## Index to Charts: Guide to Defense Basic Research Funding

<table>
<thead>
<tr>
<th>Chart #s</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 3</td>
<td>Contents</td>
</tr>
<tr>
<td>4 - 16</td>
<td>Overview Perspectives, including suggestions on working with DOD Program Officers</td>
</tr>
<tr>
<td>17 - 30</td>
<td>By Academic Disciplines</td>
</tr>
<tr>
<td>31 - 41</td>
<td>Air Force Office of Scientific Research (AFOSR)</td>
</tr>
<tr>
<td>42 - 51</td>
<td>Army Research Office (ARO)</td>
</tr>
<tr>
<td>52</td>
<td>Army Corps of Engineers</td>
</tr>
<tr>
<td>53 - 55</td>
<td>Army Medical Research and Materials Command (AMRMC)</td>
</tr>
<tr>
<td>56</td>
<td>Army Research Institute for Behavioral and Social Science (ARI)</td>
</tr>
<tr>
<td>57 - 72</td>
<td>Office of Naval Research (ONR)</td>
</tr>
<tr>
<td>73 - 75</td>
<td>Naval Post-Graduate School (NPSG)</td>
</tr>
<tr>
<td>76 - 105</td>
<td>Defense Advanced Research Projects Agency (DARPA)</td>
</tr>
<tr>
<td>106 - 125</td>
<td>Defense Threat Reduction Agency (DTRA)</td>
</tr>
<tr>
<td>126</td>
<td>High Energy Laser (HEL)</td>
</tr>
<tr>
<td>127</td>
<td>High Performance Computing</td>
</tr>
<tr>
<td>128</td>
<td>MINERVA (social science)</td>
</tr>
<tr>
<td>129 - 133</td>
<td>University Research Initiative (URI, including MURI, DURIP)</td>
</tr>
<tr>
<td>134 - 140</td>
<td>Defense Medical Research and Development Program (DMRDP)</td>
</tr>
<tr>
<td>141 - 152</td>
<td>Congressionally Directed Medical Research Program (CDMRP)</td>
</tr>
<tr>
<td>153</td>
<td>Telemedicine and Advanced Technology Research Center (TATRC)</td>
</tr>
<tr>
<td>154</td>
<td>US Department of Veterans Affairs</td>
</tr>
<tr>
<td>155</td>
<td>University Affiliated Research Centers</td>
</tr>
<tr>
<td>156 - 161</td>
<td>Young Investigator / Early Career</td>
</tr>
<tr>
<td>162</td>
<td>Defense Science Study Group</td>
</tr>
<tr>
<td>163</td>
<td>Defense Computer Study Group</td>
</tr>
<tr>
<td>164</td>
<td>Presidential Early Career Award for Science and Engineering (PECASE)</td>
</tr>
<tr>
<td>165</td>
<td>National Security Science and Engineering Faculty Fellow (NSSEFF)</td>
</tr>
<tr>
<td>166 - 169</td>
<td>National Defense Education Program (NDEP)</td>
</tr>
<tr>
<td>170 - 171</td>
<td>DOD Education Resources</td>
</tr>
</tbody>
</table>

Revised 3/10/2014
## Index to Charts: Guidance to Defense
### Selected Applied Research and Exploratory Development Funding

<table>
<thead>
<tr>
<th>Chart #s</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>172 - 174</td>
<td>Applied Research and Advanced Technology Development</td>
</tr>
<tr>
<td>175 - 182</td>
<td>Air Force Materiels Command</td>
</tr>
<tr>
<td>183 - 198</td>
<td>Army Materiel Command</td>
</tr>
<tr>
<td>199 - 206</td>
<td>Naval Applied Research and Adv Technol</td>
</tr>
<tr>
<td>207 - 213</td>
<td>Defense Advanced Research Projects Agency (DARPA)</td>
</tr>
<tr>
<td>214 - 222</td>
<td>Defense Threat Reduction Agency (DTRA)</td>
</tr>
<tr>
<td>223</td>
<td>Defense Forensics and Biometrics Agency (DFBA)</td>
</tr>
<tr>
<td>224</td>
<td>Defense Logistics Agency</td>
</tr>
<tr>
<td>225</td>
<td>Ballistic Missile Defense Agency (MDA)</td>
</tr>
<tr>
<td>226</td>
<td>Special Operations Command (SOCOM)</td>
</tr>
<tr>
<td>227 - 228</td>
<td>SERDP/ESTCP</td>
</tr>
<tr>
<td>229 - 239</td>
<td>Advanced Manufacturing (SBIR/STTR, RIF, ManTech, IMI)</td>
</tr>
</tbody>
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### Supplementary Information
Charts 240+
The DC Office of Research Advancement has created the Federal Mission Agency Program Summaries (MAPS) website to:
  1. Connect PIs with appropriate funding agency programs/program officers
  2. Assist in development of white papers/charts/elevator pitches

The website can be accessed using one’s USC NetID and Password.

It has the following resources:

1. **Search Tab** for a searchable database of programs/program officers
   At that website one can do keyword searches to locate the associated mission agency (DHS, DOD, DOE, DOT, ED, EPA, INTEL, NASA, NIST, NOAA and USDA) programs and program officers.

2. **Mission Agency Tab** (DHS, DOD, DOE, DOT, ED, EPA, INTEL, NASA, NIST, NOAA, USDA)
   Guide to Agency Funding for FYXX
   Agency Research Program Charts
   Agency Planning Documents
   Chart numbers in the text above reference the Agency Research Program Chart files.

3. **Presentation Tab** for charts from recent USC Center of Excellence in Research workshops

4. **Proposal Tab** for report / guides on writing proposals

5. **Email Alerts Tab** for URLs at which one can arrange for automatic solicitation updates

6. **Grantee Tab** for URLs at which one can find previous agency awardees

7. **Visiting DC Tab** for information about DC Office services

USC MAPS
http://web-app.usc.edu/web/ra_maps
Vision:

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

Mission:

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

Science and Technology ($11.5B in FY15 PBR)

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

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

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

Development ($52B in FY15 PBR)

**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

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

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

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

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

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

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

Army Medical Research and Materiel Command
- CDMRP (Congressional adds, fully open competition)  cdmrp.army.mil/
- TATRC (Congressional adds, special interest)  www.tatrc.org/

Army Research Inst for Behavioral & Social Sci
- DARPA  www.hqda.army.mil/ari
- Biological Technologies (BTO)  www.darpa.mil/Our_Work/BTO/
- Information Innovation Office (I2O)  www.darpa.mil/Our_Work/I2O/

Defense Threat Reduction Agency (DTRA)
- CBDP (Joint program managed by DTRA)  www.dtra.mil/

Defense Medical Research and Development Program
- 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
## FY2016 DOD Basic Research (6.1, $M)

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<th>URI</th>
<th>Other</th>
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<td>Army</td>
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<td>Navy</td>
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<td>Air Force</td>
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<td>14 High Energy Laser</td>
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<tr>
<td>DARPA</td>
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<tr>
<td></td>
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<td>Basic Operational Medical Science</td>
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<tr>
<td>CBDP</td>
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</tr>
<tr>
<td>DTRA</td>
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<tr>
<td>NDEP</td>
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<td>GDF</td>
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<td>MINERVA</td>
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<tr>
<td>CDMRP</td>
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<td>~500 - 1000?</td>
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DRS: Defense Research Sciences  
CBDP: Chemical / Biological Defense Program  
NDEP: National Defense Education Program  
URI: University Research Initiative  
DTRA: Defense Threat Reduction Agency  
CDMRP: Congressionally Directed Medical Res Program  
GDF: Guidance for the Development of the Force (in Def Health Program)

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/fy2015/budget_justification/index.html](http://comptroller.defense.gov/defbudget/fy2015/budget_justification/index.html)
## DOD FY15 Basic Research Open to University PIs, By Discipline  
(Murday Best Estimate)

<table>
<thead>
<tr>
<th>Discipline / Agency</th>
<th>Army</th>
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<th>Navy</th>
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<th>DTRA</th>
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<th>DMRDP</th>
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<td></td>
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</tr>
<tr>
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<td>57</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td>18</td>
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<td>17</td>
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<td></td>
<td></td>
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<td>24</td>
<td>48</td>
<td></td>
<td></td>
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<td>Transformative / Basic Research Challenge</td>
<td>21</td>
<td>30</td>
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<td>79</td>
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<td></td>
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<td>16</td>
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<td></td>
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<td></td>
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<td>Basic Operational Medical (in Defense Health)</td>
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| Total                                                    | 155  | 484| 559  | 333  | 38  | 46  | 7    | 94  |
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

<table>
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<tr>
<th>FY16</th>
<th>Army</th>
<th>~$239M</th>
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<tr>
<td></td>
<td>Air Force</td>
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<tr>
<td></td>
<td>Navy</td>
<td>~452</td>
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<tr>
<td></td>
<td>DARPA</td>
<td>~333</td>
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2008 Basic Research Plan (BRP) at - http://dcresadv.usc.edu/archives/index.html
OXR - umbrella acronym for AFOSR, ARO, ONR
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)

Use-inspired basic research predominates in DOD, but
Breakthrough ideas (like nano and chaos 25 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 (for which coincidently 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)
MURIs 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
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
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
(and positions for graduating PhDs)

Air Force
AFRL Air Force Research Laboratory

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

Army
ARL Army Research Laboratory
http://nrc58.nas.edu/RAPLab10/Opportunity/Opportunities.aspx?LabCode=76
US Army Medical Research and Materiel Command
Natick Soldier Research, Research, Development and Engineering Center
Night Vision Research, Development and Engineering Center
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
Biochemistry  Stephanie McElhinny  919 549 4240  stephanie.a.mcelhinny.civ@mail.mil
Microbiology  Robert Kokoska  919 549 4342  robert.j.kokoska2.civ@mail.mil
Neurophys & Cognitive Neurosci  Frederick Gregory  919 549 4318  frederick.d.gregory5.civ@us.army.mil
Social and Behavioral Science  Strand (was Johnson)
Biomathematics  Virginia Pasour  919 549 4254  virginia.b.pasour.civ@mail.mil

AFOSR
Human Performance and Biosys  Patrick Bradshaw  703 588 8492  patrick.bradshaw@afosr.af.mil
Trust and Influence  Benjamin Knott  937 938 3599  info@us.af.mil
Natural Materials and Systems  Hugh DeLong  703 696 7722  hugh.delong@afosr.af.mil
Biophysics  William Roach  703 588 8302  william.roach.r@us.af.mil

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

Human and Bioengineered Systems - ONR Code 341
Affordable Human Behavior Modeling  Harold Hawkins  703 696 4323  harold.hawkins@navy.mil
Computational Neuroscience  Thomas McKenna  703 696 4503  tom.mckenna@navy.mil
  Bio Robotics
  Human Robot Interaction
Human Perform: Decision Making  Jeffrey Morrison  703 696 4875  jeffrey.g.morrison@navy.mil
  Agile Organizational Structures
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)
Warfighter Protection and Applications Div – ONR Code 342

Capable Manpower    William Krebs   703 696 2575   william.krebs@navy.mil
Metabolic Engineering   Laura Kienker  703 696 4054   linda.kienker@navy.mil
    Biomaterials & Bionanotechnology
    Marine Mammal Health
BioEnergy Harvesting  Linda Chrisey  703 696 4504   linda.chrisey@navy.mil
    Autonomous Devices for Adv Personnel Treatment
    Synthetic Biology
    Marine Biofouling
Casualty Care & Management   Michael Given  703 696 4055   michael.given@navy.mil
Basic Biomedical    Christopher Steele  703 696 0618   christopher.steele4@navy.mil
Undersea Medicine  William D’Angelo  703 696 0367   william.dangelo@navy.mil
Stress Physiology and Biophysics  Sheri Parker  703 696 8448   sheri.parker@navy.mil
Noise Induced Hearing Loss  Kurt Yankaskas  703 696 6999   kurt.d.yankaskas@navy.mil
Force Health Protection  Timothy Bentley  703 696 4251   timothy.b.bentley@navy.mil
    Katharine Shobe

Expeditionary Warfare and Combating Terrorism - ONR Code 30

Human Behavioral Sciences  was Estabrooke
Human Perf: Training & Educ  Peter Squire  703 696 0407   peter.squire@navy.mil

Biology – DARPA BTO

Neural, therapeutics  Justin Sanchez  703 526 2189   justin.sanchez@darpa.mil
Genomics and Biotechnology  Daniel Wattendorf  703 526 4085   daniel.wattndorf@darpa.mil
Infectious Disease  Matthew Hepburn  703 526 2851   matthew.hepburn@darpa.mil
Biosystems and Medical  Barry Pallotta  571 218 4258   barry.pallotta@darpa.mil
CBWD Sense / Detect  Mildred Donlon  703 696 2289   mildred.donlon@darpa.mil
Synthetic Biology  Justin Gallivan  703 526 2879   justin.gallivan@darpa.mil
Neural engineering  Douglas Weber  703 526 2856   douglas.weber@darpa.mil

(chart updated 3/21/2014)
# Chemistry

## Chemical Sciences - ARO

<table>
<thead>
<tr>
<th>Area</th>
<th>Name</th>
<th>Phone</th>
<th>Email</th>
</tr>
</thead>
<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>
</tr>
</tbody>
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## Chemical Sciences - AFOSR

<table>
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<tr>
<th>Area</th>
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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>
</tr>
<tr>
<td>Theoretical Chemistry</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>Organic Materials Chemistry</td>
<td>Charles Lee</td>
<td>703 696 7779</td>
<td><a href="mailto:charles.lee@afosr.af.mil">charles.lee@afosr.af.mil</a></td>
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<tr>
<td>Space Power and Propulsion</td>
<td>Mitat Birkan</td>
<td>703 696 7234</td>
<td><a href="mailto:mitat.birkan@afosr.af.mil">mitat.birkan@afosr.af.mil</a></td>
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<tr>
<td>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>
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<tr>
<td>Marine Antifouling</td>
<td>Steve McElvany</td>
<td>703 696 1449</td>
<td>steve.mcelvany.navy.mil</td>
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<td>Solid/Liquid Waste Treatment</td>
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<td>Hull Grooming / Cleaning</td>
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<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>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>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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<td>Propulsion Materials</td>
<td>David Shifler</td>
<td>703 696 0285</td>
<td><a href="mailto:david.shifler@navy.mil">david.shifler@navy.mil</a></td>
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(chart updated 3/21/2014)
## Physics

### Physics - ARO

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<tr>
<td>Atomic and Molecular Physics</td>
<td>Paul Baker</td>
<td>919 549 4202</td>
<td><a href="mailto:paul.m.baker4.civ@mail.mil">paul.m.baker4.civ@mail.mil</a></td>
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<tr>
<td>Condensed Matter Physics</td>
<td>Marc Ulrich</td>
<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>
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<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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<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>
<td>William (Pat) Roach</td>
<td>703 696 8450</td>
<td><a href="mailto:william.roach.4@us.af.mil">william.roach.4@us.af.mil</a></td>
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<tr>
<td>Electromagnetics</td>
<td>Arje Nachman</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>
<td>John Luginsland</td>
<td>703 588 1775</td>
<td><a href="mailto:john.lugisland@afosr.af.mil">john.lugisland@afosr.af.mil</a></td>
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<td>Plasma &amp; Electro-Energetic Phys</td>
<td>Jason Marschall</td>
<td>703 696 7721</td>
<td><a href="mailto:Jason.marshall.3@us.af.mil">Jason.marshall.3@us.af.mil</a></td>
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<td>Quantum Electronic Solids</td>
<td>Harold Weinstock</td>
<td>703 696 8572</td>
<td><a href="mailto:harold.weinstock@afosr.af.mil">harold.weinstock@afosr.af.mil</a></td>
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<td>Remote Sensing &amp; Imaging Phys</td>
<td>Kent Miller</td>
<td>703 696 8573</td>
<td><a href="mailto:kent.miller@afosr.af.mil">kent.miller@afosr.af.mil</a></td>
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<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>
</tr>
<tr>
<td>Chaos/Non-linear Physics</td>
<td>Michael Shlesinger</td>
<td>703 696 5339</td>
<td><a href="mailto:mike.shlesinger@navy.mil">mike.shlesinger@navy.mil</a></td>
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<tr>
<td>Directed Energy</td>
<td>Quentin Saulter</td>
<td>703 696 2594</td>
<td><a href="mailto:quentin.saulter@navy.mil">quentin.saulter@navy.mil</a></td>
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<tr>
<td>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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<th>Field</th>
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<tr>
<td>Optoelectronics, Quantum Info Photonics</td>
<td>Matthew Goodman</td>
<td>571 218 4681</td>
<td><a href="mailto:matthew.goodman@darpa.mil">matthew.goodman@darpa.mil</a></td>
</tr>
<tr>
<td></td>
<td>Prem Kumar</td>
<td></td>
<td><a href="mailto:prem.kumar@darpa.mil">prem.kumar@darpa.mil</a></td>
</tr>
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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
Electromag Microwave and Power Clark (was Harvey)
Electronic Sensing William Clark 919 549 4314 william.w.clark9.civ@mail.mil
Terahertz Science and Technology Clark (was Woolard)
Power Electronics William Clark

Electronics - AFOSR
Electromagnetics Arje Nachman 703 696 8427 arje.nachman@afosr.af.mil
Optoelectronics and Photonics Gernot Pomrenke 703 696 8426 gernot.pomrenke@afosr.af.mil
Quantum Electronic Solids Harold Weinstock 703 696 8572 harold.weinstock@afosr.af.mil
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 99-103

