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# Index to Charts: Guidance to Defense
Selected Applied Research and Exploratory Development Funding

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<td>206</td>
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## Charts with Supplementary Information

Charts 207+
The Federal Mission Agencies Programs (MAPS) websites:
- connects PIs with appropriate funding agency programs/program officers
- assists in development of white papers/charts/elevator speeches

What is on the Central Desktop website:
Under “Wiki” Tab - how to use the site

Under “Files/Discussion” Tab

Mission Agency (DHS, DoD, DoE, DoEd, EPA, NASA, NIST, NOAA, USDA and cross agency programs in Adv Manuf, Sustainability, STEM-Ed)
Guide to Agency Funding for FYXX
Agency Research Program Charts
Agency S&T Planning Documents
Program Officer Data sheets (with contact info, biosketch, program descriptive, illustrative personal publications)
Program Officer presentations (when available)
Guides to Proposal Writing

Under “Database” Tab

USC MAPS - searchable table of all program officers / programmatic interest

In addition to the more extensive Central Desktop site, there is a MAPS website that can be accessed using one’s USC NetID and Password: http://web-app.usc.edu/web/ra_maps. At this website one can perform keyword searches to locate many Federal programs and program officers associated with the keywords.
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 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
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/
Air Force Office of Scientific Research (AFOSR)  www.afosr.af.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/
TATRC (Congressional adds, special interest)  www.tatrc.org/

Army Research Inst for Behavioral & Social Sci

www.hqda.army.mil/ari

DARPA

Microsystems Technology Office (MTO)  www.darpa.mil/Our_Work/MTO/
Information Innovation Office (I2O)  www.darpa.mil/Our_Work/I2O/

Defense Threat Reduction Agency (DTRA)

www.dtra.mil/

CBDP (DTRA BAA for FY10)

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

http://www.acq.osd.mi/rd/basic_research/references/funding.html
# FY2015 DOD Basic Research (6.1, $M)

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<th>URI</th>
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<td>114</td>
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<td>Air Force</td>
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<td>141 13 High Energy Laser</td>
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<td>50 Basic Operational Medical Science</td>
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DRS: Defense Research Sciences  
CDMRP: Congressionally Directed Medical Res Program  
CBDP: Chemical / Biological Defense Program  
DTRA: Defense Threat Reduction Agency  
NDEP: National Defense Education Program  
GDF: Guidance for the Development of the Force (in Def Health Program)  
URI: University Research Initiative  
HSCBM: Human Social Cultural Behavioral Modeling  

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 Research and Development Descriptive Summaries (RDDS) at [http://comptroller.defense.gov/defbudget/fy2014/budget_justification/index.html](http://comptroller.defense.gov/defbudget/fy2014/budget_justification/index.html)
# DOD FY15 Basic Research Open to University PIs, By Discipline
(Murday Best Estimate)

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<th>Discipline / Agency</th>
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<th>AF</th>
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Defense Research Sciences (DRS)

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

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

2008 Basic Research Plan (BRP) at http://dcresadv.usc.edu/archives/index.html
OXR - umbrella acronym for AFOSR, ARO, ONR, DARPA

FY15
Army ~$437M
Air Force ~524
Navy ~615
DARPA ~315
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.

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.

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 on working with DOD Basic Research

Program Officer – Program Officer – Program Officer

DOD Program officers have considerable latitude at project level
Typical “subprogram” budget ~ $1-2 M
Their reputation/professional advancement tied to your “success / failure”

Make contact with Program Officer before submitting a white paper or proposal
Significantly improves chance of tailoring ideas
First read the descriptive paragraph on the website – call informed
Plumb his/her current interest – website paragraphs are likely dated
Also ask after availability of funds – resources may be fully committed
Goal is a “marriage”, not a “date” - i.e. a long term relationship
Suggestions on working with DOD Basic Research
(cont)

Consider a rotational assignment at DARPA/OXR

Very good way to establish / cement personal relationships with other POs

Also good opportunity to broaden one’s vistas

True 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

See Faculty Exchange and Summer Faculty programs chart
Suggestions on working with DOD Basic Research
(cont)

Use-inspired basic research predominates in DOD, but

Breakthrough ideas (like nano and chaos 20 yrs ago) can be a trump card

DOD has traditionally opened up new areas of S&E – before there are peers

Provide new ideas for a program (to which coincidentally 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)
  MURIss provide “new” money to POs as well as to PIs
  Topics first competed inside OXRs (there tends to be a “fair share system”)
  Then validated / approved by OSD

Provide ideas for SBIR / STTR topic(s)
  SBIR / STTR provide a transition pathway for POs, as well as for the PIs
Faculty Exchanges and Summer Facility Positions in DOD

Navy Summer Faculty Research Program
   http://onr.asee.org/about_the_summer_faculty_program

Navy Faculty Sabbatical Leave Program
   http://onr.asee.org/about_the_sabbatical_leave_program

Air Force Visiting Scientist Program

AF PRET Partnerships for Research Excellence and Transition
National Research Council
Postdoctoral Fellowship Program
http://nrc58.nas.edu/RAPLab10/Opportunity/Programs.aspx
Source to Identify Potential DOD Research Collaborators

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

Army
Defense Basic Research
by Academic Discipline

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

ARO
Molecular Genetics  Micheline Strand  919 549 4343  micheline.k.strand.civ@mail.mil
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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
Social and Behavioral Science Strand (was Johnson)

AFOSR
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Trust and Influence Benjamin Knott  937 938 3599  info@us.af.mil
Natural Materials and Systems Hugh DeLong 703 696 7722  hugh.delong@afosr.af.mil
Biophysics         William Roach  703 588 8302  william.roach.r@us.af.mil

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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
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Bio Robotics
Human Robot Interaction
Human Perform: Decision Making Jeffrey Morrison  703 696 4875  jeffrey.g.morrison@navy.mil
Perception and Cognitive Control Paul Bello  703 696 4318  paul.bello@navy.mil
Reasoning About Uncertainty
Skill acquisition
Theory of Socio-Cognitive Architectures
Manpower and Personnel William Krebs  703 696 2575  william.krebs@.navy.mil
Cognitive Science of Learning Ray Perez  703 696 4986  ray.perez@navy.mil
Marine Mammals and Biology Michael Weise  703 696 4533  michael.j.weise@navy.mil

ONR (cont) and DARPA next page  (chart updated 3/21/2014)
## Life Sciences / Biology - continued

### Warfighter Protection and Applications Div – ONR Code 342

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<tr>
<td>Capable Manpower</td>
<td>William Krebs</td>
<td>703 696 2575</td>
<td><a href="mailto:william.krebs@navy.mil">william.krebs@navy.mil</a></td>
</tr>
<tr>
<td>Metabolic Engineering</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>Biomaterials &amp; Bionanotechnology</td>
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<td>BioEnergy Harvesting</td>
<td>Linda Chrisey</td>
<td>703 696 4504</td>
<td><a href="mailto:linda.chrisey@navy.mil">linda.chrisey@navy.mil</a></td>
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<td>Autonomous Devices for Adv Personnel Treatment</td>
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<td>Casualty Care &amp; Management</td>
<td>Michael Given</td>
<td>703 696 4055</td>
<td><a href="mailto:michael.given@navy.mil">michael.given@navy.mil</a></td>
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<tr>
<td>Basic Biomedical</td>
<td>Christopher Steele</td>
<td>703 696 0618</td>
<td><a href="mailto:christopher.steele4@navy.mil">christopher.steele4@navy.mil</a></td>
</tr>
<tr>
<td>Undersea Medicine</td>
<td>William D’Angelo</td>
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<tr>
<td>Stress Physiology and Biophysics</td>
<td>Sheri Parker</td>
<td>703 696 8448</td>
<td><a href="mailto:sheri.parker@navy.mil">sheri.parker@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>
</tr>
<tr>
<td></td>
<td>Katharine Shobe</td>
<td></td>
<td><a href="mailto:katharine.shobe@navy.mil">katharine.shobe@navy.mil</a></td>
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### Expeditionary Warfare and Combating Terrorism - ONR Code 30

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<td>Human Behavioral Sciences</td>
<td>Ivy Estabrooke</td>
<td>703 588 2396</td>
<td><a href="mailto:ivy.estabrooke@navy.mil">ivy.estabrooke@navy.mil</a></td>
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<tr>
<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 DSO (soon to be a separate Office)

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<th>Area</th>
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<tr>
<td>Neural, therapeutics</td>
<td>Justin Sanchez</td>
<td>703 526 2189</td>
<td><a href="mailto:justin.sanchez@darpa.mil">justin.sanchez@darpa.mil</a></td>
</tr>
<tr>
<td>Bioinformatics/Biochronicity</td>
<td>Christian Macedonia</td>
<td>571 526 4115</td>
<td><a href="mailto:christian.macedonia@darpa.mil">christian.macedonia@darpa.mil</a></td>
</tr>
<tr>
<td>Genomics and Biotechnology</td>
<td>Daniel Wattendorf</td>
<td>703 526 4085</td>
<td><a href="mailto:daniel.wattendorf@darpa.mil">daniel.wattendorf@darpa.mil</a></td>
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<tr>
<td>Infectious Disease</td>
<td>Matthew Hepburn</td>
<td>703 526 2851</td>
<td><a href="mailto:matthew.hepburn@darpa.mil">matthew.hepburn@darpa.mil</a></td>
</tr>
<tr>
<td>Biosystems and Medical</td>
<td>Barry Pallotta</td>
<td>571 218 4258</td>
<td><a href="mailto:barry.pallotta@darpa.mil">barry.pallotta@darpa.mil</a></td>
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<tr>
<td>Biowarfare Defense</td>
<td>John Julius</td>
<td>703 526 4735</td>
<td><a href="mailto:john.julius@darpa.mil">john.julius@darpa.mil</a></td>
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<tr>
<td>CBWD Sense / Detect</td>
<td>Mildred Donlon</td>
<td>703 696 2289</td>
<td><a href="mailto:mildred.donlon@darpa.mil">mildred.donlon@darpa.mil</a></td>
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(Chart updated 3/21/2014)
# Chemistry

**Chemical Sciences - ARO**

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<thead>
<tr>
<th>Department</th>
<th>Name</th>
<th>Phone</th>
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<tbody>
<tr>
<td>Polymer Chemistry</td>
<td>Dawanne Poree</td>
<td>919 549 4238</td>
<td><a href="mailto:dawanne.e.poree.ctr@mail.mil">dawanne.e.poree.ctr@mail.mil</a></td>
</tr>
<tr>
<td>Electrochemistry</td>
<td>Robert Mantz</td>
<td>919 549 4309</td>
<td><a href="mailto:robert.a.mantz.civ@mail.mil">robert.a.mantz.civ@mail.mil</a></td>
</tr>
<tr>
<td>Reactive Chemical Systems</td>
<td>Jennifer Becker</td>
<td>919 549 4224</td>
<td><a href="mailto:jennifer.j.becker.civ@mail.mil">jennifer.j.becker.civ@mail.mil</a></td>
</tr>
<tr>
<td>Molecular Structure &amp; Dynamics</td>
<td>James Parker</td>
<td>919 549 4293</td>
<td><a href="mailto:james.k.parker30.civ@mail.mil">james.k.parker30.civ@mail.mil</a></td>
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**Chemical Sciences - AFOSR**

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<tr>
<td>Molecular Dynamics</td>
<td>Michael Berman</td>
<td>703 696 7781</td>
<td><a href="mailto:michael.berman@afosr.af.mil">michael.berman@afosr.af.mil</a></td>
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<tr>
<td>Theoretical Chemistry</td>
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<tr>
<td>Organic Materials Chemistry</td>
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<tr>
<td>Space Power and Propulsion</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>Energy Conversion and Combust</td>
<td>Chiping Li</td>
<td>703 696 8574</td>
<td><a href="mailto:chiping.li@afosr.af.mil">chiping.li@afosr.af.mil</a></td>
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<tr>
<td>Dynamic Materials &amp; Interactions</td>
<td>Jennifer Jordan</td>
<td>703 588 8436</td>
<td><a href="mailto:jennifer.jordan.6@us.af.mil">jennifer.jordan.6@us.af.mil</a></td>
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**Chemical Sciences - ONR**

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<tr>
<td>Electrochemical Materials</td>
<td>Michelle Anderson</td>
<td>703 696 1938</td>
<td><a href="mailto:michele.anderson1@navy.mil">michele.anderson1@navy.mil</a></td>
</tr>
<tr>
<td>Envrn Quality: Marine Antifouling</td>
<td>Steve McElvany</td>
<td>703 696 1449</td>
<td>steve.mcelvany.navy.mil</td>
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<tr>
<td>Envrn Quality: Waste Treatment</td>
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<tr>
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<tr>
<td>Polymeric/Org Materials</td>
<td>Paul Armistead</td>
<td>703 696 4315</td>
<td><a href="mailto:paul.armistead@navy.mil">paul.armistead@navy.mil</a></td>
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<td>Organic Photovoltaics</td>
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<td>Capacitors for Pulsed Power</td>
<td>Sharon Beermann-Curtin</td>
<td>703 588 2358</td>
<td><a href="mailto:sharon.beermanncurti@navy.mil">sharon.beermanncurti@navy.mil</a></td>
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<td>Future Naval Fuels</td>
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<tr>
<td>Computer Aided Materials 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>Propulsion Materials</td>
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(chart updated 3/21/2014)
## Physics

### Physics - ARO
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<tr>
<th>Field</th>
<th>Name</th>
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<tbody>
<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>
<td>919 549 4319</td>
<td><a href="mailto:marc.d.ulrich.civ@mail.mil">marc.d.ulrich.civ@mail.mil</a></td>
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<tr>
<td>Optics &amp; Fields</td>
<td>Richard Hammond</td>
<td>919 549 4313</td>
<td><a href="mailto:richard.t.hammond10.civ@mail.mil">richard.t.hammond10.civ@mail.mil</a></td>
</tr>
<tr>
<td>Quantum Information Science</td>
<td>TR Govindan</td>
<td>919 549 4236</td>
<td><a href="mailto:t.r.govindan.civ@mail.mil">t.r.govindan.civ@mail.mil</a></td>
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### Physics - AFOSR
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<tr>
<td>Atomic and Molecular Physics</td>
<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>
</tr>
<tr>
<td>Biophysics</td>
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<td><a href="mailto:william.roach.4@us.af.mil">william.roach.4@us.af.mil</a></td>
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<tr>
<td>Electromagnetics</td>
<td>Arje Nachman</td>
<td>703 696 8427</td>
<td><a href="mailto:arje.nachman@afosr.af.mil">arje.nachman@afosr.af.mil</a></td>
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<tr>
<td>Laser and Optical Physics</td>
<td>Howard Schlossberg</td>
<td>703 696 7549</td>
<td><a href="mailto:howard.schlossberg@afosr.af.mil">howard.schlossberg@afosr.af.mil</a></td>
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<tr>
<td>Plasma &amp; Electro-Energetic Phys</td>
<td>John Luginsland</td>
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<td><a href="mailto:john.luginsland@afosr.af.mil">john.luginsland@afosr.af.mil</a></td>
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<tr>
<td>Quantum Electronic Solids</td>
<td>Harold Weinstock</td>
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<tr>
<td>Remote Sensing &amp; Imaging Phys</td>
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<td><a href="mailto:kent.miller@afosr.af.mil">kent.miller@afosr.af.mil</a></td>
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<tr>
<td>Ultra-short Pulse Laser-Matter</td>
<td>Riq 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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### Physics - ONR
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<tbody>
<tr>
<td>Atomic, Molec, Quantum Physics</td>
<td>Charles Clark</td>
<td>703 696 5267</td>
<td><a href="mailto:charles.clark3@navy.mil">charles.clark3@navy.mil</a></td>
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<tr>
<td>Chaos/Non-linear Physics</td>
<td>Michael Shlesinger</td>
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<td>Directed Energy</td>
<td>Quentin Saulter</td>
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<td><a href="mailto:quentin.saulter@navy.mil">quentin.saulter@navy.mil</a></td>
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<tr>
<td>RF Superconducting Technol</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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### Physical Sciences – DARPA DSO
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<tr>
<td>Optoelectronics, Quantum Info</td>
<td>Matthew Goodman</td>
<td>571 218 4681</td>
<td><a href="mailto:matthew.goodman@darpa.mil">matthew.goodman@darpa.mil</a></td>
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<tr>
<td>Photonics</td>
<td>Prem Kumar</td>
<td></td>
<td><a href="mailto:prem.kumar@darpa.mil">prem.kumar@darpa.mil</a></td>
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</table>

(chart updated 3/21/2014)
Electronics

Electronics - ARO
Solid State Devices Clark (was Woolard)
Optoelectronics Mike Gerhold 919 549 4357 michael.d.gerhold.cov@mail.mil
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Electronic Sensing William Clark 919 549 4314 william.w.clark9.civ@mail.mil
Terahertz Science and Technology Clark (was Woolard)

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Remote Sensing & Imaging Kent Miller 703 696 8573 kent.miller@afosr.af.mil
GHz-THz Electronics Pomrenke (temp)

Electronics - ONR next page

Microsystems Technology - DARPA MTO
see DARPA MTO - charts 92 - 93

(chart updated 3/21/2014)
## Electronics - continued

### Electronics ONR Code 322

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<tr>
<td>Active Aperture Arrays</td>
<td>Stephen Pappert</td>
<td>703 696 5268</td>
<td><a href="mailto:stephen.pappert@navy.mil">stephen.pappert@navy.mil</a></td>
</tr>
<tr>
<td>Atomic and Molecular Physics</td>
<td>Charles Clark</td>
<td>703 696 5267</td>
<td><a href="mailto:charles.clark3@navy.mil">charles.clark3@navy.mil</a></td>
</tr>
<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>
</tr>
<tr>
<td>Electromagnetic Materials</td>
<td>(Dan Green, now in DARPA MTO)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electronic Warfare</td>
<td>Peter Craig</td>
<td>703 696 0114</td>
<td><a href="mailto:peter.craig@navy.mil">peter.craig@navy.mil</a></td>
</tr>
<tr>
<td>EO/IR Sensor &amp; 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>Nanoscale Electronics</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>John Kim</td>
<td>703 696 4214</td>
<td><a href="mailto:john.c.kim1@navy.mil">john.c.kim1@navy.mil</a></td>
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<tr>
<td>Network Sensing</td>
<td>Michael Pollock</td>
<td></td>
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<tr>
<td>Radar and Signal Processing</td>
<td>Michael Pollock</td>
<td>703 696 4202</td>
<td><a href="mailto:michael.a.pollock@navy.mil">michael.a.pollock@navy.mil</a></td>
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<tr>
<td>RF/Digital Signal Processing</td>
<td>Stephen Pappert</td>
<td>703 588 5268</td>
<td><a href="mailto:stephen.pappert@navy.mil">stephen.pappert@navy.mil</a></td>
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<tr>
<td>RF Superconducting Technol</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>
</tr>
<tr>
<td>Semicon and Amplifiers</td>
<td>Paul Maki</td>
<td>703 696 3060</td>
<td><a href="mailto:paul.maki@navy.mil">paul.maki@navy.mil</a></td>
</tr>
</tbody>
</table>

(chart updated 3/21/2014)
# Mechanics – Solid, Fluid

### Mechanical Sciences - ARO
- **Fluid Dynamics**
  - Bryan Glaz 919 549 4322 bryan.j.glaz.civ@mail.mil
- **Solid Mechanics**
  - Anthenien (was Russell)
- **Complex Dynamics & Systems**
  - Samuel Stanton 919 549 4225 samuel.c.stanton2.civ@mail.mil
- **Propulsion & Energetic Sci**
  - Ralph Anthenien 919 549 4317 ralph.anthenien2.civ@mail.mil

### Mechanical Sciences - AFOSR
- **Flow Interactions and Control**
  - Douglas Smith 703 696 6919 douglass.smith@afosr.af.mil
- **Aerothermodynamics**
  - John Schmisseur 703 696 6962 john.schmisseur@afosr.af.mil
- **Turbulence and Transition**
  - Rengasamy Ponnappan 703 696 9558 rengasamy.ponnappan@
- **Mechanics of Multifunctional Matr**
  - Les Lee 703 696 8483 les.lee@afosr.af.mil
- **Space Power and Propulsion**
  - Mitat Birkan 703 696 7234 mitat.birkan@afosr.af.mil
- **Multiscale Structural Mechanics**
  - David Stargel 703 696 6961 david.stargel@afosr.af.mil
- **Test and Evaluation**
  - Michael Kendra 703 588 0671 michael.kendra@afosr.af.mil

### Ship Systems and Engineering Research – ONR Code 331
- **Surface Hydrodynamics**
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- **Underwater Signatures**
  - George Stimak 703 696 0616 george.stimak@navy.mil
- **Structural Reliability**
  - Paul Hess 703 696 9776 paul.hess@navy.mil
- **Energy Conversion & Power Mgmt**
  - H. Scott Coombe 703 696 1291 harold.coombe@navy.mil
- **Platform Design**
  - Kelly Cooper 703 696 0869 kelly.cooper@navy.mil
- **Thermal Management**
  - Mark Spector 703 696 4449 mark.spector@navy.mil
- **Compact Power Conversion**
  - Joseph Borraccini 703 696 7828 joseph.borraccini@navy.mil
- **Next Gen Integrated Pwr Sys**
  - Lynn Petersen 703 696 1291 lynn.j.petersen@navy.mil

