Program Life Cycle

- Concept
- Seedling
- Evaluation
- Presentation
- Acquisition
- Execution
- Reporting
- Completion

- **PM originated**
- **Other internal**
  - Office Director
  - DIRO
- **Other DoD**
  - Urgent user needs
  - Identified long-term gaps
  - OSD, DSB, etc
- **Other external**
  - Industry, Academia, Community
  - Workshops, RFIs
What are the Most Important Take-aways?

- Read the BAA and follow the instructions therein
- Communicate with a PM
- Answer the Heilmeier Questions
- Start with an Executive Summary
- Follow up with an Abstract
- Finally, submit a Full Proposal
  - Ensure proposal is “conforming”
  - Be concise, but include details to substantiate revolutionary nature of the research
- Ask questions if you don’t understand something
Top Ten Ways to Prepare to Engage with DARPA

Tyler McQuade (Jul 2015)

1. Go beyond the state of the art - DARPA courts high-risk / high-return; larger-scale programs
2. Share, but don’t over sell - “BS” won’t work
3. Plan your visit well - PMs are busy; no calendar surprises
4. Interaction is a two-way street
5. Understand the role of a PM - collects/fosters/synthesizes innovative program ideas; lead (CEO) program efforts
6. Understand the DARPA mission - multidisciplinary teaming toward mission goal
7. Understand the DARPA process - use executive summaries
8. Recognize that DARPA evolves fast - priorities change; some ideas won’t sell; program managers change
9. Know thy audience - interact with “right” program managers
10. Know thyself - strengths and weaknesses; how perform in multidisciplinary teaming; lead vice subcontract personalities
The Heilmeyer Catechism
Questions New Program Pitches Must Answer

- What are you trying to do? Articulate your objectives using absolutely no jargon
  - Example: “take anthrax off the table as a threat to our forces”
  - What is the new military capability that Semantic Web Services could provide?

- How is it done today, and what are the limits of current practice?
  - Why is this specifically a technology problem?

- What's new in your approach and why do you think it will be successful?
  - All software is Turing-equivalent, so software methodology is usually not relevant
  - What is your argument/analysis that a 10x difference in a technology will result in a new capability?

- Who cares? If you are successful, what difference will it make?
  - Who is the customer for the new idea, and what evidence do you have that any transition will be successful?

- What are the risks and the payoffs?

- How much will it cost? How long will it take?

- What are the midterm and final exams to check for success?
  - Metrics and experimentation plans defined up front
DARPA New Initiative Process

Step I:
- Define "Go / No Go" Criteria
- Permission to Issue BAA

Step II:
- Select Performers

Step III:
- Program Reviews
- "Go / No Go" Evaluations

Contract

BAA

Potential Performers

Initial Study

Office Director ("advisor", "coach")

Program Manager

Industry Government Universities
What is a Seedling?

- Seedlings
  - Turn “disbelief” into “mere doubt”
  - Are typically 3-9 month projects
  - Answer a specific question
  - Involve a limited number of personnel
  - Lead to the next generation of program ideas

However, not all seedlings become DARPA programs
"Seedlings"

PMs Receive White Papers from all sources (academia, industry, national labs).

Some are passed to other PMs.

Some are read and discarded.

Some are interesting to PMs:

- Related to a possible future program
- Trigger interest in a future program
- Solve a key challenge emerging in an existing program

PM works with Office Director, Proposer, other PMs to refine interest, define a decisive short-term study, make funding decision.

Key Step: Initial White Paper
What is a White Paper?

The goal of a white paper is to capture the interest of a PM in your idea. Successful white papers are:

1. **Short and Focused**
2. **Identify a Problem**
3. **Describe a Solution**
4. **Focus on Key Challenge and Effort Needed**
5. **Outline a Decisive Plan**

Typical length ~ 1 year. Typical Budget $300K < $500K

Include some graphics, and possibly a Penta-Chart

**Your YFA Pre-Proposals are good examples of White Papers. The Full Proposals will also be good examples (we hope!)**

**When to Send?** Anytime. We receive white papers almost every day of the year.

1-2 person scale
White Paper

Who to Send To?

Do some homework:
- Read statements on PM web pages
- Read program descriptions
- Ask Friends and Colleagues with DARPA Funding

Make contact
- We attend conferences
- We (often) read email and answer the phone
- Ask for an appointment when in DC.

Don’t be shy
- Find us at meetings
- Resend emails if ignored
- Ask about workshops
- Contact our administrative support people
- Don’t be shy
Illustration of a DARPA Program Chart: Guiding Light at the Nanometer Scale

Operating regimes of different technologies

Plasmonics
- Improved synergy between electronic and photonic devices
- Size of electronic components
- Operating speed of photonic networks
- Critical – negative permittivity and dielectric constant

Courtesy of M. Brongersma
ABOUT BTO
The Biological Technology Office (BTO) is DARPA's technology arm focused on leveraging advances in engineering and information sciences to drive and reshape biotechnology for technological advantage. BTO is responsible for all neurotechnology, human-machine interface, human performance, infectious disease, and synthetic biology programs within the agency.

BTO Focus Areas

- **Restore and Maintain Warfighter Abilities**  This focus area is grounded in the development of new techniques and therapeutic strategies for addressing current and emerging threats, but extends beyond medical applications to include exploration of complex biological issues that can impact an individual's ability to operate and interact in the biological and physical world. The research portfolio includes neuroscience to drive a deeper understanding of the human brain, how it interfaces with the body and the external world, and how it directs and coordinates behavior, including decision-making in demanding environs. BTO will extend work involving human participants and apply insights from physiology, biochemistry, psychology, sociology, and related sciences to such emerging-science domains as bioengineering, bioinformatics, and microbiomics.

- **Harness Biological Systems**  BTO seeks to establish a fundamental understanding of natural processes and the underlying design rules that govern the behavior of biological systems, and apply that knowledge to forward-engineer new systems and products with novel functionality. To support this work, BTO develops techniques at the intersection of automation, computer science, and biology to explore biological data at massive scales.

- **Apply Biological Complexity at Scale**  BTO is looking into pursuing new insights derived from biological complexity and living-system dynamics with the goal of developing applications to enhance global-scale stability and human wellbeing.

Societal Implications  DARPA periodically convenes scholars with expertise in these issues to discuss relevant ethical, legal and social issues, and to consider guidance and information published by institutional review boards that govern research involving animals or people.
DARPA
Biotechnologies Technologies Office (BTO)
Generic Solicitation

What: BTO is seeking novel approaches that will build technical communities that tap into sources of innovation both inside and outside traditional DoD performer communities. BTO encourages efforts that are creative and agile both in terms of the technologies proposed and in the structure of the approach. BTO is interested in submissions related to the following areas:

- Discovering and leveraging novel findings from neuroscience, psychology, cognitive science, and related disciplines to advance treatment and resilience in neurological health and optimize human aptitude and performance.
- Understanding and improving interfaces between the biological and physical world to enable seamless hybrid systems.
- Developing and leveraging fundamental understanding of the underlying design rules that govern the behavior of biological systems.
- Developing new tools and capabilities for forward engineering of biological systems, such as cells, tissues, organs, organisms, and complex communities, to both develop new products and functional systems, as well as to gain new insights into underlying mechanisms.
- Developing new platform technologies that integrate, automate, and miniaturize the collection, processing, and analysis of biological samples in extreme environments (marine, microgravity, desert, etc.).
- Developing and validating new theories and computational models that identify factors and principles underlying collective and interactive behaviors of biological organisms at all scales from individual cells to global ecosystems.
- Understanding the dynamics of population and ecosystem behavior to preserve equilibrium, provide strategic opportunity, or avoid catastrophe.
- Developing and leveraging new technologies that can be applied to agricultural ecosystems for production stabilization, by improving quality or reducing losses from pathogens or pests.
- Developing and leveraging new insights into non-human biology across and between populations of microbes, insects, plants, marine life, and other non-human biologic entities.
- Developing new technologies and approaches that ensure biosafety, biosecurity, and protection of the bioeconomy.
- Understanding emerging threats to global food and water supplies and developing countermeasures that can be implemented on regional or global scales.
- Developing new technologies to treat, prevent, and predict the emergence and spread of infectious diseases that have the potential to cause significant health, economic, and social burden.
- Other biological technology topic areas that fit the scope of BTO’s mission.

How Much: ~$100K to $10M depending on interest and complexity

When: Abstract (white paper) before 21 Nov 2017 for this solicitation

Where: HR001117S0005 (released 21 Nov 2016)
<table>
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<tr>
<th><strong>Program Officer</strong></th>
<th><strong>Email</strong></th>
<th><strong>Year Start</strong></th>
<th><strong>Interests</strong></th>
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<tbody>
<tr>
<td>Dr. Lori Adornato</td>
<td></td>
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<td>interpretation of organismal behavior and development of bio-inspired materials, as well as platforms and systems for marine sensing applications</td>
</tr>
<tr>
<td>Dr. Blake Bextine</td>
<td><a href="mailto:blake.bextine@darpa.mil">blake.bextine@darpa.mil</a></td>
<td>2016</td>
<td>agricultural biotechnology and biosecurity, including nucleic acid-based anti-pathogen/anti-pest strategies, insect and plant transformation strategies for rapid trait selection, and innovative approaches for altering insect behaviors.</td>
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<tr>
<td>Dr. Al Emondi</td>
<td></td>
<td>2017</td>
<td>neurotechnology and exploring novel approaches in non-invasive or minimally invasive neural interfaces for cognitive human-machine interaction.</td>
</tr>
<tr>
<td>Dr. Justin Gallivan</td>
<td><a href="mailto:justin.gallivan@darpa.mil">justin.gallivan@darpa.mil</a></td>
<td>2014</td>
<td>synthetic biology, including engineering microbial communities to produce small molecules or to prevent disease, and reprogramming multicellular organisms to perform complex tasks.</td>
</tr>
<tr>
<td>LTC Matthew Hepburn</td>
<td><a href="mailto:matthew.hepburn@darpa.mil">matthew.hepburn@darpa.mil</a></td>
<td>2013</td>
<td>dynamic threats of emerging infectious diseases with potential impact on national security.</td>
</tr>
<tr>
<td>Dr. Tristan McClure-Begley</td>
<td></td>
<td>2017</td>
<td>novel chemical biology approaches to treating disease and injury, and developing methods to accelerate and protect learning and executive functions.</td>
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<td>Dr. Paul Sheehan</td>
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<td>2017</td>
<td>nanoscale methods for biological sensing that could be coupled with advanced engineering and electronics</td>
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<tr>
<td>Dr. Eric Van Gleson</td>
<td></td>
<td>2017</td>
<td>epigenetic and real-time monitoring approaches that can dynamically guide healthcare decisions and therapy, and new methods of increasing patient survival in austere environments using intelligent systems partnered with local care providers.</td>
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<tr>
<td>Dr. Renee Wegrzyn</td>
<td><a href="mailto:renee.wegrzyn@darpa.mil">renee.wegrzyn@darpa.mil</a></td>
<td>2016</td>
<td>synthetic biology to support biosecurity and outpace infectious disease.</td>
</tr>
</tbody>
</table>
DARPA Defense Science Office (DSO)
http://www.darpa.mil/Our_Work/DSO/

Focus Areas

**Fundamental Physical Sciences**
Leading edge experimental and/or theoretical research that explores scientific boundaries and advances our understanding of physics and chemistry to generate unique capabilities for national security.

**Mathematics, Modeling and Design**
Development and implementation of advanced mathematics and modeling tools for applications of interest to national security.

**Social Systems**
Novel methods, tools, and approaches to better understand social systems and dynamics in a national security context.

**Human Machine Systems**
Develop a fundamental understanding of human-technology system dynamics to analyze and assess a wide variety of critical systems – factories, defense systems, human innovation systems – by radically magnifying the capabilities of people to respond to increasingly complex problems.
DARPA
Defense Sciences Office (DSO)
Generic Solicitation

What:

General Topics:

• Physical Sciences
  leading edge experimental and/or theoretical research that explores
  scientific boundaries and advances our understanding of physics and
  chemistry to generate unique capabilities for national security.

• Mathematics, Modeling and Design
  the development and implementation of advanced mathematics and
  modeling tools for applications of interest to national security.

• Human Machine Systems
  Development of a fundamental understanding of human technology
  system dynamics to analyze and assess a wide variety of critical
  systems – factories, defense systems, human innovation systems – by
  radically magnifying the capabilities of people (individuals and groups)
  to respond to increasingly complex problems.

• Frontiers in Social Science

How Much:  from $100K to $10M depending on interest and complexity

When:  Executive Summary before 26 Apr 2018 for this solicitation

Where:  DARPA-BAA-HR001117S0040 (released 12 June 2017)
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<tr>
<td>Dr. Michael Fiddy</td>
<td><a href="mailto:michael.fiddy@darpa.mil">michael.fiddy@darpa.mil</a></td>
<td>2016</td>
<td>fundamental studies of wave-matter interactions from RF to visible light frequencies. Advancing scattering and inverse scattering methods for multiple scattering media leads to new imaging techniques and tools to synthesize 2-D and 3-D materials and structures, including those with sub-wavelength features. These research areas can also deepen our understanding of biological systems.</td>
</tr>
<tr>
<td>Dr. Anne Fisher</td>
<td></td>
<td>2017</td>
<td>Creative applications of chemical approaches, methods, and tools to advance a wide range of technologies</td>
</tr>
<tr>
<td>Dr. Jim Gimlett</td>
<td><a href="mailto:james.gimlett@darpa.mil">james.gimlett@darpa.mil</a></td>
<td>2013</td>
<td>novel metrology for positioning, navigation and timing leveraging advances in quantum optics, nanoscale microelectromechanical systems, and atomic and nuclear physics, and new monitoring, modeling and modulation methodologies applied to immunology.</td>
</tr>
<tr>
<td>Maj C. David Lewis</td>
<td></td>
<td>2018</td>
<td>fundamental physics in unique ways to DoD challenges using the disciplines of quantum mechanics, space and plasmas, and gravitational physics</td>
</tr>
<tr>
<td>Dr. Rosa Alejandra Lukaszew</td>
<td></td>
<td>2017</td>
<td>understanding and developing new materials, structures, and devices incorporating strongly correlated electrons—particularly exploiting topological correlations to create pathways to a new paradigm of electronics for applications in memory, logic, energy conversion devices, and sensors</td>
</tr>
<tr>
<td>Program Officer</td>
<td>Email</td>
<td>Year start</td>
<td>Interests</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------------------------------------</td>
<td>------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Dr. Rosa Alejandra Lukaszew</td>
<td></td>
<td>2017</td>
<td>understanding and developing new materials, structures, and devices incorporating strongly correlated electrons—particularly exploiting topological correlations to create pathways to a new paradigm of electronics for applications in memory, logic, energy conversion devices, and sensors</td>
</tr>
<tr>
<td>Dr. John Main</td>
<td><a href="mailto:john.main@darpa.mil">john.main@darpa.mil</a></td>
<td>2015</td>
<td>General approach is to focus on tools. Tools can be virtually anything – mechanical test machines, processing systems, visualization systems, software, whatever you need to get the job done.</td>
</tr>
<tr>
<td>Dr. Predrag Milojkovic</td>
<td><a href="mailto:predrag.milojkovic@darpa.mil">predrag.milojkovic@darpa.mil</a></td>
<td>2014</td>
<td>advanced imaging concepts/devices, computational imaging, novel optical materials, imaging through scattering media; non-line-of-sight imaging.</td>
</tr>
<tr>
<td>Dr. John Paschkewitz</td>
<td><a href="mailto:john.paschkewitz@darpa.mil">john.paschkewitz@darpa.mil</a></td>
<td>2015</td>
<td>new paradigms and approaches for the interactive design of complex physical systems and system-of-systems (SoS) architectures.</td>
</tr>
<tr>
<td>Dr. Adam Russell</td>
<td><a href="mailto:adam.russell@darpa.mil">adam.russell@darpa.mil</a></td>
<td>2015</td>
<td>new experimental platforms and tools to facilitate discovery, quantification, and &quot;big validation&quot; of fundamental measures in social science, behavioral science, and human performance</td>
</tr>
<tr>
<td>Dr. Vincent Tang</td>
<td><a href="mailto:vincent.tang@darpa.mil">vincent.tang@darpa.mil</a></td>
<td>2013</td>
<td>development of new technologies for countering nuclear terrorism and other national security applications</td>
</tr>
<tr>
<td>Dr. Jan Vandenbrande</td>
<td><a href="mailto:jan.vandenbrande@darpa.mil">jan.vandenbrande@darpa.mil</a></td>
<td>2015</td>
<td>math and computational tools to radically improve the design of mechanical products.</td>
</tr>
<tr>
<td>Dr. Mark Wrobel</td>
<td></td>
<td>2017</td>
<td>development of new capabilities for detecting and interdicting nuclear and radiological terrorism, as well as technologies supporting the homeland security mission.</td>
</tr>
</tbody>
</table>
## DSO Example Program: Bio-inspired Optics Program Summary

<table>
<thead>
<tr>
<th>Technology</th>
<th>Performer</th>
<th>Platform</th>
<th>Impact</th>
<th>Bio-inspiration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compact 30X Zoom</td>
<td>Rockwell MIT, UCSD, AeroVironment</td>
<td>Pointer UAV</td>
<td>Performance</td>
<td>Crystalline Lenses</td>
</tr>
<tr>
<td>Fluidic Lens</td>
<td></td>
<td>Vis, NIR, MWIR</td>
<td>Enhanced Imaging - Dynamic 30X Zoom</td>
<td></td>
</tr>
<tr>
<td>Dynamic GRIN Lens</td>
<td>Case Western NRL</td>
<td>Dragoneye UAV</td>
<td>Performance</td>
<td>Octopus Lens</td>
</tr>
<tr>
<td>Solid state GRIN</td>
<td></td>
<td>Vis, NIR, SWIR</td>
<td>Enhanced Imaging - Variable FOV</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Reduced Weight</td>
<td></td>
</tr>
<tr>
<td>Foveated Imaging</td>
<td>U of Central Fl, Sandia, AFRL, BNS/Narrascape</td>
<td>Helo Platform</td>
<td>Performance</td>
<td>Retina (Fovea)</td>
</tr>
<tr>
<td>FPA, Rays</td>
<td></td>
<td>Vis</td>
<td>Enhanced Imaging - Track multiple images</td>
<td></td>
</tr>
<tr>
<td>Pixelated, LC SLM</td>
<td></td>
<td></td>
<td>- Image Compression</td>
<td></td>
</tr>
<tr>
<td>Multi λ/FOV system</td>
<td>U of Florida ITC, Raytheon</td>
<td>MRM</td>
<td>Performance</td>
<td>Brittlestar</td>
</tr>
<tr>
<td>Photon Sieve</td>
<td></td>
<td>NIR, LWIR</td>
<td>Significant reduction in weight and complexity</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2-color system</td>
<td></td>
</tr>
</tbody>
</table>

**Note focus on technology and impact – even in “science” program**

*Leonard J. Buckley, DSO*
The Information Innovation Office (I2O) develops game-changing information science and technology to ensure information advantage for the U.S. and its allies. To accomplish this, I2O sponsors basic and applied research in three thrust areas:

**Cyber.** The I2O defensive cyber R&D portfolio is focused on high-end cyber threats, including advanced persistent threats (cyber espionage and cyber sabotage) and other sophisticated threats to embedded computing systems, cyber-physical systems, enterprise information systems, and national critical infrastructure. I2O develops technologies that create software that is provably secure, applications that enhance cyberspace situational awareness, and systems for planning military operations in the cyber domain. Exploration of offensive methods is undertaken to inform the defensive cyber R&D and to establish viability of developed techniques with transition partners.

**Analytics.** I2O explores fundamental mathematical and computational issues such as complexity and scalability and develops applications in high-impact areas such as intelligence, software engineering, and command and control. I2O coordinates its R&D with the national security community to ensure timely transition of tools and techniques.

**Symbiosis.** The symbiosis portfolio develops technologies to enable machines to understand speech and extract information contained in diverse media, to learn, reason and apply knowledge gained through experience, and to respond intelligently to new and unforeseen events. Application areas in which machines will prove invaluable as partners include cyberspace operations, where highly-scripted, distributed cyber attacks have a speed, complexity, and scale that overwhelms human cyber defenders, intelligence analysis, to which machines can bring super-human objectivity, and command and control, where workloads, timelines and stress can exhaust human operators.
What:
I2O explores game-changing technologies in the fields of information science and software to anticipate and create rapid shifts in the complex national security landscape. Conflict can occur in traditional domains such as land, sea, air, and space, and in emerging domains such as cyber and other types of irregular warfare. I2O’s research portfolio is focused on anticipating new modes of warfare in these emerging areas and developing the concepts and tools necessary to provide decisive advantage for the U.S. and its allies. Topics of interest include:

• Symbiosis. I2O’s symbiosis portfolio develops technologies to enable machines to understand speech and extract information contained in diverse media, to learn, reason and apply knowledge gained through experience, and to respond intelligently to new and unforeseen events. Symbiosis application areas include cyberspace operations, where highly-scripted, distributed cyber attacks have a speed, complexity, and scale that overwhelms human cyber defenders, intelligence analysis, to which machines can bring objectivity, and command and control, where workloads, timelines and stress can exhaust human operators.

• Analytics. I2O analytics research and development (R&D) explores fundamental mathematical and computational issues such as complexity and scalability and develops applications in high-impact areas such as intelligence, software engineering, and command and control. I2O coordinates its R&D with the national security community to ensure timely transition of tools and techniques.

• Cyber. The I2O defensive cyber R&D portfolio focuses on high-end cyber threats, including advanced persistent threats (cyber espionage and cyber sabotage) and other sophisticated threats to embedded computing systems, cyber-physical systems, enterprise information systems, and critical national infrastructure. I2O explores offensive methods to inform its defensive cyber R&D and to establish viability of developed techniques with transition partners.

How Much: from $100K to $10M depending on interest and complexity

When: until 31 Aug 2018 for the current solicitation

Where: HR001117S0048 (released 1 Sep 2017)
<table>
<thead>
<tr>
<th>Program Officer</th>
<th>Email</th>
<th>Year start</th>
<th>Interests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Joshua Baron</td>
<td></td>
<td>2017</td>
<td>cryptography, privacy, and anonymity.</td>
</tr>
<tr>
<td>Dr. Sergey Bratus</td>
<td></td>
<td>2018</td>
<td>computer security and intrusion analysis.</td>
</tr>
<tr>
<td>Mr. Ian Crone</td>
<td></td>
<td>2017</td>
<td>develop, execute, and transition programs in cybersecurity and cyberspace operations.</td>
</tr>
<tr>
<td>Dr. David Doermann</td>
<td><a href="mailto:david.doermann@darpa.mil">david.doermann@darpa.mil</a></td>
<td>2014</td>
<td>language and media processing and exploitation, vision and mobile technologies. He comes to DARPA with a vision of increasing capabilities through joint vision/language interaction for triage and forensics applications.</td>
</tr>
<tr>
<td>Dr. Joshua Elliot</td>
<td></td>
<td>2017</td>
<td>modeling and prediction of complex natural and socio-economic systems; how computational technologies can be leveraged to improve all aspects of science and modeling from data discovery to analysis.</td>
</tr>
<tr>
<td>Mr. Dustin Fraze</td>
<td></td>
<td>2017</td>
<td>cyberspace operations automation</td>
</tr>
<tr>
<td>Dr. David Gunning</td>
<td></td>
<td>2015</td>
<td>artificial intelligence (AI) and human-computer symbiosis.</td>
</tr>
<tr>
<td>Mr. Logan Harr</td>
<td></td>
<td>2017</td>
<td>cyberspace operations</td>
</tr>
<tr>
<td>Mr. Steve Jameson</td>
<td><a href="mailto:stephen.jameson@darpa.mil">stephen.jameson@darpa.mil</a></td>
<td>2014</td>
<td>sensor and data fusion, as well as unmanned system autonomy.</td>
</tr>
<tr>
<td>Dr. Angelos Keromytis</td>
<td><a href="mailto:angelos.keromytis@darpa.mil">angelos.keromytis@darpa.mil</a></td>
<td>2014</td>
<td>computer systems, network security and cryptography.</td>
</tr>
<tr>
<td>Dr. Sandeep Neema</td>
<td></td>
<td>2016</td>
<td>cyber physical systems, model-based design methodologies, distributed real-time systems, and mobile software technologies.</td>
</tr>
<tr>
<td>Program Officer</td>
<td>Email</td>
<td>Year start</td>
<td>Interests</td>
</tr>
<tr>
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<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Dr. Boyan Onyshkevych</td>
<td><a href="mailto:boyan.onyshkevych@darpa.mil">boyan.onyshkevych@darpa.mil</a></td>
<td>2013</td>
<td>human language technologies and knowledge-based systems applied to the areas of information extraction, language understanding and semantic computing</td>
</tr>
<tr>
<td>Dr. Jonathan Pfautz</td>
<td><a href="mailto:jonathan.pfautz@darpa.mil">jonathan.pfautz@darpa.mil</a></td>
<td>2015</td>
<td>intersection of the computational and behavioral/social sciences.</td>
</tr>
<tr>
<td>Mr. Frank Pound</td>
<td><a href="mailto:frank.pound@darpa.mil">frank.pound@darpa.mil</a></td>
<td>2014</td>
<td>cyber operations and providing a useful interface to the “living Internet of things” such that it can be more easily measured and understood.</td>
</tr>
<tr>
<td>Dr. Raymond Richards</td>
<td></td>
<td>2016</td>
<td>high assurance software and systems</td>
</tr>
<tr>
<td>Dr. Jennifer Roberts</td>
<td><a href="mailto:jennifer.roberts@darpa.mil">jennifer.roberts@darpa.mil</a></td>
<td>2015</td>
<td>scalable analytics and machine learning algorithms that yield insights to human users. Applications of interest include cyber, genetics and human cognition</td>
</tr>
<tr>
<td>Dr. Carey Schwartz</td>
<td><a href="mailto:carey.schwartz@darpa.mil">carey.schwartz@darpa.mil</a></td>
<td>2014</td>
<td>analytic methods for distinguishing causality from correlation, data to decisions and quantum information sciences</td>
</tr>
<tr>
<td>Mr. Wade Shen</td>
<td><a href="mailto:wade.shen@darpa.mil">wade.shen@darpa.mil</a></td>
<td>2014</td>
<td>machine learning, machine translation, speech recognition and data analytics for improved human/computer interaction</td>
</tr>
<tr>
<td>Dr. Jonathan Smith</td>
<td></td>
<td>2017</td>
<td>cybersecurity, networking, and distributed computing</td>
</tr>
<tr>
<td>Mr. Jacob Torry</td>
<td></td>
<td>2017</td>
<td>securing complex systems that are composed of cyber, physical, and human processes and components.</td>
</tr>
<tr>
<td>Mr. Walter Weiss</td>
<td></td>
<td>2017</td>
<td>cybersecurity operations</td>
</tr>
</tbody>
</table>
Electromagnetic Spectrum
The electromagnetic spectrum is the heart of current and future warfare, but it remains highly contested and congested. The future of info-centric warfare will require electromagnetic access for collecting and distributing information.