(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>Anti-Tamper Electronics</td>
<td>Betsy DeLong</td>
<td>703 588 0069</td>
<td><a href="mailto:betsy.delong@navy.mil">betsy.delong@navy.mil</a></td>
</tr>
<tr>
<td>Atomic and Molecular Physics</td>
<td>Charles Clark</td>
<td>703 696 5267</td>
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</tr>
<tr>
<td>Communications and Networking</td>
<td>Santanu Das</td>
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</tr>
<tr>
<td>Electromagnetic Materials</td>
<td>Brian Bennett</td>
<td>703 696 4220</td>
<td><a href="mailto:brian.r.bennett@navy.mil">brian.r.bennett@navy.mil</a></td>
</tr>
<tr>
<td>Electronic Devices/Materials</td>
<td>Paul Maki</td>
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<tr>
<td>Electronic Warfare</td>
<td>Peter Craig</td>
<td>703 696 0114</td>
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<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>Mixed Signal Processing</td>
<td>Daniel Purdy??</td>
<td></td>
<td><a href="mailto:dan.purdy@navy.mil">dan.purdy@navy.mil</a></td>
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<tr>
<td>Nanoscale Computing Devices</td>
<td>Chagaan Baatar</td>
<td>703 696 0483</td>
<td><a href="mailto:chagaan.baatar@navy.mil">chagaan.baatar@navy.mil</a></td>
</tr>
<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>
</tr>
<tr>
<td>RF Surveillance/Signal Process</td>
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<td></td>
<td><a href="mailto:kevin.e.rudd@navy.mil">kevin.e.rudd@navy.mil</a></td>
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<tr>
<td>RF/Digital Signal Processing</td>
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<td><a href="mailto:stephen.pappert@navy.mil">stephen.pappert@navy.mil</a></td>
</tr>
<tr>
<td>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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(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@afosr.af.mil
- **Mechanics of Multifunctional Matr**  
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  les.lee@afosr.af.mil
- **Space Power and Propulsion**  
  Mitat Birkan  
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- **Multiscale Structural Mechanics**  
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  david.stargel@afosr.af.mil
- **Test and Evaluation**  
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## Ship Systems and Engineering Research – ONR Code 331
- **Surface Hydrodynamics**  
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  patrick.purtell@navy.mil
- **Underwater Signatures**  
  George Stimak  
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- **Structural Reliability**  
  Paul Hess  
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- **Energy Conversion & Power Mgmt**  
  H. Scott Coombe  
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  harold.coombe@navy.mil
- **Platform Design**  
  Kelly Cooper  
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  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**  
  Joseph Doychak  
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  joseph.doychak@navy.mil

*(chart updated 3/21/2014)*
Environmental Sciences
Space, Atmosphere, Ocean, Terrestrial

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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
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  Marginal Ice Zone
Sea State and Boundary Layer Physics of the Emerging Arctic Ocean
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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)
<table>
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<th>Materials Sciences - ARO</th>
<th>Materials Science</th>
</tr>
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<tr>
<td>Mechanical Behavior of Matr</td>
<td>David Stepp 919 549 4329 <a href="mailto:david.m.stepp.civ@mail.mil">david.m.stepp.civ@mail.mil</a></td>
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<tr>
<td>Earth Materials and Processes</td>
<td>David Stepp 919 549 4329 <a href="mailto:david.m.stepp.civ@mail.mil">david.m.stepp.civ@mail.mil</a></td>
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<tr>
<td>Syn &amp; Processing of Materials</td>
<td>Suveen Mathaudhu 919 549 4244 <a href="mailto:suveen.n.mathaudhu.civ@mail.mil">suveen.n.mathaudhu.civ@mail.mil</a></td>
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<tr>
<td>Physical Properties of Materials</td>
<td>Pani Varanasi 919 549 4325 <a href="mailto:chakrapani.v.varanasi.civ@mail.mil">chakrapani.v.varanasi.civ@mail.mil</a></td>
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<tr>
<td>Materials Design</td>
<td>John Prater 919 549 4259 <a href="mailto:john.t.prater.civ@mail.mil">john.t.prater.civ@mail.mil</a></td>
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<td>Douglas Smith 703 696 6219 <a href="mailto:douglas.smith@afosr.af.mil">douglas.smith@afosr.af.mil</a></td>
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<tr>
<td>Aerospace Mater for Extreme Envir</td>
<td>Ali Sayir 703 696 7236 <a href="mailto:ali.sayir@afosr.af.mil">ali.sayir@afosr.af.mil</a></td>
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<tr>
<td>Mechanics of Multifunctional Matrs</td>
<td>Les Lee 703 696 8483 <a href="mailto:les.lee@afosr.af.mil">les.lee@afosr.af.mil</a></td>
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<tr>
<td>Space Power and Propulsion</td>
<td>Mitat Birkan 703 696 7234 <a href="mailto:mitat.birkan@afosr.af.mil">mitat.birkan@afosr.af.mil</a></td>
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<tr>
<td>Multiscale Structural Mechanics</td>
<td>David Stargel 703 696 6961 <a href="mailto:david.stargel@afosr.af.mil">david.stargel@afosr.af.mil</a></td>
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<tr>
<td>Low Density Materials</td>
<td>Joycelyn Harrison 703 696 6225 <a href="mailto:joycelyn.harrison@afosr.af.mil">joycelyn.harrison@afosr.af.mil</a></td>
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<tr>
<td>Ultra-short Pulsed Laser/Materials</td>
<td>Enrique Parra 703 696 8571 <a href="mailto:enrique.parra@afosr.af.mil">enrique.parra@afosr.af.mil</a></td>
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<tr>
<td>Natural Materials and Systems</td>
<td>Hugh De Long 703 696 7722 <a href="mailto:hugh.delong@afosr.af.mil">hugh.delong@afosr.af.mil</a></td>
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<td>Alloys and Joining</td>
<td>William Mullins 703 696 0487 <a href="mailto:william.mullins@navy.mil">william.mullins@navy.mil</a></td>
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<tr>
<td>Acoustic Transduction</td>
<td>Wally Smith 703 696 0284 <a href="mailto:wallace.smith1@navy.mil">wallace.smith1@navy.mil</a></td>
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<tr>
<td>Bulk Nanostructured Materials</td>
<td>Lawrence Kabacoff 703 696 0283 <a href="mailto:lawrence.kabacoff@navy.mil">lawrence.kabacoff@navy.mil</a></td>
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<tr>
<td>Capacitors for Pulsed Power</td>
<td>Paul Armistead 703 696 4315 <a href="mailto:paul.armisted@navy.mil">paul.armisted@navy.mil</a></td>
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<tr>
<td>Cellular Materials</td>
<td>David Shifler 703 696 0285 <a href="mailto:david.shifler@navy.mil">david.shifler@navy.mil</a></td>
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<tr>
<td>Computer Aided Mater Design</td>
<td>Kenny Lipkowitz 703 696 0707 <a href="mailto:kenny.lipkowitz@navy.mil">kenny.lipkowitz@navy.mil</a></td>
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<td>Energetic Materials</td>
<td>Cliff Bedford 703 696 0437 <a href="mailto:clifford.bedford@navy.mil">clifford.bedford@navy.mil</a></td>
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<td>NDE Fracture and Fatigue</td>
<td>A.K. Vasudevan 703 696 8181 <a href="mailto:vasu.vasudevan@navy.mil">vasu.vasudevan@navy.mil</a></td>
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<tr>
<td>NDE Sensors</td>
<td>Ignacio Perez 703-696-0688 <a href="mailto:ignacio.perez1@navy.mil">ignacio.perez1@navy.mil</a></td>
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<tr>
<td>Polymer Matrix Composites</td>
<td>Ignacio Perez</td>
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<td>Propellor Materials</td>
<td>KiHan Kim 703 696 4305 <a href="mailto:kihan.kim@navy.mil">kihan.kim@navy.mil</a></td>
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<td>Propulsion Materials</td>
<td>David Shifler 703 696 0285 <a href="mailto:david.shifler@navy.mil">david.shifler@navy.mil</a></td>
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<td>Solid Mechanics</td>
<td>Yapa Rajapakse 703 696 4405 <a href="mailto:yapa.rajapakse@navy.mil">yapa.rajapakse@navy.mil</a></td>
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<td>Ultra-high Temperature Materials</td>
<td>Eric Wuchina 703 227 3949 <a href="mailto:eric.wuchina@navy.mil">eric.wuchina@navy.mil</a></td>
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| Materials – DARPA DSO                   | see next page                                                                                           |

(chart updated 3/21/2014)
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<th>Materials</th>
<th>Name</th>
<th>Phone</th>
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<tr>
<td>Energetic materials, armor</td>
<td>Judah Goldwasser</td>
<td>571 218 4293</td>
<td><a href="mailto:judah.goldwasser@darpa.mil">judah.goldwasser@darpa.mil</a></td>
</tr>
<tr>
<td>Optics/Quantum</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>Manufacturing/Materials</td>
<td>Michael Maher</td>
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<td><a href="mailto:michael.maher@darpa.mil">michael.maher@darpa.mil</a></td>
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<tr>
<td>Materials synthesis</td>
<td>Tyler McQuade</td>
<td>703 526 2864</td>
<td><a href="mailto:david.mcquade@darpa.mil">david.mcquade@darpa.mil</a></td>
</tr>
<tr>
<td>Materials and robotics</td>
<td>Gill Pratt</td>
<td>571 218 4614</td>
<td><a href="mailto:gill.pratt@darpa.mil">gill.pratt@darpa.mil</a></td>
</tr>
<tr>
<td>Instrumentation/Tools</td>
<td>John Main</td>
<td>703 526 2809</td>
<td><a href="mailto:john.main@darpa.mil">john.main@darpa.mil</a></td>
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(chart updated 3/21/2014)
Computer, Mathematics, and Information Sciences

Mathematics - ARO
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Modeling of Complex Systems John Lavery 919 549 4253 john.e.lavery4.civ@mail.mil
Probability and Statistics Mou-Hsiung Chang 919 549 4229 mouhsiung.chang.civ@mail.mil
Numerical Analysis Joe Myers 919 549 4245 joseph.d.myers8.civ@mail.mil

Math and Information Sciences - AFOSR
Computational Mathematics
Dynamics and Control
Optimization and Discrete Math
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Math of nonlinear Systems Arje Nachman 703 696 8427 arje.nachman@afosr.af.mil

Mathematics, Computers and Information Research - ONR
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Mathematical Optimization Don Wagner 703 696 4313 don.wagner@navy.mil
Mathematics Data Science Pedrag Neskovic 703 696 4304 predrag.neskovic@navy.mil

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

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Info & Software Assurance  Cliff Wang 919 549 4207  cliff.x.wang.civ@mail.mil
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Decision & Neurosciences Purush Iyer 919 549 4204  purush.iyer@us.army.mil
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Foundations of Info Systems Robert Bonneau 703 696 9545  robert.bonneau@afosr.af.mil
Dynamics and Control Fariba Fahroo 703 696 8429  fariba.fahroo@afosr.af.mil
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Sensing, Surveillance and Navig Tristan Nguyen 703 696 7796  tristan.nguyen@afosr.af.mil
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(chart updated 3/21/2014)
Computer, Mathematics, and Information Sciences - continued

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  Computational Methods for Decision Making
  Quantum Information Science  Carey Schwartz  703 696 7824  carey.schwartz@navy.mil
  Information Integration
Science of Autonomy  Marc Steinberg  703 696 0703  marc.steinberg@navy.mil
Automation in Ship Systems  Anthony Seman  703 696 5992  anthony.seman@navy.mil
Command and Control  Gary Toth  703 696 4961  gary.toth@navy.mil
Cyber Security/Complex Software  Sukarno Mertoguno  703 696 0107  sukarno.mertoguno@navy.mil

Information Innovation Office – DARPA I2O
see Charts 95-98

(chart updated 3/21/2014)
What: AFOSR manages the Air Force Defense Research Science portfolio described in subsequent charts

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

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

Where: Program information at:

AFOSR has held a Spring Review (usually in March) where program officers brief their program - good way to meet them and gauge types of research being funded.

Past program review information at:
https://community.apan.org/afosr/p/presentations.aspx

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<th>FY16</th>
<th>6.1 DRS</th>
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<tr>
<td></td>
<td>~30% goes to AFRL</td>
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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
Go to www.wpafb.af.mil/library/factsheets/factsheet.asp?id=8973

Scroll down and click on appropriate Division

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

**Optoelectronics and Photonics**

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

See also current programs at:
<table>
<thead>
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<th>Topic</th>
<th>Program Officer</th>
<th>Phone</th>
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<tr>
<td>Director</td>
<td>David Stargel</td>
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<td>Flow Interactions and Control</td>
<td>Douglas Smith</td>
<td>703 696 6219</td>
<td><a href="mailto:douglas.smith@afosr.af.mil">douglas.smith@afosr.af.mil</a></td>
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<tr>
<td>Multiscale Structural Mechanics and Prognosis</td>
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<td>703 696 6961</td>
<td><a href="mailto:david.stargel@afosr.af.mil">david.stargel@afosr.af.mil</a></td>
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<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>
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<tr>
<td>Test and Evaluation</td>
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<td><a href="mailto:michael.kendra@afosr.af.mil">michael.kendra@afosr.af.mil</a></td>
</tr>
<tr>
<td>Turbulence and Transition</td>
<td>Rengasamy Ponnappan</td>
<td>703 696 7320</td>
<td>rengasamy.ponnappan@</td>
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(chart updated 12/22/2014)
### Air Force Office of Scientific Research:
#### Quantum and Non-Equilibrium Processes Department (RTB)


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<tr>
<td>Director</td>
<td>William (Pat) Roach</td>
<td>703 855 8302</td>
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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>
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<tr>
<td>BioPhysics</td>
<td>William Roach</td>
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<tr>
<td>Electromagnetics</td>
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<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>
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<td>Plasma and Electro-Energetic Physics</td>
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<td>Remote Sensing and Imaging Physics</td>
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<td>Space Sciences</td>
<td>Kent Miller</td>
<td>703 696 8573</td>
<td><a href="mailto:kent.miller@afosr.af.mil">kent.miller@afosr.af.mil</a></td>
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<td>Ultra-Short Pulse Laser-Matter Interactions</td>
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<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 12/22/2014)
## Air Force Office of Scientific Research:
### Information, Decision and Complex Networks Department (RTC)


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<tr>
<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>
<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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<td>Computational and Machine Intelligence</td>
<td>was Lawton</td>
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<td>Dynamic Data Driven Application Systems</td>
<td>Frederica Darema</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>Foundations of Information Systems</td>
<td>Robert Bonneau</td>
<td>703 696 6565</td>
<td><a href="mailto:robert.herklotz@afosr.af.mil">robert.herklotz@afosr.af.mil</a></td>
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<tr>
<td>Information Operations and Security</td>
<td>Robert Herklotz</td>
<td>703 696 9545</td>
<td><a href="mailto:robert.herklotz@afosr.af.mil">robert.herklotz@afosr.af.mil</a></td>
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<td>Robust Decision Making in Human-System Interface</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>
</tr>
<tr>
<td>Sensing, Surveillance and Navigation</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>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 12/22/2014)
# Air Force Office of Scientific Research:
## Complex Materials and Devices Department (RTD)


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<th>Program Officer</th>
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<td>Director</td>
<td>Hugh DeLong</td>
<td></td>
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</tr>
<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>
<td>703 696 7349</td>
<td><a href="mailto:kenneth.goretta@us.af.mil">kenneth.goretta@us.af.mil</a></td>
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<tr>
<td>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>
</tr>
<tr>
<td>Mechanics of Multifunctional Materials &amp; Microsys</td>
<td>Les Lee</td>
<td>703 696 8483</td>
<td><a href="mailto:les.lee@afosr.af.mil">les.lee@afosr.af.mil</a></td>
</tr>
<tr>
<td>Natural Materials and Systems</td>
<td>Hugh DeLong</td>
<td>703 696 7722</td>
<td><a href="mailto:hugh.delong@afosr.af.mil">hugh.delong@afosr.af.mil</a></td>
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<tr>
<td>Optoelectronics and Photonics</td>
<td>Gernot Pomrenke</td>
<td>703 696 8426</td>
<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>
<td>703 696 7779</td>
<td><a href="mailto:charles.lee@afosr.af.mil">charles.lee@afosr.af.mil</a></td>
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<tr>
<td>Quantum Electronic Solids</td>
<td>Harold Weinstock</td>
<td>703 696 8572</td>
<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>
<td>John Schmisseur</td>
<td>703 588 8436</td>
<td><a href="mailto:jennifer.jordan.6@us.af.mil">jennifer.jordan.6@us.af.mil</a></td>
</tr>
<tr>
<td>Dynamic Materials and Interactions</td>
<td>Jennifer Jordan</td>
<td>703 696 8574</td>
<td><a href="mailto:chiping.li@afosr.af.mil">chiping.li@afosr.af.mil</a></td>
</tr>
<tr>
<td>Energy Conversion and Combustion Sciences</td>
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<td>703 696 8574</td>
<td><a href="mailto:chiping.li@afosr.af.mil">chiping.li@afosr.af.mil</a></td>
</tr>
<tr>
<td>Human Performance and Biosystems</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>Molecular Dynamics and Theoretical Chemistry</td>
<td>Michael Berman</td>
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<td><a href="mailto:michael.berman@afosr.af.mil">michael.berman@afosr.af.mil</a></td>
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<tr>
<td>Space Power and Propulsion</td>
<td>Mitat Birkan</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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(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.