### Sea Platforms and Undersea Weapons – ONR Code 333
- **Energetic Materials**
  - Daniel Tam 703 696 4204 daniel.tam1@navy.mil
- **Turbulence**
  - Ronald Joslin 703 696 2363 JoslinR@onr.navy.mil

### Naval Air Warfare and Weapons - ONR Code 351
- **Advanced Aerospace Propulsion**
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(chart updated 3/21/2014)
Environmental Sciences
Space, Atmosphere, Ocean, Terrestrial

Environmental Sciences - ARO
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Terrestrial Sciences  Dave Stepp (acting)  919 549 4329  david.m.stepp.civ@mail.mil

Environmental Sciences - AFOSR
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Ocean Sensing and Systems Applications – ONR Code 321
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Ocean Engineering & Marine Sys  Tom Swean  704 696 4025  tom.swean@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  Martin Jeffries  703 696 7825  martin.jeffries@navy.mil
    Marginal Ice Zone
    Sea State and Boundary Layer Physics of the Emerging Arctic Ocean
Littoral Geosciences & Optics  Thomas Drake  703 696 1206  tom.drake@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  Scott Budzien  202 767 9382  scott.budzien@nrl.navy.mil
Marine Mammals and Biology  Michael Weise  703 696 4533  michael.j.weise@navy.mil

(chart updated 3/21/2014)
Materials Sciences - ARO
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Syn & Processing of Materials  Suveen Mathaudhu  919 549 4244  suveen.n.mathaudhu.civ@mail.mil
Physical Properties of Materials  Pani Varanasi  919 549 4325  chakrapani.v.varanasi.civ@mail.mil
Materials Design  John Prater  919 549 4259  john.t.prater.civ@mail.mil

Materials Sciences - AFOSR
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Mechanics of Multifunctional Matrs  Les Lee  703 696 8483  les.lee@afosr.af.mil
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Low Density Materials  Joycelyn Harrison  703 696 6225  joycelyn.harrison@afosr.af.mil
Ultra-short Pulsed Laser/Materials  Enrique Parra  703 696 8571  enrique.parra@afosr.af.mil
Natural Materials and Systems  Hugh De Long  703 696 7722  hugh.delong@afosr.af.mil

Materials Sciences - ONR
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Polymer Matrix Composites  Ignacio Perez  
Propellor Materials  KiHan Kim  703 696 4305  kihan.kim@navy.mil
Propulsion Materials  David Shifler  703 696 0285  david.shifler@navy.mil
Solid Mechanics  Yapa Rajapakse  703 696 4405  yapa.rajapakse@navy.mil
Ultra-high Temperature Materials  Eric Wuchina  703 227 3949  eric.wuchina@navy.mil

Materials – DARPA DSO  see next page  (chart updated 3/21/2014)
## Materials Science - continued

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<tr>
<th>Materials - DARPA DSO</th>
<th>Person</th>
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<tbody>
<tr>
<td>Control Materials Structure</td>
<td>Jamil Abo-Shaeer</td>
<td>571 218 4399</td>
<td><a href="mailto:jamil.abo-shaeer@darpa.mil">jamil.abo-shaeer@darpa.mil</a> New</td>
</tr>
<tr>
<td>Energetic materials, armor</td>
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</tr>
<tr>
<td>Optics/Quantum</td>
<td>Matthew Goodman</td>
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</tr>
<tr>
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<tr>
<td>Materials synthesis</td>
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(Chart updated 3/21/2014)
## Mathematics - ARO

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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>
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<td>Modeling of Complex Systems</td>
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</tr>
<tr>
<td>Probability and Statistics</td>
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<tr>
<td>Numerical Analysis</td>
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## Math and Information Sciences - AFOSR

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<th>Area</th>
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<tbody>
<tr>
<td>Computational Mathematics</td>
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<td>703 696 8429</td>
<td><a href="mailto:fariba.fahroo@afosr.af.mil">fariba.fahroo@afosr.af.mil</a></td>
</tr>
<tr>
<td>Dynamics and Control</td>
<td>Fariba Fahroo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optimization and Discrete Math</td>
<td>Fahroo (was Hearn)</td>
<td></td>
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<tr>
<td>Math and Computational Cognit</td>
<td>Jay Myung</td>
<td>703 696 8478</td>
<td><a href="mailto:jay.myung@afosr.af.mil">jay.myung@afosr.af.mil</a></td>
</tr>
<tr>
<td>Math of nonlinear Systems</td>
<td>Arje Nachman</td>
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## Mathematics, Computers and Information Research - ONR

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<th>Area</th>
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<tr>
<td>Appd 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>
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<tr>
<td>Mathematical Optimization</td>
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## Mathematics – DARPA DSO

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<th>Area</th>
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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>
</tbody>
</table>

(chart updated 3/21/2014)
## Computer, Mathematics, and Information Sciences

### Computing and Information Sciences - ARO
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- **Info & Software Assurance**
  - Cliff Wang
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- **Info Processing and Fusion**
  - Liyi Dai
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  - Email: liyi.dai.civ@mail.mil

### Network Sciences - ARO
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- **Social and Cognitive Networks**
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  - Email: kathryn.d.coronges@mail.mil
- **Intelligent Networks**
  - Purush Iyer
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  - Email: purush.iyer@us.army.mil
- **Multi-agent Network Control**
  - Samuel Stanton
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  - Email: samuel.c.stanton2.civ@mail.mil

### Math and Information Sciences - AFOSR
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- **Systems and Software**
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- **Foundations of Info Systems**
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- **Dynamics and Control**
  - Fariba Fahroo
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- **Information Operations & Security**
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- **Computation and Machine Intell**
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- **Robust Decision Making**
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- **Sensory Information Systems**
  - Patrick Bradshaw
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- **Science of Info, Comp and Fusion**
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(chart updated 3/21/2014)
Math, **Computers & Info Research**  
**ONR Codes 311 and 351**

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<tr>
<th>Research Area</th>
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<tr>
<td>Autonomous Systems</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>Intelligent Systems</td>
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<tr>
<td>Image Analysis and Understanding</td>
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<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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<tr>
<td>Automation in Ship Systems</td>
<td>Anthony Seman</td>
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</tr>
<tr>
<td>Command and Control</td>
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<tr>
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<tr>
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<tr>
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</tr>
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**Information Innovation Office – DARPA I2O**

see Charts 89- 90

(chart updated 3/21/2014)
Air Force Office of Scientific Research (AFOSR)

What: AFOSR manages the Air Force DRS 6.1 portfolio
Defense Research Sciences (6.1) program 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: Proposal Information at:

FY15
6.1 DRS $314M
~30% goes to AFRL
AFOSR Organization Chart

Dynamical Systems and Control Department (RTA)
  Dr. David Stargel

Quantum and Non-Equilibrium Processes Department (RTB)
  Dr. William (Pat) Roach

Information, Decision and Complex Networks Department (RTC)
  Dr. Robert Bonneau

Complex Materials and Devices Department (RTD)
  Dr. Hugh DeLong

Energy, Power, and Propulsion Sciences Department (RTE)
  Dr. John Schmisseur
Acquiring AFOSR topic/PO information

Go to www.wpafb.af.mil/library/factsheets/factsheet.asp?id=8973

Scroll down and click on appropriate Directorate

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

Computational Mathematics
This program aims to develop improved mathematical methods and algorithms that exploit advanced computational capabilities in support of Air Force scientific computing interests.....
Dr. Fariba Fahroo, AFOSR/NM  Tel: (703) 696-8429
E-Mail: fariba.fahroo@afosr.af.mil

See also current solicitations at:
# Air Force Office of Scientific Research:  
Dynamical Systems and Control Department (RTA)


<table>
<thead>
<tr>
<th>Topic</th>
<th>Program Officer</th>
<th>Phone</th>
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<tbody>
<tr>
<td>Director</td>
<td>David Stargel</td>
<td></td>
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<tr>
<td>Computational Mathematics</td>
<td>Fariba Fahroo</td>
<td>703 696 8429</td>
<td><a href="mailto:fariba.fahroo@afosr.af.mil">fariba.fahroo@afosr.af.mil</a></td>
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<tr>
<td>Dynamics and Control</td>
<td>Fariba Fahroo</td>
<td>703 696 8429</td>
<td><a href="mailto:fariba.fahroo@afosr.af.mil">fariba.fahroo@afosr.af.mil</a></td>
</tr>
<tr>
<td>Flow Interactions and Control</td>
<td>Douglas Smith</td>
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<td><a href="mailto:douglas.smith@afosr.af.mil">douglas.smith@afosr.af.mil</a></td>
</tr>
<tr>
<td>Multiscale Structural Mechanics and Prognosis</td>
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<td><a href="mailto:david.stargel@afosr.af.mil">david.stargel@afosr.af.mil</a></td>
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<tr>
<td>Optimization and Discrete Math</td>
<td>Fariba Fahroo</td>
<td>703 696 8429</td>
<td><a href="mailto:fariba.fahroo@afosr.af.mil">fariba.fahroo@afosr.af.mil</a></td>
</tr>
<tr>
<td>Sensory Information Systems</td>
<td>Patrick Bradshaw</td>
<td>703 588 8492</td>
<td><a href="mailto:patrick.bradshaw@afosr.af.mil">patrick.bradshaw@afosr.af.mil</a></td>
</tr>
<tr>
<td>Test and Evaluation</td>
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</tr>
<tr>
<td>Turbulence and Transition</td>
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<td>rengasamy.ponnappan@</td>
</tr>
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(chart updated 3/21/2014)
Air Force Office of Scientific Research:
Quantum and Non-Equilibrium Processes Department (RTB)

<table>
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<tr>
<th>Topic</th>
<th>Program Officer</th>
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<tbody>
<tr>
<td>Director</td>
<td>William (Pat) Roach</td>
<td>703 855 8302</td>
<td></td>
</tr>
<tr>
<td>Atomic and Molecular Physics</td>
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<td><a href="mailto:tatjana.curcic@afosr.af.mil">tatjana.curcic@afosr.af.mil</a></td>
</tr>
<tr>
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</tr>
<tr>
<td>Electromagnetics</td>
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<td><a href="mailto:arje.nachman@afosr.af.mil">arje.nachman@afosr.af.mil</a></td>
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<tr>
<td>Laser and Optical Physics</td>
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<tr>
<td>Plasma and Electro-Energetic Physics</td>
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<tr>
<td>Remote Sensing and Imaging Physics</td>
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<tr>
<td>Space Sciences</td>
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</tr>
<tr>
<td>Ultra-Short Pulse Laser-Matter Interactions</td>
<td>Riq 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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(chart updated 3/21/2014)
**Air Force Office of Scientific Research: Information, Decision and Complex Networks Department (RTC)**


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<th>Topic</th>
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<td>Director</td>
<td>Robert Bonneau</td>
<td>703 696 9545</td>
<td><a href="mailto:robert.bonneau@afosr.af.mil">robert.bonneau@afosr.af.mil</a></td>
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<tr>
<td>Complex Networks</td>
<td>Robert Bonneau</td>
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<td><a href="mailto:robert.bonneau@afosr.af.mil">robert.bonneau@afosr.af.mil</a></td>
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<td>Computational and Machine Intelligence (was Jay Myung)</td>
<td>(was Jay Myung)</td>
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<td>Dynamic Data Driven Application Systems</td>
<td>Frederica Darema</td>
<td>703 588 1926</td>
<td><a href="mailto:frederica.darema@afosr.af.mil">frederica.darema@afosr.af.mil</a></td>
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<tr>
<td>Foundations of Information Systems</td>
<td>Robert Bonneau</td>
<td>703 696 9545</td>
<td><a href="mailto:robert.bonneau@afosr.af.mil">robert.bonneau@afosr.af.mil</a></td>
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<tr>
<td>Information Operations and Security</td>
<td>Robert Herklotz</td>
<td>703 696 6565</td>
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<tr>
<td>Mathematical and Computational Cognition (was Jay Myung)</td>
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<td>Robust Decision Making in Human-System Interface (was Jay Myung)</td>
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<tr>
<td>Science of Info, Computation and Fusion</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>Sensing, Surveillance and Navigation</td>
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<tr>
<td>Systems and Software</td>
<td>Kathleen Kaplan</td>
<td>703 696 7312</td>
<td>leaving AFOSR</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 3/21/2014)
### Air Force Office of Scientific Research: Complex Materials and Devices Department (RTD)


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<td>Director</td>
<td>Hugh DeLong</td>
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<td>Adaptive Multimode Sensing</td>
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<tr>
<td>Aerospace Materials for Extreme Environments</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>
</tr>
<tr>
<td>GHz-THz Electronics</td>
<td>Ken Goretta</td>
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<td><a href="mailto:kenneth.goretta@us.af.mil">kenneth.goretta@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>Mechanics of Multifunctional Materials &amp; Microsys</td>
<td>Les Lee</td>
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<td><a href="mailto:les.lee@afosr.af.mil">les.lee@afosr.af.mil</a></td>
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<tr>
<td>Natural Materials and Systems</td>
<td>Hugh DeLong</td>
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<tr>
<td>Optoelectronics and Photonics</td>
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<td><a href="mailto:gernot.pomrenke@afosr.af.mil">gernot.pomrenke@afosr.af.mil</a></td>
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<tr>
<td>Organic Materials Chemistry</td>
<td>Charles Lee</td>
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<tr>
<td>Quantum Electronic Solids</td>
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<td><a href="mailto:harold.weinstock@afosr.af.mil">harold.weinstock@afosr.af.mil</a></td>
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(chart updated 3/21/2014)
Air Force Office of Scientific Research:  
Energy, Power and Propulsion Department (RTE)  

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<tr>
<td>Director</td>
<td>John Schmisseur</td>
<td>703 696 6962</td>
<td><a href="mailto:john.schmisseur@afosr.af.mil">john.schmisseur@afosr.af.mil</a></td>
</tr>
<tr>
<td>Aerothermodynamics</td>
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<td><a href="mailto:jennifer.jordan.6@us.af.mil">jennifer.jordan.6@us.af.mil</a></td>
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<tr>
<td>Dynamic Materials and Interactions</td>
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<tr>
<td>Energy Conversion and Combustion Sciences</td>
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<td>Human Performance and Biosystems</td>
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<td>Molecular Dynamics and Theoretical Chemistry</td>
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<td>Space Power and Propulsion</td>
<td>Mitat Birkan</td>
<td>703 696 7234</td>
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(chart updated 3/21/2014)
AFOSR Basic Research Initiatives
2014 included in BAA-AFOSR-2014-0001

Basic Research Initiatives provide funding for new topics that AFOSR wishes to emphasize. Awards average $150,000 per year and may be proposed for up to five years.

2014 Topics
Design and Control of Energy Transfer Pathway Berman
Dynamic Material Interfaces in Extreme Environments Jordan
Chem Reactions and Collisions Processes of Ultracold Molecules Curcic
Studies of Glass & Ceramics for Hi Avg Power Lasers & Other Applications Sayir
In-situ Dynamic Mesoscale Measurements of Reacting Energetic Materials Jordan
Molecular Electronics Enabled Control of Cellular Systems Charles Lee
Muscular-Skeletal System Inspired Morphing Air Vehicles Les Lee
Predictive Probabilistics for Resident Space Objects Bollino

2013 Topics
2D Materials and Devices beyond Graphene Hwang, Pomrenke, Harrison, Bradshaw, Curcic, DeLong
Bio-sensing of Magnetic Fields Bradshaw, Curcic, DeLong
Development and Verification of Effective Modeling of Semiconductor Lasers under Non-Equilibrium Operation Nachman
Laser-matter Interactions in the Relativistic Optics Regime Parra, Luginsland
Laser Physics for Scaling of Single Fibers - Quality/Power Schlossberg
Metal Dielectric Interface - Charge Transfer Sayir, Luginsland
Nanoscale Building Blocks for Novel Materials Berman, DeLong
Perceptual and Social Cues in Human-like Robotic Interactions Lyons, Myung
Plasma-Surface Interactions in Reactive Environments Berman, Luginsland
Socio-Digital Influence Lyons
Theory-based Engineering of Biomolecular Circuits in Living Cells Fahroo, DeLong
Understanding the Interaction of Coronal Mass Ejections Miller, Luginsland
Understanding the Psychological/Behavioral Effects of Adv Weapon Lyons, Luginsland
Universty Nanosatellite Program
Cycle Process Flow

Last BAA was for FY2013
AFOSR 2012-0006

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 Science Problems with the Military Applications (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:

FY15
6.1
DRS $238M
H57 (ARO) 81M
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<tr>
<td><strong>Engineering Sciences Directorate</strong></td>
<td>Dr. Thomas Doligalski, Director</td>
<td>Mechanical Sciences Division</td>
<td>Dr. Ralph Anthenien</td>
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<td>Environmental Sciences</td>
<td>Dr. Tom Doligalski, Acting</td>
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<td><strong>Information Sciences Directorate</strong></td>
<td>Dr. Randy Zachery, Director</td>
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<td>Dr. Cliff Wang</td>
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<td>Dr. Purush Iyer</td>
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<td><strong>Physical Sciences Directorate</strong></td>
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<td>Dr. Robert Mantz, Acting</td>
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<td>Dr. Michiline Strand</td>
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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:

Dr. Cliff Wang 919.549.4207 cliff.wang

Information and Software Assurance - From the Army perspective, Information Assurance must address the delivery of authentic, accurate, secure, reliable, timely information, regardless of threat conditions, over the distributed and heterogeneous computing and communication system.…

See also current solicitations at:

www.arl.army.mil/www/default.cfm?Page=8#ARO
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<td><strong>Electronics Division</strong></td>
<td>William Clark</td>
<td>919 549 4314</td>
<td><a href="mailto:william.w.clark9.civ@mail.mil">william.w.clark9.civ@mail.mil</a></td>
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<tr>
<td>Solid-State Devices</td>
<td>William Clark (was Woolard)</td>
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<tr>
<td>Optoelectronics</td>
<td>Mike Gerhold</td>
<td>919 549 4357</td>
<td><a href="mailto:michael.d.gerhold.civ@mail.mil">michael.d.gerhold.civ@mail.mil</a></td>
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<tr>
<td>Electronic Sensing</td>
<td>William Clark</td>
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<td><a href="mailto:william.w.clark9.civ@mail.mil">william.w.clark9.civ@mail.mil</a></td>
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<tr>
<td>Terahertz Science and Technology</td>
<td>William Clark (was Palmer)</td>
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<td>Electromagnetics, Microwaves and Power</td>
<td>William Clark (was Harvey)</td>
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<td><strong>Environmental Sciences Division</strong></td>
<td>Tom Doligalski</td>
<td>919 549 4251</td>
<td><a href="mailto:thomas.l.doligalski.civ@mail.mil">thomas.l.doligalski.civ@mail.mil</a></td>
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<tr>
<td>Atmospheric Sciences</td>
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<td><a href="mailto:gorden.w.videen.civ@mail.mil">gorden.w.videen.civ@mail.mil</a></td>
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<tr>
<td>Terrestrial Sciences</td>
<td>Dave Stepp (was Preston)</td>
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<td><a href="mailto:david.m.stepp.civ@mail.mil">david.m.stepp.civ@mail.mil</a></td>
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<tr>
<td><strong>Materials Sciences Division</strong></td>
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<td><a href="mailto:david.m.stepp.civ@mail.mil">david.m.stepp.civ@mail.mil</a></td>
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<td>Mechanical Behavior of Materials</td>
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<td><a href="mailto:david.m.stepp.civ@mail.mil">david.m.stepp.civ@mail.mil</a></td>
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<tr>
<td>Synthesis and Processing of Materials</td>
<td>Suveen Mathaudhu</td>
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<td>Physical Properties of Materials</td>
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<tr>
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<td><strong>Mechanical Sciences Division</strong></td>
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<td>Fluid Dynamics</td>
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<td><a href="mailto:bryan.j.glaz.civ@mail.mil">bryan.j.glaz.civ@mail.mil</a></td>
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<td>Complex Dynamics and Systems</td>
<td>Samuel Stanton</td>
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<tr>
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<td><a href="mailto:ralph.anthenien2.civ@mail.mil">ralph.anthenien2.civ@mail.mil</a></td>
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<tr>
<td>Computing Sciences Division</td>
<td>Cliff Wang</td>
<td>919 349 4256</td>
<td><a href="mailto:joseph.m.coyle14.civ@mail.mil">joseph.m.coyle14.civ@mail.mil</a></td>
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<tr>
<td>Computational Architectures and Visualization</td>
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<td>Information and Software Assurance</td>
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<td>Information Processing and Fusion</td>
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<td>Virginia Pasour</td>
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<td>Modeling of Complex Systems</td>
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<td><a href="mailto:john.e.lavery4.civ@mail.mil">john.e.lavery4.civ@mail.mil</a></td>
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<td>Probability and Statistics</td>
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<td>Numerical Analysis</td>
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<td><a href="mailto:joseph.d.myers8.civ@mail.mil">joseph.d.myers8.civ@mail.mil</a></td>
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<td>Network Sciences Division</td>
<td>Purush Iyer</td>
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<tr>
<td>Communications &amp; Human Networks</td>
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<td>919 549 4330</td>
<td><a href="mailto:robert.j.ulman.civ@mail.mil">robert.j.ulman.civ@mail.mil</a></td>
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<tr>
<td>Socio and Cognitive Networks</td>
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<td><a href="mailto:kathryn.d.coronges@mail.mil">kathryn.d.coronges@mail.mil</a></td>
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<tr>
<td>Intelligent Networks</td>
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<tr>
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<td><a href="mailto:samuel.c.stanton2.civ@mail.mil">samuel.c.stanton2.civ@mail.mil</a></td>
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(chart updated 3/21/2014)
## Army Research Office: Physical Sciences Directorate

http://www.arl.army.mil/www/default.cfm?page=70

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<tr>
<td>Polymer Chemistry</td>
<td>Dawanne Poree (acting)</td>
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<td>dawanne.e.poree.ctr@</td>
</tr>
<tr>
<td>Electrochemistry</td>
<td>Robert Mantz</td>
<td>919 549 4309</td>
<td><a href="mailto:robert.a.mantz.civ@mail.mil">robert.a.mantz.civ@mail.mil</a></td>
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<tr>
<td>Reactive Chemical Systems</td>
<td>Jennifer Becker</td>
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<td><a href="mailto:jennifer.j.becker.civ@mail.mil">jennifer.j.becker.civ@mail.mil</a></td>
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<tr>
<td>Molecular Structure and Dynamics</td>
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<td><a href="mailto:james.k.parker30.civ@mail.mil">james.k.parker30.civ@mail.mil</a></td>
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<td><strong>Physics Division</strong></td>
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<td>Atomic and Molecular Physics</td>
<td>Paul Baker</td>
<td>919 549 4202</td>
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<td>Condensed Matter Physics</td>
<td>Marc Ulrich</td>
<td>919 549 4319</td>
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<tr>
<td>Optics and Fields</td>
<td>Richard Hammond</td>
<td>919 549 4313</td>
<td>richard.t.hammond10.civ@</td>
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<td>Quantum Information Science</td>
<td>T.R. Govindan</td>
<td>919 549 4236</td>
<td><a href="mailto:t.r.govindan.civ@mail.mil">t.r.govindan.civ@mail.mil</a></td>
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<td><strong>Life Sciences Division</strong></td>
<td></td>
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</tr>
<tr>
<td>Molecular Genetics</td>
<td>Micheline Strand</td>
<td>919 549 4343</td>
<td><a href="mailto:micheline.k.strand.civ@mail.mil">micheline.k.strand.civ@mail.mil</a></td>
</tr>
<tr>
<td>Biochemistry</td>
<td>Stephanie McElhinny</td>
<td>919 549 4240</td>
<td>stephanie.a.mcelhinny.civ@</td>
</tr>
<tr>
<td>Microbiology</td>
<td>Robert Kokoska</td>
<td>919 549 4342</td>
<td><a href="mailto:robert.j.kokosda2.civ@mail.mil">robert.j.kokosda2.civ@mail.mil</a></td>
</tr>
<tr>
<td>Neurophysiology &amp; Cognitive Neuroscience</td>
<td>Frederick Gregory</td>
<td>919 549 4318</td>
<td><a href="mailto:frederick.d.gregory5.civ@us.army.mil">frederick.d.gregory5.civ@us.army.mil</a></td>
</tr>
<tr>
<td>Social and Behavioral Science</td>
<td>Micheline Strand (was Johnson)</td>
<td></td>
<td></td>
</tr>
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</table>

(chart updated 3/21/2014)
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 offerors 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 $50,000 or less
RESEARCH INSTRUMENTATION (RI) PROGRAM.