Decentralization
The ability to update underlying capabilities in large and massively complex systems inexpensively and quickly is crucial to avoid outdated and inferior electronics. The increasing complexity of our major military systems precludes rapid change so it is essential that we move towards a new model that allows for quick adoption of new and modern electronics.

Information Microsystems
The need to process significantly more and complex data than ever before continues to increase even as the end of Moore’s Law quickly approaches (or is already here). Our computing systems must have the capabilities to handle this ever increasing demand in new ways, exploring new architectures, algorithms/signal processing, and hardware.

Globalization
As our world becomes more globalized, fabrication must be on a grounded component base that we trust and believe will work when we need it. As the manufacturing of components abroad increases, we must embrace the global capabilities that will lead to affordable systems, while maintaining trust.
DARPA
Microsystems Technology Office
Generic (office-wide) Solicitation

What:
The Microsystems Technology Office (MTO) supports DARPA’s mission of maintaining technological superiority and preventing technological surprise by investing in areas such as microelectromechanical systems (MEMS), electronics, system architecture, photonics, and biotechnology. Research areas of current interest in MTO include, but are not limited to, the following topics:
- Advanced Imaging Architectures and Systems
- Chip Scale Sensors
- Electro-Optical Infrared (EO/IR) Technologies
- Emerging MEMS Technologies
- Enabling component technology for cold-atom microsystems
- Energy-Efficient Computing
- Hardware Assurance, Reliability & Validation
- Hardware for Advanced Signal Processing
- Heterogeneous Integration
- Low Power Electronics
- Low Volume Microsystems Manufacturing
- Microsystem Design & CAD
- Microsystems for Directed Energy
- Microsystems for Precision Navigation & Timing
- Microsystems for RF/Optical Transceivers
- Non-Silicon Electronics
- Novel Photonic Devices
- Photonic & Electronic Interconnects
- Processing Techniques for Imaging and Spectral Recognition
- Quantum Devices
- Signal Processing to Reduce Hardware Requirements
- Thermal Management
- Other Microsystems Technology Topic Areas

How Much: From $100K to $10M depending in interest and complexity
When: up to 9 Sep 2016 for present solicitation
Where: HR0011-16-S-0001 (released Sep 2016)
<table>
<thead>
<tr>
<th>Program Officer</th>
<th>Email</th>
<th>Year start</th>
<th>Interests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. Kerry Bernstein</td>
<td><a href="mailto:kerry.bernstein@darpa.mil">kerry.bernstein@darpa.mil</a></td>
<td>2012</td>
<td>hardware based cyber security capabilities, anti-counterfeit, anti-tamper and supply chain risk management</td>
</tr>
<tr>
<td>Dr. John Burke</td>
<td></td>
<td>2017</td>
<td>high-stability, low-noise sensors and frequency synthesis to enable new positioning, navigation, and timing (PNT) and remote detection capabilities.</td>
</tr>
<tr>
<td>Dr. Daniel Green</td>
<td><a href="mailto:daniel.green@darpa.mil">daniel.green@darpa.mil</a></td>
<td>2013</td>
<td>advanced materials, devices and technology integration for electronic systems.</td>
</tr>
<tr>
<td>Dr. Young-Kai Chen</td>
<td></td>
<td>2017</td>
<td>semiconductor optoelectronic materials, devices, integrated circuits, and advanced system applications for smart sensors, secure broadband wireless, and photonic links.</td>
</tr>
<tr>
<td>Dr. Timothy Hancock</td>
<td></td>
<td>2016</td>
<td>RF microsystem development that spans semiconductor device processing, circuit design and system integration for communication, radar, and electromagnetic spectrum- sensing applications</td>
</tr>
<tr>
<td>Dr. Gordon Keeler</td>
<td></td>
<td>2016</td>
<td>RF microsystem development that spans semiconductor device processing, circuit design and system integration for communication, radar, and electromagnetic spectrum- sensing applications</td>
</tr>
<tr>
<td>Dr. Joseph Mangano</td>
<td><a href="mailto:joseph.mangano@darpa.mil">joseph.mangano@darpa.mil</a></td>
<td></td>
<td>reducing technical barriers in the major lithography technologies, including exposure sources and areas relevant to more than one technology option.</td>
</tr>
<tr>
<td>Dr. Whitney Mason</td>
<td></td>
<td>2017</td>
<td>imaging sensors that provide multi-function capability</td>
</tr>
<tr>
<td>Mr. Andreas Olofsson</td>
<td></td>
<td>2017</td>
<td>intelligent design automation, system optimization, and open hardware.</td>
</tr>
<tr>
<td>Program Officer</td>
<td>Email</td>
<td>Year start</td>
<td>Interests</td>
</tr>
<tr>
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<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Dr. Roy (Troy) Olsson</td>
<td><a href="mailto:roy.olsson@darpa.mil">roy.olsson@darpa.mil</a></td>
<td>2014</td>
<td>materials, devices and architectures that enable low power processing of wireless and sensor signals, adaptive radio frequency (RF) systems, and phased array antennas.</td>
</tr>
<tr>
<td>Dr. Ken Plaks</td>
<td><a href="mailto:kenneth.plaks@darpa.mil">kenneth.plaks@darpa.mil</a></td>
<td>2015</td>
<td>stealth aircraft, electronic warfare, weapons research and cybersecurity.</td>
</tr>
<tr>
<td>Dr. Ronald Polchwich</td>
<td></td>
<td>2017</td>
<td>advanced materials processing, micromechanics for small-scale robotics, device designs, and miniaturized position, navigation, and timing (PNT) systems.</td>
</tr>
<tr>
<td>Dr. Tom Rondeau</td>
<td></td>
<td>2016</td>
<td>adaptive and reconfigurable radios, improving the development cycle for new signal-processing techniques, and creating general purpose electromagnetic systems.</td>
</tr>
<tr>
<td>Dr. Linton Salmon</td>
<td><a href="mailto:linton.salman@darpa.mil">linton.salman@darpa.mil</a></td>
<td>2014</td>
<td>semiconductor process and design technology and its application to defense systems.</td>
</tr>
<tr>
<td>Dr. Hava Siegelmann</td>
<td></td>
<td>2016</td>
<td>advance intelligence in computerized devices, focusing on life-long learning, context-aware adaptivity, and user-centered applications</td>
</tr>
<tr>
<td>Mr. Paul Tilghman</td>
<td><a href="mailto:paul.tilghman@darpa.mil">paul.tilghman@darpa.mil</a></td>
<td>2015</td>
<td>intelligent and adaptive RF systems, digital signal processing, machine learning, wireless communications and electronic warfare</td>
</tr>
</tbody>
</table>
Semiconductor Technology Advanced Research Network (STARNet)

What: Combines industry know-how and funding with DOD interests and funding to support University research projects of mutual interest

Six Virtual Centers:

- Function Accelerated nanoMaterial Engineering Center
  Jane Chang, UCLA
- Ctr for Spintronic Materials, Interfaces and Architecture
  J-P Wang, Univ Minn
- Systems on Nanoscale Information fabriCs
  Naresh Shanbhag, UIUC
- Center for Low Energy Systems Technology
  Alan Seabaugh, Notre Dame
- Center for Future Architectures Research
  Todd Austin, Univ Michigan
- TerraSwarm Research Center
  Edward Lee, UC Berkeley

Recomputed every three years - DARPA funding zero in FY18 PBR

Industry/Government shared funding ~60/40

Dr. Linton Salmon DARPA Program Manager for STARNet

http://www.darpa.mil/program/starnet

How Much: Funding targeted at about $8M/yr per Virtual Center

When:

Where: https://www.src.org/program/starnet/
What: the Joint University Microelectronics Program, or JUMP, which will support long-term research focused on high performance, energy efficient microelectronics for end-to-end sensing and actuation, signal and information processing, communication, computing, and storage solutions that are cost-effective and secure.

The Consortium (industrial partners and DARPA) seeks to address existing and emerging challenges in electronics and systems technologies by concentrating resources on high-risk, high-payoff, long-range innovative research to accelerate the productivity growth and performance enhancement of electronic technologies and circuits, sub-systems, and multi-scale systems. To this end, JUMP is focused on exploratory research on an 8-12 year time horizon that is anticipated to lead to defense and commercial opportunities in the 2025-2030 timeframe.

How Much: Total JUMP funding for the five-year period will be in excess of $150M

When: White papers 6 Mar 2017 for current solicitation

Where: https://www.src.org/compete/s201617/
DARPA Strategic Technology Office (STO)
http://www.darpa.mil/Our_Work/STO/
DARPA HR001117S0030 (released Apr 26 2017)

Battlespace Management, Command and Control (BMC2): The BMC2 of such networks poses complex algorithmic and software challenges, particularly with intermittent connectivity, limited data rates, and robustness against network disruption from electronic and physical attack. Of particular interest are BMC2 technologies and systems for mixtures of manned and unmanned systems.

Communications and Networks: System concepts and enabling technologies that will provide assured high-bandwidth mobile wireless capabilities, with or without access to infrastructure. The goal is to deliver relevant and timely information to the warfighter anytime and anywhere, providing effective communications to U.S. forces while denying the same capabilities to our adversaries.

Intelligence, Surveillance, and Reconnaissance (ISR): Innovative methods for finding difficult targets in contested environments that could include combining existing or new sensor modalities, novel in-sensor Automatic Target Recognition (ATR) techniques, new algorithms, and new system concepts and processing techniques. DARPA is also interested in new approaches for the design of low-cost, adaptable sensors that leverage commercial technologies and processes to reduce development time and cost, and increase adaptability and technology refresh rate of sensor systems.

Electronic Warfare (EW): System approaches for active and passive EW techniques in order to counter these advanced networked and agile systems using technologies such as distributed systems, coherent systems, disposable systems providing asymmetric capabilities, and close-in remote sensing coupled with advanced jamming and spoofing.

Positioning, Navigation and Timing (PNT): New technology and systems solutions to provide accurate and precise PNT, independent of GPS. Systems that provide long duration precision and accuracy in positioning and timing for global synchronization, secure communications, and cooperative effects. Technologies of interest include architectures for ad hoc PNT networks of disparate nodes; sensors and signal processing to enable PNT in adverse environments; and new architectures that enable other domains such as communications, EW, and ISR systems to inherently support PNT systems.

Maritime: System-of-systems methodologies to help maintain and enhance U.S. maritime superiority using distributed and disaggregated systems as force multipliers for scarce capital assets. This includes simulation tools to assess feasibility and conduct system trades in a mission context. Feasibility and affordability of these systems requires efficient and survivable delivery for off-board assets – network elements, sensors and effects packages - and novel delivery approaches.

Foundational Strategic Technologies and Systems: Innovative ideas for systems incorporating disruptive technologies that offer significant potential capability improvement across multiple Strategic Technology Office focus areas. These could include technologies that would enable dramatic reduction in size, weight, power, or cost of systems, technologies that allow for adaptability and/or rapid refresh, technologies that offer the potential for significant advances in system-level performance, and approaches to demonstrating the military utility of these systems and technologies.
TTO’s objective is to provide or prevent strategic and tactical surprise with very high-payoff, high-risk development of revolutionary new platforms, weapons, critical technologies and systems, approaches addressing affordability, as well as rapid agile development. This is accomplished through:

- A focus on global capabilities with precision and endurance applicable to all combat environments
- Development and demonstration of system level technologies and capabilities that outpace adversary capabilities and force structures
- Advanced autonomy for ground, maritime, air and space systems performing tasks in an integrated and collaborative fashion across various mission domains. This includes model-based approaches to autonomy, swarming, counter-swarm, multi-platform coordination, and multi-modal human-machine interaction optimized for human physiology
- Improved unmanned platform efficiencies and performance within the respective operating environments, enhanced endurance, reliability management, health monitoring, damage detection, adaptation, and reconfiguration as well as approaches that allow for system and/or task performance analysis, testing, and evaluation of advanced concepts

TTO investments are structured across the following focus areas, encompassing multiple mission domains and cross-cutting enabling capabilities:

- GROUND SYSTEMS
- MARITIME SYSTEMS
- AIR SYSTEMS
- SPACE SYSTEMS
Defense Threat Reduction Agency (DTRA) and USSTRATCOM Center for Combating WMD (SCC-WMD) www.dtra.mil

DTRA Mission – CWMD

DTRA safeguards the United States and its Allies from global WMD threats by integrating, synchronizing and providing expertise, technologies, and capabilities across all operating environments

- Nuclear Weapons
- High-Yield Explosives
- Chemical Weapons
- Biological Weapons
- Radiological Devices

FY18

6.1 $ 37M
6.2 158M
6.3 268M

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DTRA Organization Chart

Acting Director

Deputy Director
- J1 Human Resources Directorate
- J3/7 Operations, Exercises, & Readiness

Executive Director
- J4/8 Acquisition, Finance & Logistics
- J2/5 Intelligence/Plans, and Resource Integration

Director, JIDO
- J8 Information Operations
- J10 Nuclear Enterprise Support

DTRA S&T
- Chief Scientist and Innovation
- Chemical Biological Technologies
- Counter WMD Technologies
- Nuclear Technologies
- Data Integration and Analysis
- Test Science & Technology

University Engagement Website:
DTRA Fundamental Research Program
HDTRA1-14-24-FRCWMD BAA

What:
Fundamental research means basic and applied research in science and engineering, Fundamental research may be defined within the first four (4) TRLs.

This announcement solicits ideas and topic-based pre-application white papers for long-term challenges that offer a significant contribution: to the current body of knowledge, to the understanding of phenomena and observable facts, to significantly advance revolutionary technology, to new concepts for technology application, or that may have impact on future C-WMD threat reduction, expertise, or capabilities.

Submissions for this BAA may occur in two ways: 1) in response to the published topics detailed in the solicitation or 2) to a general thrust area.

- Thrust Area 1: Science of WMD Sensing and Recognition
- Thrust Area 2: Network Sciences
- Thrust Area 3: Science for Protection
- Thrust Area 4: Science to Defeat WMD
- Thrust Area 5: Science to Secure WMD
- Thrust Area 6: Cooperative Counter WMD Research with Global Partners
- Thrust Area 7: Fundamental Science for Chemical and Biological Defense

How Much: grants may range from $25K to $1M/yr (total, including both direct and indirect costs)

When: Open continuously until 2024

Where: HDTRA1-14-24-FRCWMD BAA
DTRA
Science and Technology New Initiatives

What: This BAA seeks proposals for DTRA J9 requirements to advance innovative technologies that may lead to future materiel solutions to fill identified capability needs or solve hard operational problems. The goals focus our efforts on how we will adapt to the evolving trends and future security threats, and support the warfighter in engaging current WMD threats. Projects funded under this BAA will be analytic investigations, capability developments and/or experiments at Technology Readiness Levels (TRL) 2 through 6.

Specific capabilities sought in this BAA are in the Technology Areas (TA) of:
- Chemical/Biological
- Counter-WMD
- Radiation/Nuclear
- Reach-back and Decision Support
- Treaty Verification/Compliance
- Technology Forecasting

Each proposal must be submitted to one of these TAs or to an available topic. Offerors should note that on a limited basis, topics that align to the TAs may be published via Addendums to the BAA. Topics are likely to have formal proposal deadlines and be available for a limited time.

This BAA will be conducted via a single phase: formal proposal submission. Offerors may choose to pre-coordinate a white paper and quad chart. Pre-coordination, while strongly encouraged, is not mandatory.

When: BAA open from Nov 2016 to Nov 2021 with periodic amendments which may have submission deadlines

Where: HDTRA1-17-S-0002
Non-proliferation sciences primarily associated with "Secure WMD" thrust area – no investment to date
Thrust Area 1: Science of WMD Sensing and Recognition - Dr. David Peterson, david.peterson@dtra.mil
Advances fundamental understanding of materials that demonstrate measurable changes when stimulated by radiation or particles from WMD in the environment. Explore and exploit interactions between materials and various photons, molecules, nuclear radiation and/or particles. Also explores and exploits signatures of these interactions with materials, including those signatures which are actively stimulated. These interactions and the specific form of recognition they provide are used for subsequent generation of information that provides knowledge of the presence, identity, and/or quantity of material or energy in the environment.

Thrust Area 2: Network Sciences - Dr. Paul Tandy, Paul.Tandy@DTRA.MIL
The fundamental science of cognitive, information and network science results from the convergence of computer, information, mathematical, network, cognitive and social science. This research thrust expands our understanding of physical and social networks and advances knowledge of adversarial intent with respect to the acquisition, proliferation, and potential use of WMD. The methods may include analytical, computational or numerical, or experimental means to integrate knowledge across disciplines and improve rapid processing of intelligence and dissemination of information.

Thrust Area 3: Science for Protection - Dr. James Reed, james.reed@dtra.mil
Advances knowledge in physical, biological, and engineering sciences to protect life and life-sustaining resources and systems. Protection includes both passive and active defense. Approaches include hardening of infrastructure and facilities; protection of personnel, including physical defenses as well as advanced biological and chemical countermeasures or filtering; fundamental research to improve understanding defenses to non-traditional agents and threats; novel and significant active defense against WMD, including science to support innovative robotics; detecting, identifying and characterizing the origin and spread of agents or threats; methods to measure and assess the effects of WMD; new approaches to understand uncertainty and reduce risk; new principles for decon of personnel or equipment/facilities, and other mitigation or restoration; and, shielding of systems or networks.

Thrust Area 4: Science to Defeat WMD - Dr. D. Allan Dalton, douglas.dalton@dtra.mil
Improves energetic materials for use against WMD facilities and systems, for deeper penetration to deny the adversary sanctuary, for predictable modeling of counter-WMD munitions and simulation of in-theater scenarios with accurate lethality calculations, for minimizing collateral effects and for exploiting vulnerable pathways, infrastructure etc. to eliminate the threat of WMD.

Thrust Area 5: Science to Secure WMDs - Dr. Calvin Shipbaugh, calvin.shipbaugh@dtra.mil
Identification of phenomena that enable significant advancements in support of arms control; environmentally responsible innovative processes to neutralize or dispose of CBRNE; discovery of revolutionary means to secure components, materials, and weapons, including more robust nuclear security practices; enhance monitoring, compliance and verification technologies in support of existing and new treaties; exploration of principles to improve nuclear test detection and analysis; forensics; and, studies of scientific principles that lead to novel physical methods to disrupt WMD proliferation pathways.
Thrust Area 1 (TA1): Science of WMD Sensing and Recognition  Dave Peterson
Generation of information that provides knowledge of the presence, identity, and/or quantity of material or energy in the environment that may be significant.
TA1 topics reviewed: Point Detection, Nuclear Forensics, and Standoff Detection.

Thrust Area 2 (TA2): Network Sciences  Paul Tandy
Convergence of computer, information, mathematical, natural, and social science, including social networks and prediction of adversarial intent to employ WMD.
TA2 topics reviewed: Computational Sciences, Situation Awareness for Effective C-WMD Strategies, Preserving Performance in a WMD Environment, Network Theory for Understanding Robustness, and Physical Networks.

Thrust Area 3 (TA3): Science for Protection  Heather Meeks / Jacob Calkins
Knowledge to protect life and life-sustaining resources including threat containment, decontamination, threat filtering, and shielding of systems.

Thrust Area 4 (TA4): Science to Defeat WMD  Allen Dalton
Phenomena that improves success of defeat actions (use of weapons) including explosives, accessing target WMDs such as bio agents and weapon modeling.

Thrust Area 5 (TA5): Science to Secure WMD  Calvin Shipbaugh
Environmentally responsible processes to secure, neutralize and control WMD and disrupt proliferation pathways.
TA5 topics reviewed: Nano-scale Radiation Indicators, Novel Materials for Unattended Sensing, Nuclear Test Verification and Monitoring, and Ultra-low Level Detection of Nuclear Materials.
VISION
Forward-looking fundamental research program targeting strategic, mission-focused, basic research with high potential impact for the US Chemical and Biological Defense Program.

Revolutionary approaches to technological surprise
PUSH

Knowledge that supports existing needs
PULL

New science solutions with a unique approach
PULL & PUSH

BUILDING THE FOUNDATION FOR TOMORROW'S CBDP
### Chemical and Biological Technologies Department from the 2013 DTRA Basic Science Review

<table>
<thead>
<tr>
<th>Topic</th>
<th>Program Manager</th>
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</thead>
<tbody>
<tr>
<td><strong>Area Overview: Interfacial Dynamics and Reactivity</strong></td>
<td>Brian Pate</td>
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<tr>
<td>Interfacial Dynamics</td>
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<td>Catalytic Motors</td>
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<td>Threat Characterization and Chemical Medical Basic Research</td>
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<td><strong>Area Overview: Design of Molecular Interactions</strong></td>
<td>Ilya Elshvili</td>
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<td>Designer Binding</td>
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<td>Bio-Nano Interfaces &amp; Catalysis</td>
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<tr>
<td><strong>Area Overview: Protective Materials Basic Science</strong></td>
<td>Tracee (Harris) Whitfield</td>
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<td>Stimuli Responsive Polymeric Materials</td>
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<tr>
<td><strong>Area Overview: Detection &amp; Diagnostics Basic Research</strong></td>
<td>Tony Esposito</td>
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<tr>
<td>Microfluidic and Spectroscopic Sensing</td>
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<tr>
<td>Materials for Sensing</td>
<td>Kiki Ikossi</td>
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<tr>
<td><strong>Area Overview: Translational Medical Basic Research</strong></td>
<td>Amanda Horstman-Smith</td>
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<tr>
<td>Microbial Molecular Adaption</td>
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<tr>
<td>Host Pathogen Interactions</td>
<td>Dan Wolfe</td>
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</tbody>
</table>
High Energy Laser Multidisciplinary Research Initiative (HEL-MRI)

What: Supports fundamental scientific knowledge to support future DOD High Energy Laser systems. The primary focus of the FY2014 HEL MRI is to enhance the capabilities of US institutions of higher education to perform fundamental science and engineering research related to lasers, optics, laser interaction physics, and relevant advanced concepts. HEL Joint Program Office (i.e. multi-service), but AF budget line

Maximum dollar award per 12 month technical task order in each topic:
1. Free Electron Lasers NTE $700K/year (total of 2 years)
2. Advanced Concepts NTE $500K/1st year
   NTE $1M/2nd year (total of 2 years)
3. Solid State Lasers NTE $600K/year (Total of 4 years)
4. Beam Control Agile, Low Jitter, Small Aperture BD Components NTE $2M/year (total of 2 years)
   Lab Demo of Moderately Deep Turbulences NTE $1.5M/year (total of 3 years)
   Short-Wave IR Camera NTE $1.0M/year (total of 4 years)
5. Battle Damage Assessment Studies for Direct NTE $500K/year (total 2 years) Energy Counter-ISR

How Much: See above

When: White papers due date 3 Feb 2014 for FY14 BAA

Where: see HEL-JTO BAA RVKD-2014-0002 for FY2014
What:
High Performance Computing Centers
   http://centers.hpc.mil/
Networking – Defense Res and Engn Network (DREN)
Access available to OXR/DARPA grantees
   http://centers.hpc.mil/users/index.html

How:   Need DOD Program Officer to request the access
Need to satisfy security/screening requirements
   (sensitivity to foreign national access)
The goal of the Minerva Initiative is to improve DoD's basic understanding of the social, cultural, behavioral, and political forces that shape regions of the world of strategic importance to the U.S. The research program will:

- Leverage and focus the resources of the Nation's top universities, analogous to the Cold War development of Kremlinology and game theory.
- Seek to define and develop foundational knowledge about sources of present and future conflict with an eye toward better understanding of the political trajectories of key regions of the world.
- Improve the ability of DoD to develop cutting-edge social science research, foreign area and interdisciplinary studies, that is developed and vetted by the best scholars in these fields.

The Minerva Initiative brings together universities, research institutions, and individual scholars and supports interdisciplinary and cross-institutional projects addressing specific topic areas determined by the Secretary of Defense.

**What:** In FY17, solicited research topics are:
A. Sociality, Security, and Interconnectivity
B. Understanding the Social Impact of Autonomy
C. Societal Resilience and Sociopolitical (In)stability
D. Power and Deterrence for Shaping Operations
E. Military Cyber Defense

**When:**
- White Papers: 21 Mar 2017
- Full Proposals: 21 Jun 2017

**How Much:** $150K - 1M/yr for individual awards, avg $0.4M/yr for 3-5 year

**Where:** WHS-AD-FOA-17-01

**FY18**
- 6.1 $9.5M
University Research Initiative (URI)

OSD program, but the budget lines are included in the three services.

Includes:
Multidisciplinary Research Initiatives (MURI)
Defense University Instrumentation Program (DURIP)
National Defense Science and Engineering Graduate (NDSEG)
Multidisciplinary University Research Initiatives (MURI in URI)

What: Supports University teams that involve one or more traditional science/engineering disciplines
Topics down selected from OXR PO suggestions
~20-25 new topics announced annually by DOD
For prior topics and University awardees ask DC Office

How Much:
~$1-2.5M/yr for three years + two additional option years; typically 1.2-1.5M/yr
For FY18

When: Announcement (20 Mar 2017)
White paper (strongly encouraged, not required) (17 Jul 2017)
Full proposal (11 Oct 2017)

Where: ARO / AFOSR / ONR BAAs (N00014-17-S-F006

USC MURI awardees
2009 Sukhatme ONR – Adaptive Networks for Threat and Intrusion Detection
USC supporting institution in one other MURI award
2010 USC supporting institution in four different MURI awards
2011 Tambe ARO - Game Theory for Real World Adversarial Behavior
Lidar ARO - Control of Quantum Systems
2015 USC supporting institution in 3 different MURI awards
2016 Shanechi ARO - Multisensory Neural Information Processing
USC supporting institution in 2 different MURI awards
2017 Tambe ARO - Realizing Cyber Inception
USC supporting institute in three other MURI awards
2018 El-Naggar ONR - Living Electronics for Biologically-Enhanced Info
USC supporting institution in three other MURI Awards

Army $53M
Navy 86
Air Force 84

FY18
Defense University Research Instrumentation Program (DURIP in URI)

**What:** Acquisition of major equipment to augment current or develop new research capabilities to support research in the technical areas of interest to the DoD

Provide equipment to conduct research and educate scientists/engineers

Matching funds not required, but is helpful (especially for larger grants)

DOD research grant not required, but is very helpful

OXR program officer support very, very helpful

**How Much:** >$50K, <$1.5M per award

~160 awards (out of 685 proposals) averaging $300K in 2017

**When:** Proposals typically due in late Jul / early Sept (7 Jul 2017 for FY18)

**Where:** ARO / AFOSR / ONR webpages, for example:

http://www.wpafb.af.mil/Welcome/Fact-Sheets/Display/Article/842111#1

**USC Awardees**

**2015**

- Armani: Inverted fluorescent microscope (ONR)
- Haiges: A Raman spectrometer for the characterization of high-energy-density materials (ONR)
- Hashemi: Wideband high-dynamic arbitrary signal generator (ONR)
- Sha: Understanding representation learning (ARO)
- Spedding: Experiments in developing wakes of submerged bodies (ONR)

**2016**

- Cronin: Electron Beam and Magnetic Sputtering System (AFOSR)
- Madhukar: Synthesis and Optical Characterization of Metamaterials (ARO)
- Willner: Optical Transmitter (AFOSR)
- Sukhatme: Motion Capture System (ONR)

**2017**

- Carlsson: Geographic Resource Allocation Solutions (ONR)
- El-Naggar: Fast Scanning Atomic Force Microscopy System (AFOSR)
- Shanechi: High-density Electroencephalogram Recording Systems (ARO)

**2018**

- Albash: Modeling and Benchmarking Quantum Annealers (ARO)
- de la Haye: Observational System for Monitoring/Modeling Group Social Dynamics ((ARO)
- Kapadia: Broadband Ultrafast Photon Source (AFOSR)
- Madhukar: Hi Res Single Phton Emission and Optical Behavior (AFOSR/ARO)
- Malmstadt: Probes for Oxygen Damage of Neuron Cell Membranes (ONR)
- Willner: Frequency Combs and Orbital Angular Momentum (ONR)

**FY18**

- Army: $8M
- Navy: 23
- Air Force: 15

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National Defense Science and Engineering Graduate (NDSEG)

What: Fellowships for pursuit of a doctoral degree in, or closely related to, a discipline having benefit to national security
Open only to applicants who are citizens or nationals of the U.S.
NDSEG Fellows do not incur any military or other service obligations
Funds “to” the Fellow (who selects the University)

How Much:
- Full tuition and required fees
- Up to $1,000 in health insurance coverage
- A stipend in the amount of $30,500 for the first year,
  $31,000 the second, and $31,500 the third

When: Application typically due in late Dec

Where: American Society for Engineering Education (ASEE) currently administers the NDSEG
http://ndseg.asee.org/

~10,000 applications toward ~200 awardees each year
The Defense Medical Research and Development Program (DMRDP), part of the Defense Health Program (DHP), contributes to the Defense Department's overall investment for medical research and development (R&D) with Research, Development, Testing, and Development (RDT&E) dollars.