2015 None

2014 Topics
Design and Control of Energy Transfer Pathway           Berman
Dynamic Material Interfaces in Extreme Environments     Jordan
Chem Reactions and Collisonal 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
Last BAA was for FY2013
AFOSR 2012-0006
Satellite Launch Jul 22 2014

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

What:  Budget in the Defense Research Sciences  
ARO manages only the 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:  

6.1  FY16

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<td>H57 (ARO)</td>
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ARO Organization Chart

Engineering Sciences Directorate
Dr. Thomas Doligalski, Director

Mechanical Sciences Division
Dr. Ralph Anthenien

Materials Sciences Division
Dr. David Stepp

Electronics Division
Dr. William Clark

Environmental Sciences
Dr. Tom Doligalski, Acting

Information Sciences Directorate
Dr. Randy Zachery, Director

Computing Sciences Division
Dr. Cliff Wang

Mathematical Sciences Division
Dr. Joseph Myers

Network Sciences Division
Dr. Purush Iyer

Physical Sciences Directorate
Dr. Douglas Kiserow, Director

Physics Division
Dr. Marc Ulrich

Chemical Sciences Division
Dr. Robert Mantz, Acting

Life Sciences Division
Dr. Michiline Strand
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
ARO Proposal Process

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

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

3. Receive Proposals

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

5. Army Lab/RDEC Review
   - Scores/comments of Army and external reviewers are assessed

6. Analysis of Evaluations

7. PM Recommendation Management Assessment
   - Approximately one in three proposals is funded

8. Active Involvement in Execution
<table>
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<th>Topic</th>
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<th>Email</th>
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<tr>
<td><strong>Electronics Division</strong></td>
<td><strong>William Clark</strong></td>
<td>919 549 4314</td>
<td><a href="mailto:william.w.clark9.civ@mail.mil">william.w.clark9.civ@mail.mil</a></td>
</tr>
<tr>
<td>Solid-State Devices</td>
<td>William Clark (was Woolard)</td>
<td></td>
<td></td>
</tr>
<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>
<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>Terahertz Science and Technology</td>
<td>William Clark (was Palmer)</td>
<td></td>
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<tr>
<td>Electromagnetics, Microwaves and Power</td>
<td>William Clark (was Harvey)</td>
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<td><strong>Environmental Sciences Division</strong></td>
<td><strong>Tom Doligalski</strong></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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<tr>
<td><strong>Materials Sciences Division</strong></td>
<td><strong>David Stepp</strong></td>
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<td><a href="mailto:dawid.m.stepp.civ@mail.mil">dawid.m.stepp.civ@mail.mil</a></td>
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<tr>
<td>Mechanical Behavior of Materials</td>
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<tr>
<td>Earth Materials and Processes</td>
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<tr>
<td>Synthesis and Processing of Materials</td>
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<td>919 549 4244</td>
<td><a href="mailto:suveen.n.mathaudhu.civ@mail.mil">suveen.n.mathaudhu.civ@mail.mil</a></td>
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<tr>
<td>Physical Properties of Materials</td>
<td>Pani Varanasi</td>
<td>919 549 4325</td>
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<tr>
<td>Materials Design</td>
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<tr>
<td><strong>Mechanical Sciences Division</strong></td>
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<td><a href="mailto:ralph.a.anthenien2.civ@mail.mil">ralph.a.anthenien2.civ@mail.mil</a></td>
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<tr>
<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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<tr>
<td>Solid Mechanics</td>
<td>Anthenien (was Russell)</td>
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<tr>
<td>Complex Dynamics and Systems</td>
<td>Samuel Stanton</td>
<td>919 549 4225</td>
<td><a href="mailto:samuel.c.stanton2.civ@mail.mil">samuel.c.stanton2.civ@mail.mil</a></td>
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<tr>
<td>Propulsion and Energetics</td>
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<td>919 549 4317</td>
<td><a href="mailto:ralph.anthenien2.civ@mail.mil">ralph.anthenien2.civ@mail.mil</a></td>
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(chart updated 12/22/2014)
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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>
</tr>
<tr>
<td>Computational Architectures and Visualization</td>
<td>Joseph Coyle</td>
<td></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>Information and Software Assurance</td>
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<tr>
<td>Information Processing and Fusion</td>
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<td>Mathematics Division</td>
<td>Joseph Myers</td>
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<td>Biomathematics</td>
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<td>919 549 4253</td>
<td><a href="mailto:john.e.lavery4.civ@mail.mil">john.e.lavery4.civ@mail.mil</a></td>
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<tr>
<td>Modeling of Complex Systems</td>
<td>John Lavery</td>
<td>919 549 4229</td>
<td><a href="mailto:mouhsiung.chang.civ@mail.mil">mouhsiung.chang.civ@mail.mil</a></td>
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<td>Probability and Statistics</td>
<td>Harry Chang</td>
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<td>Joe Myers</td>
<td>919 549 4245</td>
<td><a href="mailto:joseph.d.myers8.civ@mail.mil">joseph.d.myers8.civ@mail.mil</a></td>
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<tr>
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<td>Intelligent Networks</td>
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<tr>
<td>Multi-agent Network Control</td>
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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 12/22/2014)
## Army Research Office: Physical Sciences Directorate

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

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<tr>
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<td><strong>Chemical Sciences Division</strong></td>
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</tr>
<tr>
<td>Polymer Chemistry</td>
<td>Dawanne Poree (acting)</td>
<td>919 549 4238</td>
<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>
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<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 and 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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<tr>
<td><strong>Physics Division</strong></td>
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<tr>
<td>Atomic and Molecular Physics</td>
<td>Paul Baker</td>
<td>919 549 4202</td>
<td><a href="mailto:paul.m.baker4.civ@mail.mil">paul.m.baker4.civ@mail.mil</a></td>
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<tr>
<td>Condensed Matter Physics</td>
<td>Marc Ulrich</td>
<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 and Fields</td>
<td>Richard Hammond</td>
<td>919 549 4313</td>
<td>richard.t.hammond10.civ@</td>
</tr>
<tr>
<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>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>
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<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>robert.j.kokosda2.civ#mial.mil</td>
</tr>
<tr>
<td>Neuropsychology &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>
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<tr>
<td>Social and Behavioral Science</td>
<td>Strand (was Johnson)</td>
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</table>

(chart updated 12/22/2014)
ARO
SHORT-TERM INNOVATIVE RESEARCH (STIR) PROGRAM.

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

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

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

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

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

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

Basic and/or applied research

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

Where: BAA W912HZ-14-BAA-01

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<th>Army DRS</th>
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<td>52C Mapping and Remote Sensing</td>
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<td>T22 Soil and Rock Mechanics</td>
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<td>T23 Basic Research Military Construction</td>
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<tr>
<td>T24 Signature Physics and Terrain State</td>
<td>1.7</td>
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Army Medical Research and Materiel Command

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
- FY16 DRS (S13) ~$11M

When: send preproposal, followed by proposal if invited to do so


USAMRMC W81XWH-BAA-15-1 Oct 2014
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  
was Col Carl Castro - who is now at USC

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
S&T Strategic Plan

S&T Plan Focus Areas:
- Autonomy & Unmanned Systems
- Assure Access to Maritime Battlespace
- Information Dominance
- Platform Design & Survivability
- Power & Energy
- Strike & Integrated Defense
- Warfighter Performance
- Total Ownership Cost
- Expeditionary & Irregular Warfare

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. Wen Masters
   Mathematics, Computers, and Info Research Div, 311
   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

Naval Research Laboratory
   Dr. John Montgomery

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 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
Office of Naval Research
www.onr.navy.mil

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

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

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


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<tr>
<td>6.1 DRS</td>
<td>452 (~25% goes to NRL)</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>
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<tr>
<th>Topic</th>
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<th>Phone</th>
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<tr>
<td>Code 30</td>
<td>John Pazik</td>
<td>703 696 5031</td>
<td><a href="mailto:john.pazik@navy.mil">john.pazik@navy.mil</a></td>
</tr>
<tr>
<td>Command Control Computers &amp; Coms (C4)</td>
<td>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 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>
</tr>
<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>Billy Short</td>
<td>703 696 0155</td>
<td><a href="mailto:billy.short@navy.mil">billy.short@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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<tr>
<td>Nonlinear Dynamics</td>
<td>Mick Shlesinger</td>
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(Chart updated 12/22/2013)
Office of Naval Research: C4ISR
(Mathematics, Computers, and Information)

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

(chart updated 10/13/2014)
# Office of Naval Research: C4ISR

*(Physics and Electronics)*

http://www.onr.navy.mil/sci_tech/31/312/

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<tr>
<td><strong>Electronics, Sensors &amp; Networks Research (312)</strong></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>Dan Purdy</td>
<td>703 588 0069</td>
<td><a href="mailto:dan.purdy@navy.mil">dan.purdy@navy.mil</a></td>
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<tr>
<td>Anti-tamper Electronics</td>
<td>Betsy Delong</td>
<td>703 696 5267</td>
<td><a href="mailto:betsy.delong@navy.mil">betsy.delong@navy.mil</a></td>
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<tr>
<td>Atomic, Molecular &amp; Quantum Physics</td>
<td>Charles Clark</td>
<td>703 696 4220</td>
<td><a href="mailto:charles.clark3@navy.mil">charles.clark3@navy.mil</a></td>
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<tr>
<td>Electromagnetic Materials</td>
<td>Brian Bennett</td>
<td>703 588 1916</td>
<td><a href="mailto:brain.r.bennett@navy.mil">brain.r.bennett@navy.mil</a></td>
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<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>
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<tr>
<td>EO/IR Sensors and Sensor Processing</td>
<td>Ravindra Athale</td>
<td>703 696 0069</td>
<td><a href="mailto:ravindra.athale@navy.mil">ravindra.athale@navy.mil</a></td>
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<tr>
<td>Integrated Topside</td>
<td>Betsy Delong</td>
<td>703 696 0483</td>
<td><a href="mailto:betsy.delong@navy.mil">betsy.delong@navy.mil</a></td>
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<tr>
<td>Mixed Signal Processing</td>
<td>Dan Purdy</td>
<td>703 696 4212</td>
<td><a href="mailto:dan.purdy@navy.mil">dan.purdy@navy.mil</a></td>
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<tr>
<td>Nanoscale Computing Devices and Systems</td>
<td>Chagaan Baatar</td>
<td>703 696 0483</td>
<td><a href="mailto:chagaan.baatar@navy.mil">chagaan.baatar@navy.mil</a></td>
</tr>
<tr>
<td>Navigation and Timekeeping</td>
<td>John Kim</td>
<td>703 696 4219</td>
<td><a href="mailto:john.c.kim1@navy.mil">john.c.kim1@navy.mil</a></td>
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<tr>
<td>RF Surveillance and Signal Processing</td>
<td>Kevin Rudd</td>
<td>703 696 4212</td>
<td><a href="mailto:kevin.w.rudd@navy.mil">kevin.w.rudd@navy.mil</a></td>
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<tr>
<td>Superconducting Technologies</td>
<td>Deborah Van Vechten</td>
<td>703 696 3060</td>
<td><a href="mailto:deborah.vanvechten@navy.mil">deborah.vanvechten@navy.mil</a></td>
</tr>
<tr>
<td>Electronic Devices, Semiconductors and Amplifiers</td>
<td>Paul Maki</td>
<td>703 588 1916</td>
<td><a href="mailto:paul.maki@navy.mil">paul.maki@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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<tr>
<td><strong>Ocean Sensing and Systems Applications (321)</strong></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>
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<tr>
<td><strong>Ocean, Atmosphere, and Space Research (322)</strong></td>
<td>Tom Drake</td>
<td>703 696 1206</td>
<td><a href="mailto:tom.drake@navy.mil">tom.drake@navy.mil</a></td>
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<tr>
<td>Ocean Acoustics</td>
<td>Robert Headrick</td>
<td>703 696 4315</td>
<td><a href="mailto:bob.headrick@navy.mil">bob.headrick@navy.mil</a></td>
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<tr>
<td>Arctic and Global Prediction Program</td>
<td>Martin Jeffries</td>
<td>703 696 7825</td>
<td><a href="mailto:martin.jeffries@navy.mil">martin.jeffries@navy.mil</a></td>
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<tr>
<td>Marginal Ice Zone</td>
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<td>Sea State and Boundary Layer Physics of the Emerging Arctic Ocean</td>
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<tr>
<td>Littoral Geosciences and Optics</td>
<td>Joan Cleveland</td>
<td>703 696 0439</td>
<td><a href="mailto:joan.cleveland@navy.mil">joan.cleveland@navy.mil</a></td>
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<tr>
<td>Marine Mammals and Biology</td>
<td>Michael Weise</td>
<td>703 696 4533</td>
<td><a href="mailto:michael.j.weise@navy.mil">michael.j.weise@navy.mil</a></td>
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<tr>
<td>Marine Meteorology &amp; Atmos Effects</td>
<td>Ron Ferek</td>
<td>703 696 0518</td>
<td><a href="mailto:ron.ferek@navy.mil">ron.ferek@navy.mil</a></td>
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<tr>
<td>Physical Oceanography</td>
<td>Terri Paluszkiewicz</td>
<td>703 696 6680</td>
<td><a href="mailto:terri.paluszkiewicz@navy.mil">terri.paluszkiewicz@navy.mil</a></td>
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<tr>
<td>Space/Environment</td>
<td>Scott Budzien (NRL)</td>
<td>202 767 9372</td>
<td><a href="mailto:scott.budzien@nrl.navy.mil">scott.budzien@nrl.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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<th>Topic</th>
<th>Program Officer</th>
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<tr>
<td>Ship Systems and Engineering Research (331)</td>
<td>Dave Drumheller</td>
<td></td>
<td><a href="mailto:david.drumheller@navy.mil">david.drumheller@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.coome@navy.mil">harold.coome@navy.mil</a></td>
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<tr>
<td>Automation in Ship Systems</td>
<td>Anthony Seman</td>
<td>703 696 5992</td>
<td><a href="mailto:anthony.seman@navy.mil">anthony.seman@navy.mil</a></td>
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<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>
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<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>
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<tr>
<td>Underwater Signatures</td>
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<tr>
<td>Compact Power Conversion Technol</td>
<td>Joseph Borraccini</td>
<td>703 696 7823</td>
<td><a href="mailto:joseph.borraccini@navy.mil">joseph.borraccini@navy.mil</a></td>
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<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>Tom Fu</td>
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<tr>
<td>Turbulence</td>
<td>Ronald Joslin</td>
<td>703 696 2363</td>
<td><a href="mailto:JoslinR@onr.navy.mil">JoslinR@onr.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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<tr>
<td><strong>Naval Materials Research (332)</strong></td>
<td>Julie Christodoulou</td>
<td>703 696 0953</td>
<td><a href="mailto:julie.christodoulou@navy.mil">julie.christodoulou@navy.mil</a></td>
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<tr>
<td>Alloys and Joining</td>
<td>William Mullins</td>
<td>703 696 0487</td>
<td><a href="mailto:william.m.mullins@navy.mil">william.m.mullins@navy.mil</a></td>
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<tr>
<td>Acoustic Transduction</td>
<td>Wallace Smith</td>
<td>703 696 0284</td>
<td><a href="mailto:wallace.smith1@navy.mil">wallace.smith1@navy.mil</a></td>
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<tr>
<td>Antifouling/Fouling Release</td>
<td>Steve McElvany</td>
<td>703 696 1449</td>
<td><a href="mailto:steve.mcelvany@navy.mil">steve.mcelvany@navy.mil</a></td>
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<td>Bulk Nanostructured Materials</td>
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<tr>
<td>Capacitors for Pulsed Power</td>
<td>Paul Armistead</td>
<td>703 696 4315</td>
<td><a href="mailto:paul.armistead@navy.mil">paul.armistead@navy.mil</a></td>
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<td>Cellular Materials</td>
<td>David Shifler</td>
<td>703 696 0285</td>
<td><a href="mailto:david.shifler@navy.mil">david.shifler@navy.mil</a></td>
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<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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<td>Dielectric Films for Capacitors</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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<tr>
<td>Electrochemical Materials</td>
<td>Michele Anderson</td>
<td>703 696 1938</td>
<td><a href="mailto:michele.anderson@navy.mil">michele.anderson@navy.mil</a></td>
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<tr>
<td>Future Naval Fuels</td>
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<td>703 696 1449</td>
<td><a href="mailto:steve.mcelvany@navy.mil">steve.mcelvany@navy.mil</a></td>
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<td>NDE - Sensors</td>
<td>Ignacio Perez</td>
<td>703-696-0688</td>
<td><a href="mailto:ignacio.perez@navy.mil">ignacio.perez@navy.mil</a></td>
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<td>Organic Photovoltaics</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>Polymer Matrix Composites</td>
<td>Ignacio Perez</td>
<td>703-696-0688</td>
<td><a href="mailto:ignacio.perez@navy.mil">ignacio.perez@navy.mil</a></td>
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<td>Propulsion Materials</td>
<td>David Shifler</td>
<td>703 696 0285</td>
<td><a href="mailto:david.shifler@navy.mil">david.shifler@navy.mil</a></td>
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<td>Solid Liquid Solid Waste Treatment</td>
<td>Steve McElvany</td>
<td>703 696 1449</td>
<td><a href="mailto:steve.mcelvany@navy.mil">steve.mcelvany@navy.mil</a></td>
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<td>Solid Mechanics</td>
<td>Yapa Rajapakse</td>
<td>703 696 4405</td>
<td><a href="mailto:yapa.rajapakse@navy.mil">yapa.rajapakse@navy.mil</a></td>
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<td>Ultra high Temperature Materials</td>
<td>Eric Wuchina</td>
<td>301 227 3949</td>
<td><a href="mailto:eric.wuchina@navy.mil">eric.wuchina@navy.mil</a></td>
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<td>Water Purification / Desalination</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>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)

Sea Platforms and Undersea Weapons (333)       Capt John Morris    703 696 4711    John.I.morris@navy.mil

Energetic Materials   Daniel Tam  703 696 4204   daniel.tam1@navy.mil
Advanced Electrical Power Systems   Terry Ericsen  703 696 7741   terry.ericsen@navy.mil
Compact Agile Materials Mover   Kate Mangum  703 588 2216   kate.mangum@navy.mil
Sense and Response Logistics   Anthony Seman  703 696 5992   anthony.seman@navy.mil
Seabasing   Geoffrey Main  703 696 1180   maing@onr.navy.mil
Biologically Inspired Underwater Propulsion   Robert Brizzolara  703 696 2597   robert.brizzolara@navy.mil
Small Combatant Craft   Robert Brizzolara  703 696 2597   robert.brizzolara@navy.mil
Undersea Weapons   Dave Drumheller  703 696 4716   david.drumheller@navy.mil

University Laboratory Initiative
Navy laboratories engaged in undersea weapons research and development and universities are encouraged to seek out graduate students that are interested in pursuing thesis or post-doctoral research in one or more of the Undersea Weaponry Core Technology Areas. Each ULI project includes a student, an academic advisor and a laboratory mentor. A single white paper outlining a potential project may be submitted to ONR. To formally propose a project for funding under ULI, separate proposals must be received from the soliciting Navy laboratory and the university.