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.
Army Corp of Engineers

http://www.usace.army.mil/Pages/default.aspx

Engineering Research and Development Center
(largely in-house effort)
http://www.erdc.usace.army.mil/

Geospatial Research & Engineering
- Technical Preparation of Joint Operating Environment (JOE)
- Geospatial Informatics and Framework
- Geo-Information Preparation of JOE
- Geo-Enabled Mission Command Enterprise

Installations & Environment
- Adaptive and Resilient Installations
- Sustainable Ranges and Lands
- Military Materials in the Environment

Military Engineering
- Force Protection in Base Camps
- Enhanced Tele-engineering Research
- Objective Force Reaching in Urban Terrains
- Weapons Effects in Urban Terrains

Military Engineering Projects
- DRS
- 52C Mapping and Remote Sensing: $2.0M
- T22 Soil and Rock Mechanics: 5.7
- T23 Basic Research Military Construction: 2.1
- T24 Signature Physics and Terrain State: 2.0

Water Resources
- Navigation and Hydropower
- Flood and Coastal Systems
- Water Supply, Emergency Management
- Environment – Restoration, Regulation, Stewardship
- Water Resources Infrastructure
- System-Wide Water Resources
- Basic Research
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 Training and Health Information Sciences
   - Radiation Health Effects Research Program
   - Special Investment Areas/ Innovation Funding:
     - Medical Logistics, Biomonitoring technologies, Cross-cutting Technologies in Neuroscience, Medical Robotics and Intelligent Systems, Nanomedicine and Biomaterials

Congressional Program Offices

   - Congressionally Directed Medical Research Program (CDMRP)
   - Telemedicine and Advanced Technology Research Center (TATRC)

How Much: Open continuously

When: Open continuously

send preproposal, followed by proposal if invited to do so


USAMRMC W81XWH-BAA-14-1 Oct 2013
1. Military Infectious Diseases Research Program  
Col. Michael P Kozar  
Program Director  
301 619 7882

2. Combat Casualty Care Research Program  
Col. Dallas C Hack (MD)  
Program Director  
310 619 7301

3. Military Operational Medicine Research Program  
Col. Carl A Castro (PhD)  
Program Director  
310 619 7304

4. Clinical and Rehabilitative Medicine Research Program  
Lt. Col. John Scherer (PhD)  
Program Director  
301 619 7591

5. Medical Biological Defense Research Program  
DTRA

6. Medical Chemical Defense Research Program  
DTRA

7. Medical Training and Health Information Sciences Research Program  
DMRDP

8. Radiation Health Effects Research Program  
DMRDP

9. Special Investment Areas/Innovation Funding  
Dr. John F. Glenn (PhD, not MD)  
Principal Asst for Research and Technology  
301 619 7620
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.
What: Add fundamental knowledge to behavioral science subdisciplines
   a. Training
   b. Leader Development
   c. Team and Inter-Organizational Performance in Complex Environments
   d. Soldier and Personnel
   e. Basic Research:
      Improving Training in Complex Environments
      Improving Leader and Team Performance
      Identifying, Assessing and Assigning Quality Personnel
      Understanding Organizational Behavior and Network Science

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

How Much: ~$200K/yr for 3 years

When: Concept papers optional (must be at least 6 weeks prior to proposal deadline)

Where: W911NF-13-R-0001
D&I Discovery and Invention (6.1 and 6.2)

INP Innovative Naval Prototype

FNC Future Naval Capabilities (6.3 and 6.2)
Office of Naval Research (ONR): Organizational Structure

Expeditionary Warfare and Combating Terrorism Department, Code 30
   Mr. Ashley Johnson (Acting)

C4ISR Department, Code 31
   Dr. Bobbie Junker
   Mathematics, Computers, and Info Research Div, 311
   Dr. Wen Masters
   Electronics, Sensors and Network Research Div, 312
   Dr. Michael Pollock
   Applications and Transitions Div, 313
   Vacant

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

Sea Warfare and Weapons Department, Code 33
   Dr. Richard Carlin
   Ship Systems and Engineering Research Div, 331
   Dr. John Pazik
   Naval Materials Div, 332
   Dr. Julie Christodoulou
   Sea Platforms and Weapons Div, 333
   Capt. J Morris

Warfighter Performance Department, Code 34
   Dr. Terry Allard
   Human and Bioengineered Systems Div, 341
   Dr. John Tangney
   Warfighter Protection and Application Div, 342
   Capt. John Schmidt

Naval Research Laboratory
   Dr. John Montgomery

Naval Air Warfare and Weapons Department, Code 35
   Capt. David Woodbury (acting)
   Aerospace Science Research Div, 351
   Dr. Thomas Beutner
   Air Warfare and Naval Weapons Application Div, 352
   Mr. Kenneth Heeke
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, such as Basic Research Challenge, need watch for program announcements


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<tr>
<td>6.1 DRS</td>
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<td>(~25% goes to NRL)</td>
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<td>6.3</td>
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Acquiring ONR topic/PO information

Go to www.onr.navy.mil

Click on appropriate Research Code – one of squares in middle

Click on appropriate Division category – from listing on left side

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
<table>
<thead>
<tr>
<th>Topic</th>
<th>Program Officer</th>
<th>Phone</th>
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<tbody>
<tr>
<td>Code 30</td>
<td>George Solhan</td>
<td>703 696 7148</td>
<td><a href="mailto:george.w.solhan@navy.mil">george.w.solhan@navy.mil</a></td>
</tr>
<tr>
<td>Command Control Computers &amp; Coms (C4)</td>
<td>John Moniz</td>
<td>703 696 4286</td>
<td><a href="mailto:john.moniz@navy.mil">john.moniz@navy.mil</a></td>
</tr>
<tr>
<td>Fires</td>
<td>Dan Simons</td>
<td>703 696 4840</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 3073</td>
<td><a href="mailto:lee.mastroianni@navy.mil">lee.mastroianni@navy.mil</a></td>
</tr>
<tr>
<td>Human Social/Cultural/Behavioral Modeling</td>
<td>Ivy Estabrooke</td>
<td>703 588 2396</td>
<td><a href="mailto:ivy.estabrooke@navy.mil">ivy.estabrooke@navy.mil</a></td>
</tr>
<tr>
<td>Human Performance Training and Education</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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<tr>
<td>Intelligence, Surveillance &amp; Recon (ISR)</td>
<td>Martin Kruger</td>
<td>703 696 5349</td>
<td><a href="mailto:martin.kruger1@navy.mil">martin.kruger1@navy.mil</a></td>
</tr>
<tr>
<td>Logistics</td>
<td>Cody Reese</td>
<td>703 696 2041</td>
<td><a href="mailto:reesec@onr.navy.mil">reesec@onr.navy.mil</a></td>
</tr>
<tr>
<td>Manuever</td>
<td>Jeff Bradel</td>
<td>703 588 2552</td>
<td><a href="mailto:jeff.bradel@navy.mil">jeff.bradel@navy.mil</a></td>
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(chart updated 8/8/2013)
### Office of Naval Research: C4ISR
(Mathematics, Computers, and Information)


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<tbody>
<tr>
<td>Math, Computers &amp; Info Research (311)</td>
<td>Wen Masters</td>
<td>703 696 3191</td>
<td><a href="mailto:wen.masters@navy.mil">wen.masters@navy.mil</a></td>
</tr>
<tr>
<td>Applied 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>
</tr>
<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>
</tr>
<tr>
<td>Image Analysis and 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>
</tr>
<tr>
<td>Intelligent and Autonomous Systems</td>
<td></td>
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</tr>
<tr>
<td>Information Integration</td>
<td>Wen Masters</td>
<td>703 696 3191</td>
<td><a href="mailto:wen.masters@navy.mil">wen.masters@navy.mil</a></td>
</tr>
<tr>
<td>Mathematical Optimization &amp; Operations Res</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>Signal Processing</td>
<td>Rabinder Madan</td>
<td>703 696 4217</td>
<td><a href="mailto:rabinder.madan@navy.mil">rabinder.madan@navy.mil</a></td>
</tr>
<tr>
<td>Software and Computing Systems</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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**C4ISR** Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance

(chart updated 8/8/2013)
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<tr>
<td>Electronics, Sensors &amp; Networks Research (312)</td>
<td>Preston Grounds</td>
<td>703 696 0331</td>
<td><a href="mailto:chip.grounds@navy.mil">chip.grounds@navy.mil</a></td>
</tr>
<tr>
<td>Active Aperture Array</td>
<td>Stephen Pappert</td>
<td>703 696 5268</td>
<td><a href="mailto:stephen.pappert@navy.mil">stephen.pappert@navy.mil</a></td>
</tr>
<tr>
<td>Atomic, Molecular &amp; Quantum Physics</td>
<td>Charles Clark</td>
<td>703 696 5267</td>
<td><a href="mailto:charles.clark3@navy.mil">charles.clark3@navy.mil</a></td>
</tr>
<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>
</tr>
<tr>
<td>Electromagnetic Materials</td>
<td>was Dan Green</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electronic Warfare</td>
<td>Peter Craig</td>
<td>703 696 0114</td>
<td><a href="mailto:peter.craig@navy.mil">peter.craig@navy.mil</a></td>
</tr>
<tr>
<td>EO/IR Sensors</td>
<td>Ravindra Athale</td>
<td></td>
<td><a href="mailto:ravindra.athale@navy.mil">ravindra.athale@navy.mil</a></td>
</tr>
<tr>
<td>Ionospheric Modification</td>
<td>Craig Selcher</td>
<td>202 767 2179</td>
<td><a href="mailto:craig.selcher@navy.mil">craig.selcher@navy.mil</a></td>
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<tr>
<td>Nanoscale Electronics</td>
<td>Chagaan Baatar</td>
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<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>John Kim</td>
<td>703 696 4212</td>
<td><a href="mailto:john.c.kim1@navy.mil">john.c.kim1@navy.mil</a></td>
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<tr>
<td>Radar and Signal Processing</td>
<td>Michael Pollock</td>
<td>703 696 4202</td>
<td><a href="mailto:michael.a.pollock@navy.mil">michael.a.pollock@navy.mil</a></td>
</tr>
<tr>
<td>RF and Digital Signal Processing</td>
<td>Stephen Pappert</td>
<td>703 696 5268</td>
<td><a href="mailto:stephen.pappert@navy.mil">stephen.pappert@navy.mil</a></td>
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<tr>
<td>RF 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>
</tr>
<tr>
<td>Semiconductors and Amplifiers</td>
<td>Paul Maki</td>
<td>703 696 3060</td>
<td><a href="mailto:paul.maki@navy.mil">paul.maki@navy.mil</a></td>
</tr>
<tr>
<td>Vacuum Devices</td>
<td>Ingham Mack</td>
<td>703 696 4825</td>
<td><a href="mailto:ingham.mack@navy.mil">ingham.mack@navy.mil</a></td>
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(chart updated 8/8/2013)
Office of Naval Research: Ocean Battlespace Sensing  
(Ocean, Atmosphere, and Space)  

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<th>Program Officer</th>
<th>Phone</th>
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<tbody>
<tr>
<td>Ocean Sensing and Systems Applications (321)</td>
<td>Dan Eleuterio</td>
<td>703 696 4303</td>
<td><a href="mailto:daniel.eleuterio@navy.mil">daniel.eleuterio@navy.mil</a></td>
</tr>
<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>
</tr>
<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>
</tr>
<tr>
<td>Ocean Engineering &amp; Marine Sys</td>
<td>Tom Swean</td>
<td>704 696 4025</td>
<td><a href="mailto:tom.swean@navy.mil">tom.swean@navy.mil</a></td>
</tr>
<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>
</tr>
</tbody>
</table>

Ocean, Atmosphere, and Space Research (322)

- Ocean Acoustics                           | Robert Headrick     | 703 696 4315 | bob.headrick@navy.mil                  |
- Arctic and Global Prediction Program       | Martin Jeffries     | 703 696 7825 | martin.jeffries@navy.mil               |
  - Marginal Ice Zone                        
  - Sea State and Boundary Layer Physics of the Emerging Arctic Ocean
- Littoral Geosciences and Optics           | Thomas Drake        | 703 696 1206 | tom.drsake@navy.mil                    |
- Marine Mammals and Biology                | Michael Weise       | 703 696 4533 | michael.j.weise@navy.mil               |
- Marine Meteorology & Atmos Effects         | Ron Ferek           | 703 696 0518 | ron.ferek@navy.mil                     |
- Physical Oceanography                      | Terri Paluszkiewicz | 703 696 6680 | terri.paluszkiewicz@navy.mil           |
- Space/Environment                          | Scott Budzien (NRL) | 202 767 9372 | scott.budzien@nrl.navy.mil             |

(chart updated 8/8/2013)
<table>
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<tr>
<td>Ship Systems and Engineering Research (331)</td>
<td>John Pazik</td>
<td>703 696 4404</td>
<td><a href="mailto:john.pazik@navy.mil">john.pazik@navy.mil</a></td>
</tr>
<tr>
<td>Energy Conversion and Power Mgmt</td>
<td>H. Scott Coombe</td>
<td></td>
<td><a href="mailto:harold.coombe@navy.mil">harold.coombe@navy.mil</a></td>
</tr>
<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>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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<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>Propeller Materials</td>
<td>Ki-Han Kim</td>
<td>703 696 4305</td>
<td><a href="mailto:kihan.kim@navy.mil">kihan.kim@navy.mil</a></td>
</tr>
<tr>
<td>Next Gen Integrated Power System</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>
</tr>
<tr>
<td>Underwater Signatures</td>
<td>George Stimak</td>
<td>703 696 0616</td>
<td><a href="mailto:george.stimak@navy.mil">george.stimak@navy.mil</a></td>
</tr>
<tr>
<td>Compact Power Conversion Technol</td>
<td>Joseph Borracini</td>
<td>703 696 7823</td>
<td><a href="mailto:joseph.borraccini@navy.mil">joseph.borraccini@navy.mil</a></td>
</tr>
<tr>
<td>Topside Signatures</td>
<td>Steven Russell</td>
<td>703 696 4714</td>
<td><a href="mailto:steven.j.russell@navy.mil">steven.j.russell@navy.mil</a></td>
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<tr>
<td>Surface Hydromechanics</td>
<td>Patrick Purtell</td>
<td>703 696 4308</td>
<td><a href="mailto:patrick.purtell@navy.mil">patrick.purtell@navy.mil</a></td>
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<tr>
<td>TBI Protection</td>
<td>Rhosdy Barsoum</td>
<td>703 696 4306</td>
<td><a href="mailto:roshdy.barsoum@navy.mil">roshdy.barsoum@navy.mil</a></td>
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(chart updated 8/8/2013)
# Office of Naval Research: Sea Warfare and Weapons
(Mechanics, Chemistry, and Materials)


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<td>[Naval Materials Research (332)]</td>
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<td>Alloys and Joining</td>
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<td>Acoustic Transduction</td>
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<td>Antifouling/Fouling Release</td>
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<td><a href="mailto:steve.mcelvany@navy.mil">steve.mcelvany@navy.mil</a></td>
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<td>Capacitors for Pulsed Power</td>
<td>Paul Armistead</td>
<td>703 696 4315</td>
<td><a href="mailto:paul.armistead@navy.mil">paul.armistead@navy.mil</a></td>
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<td>Cellular Materials</td>
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<td>Computer Aided Materials Design</td>
<td>Kenny Lipkowitz</td>
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<td>Dielectric Films for Capacitors</td>
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<td>Electrochemical Materials</td>
<td>Michele Anderson</td>
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<td>Future Naval Fuels</td>
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<td>NDE - Fatigue and Fracture</td>
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<td>NDE - Sensors</td>
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<td>Organic Photovoltaics</td>
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<td>Solid Liquid Solid Waste Treatment</td>
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<td>Solid Mechanics</td>
<td>Yapa Rajapakse</td>
<td>703 696 4405</td>
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<td>Ultra high Temperature Materials</td>
<td>Eric Wuchina</td>
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<td><a href="mailto:eric.wuchina@navy.mil">eric.wuchina@navy.mil</a></td>
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<td>Water Purification / Desalination</td>
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(chart updated 8/8/2013)
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 pursing 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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<tr>
<td><strong>Human &amp; Bioeng Systems (341)</strong></td>
<td>John Tangney</td>
<td>703 696 4505</td>
<td><a href="mailto:john.f.tangney@navy.mil">john.f.tangney@navy.mil</a></td>
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<td>Affordable Human Behavioral Modeling</td>
<td>Harold Hawkins</td>
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<td>Agile Organizational Structures</td>
<td>Jeffrey Morrison</td>
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<td><a href="mailto:jeffrey.g.morrison@navy.mil">jeffrey.g.morrison@navy.mil</a></td>
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<tr>
<td>Cognitive Science of Learning</td>
<td>Ray Perez</td>
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<td>Biometrics in the Maritime Domain</td>
<td>Thomas McKenna</td>
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<td>Biorobotics</td>
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<tr>
<td>Computational Neuroscience</td>
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<td><a href="mailto:tom.mckenna@navy.mil">tom.mckenna@navy.mil</a></td>
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<td>Human Activity Recognition</td>
<td>Thomas McKenna</td>
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<tr>
<td>Human Robot Interaction</td>
<td>Thomas McKenna</td>
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<td><a href="mailto:tom.mckenna@navy.mil">tom.mckenna@navy.mil</a></td>
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<tr>
<td>Multi-echelon Decision Making</td>
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<tr>
<td>Perception, Metacognition and Cognitive Control</td>
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<td>Reasoning about Uncertainty</td>
<td>Paul Bello</td>
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<td>Skill Acquisition</td>
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<td>Paul Bello</td>
<td>703 696 4218</td>
<td><a href="mailto:paul.bello@navy.mil">paul.bello@navy.mil</a></td>
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(chart updated 8/8/2013)
### Office of Naval Research: Warfighter Performance  
*(Biology, Cognitive, and Neural Science)*


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<td><strong>Biological &amp; Biomed Div (342)</strong></td>
<td>Capt John Schmidt</td>
<td>703 696 8448</td>
<td><a href="mailto:john.k.schmidt@navy.mil">john.k.schmidt@navy.mil</a></td>
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<td>Autonomous Devices for Adv Personnel Treatment</td>
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<td><a href="mailto:linda.chrisey@navy.mil">linda.chrisey@navy.mil</a></td>
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<td>Basic Biomedical</td>
<td>Christopher Steele</td>
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<td>Biomaterials and Bionanotechnology</td>
<td>Laura Kienker</td>
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<td><a href="mailto:linda.kienker@navy.mil">linda.kienker@navy.mil</a></td>
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<td>Bio-energy Harvesting</td>
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<tr>
<td>Capable Manpower</td>
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<td>Force Health Protection</td>
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<td>Metabolic Engineering</td>
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<td>Noise Induced Hearing Loss</td>
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<td>Stress Physiology and Biophysics</td>
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<td>Undersea Medicine</td>
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(chart updated 8/8/2013)
## Office of Naval Research: Naval Air Warfare and Weapons


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<td>Aerospace Science (351)</td>
<td>Thomas Beutner</td>
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<td>Aviation Technology</td>
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<td>High energy, dense oxidizers</td>
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<td>Science of Autonomy</td>
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<td>Unmanned air systems</td>
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<td>Electromagnetic Rail Gun</td>
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<td>Free Electron Laser</td>
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<td>Joseph Doychak</td>
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<td>UAV Heavy Fuel Engine</td>
<td>Malinda Pagett</td>
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(chart updated 8/8/2013)
Basic Research Challenges
announced through special notices; generic BRC topics mid December

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.