The objectives of the DMRDP are:
1. To discover and explore innovative approaches to protect, support, and advance the health and welfare of military personnel, families, and communities;
2. To accelerate the transition of medical technologies into deployed products; and
3. To accelerate the translation of advances in knowledge into new standards of care for injury prevention, treatment of casualties, rehabilitation, and training systems that can be applied in theater or in the clinical facilities of the Military Health System.

The DMRDP has six major program areas:
- Medical Simulation and Information Sciences  JPC-1
- Military Infectious Diseases  JPC-2
- Military Operational Medicine  JPC-5
- Combat Casualty Care  JPC-6
- Radiation Health Effects  JPC-7
- Clinical and Rehabilitative Medicine  JPC-8

Each major research program area is managed by a committee, called a Joint Program Committee or JPC, which consists of DoD and non-DoD medical and military technical experts. These experts work through a coordinated effort to translate guidance into research and development needs. The key responsibilities are to provide funding recommendations and program management oversight for research funded by the DMRDP.

Some of the extramural research opportunities are announced and executed through the CDMRP.
Defense Medical Research and Development Program Process

SecDef Direction + JFHP CONOPS JCDs

USAMRMC Program Management Support
- Medical Training and Health Information Sciences
- Infectious Diseases
- Operational Medicine
- Combat Casualty Care
- Radiation Health Effects
- Clinical & Rehabilitative Medicine

Joint Program Committees (JPCs)

R&D Opportunities (PA/RFI/RFP)

Peer/Program Reviews & Acquisitions

Execution Agents
- USAMRMC
- USUHS
- ONR
- AFOSR
- BUMED
- AFSG
- Academia/Industry/Govt

Capability Gap Assessment

Science Gap Assessment

Urgent User Needs

MHS Strategic Imperatives

Scientific Peer Review of Research Proposals + Program Review of Research Proposals
Defense Medical Research and Development Program (DMRDP)

The Defense Medical Research and Development Program (DMRDP) is a core research program of the Department of Defense (DoD) within the Office of the Assistant Secretary of Defense for Health Affairs (OASD[HA]). DMRDP began in fiscal year 2010 (FY10) to enhance the related medical research and development programs of the Army, Navy, Air Force, and Defense Advanced Research Projects Agency (DARPA). The DMRDP funds research and development spanning basic research through advanced clinical development.

DMRDP Execution Agents
- Air Force Office of Scientific Research (AFOSR)
- Air Force Surgeon General (AFSG)
- Office of Naval Research (ONR)
- The Naval Bureau of Medicine and Surgery (BUMED)
- Uniformed Services University of the Health Sciences (USUHS)
- US Army Medical Research and Materiel Command (USAMRMC)

Some of the DMRDP programs are announced and executed through the USAMRMC’s CDMRP

These include:
- Medical Simulation and Information Sciences - JPC 1
- Psychological Health and Traumatic Brain Injury - JPC 5
- Orthotics and Prosthetics Outcomes - JPC 8
- Reconstructive Transplants - JPC 8
- Regenerative Medicine - JPC 8
- Neuromusculoskeletal Injuries - JPC 8

- Academia, Industry, and Government Institutions

Defense Health Program Budget Line: Guidance for the Development of the Force (GDF)

<table>
<thead>
<tr>
<th>Budget Line</th>
<th>Amount</th>
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<tbody>
<tr>
<td>6.1 371A DHP</td>
<td>$ 6.9M</td>
</tr>
<tr>
<td>6.2 372A DHP</td>
<td>50M</td>
</tr>
<tr>
<td>6.3 373A DHP</td>
<td>127M</td>
</tr>
</tbody>
</table>
Examples of Solicitations

**What:** Adaptive Tutor Using Methodologies for Neuroplasticity  JCP-1  
The FY16 JPC-1/MSIS ATUMN is seeking research, development, and testing on compensatory/adaptive medical tutor prototype(s). This includes evidence-based sustained learning methodologies that decrease the need for future technology dependence to retain the details of the cognitive processes that assist with patient assessment, clinical reasoning, clinical judgment, and clinical diagnosis and treatment.  
**How Much:** The anticipated total costs (direct and indirect) budgeted for the entire period of performance will not exceed $1.5M  
**When:** Pre Application due 21 Oct 2015  
**Where:** W81XWH-15-DMRDP-MSIS-ATUMN

**What:** Predictive Personality & Emotional State Performance Determinants for Training  JCP-1  
PREEMPT seeks the development of a proof-of-concept task performance assessment tool that incorporates personality and emotional state as determinant components to predict an individual’s performance and overall stress level under a wide range of potential combat casualty care scenarios, environments, and other stressful situations relevant to patient care.  
**How Much:** The anticipated total costs (direct and indirect) budgeted for the entire period of performance will not exceed $1.25M.  
**When:** Preproposal due date: 11 May 2016  
**Where:** W81XWH-16-R-MSI1

**What:** Applied Research Award, Military Infectious Diseases Research Program JCP-2  
Focus Areas:  
• Development of new methods for rapid multi-pathogen/multi-phenotype detection of multidrug-resistant organisms (MDROs), nosocomial pathogens, and/or rapid multi-pathogen/multi-phenotype characterization  
• Development of assays for host immune response biomarkers for diagnosis or prognosis of infection to inform clinical infection management decisions  
• Development and preclinical testing of novel chemotypes, biologics as potential therapeutics or prophylactics for wound infection, and/or biofilm formation, maintenance, or propagation.  
**How Much:** The anticipated total costs budgeted for the entire period of performance will not exceed $2M.  
**When:** Pre Application due 25 Jan 2016  
**Where:** W81SWH-17-DMRDP-MID-ARA
Examples of Solicitations

**What:** Clinical Study Award, Military Infectious Diseases Research Program JCP-2  
Focus areas: Therapeutics  
Rapid Detection of Pathogens and/or anti-microbial Drug Resistance Markers  
Rapid Detection of Biomarkers  

**How Much:** The anticipated total costs budgeted for the entire period of performance will not exceed $2.5 million (M).  
**When:** Pre Application due 25 Jan 2016  
**Where:** W81XWH-17-DMRDP-MID-CSA

**What:** Combat Casualty Care Research Program - Prolonged Field Care. JCP-6  
The JPC-6/CCCRP has identified three overarching Focus Areas for funding under this Program Announcement/Funding Opportunity.  
• Understand the clinical implications of PFC and pDCR,  
• Develop next-generation resuscitation and stabilization methods for PFC and pDCR  
• Develop enhanced treatment of injuries during PFC and pDCR,  

**How Much:** The allowable range of total costs (direct and indirect) budgeted for the entire period of performance is between $1.5M and $3.0M  
**When:** Pre Application due date 28 Apr 2016 (required); full appl due date: 4 Aug 2016  
**Where:** W81XWH-16-DMRDP-CCCRP-PFCRA

**What:** Extremity Regeneration Intervention, Clinical and Rehabilitative Medicine Research JCP-8  
The area of interest for this BAA is extremity regeneration to address complex blast and other traumatic injuries to Service members.  

**How Much:** The anticipated total costs (direct and indirect) budgeted for the entire period of performance will not exceed $4.9M  
**When:** Pre Application due 15 Dec 2015  
**Where:** W81XWH-16-R-CRM1
What: The USSOCOM seeks novel biomedical solutions to preserve the high level of performance and save the lives of Special Operations Forces (SOF) in field environments. Any projects proposed must be unique to the requirements of SOF who typically conduct combat operations in austere, remote locations without timely access to medical evacuation or elevated levels of medical care.

1. Medical Simulation and Training Technologies
2. Damage Control Resuscitation
   • Global Treatment Strategies
   • Analgesia
   • Far Forward Blood, Blood Components
   • Austere Surgical Stabilization
3. Prolonged Field Care
   • Medical Devices
   • Telehealth Technology
4. Portable Lab Assays and Diagnostics
   • Biological
   • Occupational and Environmental Health Hazards
5. Force Health Protection and Environmental Medicine
   • Optimal Acclimatization Strategy
   • Chem, Bio, Rad, Nucl, and Explosive Rapid Diag, Treatment and Prophylaxis
   • Prevention of occupational exposure
6. Canine Medicine
7. Human Operational Performance

How Much: Proposed projects longer than two years will not be considered. $3M available

When: Organizations are required to submit a project pre-proposal for consideration no later than July 28, 2017 or 3 Nov 2017 or 14 Apr 2018 using the pre-proposal template

Where: W81XWH-17-R-SOC1
### Congressionally Directed Medical Research Program
cdmrp.army.mil

**What:** Research Programs included in the FY17 CDMRP are ($M):

<table>
<thead>
<tr>
<th>Program</th>
<th>Funding ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peer Reviewed Medical Research</td>
<td>300</td>
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<tr>
<td>Breast Cancer Research</td>
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<tr>
<td>Prostate Cancer Research</td>
<td>90</td>
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<tr>
<td>Peer Reviewed Cancer – skin, pediatric brain, genetic, non-invasive ablation treatment</td>
<td>60</td>
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<tr>
<td>Joint Warfighter Medical</td>
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<tr>
<td>Spinal Cord Injury</td>
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<td>Peer Reviewed Orthopaedic</td>
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<td>Ovarian Cancer Research</td>
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<td>Gulf War Illness Research</td>
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<td>Neurofibromatosis Research</td>
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<td>Parkinson’s Research</td>
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<td>Alzheimer’s</td>
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<tr>
<td>Reconstructive Transplant</td>
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<td>Lung Cancer Research</td>
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<td>Vision</td>
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<td>Hearing Restoration</td>
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<td>Kidney Cancer</td>
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<td>Trauma Clinical</td>
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<td>Epilepsy</td>
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<td>Amyotrophic Lateral Sclerosis</td>
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<td>Military Burn</td>
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<td>Autism Research</td>
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<td>Tuberous Sclerosis Complex Research</td>
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<td>Multiple Sclerosis</td>
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<td>Tick Born Disease</td>
<td>5</td>
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<tr>
<td>Alcohol and Substance Abuse</td>
<td>4</td>
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<tr>
<td>Bone Marrow Failure</td>
<td>3</td>
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<tr>
<td>Bone Marrow Failure</td>
<td>3</td>
</tr>
<tr>
<td>Duchenne Muscular Dystrophy</td>
<td>3</td>
</tr>
</tbody>
</table>

Proposals undergo two stage review - peer, then program.

**How Much:**

1-5 year grants, average of $150K/yr (direct)

If multiyear funded, all funds come from the year of appropriation.

**When:** Various – see website program announcement.

**Where:** Proposal submission to be done via grants.gov.

~$900M
Peer Reviewed Medical Research Program Topics

FY2017
Acute Lung Injury
Arthritis
Chronic migraine and post-traumatic headache
Congenital heart disease
Diabetes
Early Trauma Thermal
Emerging Infectious
Focal segmental glomerulosclerosis
Fragile X syndrome
Healthcare-acquired infection reduction
Hepatitis B and C
Hydrocephalus
Inflammatory bowel disease
Integrative medicine
Interstitial cystitis
Metabolic Disorders
Nanomaterials for bone regeneration
Non-opioid Pain Management
Pancreatitis
Pathogen-inactivated dried plasma
Polycystic kidney disease
Rheumatoid arthritis
Sleep disorders
Tinnitus
Vaccine Development for Infections Disease
Vascular malformations

FY2016
Acute lung injury
Chronic migraine and post-traumatic headache
Congenital heart disease
Diabetes
Emerging Infectious Diseases
Focal segmental glomerulosclerosis
Fragile X syndrome
Hepatitis B
Hereditary angioedema
Inflammatory bowel disease
Integrative medicine
Interstitial cystitis
Lupus
Metals toxicology
Nanomaterials for bone regeneration
Pancreatitis
Pathogen-inactivated dried plasma
Polycystic kidney disease
Psychotropic medications
Respiratory health
Rheumatoid arthritis
Sleep disorders
Tuberculosis
Vaccine Development for Infections Disease
Vascular malformations

By law funding provided under the Peer-Reviewed Medical Research Program shall be devoted only to the purposes listed above.

CDMRP Funding Process

Milestone 1 (Congressional Appropriation):
Milestone 2 (Vision Setting):
   Each program's Integration Panel (IP), composed of renowned experts -- scientists and clinicians, as well as disease survivors, identify the Programmatic Priorities for the year.
Milestone 3 (Release of Program Announcements)
Milestone 4 (Proposal Receipt)
Milestone 5 (Peer Review):
   • Submitted proposals are peer reviewed by program, along with other proposals submitted in response to the same mechanism offered in the Program Announcements.
   • Renowned scientists and clinicians are assigned to panels to review proposals according to their individual expertise.
   • In addition, several disease survivors sit on each peer review panel.
   • The process of Peer Review evaluates not only the science of each submission but also the proposed budget.
Milestone 6 (Programmatic Review):
   • Proposals undergo Programmatic Review by the IP with select additional scientists chosen for their expertise in the field.
   • Proposals are evaluated in a comparison basis, against submissions in other specialty fields in order to identify proposals with the greatest programmatic relevance, those that most completely address the year's Programmatic Priorities, as well as disease relevance, and innovation, among other factors.
Milestone 7 (Approval by Commanding General)
Milestone 8 (Negotiations)
Milestone 9 (Award Execution)
This page represents the organizations that assist the CDMRP in its execution of the research programs directed by Congress. Contact information for each organization is provided.

**CDMRP (Program Office)**
- Oversees program announcements, peer and programmatic reviews
  - Program Managers
  - Grants Managers
  - Program Announcement Help Desk
  - Electronic Proposal Receipt (eReceipt)
  - Program Announcement Help Desk
  - SAIC (programmatic review)
  - ABS (peer review)
- Various support contractors assist CDMRP with review and administration of protocols

**US Army Medical Research & Materiel Command**
- US Army Research Acquisition Activity (RAA) (Contracting)
- Contracting Officers
- Contract Specialists
- Various support contractors assist RAA with negotiations and administration of grants

**Office of Research Protections (ORP)** (Regulatory Compliance)
- Office of Research Protections (ORP)
- Human Subjects and Anatomical Substances
- Various support contractors assist ORP with review and administration of protocols

**Office of Survey, Safety, and Environment**
- Various support contractors are required before an award can be made

**RMA** (Technical and Annual Progress Reports)
- Instructions: https://rma.dtic.mil/rmpindex.asp
- Upload reports: https://rma.dtic.mil

**US Congress**

**Department of Defense**

**US Army**
# Recent USC Awardees from CDMRP

<table>
<thead>
<tr>
<th>Disease Area</th>
<th>Type</th>
<th>Year</th>
<th>Name</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Breast Cancer (BCRP)</strong></td>
<td>Idea</td>
<td>2010</td>
<td>Pin Wang</td>
<td>Dornsife, Chem Engn</td>
</tr>
<tr>
<td></td>
<td>Idea</td>
<td>2010</td>
<td>Alan Epstein</td>
<td>Keck, Pathology</td>
</tr>
<tr>
<td></td>
<td>Idea</td>
<td>2010</td>
<td>Parkash Gill</td>
<td>Keck, Medicine</td>
</tr>
<tr>
<td></td>
<td>Breakthrough Award</td>
<td>2014</td>
<td>Yousha Neman</td>
<td>Keck, Neurosurgery</td>
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<tr>
<td><strong>Ovarian Cancer (OCRP)</strong></td>
<td>Consortium Development</td>
<td>2012</td>
<td>Malcolm Pike</td>
<td>Keck, Preventive Medicine</td>
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<tr>
<td><strong>Prostate Cancer (PCRP)</strong></td>
<td>Idea Development</td>
<td>2010</td>
<td>Wijbe Kast</td>
<td>Keck, Molec Microbio and Immun</td>
</tr>
<tr>
<td></td>
<td>Idea Development</td>
<td>2011</td>
<td>Jean Shih</td>
<td>Pharmacy</td>
</tr>
<tr>
<td></td>
<td>Idea Development</td>
<td>2014</td>
<td>Wijbe Kast</td>
<td>Keck, Molec Microbio and Immun</td>
</tr>
<tr>
<td><strong>Lung Cancer (LCRP)</strong></td>
<td>Investigator Initiated</td>
<td>2011</td>
<td>Robert Ladner</td>
<td>Keck, Pathology</td>
</tr>
<tr>
<td></td>
<td>Concept</td>
<td>2013</td>
<td>Ite Laird-Offringa</td>
<td>Keck, Surgery</td>
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<tr>
<td></td>
<td>Idea Development, New Investigator</td>
<td>2015</td>
<td>Julio Camarero</td>
<td>Keck, Molec Microbio and Immun</td>
</tr>
<tr>
<td><strong>Autism Research (ASD)</strong></td>
<td>Idea Development</td>
<td>2012</td>
<td>Alexandre Bonnin</td>
<td>Keck, Neurogenetic Inst</td>
</tr>
<tr>
<td><strong>Spinal Cord Injury (SCI)</strong></td>
<td>Investigator Initiated</td>
<td>2013</td>
<td>Jill McNitt-Gray</td>
<td>Dornsife, Biology</td>
</tr>
<tr>
<td><strong>Multiple Sclerosis (MSRP)</strong></td>
<td>Idea Development</td>
<td>2013</td>
<td>Brett Lund</td>
<td>Keck, Neurology</td>
</tr>
<tr>
<td><strong>Defense Medical R&amp;D Program (DMRDP)</strong></td>
<td>Investigator Initiated</td>
<td>2014</td>
<td>Kathleen Rodgers</td>
<td>Pharmacy</td>
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<tr>
<td><strong>Peer Reviewed Cancer Research Program (PRCRP)</strong></td>
<td>Idea Award</td>
<td>2014</td>
<td>Terry Takahashi</td>
<td>Chemistry</td>
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<tr>
<td><strong>Peer Reviewed Medical Research Program (PRMRP)</strong></td>
<td>Investigator Initiated</td>
<td>2014</td>
<td>Kenneth Hallows</td>
<td>Keck, Medicine</td>
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<tr>
<td><strong>Psychological Health and Traumatic Brain Injury (PH-TBI)</strong></td>
<td>Psychological Health Research</td>
<td>2014</td>
<td>Jeremy Goldbach</td>
<td>Social Work</td>
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<tr>
<td></td>
<td>Psychological Health Research</td>
<td>2014</td>
<td>Carl Castro</td>
<td>Social Work</td>
</tr>
<tr>
<td><strong>Amyotrophic Lateral Sclerosis (ALSRP)</strong></td>
<td>Therapeutic Development</td>
<td>2014</td>
<td>Justin Ichida</td>
<td>Keck, Regenerative</td>
</tr>
</tbody>
</table>
## CDMRP: Example of Program Information

### FY09 Peer Reviewed Medical Research Program (PRMRP)

<table>
<thead>
<tr>
<th>Mechanism</th>
<th>Program Announce</th>
<th>Release Date</th>
<th>Funding Amount</th>
<th>Submission Deadline</th>
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<tbody>
<tr>
<td>Investigator-Initiated Research Award</td>
<td>Adobe PDF</td>
<td>1-27-09</td>
<td>Max funding of $750 K for direct costs Max period of performance is 3 years</td>
<td>Pre-Appl: Mar 19 09 Proposal: April 16 09</td>
</tr>
<tr>
<td>Technology/Therapeutic Development Award</td>
<td>Adobe PDF</td>
<td>1-27-09</td>
<td>Max funding of $2M for direct costs Max period of performance is 4 years</td>
<td>Pre-Appl: Mar 19 09 Proposal: Apr 16 09</td>
</tr>
<tr>
<td>Clinical Trial Award</td>
<td>Adobe PDF</td>
<td>1-27-09</td>
<td>Max funding of $2.5 for direct costs Max period of performance is 5 years</td>
<td>Pre-Appl: Mar 19 09 Proposal: Apr 16 09</td>
</tr>
</tbody>
</table>
Illustrations of CDMRP Award Categories
(from historical files)

Advanced Technology
- Support the advanced development of a health-related product or technology in a target area.
- Applicants are strongly encouraged to collaborate and integrate their projects with military and/or VA research laboratories and programs
- ~$3M direct costs over performance period
- Up to 4 years period of performance

Center of Excellence
- Accelerate the solution of a major, overarching problem in target area – address a single, unifying question critical to the prevention, detection, diagnosis, or treatment in target area through a synergistic, multidisciplinary research program that could not be accomplished by a single instigator or group.
- Up to $20M including direct and indirect costs over performance period
- Up to a 5 year period of performance

Clinical Trial Development Award
- Support to establish the necessary collaborations and to develop the necessary research resources that will serve as a foundation for investigator-initiated clinical trials
- Goal is development of Phase I or Phase II clinical trials that will have major impact on the treatment, diagnosis, detection or prevention of target.
- Focus on new interventions and not on refinements of existing interventions.
- Up to $100K direct costs over performance period
- Up to 1 year period of performance

Clinical Resource Development Award
- Fund development, validation and/or pilot testing of novel tools/resources for measuring clinical and/or surrogate endpoints that are relevant to the target area.
- Preliminary data are not required by my be included, if available.
- A clinical protocol and associated clinical documents must be included if human subject clinical studies are proposed.
- Include a plan describing the means by which the fully developed tool/resource will be made available to the scientific community for future studies.
- Up to $225K for direct cost over the performance period
- Up to 2 years period of performance
Clinical Consortium Award
• Clinical Research Sites and one Coordinating Center which jointly are responsible for proposing, selecting and conducting Phase II and Phase I/II clinical trials focused on target area.
• The Coordinating Center, which functions as a Clinical Research Site, also serves as the consortium information and planning nexus providing administrative, operational, and data management support services to participant Clinical Research Sites to implement consortium clinical trials in a timely manner.
• An important aspect of the CCA is that funding for each participant site after the first year is contingent upon meeting the following consortium requirements:
  • Minimum number of 35 patients accrued per year (>50 expected)
  • Presentation of at least one clinical trial per year (>2 expected)
  • Submission of annual written progress report
  • Timely submission of quality data
• Up to $600K direct costs over performance period
• Up to 2 years period of performance

Concept Award
• Exploration of a highly innovative new concept; preliminary data is not allowed.
• Rationale for work must be provided. How will new concept create an entirely new avenue for investigation toward desired target (breast cancer, TBI, . . .)
• Up to $75K /yr direct costs
• Up to 1 year period of performance

Idea Award
• Support highly innovative, high-risk/high-reward research that could ultimately lead to critical discoveries of major advancement. Innovation is a significant feature
• Up to $300K direct costs
• Up to 3 year period of performance

Impact Award
• Support unique projects or ideas that do not fit existing award mechanisms yet possess strong potential to have an unprecedented impact on the prevention, detection, diagnosis, and/or treatment in target area
• No predetermined dollar amount restriction
• Up to 5 year period of performance

Career Development
• Be within 5 years of first faculty appointment or equivalent;
• Hold a position at the level of Assistant Professor, instructor, or equivalent
• The maximum period of performance is 2 years.
• maximum allowable direct costs for the entire period of performance are $240,000 plus indirect costs
Illustrations of CDMRP Award Categories
(from historical files)

Innovator Award
• Support visionary individuals -who have a history of creativity, innovative work, and leadership – to pursue their most novel, visionary, high-risk ideas that could ultimately lead to solution in desired target.
• Up to $5M direct costs over performance period
• Up to 5 year period of performance

Investigator Initiated Research Award
• Promote basic or clinical research studies focused on target area (TBI/PTSD).
• Fund independent investigators across a broad spectrum of disciplines
• Proposals must include preliminary data relevant to target research and the proposed project.
• If appropriate, proposal should include a clear statistical plan of analysis
• ~$1M direct costs over performance period
• Up to 4 year period of performance

New Investigator Award
• Recognize and support postdoctoral fellows with at least 5 years of PD training and faculty through the level of Assistant Professor (or other individuals with comparable experience holding nonacademic positions of equivalent rank) who have innovative ideas applicable to desired target. In addition, applicants may not have received non- mentored research funding in excess of $100K in aggregate from extramural sources as a PI or co-PI
• Up to $300K direct costs over performance period
• Up to 3 year period of performance

Synergistic Idea
• Support innovative, high-risk/high-reward target areas research collaborations between two independent, faculty-level (or equivalent) investigators who address a central problem or question in target area.
• Up to $500K direct costs over performance period
• Up to 2 year period of performance
VA research is different from research sponsored by other federal research agencies:

- **VA Research is the only research program focused entirely on Veterans' needs.**
- **VA Research is intramural**, meaning only VA employees can conduct research under VA's sponsorship. *Typically, VA researchers collaborate with academic institutions.* This is an exceptional benefit because it allows VA Research to identify the direct needs of patients at chair and bed side, and to find discoveries and innovations directly in-step with these needs—keeping the Veteran at the center of health care from the very beginning.
- More than 60 percent of VA researchers are also clinicians who provide direct patient care, which is important because it allows VA Research to quickly move scientific discovery from the research setting to advancements in health care and to recruit the best and brightest healthcare professionals.