(chart updated 8/8/2013)
### Office of Naval Research: Warfighter Performance
(Biology, Cognitive, and Neural Science)


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<th>Topic</th>
<th>Program Officer</th>
<th>Phone</th>
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<tbody>
<tr>
<td>Human &amp; Bioeng Systems (341)</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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<tr>
<td>Affordable Human Behavioral Modeling</td>
<td>Harold Hawkins</td>
<td>703 696 4323</td>
<td><a href="mailto:harold.hawkins@navy.mil">harold.hawkins@navy.mil</a></td>
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<tr>
<td>Agile Organizational Structures</td>
<td>Jeffrey Morrison</td>
<td>703 696 4875</td>
<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>
<td>703 696 4986</td>
<td><a href="mailto:ray.perez@navy.mil">ray.perez@navy.mil</a></td>
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<td>Biometrics in the Maritime Domain</td>
<td>Tom McKenna and Behzad Kamgar-Parsi</td>
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<td>Biorobotics</td>
<td>Thomas McKenna</td>
<td>703 696 4503</td>
<td><a href="mailto:tom.mckenna@navy.mil">tom.mckenna@navy.mil</a></td>
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<td>Computational Neuroscience</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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<td>Human Activity Recognition</td>
<td>Tom McKenna</td>
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<td>Human Robot Interaction</td>
<td>Thomas McKenna</td>
<td>703 696 4503</td>
<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>
<td>Jeffrey Morrison</td>
<td>703 696 4875</td>
<td><a href="mailto:jeffrey.g.morrison@navy.mil">jeffrey.g.morrison@navy.mil</a></td>
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<td>Skill Acquisition</td>
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<td>Social Network Analysis for Combating Terrorists</td>
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(chart updated 8/8/2013)
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<tr>
<td>Biological &amp; Biomed Div (342)</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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<tr>
<td>Basic Biomedical</td>
<td>Christopher Steele</td>
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<td><a href="mailto:christopher.steele4@navy.mil">christopher.steele4@navy.mil</a></td>
</tr>
<tr>
<td>Biomaterials and Bionanotechnology</td>
<td>Laura Kienker</td>
<td>703 696 4045</td>
<td><a href="mailto:linda.kienker@navy.mil">linda.kienker@navy.mil</a></td>
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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>
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<td>Gut Microbiology</td>
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<tr>
<td>Force Health Protection</td>
<td>Timothy Bentley</td>
<td>703 696 4251</td>
<td><a href="mailto:timothy.b.bentley@navy.mil">timothy.b.bentley@navy.mil</a></td>
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<tr>
<td>Force Health Protection</td>
<td>Michael Given</td>
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<td><a href="mailto:michael.given@navy.mil">michael.given@navy.mil</a></td>
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<td>Force Health Protection</td>
<td>Cdr Katharine Shobe</td>
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<td><a href="mailto:katharine.shobe@navy.mil">katharine.shobe@navy.mil</a></td>
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<tr>
<td>Marine Biofouling</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>Marine Mammal Health</td>
<td>Laura Kienker</td>
<td>703 696 4045</td>
<td><a href="mailto:linda.kienker@navy.mil">linda.kienker@navy.mil</a></td>
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<td>Metabolic Engineering</td>
<td>Laura Kienker</td>
<td>703 696 4045</td>
<td><a href="mailto:linda.kienker@navy.mil">linda.kienker@navy.mil</a></td>
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<td>Microbial Fuel Cells</td>
<td>Linda Chrisey</td>
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<td><a href="mailto:linda.chrisey@navy.mil">linda.chrisey@navy.mil</a></td>
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<tr>
<td>Noise Induced Hearing Loss</td>
<td>Kurt Yankaskas</td>
<td>703 696 6999</td>
<td><a href="mailto:kurt.d.yankaskas@navy.mil">kurt.d.yankaskas@navy.mil</a></td>
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<tr>
<td>Stress Physiology and Biophysics</td>
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<tr>
<td>Undersea Medicine</td>
<td>Bill D’Angelo</td>
<td>703 696 0367</td>
<td><a href="mailto:william.dangelo@navy.mil">william.dangelo@navy.mil</a></td>
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<td>Synthetic Biology</td>
<td>Linda Chrisey</td>
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<td><a href="mailto:linda.chrisey@navy.mil">linda.chrisey@navy.mil</a></td>
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(chart updated 8/8/2013)
# Office of Naval Research: Naval Air Warfare and Weapons


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<th>Email</th>
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<td>Aerospace Science (351)</td>
<td>Thomas Beutner</td>
<td>703 696 0454</td>
<td><a href="mailto:thomas.beutner@navy.mil">thomas.beutner@navy.mil</a></td>
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<tr>
<td>Aviation Technology</td>
<td>John Kinzer</td>
<td>703 696 7917</td>
<td><a href="mailto:john.kinzer@navy.mil">john.kinzer@navy.mil</a></td>
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<tr>
<td>Airframe Structures and Materials</td>
<td>Bill Nickerson</td>
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<td><a href="mailto:wiliam.nikcerson@navy.mil">wiliam.nikcerson@navy.mil</a></td>
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<tr>
<td>AACUS</td>
<td>Max Snell</td>
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<td>Combat Safe Insensitive Munitions</td>
<td>Cliff Bedford</td>
<td>703 696 0437</td>
<td><a href="mailto:clifford.bedford@navy.mil">clifford.bedford@navy.mil</a></td>
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<tr>
<td>Counter directed energy</td>
<td>Peter Morrison</td>
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<td><a href="mailto:peter.a.morrison@navy.mil">peter.a.morrison@navy.mil</a></td>
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<td>Energetics</td>
<td>Cliff Bedford</td>
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<td>High energy, dense oxidizers</td>
<td>Cliff Bedford</td>
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<td>Jet Noise Reduction</td>
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<td>703 696 7646</td>
<td><a href="mailto:joseph.doychak@navy.mil">joseph.doychak@navy.mil</a></td>
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<td>Maritime WMD detection</td>
<td>Peter Morrison</td>
<td>703 696 0553</td>
<td><a href="mailto:peter.a.morrison@navy.mil">peter.a.morrison@navy.mil</a></td>
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<td>Science of Autonomy</td>
<td>Marc Steinberg</td>
<td>703 588 0703</td>
<td><a href="mailto:marc.steinberg@navy.mil">marc.steinberg@navy.mil</a></td>
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<td>Sea-based Aviation</td>
<td>John Kinzer</td>
<td>703 696 7917</td>
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<td>Sea-based Launch and Recovery</td>
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<td><a href="mailto:joseph.doychak@navy.mil">joseph.doychak@navy.mil</a></td>
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<td>Variable Cycle Advanced Technology</td>
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<td>Unmanned air systems</td>
<td>John Kinzer</td>
<td>703 696 7917</td>
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(chart updated 8/8/2013)
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<td>Kenneth Heeke</td>
<td>703 588 0431</td>
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<td>Rotor Blade Erosion Protection</td>
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<td>Malinda Pagett</td>
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<td>Applied Electromagnetics</td>
<td>Sarwat Chappell</td>
<td>703 696 4224</td>
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<td>Quentin Saulter</td>
<td>703 696 2594</td>
<td><a href="mailto:quentin.saulter@navy.mil">quentin.saulter@navy.mil</a></td>
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<td>Electromagnetic Rail Gun</td>
<td>Roger Ellis</td>
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<td>Free Electron Laser</td>
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<td>703 696 2594</td>
<td><a href="mailto:quentin.saulter@navy.mil">quentin.saulter@navy.mil</a></td>
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<td>Charles Garnett</td>
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<td>Laser Based Helicopter Landing Aids</td>
<td>David Ludwig</td>
<td>703 696 6942</td>
<td><a href="mailto:david.ludwig@navy.mil">david.ludwig@navy.mil</a></td>
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<td>Peter Morrison</td>
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<td>Joseph Doychak</td>
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<td><a href="mailto:joseph.doychak@navy.mil">joseph.doychak@navy.mil</a></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.

Naval Platform Power and Energy 15-SN-0005
H. Scott Combe and Lynn Petersen

Select topics in Nanoscience and Nanotechnology 15-SN-0002
- Self-Assembly Error Detection and Analysis in Complex DNS Nanostructures
  Laura Kienker
- Electric Field Assisted Sintering of Ceramics
  William Mullins
- Low Cost, Large Area Processing of Silicon Based Thin Film Solar Cells
  Paul Armistead

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 1/6/2015)
Naval Postgraduate School Research Initiatives
NPS BAA 14-004 (July release)

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

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

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

Response Date: none stated, but better before May 2015
Multi-INT Research Initiatives at the Naval Postgrad School
NPS BAA Announcement # NPS-BAA-14-005 (Sept release)

**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 31 Oct 2014 for a FY2015 award. The solicitation remains open until 30 Sep 2015.
Advanced Systems and Concepts for Countering WMD

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

1. Proliferation of weapons of mass destruction
2. WMD/WME delivery systems
4. WMD/WME issues in less-studied regions
5. Multi-domain threats to strategic stability.

How Much: approximately $3.5 to $4 million per year will be available to make PASCC-approved awards. Research projects are typically funded at levels between $50,000 and $150,000.

When: open until 31 MARCH 2015 or until replaced by a successor BAA.

Where: Naval Postgraduate School BAA Announcement #14-003
### DARPA Technical Offices

<table>
<thead>
<tr>
<th>BTO</th>
<th>DSO</th>
<th>I2O</th>
<th>MTO</th>
<th>STO</th>
<th>TTO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology, Technology &amp; Complexity</td>
<td>Discover, Model, Design &amp; Build</td>
<td>Information, Innovation &amp; Cyber</td>
<td>Electronics, Photonics &amp; MEMS</td>
<td>Networks, Cost Leverage &amp; Adaptability</td>
<td>Weapons, Platforms &amp; Space</td>
</tr>
</tbody>
</table>

**BTO**
- Restore and Maintain Warfighter Abilities
- Harness Biological Systems
- Apply Biological Complexity at Scale

**DSO**
- Physical Sciences
- Mathematics
- Transformative Materials
- Supervised Autonomy
- Novel Sensing and Detection
- Complexity

**I2O**
- Cyber
- Data Analysis at Massive Scales
- ISR Exploitation

**MTO**
- Biological Platforms
- Computing
- Electronic Warfare
- Manufacturing
- Novel Concepts
- Photonics
- Positioning, Navigation and Timing
- Thermal Management

**STO**
- Battle Mgmt, Command & Control
- Comms & Networks
- ISR
- Electronic Warfare
- Positioning, Navigation and Timing

**TTO**
- Air Systems
- Ground Systems
- Marine Systems
- Space Systems

Distribution Statement "A" (Approved for Public Release, Distribution Unlimited)
## DARPA Basic Research
### FY2015 RDT&E Budget Request

<table>
<thead>
<tr>
<th>Program Element Title</th>
<th>FY2016</th>
<th>FY2015</th>
<th>FY2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLS-01 Bio/Info/Micro Sciences</td>
<td>16</td>
<td>21</td>
<td>25</td>
</tr>
<tr>
<td>CCS-02 Math and Computer Sciences</td>
<td>134</td>
<td>114</td>
<td>91</td>
</tr>
<tr>
<td>CYS-01 Cyber Sciences</td>
<td>28</td>
<td>29</td>
<td>26</td>
</tr>
<tr>
<td>ES-01 Electronic Sciences</td>
<td>36</td>
<td>30</td>
<td>44</td>
</tr>
<tr>
<td>MS-01 Materials Sciences</td>
<td>76</td>
<td>86</td>
<td>86</td>
</tr>
<tr>
<td>TRS-01 Transformative Sciences</td>
<td>33</td>
<td>32</td>
<td>43</td>
</tr>
<tr>
<td>MED-01 Basic Operational Medical Science</td>
<td>45</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>
What: Research and technology where risk and payoff are both very high, and Success may provide dramatic advances for military roles and missions.

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

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

How much: $100K – $10M/yr in DSO as example

DARPA program managers often fund studies (“seedlings”) as initial research to determine if a more extensive program is appropriate.

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

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

FY16

6.1 ~$ 333M
6.2 ~ 1209M
6.3 ~ 1302M
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
PMs Receive White Papers from all sources (academia, industry, national labs).

Some are passed to other PMs.

Some are read and discarded.

Some are interesting to PMs:
- Related to a possible future program
- Trigger interest in a future program
- Solve a key challenge emerging in an existing program

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

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

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

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  <$500K
Include some graphics, and possibly a Penta-Chart

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

Who to Send To?

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

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

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

Operating regimes of different technologies

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

Courtesy of M. Brongersma
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 load bearing capabilities within days. Fracture putty could rapidly restore a patient to ambulatory function...

See also current solicitations at:
ABOUT BTO
The mission of the Biological Technologies Office (BTO) is to foster, demonstrate, and transition breakthrough fundamental research, discoveries, and applications that integrate biology, engineering, and computer science for national security. BTO seeks to establish and invest in new communities of scientific interest at the intersection of traditional and emerging disciplines. Its investment portfolio goes far beyond life sciences applications in medicine to include areas of research such as human-machine interfaces, microbes as production platforms, and deep exploration of the impact of evolving ecologies and environments on U.S. readiness and capabilities. BTO’s programs operate across a wide range of scales, from individual cells to complex biological systems including mammalian and non-mammalian organisms and the macro- and micro-environments in which they operate.

BTO Focus Areas
- **Restore and Maintain Warfighter Abilities**  This focus area is grounded in the development of new techniques and therapeutic strategies for addressing current and emerging threats, but extends beyond medical applications to include exploration of complex biological issues that can impact an individual's ability to operate and interact in the biological and physical world. The research portfolio includes neuroscience to drive a deeper understanding of the human brain, how it interfaces with the body and the external world, and how it directs and coordinates behavior, including decision-making in demanding environs. BTO will extend work involving human participants and apply insights from physiology, biochemistry, psychology, sociology, and related sciences to such emerging-science domains as bioengineering, bioinformatics, and microbiomics.
- **Harness Biological Systems**  BTO seeks to establish a fundamental understanding of natural processes and the underlying design rules that govern the behavior of biological systems, and apply that knowledge to forward-engineer new systems and products with novel functionality. To support this work, BTO develops techniques at the intersection of automation, computer science, and biology to explore biological data at massive scales.
- **Apply Biological Complexity at Scale**  BTO is looking into pursuing new insights derived from biological complexity and living-system dynamics with the goal of developing applications to enhance global-scale stability and human wellbeing.

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

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

- Developing radical new techniques and technologies to optimally restore and maintain the health and abilities of military service members.
- Discovering and leveraging novel insights from neuroscience, psychology, cognitive science and related disciplines to advance treatment and resilience in neurological health and optimize human aptitude and performance.
- Understanding and improving interfaces between humans and the physical and biological world to enable optimal performance in complex environments.
- Developing and leveraging a fundamental understanding of the underlying design rules that govern biological system behavior.
- Developing new tools and techniques for forward engineering of biological systems (cells, tissues, organs, and organisms) to both develop new products and functional systems as well as to gain new insights into underlying mechanisms.
- Leveraging new computational techniques from computer science, big data, and biology to enable investigation and generation of knowledge from biological data at scale.
- Developing and validating new theories and computational models that identify factors and explain principles underlying collective and interactive behaviors of biological organisms at all scales from individual cells to the warfighter to global ecosystems.
- Understanding where there are inflection points in population and ecosystem behavior in order to preserve equilibrium, provide strategic opportunity, or avoid catastrophe.
- Developing and leveraging new insights into non-human biology across and between populations of microbes, plants, marine life, and other non-human biologic entities.
- Understanding how social, environmental, and biological factors converge to generate violence and conflict or lead to deterrence and influence.
- Radical new approaches towards countermeasure development for biological, chemical and/or radiological threats.
- Other biological technology topic areas which fit the scope of BTO’s mission.