Majorana Fermions 14-SN-0005
Chagaan Baatar

Multi-Tasking Catalysis 13-SN-0022
Kenny Lipkowitz, Paul Armistead

Science of Autonomy 13-SN-0005
Structured Machine Learning for Scene Understanding
Behzd Kamgar-Parsi Paul Bello, Jason Stack
Understanding Satisficing in Human, Animal, and Engineered Autonomous Systems for Fast Decision Making
Marc Steinberg, Julie Marble, Harold Hawkins
Semantic and Visual Representation of Autonomous System Perceptual Data for Effective Human/Machine Collaboration
Mary Cummings, Marc Steinberg, Julie Marble
Mental Simulation as a Unifying Framework for Perception, Cognition and Control in Autonomous Systems
Thomas McKenna, Paul Bello
Integrated Autonomy for Log Duration Operations
Terri Paulszkiewicz, Jason Stack, Marc Steinberg

(chart updated 3/23/2014)
Naval Postgraduate School Research Initiatives

NPS BAA 13-004

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](http://www.nps.edu/About/index.html)
NPS Strategic Plan: [http://www.nps.edu/About/NPSStratPlan.html](http://www.nps.edu/About/NPSStratPlan.html)
Academic Programs: [http://www.nps.edu/Academics/index.html](http://www.nps.edu/Academics/index.html)
Research Programs: [http://www.nps.edu/Research/index.html](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.

Response Date: before 31 May 2014
Multi-INT Research Initiatives at the Naval Postgrad School
NPS BAA Announcement # NPS-BAA-13-005

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:
  • Inferencing and Reasoning
  • Orchestrated Resource Management
  • Visualization
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: $50,000 and $150,000 for up to 1 year

When: Due date 18 Oct 2013 for a FY2014 award. The solicitation remains open until 15 Sep 2014.
<table>
<thead>
<tr>
<th>DARPA Organization</th>
<th>AEO</th>
<th>DSO</th>
<th>I2O</th>
<th>MTO</th>
<th>STO</th>
<th>TTO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adaptive Execution Office</td>
<td>Coordinated field trials</td>
<td>Physical sciences</td>
<td>Cyber</td>
<td>Biology/bio platforms</td>
<td>Finding difficult targets</td>
<td>Ground systems</td>
</tr>
<tr>
<td>Technology insertion</td>
<td>Neuroscience</td>
<td>Data analytics at massive scale</td>
<td>Computing</td>
<td>Computing</td>
<td>Communications, networks, and electronic warfare</td>
<td>Maritime systems</td>
</tr>
<tr>
<td>DARPA-Combatant Command interaction</td>
<td>Materials</td>
<td>ISR exploitation</td>
<td>Electronic warfare</td>
<td>Manufacturing</td>
<td>Air systems</td>
<td>Tactical Technology Office</td>
</tr>
<tr>
<td></td>
<td>Mathematics</td>
<td>Thermal management</td>
<td>Novel concepts</td>
<td>PNT</td>
<td>Space systems</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Biology</td>
<td></td>
<td>Photonics</td>
<td>PNT</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Thermal management</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
Defense Advanced Research Projects Agency (DARPA)
www.darpa.mil

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)  Microsystems Technology Office (MTO)
Information Innovation Office (I2O)  Strategic Technology Office (STO)
Tactical Technology Office (TTO)

Larger programs are available than at OXRs (some managed by OXR POs)
Think teaming - industrial participation 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
Involvement in topic formative workshops very helpful

Where: http://www.darpa.mil/Opportunities/Universities/
http://www.darpa.mil/Opportunities/Universities/Young_Faculty.aspx

FY15
6.1  ~$ 362M
6.2  ~ 1136M
6.3  ~ 1344M
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
White Paper for Seedling

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:

Short and Focused
Identify a Problem
Describe a Solution
Focus on Key Challenge and Effort Needed
Outline a Decisive Plan
Typical length ~ 1 year. Typical Budget ~$300K
Include some graphics, and possibly a Penta-Chart

When to Send? Anytime. We receive white papers almost every day of the year.
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
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
Plasmonics
- Improved synergy between electronic and photonic devices
- Size of electronic components
- Operating speed of photonic networks
- Critical – negative permittivity and dielectric constant
Acquiring DARPA topic/PO information

Go to www.darpa.mil
Click on “Our Work” tab at the top of the page
Click on appropriate Technical Office Program
Click on appropriate “Focus Area”
Click on desired research topic(s) – get info, illustrated here by:

Program Manager: Dr. Geoffrey Ling
Fracture Putty
DARPA seeks to create a dynamic putty-like material that, when packed in and around a compound bone fracture, provides full loadbearing capabilities within days. Fracture putty could rapidly restore a patient to ambulatory function...

See also current solicitations at:
Physical Science: focus on three areas: fundamental physics, novel physics-based devices and applications, and power. These focus areas provide a sound fundamental foundation by investigating concepts in their formative stages and steering their evolution to solve vital DoD problems.

Neuroscience: DSO develops and leverages neurophysiological sensors, neuro-imaging, cognitive science and molecular biology to provide support, protection and tactical advantage to warfighters who perform under the most challenging operational conditions. DSO is discovering and applying advances in neuroscience to improve warfighters’ resilience to stress, increase the rate and quality of learning and training, defend against injury and enhance our warfighters' ability to exert influence.

Materials: The DSO Materials program seeks to advance material science on many technology fronts. Programs range from developing physics- and chemistry-based models that allow for the design of novel materials possessing radically improved or new properties, to innovative processing methods that dramatically reduce the cost of producing titanium metal and its alloys.

Mathematics: DSO’s mathematics program applies and develops new and existing mathematical tools that impact a broad continuum of DoD mission areas. The program is rooted in the tenet that DoD needs are best addressed by creating integrated teams of mathematicians and subject matter experts to address problems. This approach enables the rapid exploitation of new mathematical techniques to create new technologies as well as the translation of technological needs into challenge problems for the mathematics community to drive new research.

Biology: DSO's commitment to harnessing the biological sciences is evidenced by its growing portfolio of programs in human combat performance, tactical and restorative biomedical technologies, and biologically inspired platforms and systems. These focus areas emerged from an aggressive basic research program designed to understand fundamental processes in biology through promoting interactions among the most creative thinkers in biology with leaders in disparate fields such as physics, mathematics, and engineering.
<table>
<thead>
<tr>
<th>Program Officer</th>
<th>Email</th>
<th>Year start</th>
<th>Interests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. William Casebeer</td>
<td><a href="mailto:william.casebeer@darpa.mil">william.casebeer@darpa.mil</a></td>
<td></td>
<td>neuroethics, the evolution of morality, the intersections of cognitive science and national security policy</td>
</tr>
<tr>
<td>Dr. William Coblenz</td>
<td><a href="mailto:william.coblenz@darpa.mil">william.coblenz@darpa.mil</a></td>
<td></td>
<td>development of new materials and manufacturing processes</td>
</tr>
<tr>
<td>Dr. Mildred Donlon</td>
<td><a href="mailto:mildred.donlon@darpa.mil">mildred.donlon@darpa.mil</a></td>
<td></td>
<td>advanced chemical and biological detectors for battlefield, counter proliferation, and intelligence application</td>
</tr>
<tr>
<td>Dr. Reza Ghanadan</td>
<td><a href="mailto:reza.ghanadan@darpa.mil">reza.ghanadan@darpa.mil</a></td>
<td>2013</td>
<td>information and communications sciences and technologies, applied and computational mathematics, and adaptive and autonomous systems.</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>microstructural effects on macroscopic material properties</td>
</tr>
<tr>
<td>Dr. Judah Goldwasser</td>
<td><a href="mailto:judah.goldwasser@darpa.mil">judah.goldwasser@darpa.mil</a></td>
<td>2007</td>
<td>information and communications sciences and technologies, applied and computational mathematics, and adaptive and autonomous systems.</td>
</tr>
<tr>
<td>Dr. Matthew Goodman</td>
<td><a href="mailto:matthew.goodman@darpa.mil">matthew.goodman@darpa.mil</a></td>
<td>2007</td>
<td>quantum information, quantum communications, quantum key distribution, optical technologies</td>
</tr>
<tr>
<td>LTC (MD) Matthew Hepburn</td>
<td><a href="mailto:matthew.hepburn@darpa.mil">matthew.hepburn@darpa.mil</a></td>
<td>2013</td>
<td>infectious diseases??</td>
</tr>
<tr>
<td>Dr. Prem Kumar</td>
<td><a href="mailto:prem.kumar@darpa.mil">prem.kumar@darpa.mil</a></td>
<td>2013</td>
<td>photonics</td>
</tr>
<tr>
<td>Program Officer</td>
<td>Email</td>
<td>Year start</td>
<td>Interests</td>
</tr>
<tr>
<td>---------------------------------</td>
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<td>------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Dr. Michael Maher</td>
<td><a href="mailto:michael.maher@darpa.mil">michael.maher@darpa.mil</a></td>
<td></td>
<td>reduce manufacturing cycle time; novel lightweight multifunctional material systems</td>
</tr>
<tr>
<td>Mr. Tyler McQuade</td>
<td><a href="mailto:david.mcquade@darpa.mil">david.mcquade@darpa.mil</a></td>
<td>2013</td>
<td>chemistry of materials synthesis, biopolymers, biofuels</td>
</tr>
<tr>
<td>Mr. Doran Michels</td>
<td><a href="mailto:doran.michels@darpa.mil">doran.michels@darpa.mil</a></td>
<td>2013</td>
<td>imaging and apps??</td>
</tr>
<tr>
<td>Dr. Barry Pallotta</td>
<td><a href="mailto:barry.pallotta@darpa.mil">barry.pallotta@darpa.mil</a></td>
<td>2013</td>
<td>complex biological systems and their application to scientific discovery and the development of medical countermeasures to biological threats.</td>
</tr>
<tr>
<td>Dr. Gill A. Pratt</td>
<td><a href="mailto:gill.pratt@darpa.mil">gill.pratt@darpa.mil</a></td>
<td>2010</td>
<td>robotics; symbiosis between designer and design tool, hyper-rapid fabrication methods, interfaces that significantly enhance human/machine collaboration,</td>
</tr>
<tr>
<td>Dr. Justin Sanchez</td>
<td><a href="mailto:justin.sanchez@darpa.mil">justin.sanchez@darpa.mil</a></td>
<td>2013</td>
<td>neurotechnology, brain science and systems neurobiology.</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>Daniel J. Wattendorf, M.D.</td>
<td><a href="mailto:daniel.wattendorf@darpa.mil">daniel.wattendorf@darpa.mil</a></td>
<td>2010</td>
<td>genomics and biotechnology</td>
</tr>
<tr>
<td>Lt Col, USAF</td>
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</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>
</table>
| **Compact 30X Zoom**        | Rockwell MIT MIT UCSD AeroVironment | Pointer UAV Vis, NIR, MWIR | Performance  
- Enhanced Imaging  
- Dynamic 30X Zoom  
- Increased Loiter Time | Crystalline Lenses |
| Fluidic Lens                |                         |              |                                           |                   |
| **Dynamic GRIN Lens**       | Case Western NRL        | Dragoneye UAV Vis, NIR, SWIR | Performance  
- Enhanced Imaging  
- Variable FOV  
- Reduced Weight  
- Increased Loiter Time | Octopus Lens |
| Solid state GRIN            |                         |              |                                           |                   |
| **Foveated Imaging**        | U of Central Fl Sandia AFRL BNS/Narrascape | Helo Platform Vis | Performance  
- Enhanced Imaging  
- Track multiple images  
- Image Compression | Retina (Fovea) |
| FPA                        |                         |              |                                           |                   |
| Rays                       |                         |              |                                           |                   |
| Pixelated, LC SLM          |                         |              |                                           |                   |
| **Multi λ/FOV system**     | U of Florida ITC Raytheon | MRM         NIR, LWIR | Performance  
- Significant reduction in weight and complexity  
- 2-color system | Brittlestar |
| Photon Sieve               |                         |              |                                           |                   |

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

*Leonard J. Buckley, DSO*
DARPA Information Innovation Office (I2O)

http://www.darpa.mil/Our_Work/I2O/

Focus Areas

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. I2O’s research portfolio is focused on anticipating new modes of warfare in emerging areas and developing the concepts and tools necessary to provide decisive advantage.

The I2O defensive cyber portfolio is largely focused on changing the cyberspace paradigm through a variety of methods such as heterogeneity, formal methods proofs, secure code generation, and automation. Exploration of offensive methods is essential to expand and inform defensive work. The I2O portfolio covers a broad space, investigating enterprise networks, secure communications, industrial systems, and purpose-built military systems.

I2O is also pursuing information technologies to change the way we perceive and interact with our surroundings. Exponential improvements in computing power, network bandwidth and storage density combined with ever more pervasive sensing and measurement technologies provided new and powerful ways to gain insight into the world. Essentially all human activities that can be measured, from mercantile to military, are being quantitatively re-examined in the context of this new, “big data”, capability. Early demonstrations have produced remarkable insights into human activities and enabled quantitative decision making. I2O’s investment portfolio begins at the fundamental science level with programs investigating varied topics from the mathematical properties of graphs, to online correlation for societal unrest. The portfolio also addresses fundamental computational issues such as novel algorithm design, natural language processing, and architectures for efficient processing of streamed data.
<table>
<thead>
<tr>
<th>Program Officer</th>
<th>Email</th>
<th>Year start</th>
<th>Interests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. Timothy Booher</td>
<td><a href="mailto:timothy.booher@darpa.mil">timothy.booher@darpa.mil</a></td>
<td>2014</td>
<td>cyberspace technology</td>
</tr>
<tr>
<td>Dr. Paul Cohen</td>
<td><a href="mailto:paul.cohen@darpa.mil">paul.cohen@darpa.mil</a></td>
<td>2013</td>
<td>artificial intelligence and include machine learning, language, vision, semantic technology, data analysis, information theory and education informatics.</td>
</tr>
<tr>
<td>Mr. Benjamin Cutler</td>
<td><a href="mailto:benjamin.cutler@darpa.mil">benjamin.cutler@darpa.mil</a></td>
<td>2010</td>
<td>data exploitation, electronic design automation, parallel processing, high performance and embedded computing</td>
</tr>
<tr>
<td>Dr. Yiftach Eisenberg</td>
<td><a href="mailto:yiftach.eisenberg@darpa.mil">yiftach.eisenberg@darpa.mil</a></td>
<td>2009</td>
<td>electronic warfare, image and video processing, computer wireless communications vision,</td>
</tr>
<tr>
<td>Dr. John Everett</td>
<td><a href="mailto:john.everett@darpa.mil">john.everett@darpa.mil</a></td>
<td>2014</td>
<td>intersection of automation technologies with information security</td>
</tr>
<tr>
<td>Dr. Kathleen Fisher</td>
<td><a href="mailto:kathleen.fisher@darpa.mil">kathleen.fisher@darpa.mil</a></td>
<td>2011</td>
<td>programming languages and high assurance systems.</td>
</tr>
<tr>
<td>Mr. Timothy Fraser</td>
<td><a href="mailto:timothy.fraser@darpa.mil">timothy.fraser@darpa.mil</a></td>
<td>2011</td>
<td>cyber-security</td>
</tr>
<tr>
<td>Dr. Randy Garrett</td>
<td><a href="mailto:randy.garrett@darpa.mil">randy.garrett@darpa.mil</a></td>
<td>2010</td>
<td>use of information technologies for the counter-insurgency mission</td>
</tr>
<tr>
<td>Mr. Mike Geertsen</td>
<td><a href="mailto:michael.geertsen@darpa.mil">michael.geertsen@darpa.mil</a></td>
<td>2011</td>
<td>geospatial, simulation and mobile technologies</td>
</tr>
<tr>
<td>Mr. Richard Guidorizzi</td>
<td><a href="mailto:richard.guidorizzi@darpa.mil">richard.guidorizzi@darpa.mil</a></td>
<td>2010</td>
<td>computer network operations, computer network defense</td>
</tr>
<tr>
<td>Dr. Michael Hsieh</td>
<td><a href="mailto:michael.hsieh@darpa.mil">michael.hsieh@darpa.mil</a></td>
<td>2013</td>
<td>quantitative models of economic and social phenomena to improve situational awareness of global events with national security significance</td>
</tr>
<tr>
<td>Program Officer</td>
<td>Email</td>
<td>Year start</td>
<td>Interests</td>
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</tr>
<tr>
<td>Dr. Suresh</td>
<td><a href="mailto:suresh.jagannathan@darpa.mil">suresh.jagannathan@darpa.mil</a></td>
<td>2013</td>
<td>programming languages, compilers, program verification, and concurrent and distributed systems</td>
</tr>
<tr>
<td>Jagannathan</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dr. Robert</td>
<td><a href="mailto:Robert.laddaga@darpa.mil">Robert.laddaga@darpa.mil</a></td>
<td>2013</td>
<td>resilient computing systems and artificial intelligence (AI).</td>
</tr>
<tr>
<td>Laddaga</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dr. Boyan</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>Onyshkevych</td>
<td></td>
<td></td>
<td></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. Daniel</td>
<td><a href="mailto:daniel.ragsdale@darpa.mil">daniel.ragsdale@darpa.mil</a></td>
<td>2011</td>
<td>cyber security education, computer ethics and privacy, computer network operations, social networks, and network sciences</td>
</tr>
<tr>
<td>Ragsdale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dr. George</td>
<td><a href="mailto:george.roelke@darpa.mil">george.roelke@darpa.mil</a></td>
<td></td>
<td>nothing listed</td>
</tr>
<tr>
<td>Roelke</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dr. Michael</td>
<td><a href="mailto:michael.walker@darpa.mil">michael.walker@darpa.mil</a></td>
<td>2013</td>
<td>machine reasoning about software in situ and the</td>
</tr>
<tr>
<td>Walker</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dr. Rand</td>
<td><a href="mailto:rand.waltzman@darpa.mil">rand.waltzman@darpa.mil</a></td>
<td>2010</td>
<td>automation of application security lifecycles.</td>
</tr>
<tr>
<td>Waltzman</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dr. Christopher</td>
<td><a href="mailto:christopher.white@darpa.mil">christopher.white@darpa.mil</a></td>
<td>2011</td>
<td>enabling technology required for efficiently processing, analyzing and visualizing large volumes of data in a military, mission-oriented context</td>
</tr>
<tr>
<td>White</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Focus Areas

The **Biological Platforms focus area** explores and develops technological breakthroughs that reside at the intersection of biology and systems engineering. Programs in this area may lay the groundwork for advances in areas ranging from military medicine to novel materials development.

The **Computing focus area** supports study of new computational models and mechanisms for reasoning and communication in complex and interconnected systems, including methods for increasing the power efficiency of embedded computing systems; development of next-gen on-chip communication links; and novel approaches to “unconventional” computing models.

The **Electronic Warfare focus area** examines approaches to increase operational bandwidth, linearity and efficiency of electronic systems; the development of adaptive and reconfigurable radio architectures; and techniques to leverage spectral domains such as millimeter wave (MMW) and sub-MMW bands.

The effective and secure **Manufacturing Techniques focus area** seeks to develop techniques providing system developers the ability to determine the function of digital, analog and mixed-signal ICs non-destructively. The office also seeks revolutionary circuit design methodologies combined with hybrid lithography tools to enable cost-effective, low-volume fabrication of ASICs.

The **Novel Concepts focus area** explores non-traditional topics that may be leveraged to meet DoD-specific challenges. While the programs within this area are diverse in nature, they represent key investments that further the DARPA mission of creating and preventing technological surprise.

The **Photonics focus area** exploits the high sensitivity and large bandwidth of photonic components, as well as the ease of transmission of optical signals, to enhance sensing and communications. Research in this area explores photonic integration to develop circuits of increasing complexity with a reduced footprint, and in the fundamental development of novel photonic devices.

Through the **Position Navigation and Timing focus area**, MTO seeks to develop technologies for self-contained, chip-scale inertial navigation and precision guidance to complement GPS.