VA/DOD Collaboration Guidebook for Healthcare Research 2013
Planning for initiation and administration of collaborative research efforts
University Affiliated Research Centers (UARC)
Institutions responsible for partnering with the United States Government to solve problems of national and global significance. Largely applied research, can be classified. Recompeted at ~3-5 year intervals; some Navy UARCs date from the 1940s.
Examples:

Navy
- Applied Physics Laboratory
- University of Washington
- Applied Research Laboratories
- University of Texas at Austin
- Applied Research Laboratory
- Pennsylvania State University
- Applied Physics Laboratory
- The Johns Hopkins University
- Applied Research Laboratory
- Univ of Hawaii at Manoa

Army
- Inst for Creative Technologies
- University of Southern California
- Inst for Soldier Nanotechnologies
- Massachusetts Institute of Technology
- Inst for Advanced Technology
- University of Texas
- Inst for Collaborative Biotechnologies
- UC Santa Barbara (annex for Network Science)
- Huntsville Research Laboratory
- Georgia Tech Research Institute

MDA
- Space Dynamics Laboratory
- Utah State University

NSA
- Ctr for Advanced Study of Language
- University of Maryland

OSD
- Systems Engineering Research
- Stevens Inst of Technology (with USC)

NASA
- UARC at NASA Ames
- Univ Calif Santa Cruz

StratCom
- National Strategic Research Institute
- Univ Nebraska

MDA  Missile Defense Agency  NSA  National Security Agency
StratCom  US Strategic Command
DOD Young Investigator/Young Faculty Programs

Who: Outstanding new faculty members at institutions of higher education, to support their defense related research, and to encourage their teaching and research careers

Army, AF, Navy must be US citizen / permanent resident
DARPA and DTRA have no citizenship or residency requirement

Army/AF/DTRA - received Ph.D. or equivalent degrees within the last five years
Navy/DARPA – tenure track assistant/associate professors within 5 Navy
Army, Navy require tenure track positions; DARPA tenure track or equivalent at non-profits

What: Topics must conform with program officer interests

How Much:
Army - not to exceed $50K/yr for three years
Air Force - $150K/yr for three years
Navy - up to $170K/yr for three years, possibility of additional support for capital equipment or collaborative research with a Navy laboratory
DTRA - $100K/yr for up to five years
DARPA - up to $250K/yr for up to two years (with possible $500K for third year)

When: “Anytime” for Army
Jun 1, 2017 for the Air Force FY18 competition (AFOSR BAA 2017-0002)
Sep 15, 2017 for Naval FY18 competition (ONR N00014-17-S-FO14)
Feb 1, 2016 for the DTRA FY16 competition (HDTRA1-11-16-BRCWMD-BAA, Amend 5)
Jan 18, 2017 for the DARPA FY17 competition (DARPA RA-16-63)

Where: See BAAs on websites (identified in subsequent charts)

Listing of prior AF, Navy, DARPA awardee information available from DC Office for FY07-FY17
Army Young Investigator Award

**Who:** This program is open to resident aliens and U.S. citizens holding tenure track positions at U.S. universities and colleges who have held their graduate degrees (Ph.D. or equivalent) for fewer than five years at the time of application.

**What:** Attract to Army research outstanding young university faculty members, to support their research, and to encourage their teaching and research careers.

Strongly encourage informal discussions with the cognizant Army Research Office (ARO) technical program manager before submission of a formal proposal.

A supporting letter from the applicant's Department Chairperson, Dean, or other official who speaks for the university regarding support for and commitment to the applicant. Strong university support for the applicant is essential. This support can include the applicant's 9-month academic salary, release time from administrative responsibilities, the purchase of equipment, support for the applicant's graduate students, waiver of indirect costs, departmental cost sharing, start-up funding, and so on.

**How Much:** YIP awards not to exceed $50K per year for three years

**When:** Proposals may be submitted at any time.

**Where:** Broad Agency Announcement for Basic and Applied Scientific Research FY12 – FY17

W911NF-12-R-0012-02  YIP information on page 50

USC Awardees

<table>
<thead>
<tr>
<th>Year</th>
<th>Name</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>Fei Sha</td>
<td>CS</td>
</tr>
<tr>
<td>2009</td>
<td>Michelle Povinelli</td>
<td>EE</td>
</tr>
</tbody>
</table>
AF Young Investigator Award (YIP)

Who: The individual award will be made to a U.S. institution of higher education, industrial laboratory, or non-profit research organization where the principal investigator is employed on a full-time basis and holds a regular position.

The principal investigator must be a U.S. citizen, national, or permanent resident who has received a Ph.D. or equivalent degrees in the last five years (on or after 1 Apr 2011 for the FY17 competition)

What: foster creative basic research in science and engineering, enhance early career development of outstanding young investigators, and increase opportunities for the young investigators to recognize Air Force mission and the related challenges in science and engineering.

Proposals addressing the research areas of interest for the Air Force Research Laboratory will be considered. The basic research areas of current interest are available on-line at the AFOSR web site:

How Much: The estimated value of each award is approximately $150K per year for three years. Exceptional proposals will be considered individually for higher funding level and/or longer duration (up to five years upon a successful review during the third year).

When: proposal due 01 Jun 2017 for FY18 competition (Solicitation released Apr 2017)

Where: AF FY2017 Young Investigator Research Program BAA-AFRL-AFOSR-2017-0002

<table>
<thead>
<tr>
<th>Year</th>
<th>Awards</th>
<th>Proposals</th>
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<td>58</td>
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<td>FY 2016</td>
<td>56</td>
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<td>FY 2015</td>
<td>57</td>
<td>200+</td>
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<td>FY 2014</td>
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<td>234</td>
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<td>FY 2011</td>
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<td>FY 2010</td>
<td>38</td>
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USC Awardees

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<th>Year</th>
<th>Name</th>
<th>Department</th>
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<tbody>
<tr>
<td>2017</td>
<td>Mitul Luhar</td>
<td>AME</td>
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<tr>
<td>2016</td>
<td>Rehan Kapadia</td>
<td>EE</td>
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<td>2013</td>
<td>Jahan Dawlaty</td>
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<td>2012</td>
<td>Morteza Dehghani</td>
<td>ICT</td>
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<td>2012</td>
<td>Greg Ver Steeg</td>
<td>ISI</td>
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<td>2010</td>
<td>Mohamed El-Naggar</td>
<td>Physics</td>
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<td>2008</td>
<td>Stephen Cronin</td>
<td>EE</td>
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<tr>
<td>2008</td>
<td>Chunqi Jiang</td>
<td>EE</td>
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</tbody>
</table>
Naval Young Investigator Program

**Who:** Principal Investigator of a proposal must be a U.S. citizen, national, or permanent resident (on the date proposals are due), in their first or second full-time tenure-track or tenure-track-equivalent academic appointment and for FY2017 have begun their first appointment on or after 04 Nov 2011

**What:** The objectives of this program are to attract outstanding faculty members of Institutions of Higher Education to the Department of the Navy's research program, to support their research, and to encourage their teaching and research careers.

Applications should contact a Program Officer, who is the point-of-contact for a specific technical area, to discuss their research ideas. Brief informal pre-proposals may be submitted to facilitate these discussions. Application will likely need a long CV with all evidence of leadership as opposed to the typical short biosketch, i.e. organizing conferences, other grants, etc... Also letters of support from dean and chair, including some evidence of commitment, e.g. small matching amount, teaching relief, ...

**How Much:** Proposals may request up to $170K per year for three (3) years. These funds may be budgeted against any reasonable costs related to the conduct of the proposed research, for example, salary for the Young Investigator, graduate student support, supplies, and operating expenses. Additional funds (beyond the basic $170K yearly amount) for capital equipment which enhances the Young Investigator's proposed research may be requested for the first budget period, based on the needs of the research. The basic $170K per year award can be supplemented through a "matching funds" enhancement available only to those receiving an ONR Young Investigator award.

**When:** proposal due 15 Sep 2017 for the FY18 competition (Solicitation released Jun 2017)

**Where:** Fiscal Year 2017 ONR Young Investigator Program, ONR N00014-16-S-F015

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**USC Awardees**

<table>
<thead>
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<th>Year</th>
<th>Name</th>
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<tr>
<td>2012</td>
<td>Rahul Jain</td>
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<td>2012</td>
<td>Andrea Hodge</td>
<td>CEMS</td>
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<td>2012</td>
<td>Noah Malmstadt</td>
<td>CEMS</td>
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<tr>
<td>2009</td>
<td>Andrea Armani</td>
<td>CEMS</td>
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<td>2008</td>
<td>David Kempe</td>
<td>Computer Scii</td>
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**FY**

<table>
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<tr>
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<tr>
<td>2012</td>
<td>26</td>
<td>310</td>
</tr>
<tr>
<td>2011</td>
<td>21</td>
<td>270</td>
</tr>
</tbody>
</table>
DEFENSE THREAT REDUCTION AGENCY (DTRA)
Research and Development Enterprise
Basic and Applied Sciences Directorate

Who: Faculty who received a Ph.D. or equivalent degree within 5 years of date of the pre-application white paper submission. No requirement for US citizenship or permanent residency

What: Proposals that focus on exploratory aspects of a unique problem, a high risk approach, or innovative research in subjects with potential for high impact to CWMD science in the topics for Period F (2016):

- PerF-YIP-Topic 1: Plasma Chemistry for Nuclear Forensics
- PerF-YIP-Topic 2: Basic Research on Prompt Diagnostic Signatures of Nuclear Detonations for Forensics
- PerF-YIP-Topic 3: Radiation Effects in Wide Bandgap Semiconductor Materials
- PerF-YIP-Topic 4: Radiation Effects in Non-Conventional Computing Approaches
- PerF-YIP-Topic 5: Bridging the Gap: From in vitro to in vivo Studies for Radiogenic Disease Risk Estimation
- PerF-YIP-Topic 6: Isotopic Discrimination using Biological Systems
- PerF-YIP-Topic 7: Dynamic Characterization of Post-detonation Fireballs Involving Agent Defeat Additives and Simulants
- PerF-YIP-Topic 8: Photochemistry of Organohalides and Agent Simulants
- PerF-YIP-Topic 9: Novel Signatures and Methodologies to Monitor Very Low Yield Explosions

When: 1 Feb 2016 Phase I White Paper Submission Deadline for Period F

How Much: $100K/yr for up to five years

Where: Basic Research for Combating Weapons of Mass Destruction (C-WMD)
HDTRA1-11-16-BRCWMD-BAA Amendment 5 - Dec 2015 (Period F)

In 2011 competition ~15 awards
In 2009 competition ~15 awards
Defense Advanced Projects Agency (DARPA) Young Faculty Award

Who: Participation is limited to untenured Assistant or Associate Professors within 8 years of appointment to a tenure-track position at a U.S. institution of higher learning. DARPA is particularly interested in identifying outstanding researchers who have previously not been performers on DARPA programs, but the program is open to all qualified applicants with innovative research ideas. There is no prohibition against a non-U.S. citizen/a Permanent Resident/her on a Green Card/etc., from submitting a proposal for consideration; nor is it a requirement of the RA that the submitter be eligible to obtain a U.S. security clearance.

What: The YFA program will provide high-impact funding to these faculty early in their careers in order to develop their research ideas in the context of Defense needs. The announcement contains detailed descriptions of the specific interest areas to be addressed. The RA solicits ground-breaking single investigator proposals for research and development in the areas of Physical Sciences, Engineering, Mathematics, Medicine, Biology, Information and Social Sciences of interest to DARPA’s Defense Sciences Office (DSO), Biological Technology Office (BTO) and Microsystems Technology Office (MTO). Proposed research should focus on innovations that will enable revolutionary advances; high-risk/high-payoff ideas are strongly encouraged. Proposers should familiarize themselves with and address the Heilmeyer Catechism

Topic POCs are unable to accommodate any meetings/calls; you may send questions to YFA2017@darpa.mil.

How much: Two years of funding at $250K each year. Of the entire 2014 YFA class, four of the most promising recipients may be selected for a third year supported by $500,000 each in funding. Each recipient will be assigned a DARPA program manager with closely aligned research interests.

When: Proposals due 18 Jan 2017 for the FY17 competition (Solicitation released Sep 2016)

Where: Research Announcement Young Faculty Award, DARPA-RA-16-63

FY15 24 awards out of 233 proposals
FY14 28 awards
FY13 25 awards out of 226 proposals
FY12 51 awards out of 560 proposals
FY11 33 awards out of 405 proposals
FY10 31 awards

USC Awardees

<table>
<thead>
<tr>
<th>Year</th>
<th>Name</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>Mike Chen</td>
<td>EE</td>
</tr>
<tr>
<td>2012</td>
<td>Andrea Hodge</td>
<td>CEMS</td>
</tr>
<tr>
<td></td>
<td>Yongseung Yoon</td>
<td>CEMS</td>
</tr>
<tr>
<td>2008</td>
<td>Hossein Hashimi</td>
<td>EE</td>
</tr>
</tbody>
</table>
Defense Sciences Study Group (DSSG)  
DARPA/IDA  http://dssg.ida.org/index.html

Who:
- Faculty member in science, engineering, or related discipline, preferably within 15 years of PhD
- Outstanding academic accomplishments and likely future leader
- Must be a U.S. citizen able to acquire a security clearance

What: The Defense Science Study Group (DSSG) seeks to develop and maintain strong links between the national security community and emerging leaders in the fields of science and technology. The DSSG identifies the nation’s most outstanding scientists and engineers early in their careers, educates them on national security issues, and fosters their long-term interest and involvement in the national security community. Over the course of the two-year program (approximately 20 days/year), those invited to participate focus on defense policy, related research and development, and the systems, missions, and operations of the armed forces. Over the course of 8 sessions, spread out over the two years, members interact with top-level officials from the Defense Department, as well as senior officials of other government organizations such as the Department of Energy, various intelligence agencies, and Congress. The program has also produced over 200 national defense-related research projects.

How Much: Travel support

When: Nominations for DSSG 2018-2019 will be accepted through Jan 2017.

Where: Forward your resume or CV and a letter of recommendation from your Provost, Dean or Defense Science Study Group Member, Mentor, Alumni or Advisor, through the following mail or email address:

Institute for Defense Analyses  
ATTN: DSSG Nominations  
4850 Mark Center Drive  
Alexandria, VA 22311-1882

Dr. Robert E. Roberts  
Chief Scientist IDA  
703.845.2100  
rroberts@ida.org

USC Awardees:  
2018-19  Michelle Povinelli EE  
2010-11  John Heidemann  ISI
Presidential Early Career Award Science and Engineering (PECASE)

http://en.wikipedia.org/wiki/Presidential_Early_Career_Award_for_Scientists_and_Engineers

Who:
- Nominations ONLY by participating Federal Agencies including:
- Nominees must hold tenure-track positions at U.S. Univ. or College or at Agency intramural laboratories
- Have received their Ph.D. degree within the preceding 5 years
- Typically each agency nominates candidates from its own young investigator/early career awardees and/or from its intramural laboratories

What:
White House award to recognize some of the finest scientists and engineers who, while early in their research careers, show exceptional potential for leadership at the frontiers of scientific knowledge during the twenty-first century.

How Much: ~$200K/yr for five years (cost borne by nominating agency)

When: Submitted in October by Agencies

<table>
<thead>
<tr>
<th>USC Awardees:</th>
<th>2012</th>
<th>Mo El-Naggar</th>
<th>AFOSR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2009</td>
<td>Andrea Armani</td>
<td>ONR</td>
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<tr>
<td></td>
<td></td>
<td>Michelle Povinelli</td>
<td>ARO</td>
</tr>
<tr>
<td></td>
<td>2007</td>
<td>Li Zhang</td>
<td>NIH</td>
</tr>
<tr>
<td></td>
<td>2004</td>
<td>Elaine Chew</td>
<td>NSF</td>
</tr>
<tr>
<td></td>
<td>2003</td>
<td>Cyrus Shahabi</td>
<td>NSF</td>
</tr>
</tbody>
</table>
Vannevar Bush Faculty Fellowship (VBFF)
(was the NSSEFF Program)

What:
Provide extensive, long-term financial support to distinguished University faculty scientists/engineers to conduct unclassified, fundamental research on topics of interest to the DOD
Fellowship open to S&E with earned PhD awarded in ~ past 20-25 years; faculty/staff at an accredited, degree granting educational institution
PI must be U.S. citizen or permanent resident
Research topics aligned with Desired Capabilities S&T Investment Areas or Enabling Technologies Investment Areas
Listing of prior awardees available from Res Adv

How Much:
up to $3M for up to 5 years

When (2018 call):
16 Aug 2017 white paper
8 Jan 2018 full proposal (by invite only)

Where: N00014-17-S-FO15 (presently managed by ONR)

USC Awardee
Alan Willner 2017
Laboratory University Collaboration Initiative (LUCI)

**What:** pilot program designed to foster collaboration between service laboratory researchers and Vannevar Bush Faculty Fellows (foremost academics who receive DoD support to carry out cutting edge research in areas of critical interest to DoD). An important objective of this pilot phase of LUCI is to engage leading university scientists and their students, introduce them to the DoD research environment, and have them work with top DoD researchers to address long-term DoD basic research needs.

**How Much:** Each researcher selected for the LUCI program will receive $600K over a three year period to conduct a basic research project in collaboration with their fellows.
Proof of Concept Commercialization Pilot Program
DOD I-Corps

What: applications from current/recent grant awardees to receive mentoring and funding to accelerate the transition and commercialization of the funded research. The I Corps @ DoD program is designed to support the acceleration of innovation by providing Principal Investigators (PIs) with training and mentorship in customer discovery and commercialization. The purpose of funding under this Program Announcement (PA) is to accelerate the commercialization of basic research innovations from qualifying institutions.

The goals of this program are to spur the transition of fundamental research, to encourage collaboration between academia and industry, and to train students to understand innovation and entrepreneurship.

How Much: $40K-$70K grant as well as extensive training in product commercialization from industry experts and ‘serial entrepreneurs’ who have helped train over 900 I-Corps™ Teams in how to bring their innovations to market.

When: Applications due 15 Sep 2017

Where: WP11NF-17-S-0011 (issued July 2017)
National Defense Education Program
http://www.ndep.us/

- SMART scholarship/fellowship awards
  The Science, Mathematics And Research for Transformation (SMART) Scholarship for Service Program is an opportunity for students pursuing an undergraduate or graduate degree in Science, Technology, Engineering, and Mathematics (STEM) disciplines (of interest to DOD) to receive a full scholarship and be gainfully employed upon degree completion. https://smart.asee.org/

Students pursuing degrees related to the following are encouraged to apply:
- Mechanical Engineering
- Nuclear Engineering
- Naval Architecture and Ocean Engn
- Geosciences
- Materials Science and Engineering
- Aeronautical and Astronautical Engn
- Chemical Engineering
- Computer and Computational Science
- Cognitive, Neural, and Behavioral Sciences
- Operations Research (technical tracks only)
- Industrial and Systems Engineering (technical tracks only)

FY18
$74M
Science, Mathematics and Research for Education – SMART

What: Scholarships to undergraduate, master's, and doctoral students who have demonstrated ability and special aptitude in Science, Technology, Engineering & Mathematics (STEM) Only to citizens and nationals of the United States (failure to obtain and maintain a security clearance grounds for dismissal from the SMART Program) Offers career opportunities to continue their research in civil service roles following graduation Tenure of a SMART Scholarship is up to the time typically required to complete degree studies

How Much:

When: Opens in August, closes in December

Where: SMART Scholarship for Service Program American Society for Engineering Education ASEE Website: http://smart.asee.org
DOD Education Resources

1. AF Visiting Scientist Program
2. Awards to Stimulate and Support Undergraduate Research Experiences (ASSURE) program
3. Defense Experimental Program to Stimulate Competitive Research (DEPSCoR)
4. Defense University Research Instrumentation Program (DURIP)
5. DOD High Performance Computing Services
   http://www.hpcmo.hpc.mil/
6. DOD STARBASE Program
   http://starbasedod.org/index.php
7. Faculty Sabbatical Leave Program
   http://onr.asee.org/about_the_sabbatical_leave_program
8. Historically Black Colleges and Universities and Minority Institutions (HBCU/MI)
   Future Engineering Faculty Program
9. Mathematics Summer Employment Program (MSEP)
   http://www.nsa.gov/careers/opportunities_4_u/students/undergraduate/msep.shtml
10. Multidisciplinary Research Initiative (MURI)
    https://www.asee.org/ndseg/
12. The Naval High School Science Awards Program (NSAP)
    https://secure.onr.navy.mil/NSAP/
13. Naval Research Enterprise Intern Program
    http://nreip.asee.org
DOD Education Resources

14. Naval Research Science & Technology for America's Readiness (N-STAR)
   http://nstarweb.com
15. Navy Postdoctoral Fellowship Program
   http://nrl.asee.org
16. Navy Science and Engineering Apprentice Program (SEAP)
   http://seap.asee.org
   http://www.onr.navy.mil/Education-Outreach/K-12-Programs/SEAP.aspx
17. Presidential Early Career Award in Science & Engineering (PECASE)
18. Science, Mathematics and Research for Transformation (SMART)
   https://smart.asee.org
19. Summer Faculty Fellowship Program (SFFP)
   http://sffp.asee.org
20. Uniformed Services University of the Health Sciences (USUHS)
    http://www.usuhs.mil/
    (USAF/NRC-RRA) Program
22. U.S. Army Educational Outreach Program (USAEOP)
    http://www.usaeop.com
Applied Research (6.2)

Funding Opportunity Sources:

- Air Force Materiel Command / Air Force Research Laboratories (AFRL)
- Army Materiel Command / Army Research Lab / Research, Development, and Engineering Centers
- Army Corps of Engineers / Engineer Research and Development Center (ERDC)
- Office of Naval Research (ONR) / Naval Warfare Centers / Naval Postgraduate School
- Defense Advance Research Projects Agency (DARPA)
- Defense Threat Reduction Agency (DTRA)
- Combatting Terrorism Technical Support Office (CTTSO)
- Defense Forensics Biometrics Agency (DFBA)
- Defense Logistics Agency (DLA)
- Missile Defense Agency (MDA)
- Special Operations Command (SOCOM)
- Environment (SERDP/ESTCP)
- Advanced Manufacturing (SBIR/STTR, Rapid Innovation Fund (RIF), ManTech, Manuf Innovative Inst)
DOD RDT&E Taxonomy - Primer

Science and Technology ($13B in FY18 PBR)

BA1 6.1 Basic Research (TRL 0-1)  greater knowledge of fundamental aspects of phenomena – largely use inspired

BA2 6.2 Appl Research (TRL 2-3)  determine means by which a specific need may be met

BA3 6.3 Adv Technol Development  development / integration of hardware for field expt

Development ($70B in FY18)

BA4 6.4 Demonstration & Validation  evaluate integrated technology in realistic environment

BA5 6.5 Engn and Manuf Development  for projects without approval for full rate production

BA6 6.6 RDT&E Management Support  program managers, ranges, test facilities,…

BA7 6.7 Operational Sys Development  support of development acquisition programs or upgrades

Congressionally Directed Medical Research

SBIR / STTR – 3.2% / 0.35% tax on R&D funding

BA  Budget Activity
RDT&E  Research, Development, Test & Evaluation
SBIR  Small Business Innovation Research
STTR  Small Business Technology Transfer
TRL  Technology Readiness Level
PBR  President’s Budget Request
6.2 Funding in Budget Request

<table>
<thead>
<tr>
<th>AF Applied Research</th>
<th>2017 ($M)</th>
<th>2018 ($M)</th>
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<tr>
<td>0602102F Materials</td>
<td>126</td>
<td>124</td>
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<td>0602201F Aerospace Vehicle Technologies</td>
<td>123</td>
<td>125</td>
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<tr>
<td>0602202F Human Effectiveness Applied Research</td>
<td>112</td>
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<td>0602203F Aerospace Propulsion</td>
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<td>0602204F Aerospace Sensors</td>
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<td>0602601F Space Technology</td>
<td>118</td>
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<td>0602602F Conventional Munitions</td>
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<td>0602605F Directed Energy Technology</td>
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<td>0602788F Dominant Information Sciences and Methods</td>
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<td>0602890F High Energy Laser Research</td>
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<tr>
<th>Naval Applied Research</th>
<th>2017 ($M)</th>
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<tr>
<td>0602114N Power Projection</td>
<td>41</td>
<td>14</td>
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<td>0602123N Force Protection</td>
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<td>0602131M Marine Corps Landing Force Technology</td>
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<td>0602235N Common Picture</td>
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<td>0602236N Warfighter Sustainment</td>
<td>45</td>
<td>49</td>
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<td>0602271N Electromagnetic Systems</td>
<td>119</td>
<td>80</td>
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<tr>
<td>0602435N Ocean Warfighting Environment</td>
<td>43</td>
<td>42</td>
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<tr>
<td>0602651M Joint Non-Lethal Weapons</td>
<td>6</td>
<td>6</td>
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<tr>
<td>0602747N Undersea Warfare</td>
<td>126</td>
<td>56</td>
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<td>0602750N Future Naval Capabilities</td>
<td>165</td>
<td>157</td>
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<tr>
<td>0602782N Mine and Expeditionary Warfare</td>
<td>34</td>
<td>33</td>
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6.2 Funding in Budget Request

<table>
<thead>
<tr>
<th>Program Description</th>
<th>2017 ($M)</th>
<th>2018 ($M)</th>
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<tbody>
<tr>
<td><strong>Army Applied Research</strong></td>
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<tr>
<td>0602105A Materials Technology</td>
<td>31</td>
<td>30</td>
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<td>0602120A Sensors and Electronic Survivability</td>
<td>36</td>
<td>36</td>
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<td>0602122A TRACTOR HIP</td>
<td>7</td>
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<td>0602211A Aviation Technology</td>
<td>66</td>
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<td>0602270A Electronic Warfare</td>
<td>25</td>
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<td>0602303A Missile Technology</td>
<td>44</td>
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<td>0602307A Advanced Weapons Technology</td>
<td>29</td>
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<td>0602308A Advanced Concepts and Simulation</td>
<td>28</td>
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<td>0602601A Combat Vehicle and Automotive Technology</td>
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<td>0602618A Ballistics Technology</td>
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<td>0602622A Chemical, Smoke and Equipment Defeat</td>
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<td>0602623A Joint Service Small Arms Program</td>
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<td>0602624A Weapons and Munitions Technology</td>
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<td>0602705A Electronics and Electronic Devices</td>
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<td>58</td>
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<tr>
<td>0602709A Night Vision Technology</td>
<td>36</td>
<td>35</td>
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<td>0602712A Countermine Systems</td>
<td>37</td>
<td>36</td>
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<td>0602716A Human Factors Engineering Technology</td>
<td>24</td>
<td>24</td>
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<td>0602720A Environmental Quality Technology</td>
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<td>22</td>
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<tr>
<td>0602782A Command, Control, Communications</td>
<td>38</td>
<td>33</td>
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<tr>
<td>0602783A Computer and Software Technology</td>
<td>14</td>
<td>14</td>
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<tr>
<td>0602784A Military Engineering Technology</td>
<td>67</td>
<td>68</td>
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<tr>
<td>0602785A Manpower/Personnel/Training Technology</td>
<td>26</td>
<td>20</td>
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<tr>
<td>0602786A Warfighter Technology</td>
<td>37</td>
<td>40</td>
</tr>
<tr>
<td>0602787A Medical Technology</td>
<td>77</td>
<td>83</td>
</tr>
</tbody>
</table>
### 6.2 Funding in Budget Request

<table>
<thead>
<tr>
<th>DARPA Applied Research</th>
<th>2017 ($M)</th>
<th>2018 ($M)</th>
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<tbody>
<tr>
<td>0602115E Biomedical Technology</td>
<td>115</td>
<td>109</td>
</tr>
<tr>
<td>0602303E Information and Communications Technology</td>
<td>354</td>
<td>393</td>
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<td>0602382E Biological Defense</td>
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<td>13</td>
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<tr>
<td>0602702E Tactical Technology</td>
<td>314</td>
<td>344</td>
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<tr>
<td>0602715E Materials Technology</td>
<td>221</td>
<td>224</td>
</tr>
<tr>
<td>0602716E Electronics Technology</td>
<td>222</td>
<td>295</td>
</tr>
</tbody>
</table>
DOD COI
DOD Current S&T Focus Areas and Priorities
April 2017 presentation to NDIA S&T Conference by Mary Miller

Priorities

Personal Protection & Performance
- Emerging Biosciences
- Human Systems - Cognition Performance & Sustainment

Detection, Sensing, & Navigation
- Quantum
- Nanotechnology
- Precision Position, Navigation, & Timing

Structural Technologies
- Novel Emerging Materials & Advanced Manufacturing
- Weapons Systems
- Engines & Mobility

Electromagnetics & Energetic Systems
- Directed Energy
- Electronic Warfare & Electromagnetic Spectrum
- Energy Efficiency & Power

Information Systems & Decision Support
- Autonomy & Robotics
- Artificial Intelligence
- Future & High Performance Computing
- Cyber
- C4I
- Data Analytics
R&D Focus Areas
April 2017 NDIA Conference Presentation by Mary Miller

- Autonomy & Robotics
- Artificial Intelligence / Man-Machine Interface
- Micro-electronics
- Hypersonics
- Directed Energy
- Manufacturing
- Electronic Warfare
- Cyber

- Future of Computing
- Novel Engineered Materials
- Precision Sensing: Time, Space, Gravity, Electromagnetism
- Emerging Biosciences
  - Synthetic Biology
- Understanding Human and Social Behavior
- Human Performance
DOD Communities of Interest
April 2017 NDIA Presentation

_Cols lead the innovation and the acceleration of advanced concepts and prototypes across three main focus areas:_

<table>
<thead>
<tr>
<th>Mission Focus</th>
<th>Countersrichter Improvised Explosive Devices (IED)</th>
<th>Countersrichter Weapons of Mass Destruction (WMD)</th>
<th>Biomedical (ASBREM*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capabilities enabled by advanced technologies &amp; systems</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Systems / Capability Focus**
Multiple technologies are integrated into complex systems to achieve mission impact

- Human Systems
- Ground and Sea Platforms
- Cyber
- Sensors
- Electronic Warfare
- Command, Control, Communication, Computers and Intelligence (C4I)
- Air Platforms
- Space
- Weapon Technologies

**Technology Focus**
Technology goals with multiple applications

- Energy and Power Technologies
- Advanced Electronics
- Materials and Manufacturing Processes

Alumni CoIs: Engineered Resilient Systems

*ASBREM: Armed Services Biomedical Research Evaluation and Management
COIs were established in 2009 as a mechanism to encourage multi-agency coordination and collaboration in cross-cutting technology focus areas with broad multiple-Component investment. COIs provide a forum for coordinating S&T strategies across the Department, sharing new ideas, technical directions and technology opportunities, jointly planning programs, measuring technical progress, and reporting on the general state of health for specific technology areas.