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

**When:** Abstract (white paper) before 30 April 2015 for this solicitation

**Where:** DARPA-BAA-14-38
<table>
<thead>
<tr>
<th>Program Officer</th>
<th>Email</th>
<th>Year Start</th>
<th>Interests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Mildred Donlon</td>
<td><a href="mailto:mildred.donlon@darpa.mil">mildred.donlon@darpa.mil</a></td>
<td>2014</td>
<td>advanced chemical and biological detectors for battlefield, counter proliferation, and intelligence applications.</td>
</tr>
<tr>
<td>Dr. Justin Gallivan</td>
<td><a href="mailto:juntin.gallivan@darpa.mil">juntin.gallivan@darpa.mil</a></td>
<td></td>
<td>synthetic biology, including engineering microbial communities to produce small molecules or to prevent disease, and reprogramming multicellular organisms to perform complex tasks.</td>
</tr>
<tr>
<td>LTC Matthew Hepburn</td>
<td><a href="mailto:matthew.hepburn@darpa.mil">matthew.hepburn@darpa.mil</a></td>
<td>2013</td>
<td>dynamic threats of emerging infectious diseases with potential impact on national security.</td>
</tr>
<tr>
<td>Dr. Barry Pallotta</td>
<td><a href="mailto:barry.pallotta@darpa.mil">barry.pallotta@darpa.mil</a></td>
<td>2011</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. 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>LTC Daniel Wattendorf</td>
<td><a href="mailto:daniel.wattendorf@darpa.mil">daniel.wattendorf@darpa.mil</a></td>
<td>2010</td>
<td>methodological advances in genomics and biotechnology to optimize health and prevent disease—specifically to achieve simple solutions that improve health care at the point-of-care, anywhere.</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 engineering, specifically: 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>
DARPA Defense Science Office (DSO)
http://www.darpa.mil/Our_Work/DSO/

Focus Areas

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

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

Multidisciplinary Topics
- **Transformative Materials**
  Investigating the structure/function relationships that control physical, electrical, and chemical properties and how to de-couple these properties through hierarchical structural control. In addition, the office is interested in how to design and fabricate new materials across multiple length scales that deliver superior performance.
- **Supervised Autonomy**
  Developing both hardware and computational tools to enable systems to operate with intermittent access to supervision in resource-constrained environments where there is limited or no infrastructure.
- **Novel Sensing and Detection Enabled by New Science**
  Applying novel approaches to sensing and detecting Chemical, Biological, Radiological, Nuclear and Explosive (CBRNE) materials and devices.
- **Complexity**
  Exploring the science of complexity and developing novel approaches for accelerating discovery in complex materials and systems.
DARPA
Defense Sciences Office (DSO)
Generic Solicitation

What:

General Topics:
• Physical Sciences
  leading edge experimental and/or theoretical research that explores scientific boundaries
  and advances our understanding of physics and chemistry to generate unique capabilities for
  national security.
• Mathematics
  the development and implementation of advanced mathematics and modeling tools for
  applications of interest to national security.

Multidisciplinary Topics:
• Transformative Materials
  investigating the structure/function relationships that control physical, electrical, and chemical
  properties and how to de-couple these properties through hierarchical structural control. In addition,
  how to design and fabricate new materials across multiple length scales that deliver superior
  performance.
• Supervised Autonomy
  developing both hardware and computational tools to enable systems to operate with intermittent
  access to supervision in resource-constrained environments where there is limited or no
  infrastructure.
• Novel Sensing and Detection Enabled by New Science
  applying novel approaches to sensing and detecting Chemical, Biological, Radiological, Nuclear and
  Explosive (CBRNE) materials and devices.
• Complexity
  exploring the science of complexity and developing novel approaches for accelerating discovery in
  complex materials and systems.

How Much: from $100K to $10M depending on interest and complexity
When: Executive Summary before 1 May 2015 for this solicitation
Where: DARPA-BAA-14-46
<table>
<thead>
<tr>
<th>Program Officer</th>
<th>Email</th>
<th>Year start</th>
<th>Interests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Fariba Fahroo</td>
<td><a href="mailto:fariba.fahroo@darpa.mil">fariba.fahroo@darpa.mil</a></td>
<td>2014</td>
<td>new paradigms for modeling, simulation and design of complex systems; analysis and control of complex networks; data science</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>novel metrology for positioning, navigation and timing leveraging advances in quantum optics, nanoscale microelectromechanical systems, and atomic and nuclear physics, and new monitoring, modeling and modulation methodologies applied to immunology.</td>
</tr>
<tr>
<td>Dr. Judah Goldwasser</td>
<td><a href="mailto:judah.goldwasser@darpa.mil">judah.goldwasser@darpa.mil</a></td>
<td>2007</td>
<td>microstructural effects on macroscopic material properties</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>
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</tr>
<tr>
<td>Dr. Michael Maher</td>
<td><a href="mailto:michael.maher@darpa.mil">michael.maher@darpa.mil</a></td>
<td>2011</td>
<td>reduce manufacturing cycle time; novel lightweight multifunctional material systems</td>
</tr>
<tr>
<td>Dr. John Main</td>
<td><a href="mailto:john.main@darpa.mil">john.main@darpa.mil</a></td>
<td></td>
<td>General approach is to focus on tools. Tools can be virtually anything – mechanical test machines, processing systems, visualization systems, software, whatever you need to get the job done.</td>
</tr>
<tr>
<td>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>Applications of the modernized OODA-loop; poor-man’s “red team” - consumer-grade adversaries; new materials for warfighter weapon systems</td>
</tr>
<tr>
<td>Dr. Mark Micire</td>
<td><a href="mailto:mark.micire@darpa.mil">mark.micire@darpa.mil</a></td>
<td>2014</td>
<td>mobile and space robotics, multi-touch interfaces, search and rescue, human-robot interaction and autonomy</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. Predrag Milojkovic</td>
<td><a href="mailto:predrag.milojkovic@darpa.mil">predrag.milojkovic@darpa.mil</a></td>
<td>2014</td>
<td>advanced imaging concepts/devices, computational imaging, novel optical materials, imaging through scattering media; non-line-of-sight imaging.</td>
</tr>
<tr>
<td>Dr. 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>
</tbody>
</table>
## DSO Example Program:
### Bio-inspired Optics Program Summary

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

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.
DARPA
Information Innovation Office (I2O)
Generic Solicitation

What:
I2O explores game-changing technologies in the fields of information science and software to anticipate and create rapid shifts in the complex national security landscape. Conflict can occur in traditional domains such as land, sea, air, and space, and in emerging domains such as cyber and other types of irregular warfare. I2O’s research portfolio is focused on anticipating new modes of warfare in these emerging areas and developing the concepts and tools necessary to provide decisive advantage for the U.S. and its allies. Topics of interest include:

- secure cloud computing systems
- software code with mathematically provable security properties
- automated cyber security systems
- preserving security on untrustworthy computational infrastructure
- insider threat detection and response
- maintaining security and mission effectiveness of systems after attack, including detection, cleanup, and reconstitution
- computational tools and scalable algorithms
- advanced user interfaces
- pre-processing technology for data sets, including those that are corrupted, incomplete, or disaggregated
- processing and computational approaches (including, but not limited to, novel algorithm design, natural language processing, and architecture systems) for data sets that may be multimodal, realtime-streamed, or on a scale for which storage is infeasible
- algorithm development for analysis of dynamic, unlinked and scripted content
- tools to draw inferences, deduce relationships, make correlations or detect anomalies working solely from data sets that are weak proxies for the underlying quantities of interest
- fusion of data from varied modalities ranging from traditional overhead sensing to open source data
- automated language translation and understanding
- fundamental science and mathematics supporting data analytics
- environment modeling and reconstruction
- crowd-sourced approaches to data processing
- modeling of human activity and proclivities
- analytics of economic systems
- technologies for scalable education and training
- electronic warfare and cyber systems
- biometrics and provenance
- online information validation and evidence collection
- resilient command and control systems, including secure information exchange
- assured information access
- privacy science and systems
- semantic analysis
- programming languages

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

When: until 15 July 2015 for the current solicitation

Where: DARPA-BAA-14-39
<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>Dr. David Doermann</td>
<td><a href="mailto:david.doermann@darpa.mil">david.doermann@darpa.mil</a></td>
<td>2014</td>
<td>language and media processing and exploitation, vision and mobile technologies. He comes to DARPA with a vision of increasing capabilities through joint vision/language interaction for triage and forensics applications.</td>
</tr>
<tr>
<td>Dr. 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>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>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>Dr. Suresh Jagannathan</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>Mr. Steve Jameson</td>
<td><a href="mailto:stephen.jameson@darpa.mil">stephen.jameson@darpa.mil</a></td>
<td>2014</td>
<td>sensor and data fusion, as well as unmanned system autonomy.</td>
</tr>
<tr>
<td>Program Officer</td>
<td>Email</td>
<td>Year start</td>
<td>Interests</td>
</tr>
<tr>
<td>------------------------------</td>
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<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Dr. Angelos Keromytis</td>
<td><a href="mailto:angelos.keromytis@darpa.mil">angelos.keromytis@darpa.mil</a></td>
<td>2014</td>
<td>computer systems, network security and cryptography.</td>
</tr>
<tr>
<td>Dr. Robert Laddaga</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>Dr. John Launchbury</td>
<td><a href="mailto:john.launchbury@darpa.mil">john.launchbury@darpa.mil</a></td>
<td>2014</td>
<td>programming languages, security, privacy and cryptography.</td>
</tr>
<tr>
<td>Dr. Boyan Onyshkevych</td>
<td><a href="mailto:boyan.onyshkevych@darpa.mil">boyan.onyshkevych@darpa.mil</a></td>
<td>2013</td>
<td>human language technologies and knowledge-based systems applied to the areas of information extraction, language understanding and semantic computing</td>
</tr>
<tr>
<td>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 Ragsdale</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>Dr. George Roelke</td>
<td><a href="mailto:geogre.roelke@darpa.mil">geogre.roelke@darpa.mil</a></td>
<td></td>
<td>nothing listed</td>
</tr>
<tr>
<td>Mr. Wade Shen</td>
<td><a href="mailto:wade.shen@darpa.mil">wade.shen@darpa.mil</a></td>
<td>2014</td>
<td>machine learning, machine translation, speech recognition and data analytics for improved human/computer interaction</td>
</tr>
<tr>
<td>Dr. Michael Walker</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>Dr. Rand Waltzman</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>Dr. Christopher White</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>
</tbody>
</table>
Electromagnetic Spectrum
The electromagnetic spectrum is the heart of current and future warfare, but it remains highly contested and congested. The future of info-centric warfare will require electromagnetic access for collecting and distributing information.

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

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

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

What:
The Microsystems Technology Office (MTO) supports DARPA's mission of maintaining technological superiority and preventing technological surprise by investing in areas such as microelectromechanical systems (MEMS), electronics, system architecture, photonics, and biotechnology. Research areas of current interest in MTO include, but are not limited to, the following topics:

- Advanced Imaging Architectures and Systems
- Chip Scale Sensors
- Electro-Optical Infrared (EO/IR) Technologies
- Emerging MEMS Technologies
- Enabling component technology for cold-atom microsystems
- Energy-Efficient Computing
- Hardware Assurance, Reliability & Validation
- Hardware for Advanced Signal Processing
- Heterogeneous Integration
- Low Power Electronics
- Low Volume Microsystems Manufacturing
- Microsystem Design & CAD
- Microsystems for Directed Energy
- Microsystems for Precision Navigation & Timing
- Microsystems for RF/Optical Transceivers
- Non-Silicon Electronics
- Novel Photonic Devices
- Photonic & Electronic Interconnects
- Processing Techniques for Imaging and Spectral Recognition
- Quantum Devices
- Signal Processing to Reduce Hardware Requirements
- Thermal Management
- Other Microsystems Technology Topic Areas

How Much: From $100K to $10M depending in interest and complexity
When: up to 9 Sep 2016 for present solicitation
Where: DARPA BAA-14-42
<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. 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. 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. 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>
<tr>
<td>Dr. Jay Lewis</td>
<td><a href="mailto:jay.lewis@darpa.mil">jay.lewis@darpa.mil</a></td>
<td>2014</td>
<td>materials, devices, and systems that enable advanced electro-optic detection, sensing and imaging</td>
</tr>
<tr>
<td>Program Officer</td>
<td>Email</td>
<td>Year start</td>
<td>Interests</td>
</tr>
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<td>------------------------------------------------------------------------------------------------------------------------------------------</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. Roy (Troy) Olsson</td>
<td><a href="mailto:roy.olsson@darpa.mil">roy.olsson@darpa.mil</a></td>
<td>2014</td>
<td>materials, devices and architectures that enable low power processing of wireless and sensor signals, adaptive radio frequency (RF) systems, and phased array antennas.</td>
</tr>
<tr>
<td>Dr. 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. Linton Salmon</td>
<td><a href="mailto:linton.salman@darpa.mil">linton.salman@darpa.mil</a></td>
<td>2014</td>
<td>semiconductor process and design technology and its application to defense systems.</td>
</tr>
<tr>
<td>Dr. 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>
</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/

FY15
DARPA (ES-01 STARNet)  $20M

103
DARPA Strategic Technology Office (STO)
http://www.darpa.mil/Our_Work/STO/
Focus Areas

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.

Maritime:

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

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

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

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

DTRA Mission – CWMD

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

Nuclear Weapons

High-Yield Explosives

Chemical Weapons

Biological Weapons

Radiological Devices

FY16

6.1 $ 38M

6.2 155M

6.3 291M

106
DTRA Organization

Defense Threat Reduction Agency

J9
Research and Development
- Nuclear Technologies
- Counter WMD
- Innovation/Systems/Reachback
- Chem-Bio
- Basic and Applied

J3/7
Operations/Exercise & Readiness
- Operations Center
- Current/Future Ops
- Ops & Nuc Spt
- On-Site Inspection
- Cooperative Threat Reduction

J2/5/8R
Intelligence/Plans & Resource Integration
- Concepts, Capabilities, Plans & Doctrine Integration
- Planning Capability & Resource Analysis
- Future Plans
- Regional Engagement and Liaison

J4/8C
Acquisition/Financial/Logistics
- Acquisition Mgmt
- Contracts
- Comptroller
- Facilities/Engineering, Logistics
- Environment, Safety & Occupational Health
- Small Business

Dec 2012
Non-proliferation sciences primarily associated with “Secure WMD” thrust area – no investment to date
Two program areas

- Basic Research Program (HDTRA1-11-16-BRCWMD-BAA)
  - High payoff fundamental research
  - 200+ grants to 90+ universities and labs
  - Annual competition on specific topics with due dates in the Dec - Jan timeframe
- 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
  - Open Continuously, but without specific funds set aside - white papers essential

Five Thrust Areas:
- Science of WMD Sensing and Recognition
- Network Sciences
- Science for Protection
- Science for Defeat WMD
- Science to Secure WMD
Thrust Area 1: Science of WMD Sensing and Recognition - Dr. David Peterson, david.peterson@dtra.mil
Advances fundamental understanding of materials that demonstrate measurable changes when stimulated by radiation or particles from WMD in the environment. Explore and exploit interactions between materials and various photons, molecules, nuclear radiation and/or particles. Also explores and exploits signatures of these interactions with materials, including those signatures which are actively stimulated. These interactions and the specific form of recognition they provide are used for subsequent generation of information that provides knowledge of the presence, identity, and/or quantity of material or energy in the environment.

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

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

Thrust Area 4: Science to Defeat WMD - Dr. 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
2014 Agenda

Thrust 1: Science of WMD Sensing and Recognition        Dave Petersen
Nuclear Point Detection                           Technical Nuclear Forensics
Radiological - Nuclear Standoff Detection and Wide Area Search

Thrust 2: Cognitive, Information and Network Sciences  Paul Tandy
Physical Networks: Power Grids                     Physical Networks: Telecom and Data
Physical Networks: Math Network Analysis           Social Networks

Thrust 3: Science for Protection                    James Reed
Intro to Metamaterials                            Jacob Calkins
Protection of Sensitive Systems                   Heather Meeks
Life Sciences

Thrust 4: Science to Defeat WMD                    Suhithi Peiris
Amorphous Metals                                  Nano-sized Thermometers
Agent Defeat Materials and Properties              Agent Defeat Reactions and Modeling
Agent Defeat Binders and Coatings                  HEDM
Meso-scale Modeling and Verification               Meso Diagnostics

Thrust 5: Science to Secure WMDs                  Calvin Shipbaugh
Monitoring and Verification                       Securing Weapons, Facilities & Weapon-usable Materials
DTRA Basic Research Program

What
Extramural endeavor addressing basic research needs of DTRA and the Joint Science and Technology Office for Chemical and Biological Defense (JSTO-CBD).