The **Thermal Management focus area** explores new materials and architectures for use in thermal management systems.
<table>
<thead>
<tr>
<th>Program Officer</th>
<th>Email</th>
<th>Year start</th>
<th>Interests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Avram Bar-Cohen</td>
<td><a href="mailto:avram.bar-cohen@darpa.mil">avram.bar-cohen@darpa.mil</a></td>
<td></td>
<td>thermal management of electronic components and systems, energy-efficient sustainable design of manufactured products</td>
</tr>
<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. Timothy Broderick</td>
<td><a href="mailto:Timothy.broderick@darpa.mil">Timothy.broderick@darpa.mil</a></td>
<td></td>
<td>development of surgical capabilities for aeromedical transport and long-duration spaceflight</td>
</tr>
<tr>
<td>Dr. William Chappell</td>
<td><a href="mailto:william.chappell@darpa.mil">william.chappell@darpa.mil</a></td>
<td>2011</td>
<td>advanced packaging, adaptable RF systems, and antenna arrays.</td>
</tr>
<tr>
<td>Dr. Josh Conway</td>
<td><a href="mailto:joshua.conway@darpa.mil">joshua.conway@darpa.mil</a></td>
<td>2012</td>
<td>linear and non-linear nano-photonics from UV to LWIR frequencies, active integrated photonic devices, RF photonics, advanced imaging systems and revolutionary space systems.</td>
</tr>
<tr>
<td>Dr. Joseph Cross</td>
<td><a href="mailto:joseph.cross@darpa.mil">joseph.cross@darpa.mil</a></td>
<td>2013</td>
<td>embedded computing systems, in particular power and computing efficiency, and the DoD software development process including verification and overall software cost.</td>
</tr>
<tr>
<td>Dr. Nibir Dhar</td>
<td><a href="mailto:nibir.dhar@darpa.mil">nibir.dhar@darpa.mil</a></td>
<td>2008</td>
<td>novel architectures in infrared detectors and imaging, nanoelectronics including NEMS/MEMS components, novel materials synthesis techniques, bio-inspired concepts, new modality power sources and storage</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. 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>Dr. Dan Hammerstrom</td>
<td><a href="mailto:daniel.hammerstrom@darpa.mil">daniel.hammerstrom@darpa.mil</a></td>
<td>2012</td>
<td>biologically inspired information engineering, hybrid nanoscale/CMOS VLSI for ISP, parallel architectures for image processing and pattern recognition,</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Program Officer</th>
<th>Email</th>
<th>Year start</th>
<th>Interests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Alicia Jackson</td>
<td><a href="mailto:alicia.jackson@darpa.mil">alicia.jackson@darpa.mil</a></td>
<td>2010</td>
<td>integration of engineering with biology, novel manufacturing processes, biomanufacturing to create self-healing materials, evolvable processes</td>
</tr>
<tr>
<td>Dr. Robert Lutwak</td>
<td><a href="mailto:robert.lutwak@darpa.mil">robert.lutwak@darpa.mil</a></td>
<td>2013</td>
<td>miniature position, navigation, and timing (PNT) technology portfolio</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. Dev Palmer</td>
<td><a href="mailto:dev.palmer@darpa.mil">dev.palmer@darpa.mil</a></td>
<td>2012</td>
<td>sub-millimeter wave and terahertz electronic sources, sensors, and control components; vacuum electronics; computational modeling of electromagnetics and electronics in the presence of uncertainty; and antennas.</td>
</tr>
<tr>
<td>Dr. Daniel Purdy</td>
<td><a href="mailto:daniel.purdy@darpa.mil">daniel.purdy@darpa.mil</a></td>
<td></td>
<td>electronics, signal processing and electromagnetics</td>
</tr>
<tr>
<td>Dr. Jagdeep Shah</td>
<td><a href="mailto:jag.shah@darpa.mil">jag.shah@darpa.mil</a></td>
<td>2001</td>
<td>optical and electrical properties of semiconductors, ultrafast coherent and incoherent dynamics in semiconductors and their nanostructures</td>
</tr>
<tr>
<td>Dr. Douglas Weber</td>
<td><a href="mailto:douglas.weber@darpa.mil">douglas.weber@darpa.mil</a></td>
<td>2013</td>
<td>neural interface systems and how to apply these technologies to acquiring and decoding neural signals for controlling assistive and prosthetic devices; and neural stimulation technologies for restoring or retraining sensory, motor and autonomic functions</td>
</tr>
</tbody>
</table>
Focus Research Center Program
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:
- TerraSwarm Research Center, Edward Lee, UC Berkeley
- Function Accelerated nanoMaterial Engineering Center, Jane Chang, UCLA
- Ctr for Spintronic Materials, Interfaces and Architecture, J-P Wang, Univ Minn
- Center for Low Energy Systems Technology, Alan Seabaugh, Notre Dame
- Center for Future Architectures Research, Todd Austin, Univ Michigan
- Systems on Nanoscale Information fabrics, Naresh Shanbhag, UIUC

Recompeted every three years

Industry/Government shared funding ~60/40

Dr. Avram Bar-Cohen DARPA Program Manager for STARNet

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

When:

Where: https://www.src.org/program/starnet/  

DARPA (ES-01 STARNet) $20M  

FY15
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. Of particular interest are 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.

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.
DARPA Tactical Technology Office (TTO)

http://www.darpa.mil/Our_Work/TTO/

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

FY14

6.1 $45M

6.2 ~175M
Basic Research (6.1)
Cumulative Investment to Date (April 2010)

Secure WMD
- TA 1: 25%
- TA 4: 31%
- TA 3: 21%
- TA 5: 0%

Other areas:
- Physical Networks: 15%
- Social Networks: 8%

Non-proliferation sciences primarily associated with “Secure WMD” thrust area – no investment to date

FY11-15: $48M/year
Three program areas
- Basic Research Program (HDTRA1-11-16-BRCWMD-BAA)
  - High payoff fundamental research
  - 200+ grants to 90+ universities and labs
- Fundamental Research Program (basic and applied) (HDTRA1-09-14-FRCWMD-BAA - amended on Feb 2013)
  - Bridge gap between basic and applied research
  - Vehicle to support cooperative research with global partners
- University Strategic Partnership (USP)
  - “Transition enabler”
  - 6.2 Indefinite Delivery / Indefinite Quantity contract to University teams

Six Thrust Areas:
Science of WMD Sensing and Recognition
Cognitive, Recognition, and Network Science
Science for Protection
Science for Defeat WMD
Science to Secure WMD
Cooperative Counter WMD Research with Global Partners
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: Cognitive, Information and Network Science - Mr. Robert Kehlet, robert.kehlet@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. Suhithi M. Peiris, suhithi.peiris@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.
DTRA BA Basic Research Review
2013 Agenda

**Thrust 1: Science of WMD Sensing and Recognition**
Dave Petersen
- Point Detection
- Standoff Detection

**Thrust 2: Cognitive, Information and Network Sciences**
Rob Kehlet
- Preserving Performance in a WMD Environment
- Situation Awareness for Effective C-WMD Strategies

**Thrust 3: Science for Protection**
James Reed
- Ordered Materials for Blast Mitigation
- Radiation Failure Mechanisms in Robotic Systems

**Thrust 4: Science to Defeat WMD**
Suhithi Peiris
- Amorphous Metals for Penetrator Cases
- Penetration into Granular Media
- Meso Diagnostics
- Meso-scale Modeling and Verification
- Multi-scale Modeling

**Thrust 5: Science to Secure WMDs**
Calvin Shipbaugh
- Nanoscale Radiation Indicators Nuclear
- Novel Materials for Unattended Sensing

- Nano-sized Thermometers
- Agent Defeat Reactions and Modeling
- Agent Defeat Materials and Properties
- High Energy Density Materials
- Test Verification and Monitoring
- Ultra-low Level Detection of Nuclear Materials
What: 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 or capabilities.

Pre-application white papers may be evaluated at any time after submission and invitations for full proposal submission may occur any time after pre-application white paper evaluation.

Authors of these pre-application white papers and invited proposals must take great care to clearly outline the impact to C-WMD science that is to be gained.

How much: Unless otherwise noted in the topic, applicants may assume that a base period of three (3) years with two (2) additional years is available.

Single Scope
Single Scope Awards may have Co-Principal Investigators (Co-PIs), subawards, and/or subcontracts. Grants may range from small dollar value (e.g., $25K) up to $1M annually.

Multidisciplinary
Investigators may be from a single institution or multiple institutions. Research must support multiple undergraduate, and/or graduate students, and/or postgraduate students. Grants may range from small dollar value (e.g., $25K) up to $1M annually.

When: Nov, Mar and Jul phase 1 due dates

https://www.dtrasubmission.net/portal/
Diagnostics, Detection, and Disease Surveillance S&T Division (CBA)
Dr. Eric Van Gieson, Chief, eric.vangieson@dtra.mil

Assays & Biomarkers Branch
Lt Col Richard Schoske, Chief, richard.schoske@dtra.mil

Surveillance Branch
Dr. John Hannan, Chief, john.hannan@dtra.mil

Devices Branch
Dr. Christian Whitchurch, Chief, christian.whitchurch@dtra.mil

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
Information Systems Office (CBI)
Mr. Jerry Glasow, Chief, jerry.glasow@dtra.mil

Advancing 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

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
## Area Overview: Interfacial Dynamics and Reactivity
- **Brian Pate**
  - Interfacial Dynamics
  - Catalytic Motors
  - Threat Characterization and Chemical Medical Basic Research

## Area Overview: Design of Molecular Interactions
- **Ilya Elshvili**
  - Designer Binding
  - Bio-Nano Interfaces & Catalysis

## Area Overview: Protective Materials Basic Science
- **Tracee Harris**
  - Stimuli Responsive Polymeric Materials

## Area Overview: Detection & Diagnostics Basic Research
- **Tony Esposito**
  - Microfluidic and Spectroscopic Sensing
  - Materials for Sensing
  - Kiki Ikossi

## Area Overview: Translational Medical Basic Research
- **Amanda Horstman-Smith**
  - Microbial Molecular Adaption
  - Host Pathogen Interactions
  - Dan Wolfe
Chemical / Biological Defense Program
www.jpeocbd.osd.mil/

What: Joint Service core research program for chemical and biological (CB) defense (medical and physical sciences):

   Chemical/Biological Tech (non-medical)
   Information Sciences ($2M in FY12)
   Life Sciences ($25M in FY12)
   Physical Sciences ($18M in FY12)

   Medical Biological Defense (~$7M in FY12)

See amendments to the BAAs below for a listing of current topics.

How much: ~250K for single investigator, ~500K multiple investigator up to 5 yrs
SEED Awards of up to $75K for one year
Young Investigator awards of ~$100K/yr for two years

When: Mar 2013 for FY2014 competition in HDTRA1-14-CHEM-BIO

Where: through DTRA Chem/Bio Department
HDTRA1-09-14-FRCWMD-BAA
HDTRA1-11-16-BRCWMD-BAA
HDTRA1-14-CHEM-BIO-BAA

<table>
<thead>
<tr>
<th>FY14</th>
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<td>6.1</td>
<td>$51M</td>
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<tr>
<td>6.2</td>
<td>227</td>
</tr>
<tr>
<td>6.3</td>
<td>170</td>
</tr>
</tbody>
</table>
What
Extramural endeavor addressing basic research needs of DTRA and the Joint Science and Technology Office for Chemical and Biological Defense (JSTO-CBD).
Responses to this BAA must address only basic research.
Single Scope Awards: Research projects that focus on exploratory aspects of a unique problem, a high-risk approach, or innovative research in subjects with potential for high impact to C-WMD science.
Multidisciplinary Awards: Research projects that involve innovative research in an interdisciplinary area with potential for high impact. The proposed research must involve fundamental contributions in research by multiple investigators from diverse disciplines. Investigators may be from a single institution or multiple institutions.
Young Investigator Awards: Individuals currently employed by a U.S. accredited degree-granting college or university who received a Ph.D. or equivalent degree within five (5) years of the date of the pre-application white paper submission.
Seed Awards: Exploratory aspects of a research hypothesis or on the development of a high-risk approach with potential for high impact to C-WMD science.

How Much
Single Scope Awards will average $150K per year for DTRA sponsored topics and up to $500K per year for JSTO-CBD Program sponsored topics.
Multidisciplinary Awards will average $350K per year for DTRA sponsored topics and up to $1M per year for JSTO-CBD Program sponsored topics.
Young Investigator Awards will average $100K per year.
Seed awards will be less than $75K.
When: White Paper (required) by 14 Jan 2013 for Period C
         https://www.dtrasubmission.net/portal/
Period C Time Line

12/3
BAA and CALL
Posted with
Period C Topics

1/14
Phase I
White Papers
Due

On/about
3/1
Phase I
Notifications

On/about
4/5
Phase II
Full Proposals
Due

On/about
7/12
Phase II
Notifications

On/about
Award
Processing
Begins

Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct

Dec 2012
PerC-1: Manipulating Multiple Domains of the Electromagnetic Spectrum for Sensing Nuclear Materials in Complex Environments

PerC-2: Advancing Nuclear Forensic Methods for Collecting and Analyzing Post-Detonation Debris

PerC-3: Nanoscale Solutions for Radiation Sensing Systems

PerC-4: Understanding Multi-layer/Multi-dependent Network Responses to WMD Attacks and Developing Control Strategies for Cascading Failures

PerC-5: Radiation Effects in Advanced Gate Dielectrics and Channel Materials

PerC-6: Kinetics and Turbulence in Chem/Bio Defeat

PerC-7: Polymers and Binders for Chem/Bio Defeat Formulations

PerC-8: Novel Physicochemical Signatures of Radiation Exposure History for Treaty Compliance

PerC-9: Interaction of Substrate-Mediated Transport and Catalyst Kinetics in Multicatalyst Systems (joint with CB)
HDTRA1-11-16-BRCWMD BAA

RD BA Young Investigator Topics for FY13 Period C

PerC-YIP-1: Manipulating Multiple Domains of the Electromagnetic Spectrum for Sensing Nuclear Materials in Complex Environments

PerC-YIP-2: Advancing Nuclear Forensic Methods for Collecting and Analyzing Post-Detonation Debris

PerC-YIP-3: Nanoscale Solutions for Radiation Sensing Systems

PerC-YIP-4: Understanding Multi-layer/Multi-dependent Network Responses to WMD Attacks and Developing Control Strategies for Cascading Failures

PerC-YIP-5: Radiation Effects in Advanced Gate Dielectrics and Channel Materials

PerC-YIP-6: Kinetics and Turbulence in Chem/Bio Defeat

PerC-YIP-7: Polymers and Binders for Chem/Bio Defeat Formulations

PerC-YIP-8: Novel Physicochemical Signatures of Radiation Exposure History for Treaty Compliance
PerC-9: Interaction of Substrate-Mediated Transport and Catalyst Kinetics in Multicatalyst Systems (joint with BA)
PerC-10: Comparative immunology of Reservoir Hosts
PerC-11: Persisters: Antimicrobial Tolerance in Recurring Infections
PerC-12: Rules Governing Gram Negative Cell Wall Permeability to Molecules
PerC-13: Synthetic Biology for Therapeutics
PerC-14: Human Antibody Responses to DOD Priority Biological Agents
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: Diagnostics, Detection, and Disease Surveillance, Physical Science and Technology, Translational Medical, Advanced and Emerging Threats, and Information Systems Capability. The topics may be expanded annually over the next two years.

Proposals will be accepted and considered that combine Basic Research with Applied Research, Applied Research, and/or Advanced Technology Development as specified in each topic.

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.

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: Mar 2014 for the amended call in Feb 2014

Diagnostics, Detection, and Disease Surveillance

CBA-01 Diagnosis of Antimicrobial Resistance Markers and Multidrug Resistance
CBA-02 Sample to Sequence
CBA-03 Next Generation Analytic Capabilities for Biosurveillance (BSV)
CBA-04 New and Unique Data Sources for BSV
CBA-05 Biosurveillance Ecosystem (BSVE) Data Challenge
CBA-06 Micro Gas Analyzer Integration

Adaptive Medical Countermeasures

CBM-T-01 Reinvestigating, reformulating, and/or repurposing antimicrobial drugs or leads: Development of improved dosing, drug delivery, or combination therapy to counter biothreats
CBM-T-02 Targeting Mechanisms of Antimicrobial Resistance (AMR) in *Bacillus anthracis*, *Yersinia pestis*, *Francisella tularensis* and *Burkholderia pseudomallei*
CBM-T-03 Discovery and development of antitoxin against botulinum neurotoxin
CBM-V-01 Q Fever Clinical Immunology and Vaccine Development
CBM-V-02 Closing the Immunity Onset Gap: Urgent Pre-Exposure, and Post-Exposure Prophylaxis with Single Dose, Rapidly Protective Vaccines in Unvaccinated Warfighters
CBM-V-03 Pre-Exposure or Post-Exposure Immuno-Prophylaxis Against Aerosol Exposure to Bacterial or Viral Threat Agents
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
High Performance Computing
www.hpcmo.hpc.mil

What:
High Performance Computing Centers
http://centers.hpc.mil/
Networking – Defense Res and Engn Network (DREN)
Software Applications Support
Access available to OXR/DARPA grantees

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 FY14, solicited topics
- Belief Formation and Movements for Change
- Models of Societal Resilience and Change
- Theories of Power and Escalation
- Emerging Topics in Conflict and Security

**When:**
- White Papers: Monday, November 18, 2013
- Full Proposals: Friday, February 14, 2014

**How Much:** $0.2 - 1.5M/yr for individual awards, avg $0.6M/yr for 3-5 years

**Where:** ONR BAA Announcement # 13-024
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
~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

**When:**
Announcement (19 Aug 2013)
White paper (strongly encouraged, not required) (15 Oct 2013)
Full proposal (16 Dec 2013)

**Where:** ARO / AFOSR / ONR BAA

**USC MURI awardees**

<table>
<thead>
<tr>
<th>Year</th>
<th>PI</th>
<th>Agency/Program Description</th>
<th>FY15</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>Nealson</td>
<td>AFOSR - Bioengineered Fuel Cells: Optimization and Modeling</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>USC</td>
<td>supporting Institution in four different MURI awards</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>Sukhatme</td>
<td>ONR – Adaptive Networks for Threat and Intrusion Detection</td>
<td>Army $51M</td>
</tr>
<tr>
<td></td>
<td>USC</td>
<td>supporting institution in one other MURI award</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>USC</td>
<td>supporting institution in four different MURI awards</td>
<td>Navy 83</td>
</tr>
<tr>
<td>2011</td>
<td>Tambe</td>
<td>ARO - Game Theory for Real World Adversarial Behavior</td>
<td>Air Force 71</td>
</tr>
<tr>
<td></td>
<td>Lidar</td>
<td>ARO - Control of Quantum Systems</td>
<td></td>
</tr>
</tbody>
</table>
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, <$1.5 M per award, 169 awards totaling $51M in FY2013

Total funds fluctuate somewhat depending on MURI selections

**When:** Proposals typically due in late Aug / early Sept (20 Oct 2013 for FY14)

**Where:** ARO / AFOSR / ONR webpage, example

**USC Awardees**

**2009**
- Langdon
  - High-Pressure Torsion Research (ARO)
- Madhukar
  - Novel PV Solar Cell Synthesis & Characterization (AFOSR)
- Schaal
  - Humanoid Robotic Research (ARO)

**2010**
- Armani
  - Characterize Micro-Nano Devices for Photonics/BioDetection (ONR)
- Madhukar
  - In-situ Characterization of Highly Heterogeneous Nanostructures (AFOSR)

**2011**
- Christe
  - High energy density materials (ONR)
- Molisch
  - Distributed electronic warfare applications (ONR)
- Debevec
  - Improve the photorealism of simulations to enhance training (AFOSR)

**2012**
- Cronin
  - Atomic Layer Deposition System (ONR)
- Narayan
  - A Versatile Thin-Film Deposition System for Advanced Power Sources Research (ARO)
- Sukhatme
  - Robotic Platform for Study of Human-Robot Interaction, Motor Control, Perception (ONR)
- Zhou
  - Maskless Photolithography for Nanoelectronic Device Prototyping and Fabrication (ONR)

**2013**
- Malmstadt
  - Instruments for High-throughput analysis of oxidative cell membrane damage (ONR)
- Vashishta
  - Computing platform for simulation and visualization of insensitive nanoenergetic (ONR)
- Hodge
  - Instrumentation for TEM sample prep (ONR)

**FY15**

Army $12M

Navy 23

Air Force 14
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
As percentage of fellows selected for given year, with respect to FY07 top numbers
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 Training and Health Information Sciences
- Military Infectious Diseases
- Military Operational Medicine
- Combat Casualty Care
- Radiation Health Effects
- Clinical and Rehabilitative Medicine

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.
Defense Medical Research and Development Program Process

- SecDef Direction
- JFHP CONOPS JCDs
- Capability Gap Assessment
- Science Gap Assessment
- Urgent User Needs
- MHS Strategic Imperatives
- 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
  - CDMRP
  - TATRC
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)
- Academia, Industry, and Government Institutions

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

<table>
<thead>
<tr>
<th>FY15</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1 371A DHP</td>
<td>$ 7.5M</td>
</tr>
<tr>
<td>6.2 372A DHP</td>
<td>38M</td>
</tr>
<tr>
<td>6.3 373A DHP</td>
<td>113M</td>
</tr>
</tbody>
</table>
What: The FY13 Defense Medical Research and Development Program’s (DMRDP) Clinical and Rehabilitative Medicine Research Program (CRMRP) **Neurosensory Research Award (NSRA)** is intended to support both applied (preclinical) research and clinical trials within specific focus Areas of pain management, hearing loss/dysfunction, balance disorders, and/or tinnitus. Applications focused on traumatic brain injury (TBI) are highly encouraged.

When:  
Pre-Application Submission Deadline November 25, 2013  
Application Submission Deadline (if invited) February 11, 2014

How Much: max of $1M (including overhead) for up to 3 years.