Advanced Electronics
Air Platforms
Autonomy
Biomedical (ASBREM)
Command, Control, Comms, Computers, and Intelligence (C4I)
CounterIED
CounterWMD
Cyber
Electronic Warfare
Energy & Power Technologies
Ground & Sea Platforms
Human Systems
Materials & Manufacturing Processes
Sensors
Space
Weapons Technologies

Retired: Engineered Resilient Systems
Air Force Materiel Command (AFMC)

The Air Force Materiel Command (AFMC) conducts research, development, test and evaluation, and provides acquisition management services and logistics support necessary to keep Air Force weapon systems ready for war.

Air Force Materiel Command develops, acquires and sustains the aerospace power needed to defend the United States and its interests for today and tomorrow. This is accomplished through management, research, acquisition, development, testing and maintenance of existing and future weapons systems and their components. It consists of center headquarters and host wing units.

**Air Force Installation and Mission Support Center (Provisional)**
installation support management

**Air Force Life Cycle Management Center**
responsible for total life cycle management of Air Force weapon systems.

**Air Force Nuclear Weapons Center**
Deliver nuclear capabilities and winning solutions warfighters use daily to deter and assure

**Air Force Research Laboratory**
discovery, development, and integration of warfighting technologies for our air, space and cyberspace forces

**Air Force Sustainment Center**
depot maintenance, supply chain management and installation support

**Air Force Test Center**
plans, conducts, analyzes, and reports on all flight and ground testing of aircraft, weapons systems, software and components as well as modeling and simulation for the U.S. Air Force. There are three core components for this mission: flying operations, maintenance and engineering.
Open Innovation and Collaboration
Air Force Material Command (AFMC)

**What:** Open innovation is a methodology to capitalize on diverse, often non-traditional talents and insights, wherever they reside, to solve problems. Commercial industry has proven open innovation to be an effective and efficient mechanism to overcome seemingly impossible technology and/or new product barriers.

This BAA provides AFRL an acquisition tool with the flexibility to rapidly solicit proposals through Calls for Proposals and make awards to deliver innovative technical solutions to meet present and future compelling Air Force needs as ever-changing operational issues become known. This announcement posts the basic BAA and does not request proposals at this time. The requirements, terms and specific deliverables of each Call for Proposals will vary depending on the nature of the challenge being addressed. It is anticipated that Call(s) for Proposals will address challenges in (or the intersection between) such as the following technology areas:

**Materials:**
- Exploiting material properties to meet unique needs
- Material analysis, concept / prototype development, and scale up

**Manufacturing Processes** that enable affordable design, production and sustainment operations

**Aerospace systems:**
- Vehicle design, control, and coordinated autonomous and/or manned operations
- Power and propulsion to enable next generation systems

**Human Effectiveness:**
- Methods and techniques to enhance human performance and resiliency in challenging environments
- Man – Machine teaming and coordinated activities

**Sensors and Sensing Systems:**
- Sensor and sensing system concept development, design, integration and prototyping
- Data integration and exploitation

**When:** See specific Call for Proposals - the BAA is open for five years 2014-2019

**Where:** BAA-RQKD-2014-0001
### Air Force Research Laboratory Directorates and Centers

<table>
<thead>
<tr>
<th>Directorate</th>
<th>Location</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office of Scientific Research (AFOSR), Arlington VA</td>
<td></td>
<td>basic research funding agency</td>
</tr>
<tr>
<td>Directed Energy (RD), Kirtland AFB NM</td>
<td></td>
<td>laser systems, high power electromagnetics, weapons modeling and simulation, and directed energy and electro-optics for space superiority.</td>
</tr>
<tr>
<td>Information (RI), Rome NY</td>
<td></td>
<td>research and advanced development in the cyber domain</td>
</tr>
<tr>
<td>Space Vehicles (RV), Kirtland AFB NM</td>
<td></td>
<td>develop and transition innovative high-payoff space technologies</td>
</tr>
<tr>
<td>Aerospace Systems (RQ), WPAFB OH</td>
<td></td>
<td>scramjet engines, alternative fuels, unmanned vehicles, hypersonic vehicles, collision avoidance and aircraft energy optimization (note this reflects a merger of the prior Air Vehicles Directorate RB and the Propulsion Directorate RZ).</td>
</tr>
<tr>
<td>Munitions (RW), Eglin AFB FL</td>
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<td>conventional munitions technologies to provide the Air Force with a strong technology base upon which future air-delivered munitions</td>
</tr>
<tr>
<td>Materials and Manufacturing (RX), WPAFB OH</td>
<td></td>
<td>develops materials, processes, and advanced manufacturing technologies for aircraft, spacecraft, missiles, rockets, and ground-based systems and their structural, electronic and optical components.</td>
</tr>
<tr>
<td>Sensors (RY), WPAFB OH</td>
<td></td>
<td>developing, demonstrating and transitioning advanced sensors and sensor technologies</td>
</tr>
<tr>
<td>711th Human Performance Wing (HPW), WPAFB OH</td>
<td></td>
<td>study and advancement of human performance</td>
</tr>
</tbody>
</table>
Air Force University Centers of Excellence

**What:** Initiated by an AFRL Technology Directorate, but basic research funding comes from AFOSR (present program managers listed below)

**Purpose:**
- perform research in high priority AF interest area
- educate US students in critical technology areas
- frequent professional interchanges between AFRL and University personnel
- strengthen AFRL in-house technical capabilities

**When:** Periodic solicitations announced on FBO.

**How Much:** Funding for 5 years plus ramp up/down

- ~$500K/yr 6.1 funding by AFOSR
- ~$500K/yr 6.2 funding by AFRL TD

University Matching (there are rare cases without matching funds)

**Examples:**

<table>
<thead>
<tr>
<th>Year</th>
<th>TD</th>
<th>Univ</th>
<th>Center Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>AFRL/RI</td>
<td></td>
<td>Efficient and Robust Machine Learning</td>
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<tr>
<td>2017</td>
<td>AFRL/RH</td>
<td></td>
<td>Trusted Human-Machine Teaming</td>
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<tr>
<td>2016</td>
<td>AFRL/RQR</td>
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<td>Multi-Fidelity Modeling of Combustion Instabilities</td>
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<tr>
<td>2016</td>
<td>AFRL/RV</td>
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<td>Astrodynamics</td>
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<tr>
<td>2015</td>
<td>AFRL/RD</td>
<td>UMN</td>
<td>Electromagnetic Interference for Extreme EM Environments</td>
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<tr>
<td>2015</td>
<td>AFRL/RX</td>
<td>Northwestern</td>
<td>Advanced Bioprogrammable Nanomaterials</td>
</tr>
<tr>
<td>2014</td>
<td>AFRL/RW (Bradshaw)</td>
<td>Univ Wash</td>
<td>Nature Inspired Sciences (sensing)</td>
</tr>
<tr>
<td>2013</td>
<td>AFRL/RY</td>
<td>U. Wisc</td>
<td>Guided-wave Infrared Sources</td>
</tr>
<tr>
<td>2012</td>
<td>AFRL/RX</td>
<td>JHU</td>
<td>Integrated Computational Materials S&amp;E of Structural Materials</td>
</tr>
<tr>
<td>2011</td>
<td>AFRL/RW (Les Lee)</td>
<td>CalTech</td>
<td>Hi-rate Deformation Physics of Heterogeneous Materials</td>
</tr>
<tr>
<td>2010</td>
<td>AFRL/RW (Les Lee)</td>
<td>CalTech</td>
<td>Hi-rate Deformation Physics of Heterogeneous Materials</td>
</tr>
<tr>
<td>2010</td>
<td>AFRL/RI</td>
<td>UIUC</td>
<td>Assured Cloud Computing</td>
</tr>
</tbody>
</table>
**What:** This is a five-year, open-ended Broad Agency Announcement (BAA) to solicit research proposals for the United States Air Force Research Laboratory (AFRL) Directed Energy (RD) Directorate. This BAA is a university grant vehicle that can provide small grants of $100k or less to students/professors in a timely manner for the purpose of engaging U.S./U.S. territories’ colleges and universities in directed energy-related basic, applied, and advanced research projects that are of interest to the Department of Defense.

**How Much:** Multiple awards of grants up to $100k are anticipated with a period of performance ranging from one to two years.

**When:** This BAA will remain open for a period of five years from the date of publication - til 1 Apr 2017. Proposals may be submitted at any time during that period. However, prospective offerors/applicants must call the technology points of contacts (POCs) before submission.

**Where:** BAA-RDK-2012-0001
AFRL /RI (Information Directorate)  
Information Institute

**What:** The Information Institute is a virtual, collaborative research environment concentrating on Information Science and Technology. The Information Institute currently consists of universities allied with the US Air Force Research Laboratory Information Directorate in Rome, NY. The Information Directorate is focused on basic research and advanced development in the cyber domain.

Visiting Faculty Research Program

AFRL/RV (Space Vehicles)
University Grants Program

What: In Fiscal Year 2012, approximately 24 grants to academic institutions. Awards may be proposed for up to three years. Awards may start any time during the fiscal year. Due to funding fluctuations, this does not guarantee funds being available in the amount outlined.

Topics of interest are:
1. Space Electro-Optical and Infrared Sensing (EO/IR)
2. Space Electronics
3. Space Environmental Impacts and Mitigation
4. Space Platforms & Operations Technologies
5. Space Experiments
6. Quantum Computer Technology
7. Strategic Systems and Responsive Launch Technologies

Before submitting a research proposal, you must contact the appropriate technical point of contact (TPOC). You can do this by contacting the appropriate AFRL/RV Program Officer who can provide greater detail about a particular opportunity. The Program Officer is required to complete a preliminary grant tool worksheet. This will advise the TPOC whether to advise you to proceed with proposal submission or explore other proposal opportunities under another assistance or acquisition solicitation.

How Much: About $20M is anticipated to be available for support of actions in FY2012. Research proposals ≤ $150K per year are encouraged.

Where: BAA RV-10-03
RDECOM develops technologies in its laboratory and research, development and engineering centers. It also integrates technologies developed in partnership with an extensive network of academic, industry, and international partners.

**Army Research Laboratory (ARL, 6.1 and 6.2)**
Discover, innovate, and transition science and technology to ensure dominant strategic land power.

**Armament (ARDEC) - Picatinny Arsenal, NJ**
Empower, unburden, and protect the Warfighter by providing superior armaments solutions that dominate the battlefield

**Aviation and Missile (AMRDEC) - Redstone Arsenal, AL**
- Aeroflightdynamics Directorate - Moffet Field, CA
- Aviation Applied Technology Directorate - Fort Eustis VA
Deliver collaborative and innovative technical capabilities for responsive and cost-effective research, product development, and life cycle systems engineering solutions.

**Communications-Electronics (CERDEC)**
- Command Power & Integration Directorate - Aberdeen MD
- Night Vision & Electronic Sensors Directorate - Fort Belvoir VA
Capabilities that enable situational awareness and understanding, establish and secure communications, and protect Soldiers from surprise attack.

**Edgewood Chemical Biological Center (ECBC) - Aberdeen, MD**
Innovative solutions to counter WMD threats

**Natick Soldier Systems (NSRDEC) - Natick MA**
Maximize The Warfighter’s Survivability, Sustainability, Mobility, Combat Effectiveness And Field Quality Of Life By Treating The Warfighter As A System.

**Tank Automotive (TARDEC) - Warren MI**
Develops, integrates and sustains the right technology solutions for all manned and unmanned DoD ground vehicle systems (GVS) and combat service support (CSS) equipment
Army Research Laboratory

Army Research Office (ARO)
Utilizing Basic Research monies, initiates the scientific and far reaching technological discoveries in extramural organizations: educational institutions, nonprofit organizations, and private industry.

Computational and Informational Sciences Directorate (CISD)
Programs address the sensing, distribution, analysis, and display of information in the modern battle space: communications, atmospheric modeling, battlefield visualization, and computing.

Human Research and Engineering Directorate (HRED)
The HRED examines human performance in the perceptual, cognitive, and psychomotor domains in order to increase the body of knowledge of human capabilities and limitations, and to assess the impact of emerging technologies on soldier performance.

Sensors and Electron Devices Directorate (SEDD)
SEDD is the Army’s principal center for research and development in the exploration and exploitation of the electromagnetic spectrum, which includes radio frequency, microwave, millimeter-wave, infrared (IR), visible, and audio regions.

Vehicle Technology Directorate (VTD)
VTD leads the ARL Major Laboratory Program in mobility and the RDECOM Technology Focus Team in mobility and logistics. The technology focus areas within the ARL and RDECOM programs have been defined as platform, propulsion, intelligent systems and logistics.

Weapons and Materials Research Directorate (WMRD)
The goals of the WMRD are to enhance the lethality and survivability of weapons systems, and to meet the soldier’s technology needs for advanced weaponry and protection.
National Research Council
Postdoctoral Fellowship Program
(also a good way to ascertain basic/applied research interests)
http://nrc58.nas.edu/RAPLab10/Opportunity/Programs.aspx

ARL Army Research Laboratory
http://nrc58.nas.edu/RAPLab10/Opportunity/Opportunities.aspx?LabCode=76

AMRMC Army Medical Research and Material Command

AMRDEC Army Aviation and Missile Research, Development and Engineering Center

CBD Chemical and Biological Defense Funded Laboratories
http://nrc58.nas.edu/RAPLab10/Opportunity/Opportunities.aspx?LabCode=01

ECBC Edgewood Chemical Biological Center

IWR Army Corp of Engineers Institute for Water Resources

NSRDEC US Army Natick Soldier Research, Development and Engineering Center

ARDEC US Army Res, Dev and Engn Com / Armament Res, Dev & Eng Ctr

NVESD US Army Res Dev & Engn Com / Night Vision & Elect Sensors Dir
Army Research Laboratory - University Opportunities

University Centers (UARCs) are university led initiatives with a 3-5 year duration that are focused on S&T issues of critical importance to the Army. Examples include:
- Materials Center of Excellence at Univ. of Delaware
- Inst for Creative Biotechnology at UCSB
- Inst for Creative Technology at USC
- Inst for Soldier Nanotechnologies at MIT

Educational Partnership Agreements (EPAs) provide ARL the means to assist universities in extending their research capabilities in areas relevant to Army needs and provide an opportunity for students to work on degrees in programs of interest to ARL. The university develops scientific and engineering expertise applicable to future Army needs. Students working on ARL-sponsored research receive an early exposure to ARL thereby expanding the possible talent pool for future recruitment.

Cooperative Research and Development Agreements encourage outside businesses and university organizations to share in the discovery of and investment in technologies.
Collaborative Research Alliances
Government, industrial, and academic institutions to address some of the fundamental scientific and technological underpinnings of our military defense systems. The CRA’s have 5 year duration with option for an additional 5 years. Funding at approximately $2.5M/yr.

- Materials in Extreme Dynamic Environments (MEDE) in 2012
  - Johns Hopkins Univ. lead
- Multiscale Multidisciplinary Modeling of Electronic Materials (MSME) in 2012
  - Univ. of Utah lead
- Cybersecurity in 2013
  - PSU lead

Collaborative Technology Alliances
Government, industry, and academia research partnerships focused on Army Transformation technologies in which the expertise resident in the private sector can be leveraged to address Army challenges. They are cooperative agreements for core research with task order contracts to facilitate technology transition. Funding is budgeted for novel research proposals from outside the alliances. The CTAs have 5 to 8 year durations and are resourced at $5 million to $8 million per year.

- Micro Autonomous Systems and Technology (MAST) in 2008
  - BAE lead
- Network Science (NS) in 2009
  - BBN Technology Industrial lead, PSU, UIUC, RPI as lead Universities
- Robotics in 2010
  - General Dynamics Robotics Systems lead
- Cognition and Neuroergonomics (CAN) in 2010
  - DCS Corp lead
What: This Broad Agency Announcement (BAA) sets forth research areas of interest to the Army Research Laboratory (ARL) Directorates and Army Research Office (ARO, basic research only),

Research proposals are sought from educational institutions, nonprofit organizations, and commercial organizations for research in materials sciences; ballistics and aeromechanics sciences; information sciences; human sciences; survivability, lethality, and vulnerability analysis and assessment; chemistry; electronics; physics; environmental sciences; life sciences; mechanical sciences, mathematical sciences, computing sciences and network sciences.

Although ARL Directorates consider funding proposals for extramural research programs, they can fund only a modest number of proposals. But ARL Directorates are highly interested in performing research in collaboration with other scientists and engineers. So, in addition to funding select external research projects, the ARL Directorates also have a strong interest in performing joint research with other organizations.

ARL strongly encourages organizations and individuals interested in submitting research proposals to make preliminary inquiries as to the general need for the type of research effort contemplated, before expending extensive effort in preparing a detailed research proposal or submitting proprietary information. The TPOCs’ names, telephone numbers, and e-mail addresses are listed immediately after each research area of interest in the BAA and they should be contacted as appropriate prior to the submission of white papers or formal proposals.

When: Any time in the interval 15 May 2012 – 31 March 2017

Where: BAA W911NF-12-R-0011-03
## ARL Research Interests

### Core Competency 1: Materials Science

<table>
<thead>
<tr>
<th>Research Topic</th>
<th>POC</th>
<th>Directorate</th>
<th>email address</th>
<th>telephone</th>
<th>location</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.1 Structural Materials and Components</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1.1 Composite Materials</td>
<td>Ms. Pauline Smith</td>
<td>WMRD</td>
<td><a href="mailto:pauline.m.smith.civ@mail.mil">pauline.m.smith.civ@mail.mil</a></td>
<td>410 306 0899</td>
<td>APG, Md</td>
</tr>
<tr>
<td>1.1.2 Advanced Materials and Materials Processing</td>
<td>Ms. Pauline Smith</td>
<td>WMRD</td>
<td>pauline.m.smith.civ@</td>
<td>410 306 0899</td>
<td>APG, Md</td>
</tr>
<tr>
<td>1.1.3 High Rate Deformation and Failure of Materials</td>
<td>Dr. Todd W. Bjerke</td>
<td>WMRD</td>
<td>todd.w.bjerke2.civ@</td>
<td>410 278 5819</td>
<td>APG, Md</td>
</tr>
<tr>
<td>1.1.4 Structural Mechanics</td>
<td>Dr. Jaret Riddick</td>
<td><a href="mailto:jaret.c.riddick.civ@mail.mil">jaret.c.riddick.civ@mail.mil</a></td>
<td></td>
<td>410 278 9831</td>
<td>APG, Md</td>
</tr>
<tr>
<td>1.1.5 Multifunctional Structures</td>
<td>Dr. Mark Bundy</td>
<td>WMRD</td>
<td>mark.l.bundy2.civ@</td>
<td>410 278 4318</td>
<td>APG, Md</td>
</tr>
<tr>
<td>1.1.6 Adaptive Structures</td>
<td>Dr. Mark Bundy</td>
<td>WMRD</td>
<td>mark.l.bundy2.civ@</td>
<td>410 278 4318</td>
<td>APG, Md</td>
</tr>
<tr>
<td>1.1.7 Nanomaterials Processing</td>
<td>Mr. Victor K. Champagne</td>
<td>WMRD</td>
<td>victor.k.champagne.civ@</td>
<td>410 306 0822</td>
<td>APG, Md</td>
</tr>
<tr>
<td>1.1.8 Coatings and Corrosion Science</td>
<td>Dr. John La Scala</td>
<td>WMRD</td>
<td>john.j.lascala.civ@</td>
<td>410 306 0687</td>
<td>APG, Md</td>
</tr>
<tr>
<td><strong>1.2 Electronic Materials and Devices</strong></td>
<td>Electronics and RF Division - AMSRD-ARL-SE-R</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2.1 MEMS</td>
<td>Dr. Chris J. Morris</td>
<td>SEDD</td>
<td>christopher.j.morris58.civ@</td>
<td>301 394 0950</td>
<td>Adelphi, Md</td>
</tr>
<tr>
<td>1.2.2 Nanoelectronics and Nanosensors</td>
<td>Dr. Madan Dubey</td>
<td>SEDD</td>
<td>madan.dubey.civ@</td>
<td>301 394 1186</td>
<td>Adelphi, Md</td>
</tr>
<tr>
<td>1.2.3 Piezoelectric MEMS Technology</td>
<td>Dr. Ronald G. Polcawich</td>
<td>SEDD</td>
<td>ronald.g.polcawich.civ@</td>
<td>301 394 1275</td>
<td>Adelphi, Md</td>
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<tr>
<td>1.2.4 Emerging Technologies for Semicon</td>
<td>Dr. Glen Birdwell</td>
<td>SEDD</td>
<td>anthony.g.birdwell.civ@</td>
<td>301 394 0601</td>
<td>Adelphi, Md</td>
</tr>
<tr>
<td>1.2.5 Small RF (microsensor) Systems</td>
<td>Mr. Edward Viveiros</td>
<td>SEDD</td>
<td>edward.a.viveiros2.civ@</td>
<td>301 394 0930</td>
<td>Adelphi, Md</td>
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<tr>
<td>1.2.6 Microwave Device and Analog Signal Processing R&amp;D</td>
<td>Dr. Joe Qiu</td>
<td>jeo.x.qiu.civ@</td>
<td>301 394 2532</td>
<td>Adelphi, Md</td>
<td></td>
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<tr>
<td>1.2.7 Broadband Analog, Microwave, MM wave and MixeDr. James E. Wilson</td>
<td>SEDD</td>
<td>james.w.wilson889.civ@</td>
<td>301 394 0328</td>
<td>Adelphi, Md</td>
<td></td>
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<tr>
<td>1.2.8 Frequency Control</td>
<td>Dr. Joe Qiu</td>
<td>SEDD</td>
<td>jeo.x.qiu.civ@</td>
<td>301 394 2532</td>
<td>Adelphi, Md</td>
</tr>
<tr>
<td>1.2.9 High Power RF Sources and Amplifiers</td>
<td>Dr. Tony Ivanov</td>
<td>SEDD</td>
<td>tony.g.ivanov.civ@</td>
<td>310 394 3568</td>
<td>Adelphi, Md</td>
</tr>
<tr>
<td>1.2.10 RF to THz Devices and IC Technology</td>
<td>Dr. H. Alfred Hung</td>
<td>SEDD</td>
<td>hinglo.i.hung.civ@</td>
<td>310 394 2997</td>
<td>Adelphi, Md</td>
</tr>
<tr>
<td>1.2.11 RF Wide Band Gap Semiconductors, Devices, and CI</td>
<td>Dr. Pankaj Shah</td>
<td>SEDD</td>
<td>pankaj.b.shah.civ@</td>
<td>301 394 2809</td>
<td>Adelphi, Md</td>
</tr>
<tr>
<td>1.2.12 Antenna Front End and Receiver Technology for MultiDr. Steven Weiss</td>
<td>SEDD</td>
<td>steven.j.weiss14.civ@</td>
<td>301 394 1987</td>
<td>Adelphi, Md</td>
<td></td>
</tr>
<tr>
<td>1.2.13 Conformal Antennas</td>
<td>Dr. Steven Weiss</td>
<td>SEDD</td>
<td>steven.j.weiss14.civ@</td>
<td>301 394 1987</td>
<td>Adelphi, Md</td>
</tr>
<tr>
<td>1.2.14 Vehicle Integrated Antenna Technologies</td>
<td>Dr. Steven Weiss</td>
<td>SEDD</td>
<td>steven.j.weiss14.civ@</td>
<td>301 394 1987</td>
<td>Adelphi, Md</td>
</tr>
<tr>
<td>1.2.15 Mmmwave and Sub Mmmwave Sensor Technology</td>
<td>Mr. David Wikner</td>
<td>SEDD</td>
<td>david.a.wikner.civ@</td>
<td>301 394 0865</td>
<td>Adelphi, Md</td>
</tr>
<tr>
<td>1.2.16 Next Gen Digital Imaging</td>
<td>Dr. Joseph Mait</td>
<td>SEDD</td>
<td>joseph.n.mait2.civ@</td>
<td>301 394 2462</td>
<td>Adelphi, Md</td>
</tr>
<tr>
<td>1.2.17 Electronic Warfare/Electronic Attack</td>
<td>Mr. Eric Adler</td>
<td>SEDD</td>
<td>eric.d.adler.civ@</td>
<td>301 394 0933</td>
<td>Adelphi, Md</td>
</tr>
<tr>
<td>1.2.18 Prognostics and Diagnostics</td>
<td>Mr. Kwok F. Tom</td>
<td>SEDD</td>
<td>kwok.f.tom.civ@</td>
<td>301 394 2612</td>
<td>Adelphi, Md</td>
</tr>
<tr>
<td>1.2.19 Prognostics and Diagnostics for Condition-based M</td>
<td>Dr. Jaret Riddick</td>
<td><a href="mailto:jaret.c.riddick.civ@mail.mil">jaret.c.riddick.civ@mail.mil</a></td>
<td>410 278 9831</td>
<td>APG, Md</td>
<td></td>
</tr>
<tr>
<td>1.2.20 Bio-/Neuro-inspired Sensing and Information Mana Dr. William D. Nothwang</td>
<td>SEDD</td>
<td>william.d.nothwang.civ@</td>
<td>301 394 1163</td>
<td>Adelphi, Md</td>
<td></td>
</tr>
<tr>
<td>1.2.21 Quantum, Bio, and Flexible Materials for Next Gen</td>
<td>Dr. Eric Forsythe</td>
<td>SEDD</td>
<td>eric.w.forsythe.civ@</td>
<td>301 394 0606</td>
<td>Adelphi, Md</td>
</tr>
<tr>
<td>Flexible opto-electronic materials and devices</td>
<td>Dr. Parvez N. Uppal</td>
<td>SEDD</td>
<td>parvez.n.uppal.civ@</td>
<td>301 394 5757</td>
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</tr>
<tr>
<td>Quantum and Nano-electronics</td>
<td>Dr. Amethist Finch</td>
<td>SEDD</td>
<td>amethist.s.finch.civ@</td>
<td>301 394 0326</td>
<td>Adelphi, Md</td>
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<tr>
<td>Bio-electronics</td>
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</table>
ARL Research Interests (continued)