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 30 Jan 2015 for Period E

Where: HDTRA1-11-16-BRCWMD-BAA (Amendment 4)
https://www.dtrasubmission.net/portal/
**Period C Timeline**

- **12/3**: BAA and CALL posted with Period C Topics.
- **1/14**: Phase I White Papers Due.
- **3/1**: Phase I Notifications.
- **4/5**: Phase II Full Proposals Due.
- **7/12**: Phase II Notifications.
- **On/about Award Processing Begins**:  

*Timeline events from January to October 2012.*
PerE-1: Methodologies for Autonomous Radiological and Multi-mode Information Collection
PerE-2: Advancing Nuclear Forensic Methods for Collecting and Analyzing Post-Detonation Debris
PerE-3: Development of Models for the Time Evolution of Realistic Multilayered Networks in Response to Large-Scale Damage
PerE-4: Machine Learning Methods for Network Analysis
PerE-5: Semantic Representation
PerE-6: Model Framework for Societal Responses to Nuclear Events
PerE-7: Epigenetics of Response to Radiation
PerE-8: Determining the Mechanistic Basis for Surface Interactions and Effects on Catalytic Efficiency in Tethered Enzyme Systems
PerE-9: Understanding X-ray Interactions that Lead to Arc Formation in Solar Arrays
PerE-10: Techniques, Methods, and Structures for Characterizing Radiation Effects in Emerging Nanoscale Memory and Logic Materials and Devices
PerE-11: Chemistry of Chemical Agents, Simulants and Precursors
PerE-12: (CB Directorate) Alternative Signatures and Characterization Methods for Monitoring Potential CBRN Sites
PerE-13: (CB Directorate) Discovery of Secreted Circulating and In Vivo Amplified Bacterial Antigens
PerE-14: (CB Directorate) Signatures of Antimicrobial Resistance Detectable by Minimally Invasive Means
PerE-YIP-1: Methodologies for Autonomous Radiological and Multi-mode Information Collection
PerE-YIP-2: Advancing Nuclear Forensic Methods for Collecting and Analyzing Post-Detonation Debris
PerE-YIP-3: Development of Models for the Time Evolution of Realistic Multilayered Networks in Response to Large-Scale Damage
PerE-YIP-4: Machine Learning Methods for Network Analysis
PerE-YIP-5: Semantic Representation
PerE-YIP-6: Model Framework for Societal Responses to Nuclear Events
PerE-YIP-7: Epigenetics of Response to Radiation
PerE-YIP-8: Determining the Mechanistic Basis for Surface Interactions and Effects on Catalytic Efficiency in Tethered Enzyme Systems
PerE-YIP-9: Understanding X-ray Interactions that Lead to Arc Formation in Solar Arrays
PerE-YIP-10: Techniques, Methods, and Structures for Characterizing Radiation Effects in Emerging Nanoscale Memory and Logic Materials and Devices
PerE-YIP-11: Chemistry of Chemical Agents, Simulants and Precursors
VISION
Forward-looking fundamental research program targeting strategic, mission-focused, basic research with high potential impact for the US Chemical and Biological Defense Program.

Knowledge that supports existing needs

Revolutionary approaches to technological surprise

New science solutions with a unique approach

BUILDING THE FOUNDATION FOR TOMORROW'S CBGP
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

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

PROJECT AREAS
Biosurveillance Ecosystem (BSVE)   Wearable Technologies
Data sources & analytic tools   Field Forward Diagnostics
Chem-Bio Detection
Host-Based Biomarker Identification/Verification/Validation
Genetic Sequencing for Clinical Microbial/Viral Diagnostics
Translational Medical Division (CBM)
Dr. Erin Reichert, Chief, erin.reichert@dtra.mil

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

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

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

VACCINES & THERAPEUTICS FOCUS AREAS
Viral: Ebola & Marburg; EEEV, VEEV, WEEV
Bacterial: Bacillus anthracis, Francisella tularensis, Burkholderia mallei & pseudomallei, C. Burnetii, Yersina pestis
Toxins: Ricin, Botulinum Neurotoxin
Platform Technologies: Animal Model Development, Ex vivo mimetics, Flexible Manufacturing, Adjuvants and Stabilization
Information Analysis Division (CBI)
Mr. Jerry Glasow, Chief, jerry.glasow@dtra.mil
Mr. Michael Roberts

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

PROJECT AREAS
Collective Protection System Performance Model
Individual Protection System Performance Model
Decontamination System Performance Model
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

MISSION: Deliver novel concepts and technologies to address current and emerging chemical and biological threats to protect the lives of our warfighters

EXAMPLE PROJECT AREAS
Catalytic bioscavengers of nerve agents
Centrally-acting reactivators of acetylcholinesterase, neuroprotectants
ADMET Center to enhance drug discovery/development efforts
Host response to chem toxicants, human toxicity estimates and predictive toxicology
Characterization and predictive environmental fate of CB agents, especially particulates
Relevant understanding of routes of exposure and the blood-brain barrier
Autonomic threat response, including nano- and micromotors
DTRA (and JSTO CBD) (continued)

**Chemical & Biological Technologies Department (2013)**


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**Physical Science & Technology Division (CBT)**
Dr. Robert Botto, Chief, robert.botto@dtra.mil

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

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

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

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

## DTRA Basic Review

### 2013 Topics

<table>
<thead>
<tr>
<th>Topic</th>
<th>Program Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Area Overview: Interfacial Dynamics and Reactivity</strong></td>
<td>Brian Pate</td>
</tr>
<tr>
<td>Interfacial Dynamics</td>
<td></td>
</tr>
<tr>
<td>Catalytic Motors</td>
<td></td>
</tr>
<tr>
<td>Threat Characterization and Chemical Medical Basic Research</td>
<td></td>
</tr>
<tr>
<td><strong>Area Overview: Design of Molecular Interactions</strong></td>
<td>Ilya Elshvili</td>
</tr>
<tr>
<td>Designer Binding</td>
<td></td>
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<tr>
<td>Bio-Nano Interfaces &amp; Catalysis</td>
<td></td>
</tr>
<tr>
<td><strong>Area Overview: Protective Materials Basic Science</strong></td>
<td>Tracee (Harris) Whitfield</td>
</tr>
<tr>
<td>Stimuli Responsive Polymeric Materials</td>
<td></td>
</tr>
<tr>
<td><strong>Area Overview: Detection &amp; Diagnostics Basic Research</strong></td>
<td>Tony Esposito</td>
</tr>
<tr>
<td>Microfluidic and Spectroscopic Sensing</td>
<td></td>
</tr>
<tr>
<td>Materials for Sensing</td>
<td>Kiki Ikossi</td>
</tr>
<tr>
<td><strong>Area Overview: Translational Medical Basic Research</strong></td>
<td>Amanda Horstman-Smith</td>
</tr>
<tr>
<td>Microbial Molecular Adaption</td>
<td></td>
</tr>
<tr>
<td>Host Pathogen Interactions</td>
<td>Dan Wolfe</td>
</tr>
</tbody>
</table>
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: 22 Dec 2014 for FY2015 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

University Engagement Website:
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: Dec 2014 for the amended call in Nov 2014

HDTRA1-14-CHEM-BIO-BAA Amendment 10

Diagnostics, Detection, and Disease Surveillance Division
CBA-01 Vertical Flow Paper-based Devices as Point of Need Multiplex Diagnostic and Surveillance
CBA-02 Fieldable Tests for Early Exposure Response Program: Viral vs Bacterial Biomarkers
CBA-03 Portable Field Analytical Platform for Detection/Diagnostic of Protein Targets - Ebola
CBA-04 Biosurveillance Analytics and Applications for the Biosurveillance Ecosystem (BSVE)
CBA-05 Wearable Early Warning

Translational Medicine Division (CBM)
CBM-01 Vaccines Directed Against Francisella Tularensis
CBM-02 Platform Technologies for Rapid and Translational Vaccine Design
CBM-03 Vaccines Directed Against Burkholderia Species
CBM-04 Novel Medical Countermeasures Development Targeting Staphylococcus Enterotoxin
CBM-05 Novel Medical Countermeasures Development Targeting Filoviridae Pathogenesis
CBM-06 Overcoming Mechanisms of Antimicrobial Resistance and Biothreat Bacteria
CBM-07 Investigation of Next Generation Adjuvants for Biodefense Vaccines

Advanced and Emerging Threat Division (CBS)
CBS-01 Discovery of New Central Nervous System Accessible Acetylcholinesterase Reactivators
CBS-02 Alternative Manufacturing Processes for Protein-based Medical Countermeasures
CBS-03 Therapeutics and Clinical Strategies for Cutaneous Injury from Chem Warfare Agent Exposure
CBS-04 Media Scoping Study

Physical Science and Technology Division (CBT)
CBT-01 Bio-inspired Catalytic Systems for Chemical/Biological Remediation
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)

Access available to OXR/DARPA grantees
http://centers.hpc.mil/users/index.html

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

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

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

**What:** In FY15, solicited topics
- Identity, Influence, and Mobilization
- Contributors to Societal Resilience and Change
- Power and Deterrence
- Innovations in National Security, Conflict, and Cooperation

**When:**
- White Papers: 31 Oct 2014
- Full Proposals: 30 Jan 2015

**How Much:** $150K - 1M/yr for individual awards, avg $0.5M/yr for 3-5 year

**Where:** ONR BAA Announcement # 14-013
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; typically 1.2-1.5M/yr
For FY15

**When:** Announcement (22 Sep 2014) (usually earlier)
White paper (strongly encouraged, not required) (24 Nov 2014)
Full proposal (23 Feb 2015)

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

**USC MURI awardees**

<table>
<thead>
<tr>
<th>Year</th>
<th>Advisor</th>
<th>Institution</th>
<th>Title</th>
<th>Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>Nealson</td>
<td>AFOSR</td>
<td>Bioengineered Fuel Cells: Optimization and Modeling</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>USC</td>
<td>AFOSR</td>
<td>supporting Institution in four different MURI awards</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>Sukhatme</td>
<td>ONR</td>
<td>Adaptive Networks for Threat and Intrusion Detection</td>
<td></td>
</tr>
<tr>
<td></td>
<td>USC</td>
<td>supporting institution in one other MURI award</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>USC</td>
<td>supporting institution in four different MURI awards</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>Tambe</td>
<td>ARO</td>
<td>Game Theory for Real World Adversarial Behavior</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lidar</td>
<td>ARO</td>
<td>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 2013; 149 awards averaging $268K in 2014

**When:** Proposals typically due in late Aug / early Sept (17 Nov 2014 for FY15)

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


**USC Awardees**

<table>
<thead>
<tr>
<th>Year</th>
<th>Name</th>
<th>Project Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>Langdon</td>
<td>High-Pressure Torsion Research (ARO)</td>
</tr>
<tr>
<td></td>
<td>Madhukar</td>
<td>Novel PV Solar Cell Synthesis &amp; Characterization (AFOSR)</td>
</tr>
<tr>
<td></td>
<td>Schaal</td>
<td>Humanoid Robotic Research (ARO)</td>
</tr>
<tr>
<td>2010</td>
<td>Armani</td>
<td>Characterize Micro-Nano Devices for Photonics/BioDetection (ONR)</td>
</tr>
<tr>
<td></td>
<td>Madhukar</td>
<td>In-situ Characterization of Highly Heterogeneous Nanostructures (AFOSR)</td>
</tr>
<tr>
<td>2011</td>
<td>Christe</td>
<td>High energy density materials (ONR)</td>
</tr>
<tr>
<td></td>
<td>Molisch</td>
<td>Distributed electronic warfare applications (ONR)</td>
</tr>
<tr>
<td></td>
<td>Debevec</td>
<td>Improve the photorealism of simulations to enhance training (AFOSR)</td>
</tr>
<tr>
<td>2012</td>
<td>Cronin</td>
<td>Atomic Layer Deposition System (ONR)</td>
</tr>
<tr>
<td></td>
<td>Narayan</td>
<td>A Versatile Thin-Film Deposition System for Advanced Power Sources Research (ARO)</td>
</tr>
<tr>
<td></td>
<td>Sukhatme</td>
<td>Robotic Platform for Study of Human-Robot Interaction, Motor Control, Perception (ONR)</td>
</tr>
<tr>
<td></td>
<td>Zhou</td>
<td>Maskless Photolithography for Nanoelectronic Device Prototyping and Fabrication (ONR)</td>
</tr>
<tr>
<td>2013</td>
<td>Malmstadt</td>
<td>Instruments for High-throughput analysis of oxidative cell membrane damage (ONR)</td>
</tr>
<tr>
<td></td>
<td>Vashishta</td>
<td>Computing platform for simulation and visualization of insensitive nanoenergetic (ONR)</td>
</tr>
<tr>
<td></td>
<td>Hodge</td>
<td>Instrumentation for TEM sample prep (ONR)</td>
</tr>
<tr>
<td>2014</td>
<td>Armani</td>
<td>Laser for non-linear optics and biophotonics (ONR)</td>
</tr>
<tr>
<td></td>
<td>Egolfoupoulos</td>
<td>Hi-resol diagnostics for velocity and scalar field study in turbulent reacting flows (AFOSR)</td>
</tr>
</tbody>
</table>
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

FY16
AF (for all services) $47M

132
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
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>
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<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 FY14/15 CRMRP Neurosensory and Rehabilitation Research Award (NSRRA) is intended to support both applied (preclinical) research and clinical trials addressing TBI within specific Focus Areas of pain management, hearing loss/dysfunction, balance disorders, tinnitus, vision, or physical rehabilitation.

When:
- Pre-Application Submission Deadline 10 Dec 2014
- Application Submission Deadline (if invited) 11 Feb 2014

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

Where: W81XWH-14-CRMRP-NSRRA

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 TPT Research Initiative seeks to support research into the design, plan, and components of an effective, efficient, interactive, user-friendly, evidence-based team performance trainer with automated assessment technology, which will improve team performance in delivery of healthcare with the overall goal of reducing medical errors/adverse events, and improving patient safety and healthcare outcomes.

When:

How Much:

Where: W81XWH14DMRDPJPC1TPT
**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

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**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
15 April 2014

What: The USSOCOM seeks novel biomedical solutions to preserve the high level of performance and save the lives of Special Operations Forces (SOF) in field environments. Any projects proposed must be unique to the requirements of SOF who typically conduct combat operations in austere, remote locations without timely access to medical evacuation or elevated levels of medical care.

1. Damage Control Resuscitation
   • Global Treatment Strategies
   • Vital Signs Monitoring
   • Analgesia
   • Far Forward Blood
2. Portable Lab Diagnostics
   • Resuscitation
   • Biological
   • Occupational and Environmental Health Hazards
3. Force Health Protection and Environmental Medicine
   • Optimal Acclimatization Strategy
   • High Altitude Pulmonary Edema/High Altitude Cerebral Edema
   • Chem, Bio, Rad, Nucl, and Explosive Rapid Diag, Treatment and Prophylaxis
   • Patient Decontamination
   • Universal Antivenin
4. Medical Simulation and Training Technologies
5. Extended Care
6. 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 March 15, 2014 using the pre-proposal template

Where: W81XWH-USSOCOM-BAA 14-1
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
### Congressionally Directed Medical Research Program

cdmrp.army.mil

**What:** Research Programs included in the FY15 CDMRP are ($M):

<table>
<thead>
<tr>
<th>Program</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>248 Peer Reviewed Medical Research</td>
<td>248</td>
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<tr>
<td>125 Traumatic Brain Injury and Psychological Health</td>
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</tr>
<tr>
<td>120 Breast Cancer Research</td>
<td>120</td>
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<tr>
<td>80 Prostate Cancer Research</td>
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<tr>
<td>50 Peer Reviewed Cancer – skin, pediatric brain, genetic, non-invasive ablation treatment</td>
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<td>30 Spinal Cord Injury</td>
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<tr>
<td>30 Peer Reviewed Orthopaedic</td>
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<tr>
<td>20 Ovarian Cancer Research</td>
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<td>20 Gulf War Illness Research</td>
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<td>15 Reconstructive Transplant</td>
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<td>15 Neurofibromatosis Research</td>
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<tr>
<td>15 Neurotoxin Exposure treatment Parkinson’s Research</td>
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<tr>
<td>12 Alzheimer</td>
<td>12</td>
</tr>
<tr>
<td>10 Lung Cancer Research</td>
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</tr>
<tr>
<td>10 Vision</td>
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<tr>
<td>8 Epilepsy</td>
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<tr>
<td>8 Amyotrophic Lateral Sclerosis</td>
<td>8</td>
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<tr>
<td>8 Military Burn</td>
<td>8</td>
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<tr>
<td>6 Autism Research</td>
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</tr>
<tr>
<td>6 Tuberous Sclerosis Complex Research</td>
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<tr>
<td>5 Multiple Sclerosis</td>
<td>5</td>
</tr>
<tr>
<td>4 Alcohol and Substance Abuse</td>
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<tr>
<td>3 Bone Marrow Failure</td>
<td>3</td>
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<tr>
<td>3 Duchennne Muscular Dstrophy</td>
<td>3</td>
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</tbody>
</table>

Proposals undergo two stage review - peer, then program

**FY15**

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

If multiyear funded, all funds come from the FY14 appropriation

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

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

~$1200M
<table>
<thead>
<tr>
<th>Topic</th>
<th>FY15</th>
<th>FY14</th>
<th>FY13</th>
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<td>Peer-reviewed tuberous sclerosis complex research</td>
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<td>Peer-reviewed ALS research</td>
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<td>Peer-reviewed epilepsy research</td>
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<td>Peer-reviewed gulf war illness research</td>
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<td>Orthotics and prosthetics outcomes research</td>
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<td>Joint Warfighter Medical Research Program</td>
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<td><strong>Total</strong></td>
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<td>Defense Medical R&amp;D Program (DMRDP)</td>
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## Peer Reviewed Medical Research Program Topics

### FY2015
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<tbody>
<tr>
<td>Acupuncture</td>
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<td>Advanced prosthetics</td>
<td>Arthritis</td>
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<td>Burn pit exposure</td>
<td>Cardiovascular health</td>
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<td>Chronic migraine and post-traumatic headache</td>
<td>Chronic Migraine and Post-Traumatic Headaches</td>
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<td>Congenital heart disease</td>
<td>Congenital Heart Disease</td>
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<td>DNA vaccine technology for postexposure prophylaxis</td>
<td>DNA Vaccine Technology for Postexposure</td>
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<td>Diabetes</td>
<td>Prophylaxis</td>
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<td>Focal segmental glomerulosclerosis</td>
<td>Dystonia</td>
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<td>Food allergies</td>
<td>Epilepsy</td>
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<td>Healthcare-acquired infection reduction</td>
<td>Food Allergies</td>
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<td>Hepatitis B</td>
<td>Fragile X Syndrome</td>
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<tr>
<td>Hydrocephalus</td>
<td>Hereditary angioedema</td>
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<tr>
<td>Inflammatory bowel disease</td>
<td>Illnesses Related to Radiation Exposure</td>
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<tr>
<td>Integrative medicine</td>
<td>Inflammatory Bowel Disease</td>
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<tr>
<td>Lupus</td>
<td>Interstitial Cystitis</td>
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<td>Metastatic osteosclerosis</td>
<td>Lupus</td>
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<tr>
<td>Nanomaterials for bone regeneration</td>
<td>Malaria</td>
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<tr>
<td>Nanomaterials for bone regeneration</td>
<td>Metastatic Osteosclerosis</td>
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<tr>
<td>Nanomaterials for bone regeneration</td>
<td>Metabolic Disease</td>
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<td>Nanomaterials for bone regeneration</td>
<td>Neuroprosthetics</td>
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<td>Pathogen-inactivated dried plasma</td>
<td>Pancreatitis</td>
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<td>Pathogen-inactivated dried plasma</td>
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<td>Polycystic kidney disease</td>
<td>Post-traumatic osteoarthritis</td>
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<tr>
<td>Psychotropic medications</td>
<td>Post-Traumatic Osteoarthritis</td>
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<tr>
<td>Respiratory health</td>
<td>Psychotropic Medications</td>
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<td>Scleroderma</td>
<td>Respiratory Health</td>
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<td>Tinnitus</td>
<td>Rheumatoid Arthritis</td>
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<td>Women's heart disease</td>
<td>Segmental Bone Defects</td>
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<tr>
<td></td>
<td>Tinnitus</td>
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</tbody>
</table>

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

CDMRP Funding Process

Milestone 1 (Congressional Appropriation):

Milestone 2 (Vision Setting):
   Each program's Integration Panel (IP), composed of renowned experts -- scientists and clinicians, as well as disease survivors, identify the Programmatic Priorities for the year.