Where: W81XWH-13-DMRDP-CRMRP-NSRA

What: The FY13 Defense Medical Research and Development Program’s (DMRDP) Clinical and Rehabilitative Medicine Research Program (CRMRP) **Vision Research Program (VRP)** is intended to be used for restoration and maintaining of visual function to ensure and sustain combat readiness. Basic, translational and clinical research efforts are sought to ensure that results of scientific research will be used to directly benefit the lives of military, veteran and civilian populations. Preliminary research proposals (preproposals) are required and will provide the basis for invited full proposals.

When:  
pre-application due date Nov 25, 2013  
full application (if invited) due date Feb 06, 2014

How Much: max of $1M (including overhead) for up to 3 years.

Where: W81XWH-13-CRMRP-VRP-TRA
**What:** The FY14 Defense Medical Research and Development Program’s (DMRDP) Clinical and Rehabilitative Medical Research Program (CRMRP) **Neuromusculoskeletal Injuries Research Award (NMSIRA)** supports preclinical research and clinical trials on the functional utility of assistive devices related to the human-device interface, secondary health effects following severe extremity injury, and optimizing rehabilitation and device prescription for patients with severe extremity trauma.

**When:**
- Pre-Application Submission Deadline: November 25, 2013
- Application Submission Deadline (if invited): February 11, 2014

**How Much:** max of $1.5M (including overhead) for up to 3 years.

**Where:** W81XWH-14-DMRDP-CRMRP-NMSIRA

---

**What:** The FY14 Defense Medical Research and Development Program’s (DMRDP) Clinical and Rehabilitative Medical Research Program (CRMRP) **Regenerative Medicine Clinical Trial Award (RMCTA)** is intended to support Phase I or II clinical trials focused on extremity regeneration, craniomaxillofacial regeneration, vascularized composite allografts, and/or genitourinary/lower abdomen reconstruction. *Funding from this award mechanism cannot be used for preclinical research studies.*

**When:**
- Pre-Application Submission Deadline: November 25, 2013
- Application Submission Deadline (if invited): February 11, 2014

**How Much:** max of $2.5M (including overhead) for up to 4 years.

**Where:** W81XWH-14-DMRDP-CRMRP-RMCTA
Extramural Biomedical Research and Development
W81XWH-USSOCOM-BAA 13-1
February 2013

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. Research projects may apply existing scientific and technical knowledge for which concept and/or patient care efficacy have already been demonstrated to meet SOF requirements.

1. Damage Control Resuscitation
   • Global Treatment Strategies
   • Vital Signs Monitoring
   • Analgesia
   • Far Forward Blood

2. Environment-Specific Medicine
   • Optimal Acclimatization Strategy
   • High Altitude Pulmonary Edema/High Altitude Cerebral Edema
   • Chemical, Biological, Radiological, Nuclear, and Explosive Rapid Diagnostics

3. Force Protection rapid field diagnostics for infectious disease, toxic industrial compounds, and/or toxic industrial materials

4. Canine Medicine

How Much: Proposed projects longer than two years will not be considered. Projects with a total cost exceeding $700,000

When: Organizations are required to submit a project pre-proposal for consideration no later than (NLT) March 15, 2013 using the pre-proposal template
Congressionally Directed Medical Research Program
cdmrp.army.mil

What: Research Programs included in the FY14 CDMRP are ($M):

- Peer Reviewed Medical Research (see chart for allowed 2011 topics) $200
- Breast Cancer Research $120
- Prostate Cancer Research $80
- Peer Reviewed Orthopaedic Research $30
- Ovarian Cancer Research $20
- Peer Reviewed Cancer – skin, pediatric brain, genetic, non-invasive ablation treatment $25
- Neurofibromatosis Research $15
- Lung Cancer Research $10
- Spinal Cord Injury $30
- Gulf War Illness Research $20
- Amyotrophic Lateral Sclerosis $7
- Autism Research $6
- Tuberous Sclerosis Complex Research $6
- Multiple Sclerosis $5
- Bone Marrow Failure $3
- Duchenne Muscular Dystrophy $3

Proposals undergo two stage review - peer, then program

How Much: 1-5 year grants, average of $150K/yr (direct) FY14
If multiyear funded, all funds come from the FY12 appropriation ~$600M

When: Various – see website program announcement

Where: Proposal submission to be done via grants.gov
**Peer Reviewed Medical Research Program Topics**

**FY2013**
- Chronic Kidney Disease
- Chronic Migraine and Posttraumatic Headaches
- Congenital Heart Disease
- DNA Vaccine Technology for Postexposure Prophylaxis
- Epilepsy
- Fragile X Syndrome
- Hereditary Angioedema
- Illnesses Related to Radiation Exposure
- Inflammatory Bowel Disease
- Interstitial Cystitis
- Lupus
- Malaria
- Metabolic Disease
- Neuropathotics
- Pancreatitis
- Polycystic Kidney Disease
- Post-Traumatic Osteoarthritis
- Psychotropic Medications
- Respiratory Health
- Rheumatoid Arthritis
- Scleroderma
- Tinnitus

**FY2014**
- Acupuncture
- Arthritis
- Chronic Migraine and Post-Traumatic Headaches
- Congenital Heart Disease
- DNA Vaccine Technology for Postexposure Prophylaxis
- Epilepsy
- Food Allergies
- Fragile X Syndrome
- Hereditary Angioedema
- Illnesses Related to Radiation Exposure
- Inflammatory Bowel Disease
- Interstitial Cystitis
- Lupus
- Malaria
- Metabolic Disease
- Neuropathotics
- Pancreatitis
- Polycystic Kidney Disease
- Post-Traumatic Osteoarthritis
- Psychotropic Medications
- Respiratory Health
- Rheumatoid Arthritis
- Segmental Bone Defects
- Tinnitus

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

From CDMRP PRMRP website  
Psychological Health/Traumatic Brain Injury Research Program
W81XWH-13-PHTBI-BAPHA

All applications to the FY13 PH/TBI BAPHA mechanism must specifically address one or more of the Topic Areas listed below. Applications can address basic science and/or applied research needs related to these specific topics.

- Research and develop assessment tools, methods, assistive devices, training strategies, and clinical applications (specifically those which target return-to-duty, cognitive self-management, evidence-based retraining focused on compensatory strategies, and/or daily functioning) that show promise in ameliorating cognitive deficits due to TBI and/or its co-morbidities such as stress disorders.
- Understand and prevent or address psychological injuries (depression, anxiety, PTSD, suicide, etc.) and psychosocial issues (relationships, fertility issues, vocational) associated with dismounted combat injuries (DCI; urogenital system damage/loss).
- Research to elucidate combat-related psychological issues unique to women and develop specific interventions as indicated.
- Research to understand and prevent or address psychosocial issues related to sexual trauma (males and females).
- Develop and validate military-relevant standards for making return-to-duty decisions that are related to PH issues.
- Understand and address unique military-related issues associated with gender and gender orientation (lesbian, gay, bisexual, transgender) with consideration in the context of the Don't Ask Don't Tell repeal and to include the impact on family (e.g., parents, partner, children).
- Understand, prevent, and address violence within the military (targeted/radicalized violence within the workplace, sexual trauma).
- Develop methods to improve use of pre-deployment resilience-focused sleep interventions, and post-deployment use of non-pharmacologic, behavioral sleep interventions as a primary treatment for sleep difficulties, obviating the use of hypnotics.
- Employ implementation science and translational research approaches to provide methods for motivating families to engage in health-promoting behaviors; population level skills-based family resilience training and education (communication, parenting, relationship, etc.) for military families to promote adaptation, flexibility, and reduce cumulative stress burden.
- Research to optimize dissemination and foster provider adoption and use of evidence-based treatments for deployment-related psychological health problems (e.g., depression, adjustment disorder, anxiety, PTSD) requires strong military collaboration.
- Address prevention and treatment of alcohol and substance abuse in the military, including evaluation of effectiveness of current Service prevention programs as well as adaptation and validation of screening

Currently, we anticipate that up to $15 million (M) in FY13-14 funds may be available. The executing agent for this announcement is the CDMRP.

Pre-Application Submission Deadline: 5:00 p.m. Eastern time (ET), April 16, 2013
- Invitation to Submit an Application: May 30, 2013
- Application Submission Deadline: 11:59 p.m. ET, July 23, 2013
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)
# CDMRP Historical Funding / Success Rates

<table>
<thead>
<tr>
<th>Research Program</th>
<th>Stats through FY12 FYs</th>
<th>Amount ($M) for Research</th>
<th>Stats through FY10 Prop Rcvd</th>
<th>Prop Funded</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast Cancer</td>
<td>92–12</td>
<td>2803</td>
<td>45226</td>
<td>6107</td>
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<td>Prostate Cancer</td>
<td>97–12</td>
<td>1210</td>
<td>11861</td>
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<td>Ovarian Cancer</td>
<td>97–12</td>
<td>196</td>
<td>2206</td>
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<td>Neurofibromatosis</td>
<td>96–12</td>
<td>243</td>
<td>1043</td>
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<td>Peer-Reviewed Med Res</td>
<td>99–06,08-12</td>
<td>595</td>
<td>4604</td>
<td>382</td>
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<td>Tuberous Sclerosis</td>
<td>02–06,08-12</td>
<td>41</td>
<td>344</td>
<td>78</td>
<td>23</td>
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<tr>
<td>Gulf War Illness</td>
<td>2006,08-12</td>
<td>49</td>
<td>141</td>
<td>43</td>
<td>30</td>
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<tr>
<td>Autism</td>
<td>2007-12</td>
<td>41</td>
<td>749</td>
<td>69</td>
<td>9</td>
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<tr>
<td>Amyotrophic Lateral Sclerosis</td>
<td>2007, 09-12</td>
<td>32</td>
<td>130</td>
<td>14</td>
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<tr>
<td>Psychological Health/TBI</td>
<td>2007, 09-12</td>
<td>545</td>
<td>2681</td>
<td>276</td>
<td>10</td>
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</table>

**TOTALS (incl items not included above)** 7,061 74,879 10,719 14

Totals include all programs - some have not been recorded above
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<thead>
<tr>
<th>Cancer Type</th>
<th>Year</th>
<th>Category</th>
<th>Name</th>
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<tbody>
<tr>
<td>Breast Cancer</td>
<td>2007</td>
<td>Era of Hope Scholar</td>
<td>Christopher Haiman</td>
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<td></td>
<td>2008</td>
<td>Concept</td>
<td>Woojin An</td>
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<td>2010</td>
<td>Idea</td>
<td>Pin Wang</td>
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<td>2010</td>
<td>Idea</td>
<td>Nouri Neamati</td>
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<td>Idea</td>
<td>Alan Epstein</td>
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<td>Parkash Gill</td>
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<td>Debasish Tripathy</td>
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<td>Ovarian Cancer</td>
<td>2006</td>
<td>Idea Development</td>
<td>Francis Markland</td>
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<td>2008</td>
<td>Consortium Development</td>
<td>Louis Dubeau</td>
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<td>2012</td>
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<td>Malcolm Pike</td>
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<td>Prostate Cancer</td>
<td>2007</td>
<td>Training Award - Predoctoral</td>
<td>Andrew Gray</td>
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<td></td>
<td>2009</td>
<td>New Investigator</td>
<td>Andrea Armani</td>
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<td>2009</td>
<td>Idea Development</td>
<td>Julio Camarero</td>
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<td>2009</td>
<td>Idea Development</td>
<td>Shao-yao Ying</td>
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<td>Idea Development</td>
<td>Wijbe Kast</td>
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<td>2011</td>
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<td>Jean Shih</td>
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<td>Lung Cancer</td>
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<td>2009</td>
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<td></td>
<td>2011</td>
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<td>Robert Ladner</td>
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<td>Peer Reviewed</td>
<td>2005</td>
<td>Investigator Initiated</td>
<td>Wendy Cozen</td>
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<td>Deployment Related</td>
<td>2008</td>
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<td>Stefan Lee</td>
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<td>Institutionally Based</td>
<td>2005</td>
<td>Neurogenetic Res &amp; Computational Genetics</td>
<td>Xiaojing Chen</td>
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<tr>
<td>Autism Research</td>
<td>2012</td>
<td>Idea Development</td>
<td>Alexandre Bonnin</td>
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</table>
## FY09 Peer Reviewed Medical Research Program (PRMRP)

<table>
<thead>
<tr>
<th>Mechanism</th>
<th>Program</th>
<th>Release Date</th>
<th>Funding Details</th>
<th>Submission Details</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</td>
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<tr>
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<td>Proposal: April 16 09</td>
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<tr>
<td>Technology/Therapeutic Development Award</td>
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<td>Max funding of $2M for direct costs. Max period of performance is 4 years.</td>
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<td>Proposal: Apr 16 09</td>
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<td>Clinical Trial Award</td>
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<td>1-27-09</td>
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</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 trails 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
FY11 Peer Reviewed Vision Program Announcement

The US Army Medical Research and Materiel Command (USAMRMC) is soliciting research that targets the causes, effects and treatment of eye damage, visual deficits due to traumatic brain injury (TBI) and diseases that, despite their different mechanisms and pathogenesis, all have a common end result: degeneration of the critical components of the eye and impairment or loss of vision. The results of this research are intended to be used for restoration and maintaining of visual function to ensure and sustain combat readiness. Basic, translational and clinical research efforts are sought to ensure that results of scientific research will be used to directly benefit the lives of military, veteran and civilian populations.

Timelines for each of the two announcements are as follows:

- Pre-application Submission Deadline: 5:00 pm Eastern time (ET), September 15, 2011
- Invitation to Submit an Application: October 14, 2011
- Application Submission Deadline: 11:59 p.m. ET, December 15, 2011
- Scientific Peer Review: January, 2012
- Programmatic Review: March, 2012
- Funding/Not Funding Notification Letters: April, 2012

This funding opportunity invites proposals for research in a number of critical topic areas:

- Inadequate vision rehabilitation strategies and quality of life measures.
- Inadequate vision restoration.
- Inadequate mitigation and treatment of traumatic injuries, war-related injuries, and diseases to ocular structures and the visual system.
- Inadequate mitigation and treatment of visual dysfunction associated with traumatic brain injury (TBI).
- Inadequate ocular and visual systems diagnostic capabilities and assessment strategies
- Inadequate war fighter vision readiness and enhancement related to refractive surgery.
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) – official and unofficial**

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:

<table>
<thead>
<tr>
<th>Agency</th>
<th>Institution</th>
<th>University/Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Navy</td>
<td>Applied Physics Laboratory</td>
<td>University of Washington</td>
</tr>
<tr>
<td>Navy</td>
<td>Applied Research Laboratories</td>
<td>University of Texas at Austin</td>
</tr>
<tr>
<td>Navy</td>
<td>Applied Research Laboratory</td>
<td>Pennsylvania State University</td>
</tr>
<tr>
<td>Navy</td>
<td>Applied Physics Laboratory</td>
<td>The Johns Hopkins University</td>
</tr>
<tr>
<td>Navy</td>
<td>Applied Research Laboratory</td>
<td>Univ of Hawaii at Manoa</td>
</tr>
<tr>
<td>Army</td>
<td>Inst for Creative Technologies</td>
<td>University of Southern California</td>
</tr>
<tr>
<td>Army</td>
<td>Inst for Soldier Nanotechnologies</td>
<td>Massachusetts Institute of Technology</td>
</tr>
<tr>
<td>Army</td>
<td>Inst for Advanced Technology</td>
<td>University of Texas</td>
</tr>
<tr>
<td>Army</td>
<td>Inst for Collaborative Biotechnologies</td>
<td>UC Santa Barbara (annex for Network Science)</td>
</tr>
<tr>
<td>Army</td>
<td>Huntsville Research Laboratory</td>
<td>Georgia Tech Research Institute</td>
</tr>
<tr>
<td>MDA</td>
<td>Space Dynamics Laboratory</td>
<td>Utah State University</td>
</tr>
<tr>
<td>IC/DOD</td>
<td>Ctr for Advanced Study of Language</td>
<td>University of Maryland</td>
</tr>
<tr>
<td>NSA</td>
<td>Systems Engineering Research</td>
<td>Stevens Inst of Technology (with USC)</td>
</tr>
<tr>
<td>NASA</td>
<td>UARC at NASA Ames</td>
<td>Univ Calif Santa Cruz</td>
</tr>
</tbody>
</table>

**MDA**    | Missile Defense Agency                             |
**IC**     | Intelligence Community                             |

**NSA**    | National Security Agency                           |
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 years of appointment
Army, Navy and DARPA require tenure track positions

What: Topics must conform with agency interests

How Much:
Army - not to exceed $50K/yr for three years
Air Force - $120K/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
Sep 15, 2013 for the Air Force FY14 competition (AFOSR BAA 2013-0005)
Jan 3, 2014 for Naval FY14 competition (ONR BAA 14-001)
Jan 13, 2014 for the DTRA CY14 competition (HDTRA1-11-16-BRCWMD-BAA)
Jan 7, 2014 for the DARPA FY14 competition (DARPA RA 14-07)

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

Listing of prior AF, Navy, DARPA awardee information available from DC Office for FY07-FY13
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 $50,000 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 May 2008 for the FY14 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: http://www.wpafb.af.mil/AFRL/afosr/

How Much: The estimated value of each award is approximately $120K 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 15 Sep 2013 for FY14 competition (Solicitation released July 2013)

Where: Air Force Fiscal Year 2014 Young Investigator Research Program AFOSR-BAA-2013-0005

<table>
<thead>
<tr>
<th>FY</th>
<th>Number of Awards</th>
<th>Number of Proposals</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>40</td>
<td>192</td>
</tr>
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<td>2012</td>
<td>48</td>
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<td>2011</td>
<td>43</td>
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<td>2010</td>
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<td>202</td>
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<tr>
<td>2009</td>
<td>39</td>
<td>210</td>
</tr>
</tbody>
</table>

USC Awardees

<table>
<thead>
<tr>
<th>Year</th>
<th>Name</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>Jahan Dawlaty</td>
<td>Chem</td>
</tr>
<tr>
<td>2012</td>
<td>Morteza Dehghani</td>
<td>ICT</td>
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<tr>
<td></td>
<td>Greg Ver Steeg</td>
<td>ISI</td>
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<tr>
<td>2010</td>
<td>Mohamed El-Naggar</td>
<td>Physics</td>
</tr>
<tr>
<td>2008</td>
<td>Stephen Cronin</td>
<td>EE</td>
</tr>
<tr>
<td></td>
<td>Chunqi Jiang</td>
<td>EE</td>
</tr>
</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 FY2014 have begun their first appointment on or after 01 Nov 2008

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 $170,000 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 $170,000 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 $170,000 per year award can be supplemented through a "matching funds" enhancement available only to those receiving an ONR Young Investigator award.

When: proposal due 03 Jan 2014 for the FY14 competition (Solicitation released Aug 2013)

Where: Fiscal Year 2014 ONR Young Investigator Program, ONR BAA 14-001

USC Awardees

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Number of Proposals</th>
<th>USC Awardee Name</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY13</td>
<td>16 out of 369</td>
<td>Rahul Jain</td>
<td>EE</td>
</tr>
<tr>
<td>FY12</td>
<td>26 out of 310</td>
<td>Andrea Hodge</td>
<td>CEMS</td>
</tr>
<tr>
<td>FY11</td>
<td>21 out of 270</td>
<td>Noah Malmstadt</td>
<td>CEMS</td>
</tr>
<tr>
<td>FY10</td>
<td>17 out of 211</td>
<td>Andrea Armani</td>
<td>CEMS</td>
</tr>
<tr>
<td>FY09</td>
<td>15 awards out of 193 proposals</td>
<td>David Kempe</td>
<td>Computer Sci</td>
</tr>
</tbody>
</table>

2012
2009
2008
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 D (2014):

- PerD-YIP-Topic 1: Refractory Debris Dissolution Techniques for Nuclear Forensic Field Procedures
- PerD-YIP-Topic 2: Photodetectors and Solid-State Neutron Sensors for Radiation Detection
- PerD-YIP-Topic 3: Sensing of Radiation Shielding Materials and Exploiting Interactions with Radiation from Radiological and Nuclear Sources
- PerD-YIP-Topic 4: Development of Extremely Rapid Control Strategies for Mitigation of Cascading Failures on Multi-layer/Multi-dependent Dynamic Networks
- PerD-YIP-Topic 5: Improved Semantic Analysis Theory to Identify WMD-Related Activities
- PerD-YIP-Topic 6: Area of Responsibility Centric Cultural Modeling for WMD Threat Detection
- PerD-YIP-Topic 7: Interrogation of Mechanisms for Cellular Resistance to Radiation Damage using Melanized Fungi as Model Systems
- PerD-YIP-Topic 8: Basic Science of Radiation Effects in Micro/Nanoelectromechanical Systems MEMS/NEMS
- PerD-YIP-Topic 9: Crustal-Earth Materials and Manufactured Materials under Dynamic Extremes
- PerD-YIP-Topic 10: Energetic Materials for CWMD
- PerD-YIP-Topic 11: Smart Materials with Unconventional Indicators for Facility Access Denial and Security of WMD Materials

When: 13 Jan 2014   Phase I White Paper Submission Deadline for Period D

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 3 - Dec 2013 (Period D)

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 5 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 here 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), 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 DARPA-RA-14-07@darpa.mil.