### Core Competency 1: Materials Science

<table>
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<tr>
<th>Research Topic</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>1.3 Photonic Materials and Devices</strong></td>
<td></td>
<td><strong>Electro-optics and Photonics</strong></td>
<td>Division - AMSRD-ARL-SE-E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.3.1 Photonic Devices and Modules</td>
<td>Dr. Lawrence Stout</td>
<td>SEDD</td>
<td>lawrence.m.stout.civ@</td>
<td>301 394 4616</td>
<td>Adelphi, Md</td>
</tr>
<tr>
<td>1.3.2 Novel Optical Processing Algorithms and Technique</td>
<td>Dr. Lawrence Stout</td>
<td>SEDD</td>
<td>lawrence.m.stout.civ@</td>
<td>301 394 4616</td>
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</tr>
<tr>
<td>1.3.3 EO/IR sensors</td>
<td>Mr. Barry Stann</td>
<td>SEDD</td>
<td>barry.l.stann.civ@</td>
<td>301 394 3141</td>
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</tr>
<tr>
<td>1.3.4 IR Detectors and Power Sources</td>
<td>Dr. Priyalal Wijewarnaurs</td>
<td>SEDD</td>
<td>priyalal.s.wijewarnaursuriya.civ@</td>
<td>301 394 0963</td>
<td>Adelphi, Md</td>
</tr>
<tr>
<td>1.3.5 Novel and Highly Scalable Diode-Pumped Solid State</td>
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<td>1.3.7 Luminescent Materials and Devices</td>
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<td>1.3.9 Biologically Inspired and Biologically Derived Sensors</td>
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<td>1.3.10 Adv Concepts for Hazardous Material Sensing Applications</td>
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<td>1.3.11 Technology Demonstrations and Assessments for DOD</td>
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<td>1.3.12 Technology Demonstrations and Assessments for SOLIC</td>
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### Energy Materials and Components

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<td>1.4.1 Electrochemical Power Production and Energy Storage</td>
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# ARL Research Interests (continued)

## Core Competency 2: Ballistics and Aeromechanics Sciences

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<td>2.2.1 Warhead and Penetrator Technology</td>
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<td>2.3.1 Rotorcraft Aeroelasticity</td>
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## Core Competency 3: Information Sciences

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<td>3.1.1 Network Theory</td>
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<td>3.3.1 Simulation-based Engineering Sciences</td>
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### Core Competency 4: Human Sciences

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<td>4.2.6 Training Application Environments: Ground</td>
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</tr>
<tr>
<td>4.2.6.1 Embedded Simulation and Training for Combat Sysl</td>
<td>Ms. Latika Eifert</td>
<td>HRED</td>
<td><a href="mailto:latika.eifert@us.army.mil">latika.eifert@us.army.mil</a></td>
<td>407 384 5338</td>
<td>Orlando, FL</td>
</tr>
<tr>
<td>4.2.6.2 Tactical Engagement Simulation Sensor Technology</td>
<td>Mr. Frank Tucker</td>
<td>HRED</td>
<td><a href="mailto:frank.tucker2@us.army.mil">frank.tucker2@us.army.mil</a></td>
<td>407 384 5448</td>
<td>Orlando, FL</td>
</tr>
<tr>
<td>4.2.6.3 Indoor Position, Location and Tracking for Live Trai</td>
<td>Mr. Frank Tucker</td>
<td>HRED</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>4.2.7 Training Application Environments</td>
<td>Mr. Jack Norfleet</td>
<td>HRED</td>
<td><a href="mailto:jack.norfleet@us.army.mil">jack.norfleet@us.army.mil</a></td>
<td>407 384 3897</td>
<td>Orlando, FL</td>
</tr>
<tr>
<td>4.2.8 Training Application environments Dismounted Soldier</td>
<td>Mr. Pat Garrity</td>
<td>HRED</td>
<td><a href="mailto:pat.garrity@us.army.mil">pat.garrity@us.army.mil</a></td>
<td>407 384 3663</td>
<td>Orlando, FL</td>
</tr>
<tr>
<td>4.2.9 Advanced Situational / Battlespace Awareness</td>
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</tr>
<tr>
<td>4.2.9.1 Adversarial Reasoning</td>
<td>Mr. Joseph Traugott</td>
<td>HRED</td>
<td><a href="mailto:joseph.f.traugott2.civ@mail.mil">joseph.f.traugott2.civ@mail.mil</a></td>
<td>407 384 3988</td>
<td>Orlando, FL</td>
</tr>
<tr>
<td>4.2.9.2 Emerging Modeling and Simulation Technologies</td>
<td>Mr. Joseph Traugott</td>
<td>HRED</td>
<td><a href="mailto:joseph.f.traugott2.civ@mail.mil">joseph.f.traugott2.civ@mail.mil</a></td>
<td>407 384 3988</td>
<td>Orlando, FL</td>
</tr>
<tr>
<td>4.3 Human systems Integration</td>
<td>RDRL-HR</td>
<td>HRED</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.3.1 Human Systems Integration</td>
<td>Dr. Pam Savage-Knepschiel</td>
<td>HRED</td>
<td>pamela.a.savage-knepschield.civ@</td>
<td>410 278 5916</td>
<td>APG, Md</td>
</tr>
<tr>
<td>4.3.2 Human Robotic Interaction</td>
<td>Dr. Don Headley</td>
<td>HRED</td>
<td>donald.b.headley.civ@</td>
<td>410 278 5919</td>
<td>APG, Md</td>
</tr>
</tbody>
</table>

### Core Competency 5: Survivability, Lethality, and Vulnerability Analysis and Assessment

<table>
<thead>
<tr>
<th>Research Topic</th>
<th>POC</th>
<th>Directorate</th>
<th>email address</th>
<th>telephone</th>
<th>location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ballistic vulnerability Analysis and Assessment</td>
<td>Ballistics and NBC Division - AMSRD-ARL-SL-B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1.1 Vulnerability Research and Analysis for Under-body</td>
<td>Mr. Michael Tegtmeyer</td>
<td>SLAD</td>
<td>michael.b.tegtmeyer.civ@</td>
<td>410 278 6074</td>
<td>APG, Md</td>
</tr>
<tr>
<td>5.2 Electronic and Information Warfare Vulnerability</td>
<td>Information and Electronic Protection Division - AMSRD-ARL-SL-E</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.2.1 RF Directed Energy/High Power Microwave</td>
<td>Mr. Daniel Williams</td>
<td>SLAD</td>
<td>daniel.s.williams52.civ@</td>
<td>575 678 4694</td>
<td>White Sands,</td>
</tr>
<tr>
<td>5.2.2 RF Digital Models/Simulations</td>
<td>Mr. Jose Gonzalez</td>
<td>SLAD</td>
<td>jose.m.gonzalez158.civ@</td>
<td>575 678 5309</td>
<td>White Sands,</td>
</tr>
</tbody>
</table>
Examples of RDEC Solicitations
What: This Broad Agency Announcement (BAA) is intended to fulfill requirements for scientific study and experimentation directed toward advancing state-of-the-art technologies and/or increasing knowledge and understanding as a means of eliminating current technology barriers.
   A. Combat Feeding Equipment and Systems
   B. Combat Ration Research and Development
   C. Warfighter Systems Technologies
   D. Shelters and Life Support Technologies for Contingency Basing
   E. Airdrop–Advanced Personnel and Cargo Airdrop Systems
   F. Textile Technologies
   G. Modeling and Simulation
   H. Warfighter Advanced Technologies
   I. Technology Enabled Capability Demonstrations (TECDs)

When: Effective from 1 March 2013–31 March 2015

Where: Solicitation Number: BAA W911QY-13-R-0032
Edgewood Chemical and Biological Center

**What:** Support the acquisition of unique and innovative concepts for basic and applied research and development efforts not related to the development of specific systems or hardware through the receipt of concept papers. ECBC competitively solicits project offers in the Technical Topic areas, including:

- Aerosol technology
- Decontamination
- Biological detection
- Early warning and detection
- Biotechnology
- Flame and incendiary technology
- Chemical detection
- Modeling, simulation & analysis
- Collective protection
- Respiratory protection
- Counterterrorism
- Smoke/obscurant munitions

**When:** The BAA is revised approximately every year. It is continually open for submissions, which are evaluated on their own merit against the Government's requirements, not against the submissions of other offerors.

**Where:** Broad Agency Announcement (BAA) ECBC-11
What: The Space and Terrestrial Communications Directorate (S&TCD) is part of the Communications, Electronic Research Development Engineering Command (CERDEC). There are six Program Directorates: Information Assurance, Space & Terrestrial Communications (SATCOM), Systems Engineering Architecture, Modeling and Simulations (SEAMS), Antennas & Spectrum Analysis, Tactical Wireless Networking, GIG Tactical Networks, as well as Special Projects Offices. Each Program Directorate has a specific mission area of responsibility in support of the Army’s need for the most modern strategic and tactical communication technologies.

CERDEC encourages industry interested in conducting scientific research, educational institutions, small businesses, and small disadvantaged business concerns, historically black colleges, university and minority business enterprises and institutions to submit proposals.

The Government may also consider initial white paper responses before proposal submission. The offeror should first contact the Government TPOC for the particular topic to determine if the TPOC is accepting white papers at that time. The white paper should address the following:

1. A high level description of the concept, technology or product.
2. Expected deliverables.
3. Is the proposed technology leveraged from commercial programs?
4. Does the proposed technology or product contain a proprietary solution?
5. Can the technology be matured sufficiently to meet a Technology Readiness Level (TRL) of 5 after 12 months of effort?

When: any time in the interval 31 Jan 2013 to 31 Jan 2018

Where: W15P7T-13-R-A424, Amended 31 October 2013
What: The U. S. Army CERDEC is soliciting proposals under this BAA for the performance of research, development, design, and testing that directly supports advancement of battlefield technologies in the area of Command and Control (C2). The aim of this BAA is to discover technical approaches to improve and enhance current and future land warrior capabilities, flexibility, and responsiveness in line with CERDECs strategic vision for enhancing Warfighter capabilities to operate in a symmetric and unsymmetrical environment.

Topics of Interest:
- Adapting Mission Command Software
- Emerging Mission Command
- Unmanned Systems
- Flexible Electronics
- Pseudolite Systems
- Vehicle Navigation System
- Inertial Navigation
- Positioning
- Aiding Sensors for Navigation Systems
- Navigation Sensor Fusion
- Biomimetics for Navigation Purposes
- Timing for PNT Systems

Cost plus fixed fee contracts anticipated

When: through 16 Feb 2017

Where: BAA W56KGU-15-R-0022
CERDEC
Intelligence and information Warfare Directorate (I2WD)

What: The research areas described may have short or long-range impact on Army Signals Intelligence (SIGINT), Electronic Intelligence (ELINT), Measurement & Signature Intelligence (MASINT), Electronic Warfare (EW), Information Operations (IO), Information Warfare (IW), Language Translation, Command, Control, Communication, Computers Intelligence, Surveillance, and Reconnaissance (C4-ISR) Integrity, Automatic Target Recognition (ATR), Combat Identification (CID), Radio Detecting and Ranging (RADAR), Aircraft and Ground Vehicle Survivability Equipment (ASE & GSE), Electro-Optics (EO), or Infrared (IR) requirements advancement.

Cost plus fixed fee contracts

When: open 5 years from initial date of issue (26 Aug 2014)

Where: BAA W56KGU-16-A330 (as amended 6 June 2016)
**US Army Corps of Engineers (USACE)**
**ARMY ENGINEER RESEARCH AND DEVELOPMENT CENTER (ERDC)**

**What:** The ERDC is responsible for conducting research in the broad fields of hydraulics, dredging, coastal engineering, instrumentation, oceanography, remote sensing, geotechnical engineering, earthquake engineering, soil effects, vehicle mobility, self-contained munitions, military engineering, geophysics, pavements, protective structures, aquatic plants, water quality, dredged material, treatment of hazardous waste, wetlands, physical/mechanical/chemical properties of snow and other frozen precipitation, infrastructure and environmental issues for installations, computer science, telecommunications management, energy, facilities maintenance, materials and structures, engineering processes, environmental processes, land and heritage conservation, and ecological processes.

Proposed efforts shall focus on supporting ERDC’s requirements for scientific study and experimentation directed toward advancing the state-of-the-art or increasing knowledge or understanding, rather than focusing on a specific system or hardware solution. All proposals initially submitted in response to this BAA will be considered pre-proposals. Offerors of pre-proposals receiving favorable initial review will be encouraged to submit a more detailed full proposal.

**When:** Proposals may be accepted at any time.

**Where:** BAA W912HZ-17-BAA-01
Naval Perspective on S&T
(S&T must address near-term objectives & long-term challenges)

How we work:
Present . . .

Today’s
Navy and
Marine Corps

• Naval Research Enterprise
• Technology Solutions
• NR-Stat
• Swampworks

5 Years . . .

The Next
Navy and
Marine Corps
• Requirements-Driven FNCs
• Transformational Technologies
• Fleet/Force Experimentation

5 ⇒ 20 Years . . .

Navy and
Marine Corps
After Next
• Idea Exploration
• Naval Unique
• Naval Essential

Exploitation & Deployment

Discovery & Invention

Note: Percentages indicate approximate division of total DoN S&T annual investment in each area.
Updated 22 Apr 2003

From Dr. Starnes Walker (ex) ONR TD
The Future Naval Capabilities (FNC) program is a 6.2 - 6.3 program designed to develop and transition cutting-edge technology products to acquisition managers. Through the FNC program, the Office of Naval Research (ONR) responds to S&T capability gaps by proposing technology investments called enabling capabilities (ECs). ECs consist of one or more interrelated products, which together provide a distinct capability that addresses one or more gaps. These investments begin at a point where analytical proof-of-concept or component/breadboard validation has been established in the laboratory, and are subsequently matured during their three- to five-year development cycle such that a model or prototype can be demonstrated in a relevant environment.

FNC Pillars (functional areas)
- Capable Manpower: Intuitive systems and personnel tools for matching Sailors and Marines to the right jobs and training for mission-essential competencies
- Enterprise and Platform Enablers: Cross-cutting technologies to lower acquisition, operations and maintenance costs
- Expeditionary Maneuver Warfare: Naval ground forces with special emphasis on regular and irregular warfare
- Force Health Protection: Medical equipment, supplies and procedures to reduce morbidity and mortality when casualties occur
- FORCEnet: C4ISR; networking; navigation; decision support; and space technologies that provide an architectural framework for naval warfare in the information age
- Power & Energy: Energy security, efficient power and energy systems, high energy, pulse power
- Sea Basing: Logistics, shipping and at-sea transfer technologies that provide operational independence
- Sea Shield: Missile defense, antisubmarine warfare, mine warfare and fleet/force protection technologies that provide global defensive assurance
- Sea Strike: Weapons, aircraft and expeditionary warfare technologies that provide precise and persistent offensive power

INPs explore high 6.2 and 6.3 technologies that can dramatically change the way naval forces fight. Programs in this category may be disruptive technologies which, for reasons of high risk or radical departure from established requirements and concepts of operation, are unlikely to survive without top leadership endorsement, and, unlike Future Naval Capabilities, are initially too high risk for a firm transition commitment from the acquisition community. INPs should be identified based on a balanced combination of naval need and technology exploitation. Investments are planned with the critical mass needed to achieve a level of technology maturity suitable for transition in four to eight years.

Current INPs
- Autonomous Aerical Cargo/Utility System (AACUS): explores advanced autonomous capabilities for reliable resupply/retrograde and, in the long term, casualty evacuation by an unmanned air vehicle under adverse conditions. Key features of AACUS include a vehicle autonomously avoiding obstacles while finding and landing at an unprepared landing site in dynamic conditions, with goal-directed supervisory control by a field operator with no special training.
- Electromagnetic Railgun (EMRG): The EMRG is a revolutionary long-range naval gun that will fire precision-guided hypervelocity projectiles to ranges greater than 200 nautical miles.
- Free Electron Laser (FEL): exploring the development of a laser capable of operating in a maritime environment and consistent with the Navy’s planned all-electric ship. The high average power infrared FEL provides intense beams of laser light that can be tuned to atmosphere-penetrating wavelengths.
- Integrated Topside (InTop): provides an integrated, multi-function, multi-beam top-side aperture construct that has modular open radio frequency (RF) architecture, software defined functionality, synchronization and optimization of RF functions for mission support electromagnetic interface mitigation.
- Large Displacement Unmanned Undersea Vehicle (LDUUV): develop fully autonomous, long-endurance, land-launched unmanned undersea vehicles capable of operating near shore. It will extend and augment the current Navy platform capability. The LDUUV program will develop new air independent energy systems and core vehicle technologies to extend unmanned undersea vehicles endurance into months of operation time. Advanced autonomy and sensing will enable operation in the cluttered littoral environment.
- Sea Base Enablers: The Transformable Craft (T-Craft) – one example of a Sea Base Enabler – is a vessel which can operate in multiple modes. It can self-deploy from an intermediate support base to the sea base and then be used as a high-speed connector from the sea base to the shore. It can transport wheeled and tracked vehicles and other heavy cargo through the surf zone and onto the beach, where it can discharge its cargo without the need for a port.
- Tactical Satellite (TACSAT): a new era of small, responsive and flexible satellites. The TACSAT program will demonstrate communication relay, electronic intelligence and maritime domain awareness capabilities – all of which will enable tactical radios to communicate theatre-wide and facilitate effective command and control of distributed assets.
Examples of Applied Research and Advanced Technology Opportunities

Examples of BAAs addressing 6.2/6.3 funding opportunities
15-0005  Solid State, High Power Laser Weapon Demonstrator
15-0008  Accelerating the Development of Small Unit Decision Making

N00014-15-R-BA10  Expeditionary Intelligence Surveillance, Reconnaissance S&T
N00014-15-R-BA14  Helicopter Active RPG Protection
N00014-15-R-BA15  Sea Based Aviation Aircraft Science and Technology
N00014-16-R-BA02  Advanced TopCoat Systems for Air and Ground Vehicles
N00014-16-R-BA04  Realtime Full Spectrum Cyber S&T
N00014-16-R-SN02  Undersea Technologies for Autonomous Detection and Communications
<table>
<thead>
<tr>
<th>Naval Laboratory and Centers</th>
<th>Largely Performers, but some extramural efforts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naval Research Laboratory (NRL)</td>
<td>broad based S&amp;T</td>
</tr>
<tr>
<td>Washington DC</td>
<td>oceanography, marine geology, geophysics/acoustics/technology</td>
</tr>
<tr>
<td>Stennis MS</td>
<td>atmospheric research</td>
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<tr>
<td>Monterey CA</td>
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<tr>
<td>Naval Postgraduate School, Monterey CA</td>
<td>intellectual know how and the practical skills for improving defense technologies, systems and programs</td>
</tr>
<tr>
<td>Navy Medical Research Ctr, Bethesda MD</td>
<td>operationally relevant health and medical research solution</td>
</tr>
<tr>
<td>Naval Air Warfare Center (NAWC)</td>
<td>aircraft, avionics</td>
</tr>
<tr>
<td>Aircraft Div, Patuxent River, MD</td>
<td>weapons development</td>
</tr>
<tr>
<td>Weapons Div, China Lake CA</td>
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<tr>
<td>Naval Surface Warfare Center (NSWC)</td>
<td>weapon system integration</td>
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<tr>
<td>Dahlgren Division VA</td>
<td>ship design &amp; integration</td>
</tr>
<tr>
<td>Carderock Div MD and PA</td>
<td>acquisition engn, in-service engn and technical support</td>
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<tr>
<td>Crane Division IN</td>
<td>energetics and energetic systems</td>
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<tr>
<td>Indian Head Division MD</td>
<td>life-cycle Engineering and Logistics</td>
</tr>
<tr>
<td>Port Hueneme Division CA</td>
<td>mine warfare, diving support systems, amphibious maneuver</td>
</tr>
<tr>
<td>Panama City Division FL</td>
<td></td>
</tr>
<tr>
<td>Naval Undersea Warfare Center (NUWC)</td>
<td>systems RD&amp;E</td>
</tr>
<tr>
<td>Div Newport, Newport RI</td>
<td>test, training and evaluation services, life cycle support</td>
</tr>
<tr>
<td>Div Keyport, Pudget Sound WA</td>
<td></td>
</tr>
<tr>
<td>Space and Naval Warfare Systems Center</td>
<td>command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR)</td>
</tr>
<tr>
<td>San Diego CA</td>
<td></td>
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</table>
ESTABLISHMENT OF GOVERNMENT-UNIVERSITY COOPERATIVE AGREEMENTS
IN SUPPORT OF BASIC AND APPLIED RESEARCH FOR
THE NAVAL AIR SYSTEMS COMMAND

What: The Naval Air Systems Command (NAVAIR) is soliciting white papers from universities, colleges, and educational research institutes to establish Cooperative Agreements (CAs) to collaborate on and support a broad range of research areas for advances in Science and Technology (S&T) of revolutionary capabilities for U.S. Naval forces to mature and transition in S&T.

The work to be performed shall be in direct support of NAVAIR. Activities shall include but are not limited to:

- Conducting research in current and emerging technologies. NAVAIR’s S&T philosophy spans the continuum from science to product.
- Teaming with academia and DoD agencies to find the most appropriate solution to current and future war fighter requirements.
- Promoting technology transfer using NAVAIR facilities including operational aircraft test beds.
- Providing technical assistance and training associated with different types, models, and series of aircrafts.
- Providing SMEs in the aviation specific area of expertise.
- Providing research and development for projects in the areas of planning, design, development, construction, and training of fixed and rotary wing aircraft.
- Conducting short courses and seminars to address unique topics and issues in research and development as determined by NAVAIR SMEs for current and future aircrafts.
- Providing and participating in summer internships and sabbaticals for professors and senior students.

Areas of interest: Air Vehicles; Propulsion and Power; Avionics; Human Systems; Weapons and Energetics; Support Equipment and Aircraft Launch and Recovery Equipment; Warfare Analysis; Research and Intelligence; Test, Evaluation and Engineering; Simulation and Modeling.

When: white paper submission anytime up to 1 Jul 2016

Where: Solicitation Number: NAWCAD-BAA-063015 (posted June 30, 2015)
Resilient Cyber Warfare Capabilities
for NAVAIR Weapon Systems

What:
Proposals are being solicited in following areas for NAVAIR Weapon Systems:
(1) SWaP sensitive cyber resiliency for RTOS and aviation warfare environment
(2) Access point identification, prioritization and defense
(3) Cyber-EW convergent capabilities
(4) Full acquisition cycle cybersecurity measures
(5) Cyber test, inspection, and incident response concepts
(6) Cyber warning system techniques
(7) Cyber fault, risk and threat assessment methodologies
(8) Resilient Network concepts

When: Phase I (five pages) proposals may be submitted at any time up until the closing date of the BAA (15 May 2016).

Where: BAA N68335-15-R-0179
Naval Air Warfare Center, Weapons Division (China Lake)
Generic BAA

**What:**
Awards may take the form of contracts or cooperative agreements.

"White Papers" are desired by NAWCWD Program Officers. Offerors should consult the cognizant NAWCWD TPOC regarding the desirability of "White Paper" submissions.

**Areas of Interest:**
- Air Vehicles
- Propulsion and Power
- Avionics
- Human Systems
- Weapons and Energetics
- Support Equipment and Aircraft Launch and Recovery Equipment
- Warfare Analysis
- Research and Intelligence
- Test, Evaluation and Engineering
- Simulation and Modeling

**When:** This announcement will remain open for one (1) year from the date of publication. White papers may be submitted at any time during this period.

**Where:** Solicitation number NAWCAD-BAA-17-03
What:
The requests for white papers for specific topics will be transmitted via Topic Calls issued as amendments to this this BAA. Each Topic Call will specify the due date for the requested white papers. The following identifies NSWCDD TC areas for informational purposes only. Not all technologies identified will be the subject of Topic Calls and some Topic Calls may be responsive to more than one TC.

DD01 Force and Surface Platform Level Warfare Systems Analysis and Modeling
DD02 Weapon Systems Analysis, Effects, and Effectiveness
DD03 Radar and Electro-optic Systems Research, Development, Text and Evaluation
DD04 Surface Warfare Systems Engineering and Integration
DD05 Surface Combat Systems Engineering and Integration
DD06 Surface Combat Control Systems Science and Technology
DD07 Surface Conventional Weapon Control Systems
DD08 Surface Warfare System and Force Level Certification
DD09 Human Systems Integration Science and Engineering
DD10 Surface Missile Systems Integration
DD11 Surface Conventional and Electromagnetic Gun Systems
DD12 Directed Energy Systems
DD13 Weapons Systems Integration for Surface, Air and Ground Unmanned Systems
DD14 Expeditionary and Other Weaponry Systems
DD15 Strategic Mission Planning, Targeting, and Fire Control Systems
DD16 Re-entry Systems
DD17 Surface Electronic Warfare Systems Architecture and Combat System Integration
DD18 Surface Warfare Systems Safety
DD19 Surface Warfare Electromagnetic Environmental Effects
DD20 Chemical, Biological and Radiological Defense Systems
DD21 National Response Missions, including Homeland Security and Defense
DD22 Physical and Non-Physical Vulnerability Analysis
DD23 Force Level Warfare Systems Engineering and Integration
DD24 Force Level Warfare Systems Interoperability Engineering
DD27 Tactical Common Data Communications Systems Integration and Interoperability
DD35 Integrated Surface Combat Control Systems Support
DD36 Integrated Training Systems
DD37 Radar Distribution Systems
DD38 Joint Command and Control Systems Integration and Architecture

When: This announcement will remain open for one (1) year from the date of publication. White papers responding to a Topic Call may be submitted up to the specified date identified in that respective Topic Call for white papers.