Milestone 3 (Release of Program Announcements)

Milestone 4 (Proposal Receipt)

Milestone 5 (Peer Review):
   - Submitted proposals are peer reviewed by program, along with other proposals submitted in response to the same mechanism offered in the Program Announcements.
   - Renowned scientists and clinicians are assigned to panels to review proposals according to their individual expertise.
   - In addition, several disease survivors sit on each peer review panel.
   - The process of Peer Review evaluates not only the science of each submission but also the proposed budget.

Milestone 6 (Programmatic Review):
   - Proposals undergo Programmatic Review by the IP with select additional scientists chosen for their expertise in the field.
   - Proposals are evaluated in a comparison basis, against submissions in other specialty fields in order to identify proposals with the greatest programmatic relevance, those that most completely address the year's Programmatic Priorities, as well as disease relevance, and innovation, among other factors.

Milestone 7 (Approval by Commanding General)

Milestone 8 (Negotiations)

Milestone 9 (Award Execution)
CDMRP
Our Team

This page represents the organizations that assist the CDMRP in its execution of the research programs directed by Congress. Contact information for each organization is provided.

CDMRP (Program Office)
- Oversees program announcements, peer and programmatic reviews
  Phone: 301-619-7747
  Fax: 301-619-7796

- Electronic proposal receipt (eReceipt) help desk
  Phone: 301-619-5307
  Email: help@cdmrp.org

- Program announcement help desk
  Phone: 301-619-7759
  Fax: 301-619-7792
  Email: cdmrp.pa@del.army.mil

- Peer review for proposal submitted under the Direct Agency Announcement (DAA)
  Phone: 703-614-2706

- Various support contractors
  assist CDMRP with review and administration of protocols

US Army Medical Research & Materiel Command
- Contracting Officers
  Signing authority for all grants and contracts. Office communications from Army to institutions

Research Acquisition Activity (RAA) (Contracting)
- Contract Specialists
  Points of contact for PI and research administrators regarding issues with grants; conducts negotiations in consultation with Grants Managers.
  Phone: listed on award agreement

- Various support contractors
  assist RAA with negotiations and administration of grants

- Animal Regulations
  Proposals using animals must receive approvals from DARP.
  Phone: 301-619-2763
  Fax: 301-619-7165

- Office of Research Protection (ORP) (Regulatory Compliance)
  Proposals using human anatomical substrates and human subjects must receive approvals from DARP.
  Phone: 301-619-7202
  Fax: 301-619-7032

- Various support contractors
  assist ORP with review and administration of protocols

- Office of Survey, Safety and Environment
  Environmental and facilities safety approvals are required before an award can be made.
  Phone (Safety Office): 301-619-6535
  Phone (Environmental Office): 301-416-3501

- RVII (Technical and Annual Progress Reports)

Instructions: https://rmi.deriarmy.mil/rviiindex.asp
Up-load reports: https://rmi.deriarmy.mil

- Grants Managers
  Point of contact for awarded grants, statements of work (SOW), transfers and other issues
  Phone: 301-619-7747
  Fax: 301-619-7796

- SPA International (programmatic review & peer review)

- ABS (peer review)

- Various support contractors
  assist CDMRP with review and administration of protocols

# 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>
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<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>
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<td>Peer-Reviewed Med Res</td>
<td>99–06,08-12</td>
<td>595</td>
<td>4604</td>
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<td>Tuberous Sclerosis</td>
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<td>41</td>
<td>344</td>
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<tr>
<td>Gulf War Illness</td>
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<td>49</td>
<td>141</td>
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<td>Autism</td>
<td>2007-12</td>
<td>41</td>
<td>749</td>
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<td>Amyotrophic Lateral Sclerosis</td>
<td>2007, 09-12</td>
<td>32</td>
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<td>Psychological Health/TBI</td>
<td>2007, 09-12</td>
<td>545</td>
<td>2681</td>
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<td><strong>TOTALS (incl items not included above)</strong></td>
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<td><strong>74,879</strong></td>
<td><strong>10,719</strong></td>
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</table>

Totals include all programs - some have not been recorded above
Selected USC Awardees from CDMRP

**Breast Cancer**
- 2007 Era of Hope Scholar: Christopher Haiman, Keck, Cancer Center
- 2008 Concept: Woojin An, Keck, Biochem and Molec Bio
- 2010 Idea: Pin Wang, Dornsife, Chem Engn
- 2010 Idea: Alan Epstein, Keck, Pathology
- 2010 Idea: Parkash Gill, Keck, Medicine

**Ovarian Cancer**
- 2006 Idea Development: Francis Markland, Keck, Biochem and Molec Bio
- 2008 Consortium Development: Louis Dubeau, Keck, Pathology
- 2012 Consortium Development: Malcolm Pike, Keck, Preventive Medicine

**Prostate Cancer**
- 2009 New Investigator: Andrea Armani, Viterbi, Materials
- 2009 Idea Development: Julio Camarero, Pharmacy
- 2009 Idea Development: Shao-yao Ying, Keck, Cell & Neurobio
- 2010 Idea Development: Wijbe Kast, Keck, Molec Microbio and Immun
- 2011 Idea Development: Jean Shih, Pharmacy

**Lung Cancer**
- 2009 Concept: Ite Laird-Offringa, Keck, Surgery
- 2011 Investigator Initiated: Robert Ladner, Keck, Pathology
- 2013 Concept: Ite Laird-Offringa, Keck, Surgery

**Deployment Related**
- 2008 Hypothesis: Stefan Lee, Keck

**Autism Research**
- 2012 Idea Development: Alexandre Bonnin, Keck, Neurogenetic Inst

**Spinal Cord Injury**
- 2013 Investigator Initiated: Jill McNitt-Gray, Dornsife, Biology

**Multiple Sclerosis**
- 2013 Idea Development: Brett Lund, Keck, Neurology
# CDMRP: Example of Program Information

## FY09 Peer Reviewed Medical Research Program (PRMRP)

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

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

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

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

Clinical Resource Development Award
• Fund development, validation and/or pilot testing of novel tools/resources for measuring clinical and/or surrogate endpoints that are relevant to the target area.
• Preliminary data are not required by my be included, if available.
• A clinical protocol and associated clinical documents must be included if human subject clinical studies are proposed.
• Include a plan describing the means by which the fully developed tool/resource will be made available to the scientific community for future studies.
• Up to $225K for direct cost over the performance period
• Up to 2 years period of performance
Illustrations of CDMRP Award Categories
(from historical files)

Clinical Consortium Award
- Clinical Research Sites and one Coordinating Center which jointly are responsible for proposing, selecting and conducting Phase II and Phase I/II clinical trials focused on target area.
- The Coordinating Center, which functions as a Clinical Research Site, also serves as the consortium information and planning nexus providing administrative, operational, and data management support services to participant Clinical Research Sites to implement consortium clinical trials in a timely manner.
- An important aspect of the CCA is that funding for each participant site after the first year is contingent upon meeting the following consortium requirements:
  - Minimum number of 35 patients accrued per year (>50 expected)
  - Presentation of at least one clinical trial per year (>2 expected)
  - Submission of annual written progress report
  - Timely submission of quality data
- Up to $600K direct costs over performance period
- Up to 2 years period of performance

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

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

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

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

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

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

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

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

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

VA/DOD Collaboration Guidebook for Healthcare Research 2013
Planning for initiation and administration of collaborative research efforts
University Affiliated Research Centers (UARC)

Institutions responsible for partnering with the United States Government to solve problems of national and global significance. Largely applied research, can be classified. Recompeted at ~3-5 year intervals; some Navy UARCs date from the 1940s.

Examples:

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

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

| MDA | Space Dynamics Laboratory | Utah State University |
| IC/DOD | Ctr for Advanced Study of Language | University of Maryland |
| OSD | Systems Engineering Research | Stevens Inst of Technology (with USC) |
| NASA | UARC at NASA Ames | Univ Calif Santa Cruz |
| StratCom | National Strategic Research Institute | Univ Nebraska |

MDA Missle Defense Agency  | NSA National Security Agency  | 155
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, 2014 for the Air Force FY15 competition (AFOSR BAA 2014-0003)
- Mar 4, 2015 for Naval FY15 competition (ONR 14-FOA-0006)
- Jan 30, 2015 for the DTRA FY15 competition (HDTRA1-11-16-BRCWMD-BAA, Amend 4)
- Apr 9, 2015 for the DARPA FY15 competition (DARPA RA-15-23)

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 2009 for the FY15 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 2014 for FY15 competition (Solicitation released June 2014)

Where: Air Force Fiscal Year 2015 Young Investigator Research Program AFOSR-BAA-2014-0003

FY 2014 42 awards out of 234 proposals
FY 2013 40 awards out of 192 proposals
FY 2012 48 awards out of 220 proposals
FY 2011 43 awards out of 202 proposals
FY 2010 38 awards out of 202 proposals
FY 2009 39 awards out of 210 proposals

USC Awardees

2013 Jahan Dawlaty Chem
2012 Morteza Dehghani ICT
2010 Mohamed El-Naggar Physics
2008 Stephen Cronin EE
2008 Chunqi Jiang EE
**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 04 Mar 2015 for the FY15 competition (Solicitation released Jan 2015)

**Where:** Fiscal Year 2015 ONR Young Investigator Program, ONR 15-­‐FOA-­‐0006

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Awards</th>
<th>Proposals</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY14</td>
<td>24</td>
<td>280</td>
</tr>
<tr>
<td>FY13</td>
<td>16</td>
<td>369</td>
</tr>
<tr>
<td>FY12</td>
<td>26</td>
<td>310</td>
</tr>
<tr>
<td>FY11</td>
<td>21</td>
<td>270</td>
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<tr>
<td>FY10</td>
<td>17</td>
<td>211</td>
</tr>
<tr>
<td>FY09</td>
<td>15</td>
<td>193</td>
</tr>
</tbody>
</table>

**USC Awardees**

<table>
<thead>
<tr>
<th>Year</th>
<th>Name</th>
<th>College</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>Rahul Jain</td>
<td>EE</td>
</tr>
<tr>
<td></td>
<td>Andrea Hodge</td>
<td>CEMS</td>
</tr>
<tr>
<td></td>
<td>Noah Malmstadt</td>
<td>CEMS</td>
</tr>
<tr>
<td>2009</td>
<td>Andrea Armani</td>
<td>CEMS</td>
</tr>
<tr>
<td>2008</td>
<td>David Kempe</td>
<td>Computer Sci</td>
</tr>
</tbody>
</table>
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 E (2015):

- PerE-YIP-Topic 1: Methodologies for Autonomous Radiological and Multi-mode Information Collection
- PerE-YIP-Topic 2: Advancing Nuclear Forensic Methods for Collecting and Analyzing Post-Detonation Debris
- PerE-YIP-Topic 3: Development of Models for the Time Evolution of Realistic Multilayered Networks in Response to Large-Scale Damage
- PerE-YIP-Topic 4: Machine Learning Methods for Network Analysis
- PerE-YIP-Topic 5: Semantic Representation
- PerE-YIP-Topic 6: Model Framework for Societal Responses to Nuclear Events
- PerE-YIP-Topic 7: Epigenetics of Response to Radiation
- PerE-YIP-Topic 8: Determining the Mechanistics of Surface Interactions and Affects on Catalytic Efficiency in Tethered Enzyme Systems
- PerE-YIP-Topic 9: Understanding X-ray Interactions that lead to arc Formation in Solar Arrays
- PerE-YIP-Topic 10: Techniques, Methods, and Structures for Characterizing Radiation Effects in Emerging Nanoscale Memory and Logic Materials and Devices
- PerE-YIP-Topic 11: Chemistry of Chemical Agents, Simulants and Precursors
- PerE-YIP-Topic 12: Alternative Signatures and Characterization Methods for Monitoring Potential CBRN Sites

When: 20 Jan 2015    Phase I White Paper Submission Deadline for Period E

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 4 - Dec 2014 (Period E)

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-15-23@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 Apr 9, 2015 for the FY15 competition (Solicitation released Feb 2015)

**Where:** Research Announcement Young Faculty Award, DARPA-RA-15-23

<table>
<thead>
<tr>
<th>Year</th>
<th>Awards</th>
<th>Proposals</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY14</td>
<td>28</td>
<td>226</td>
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<td>FY13</td>
<td>25</td>
<td>560</td>
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<tr>
<td>FY12</td>
<td>51</td>
<td>405</td>
</tr>
<tr>
<td>FY11</td>
<td>33</td>
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</tr>
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</table>

**USC Awardees**

<table>
<thead>
<tr>
<th>Year</th>
<th>Name</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>Mike Chen</td>
<td>EE</td>
</tr>
<tr>
<td>2012</td>
<td>Andrea Hodge</td>
<td>CEMS</td>
</tr>
<tr>
<td></td>
<td>Yongseung Yoon</td>
<td>CEMS</td>
</tr>
<tr>
<td>2008</td>
<td>Hossein Hashimi</td>
<td>EE</td>
</tr>
</tbody>
</table>

FY10 31 awards
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

Dr. Matthew Goodman  
DARPA DSO  
571 218 4681

Email: rroberts@ida.org  
matthew.goodman@darpa.mil

USC Awardees:  
2010-11 John Heidemann ISI
DARPA Computer Science Study Group


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

USC Awardees:
2010 Fei Sha CS

FY15 $0
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
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/

FY16
$47M
NDEP Portfolio Components

Pre-College (K-12)

Undergraduate
Graduate

Post-Graduate

DoD Employees

STEM Interest…
Potential DoD Employees

DoD Affiliated Faculty

Pre-engineering Partnership – PEP
STEM Learning Module - SLM
Science, Mathematics and Research for Transformation (SMART) Education Program
http://smart.asee.org/
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.

Students pursuing degrees related to the following are encouraged to apply:

• Mechanical Engineering
• Nuclear Engineering
• Physics
• Geosciences
• Materials Science and Engineering
• Aeronautical and Astronautical Engineering
• Chemical Engineering
• Civil Engineering.
• Computer and Computational Sciences
• Operations Research (technical tracks only)
• Industrial and Systems Engineering (technical tracks only)

National Security Education Program
http://www.nsep.gov/
NSEP was created to develop a much-needed strategic partnership between the national security community and higher education, addressing the national need for experts in critical languages and regions. NSEP is one of the most significant efforts in international education since the 1958 passage of the National Defense Education Act, and it continues to play a critical role within the Department of Defense.
Science, Mathematics and Research for Education – SMART

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

How Much:

When: Opens in August, closes in December

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

1. AF Visiting Scientist Program

2. Awards to Stimulate and Support Undergraduate Research Experiences (ASSURE) program

3. Defense Experimental Program to Stimulate Competitive Research (DEPSCoR)

4. Defense University Research Instrumentation Program (DURIP)

5. 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.assee.org/about_the_sabattical_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.assee.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.assee.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 (USAEOE)
    http://www.usaeop.com
Applied Research (6.2) and
Adv Technol Development (6.3)

Funding Opportunity Sources:

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

**Science and Technology** ($11.5B in FY15 PBR)

<table>
<thead>
<tr>
<th>BA1 6.1 Basic Research (TRL 0-1)</th>
<th>greater knowledge of fundamental aspects of phenomena – largely use inspired</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BA2 6.2 Appl Research</strong> (TRL 2-3)</td>
<td>determine means by which a specific need may be met</td>
</tr>
<tr>
<td><strong>BA3 6.3 Adv Technol Development</strong></td>
<td>development / integration of hardware for field expt</td>
</tr>
</tbody>
</table>

**Development** ($64B in FY15)

| 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>
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<tr>
<td>TRL</td>
<td>Technology Readiness Level</td>
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<tr>
<td>PBR</td>
<td>President’s Budget Request</td>
</tr>
</tbody>
</table>

173
Priorities

Science & Technology (6.1-6.3) Priorities
1. Data to Decisions
2. Engineered Resilient Systems
3. Cyber Science and Technology
4. Electronic Warfare / Electronic Protection
5. Counter Weapons of Mass Destruction (WMD)
6. Autonomy
7. Human Systems

Significant Technology Areas
8. Advanced Electronics
9. Air Platforms
10. Biomedical
11. Counter Improvised Explosive Devices
12. Energy & Power Technologies
13. Ground & Sea Platforms
14. Materials and Manufacturing Processes
15. Sensors & Processing
16. Space
17. Weapons
Air Force Materiel Command (AFMC)

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

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

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

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

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

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

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

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

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

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

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

Manufacturing Processes that enable affordable design, production and sustainment operations

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

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

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

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

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

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

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

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

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

**How Much:** Funding for 5 years plus ramp up/down
- ~$500K/yr 6.1 funding by AFOSR
- ~$500K/yr 6.2 funding by AFRL TD
- University Matching (there are rare cases without matching funds)

**Examples:**

<table>
<thead>
<tr>
<th>Year</th>
<th>TD (Name)</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>
AFRL/RD
University Small Grants

What: This is a five-year, open-ended Broad Agency Announcement (BAA) to solicit research proposals for the United States Air Force Research Laboratory (AFRL) Directed Energy (RD) Directorate. This BAA is a university grant vehicle that can provide small grants of $100k or less to students/professors in a timely manner for the purpose of engaging U.S./U.S. territories’ colleges and universities in directed energy-related basic, applied, and advanced research projects that are of interest to the Department of Defense.