How much: Two years of funding at $250,000 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 January 21, 2013 for the FY14 competition (Solicitation released Nov 2013)

Where: Research Announcement Young Faculty Award, DARPA-RA-14-07

| 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></th>
<th>2012</th>
<th>CEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>Andrea Hodge</td>
<td>CEMS</td>
</tr>
<tr>
<td>2008</td>
<td>Hossein Hashimi</td>
<td>EE</td>
</tr>
</tbody>
</table>

2012 Andrea Hodge CEMS
Yongseung Yoon CEMS
2008 Hossein Hashimi EE
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: ?

When: Nominations for DSSG 2016-2017 will be accepted through Dec 2014.

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
Email: dssg@ida.org

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

Dr. Matthew Goodman
DARPA DSO
571 218 4681
matthew.goodman@darpa.mil

USC Awardees:
2010-11  John Heidemann  ISI
What: The Computer Science Study Group (CSSG) was a program that supports university research in computer science and related fields, while informing a new generation of researchers on Department of Defense (DoD) information technology needs and priorities. The goal is to enable the development of transformational technologies in these areas while informing a new generation of researchers of Department of Defense (DoD) computer science technology needs and priorities. The CSSG funds the participation of a select group of pre-tenure university professors in a multi-phase program of educational and research activities based on interaction with current and former senior DoD military and Government personnel.

The CSSG was a multi-year program, consisting of a funded educational experience to familiarize the participants with DoD practices, challenges and risks, and up to four years of funded research to explore and develop technologies that have the potential to transition innovative and revolutionary computer science and technology advances to the government. The members of the CSSG receive DARPA research grants for their first year of program participation and research. They are then eligible for significant DARPA funding to conduct research in the second phase of the program, with the intention that each participant will obtain matched funding to continue their research project in the third phase. Successful projects will find DoD support and interest to continue computer technology development beyond the CSSG period of support.

Who: Pre-tenure junior faculty member, no more than 7 years beyond receiving PhD degree
US citizen and eligible to receive a U.S. SECRET security clearance
Research interest in a computer science topic of relevance to DoD

How Much: Period 1: $100K for 12
Option Period 1: $200K for 12 months
Period 2: $250K for 12 months

When: last solicitation DARPA-RA-10-76 with due date 15 October 2010

Mr. Mike Geertson, DARPA I2O
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>Year</th>
<th>USC Awardees</th>
<th>Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>Mo El-Naggar</td>
<td>AFOSR</td>
</tr>
<tr>
<td>2009</td>
<td>Andrea Armani</td>
<td>ONR</td>
</tr>
<tr>
<td></td>
<td>Michelle Povinelli</td>
<td>ARO</td>
</tr>
<tr>
<td>2007</td>
<td>Li Zhang</td>
<td>NIH</td>
</tr>
<tr>
<td>2004</td>
<td>Elaine Chew</td>
<td>NSF</td>
</tr>
<tr>
<td>2003</td>
<td>Cyrus Shahabi</td>
<td>NSF</td>
</tr>
</tbody>
</table>
National Security Science and Engineering
Faculty Fellowship (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

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

When (2014 call):
6 Jan 2014 letter of intent
27 Jan white paper
16 May full proposal (by invite only)

Where: ONR FOA14-005

FY15
$33M
National Defense Education Program
http://www.ndep.us/

- K-12 STEM (“transferred” to Department of Education) (~$ 0 )

- NSSEFF (transferred to OSD budget line P101 in Basic Research Initiatives)

- SMART scholarship/fellowship awards (~$45M)
  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/

FY15
$45M
NDEP Portfolio Components

Pre-College (K-12)
- DoD Comm
- DoDEA
- Air Force
- Digital Delivery
- Other Gvmt
- Other Org’s
- STAR BASE
- Navy
- Math Content

Undergraduate Graduate
- SLM
- SMART

Post-Graduate
- NSSEFF

STEM Interest…
Potential DoD Employees

DoD Employees

DoD Affiliated Faculty

Pre-engineering Partnership – PEP
STEM Learning Module - SLM
National Defense Educational Program (NDEP)
The National Security Educational Program (NDEP) is a Department of Defense (DoD) sponsored program that promotes the education, recruitment and retention of outstanding undergraduate and graduate science, mathematics and engineering students. Students are offered these scholarships and fellowships in exchange for a period of employment of up to four years with DoD.

Science, Mathematics and Research for Transformation (SMART) Education Program
The Science, Mathematics and Research for Transformation (SMART) Education Program is a DoD sponsored program that promotes the education, recruitment and retention of outstanding undergraduate and graduate science, mathematics and engineering students. Students are offered scholarships and fellowships in exchange for a period of employment with DoD in the areas specified. Learn more about this program by visiting the SMART Program web site.

Student Education Employment Program (STEP and SCEP)
The Student Education and Employment Programs provide student the opportunity to work part time during the school year and full time on breaks and during the summer. In the Student Temporary Employment Program (STEP), the nature of the work does not have to be related to the student’s educational program and career goals. The Student Career Experience Program (SCEP) provides experience directly related to the student’s educational program and career goals. Students in the SCEP may be converted to full-time permanent position within 120 days after satisfactory completion of their diploma, certificate or degree requirements and successful completion of at least 640 hours of work experience.

For more information on SCEP and STEP, please contact DTRA's Student Education Employment Programs office.
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:

Starting salary/stipend ranging from $25K for undergraduates to $41K for doctoral students.

Full tuition and related education fees.

Book allowance.

Paid summer internships. Career opportunities after graduation.

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. 000 High Performance Computing Services
   http://www.hpcmo.hpc.mil/
6. 000 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
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. Partnerships for Research Excellence and Transition (PRET)
18. Presidential Early Career Award in Science & Engineering (PECASE)
19. Science, Mathematics and Research for Transformation (SMART)
   https://smart.asee.org
20. Summer Faculty Fellowship Program (SFFP)
   http://sffp.asee.org
21. Uniformed Services University of the Health Sciences (USUHS)
   http://www.usuhs.mil/
    (USAF/NRC-RRA) Program
23. U.S. Army Educational Outreach Program (USAEP)
    http://www.usaeop.com
Intelligence / Security Agencies

Department of Homeland Security (DHS)
Intelligence Advanced Research Project Agency (IARPA)
National Geospatial Intelligence (NGI)
National Reconnaissance Office (NRO)
Defense Intelligence Agency (DIA)
National Security Agency (NSA)
Intelligence Agency Postdoctoral Program
S&T’s five goals are:

Rapidly develop and deliver knowledge, analyses, and innovative solutions that advance the mission of the Department.

Leverage technical expertise to assist DHS components’ efforts to establish operational requirements and select and acquire needed technologies.

Strengthen the Homeland Security Enterprise and first responders’ capabilities to protect the homeland and respond to disasters.

Conduct, catalyze, and survey scientific discoveries and inventions relevant to existing and emerging homeland security challenges.

Foster a culture of innovation and learning, in S&T and across DHS, that addresses the challenges with scientific, analytic, and technical rigor.
To maximize DHS' return on investment in university-based research and education, the OUP will:

- Build a stable community of homeland security researchers and educators at U.S. colleges and universities.
- Foster a homeland security culture within the academic community through research and educational programs.
- Strengthen U.S. scientific leadership in homeland security research and education.
- Generate and disseminate knowledge and technical advances to advance the homeland security mission.
- Integrate homeland security activities across agencies engaged in relevant academic research.
- Develop a permanent homeland security science and engineering workforce.

Programs:

- **Centers of Excellence** engage the academic community to deliver tools, technologies, knowledge products, training and talent to enhance the Department’s homeland security capabilities.
- **OUP Education Programs** engage, educate and ultimately direct academically high performing individuals toward choosing Homeland Security-Science, Technology, Engineering, and Mathematics (HS-STEM) related careers.
- **Minority Serving Institutions (MSI) Programs** ensure that the face of America is reflected in the future of Homeland Security science and technology work force.
DHS UOP
University Centers of Excellence

• The Center for Risk and Economic Analysis of Terrorism Events (CREATE), led by the University of Southern California, develops advanced tools to evaluate the risks, costs and consequences of terrorism.

• The Center for Advancing Microbial Risk Assessment (CAMRA), led by Michigan State University and Drexel University established jointly with the U.S. Environmental Protection Agency, fills critical gaps in risk assessments for mitigating microbial hazards.

• The Center of Excellence for Zoonotic and Animal Disease Defense (ZADD), led by Texas A&M University and Kansas State University, protects the nation's agricultural and public health sectors against high-consequence foreign animal, emerging and zoonotic disease threats.

• The National Center for Food Protection and Defense (NCFPD), led by the University of Minnesota, defends the safety and security of the food system by conducting research to protect vulnerabilities in the nation's food supply chain.

• The National Consortium for the Study of Terrorism and Responses to Terrorism (START), led by the University of Maryland, informs decisions on how to disrupt terrorists and terrorist groups through empirically-grounded findings on the human element of the terrorist threat.

• The National Center for the Study of Preparedness and Catastrophic Event Response (PACER), led by Johns Hopkins University, optimizes our nation's preparedness in the event of a high-consequence natural or man-made disaster.

• The Center of Excellence for Awareness & Location of Explosives-Related Threats (ALERT), led by Northeastern University and the University of Rhode Island will develop new means and methods to protect the nation from explosives-related threat.
The National Center for Border Security and Immigration (NCBSI), led by the University of Arizona in Tucson (research co-lead) and the University of Texas at El Paso (education co-lead), are developing technologies, tools, and advanced methods to balance immigration and commerce with effective border security.

The Center for Maritime, Island and Remotes and Extreme Environment Security (MIREES), led by the University of Hawaii and Stevens Institute of Technology focuses on developing robust research and education programs addressing maritime domain awareness to safeguard populations and properties in geographical areas that present significant security challenges.

The Coastal Hazards Center of Excellence (CHC), led by the University of North Carolina at Chapel Hill and Jackson State University in Jackson, Miss., performs research and develops education programs to enhance the nation's ability to safeguard populations, properties, and economies from catastrophic natural disaster.

The National Transportation Security Center of Excellence (NTSCOE) was established in accordance with HR1, Implementing the Recommendations of the 9/11 Commission Act of 2007, in August 2007. The NTSCOE will develop new technologies, tools and advanced methods to defend, protect and increase the resilience of the nation's multimodal transportation. It comprises seven institutions.

The Center of Excellence in Command, Control and Interoperability (C2I) led by Purdue University (visualization sciences co-lead) and Rutgers University (data sciences co-lead) will create the scientific basis and enduring technologies needed to analyze massive amounts of information to detect security threats.
HSARPA

http://www.dhs.gov/st-hsarpa

HSARPA uses innovation and modernization to push scientific limits and produce front line products that support organizations like the Secret Service, bomb squads, first responders, Transportation Security Administration, and officers along our borders. HSARPA conducts analysis to understand these organizations’ current missions, systems, and processes and ultimately identifies operational gaps where new technologies can have the most impact. Program managers lead teams of national experts to develop, test, and evaluate these new homeland security technologies and capabilities.

Select areas of HSARPA focus include:

- Borders and Maritime Security Division - Prevent contraband, criminals and terrorists from entering the U.S. while permitting the lawful flow of commerce and visitors.
- Chemical and Biological Defense Division - Detect, protect against, respond to, and recover from potential biological or chemical events.
- Cyber Security Division - Create a safe, secure and resilient cyber environment.
- Explosives Division - Detect, prevent and mitigate non-nuclear explosives attacks against people and infrastructure.
- Resilient Systems Division - Develop and deliver innovative solutions that enhance the resilience of individuals, communities, and systems to prevent and protect against threats, mitigate hazards, effectively respond to disasters, and expedite recovery.

Solicitations are posted on the DHS website.

HSARPA also has topics in the DHS Long Range BAA under the HID section.
Within its Basic Research Portfolio, S&T generally funds quality research projects that meet at least one of these selection criteria:

* Addresses an important Department issue without a near-term solution.
* Pursues a creative solution that addresses a unique, long-term Department need, which is not addressed elsewhere.
* Exploits new scientific breakthroughs (for example, from universities, laboratories, or industry) that could strengthen homeland security.

DHS S&T LRBAA14-02  DHS S&T Long Range Broad Agency Announcement (payback >8 yrs)

A white paper submission anytime up to 31 Dec 2018

Basic science ideas which hold promise for transformative performance improvements.

Generic areas (DHS S&T Divisions) are:

Border and Maritime Security (BMD)- Tools and Technologies to improve security
Chem / Bio (CBD) - Awareness and Countermeasures
Cybersecurity (CSD) - Cybersecurity and information assurance solutions
Explosives Countermeasures (EXD) - Detection, Mitigation, Response
First Responder Group (FRG) - identifies/validates/fixes capability gaps
Office of Standards (STN) - development and promote use of standards
Resilient Systems (RSD) - develop and deploy solutions

Resources
DHS S&T Directorate Strategic Plan 2011
High Priority Technology Needs May 2009
Domestic Nuclear Detection Office

http://www.dhs.gov/about-domestic-nuclear-detection-office

Domestic Nuclear Detection Office (DNDO) within the Department of Homeland Security (DHS), in partnership with the National Science Foundation (NSF), invests in frontier research at academic institutions. This transformational research effort will be focused on detection systems, individual sensors or other research that is potentially relevant to the detection of nuclear weapons, special nuclear material, radiation dispersal devices and related threats.

Transformational & Applied Research Directorate
The Transformational & Applied Research Directorate develops break-through technologies that will have a dramatic impact on capabilities to detect nuclear threats through an aggressive and expedited research and development (R&D) program.

    Exploratory Research Program
    Small Business Innovative Research
    Academic Research Initiative (in partnership with NSF)
    Advanced Technology Demonstration

NSF BAA 13-554: Domestic Nuclear Detection Office-National Science Foundation Academic Research Initiative (ARI) Topics:

    Sci and Engn Approaches for Extremely Low-cost Monitoring for Radiological and Nuclear Threats
    Deterrence Theory and Analytics
    Sci and Engn of Threat Detection through Data Fusion, Informatics and/or Non-Radiological Signal/Signature Exploitation
    Science and Engineering of Nuclear Forensics
    Integrated Multi-disciplinary Approaches to Clear Objects from Nuclear Threats

~$3M for new starts in FY13

Full Proposal Deadline 10 July 2013
Program Offices:

- **Incisive Analysis**  Rita Bush (acting) Office Director, rita.m.bush@ugov.gov
  The goal of the programs in this office is to maximize insight from the information we collect, in a timely fashion.

- **Smart Collection**  Edward Barnoski, Office Director, edward.j.baranoski@ugov.gov
  The goal of the programs in this office is to dramatically improve the value of collected data from all sources.

- **Safe & Secure Operations**  Susan Alexander, Office Director, susan.d.alexander@ugov.gov
  The goal of the programs in this office is to be able to counter new capabilities implemented by our adversaries that would threaten our ability to operate freely and effectively in a networked world.

**Long Range BAAs**

<table>
<thead>
<tr>
<th>Incisive Analysis</th>
<th>IARPA-BAA-13-02 Amendment Date: Feb 12, 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smart Collection</td>
<td>IARPA-BAA-13-01 Amendment Date: Feb 12, 2014</td>
</tr>
<tr>
<td>Safe &amp; Secure Operations</td>
<td>IARPA-BAA-13-03 Amendment Date: Feb 12, 2014</td>
</tr>
</tbody>
</table>
University Research Initiatives (NURI)
The NGA University Research Initiatives (NURI) program supports geospatial intelligence research through annual solicitation for basic research proposals from US academic institutions. The solicitation topics are selected to provide the scientific basis for advanced and applied research in NGA core disciplines. Institutions are encouraged to involve graduate students in the research projects. The stimulation of graduate programs in geospatial intelligence-related disciplines is an additional benefit to the basic geospatial intelligence research conducted under the NURI program.
Up to $300K for 2 year with option of $150K/yr for 3 additional years

Outstanding New Scientific and Technical Innovative Researcher (ONSTIR)
These awards are grants open to faculty employed by eligible institutions who are U.S. citizens, U.S. nationals, or permanent U.S. residents holding faculty positions at U.S. universities and colleges and who have held their doctorate degrees (PhD or equivalent) for less than five years at the time of application. Institution letter of support mandatory
Up to $200K for 2-years with option of $100K/yr for 1 additional year

Research Collaboration Forum (NRCF)
These grants are intended to encourage collaboration forums in the United States for the systematic exploration and advancement of greater scientific breakthroughs or understanding in one or more research issues for GEOINT.
Up to $30K per event

For the FY12-13 competition white papers any time before 30 April 2013
National Reconnaissance Office
Director's Innovation Initiative
DIA BAA 14-01

What
The Director's Innovation Initiative provides a risk-tolerant environment to invest in cutting edge technologies and high payoff concepts relevant to the NRO's mission of "Innovative Overhead Intelligence Systems for National Security." The projects focus on NRO R&D thrusts such as developing new intelligence sources and methods to solve intractable intelligence problems. We are not looking for incremental improvements; instead the projects we choose focus on making orders of magnitude improvements in efficiency and effectiveness, trying to expand the frontiers of detection, exploitation and processing. The DII is committed to providing continuous access to the most revolutionary concepts and ideas. The DII fosters innovation by providing seed funding to push the boundaries of technology in order to dramatically improve the nation's satellite reconnaissance capabilities. Additionally, it provides an opportunity for developers not traditionally associated with the NRO to participate.

Fundamental research means basic and applied research in science and engineering, the results of which ordinarily are published and shared broadly with the scientific community, as distinguished from proprietary research and from industrial development, design, production, and product utilization, the results of which ordinarily are restricted for proprietary or national security reasons.

How Much: In the past selected projects had a maximum of $400,000.00 over a three (3) year period of performance with a cost reimbursable contract.

When. In CY2014 call issued 27 Nov 2013 with response dates for step one (white paper) of Jan through July 2014

Where: http://dii.westfields.net
Defense Intelligence Agency
Generic Innovation Solicitation DIA BAA 14-01

What: The DIA is interested in all potential "innovative" concepts/ideas of interest that may fill current gaps, to include effort focused principally on maximizing agency operating efficiency and effectiveness, and access by the DIA to potential or existing state-of-the-art innovations, both technical and otherwise, that may not currently be in use by the agency or that may be in limited use and in need of leveraging across a greater expanse of the collective enterprise.

The areas of need, as listed on DIA's Needipedia webpage are:
1. Prevents Strategic Surprise
2. Supports Contingency Response
3. New Analysis Technologies and Methods
4. Enhances Counter Intelligence and Security
5. Human Intelligence Capability Development
6. Mission Enhancing Science and Technology
7. Improves Mission Support Capabilities
8. Enhances Technical Collection
9. Increases Organizational Effectiveness
10. Empower Partnerships

How Much: No funding has been specifically reserved for this solicitation at this time. However, funding may be provided throughout the open period of this BAA to pursue promising innovation concepts of interest with any and all qualified sources. The number and variety of types of awards possible, including any associated resources made available to support the initiatives under this BAA will depend upon the quality of submissions received and the availability of funds.

When:
BAA OPEN PERIOD: 27 NOV 2013 - 26 NOV 2014
PROPOSER SUBMISSION AND SELECTION DEADLINES:
- STEP 1- "WHITE PAPERS" - Submissions will be accepted from 1/VJ/2014 - 8/01/2014
- STEP 2- "PROPOSALS" Upon Government request throughout BAA open period

Where: http://www.dia.mil/innovation/Needipedia/
What: The National Security Agency (NSA) funds a limited amount of research designed to advance DOD’s cryptology and communications abilities. Key NSA programs include a robust mathematics research enterprise and a centers of excellence program that engages universities in support of the agency’s cybersecurity and information assurance goals.

Grants for Research in Mathematics:
http://www.nsa.gov/research/math_research/index.shtml
The MSP supports self-directed, unclassified research in the areas of Algebra, Number Theory, Discrete Mathematics, Probability, and Statistics. The program does not support research in cryptology. The Research Grants program offers two types of grants: the Young Investigators Grant and the Standard Grant. More details are available on the MSP proposal submission website. Investigators must be U.S. citizens or permanent residents of the United States. Proposals must be annually submitted electronically beginning on September 1 and ending on October 15 via the Proposal Submission Website.

The Biometric Consortium, (http://www.biometrics.org/) supported by the National Institute of Standards and Technology (NIST) and the National Security Agency (NSA), exists to facilitate scientific and technical (S&T) interchanges between the U.S. federal government and outside entities on biometric and other identity technologies in support of Defense, Homeland Security, Identity Management, Border Crossing and Electronic Commerce.

In 2013 the NSA and North Carolina State University partnered to establish a $60M Laboratory for Analytic Sciences (LAS) on NC State's Centennial Campus in Raleigh (http://analytics.ncsu.edu/?page_id=3978)

Laboratory for Physical Sciences (http://www.lps.umd.edu/) at the University of Maryland, College Park, is a unique facility where university and federal government personnel collaborate on research in advanced communication and computer technologies.

Where: http://www.nsa.gov/research/
National Centers of Academic Excellence (CAE) in Cyber Operations Program

The CAE-Cyber Operations program is intended to be a deeply technical, inter-disciplinary, higher
education program firmly grounded in the computer science (CS), computer engineering (CE), and/
or electrical engineering (EE) disciplines, with extensive opportunities for hands-on applications via
labs/exercises. providing a particular emphasis on technologies and techniques related to
specialized cyber operations (e.g., collection, exploitation, and response), to enhance the national
security posture of our Nation. These technologies and techniques are critical to intelligence,
military and law enforcement organizations authorized to perform these specialized operations.