Where: NSWCDD BAA N00178-14-Q-1200
Naval Surface Warfare Center
Indian Head Explosive Ordnance Disposal Technology Division

What:
Proposals should include concepts and activities that will lead to increased collaboration between NSWC IHEODTD and affiliated organizations and external partners, including universities, industry consortia, economic development entities, and State and local governments. The desired goal is to make the most of the R&D budget and the expertise of both government and nongovernment scientists and engineers, increase the return on investment of the federal R&D budget, and help NSWC IHEODTD and affiliated organizations meet mission requirements while enhancing U.S. competitiveness in the world economy.

Areas of research interest for NSWC IHEODTD: Weapons and Energetics; Explosive Ordnance Technology; Hybrid Warfare; Autonomous Systems; Text Data Mining and Network Analysis for the Mitigation of Technology Surprise; Additive Manufacturing Defense Industrial Base Assessment

Awards under this BAA are expected to take the form of contracts,

When: Open for no less than one (1) year from the date of publication (23 Dec 2015). White papers may be submitted at any time during the open period of this BAA

Where: BAA N00174-16-0001
C4ISR, Information Operations and Information Technology System
Space and naval Warfare Systems Command
SPAWAR Systems Center Pacific


What
Submissions in response to this announcement shall be for areas relating to the advancement of Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) capabilities, enabling technologies for Information Operations and Cyber Operations, and Information Technology systems.

This BAA is for contracts only.

When: Specific Calls issued with deadlines for that call.

Where: N66001-15-X-3001
What: White papers are initially sought to preclude unwarranted effort on the part of the offeror in preparing full technical
and cost proposals without an initial assessment of the operational, technical and logistical feasibility of the concept.

Upon receipt, a white paper will be reviewed and the offeror will be advised of the results.

Only Contracts, no grants. Specific deliverables, delivery schedule, and other terms will be negotiated.

Topics of interest (more detail in the solicitation):
1. SEAPOWER 21 / SEATRIAL CONCEPT EXPERIMENTATION SOFTWARE TECHNOLOGIES
2. UNDERSEA WARFARE MODELING, SIMULATION, AND ANALYSIS
3. SUBMARINE AND SURFACE SHIP SONAR
4. SUBMARINE/SURFACE SHIP COMBAT CONTROL AND INFORMATION MANAGEMENT SYSTEMS
5. TASK FORCE ASW SYSTEMS
6. ENVIRONMENTAL AND TACTICAL SUPPORT SYSTEMS
7. SURFACE SHIP UNDERSEA WARFARE (USW) SYSTEMS
8. SUBMARINE ELECTROMAGNETIC SYSTEMS
9. TEST AND EVALUATION
10. UNDERSEA COMMUNICATIONS
11. TORPEDO AND TORPEDO TARGET SYSTEM TECHNOLOGY AND ASSESSMENT
12. THERMAL AND ELECTRIC PROPULSION (FOR TORPEDO, TARGET, UUV, MOBILE MINE AND COUNTERMEASURE APPLICATIONS)
13. HIGH-SPEED UNDERSEA MISSILES, PROJECTILES, AND MUNITIONS
14. UNMANNED VEHICLES (UV): UNMANNED UNDERSEA VEHICLES (UUV)/AUTONOMOUS UNDERSEA SYSTEMS (AUS)/UNMANNED
   SURFACE VEHICLES (US4) TECHNOLOGY AND ASSESSMENT
15. TEST BED TECHNOLOGIES
16. LAUNCHER, MISSILE AND PAYLOAD INTEGRATION SYSTEMS
17. TORPEDO DEFENSE (LAUNCHERS)
18. TORPEDO DEFENSE (MODELING AND SIMULATION)
19. COUNTERMEASURES TECHNOLOGY
20. MATERIALS
21. COGNITIVE NEUROSCIENCE (CNS) OR OTHER EMERGING/LEAP-AHEAD TECHNOLOGIES THAT OFFER TO DRAMATICALLY ADVANCE
   SUBMARINE SONAR AND/OR OTHER ADVANCED UNDERWATER SYSTEMS
22. BIOEFFECTS
23. AUDITION AND COMMUNICATION
24. DISTRIBUTED NETWORKED FORCES (DNF) RELATED TECHNOLOGIES AND COMPLEX ANALYTICAL TOOLS & METHODS

When: Anytime during BAA lifetime.

Where: NWPT.NUWC_NPT_59_BAA_Proposal_Submittal@navy.mil
National Research Council

Postdoctoral Fellowship Program
(also a good way to ascertain basic/applied research interests)

http://nrc58.nas.edu/RAPLab10/Opportunity/Programs.aspx

Naval Air Warfare Center Weapons Division
http://nrc58.nas.edu/RAPLab10/Opportunity/Opportunities.aspx?LabCode=34

Naval Medical Research Center/ Naval Health Research Center

Naval Postgraduate School

Naval Research Laboratory
http://nrc58.nas.edu/RAPLab10/Opportunity/Opportunities.aspx?LabCode=34
What: Research and technology where risk and payoff are both very high, and Success may provide dramatic advances for military roles and missions.

- Defense Science Office (DSO)
- Information Innovation Office (I2O)
- Tactical Technology Office (TTO)
- Biological Technologies Office (BTO)
- Microsystems Technology Office (MTO)
- Strategic Technology Office (STO)

BTO, I2O and MTO are more generic technology (but DOD pertinent) oriented
TTO and STO are more DOD platform/systems oriented
Focuses on 2-4 year projects run by purpose-built teams.
Industrial participation usually desirable
First deliverable milestone in 12-18 months; “widget” in 3-5 years

How much: ~$M as warranted

When: Various, need watch for program topic announcements, requests for information toward topic development, and announcements of proposer days

<table>
<thead>
<tr>
<th>FY18</th>
<th>6.1</th>
<th>~$ 432M</th>
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<td>6.2</td>
<td>~ 1379M</td>
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<tr>
<td>6.3</td>
<td>~ 1238M</td>
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Where: http://www.darpa.mil/Opportunities/Universities/
http://www.darpa.mil/Opportunities/Universities/Young_Faculty.aspx
DARPA Advanced Development 6.02xxxE)  
FY2018 Budget Request

<table>
<thead>
<tr>
<th>Program Element Title</th>
<th>FY2018</th>
<th>FY2017</th>
<th>FY2016</th>
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</thead>
<tbody>
<tr>
<td>MBT - Materials and Biological Technology</td>
<td>224</td>
<td>220</td>
<td>193</td>
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<tr>
<td>BT - Biomedical Technology</td>
<td>109</td>
<td>120</td>
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<tr>
<td>BW - Biological Warfare Defense</td>
<td>13</td>
<td>21</td>
<td>25</td>
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<tr>
<td>IT - Information and Communications Technology</td>
<td>393</td>
<td>354</td>
<td>332</td>
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<tr>
<td>ELT - Electronics Technology</td>
<td>295</td>
<td>222</td>
<td>168</td>
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<tr>
<td>TT - Tactical Technology</td>
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<td>Naval Warfare</td>
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<td>Advanced Land Systems Technology</td>
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<td>Advanced Tactile Technology</td>
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<tr>
<td>Aeronautics Technology</td>
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<td>63</td>
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<tr>
<td>Information Analytics Technology</td>
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## DARPA Applied Research Budget 0603XXXE

<table>
<thead>
<tr>
<th>Program Element Title</th>
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<th>FY2017</th>
<th>FY2016</th>
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<tbody>
<tr>
<td>CCC - Command, Control and Communications Systems</td>
<td>107</td>
<td>155</td>
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<tr>
<td>NET - Network-Centric Warfare Technology</td>
<td>439</td>
<td>429</td>
<td>411</td>
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<tr>
<td>MT - Advanced Electronics Technologies</td>
<td>79</td>
<td>50</td>
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<tr>
<td>SEN - Sensor Technology</td>
<td>210</td>
<td>241</td>
<td>232</td>
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<tr>
<td>SPC - Space Programs and Technology</td>
<td>247</td>
<td>175</td>
<td>121</td>
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<tr>
<td>AIR - Advanced Aerospace Systems</td>
<td>155</td>
<td>182</td>
<td>166</td>
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<td>Classified DARPA Programs</td>
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<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
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<tr>
<td>Fotis Barlos</td>
<td></td>
<td>2017</td>
<td>data analytics, computational science, and planning technologies.</td>
</tr>
<tr>
<td>Joseph Evans</td>
<td></td>
<td>2015</td>
<td>advanced networking and communications technologies with an emphasis on large-scale wireless, dynamic and cross-domain systems</td>
</tr>
<tr>
<td>Neil Fox</td>
<td></td>
<td>2017</td>
<td>secure wireless communications, distributed systems, electronic warfare, specialized radar, PNT, and cyber physical systems</td>
</tr>
<tr>
<td>James Galambos</td>
<td></td>
<td>2015</td>
<td>expanding combat capability through combining manned and unmanned systems, include autonomy, undersea communications, unmanned vehicles, maritime power and energy systems, heterogeneous networking and the</td>
</tr>
<tr>
<td>John Gorman</td>
<td><a href="mailto:john.gorman@darpa.mil">john.gorman@darpa.mil</a></td>
<td>2013</td>
<td>statistical estimation and learning, advanced radar systems, and distributed sensing.</td>
</tr>
<tr>
<td>Lin Haas</td>
<td><a href="mailto:lin.haas@darpa.mil">lin.haas@darpa.mil</a></td>
<td>2012</td>
<td>positioning, navigation, and timing (PNT) and geolocation technologies</td>
</tr>
<tr>
<td>Richard Heinrichs</td>
<td></td>
<td></td>
<td>optics, lasers and sensors. His program interests include lasers, laser radar, and electro-optic sensors</td>
</tr>
<tr>
<td>Jimmie Jones</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thomas Karr</td>
<td><a href="mailto:thomas.karr@darpa.mil">thomas.karr@darpa.mil</a></td>
<td>2012</td>
<td>ISR and EW technologies and systems, optical LPD/LPI sensing and communication, new weapon technologies and effects, weapon and ISR countermeasures and counter-countermeasures, space control, and the integration of space with tactical systems</td>
</tr>
<tr>
<td>Jeffrey Kroliick</td>
<td><a href="mailto:jeffrey.krolik@darpa.mil">jeffrey.krolik@darpa.mil</a></td>
<td>2014</td>
<td>physics-based signal and sensor array processing with applications to radio frequency (RF) and acoustic surveillance systems</td>
</tr>
<tr>
<td>Craig Lawrence</td>
<td><a href="mailto:craig.lawrence@darpa.mil">craig.lawrence@darpa.mil</a></td>
<td>2013</td>
<td>battle management, command and control (BMC2); autonomy, optimization and control theory; and modeling and simulation</td>
</tr>
<tr>
<td>Program Officer</td>
<td>email</td>
<td>Start Date</td>
<td>Interests</td>
</tr>
<tr>
<td>---------------------</td>
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</tr>
<tr>
<td>David Shaver</td>
<td><a href="mailto:john.shaw@darpa.mil">john.shaw@darpa.mil</a></td>
<td>2015</td>
<td>laser area defense, military imaging and surveillance</td>
</tr>
<tr>
<td>John Shaw</td>
<td><a href="mailto:john.shaw@darpa.mil">john.shaw@darpa.mil</a></td>
<td>2013</td>
<td>battle management, command and control (BMC2) technologies and systems, systems engineering, and large-scale optimization</td>
</tr>
<tr>
<td>Shelby Sullivan</td>
<td><a href="mailto:shelby.sullivan@darpa.mil">shelby.sullivan@darpa.mil</a></td>
<td>2014</td>
<td>undersea warfare</td>
</tr>
<tr>
<td>David Tremper</td>
<td></td>
<td>2017</td>
<td>EW and counter-intelligence, surveillance, and reconnaissance (C-ISR) for both stand-alone and networked systems applications</td>
</tr>
<tr>
<td>Vincent Urick</td>
<td></td>
<td>2016</td>
<td>photonics for electronic warfare applications, innovative concepts for optical signal processing, and electronic signal generation via optical domain techniques.</td>
</tr>
<tr>
<td>Kurt Vogel</td>
<td></td>
<td>2015</td>
<td>air systems, electronic warfare, stealth, space systems and counter-space.</td>
</tr>
<tr>
<td>Bruce Wallace</td>
<td><a href="mailto:bruce.wallace@darpa.mil">bruce.wallace@darpa.mil</a></td>
<td>2011</td>
<td>Technologies for Multifunction Millimeter wave systems</td>
</tr>
<tr>
<td>John Waterston</td>
<td></td>
<td>2017</td>
<td>maritime autonomy, undersea warfare, distributed sensing, and non-traditional communications.</td>
</tr>
<tr>
<td>Ted Woodward</td>
<td></td>
<td>2015</td>
<td>optical and RF technology for sensing and communications, and include high-capacity networked systems in particular. Relevant technologies include photonics, millimeter wave RF, distributed coherent signaling (e.g., multiple-input and multiple-output,MIMO), signal processing methods and host platforms, and networking.</td>
</tr>
<tr>
<td>Lisa Zurk</td>
<td></td>
<td>2016</td>
<td>physics-based processing techniques applied to advanced sensor system concepts, particularly for underwater acoustics and electromagnetic sensing</td>
</tr>
<tr>
<td>Program Manager</td>
<td>email</td>
<td>Start Date</td>
<td>Interests</td>
</tr>
<tr>
<td>-----------------</td>
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<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Ashish Bagai</td>
<td><a href="mailto:ashish.bagai@darpa.mil">ashish.bagai@darpa.mil</a></td>
<td>2012</td>
<td>Aircraft</td>
</tr>
<tr>
<td>Timothy Chung</td>
<td></td>
<td>2016</td>
<td>autonomous/unmanned air vehicles, swarm system capabilities, distributed perception, distributed decision-making, and counter unmanned system technologies</td>
</tr>
<tr>
<td>Christopher Clay</td>
<td></td>
<td>2016</td>
<td>hypersonics, fixed- and rotary-wing platform development, munitions and aeropropulsion.</td>
</tr>
<tr>
<td>Mark Costello</td>
<td></td>
<td>2017</td>
<td>dynamic behavior of complex mechanical and aeronautical devices, creating new aerospace devices, developing unique control mechanisms, designing innovative sensor systems.</td>
</tr>
<tr>
<td>Graham Drozeski</td>
<td></td>
<td>2016</td>
<td>vertical takeoff and landing (VTOL) aircraft, advanced guidance and control, autonomy for distributed operations, manned-unmanned teaming, human-machine interfaces</td>
</tr>
<tr>
<td>Jerome Dunn</td>
<td><a href="mailto:jerome.dunn@darpa.mil">jerome.dunn@darpa.mil</a></td>
<td>2013</td>
<td>advanced munitions, counter-swarm, distributed unmanned sensor networks and counter-mine technologies</td>
</tr>
<tr>
<td>Peter Erbland</td>
<td><a href="mailto:peter.erbland@darpa.mil">peter.erbland@darpa.mil</a></td>
<td>2013</td>
<td>advanced hypersonic systems including hypersonic aerodynamics and aerothermodynamics, structures and materials, and guidance, navigation and control</td>
</tr>
<tr>
<td>Mark Gustafson</td>
<td><a href="mailto:mark.gustafson@darpa.mil">mark.gustafson@darpa.mil</a></td>
<td>2012</td>
<td>advanced aircraft and weapons with specific interests in propulsion, advanced technologies, hypersonics, and X-planes</td>
</tr>
<tr>
<td>Jean-Charles Lede</td>
<td><a href="mailto:jena-charles.lede@darpa.mil">jena-charles.lede@darpa.mil</a></td>
<td>2013</td>
<td>autonomous/unmanned air vehicle systems, cooperative systems, counter UAS and counter-swarms, and operations in contested and denied environments</td>
</tr>
<tr>
<td>Scott Littlefield</td>
<td><a href="mailto:scot.littlefield@darpa.mil">scot.littlefield@darpa.mil</a></td>
<td>2011</td>
<td>autonomous/unmanned air vehicle systems, cooperative systems, counter UAS and counter-swarms, and operations in contested and denied environments</td>
</tr>
<tr>
<td>John Losinski</td>
<td><a href="mailto:john.losinski@darpa.mil">john.losinski@darpa.mil</a></td>
<td>2011</td>
<td>Space system program management and technology development</td>
</tr>
<tr>
<td>Program Manager</td>
<td>Email</td>
<td>Start Date</td>
<td>Interests</td>
</tr>
<tr>
<td>-------------------------</td>
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</tr>
<tr>
<td>Kevin Massey</td>
<td><a href="mailto:kevin.massey@darpa.mil">kevin.massey@darpa.mil</a></td>
<td>2013</td>
<td>aeroacoustics and noise control; blast modeling and vehicle survivability; smart/guided munitions; air defense; supersonic aerodynamics; unmanned aerial vehicles and flapping wing flight</td>
</tr>
<tr>
<td>Lindsay Millard</td>
<td><a href="mailto:lindsay.millard@darpa.mil">lindsay.millard@darpa.mil</a></td>
<td>2014</td>
<td>space-based imagers, sensor data processing, and increasing the resilience of the U.S. space architecture through disruptive technology</td>
</tr>
<tr>
<td>Christopher Orlowski</td>
<td><a href="mailto:christopher.orlowski@darpa.mil">christopher.orlowski@darpa.mil</a></td>
<td>2014</td>
<td>manned and unmanned teaming in complex environments, biomimetic unmanned systems and technologies to improve the performance and capability of dismounted ground forces</td>
</tr>
<tr>
<td>Jeremy Palmer</td>
<td></td>
<td>2015</td>
<td>space systems engineering, including structural and dynamic elements, and additive manufacturing technology</td>
</tr>
<tr>
<td>Jeremy Raley</td>
<td></td>
<td>2016</td>
<td>offensive and defensive space control, remote sensing, assured availability of space assets, and command and control of the U.S. space enterprise</td>
</tr>
<tr>
<td>Gordon Roesler</td>
<td><a href="mailto:gordon.roesler@darpa.mil">gordon.roesler@darpa.mil</a></td>
<td>2014</td>
<td>robotic servicing of satellites.</td>
</tr>
<tr>
<td>Philip Root</td>
<td></td>
<td>2017</td>
<td>unmanned vehicles, collaborative autonomy, and machine learning algorithms.</td>
</tr>
<tr>
<td>Jess Sponable</td>
<td><a href="mailto:jess.sponable@darpa.mil">jess.sponable@darpa.mil</a></td>
<td>2012</td>
<td>supporting access to and through space; unmanned air vehicles, energy generation and storage, hypersonics</td>
</tr>
<tr>
<td>Amber Walker</td>
<td></td>
<td>2017</td>
<td>advanced hypersonic systems for ground launch</td>
</tr>
<tr>
<td>Scott Wierzbanowski</td>
<td></td>
<td>2016</td>
<td>aircraft and weapons with a focus on autonomous and semi-autonomous air systems, manned/unmanned teaming, and reusable space launch.</td>
</tr>
</tbody>
</table>
Defense Threat Reduction Agency (DTRA)
and
USSTRATCOM Center for Combating WMD (SCC-WMD)
www.dtra.mil
What: The DoD CBDP, DTRA, and the Joint Science and Technology Office for Chemical and Biological Defense (JSTO-CBD) are seeking optimum approaches to meet technology objectives within the following areas: Detection - Chemical and Biological, Information Systems Capability, Protection - individual and collective, Hazard Mitigation, Threat Agent Science, Medical Pretreatments, Medical Diagnostics, Medical Therapeutics, Threat Surveillance - Chemical and Biological. See next chart for 2018 topics

This BAA will utilize a two-step process, consisting of the submission and evaluation of Phase I (White Paper Packages) and Phase II (Full) proposals. While all interested parties may submit Phase I proposals, submission of Phase II proposals will be by invitation only.

A full range of flexible acquisition related statutory authority arrangements available to DTRA are possible results from this announcement, including but not limited to, Contracts, Task Orders, and Other Transaction Agreements (OTA). The government does not intend to award grants or Cooperative agreements under this solicitation. TRL range 3-6 and strive to be TRL 4-6 by end of project.

How Much: Historically, Physical Science and Technology awards ranged from approximately $300K to $3.8M with periods of performance ranging from 12 to 60 months. Medical Science and Technology awards ranged from approximately $1.4M to $12M with periods of performance ranging from 12 to 60 months.

When: Open from 18 Jul through 30 Sep 2016

Where: HDTRA1-18-S-0001
HDTRA1-18-S-0001
JSTO-CB INITIATIVES FY2018 PROGRAM

Diagnostics, Detection, and Disease Surveillance Division (CBA)
Topic CBA-01  Multiplex Molecular Diagnostics Platform and Assays for Host-derived Microbial Blood-Infection
Topic CBA-02  Micro-Fluidic Capability for Rapid Environmental Bioreconnaissance Point Sensor Targeting Biological Threats

Translational Medicine Division (CBM)
none listed in 2018

Advanced and Emerging Threat Division (CBS)
Topic CBS-01  Enhancing Resuspension/Reaerosolization Modeling of Particles from Surfaces of Interest to the DoD.
Topic CBS-02  Therapeutics to Treat Long-Term Effects of OP induced Status Epilepticus
Topic CBS-03  Therapeutics to Treat Symptoms of Exposure to Organophosphorus Nerve Agents
Topic CBS-04  Prophylaxis/Pretreatment Medical Countermeasures for Adverse Effects of Organophosphorus Nerve Agents
Topic CBS-05  Therapeutics to Treat Long-Term Effects of Ocular Injury from Sulfur Mustard

Information Analysis Office (CBI)
Topic CBI-01  Joint Science & Technology Prototype/Hazard Prediction and Assessment Capability Program
Topic CBI-02  Urban Modeling and Simulation for the Joint S&T Prototype/Hazard Prediction and Assessment Capability
Topic CBI-03  Mobile Solutions for Modeling and Simulation
Topic CBI-04  Methodologies for Modeling Waterborne Transport and Dispersion of CBRN Hazards
Topic CBI-05  Operational Effects and Risk Assessment
Topic CBI-06  Virtual Training and Table Top Exercise “Games” for Chemical and Biological Defense
Topic CBI-07  Developing Comprehensive Infectious Disease Models
Topic CBI-08  Evaluation of Wearable Technologies for Earlier Warning of Health Changes

Physical Science and Technology Division (CBT)
Topic CBT-01  Novel Munitions Access System for Chemical-Biological Tactical Disablement
Topic CBT-02  Novel Chemical Warfare Agent Man-Portable Destruction System for Chemical-Biological Tactical Disablement
DTRA (and JSTO CBD)
Chemical & Biological Technologies Directorate (2013)

Diagnostics, Detection, and Disease Surveillance S&T Division (CBA)
Dr. Richard Schoske (retired AF) richard.schoske@dtra.mil
Dr. Christian Whitchurch, Senior Scientist, christian.whitchurch@dtra.mil

Assays & Biomarkers Branch
  Lt Col. (AF) Watson, Chief,
Surveillance Branch
  Dr. John Hannan, Chief, john.hannan@dtra.mil
Diagnostics and Detection Branch
  Dr. Brandi Vann, Chief, brandi.vann@dtra.mil

MISSION: Deliver cutting edge Integrated Early Warning, Information Management and Applied Analytic capabilities to the warfighter; virtually connect them to these capabilities and other system users for rapid situational awareness, course of action (CoA) analysis and decision support.

PROJECT AREAS
Biosurveillance Ecosystem (BSVE)  Wearable Technologies
Data sources & analytic tools  Field Forward Diagnostics
Chem-Bio Detection
Host-Based Biomarker Identification/Verification/Validation
Genetic Sequencing for Clinical Microbial/Viral Diagnostics
Information Analysis Office (CBI)
Mr. Jerry Glasow, Chief, jerry.glasow@dtra.mil
Mr. Michael Roberts

Mission: Provide and use Chemical Biological Radiological Nuclear information and analysis capabilities to enable and support operational & programmatic decision-making.

PROJECT AREAS
Collective Protection System Performance Model
Individual Protection System Performance Model
Decontamination System Performance Model
Translational Medical Division (CBM)
Dr. Erin Reichert, Chief, erin.reichert@dtra.mil

Biological Therapeutics Branch
Dr. Erin Reichert, Chief, erin.reichert@dtra.mil

Vaccines Branch
Dr. William (Clint) Florence, Chief, william.florence@dtra.mil

Mission: Develop vaccines and therapeutics to mitigate the threat of biological warfare agents

VACCINES & THERAPEUTICS FOCUS AREAS
Viral: Ebola & Marburg; EEEV, VEEV, WEEV
Bacterial: Bacillus anthracis, Francisella tularensis, Burkholderia mallei & pseudomallei, C. Burnetii, Yersina pestis
Toxins: Ricin, Botulinum Neurotoxin
Platform Technologies: Animal Model Development, Ex vivo mimetics, Flexible Manufacturing, Adjuvants and Stabilization
Advanced and Emerging Threats Division (CBS)
Dr. Eric Moore, Chief, eric.moore@dtra.mil

Threat Agent Characterization and Medical Chemical Countermeasures Branch
Dr. Alison Director-Myska, alison.myska@dtra.mil

MISSION: Deliver novel concepts and technologies to address current and emerging chemical and biological threats to protect the lives of our warfighters; much of the work is classified. Has a CB Center of Excellence - Edgewood and Navy

EXAMPLE PROJECT AREAS
Catalytic bioscavengers of nerve agents
Centrally-acting reactivators of acetylcholinesterase, neuroprotectants
ADMET Center to enhance drug discovery/development efforts
Host response to chem toxicants, human toxicity estimates and predictive toxicology
Characterization and predictive environmental fate of CB agents, especially particulates
Relevant understanding of routes of exposure and the blood-brain barrier
Autonomic threat response, including nano- and micromotors
Physical Science & Technology Division (CBT)
Dr. Robert Botto, Chief, robert.botto@dtra.mil

Protection & Hazard Mitigation Branch
Dr. Charles Bass, Chief, charles.bass@dtra.mil

Materials & Demonstrations Branch
Mr. Ryan Madden, Chief, ryan.madden@dtra.mil

MISSION: Providing tomorrow’s solutions today to build next gen chemical and biological defense capabilities for decontamination and protective materials, and ensuring transition of prototypes to advanced developers serving warfighter needs through advanced demonstrations and exercises.

FOCUS AREAS
Protective Materials – e.g. Second Skin and Ammonia Breakthrough Filters
Hazard Mitigation – e.g. Material and Equipment Restoration (HaMMER) decontamination system (DFoS)
Demonstrations – e.g. Consequence Management Bioresiliency (TaCBRD)
Materials and Imaging Sciences – e.g. Better Biosensors, Nanomaterials for drug delivery, Robust Biomimetic Materials & Devices
**What:** Research and Development Requirements

A three-phased proposal selection process will be used for this BAA to minimize cost and effort for prospective offerors:

- Phase 1 will consist of the solicitation, receipt, and evaluation of a one-page Quad Chart.
- Phase 2 will consist of the solicitation, receipt, and evaluation of a White Paper and applies to only those submissions that have been accepted in Phase 1.
- Phase 3 will consist of the solicitation, receipt, and evaluation of a Full Proposal and applies to only those submissions that have been accepted in Phase 2. Based on the priority of critical requirements and the availability of funding, Phase 1 submissions can be selected for Phase 3 without a Phase 2 submission.

Describe the overall strategy to transition the results of this development effort to production once the funded effort is concluded.

**Mission Areas:**

**AAC** – Advanced Analytic Capabilities

**CBRNE** – Chemical, Biological, Radiological, Nuclear, and Explosives

**IDD/EC** – Improvised Device Defeat/Explosives Countermeasures

**IFS** – Investigative and Forensic Science

**IW/ET** – Irregular Warfare and Evolving Threats

**PP** – Personnel Protection

**PS** – Physical Security

**SCOS** – Surveillance, Collection, and Operations Support

**TOS** – Tactical Operations Support

**TTD** – Training Technology Development

Funding mechanism will be contracts, 6-24 months in duration.

**When:** 2 Feb 2017 for Phase 1 Quad Charts

**Where:** BAA 17-S-4710
Strategic Capabilities Office (SCO)

What:
The Strategic Capabilities Office of the Office of the Secretary of Defense is soliciting abstracts and proposals that aligns with its mission to provide cost-effective, strategic alternatives for shaping and countering emerging near peer threats for rapid fielding. Novel concepts are sought in the following focus areas:
- Autonomy,
- Command and Control,
- Cyber,
- Sensors,
- Weapon Technologies.

Funding mechanism will be contract.

Three stages of submission: Worksheet, Abstract (a five page white paper), Full Proposal (by invitation only)

White Paper will address
- What is your novel concept?
- How will this meet the timeline for demonstration in PART II; I; B (contract phases)?
- What new and novel capabilities will the novel concept bring to the warfighter?
- Who is the potential transition partner?
- How much will it cost and what is the projected cost across its life cycle?
- How rapidly can the enhancement be fielded?

When: 17 June 2016 - 16 June 2021

Where: SCO-BAA-16-01 (released 17 Jun 2016)
Defense Forensics and Biometrics Agency (DFBA)
Basic, Applied and Advanced Scientific Research

What: Forensic research proposals should focus on the creation of new and improved field or laboratory functional capabilities that result in faster, more robust, more informative, less costly, or less labor-intensive recognition, identification, collection, preservation, and/or analysis of forensic evidence. Biometric research proposals should contribute to biometric applications or operations, including military functions such as combat identification (friend, foe, or neutral), offensive operations (intelligence support to targeting), force protection (physical access control), detention operations, civil-military operations (track target members of a population), personnel recovery and identification, and recognition and recovery of human remains. Several topics identified as needing further research and development are specified below, but proposals are not limited to these areas:

• Digital evidence and computer forensics
• Signal processing/visual comparison of patterned and impression forensic materials
• Analytical chemistry (detection of compounds/molecules/elements)
• Molecular biology
• Forensic genetics
• Forensic equipment miniaturization/ruggedization
• Site exploitation and forensic material recognition

Those contemplating submission of a proposal are encouraged to submit a white paper and quad chart, summarizing their proposed work. If the proposed R&D warrants further inquiry and funding is available, submission of a full technical and cost proposal will be requested.

When: between 18 October 2016 - 15 October 2021

Where: W911NF-17-R-0001
Defense Logistics Agency

What: Emergent Research and Development Requirements
DLA requests interested parties to submit a white paper. White papers may be based on fundamental R&D; concept formulation; assessment of system and subsystem requirements and processes; development, analysis and evaluation of concepts, systems and subsystems; development of associated industrial capabilities support techniques and processes; development of associated manufacturing techniques and processes; modeling and simulation; simulation-based acquisition; integrated data environments and product data managers; and development of operational systems.

The particular emergent requirements that are the subject of this BAA are:
- Transportation Management and Logistics
- Medical Logistics
- Distribution
- Additive Manufacturing
- Emerging Technologies to Enhance Part, Component and Logistical Product Data Granularity, Availability and Interoperability
- Smart Connected Logistics
- Anti-counterfeiting Technical Solution
- Energy Research
- Deployable Hazardous Waste Disposal Technology
- Advanced Military Field Heating Equipment
- Forging Research and Development

Funding mechanism will be contract

When: Open for five years for date of release
White paper any time
Proposal by invitation only

Where: BAA-0001-17 (released 23 Jun 2017)
What
The Defense Logistics Agency (DLA) seeks interested parties to participate in the Subsistence Network Research and Development (R&D) Program, (hereinafter referred to as SUBNET). The SUBNET Program is a DLA-Sponsored DoD Manufacturing Technology Program and is the successor to the previous Combat Rations Network (CORANET) R&D program.

- Combat Rations
- Field Feeding Solutions
- Food Innovations
- Garrison Feeding
- Storage and Packaging Solutions
- Additional Topics
- Food Equipment
- Food Footprint
- Food Safety and Defense
- Nutrition and Health
- Water Security

SUBNET proposals that include a new technology or potential future trend must be vetted through the respective material developer (e.g., the Natick Soldier Research, Development and Engineering Center (NSRDEC), Combat Feeding Directorate (CFD) for combat rations, field food service equipment and related technologies to determine and assess the maturity of the technology or future trend and readiness for SUBNET involvement. This will be completed via the Program Manager.

When: Open for five years

How Much; period of performance 6-24 months; total cost less than $1M

Where: DLA BAA-0003-16 posted 21 July 2016
Missile Defense Agency
University Research Program

**What:** The research sought by the MDA from colleges and universities is used for advancing and solving complex technological problems, ultimately contributing to enhancing a more robust Ballistic Missile Defense System (BMDS). Several BMDS research areas interest the MDA and may provide direction for MSTAR proposal (HQ0147-12-MSTAR-BAA) submissions:

- Radar Systems
- Lasers and Electro-Optical Systems
- Integrated Infra Red Sensor Systems
- Computer Science, Signal and Data Processing
- Mathematics, Probability and Decision Theory
- Physics, Chemistry and Materials
- Mechanical and Aerospace Engineering
- Battle Management/Command and Control
- Modeling and Simulation
- Science, Technology, Engineering and Mathematics (STEM) Outreach

Proposals must be for **Advanced Research.** MDA will review information regarding research conducted under MDA funded actions for possible publication or presentation in open or ITAR-controlled forums.

**Who:** MDA requires all lead Principal Investigators of institutions submitting a proposal under this program hold **US citizenship.** MDA desires all participating students conducting research for contracts sponsored under this program award, to hold US citizenship.

**How Much:** We anticipate each MSTAR contract’s funding at a maximum of $500,000 (two year period of performance) or $700,000 (three year period of performance). Funding ceilings are $250,000 a year during a two year base period of performance with a potential option for a third year of performance funded at a maximum of $200,000.

**How:** Universities contemplating submission of a proposal are encouraged to contact the MDA technical point of contact, Richard Schwarz (MDA/DVR; 256-450-4366) to determine the likelihood of funding prior to committing resources preparing a proposal in response to this BAA.
US Special Operations Command (SOCOM)
Special Operations Research, Development, and Acquisition Center (SORDAC)
http://www.socom.mil/SORDAC/Pages/Default.aspx

What: USSOCOM has a long-term goal to develop technologies to meet Special Operations Forces (SOF) mission requirements. The intent is to accelerate the delivery of these innovative capabilities to the SOF warfighter. Those challenges are 1) trade space between weight, protection, power, and mobility; 2) cost; and 3) system component integration.

Solicitations requesting white papers or proposals will be accomplished via amendments to BAA USSOCOM-BAAST-2015. Each call for white papers will identify:
1. specific details regarding the call technical topic area,
2. submission instructions in addition to those outlined in the overarching five year USSOCOM-BAAST-2015, and
3. a cutoff date for submissions.

When: BAA will remain open for 5 years until 16 December 2019

Where: USSOCOM-BAAST-2015
DOD I-Corps
Strategic Environmental Research and Development Program (SERDP) [Environmental Science and Technology Cooperative Program (ESTCP)]

What: Pursues hi-risk / hi-payoff solutions to “intractable” environ problems
Focuses on cross-service requirements
Published Statements of Need (SON) to identify topics of interest
Core Solicitation for full scale efforts
Exploratory Development Proposals (SEED) for up to $150K for 1 year
SERDP is 6.3 (tech develop) [ESTCP is 6.3 (field demonstration)]

How Much: Core ~$200-300K for clean-up to ~$750 – 1000K for munitions mgmt

When: Core Solicitation Preproposals ~Jan 05 2017 for FY2017 solicitation
SEED Proposals ~Mar 7 2017 for FY2017 solicitation

Where: For FY 2017 Core Solicitation and SEED programs
http://www.serdp.org/Funding-Opportunities/SERDP-Solicitations
http://www.serdp.org/Funding-Opportunities/ESTCP-Solicitations

SERDP can fund basic/applied-research like efforts

<table>
<thead>
<tr>
<th></th>
<th>FY18</th>
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<tbody>
<tr>
<td>SERDP</td>
<td>$72M</td>
</tr>
<tr>
<td>ESTCP</td>
<td>55M</td>
</tr>
</tbody>
</table>
Core Selection Criteria

- Relevance (Pass/Fail)
  - Does it address the SON Objective?
  - Is it basic research, applied research, or advanced technology development?

- Technical Merit
  - Overall scientific and technical merit of the submission

- Personnel
  - Qualifications capabilities and achievements

- Cost
  - Reasonableness for the technical complexity

- Transition Plan
  - Plan to transition to implementation or future development

For a presentation describing the SERDP process for FY12 go to:
http://www.serdp.org/Funding-Opportunities/SERDP-Solicitations/SERDP-Funding-Opportunities-Webinar-FY-2012
Examples of SERDP Awards
BAA 13-0001

Environmental Restoration, Munitions Response, Resource Conservation and Climate Change, and Weapons Systems and Platforms technologies

14-Mar-14 $843K Rutgers PI: Dr. Lee Slater
Investigating the Sensitivity of Emerging Geophysical Technologies to Immobile Porosity and Isolated DNAPL and Dissolved/Sorbed VOC Mass in Fractured Media

19-May-14 $986K Texas Tech Univ
High Resolution Delineation of Contaminant Concentrations, Biogeochemical Processes, and Microbial Communities in Saturated Subsurface Environments

16-Jul-14 $566K Purdue Univ
Quantification of In Situ Chemical Reductive Defluorination (ISCRD) of Perfluoroalkyl Acids in Ground Water Impacted by AFFFS

7-Aug-14 $869K Univ Minn PI: Dr. Matt F Simcik
Development of a Novel Approach for In Situ Remediation of PFC Contaminated Groundwater Systems

24-Sep-14 $1986K Univ New Hampshire
Recovery of Ecological Processes Impacted by Non-Native Invasive Species in the Pacific Islands

27-Sep-14 $649K Leidos
Empirical Investigation of the Factors Influencing Marine Applications of EMI

30-Sep-14 $607K TNO Locatie Rijswijk PI: Mr. Joost van Lingen
Proof of Concept Novel Low-toxicity Obscurant -

15-May-15 $2499K Rice Univ PI: Dr. Haldre S Rogers
Restoring Function to a Novel Ecosystem in the Presence of One of the World’s Most Destructive Invasive Species
DOD Advanced Manufacturing Opportunities

SBIR/STTR
Rapid Innovation Fund (RIF)
ManTech
Innovative Manufacturing Institutes (IMI)
SBIR/STTR

http://www.acq.osd.mil/osbp/sbir/sb/program-descriptions.shtml

Objectives: The SBIR and STTR programs are designed to:
- Stimulate technological innovation
- Increase private sector commercialization of federal R&D
- Increase small business participation in federally funded R&D
- Foster participation by minority and disadvantaged firms in technological innovation

Three-Phased Program
1. **Phase I** (Project feasibility) determines the scientific, technical and commercial merit and feasibility of the ideas submitted. Phase I contracts are typically $150,000 over a period of six months. If Phase I proves successful, the company may be invited to submit a Phase II proposal.

2. **Phase II** (Project development to prototype) is the major R&D effort, funding the prototyping and demonstration of the most promising Phase I projects. Phase II contracts are up to $1 million and usually span 24 months. Phase II proposal submissions are by invitation only.

3. **Phase III** (Commercialization) is the ultimate goal of the SBIR program. Small businesses are expected to obtain funding from the private sector or government sources outside the SBIR program to commercialize the Phase II project for sale in the military and private sector markets.

<table>
<thead>
<tr>
<th>Three-Phased Program</th>
<th>SBIR</th>
<th>STTR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase I: Project feasibility</td>
<td>6 months, up to $150,000</td>
<td>12 months, up to $100,000</td>
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<tr>
<td>Phase II: Project development to prototype</td>
<td>2 years, up to $1,500,000</td>
<td>2 years, up to $750,000</td>
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<tr>
<td>Phase III: Commercialization</td>
<td>Commercialization of the technology in military and/or private sector markets with non-SBIR/non-STTR fund</td>
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</table>

The DoD issues three SBIR and two STTR solicitations per year describing R&D needs and inviting R&D proposals from small businesses.
### SBIR/STTR Report for FY10

[http://www.acq.osd.mil/osbp/sbir/about/program-reports.shtml](http://www.acq.osd.mil/osbp/sbir/about/program-reports.shtml)

<table>
<thead>
<tr>
<th>SBIR</th>
<th>DoD Component</th>
<th>Budget ($K)</th>
<th># Topics</th>
<th># Ph I proposals</th>
<th># Ph I awards</th>
<th># Ph II awards</th>
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<th>DoD Component</th>
<th>Budget ($K)</th>
<th># Topics</th>
<th># Ph I proposals</th>
<th># Ph I awards</th>
<th># Ph II awards</th>
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<td>126</td>
<td>1,646</td>
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</table>
Small Business Innovative Research (SBIR)
http://www.acq.osd.mil/osbp/sbir/overview/index.htm

What: Early-stage R&D funding directly to small companies working cooperatively with researchers at universities and other research institutions
Firm must be a U.S. for-profit small business of 500 or fewer employees
Work must be performed in the United States
Topics suggested by OXR / SYSCOM program managers
Topics http://www.dodsbir.net/Topics/Default.asp

How Much: Up to $150K for Phase 1 and up to $1M for Phase 2
Historically about 15% of Phase I and 50% of Phase II are successful

When: See prior chart
Only in preproposal interval is it permitted to contact the topic officer
Proposal deadline Dec, May and Aug typically


OXR the various DOD Funding agencies “Office of X Research”
SYSCOM Systems Commands
Small Business Technology Transfer (STTR)

What: Early-stage R&D funding directly to small companies working cooperatively with researchers at universities and other research institutions

Firm must be a U.S. for-profit small business of 500 or fewer employees

Research institution a U.S. college or Univ, FFRDC or non-profit

Small business must perform a minimum of 40% of the work and the research institution a minimum of 30% of the work in both Phase I & II

Work must be performed in the United States

Topics suggested by OXR / SYSCOM program managers

Topics http://www.dodsbir.net/Topics/Default.asp

How Much: Up to $850,000 (Phase 1 and Phase 2 combined) - this varies among agencies, and might be larger.

When: Announcements in January and July typically

Proposal deadlines in Mar and Aug typically


For a listing if SBIR program managers: http://sbir.us/pm.html
SYSCOM Systems Commands  O"X"R - the three Service Research Offices
SBIR AND STTR PROGRAMS
CRITICAL DIFFERENCES

• **Research Partner**

**SBIR:** Permits (encourages) research institution partners
[ ~ 33% Phase I and 50% Phase II R&D]

**STTR:** Requires research institution partners (e.g., universities)
[ 40% small business and 30% research institution]

AWARD ALWAYS MADE TO SMALL BUSINESS
SBIR AND STTR PROGRAMS
CRITICAL DIFFERENCES

• **Principal Investigator**

  **SBIR:** Primary (>50%) employment must be with small business concern

  **STTR:** Primary employment not stipulated

  [PI can be from research institution and/or from small business concern]
# SBIR vs STTR

## UNIQUE FEATURES

<table>
<thead>
<tr>
<th></th>
<th>SBIR</th>
<th>STTR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set-Aside of Agency Budget</td>
<td>2.5%</td>
<td>0.3%</td>
</tr>
<tr>
<td>FY10 SBIR/STTR Budget</td>
<td>~ $1.3 Billion</td>
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<tr>
<td>Award Guidelines</td>
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<tr>
<td>Phase I</td>
<td>$150K/6-9mos</td>
<td>$150K/1 yr</td>
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<tr>
<td>Phase II</td>
<td>$1M/2 yrs</td>
<td>$1M/2 yrs</td>
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<td>Subcontracts</td>
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<tr>
<td>Phase I</td>
<td>&lt; 33.3%</td>
<td>&lt; 60%</td>
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<tr>
<td>Phase II</td>
<td>&lt; 50%</td>
<td>&lt; 60%</td>
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<tr>
<td>Research Partner</td>
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<td>&gt; 30%</td>
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<tr>
<td>Business Employment of PI</td>
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</table>
Rapid Innovation Fund (RIF) Program

What:
The goal of the Rapid Innovation Fund is to transition innovative technologies that resolve operational challenges or save costs into acquisition programs. The DoD seeks mature prototypes for final development, testing, evaluation, and integration.

The RIF is a competitive, merit-based program to accelerate fielding of innovative technologies into military systems from SBIR phase II projects or lab-developed technologies. Selection Preference to Small Business Proposals

RIF Key Requirements - Proposals or Projects:
- Support one of the specific DoD Component requirements (as listed in solicitation)
- TRL 6-9 or lower TRL if potentially breakthrough
- Reduce Technical risk and or Cost of Development, acquisition, sustainment, or lifecycle
- Improve timeliness & quality of test & evaluation outcome
- Provide approach for use by an acquisition program
- Are completed within 24 months of award
- Cost is not more than $3 million

Funding mechanism will be contract

How Much: Average award in FY2011 ~$2M. Up to $3 million in Rapid Innovation Funding for an award and will have up to two years to perform the work.

When:
- White papers due 19 May 2017
- Proposals by invitation only

Where: HQ0034-17-BAA-RIF-0001 (issued 17 Mar 2017)
The Strategic thrusts are:
1. A responsive and balanced manufacturing technology investment portfolio to meet DoD requirements
2. Active support for a highly connected and collaborative defense manufacturing enterprise
3. Active support for a strong institutional focus on manufacturability and manufacturing process maturity
4. Active support for a healthy, sufficient, and effective defense manufacturing infrastructure and workforce

The overall ManTech program is overseen by the office of Manufacturing and Industrial Base Policy (MIBP) within OSD AT&L, however each component ManTech program is managed individually by Air Force, Army, Navy, Defense Logistics Agency and the Defense-wide Manufacturing Science and Technology (MDS&T)

DMS&T was established in FY08 to complement each service’s ManTech program. The goal is to focus on cross-cutting defense manufacturing needs – those that are beyond the ability of a single service to address – and to stimulate the early development of manufacturing processes and enterprise business practices concurrent with S&T development to achieve the largest cost-effective impact.
Innovation Manufacturing Institutes
http://www.manufacturing.gov/nnmi.html

**What:** The National Network for Manufacturing Innovation (NNMI) consists of linked Institutes for Manufacturing Innovation (IMIs) with common goals, but unique concentrations. Here industry, academia, and government partners are leveraging existing resources, collaborating, and co-investing to nurture manufacturing innovation and accelerate commercialization.

As sustainable manufacturing innovation hubs, the institutes will:
- Develop advanced manufacturing technologies that will "lift all ships," creating, showcasing and deploying new capabilities that can increase commercial productivity.
- Help businesses who otherwise couldn't invest in advanced manufacturing research, by bringing together the best talents and capabilities from the public and private sector into a proving ground for cutting-edge technology.
- Build a pipeline of talent that can support advanced manufacturing.

The Institutes are given on the order of $75-100M over 5 years; at least as much matching funds are expected from non-federal sources.
As of 2017 DOD sponsors 8 Institutes (additive manufacturing, digital manufacturing and design, lightweight metals, integrated photonics, flexible hybrid electronics, functional fabrics, advanced tissue biofabrication, robotics in manufacturing) and is considering a sixth.

**When:** No formal schedule

**Where:** AFRL has issued the solicitations for the last several IMIs, but Army and Navy have also been engaged.
DOD
1. additive manufacturing - America Makes - https://americamakes.us/
2. lightweight and modern metals - Lightweight Innovations for Tomorrow (LIFT) - http://lift.technology/
5. flexible hybrid electronics - Flexible Hybrid Electronics Manufacturing Innovation Institute (NextFlex) - http://www.nextflex.us/
7. Advanced Tissue Biofabrication (ARMI) - https://www.armiusa.org/

DOE
9. power electronics - Power America - https://www.poweramericainstitute.org/
10. advanced composites - Institute for Advanced Composites Manufacturing Innovation (ICAMI) - http://iacmi.org/
11. smart manufacturing for energy efficiency (CESMII) - https://www.cesmii.org/
Back-up / Supplement
Other S&T Programs (Beyond DRS)

Acronyms

CDMRP  Congressional Directed Medical Research Programs
DMRDP  Directed Medical Research and Development Program
MURI  Multidiscipline University Research Initiative
HEL MRI High Energy Laser, Multidisciplinary Research Initiative
GICUR Government-Industry Cosponsorship of University Research
DURIP Defense University Research Instrumentation Program
DTRA Defense Threat Reduction Agency
CBDP Chemical, Biological Defense Program
HPC High Performance Computing
YIP Young Investigator Program
PECASE Presidential Early Career Award in Science and Engineering
NDSEG National Defense Science and Engineering Graduate
NDEP National Defense Education Program
STTR/SBIR Small Business Technology Transfer /
Small Business Innovative Research
DEPSCOR Defense Experimental Program to Stimulate Competition
DoD R&D Considered Essential for:

- Fund military unique/critical technology, such as
  - Armored vehicles
  - Combat aircraft
  - Missiles
  - Submarines
  - Guns and munitions
  - Infectious diseases
  - Combat casualty care
  - Night vision
  - Automatic target recognition
  - Radiation hardened electronics

- Provide military advantage and options to future warfighters

- Focus/influence private sector research on military needs

- Sponsor long term, high risk and/or breakthrough research

- Educate future scientists and engineers

- Enable smart buyers

- Hedge against technological surprise
Military Research Payoff

Death Rates In America’s Major Wars

http://www.va.gov/opa/fact/index.htm
World of R&D 2010
Size of circle reflects the relative amount of annual R&D spending by the country noted.

Source: Battelle, R&D Magazine, OECD, IMF, CIA
FY13 and FY14 RDT&E Budget Request Comparison

- in Then Year Dollars -

FY13 RDT&E request = $69.41B
(Budget Activities 1-7)

($B)

BA6  + BA7
= $30.44B

BA6 RDT&E Management Support ($4.26B)

BA5 System Development & Demonstration ($14.69B)

BA4 Advanced Component Development & Prototypes ($12.41B)

BA3 Advanced Technology Development ($5.27B)

BA2 Applied Research ($4.48B)

BA1 Basic Research ($2.12B)

Technology Base (BA1 + BA2) = $6.59B

PBR13 S&T is 17.0% of RDT&E

FY14 RDT&E request = $67.52B
(Budget Activities 1-7)

($B)

BA6  + BA7
= $29.78B

BA6 RDT&E Management Support ($4.32B)

BA5 System Development & Demonstration ($13.70B)

BA4 Advanced Component Development & Prototypes ($12.06B)

BA3 Advanced Technology Development ($5.19B)

BA2 Applied Research ($4.63B)

BA1 Basic Research ($2.16B)

Technology Base (BA1 + BA2) = $6.79B

PBR14 S&T is 17.7% of RDT&E
DoD Basic Research 2014 PBR

Constant Dollars ($B) and % of RDT&E

Total RDT&E $67.5B

Operational Systems Development $25.5B, 38%
Applied Research, $4.6B, 7%
Advanced Technology Development $5.2B, 8%
Advanced Component Development & Prototypes $12.1B, 18%
System Development & Demonstration $13.7B, 20%
Basic Research $2.2B, 3%
RDT&E Management Support $4.3B, 6%
DoD Basic Research is 6% of Overall Federal Agency Support

- Total: $32.9B
- DHHS: 50%
- NSF: 16%
- NASA: 8%
- DOE: 13%
- DOD: 6%
- Other: 1%
  - Smithsonian: 1%
  - Veterans Affairs: 1%
  - Agriculture: 3%
  - Commerce: 1%
DoD Basic Research by Component FY14 President’s Budget Request

TOTAL
$2,165 M

Air Force
$524.8 M, 24%

DARPA
$364.5 M, 17%

Navy
$615.3 M, 29%

Army
$436.7 M, 20%

OSD
$126.3 M, 6%

Chem Bio
$51.4 M, 2%

DTRA
$45.8 M, 2%
Recipients of DoD S&T Funds

*Includes non-profit institutions, State & local govt., & foreign institutions
Source: National Science Foundation Report (PBR08)
## DOD Percentage of the Federal Funding to Academic Research

<table>
<thead>
<tr>
<th>Discipline</th>
<th>FY01</th>
<th>FY03</th>
<th>FY06</th>
<th>FY08</th>
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<td>1.4</td>
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<td>9.3</td>
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<td><strong>DOD Total to all fields</strong></td>
<td><strong>9.6</strong></td>
<td><strong>6.2</strong></td>
<td><strong>6.0</strong></td>
<td><strong>6.3</strong></td>
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From NSF Federal R&D Funding
Capability Priorities for FY13-17

Complex Threats
- Electronic Warfare / Electronic Protection
- Cyber Science and Technology
- Counter Weapons of Mass Destruction

Force Multipliers
- Data-to-Decisions
- Autonomy
- Engineered Resilient Systems
- Human Systems
High Interest Basic Science Areas

- Synthetic Biology
- Human Behavior Modeling
- Novel Engineered Materials
- Cognitive Neuroscience
- Quantum Information Science
- Nanoscience
Revolutionary Advances

Adaptive Optics and Lasers

Stealth

Night Vision

GPS

Phased Array Radar

From OSD R&D Overview, Dr. Lewis Sloter
From OSD R&D Overview, Dr. Lewis Sloter
S&T Requires Strong Partnerships

Service Labs/Centers

Expanded Resource Base

Universities

Link to the Warfighter

Maximum National Security Payoff

DARPA

New Ideas, Knowledge

Intergency

International

High Risk, High Payoff

Coalition Capability

Industry

From OSD R&D Overview, Dr. Lewis Slote