Centers for Academic Excellence (CAE) in Information Assurance Education (CAE-IAE)
National Centers of Academic Excellence in Information Assurance Research (CAE-R)
National centers of Academic Excellence in Info Assurance 2-Year Education (CAE-2Y)
http://www.nsa.gov/ia/academic_outreach/nat_cae/index.shtml

NSA and the Department of Homeland Security (DHS) jointly sponsor the National Centers of
Academic Excellence in IA Education (CAE/IAE), IA 2-year Education (CAE/2Y) and IA Research
(CAE/R) programs. The goal of these programs is to reduce vulnerability in our national information
infrastructure by promoting higher education and research in IA and producing a growing number
of professionals with IA expertise in various disciplines. The Cyber Operations CAE program must
be based within a computer science, electrical engineering or computer engineering department,
or a degree program of equivalent technical depth, or a collaboration between two or more of these
departments.
Intelligence Community
Centers of Academic Excellence (IC CAE)

**What:** The IC CAE Program aims to increase the pool of eligible applicants in core skills areas, specifically targeting women and racial/ethnic minorities with varied cultural backgrounds, regional and geographical expertise, skills, language proficiency, and related competencies.

The IC CAE grant program will forge mutually beneficial relationships among the IC, colleges and universities that will support efforts to incorporate curriculum and programs to improve the pipeline and representation of minorities and women in, at least, one of five CAE Areas of Focus:

1. Information Technology Specialists
2. Language Specialists
3. Threat Specialists
4. Scientific/Technical Specialties
5. Political/Economic Specialists

institutions shall:

- Make a commitment to the goals and objectives of the IC CAE Program -- in particular, creating a pool of competitive applicants from the targeted populations noted above;
- Enroll and graduate a significant number of ethnically diverse students who are eligible and competitive for careers across IC agencies and components;
- Link their CAE activities and curriculum offerings to at least one of the five CAE Areas of Focus; and
- Commit resources to support the infrastructure needed for the institution’s CAE initiative.

All students participating in the IC CAE Program must be United States citizens.

**Where:**
Intelligence Community (IC) Postdoctoral Research Fellowship Program
http://www.icpostdoc.org/

What: Research in leading-edge technologies to meet IC needs
Topics announced annually (see website listed in “Where” below)
Research at accredited US University or College
Fellow must be US citizen with PhD completed within last 5 years (but Univ/College advisor is not required to be US citizen)
PD research also mentored by IC Advisor

How Much:
$120K/yr - 50% must be direct support of full-time PD
Two years, with an additional one year option
~20 awards expected per year

When: Proposal due date for FY2013 is 18 January 2013
Start date in ~May 2013

Where: http://www.icpostdoc.org

The 2010 Intelligence Community Postdoctoral Research Fellowship Program Research Solicitation # ICPDP-2010-0001 available at jhuresearch.jhu.edu/ICPDP_2010_0001.pdf
Applied Research
and
Exploratory Development
## Air Force R&D Laboratories/Centers

<table>
<thead>
<tr>
<th>Laboratory/Center</th>
<th>Location</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Force Research Laboratory</td>
<td>Office of Scientific Research, Arlington VA</td>
<td>basic research funding agency</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</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>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>Munitions (RW), Eglin AFB FL</td>
<td></td>
<td>conventional munitions technologies to provide the Air Force with a strong technology base upon which future air-delivered munitions</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>Space Vehicles (RV), Kirtland AFB NM</td>
<td></td>
<td>develop and transition innovative high-payoff space technologies</td>
</tr>
<tr>
<td>Information (RI), Rome NY</td>
<td></td>
<td>research and advanced development in the cyber domain</td>
</tr>
<tr>
<td>Human Effectiveness (711 HPC), WPAFB OH</td>
<td></td>
<td>study and advancement of human performance</td>
</tr>
</tbody>
</table>
Air Force University Centers of Excellence

Initiated by an AFRL Technology Directorate

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

Funding for 5 years plus ramp up/down
- ~$500K 6.1 funding by AFOSR
- ~$500K 6.2 funding by AFRL TD
- University Matching (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>2014</td>
<td>AFRL/RW (Bradshaw)</td>
<td>TBD</td>
<td>Nature Inspired Sciences (sensing)</td>
</tr>
<tr>
<td>2014</td>
<td>AFRL/RV (Miller)</td>
<td>TBD</td>
<td>HI-Power Radiowave Effects on Space Plasma Environment</td>
</tr>
<tr>
<td>2013</td>
<td>AFRL/RY (Schlossberg)</td>
<td>U. Wisc</td>
<td>Guided-wave Infrared Sources</td>
</tr>
<tr>
<td>2012</td>
<td>AFRL/RX (Fahroo)</td>
<td>JHU</td>
<td>Integrated Materials Modeling</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>2011</td>
<td>AFRL/RI (Bonneau)</td>
<td>UIUC</td>
<td>Assured Cloud Computing</td>
</tr>
<tr>
<td>2010</td>
<td>AFRL/RZ (Birkan)</td>
<td>Univ Mich</td>
<td>Center of Excellence in Electric Propulsion</td>
</tr>
<tr>
<td>2010</td>
<td>AFRL/RH (Myung)</td>
<td>GMU</td>
<td>Neuroergonomics, Technology and Cognition</td>
</tr>
<tr>
<td>2009</td>
<td>AFRL/RX (Charles Lee)</td>
<td>GIT</td>
<td>Bio-nano-enabled Nanostructures and Improved Cognition*</td>
</tr>
<tr>
<td>2009</td>
<td>AFRL/RX (Stargel)</td>
<td>Ohio State</td>
<td>Multi-Materials System with Adaptive Microstructures*</td>
</tr>
</tbody>
</table>

* ending in 2013
AFRL/RV University Grants Program  
BAA RV-10-03

In Fiscal Year 2012, BAA RV-10-03 resulted in approximately 24 grants to academic institutions. About $20M is anticipated to be available for support of actions awarded through this FOA process; subject to availability of funds. Research proposals ≤ $150K per year are encouraged. 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.
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.

Cyber Awareness and Resilience Research
Solicitation Number: BAA-RIK-12-14
# Army R&D Laboratories/Centers

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<thead>
<tr>
<th>Army Research Laboratory (ARL)</th>
<th>Adelphi MD</th>
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<tbody>
<tr>
<td>Computational and Information Sciences Directorate (CISD)</td>
<td>Adelphi MD</td>
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<tr>
<td>Sensors and Electron Devices Directorate (SEDD)</td>
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<tr>
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<tr>
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<tr>
<td>Weapons and Materials Research Directorate (WMRD)</td>
<td>Aberdeen MD</td>
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<tr>
<th>Research, Development and Engineering Command (RDECOM)</th>
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<td>Armament Research, Development &amp; Engineering Center (ARDEC)</td>
<td>Picatinny Arsenal NJ</td>
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Army Research Laboratory

**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.
Army Research Laboratory - University Opportunities

ARL’s **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 University of Del, 
- Institute for Creative Biotechnology at UCSB
- Institute for Creative Technology at USC
- Institute for Soldier Nanotechnologies at MIT

ARL’s **Collaborative Technology Alliances (CTAs)** are 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. There are four CTAs: Cognition and Neuroergonomics, Micro Autonomous Systems and Technology, Network Systems, and Robotics. 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.

ARL’s **Collaborative Research Alliances (CRAs)** will bring together 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.

**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.

Creative partnerships through **Cooperative Research and Development Agreements** encourage outside businesses and university organizations to share in the discovery of and investment in technologies.
Army University Centers of Excellence

**Collaborative Technology Alliances ($5-13M/yr per CTA)**
Partnerships between Army Laboratories and Centers, private industry, and academia that are focusing on the rapid transition of innovative technologies to the warfighter to enable the Army's Future Force.
- Micro Autonomous Systems and Technology (MAST) in 2008
  - BAE lead
- Network Science (NS) CTA in 2009
  - BBN Technology Industrial lead, PSU, UIUC, RPI as lead Universities
- Robotics CTA in 2010
  - General Dynamics Robotics Systems lead
- Cognition and Neuroergonomics (CAN) CTA in 2010
  - DCS Corp lead

**Collaborative Research Alliances**
ARL envisions these alliances will bring together government, industrial, and academic institutions to address some of the fundamental scientific and technological underpinnings of our military defense systems.
- Materials in Extreme Dynamic Environments (MEDE) in 2012
- Multiscale Multidisciplinary Modeling of Electronic Materials (MSME) in 2012
- Cybersecurity in 2013 (led by PSU)
National Research Council
Postdoctoral Fellowship Program
http://nrc58.nas.edu/RAPLab10/Opportunity/Programs.aspx
Source to Identify Potential DOD Research Collaborators

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

http://nrc58.nas.edu/RAPLab10/Opportunity/Opportunities.aspx?LabCode=64

NSRDEC US Army Natick Soldier Research, Development and Engineering Center

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

RDEC/NVESD US Army Res Dev & Engn Com / Night Vision & Elect Sensors Dir
Solicitation Number: W911QY-13-R-0032
Effective from 1 March 2013–31 March 2015
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)
Broad Agency Announcement (BAA) ECBC-11 supports 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 as described in section 5 of the BAA. ECBC competitively solicits project offers in the Technical Topic areas set forth in section 7 of the BAA, which include:

- 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

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. If in compliance with the criteria and requirements outlined in section 3.2 of the BAA and evaluated favorably, a potential procurement action could follow, contingent upon the availability of funding and in conformance with applicable procurement regulations.

Navy R&D Laboratories/Centers

Naval Research Laboratory (NRL)
  Washington DC  broad based S&T
  Stennis MS  oceanography, marine geology, geophysics/acoustics/technology
  Monterey CA  atmospheric research

Naval Surface Warfare Center (NSWC)
  Dahlgren Division VA  weapon system integration
  Carderock Div MD and PA  ship design & integration
  Crane Division IN  acquisition engn, in-service engn and technical support
  Indian Head Division MD  energetics and energetic systems
  Port Hueneme Division CA  life-cycle Engineering and Logistics
  Panama City Division FL  mine warfare, diving support systems, amphibious maneuver

Naval Air Warfare Center (NAWC)
  Aircraft Div, Patuxent River, MD  aircraft, avionics
  Weapons Div, China Lake CA  weapons development

Naval Undersea Warfare Center (NUWC)
  Div Newport, Newport RI  systems RD&E
  Div Keyport, Pudget Sound WA  test, training and evaluation services, life cycle support

Space and Naval Warfare Systems Center
  San Diego CA  C4ISR

Navy Medical Research Ctr, Bethesda MD  operationally relevant health and medical research solutions

Naval Postgraduate School, Monterey CA  intellectual know how and the practical skills for improving defense technologies, systems and programs
NUWC Generic BAA 2014

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.

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
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
DTRA
HDTRA1-14-17-NTA
Non-Traditional Agent (NTA) Initiatives

The purpose of this BAA is to solicit research proposals for Chemical and Biological Defense Program, specifically in the area of Advanced and Emerging Threats to support its mission focused on identifying and developing technologies to assist in countering emerging chemical threats across the CWMD spectrum of missions with the following NTA focus areas:

1. Expand scientific knowledge required to develop enhanced defensive capabilities against the NTA threat, with emphasis on addressing discrete data gaps associated with emerging chemical threats.
2. Build spectral and toxicological databases necessary to advance NTA and emerging threat defense technology.
3. Demonstrate fast and agile scientific responses to enhance or develop capabilities (e.g., detect, identify, report, respond) that address NTAs, emerging threats and items of priority interest.

Proposals will be accepted and considered for Applied Research and/or Advanced Technology Development budget activity efforts in support of each topic. Basic Research may only be proposed if combined with either of the aforementioned budget activities.

Topics
CBS-01  Resuspension Factors and Atmospheric Persistence of CB Particulate and Aerosol Threats
CBS-02  Pretreatments for CWA/NTA Exposure
CBS-03  Centrally Active Nerve Agent Treatment Systems
CBS-04  Predictive Toxicology Tools for Enabling Rapid Countermeasure Development
CBS-05  Methods for Rapid Prediction of Agent-Substrate Interactions Including Correlation or Chemical or Biological Agent Physical Properties to Determine Underlying Mechanisms
DTRA R&D Innovation Office – Science and Technology New Initiatives
HDTRA1-11-16-RDIS-BAA
• Extramural (non-US Government) only, leading to contract FY14-17
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.
Defense Forensics and Biometrics Agency (DFBA)
W911NF-13-R-0006

**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:

- Novel analytical chemistry, tools, techniques, and methodologies that enhance sensitivity and selectivity over currently existing forensic capabilities
- Innovative approaches for source attribution of forensic samples (e.g., drugs, explosives)
- New methods or protocols for extracting information from mixed DNA samples
- The development of new analytical protocols for patterned forensic analyses (e.g., firearms, latent prints) that utilize a quantitative rather than qualitative approach
- Novel methods to pre-process, match, and analyze latent prints with or without human intervention
- Novel methods to pre-process, match, and analyze pattern evidence with or without human intervention
- Approaches/tools/techniques for facial recognition which are gender and ethnic independent
- Novel approaches/tools/techniques for correlating 2D imagery to 3D imagery
- Novel approaches to correlate forensic and/or biometric data in order to develop investigative leads or behavior patterns

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 1 July 2013 and 30 June 2015

**Where:** White papers must be submitted electronically in PDF file form and e-mailed to the RDT&E Program mailbox, USArmy.Gillem.DFSC.MBX.DFSCOEO-RDTE@mail.mil.
Human Social Culture Behavior Modeling Program (HSCB)

• Established in 2008 by DOD to develop a science base and associated technologies for modeling human, social and cultural behavior

• Funded with 6.2 (applied research):
  Research will address needs in four areas: modeling, visualization, training, and data. It will: develop and validate theoretical constructions, generate knowledge products, and develop stand-alone computational models of socio-cultural behavior; develop methods for visualizing socio-cultural behavior variables and their associated complexity and uncertainty; identify cultural competencies indexed to warfighter tasking and develop methods for flexible training of socio-cultural knowledge, skills, and abilities at tactical and operational levels; and develop improved methods for valid collection of quality socio-cultural data that will facilitate subsequent model development and validation.

  6.3 (advanced technology development) and
  6.4 (Advanced Component Development and Prototypes) monies

HSCB program Program Director: Capt Dylan Schmorrow, USN
Assistant Director for Human Systems
Office of the Dept Undersecretary of Defense for S&T
An Integrated Product Team (IPT) guides program execution

• See ONR Code 30

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<td>Adv Technol (6.3)</td>
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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 guide proposals
Core Solicitation for full scale efforts
Exploratory Development Proposals (SEED) for $150K for 1 year

SERDP is 6.3 (tech develop)  [ESTCP is 6.4 (field demonstration)]

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

When: Core Solicitation Preproposals ~Jan 08 2013 for FY2014 solicitation
SEED Proposals ~Mar 12 2013 for FY2014 solicitation

Where: For FY 2014 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
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
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.

**Three-Phased Program**

<table>
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<tr>
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<th>SBIR</th>
<th>STTR</th>
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</thead>
<tbody>
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<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 $1,000,000</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>
<td></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

<table>
<thead>
<tr>
<th>SBIR 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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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

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>Feature</th>
<th>SBIR</th>
<th>STTR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set-Aside of Agency Budget</td>
<td>2.5%</td>
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<td>FY10 SBIR/STTR Budget</td>
<td>~ $1.3 Billion</td>
<td></td>
</tr>
<tr>
<td>Award Guidelines Phase I</td>
<td>$150K/6-9mos</td>
<td>$150K/ 1 yr</td>
</tr>
<tr>
<td>Phase II</td>
<td>$1M/2 yrs</td>
<td>$1M/ 2 yrs</td>
</tr>
<tr>
<td>Subcontracts Phase I</td>
<td>&lt; 33.3%</td>
<td>&lt; 60%</td>
</tr>
<tr>
<td>Phase II</td>
<td>&lt; 50%</td>
<td>&lt; 60%</td>
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<tr>
<td>Research Partner</td>
<td>Not Required</td>
<td>&gt; 30%</td>
</tr>
<tr>
<td>Business Employment of PI</td>
<td>&gt;50%</td>
<td>n/a</td>
</tr>
</tbody>
</table>
Rapid Innovation Fund (RIF) Program

What: 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:
• Satisfy an operational or national security need by accelerating or enhancing military capability
• 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

How Much: Average award in FY2011 ~$2M

When:
BAA
• OSD/Defense Agency Solicitation Posting (white paper submission closes 9/23/13)
• Department of the Navy Solicitation Posting (white paper submission closes 9/30/13)
• Department of the Air Force Solicitation Posting (white paper submission closes 10/8/13)
• Department of the Army Solicitation Posting (white paper submission closes 10/21/13)

WHITE PAPERS
• September 2013 or 60 days after BAA release: White papers due

FULL PROPOSALS
• February 2014 or 30 days after invitation: Full proposals due

Where: http://www.dodsbir.net/rif/SignIn.asp
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 RDT&E Taxonomy - Primer

Science and Technology ($12.2B in FY12)

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 ($64B in FY12)

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 – 2.5% / 0.3% tax on R&D funding

<table>
<thead>
<tr>
<th>BA</th>
<th>Budget Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>RDT&amp;E</td>
<td>Research, Development, Test &amp; Evaluation</td>
</tr>
<tr>
<td>SBIR</td>
<td>Small Business Innovation Research</td>
</tr>
<tr>
<td>STTR</td>
<td>Small Business Technology Transfer</td>
</tr>
<tr>
<td>TRL</td>
<td>Technology Readiness Level</td>
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</tbody>
</table>
DoD R&D Considered Essential for:

- Fund military unique/critical technology, such as
  - Armored vehicles
  - Infectious diseases
  - Combat aircraft
  - Combat casualty care
  - Missiles
  - Night vision
  - Submarines
  - Automatic target recognition
  - Guns and munitions
  - 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
World of R&D 2010

Size of circle reflects the relative amount of annual R&D spending by the country noted.

Scientists & Engineers/Million People

R&D as % GDP

Source: Battelle, R&D Magazine, OECD, IMF, CIA

in billions of constant FY 2014 dollars

FY 2009 figures include Recovery Act appropriations. Research includes basic research and applied research. FY 2015 figures exclude Opportunity, Growth, and Security Initiative proposals.
FY13 and FY14 RDT&E Budget Request Comparison

FY13 RDT&E request = $69.41B (Budget Activities 1-7)

FY14 RDT&E request = $67.52B (Budget Activities 1-7)

Technology Base (BA1 + BA2) = $6.59B

Technology Base (BA1 + BA2) = $6.79B

PBR13 S&T is 17.0% of RDT&E

PBR14 S&T is 17.7% of RDT&E
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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<tr>
<td>Life Sciences</td>
<td>4.3</td>
<td>1.4</td>
<td>1.2</td>
<td>1.4</td>
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<tr>
<td>Psychology</td>
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<td>1.0</td>
<td>1.1</td>
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<td>7.9</td>
<td>11.4</td>
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<td>Chemistry</td>
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<td></td>
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<td>Physics</td>
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<td>11.0</td>
<td>11.1</td>
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<tr>
<td>Environmental Sciences</td>
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<td>Mathematics</td>
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<td>Computer Science</td>
<td>37.8</td>
<td>28.8</td>
<td>20.1</td>
<td>20</td>
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<tr>
<td>Engineering</td>
<td>43.4</td>
<td>37.1</td>
<td>30.0</td>
<td>28.9</td>
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<tr>
<td>Aeronautical</td>
<td>51.4</td>
<td>34.8</td>
<td>26.3</td>
<td></td>
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<tr>
<td>Astronautical</td>
<td>13.5</td>
<td>27.2</td>
<td>15.3</td>
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<tr>
<td>Chemical</td>
<td>9.7</td>
<td>10.4</td>
<td>9.3</td>
<td></td>
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<tr>
<td>Civil</td>
<td>5.1</td>
<td>7.2</td>
<td>8.0</td>
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<tr>
<td>Electrical</td>
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<td>62.9</td>
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<tr>
<td>Mechanical</td>
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<td>87.6</td>
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<tr>
<td>Metallurgy and Materials Science</td>
<td>43.6</td>
<td>42.4</td>
<td>34.0</td>
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<tr>
<td>Other</td>
<td>33.0</td>
<td>26.3</td>
<td>21.8</td>
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<tr>
<td>Social Sciences</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.5</td>
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<tr>
<td>Other Sciences</td>
<td>0.8</td>
<td>1.4</td>
<td>9.8</td>
<td>11.1</td>
</tr>
</tbody>
</table>

DOD Total to all fields          | 9.6  | 6.2  | 6.0  | 6.3  |

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-Decision
- 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
Navy (DOD) 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

~50%

6.1 6.2 6.3

**5 ⇒ 20 Years . . .**

Navy and Marine Corps

**After Next**

- Idea Exploration
- Naval Unique
- Naval Essential

~48%

From Dr. Starnes Walker (ex) ONR TD

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

Adaptive Optics and Lasers

Stealth

Night Vision

GPS

Phased Array Radar

From OSD R&D Overview, Dr. Lewis Sloter
1. Maturing technology for Tech “Push”
2. Maturing technology from Requirements “Pull”
3. Technology Readiness Assessment
4. Quick Reaction Technical Support

From OSD R&D Overview, Dr. Lewis Sloter
S&T Requires Strong Partnerships

- Service Labs/Centers
- Expanded Resource Base
- Universities
- Interagency
- New Ideas, Knowledge
- Industry
- International
- Coalition Capability
- Innovation, Transition

Link to the Warfighter

High Risk, High Payoff

Maximum National Security Payoff

From OSD R&D Overview, Dr. Lewis Sloter