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

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

Where: BAA-RDK-2012-0001
AFRL /RI Information Institute

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

**How Much:** The anticipated funding is: FY13 - $2M; FY 14 - $2M; FY 15 - $2M; FY 16 - $1.9M. Individual awards will not normally exceed thirty six (36) months with dollar amounts normally ranging between $50K to $300K per year.

**Where:** Solicitation Number: BAA-RIK-12-14
AFRL/RV
University Grants Program

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

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

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

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

Where: BAA RV-10-03
Examples of BAAs released by AFRL in 2014

**Information (RI)**
RIK-2014-0002 Innovative Cross-Domain Cyber Reactive Information Sharing
RIK-2014-0007 Capabilities for Cyber Resiliency
RIK-2014-0010 SIGINT Collection, Processing and Exploitations
RIK-2014-0011 Mission Oriented Information Management

**Aerospace Systems (RQ)**
RQKPA-2014-0001 Fuels and Combustion Technologies for Aerospace Propulsion
RQKPC-2014-0006 Unmanned Aircraft System Airspace Integration
RQKPC-2014-0004 Aircraft Drag Reduction Program

**Materials and Manufacturing (RX)**
RQKM-2014-0001 Request for information on the Industrial Base Innovation Fund
RQKM-2014-0025 Process Modeling of Ceramic Matrix Composites

**Sensors Directorate (RY)**
RQKS-2014-0012 Sensing and Information Research Center for Understanding Systems

**Human Performance Wing (HPW)**
RHXM-2015-0002 Human-Machine Teaming for Intelligence, Surveillance and Reconnaissance
Empower, unburden and protect the Warfighter through integrated research, development and engineering solutions. To meet this commitment to the Army, RDECOM develops technologies in its laboratories and research, development and engineering centers. It also integrates technologies developed in partnership with an extensive network of academic, industry, and international partners.

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

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

**Aviation and Missile (AMRDEC)**
Deliver collaborative and innovative technical capabilities for responsive and cost-effective research, product development, and life cycle systems engineering solutions.

**Communications-Electronics (CERDEC)**
capabilities that enable situational awareness and understanding, establish and secure communications, and protect Soldiers from surprise attack.

**Edgewood Chemical Biological Center (ECBC)**
innovative solutions to counter WMD threats.

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

**Tank Automotive (TARDEC)**
develops, integrates and sustains the right technology solutions for all manned and unmanned DoD ground vehicle systems (GVS) and combat service support (CSS) equipment.
### Army R&D Laboratories/Centers

<table>
<thead>
<tr>
<th>Laboratory/Center</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Army Research Laboratory (ARL)</td>
<td>Adelphi MD</td>
</tr>
<tr>
<td>Computational and Information Sciences Directorate (CISD)</td>
<td>Adelphi MD</td>
</tr>
<tr>
<td>Sensors and Electron Devices Directorate (SEDD)</td>
<td>Adelphi MD</td>
</tr>
<tr>
<td>Human Research and Engineering Directorate (HRED)</td>
<td>Aberdeen MD</td>
</tr>
<tr>
<td>Survivability/Lethality Analysis Directorate (SLAD)</td>
<td>Aberdeen MD</td>
</tr>
<tr>
<td>Vehicle Technology Directorate (VTD)</td>
<td>Aberdeen MD</td>
</tr>
<tr>
<td>Weapons and Materials Research Directorate (WMRD)</td>
<td>Aberdeen MD</td>
</tr>
<tr>
<td>Research, Development and Engineering Command (RDECOM)</td>
<td>Aberdeen MD</td>
</tr>
<tr>
<td>Edgewood Chemical Biological Center</td>
<td>Aberdeen MD</td>
</tr>
<tr>
<td>Soldier Research Development and Engineering Center</td>
<td>Natick MA</td>
</tr>
<tr>
<td>Communication-Electronics RDE Center (CERDEC)</td>
<td>Aberdeen MD</td>
</tr>
<tr>
<td>Command Power &amp;Integration Directorate</td>
<td>Fort Belvoir VA</td>
</tr>
<tr>
<td>Night Vision &amp; Electronic Sensors Directorate</td>
<td>Fort Belvoir VA</td>
</tr>
<tr>
<td>Aviation &amp; Missile Research, Development &amp; Engineering Center (AMRDEC)</td>
<td>Redstone Arsenal, AL</td>
</tr>
<tr>
<td>Aeroflightdynamics Directorate</td>
<td>Moffet Field, CA</td>
</tr>
<tr>
<td>Aviation Applied Technology Directorate</td>
<td>Fort Eustis VA</td>
</tr>
<tr>
<td>Tank-Automotive Research, Development &amp; Engineering Center (TARDEC)</td>
<td>Warren MI</td>
</tr>
<tr>
<td>Armament Research, Development &amp; Engineering Center (ARDEC)</td>
<td>Picatinny Arsenal NJ</td>
</tr>
</tbody>
</table>
National Research Council
Postdoctoral Fellowship Program
(also a good way to ascertain basic/applied research interests)
http://nrc58.nas.edu/RAPLab10/Opportunity/Programs.aspx

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

AMRMC Army Medical Research and Material Command

AMRDEC Army Aviation and Missile Research, Development and Engineering Center

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

ECBC Edgewood Chemical Biological Center

IWR Army Corp of Engineers Institute for Water Resources

NSRDEC US Army Natick Soldier Research, Development and Engineering Center

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

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

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

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

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

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

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

Weapons and Materials Research Directorate (WMRD)
The goals of the WMRD are to enhance the lethality and survivability of weapons systems, and to meet the soldier’s technology needs for advanced weaponry and protection.
University Centers (UARCs) are university led initiatives with a 3-5 year duration that are focused on S&T issues of critical importance to the Army. Examples include:
- Materials Center of Excellence at Univ. of Delaware
- Inst for Creative Biotechnology at UCSB
- Inst for Creative Technology at USC
- Inst for Soldier Nanotechnologies at MIT

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

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

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

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

- Micro Autonomous Systems and Technology (MAST) in 2008
  - BAE lead
- Network Science (NS) 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
ARL
APPLIED SCIENTIFIC RESEARCH

What: This Broad Agency Announcement (BAA) sets forth research areas of interest to the Army Research Laboratory (ARL) Directorates and Army Research Office (ARO, basic research only),

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

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

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

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

Where: BAA W911NF-12-R-0011-02
## Core Competency 2: Ballistics and Aeromechanic Sciences

### 2.1 Energetics and Propulsion Science

| 2.1.1 Novel Insensitive Energetic Materials | Dr. Brad E. Forch | WMRD | brad.e.forch.civ@ | 410 306 0929 | APG, Md |
| 2.1.2 Laser-matter Interactions | Dr. Anthony Valenzuela | WMRD | anthony.r.valenzuela6.civ@ | 410 278 9876 | APG, Md |
| 2.1.3 Engine Technologies | Dr. Chol-Bum "Mike" Kwe | VTD | chol-bum.m.kweon2.civ@ | 410 278 9319 | APG, Md |
| 2.1.4 Drive Train Technologies | Dr. Brian D. Dykas | VTD | brain.d.dykas.civ@ | 410 278 9545 | APG, Md |
| 2.1.5 Rotorcraft Research | Dr. (LTC) David "Blake" Sti | VTD | david.b.stringer.civ@ | 216 433 8482 | NASA Lewis F |
| 2.1.6 Thermal and Propulsion Materials and Components | Dr. (LTC) David "Blake" Sti | VTD | david.b.stringer.mil | 216 433 8482 | NASA Lewis F |

### 2.2 Impact Physics

| 2.2.1 Warhead and Penetrator Technology | Mr. Timothy G. Farrand | WMRD | timothy.g.farrand.civ@ | 410 278 6065 | APG, Md |
| 2.2.2 Human Incapacitation- Penetration of Soft Tissue | Dr. Lee Magness | WMRD | lee.s.magnness.civ@ | 410 278 6022 | APG, Md |
| 2.2.3 Armor Technology for Warhead Defest | Mr. John Runyeon | WMRD | john.w.runyeon.civ@ | 410 278 6568 | APG, Md |
| 2.2.4 Early Detection and Vehicle Response to Underbod | Mr. Neil Gniazdowski | WMRD | neil.m.gniazdowski.civ@ | 410 278 6058 | APG, Md |
| 2.2.5 Ballistic Launch and Transitional Ballistics | Dr. Joseph South | WMRD | joseph.t.south.civ@ | 410 278 9077 | APG, Md |
| 2.2.6 Munition Systems Research | Dr. Muge Fermen-Coker | WMRD | muge.fermen-coker.civ@ | 410 278 6018 | APG, Md |
| 2.2.7 Human Response to Ballistic Loading | Dr. Christopher Hoppel | WMRD | christopher.p.hoppel.civ@ | 410 278 8878 | APG, Md |

### 2.3 Aeromechanics

| 2.3.1 Rotorcraft Aeroelasticity | Mr. Matthew L. Wilbur | ? | matthew.l.wilbur.civ@ | 757 864 1268 | collocated at ARL Research Interests |
| 2.3.2 Vehicle Dynamics | Dr. Muthuvel Murugan | VTD | muthuvel.murugan.civ@ | 410 278 7903 | APG, Md |
| 2.3.3 Vehicle Integrated Analysis Technologies | Dr. Rajneesh Singh | VTD | rajneesh.k.singh.civ@ | 410 278 4022 | APG, Md |
| 2.3.4 Affordable Precision Munition technologies | Dr. Paul Weinacht | WMRD | paul.weinacht.civ@ | 410 306 0800 | APG, Md |
| 2.3.5 Weapon and Ammunition Accuracy | Dr. Paul Weinacht | WMRD | paul.weinacht.civ@ | 410 306 0800 | APG, Md |

### 2.4 Ballistic Vulnerability

| 2.4.1 Weapons Effectiveness | Dr. William Oberle | WMRD | william.f.oberle.civ@ | 410 278 4362 | APG, Md |
| 2.4.2 Fundamental Basis for Survivable Systems Subjecte | Mr. Neil Gniazdowski | WMRD | neil.m.gniazdowski.civ@ | 410 278 6058 | APG, Md |
Core Competency 3: Information Sciences

3.1 Network Sciences
3.1.1 Network Theory
Dr. Brian Rivera
CISD
brian.m.rivera.civ@
301 394 2298
Adelphi, Md

3.1.2 Secure Wireless Mobile Communications
Dr. Brian Sadler
CISD
brian.m.sadler6.civ@
301 394 1239
Adelphi, Md

3.1.3 Sensor Network Communications
Mr. Ronald G. Tobin
CISD
ronald.g.tobin.civ@
301 394 2184
Adelphi, Md

3.1.4 Cyber Defense and Information Assurance
Dr. Robert F. Ebacher
CISD
robert.f.erbacher.civ@
301 394 1674
Adelphi, Md

3.1.5 Unattended Ground Sensor Technology
Mr. Tom Walker
SEDD
thomas.walker68.civ@
301 394 0756
Adelphi, Md

3.1.6 Disposable Sensor Technology
Mr. Jeff Houser
SEDD
jeffrey.g.houser.civ@
301 394 0797
Adelphi, Md

3.2 Decision Support Sciences
3.2.1 Information Science and Technology
Dr. Barbara Broome
CISD
barbara.d.broome.civ@
301 394 1956
Adelphi, Md

3.2.2 Natural Language Processing
Dr. Melissa Holland
CISD
virginia.m.holland6.civ@
301 394 3001
Adelphi, Md

3.2.3 Software Technologies Targeting Interoperability
Mr. Larry J. Tokarcik
CISD
larry.j.tokarcik.civ@
301 394 5614
Adelphi, Md

3.2.4 High-level Information Fusion, Exploitation, Social
Mr. Mark Thomas
CISD
mark.a.thomas342.civ@
410 278 5840
APB, Md

3.2.5 RF Phenomenology, Signal Processing and System
Dr. Anders Sullivan
SEDD
anders.j.sullivan.civ@
301 394 0838
Adelphi, Md

3.2.6 Image Processing
Dr. Raghuvan Rana
SEDD
raghuveer.m.rao.civ@
301 394 0860
Adelphi, Md

3.2.7 Acoustic Technology
Mr. Mike Scanlon
SEDD
michael.v.scanlon2.civ@
301 394 3081
Adelphi, Md

3.2.8 Sniper and Artillery Location Technology
Mr. Mike Scanlon
SEDD
michael.v.scanlon2.civ@
301 394 3081
Adelphi, Md

3.2.9 Electric Field Sensor Technology
Mr. David M. Hull
SEDD
david.m.hull6.civ@
301 394 3140
Adelphi, Md

3.2.10 Passive Magnetic Sensor Technology
Dr. Alan S. Edelstein
SEDD
alan.s.edelstein.civ@
301 394 2162
Adelphi, Md

3.2.11 Sensor, Data and Information Fusion
Dr. Lance Kaplan
SEDD
lance.m.kaplan.civ@
301 394 0807
Adelphi, Md

3.2.12 Quantitative Technology Assessment
Mr. Eric Spero
VTD
eric.spero.civ@
410 278 8743
APG, Md

3.2.13 Technology Demonstration and Assessments for C
Mr. Andrew Ladas
SEDD
andrew.p.ladas.civ@
301 394 2622
Adelphi, Md

3.3 Computational Sciences
3.3.1 Simulation-based Engineering Sciences
Mr. Jerry Clarke
CISD
jerry.a.clarke4.civ@
410 278 9279
APG, Md

3.3.2 Quantum Information Science
Dr. Patricia Lee
SEDD
patricia.j.lee26.civ@
301 394 1917
Adelphi, Md

3.3.3 Signature Management Codes, Predictions and M
Dr. Keith Snail
SEDD
keith.a.snail.civ@
301 394 5507
Adelphi, Md

3.4 Autonomy
3.4.1 Tactical Mobile Robotics
Mr. Stuart Young
CISD
stuart.h.young.civ@
301 394 5618
Adelphi, Md

3.4.2 Micro Autonomous Systems and Technology
Dr. Brett Piekaraki
SEDD
brett.h.piekarski.civ@
301 394 1263
Adelphi, Md

3.4.3 Robotics Science and Technology
Dr. Jon Bornstein
VTD
jonathan.a.bornstein.civ@
410 278 8810
APG, Md

3.5 Atmospheric Sciences
Battlefield Environment Division
- AMSRD-ARL-CL-E
3.5.1 Atmospheric Sensing and Characterization
Ms. Pamela A. Clark
CISD
pamela.a.clark.civ@
301 394 3447
Adelphi, Md

3.5.2 Atmospheric Modeling and Decision Aids
Ms. Pamela A. Clark
CISD
pamela.a.clark.civ@
301 394 3447
Adelphi, Md

3.5.3 Intelligent Atmospheric Optics Systems for Army B
Ms. Pamela A. Clark
CISD
pamela.a.clark.civ@
301 394 3447
Adelphi, Md

3.6 Electronic and Information Warfare Vulnerability
ARL Research Interests

Core Competency 4: Human Sciences

4 Human Sciences
4.1 Soldier Performance
4.1.1 Soldier Performance Research
Dr. Michael LaFiandra
HRED
michael.e.lafianadra.civ@us.army.mil
410 278 5973 APG, Md
4.1.2 Neuroscience
Dr. Kaleb McDowell
HRED
kaleb.g.mcdowell.civ@us.army.mil
410 278 1453 APG, Md
4.1.3 Social/Cognitive Network Science
Dr. Don Headley
HRED
donald.b.headley.civ@us.army.mil
410 278 5919 APG, Md
4.2 Simulation and Training
4.2.1 Adaptive and Intelligent Training Technologies
Dr. Heather Holden
HRED
heather.k.holdn@us.army.mil
407 208 5693 Orlando, FL
4.2.2 Advanced Distributive Simulation
Mr. Charles Amburn
HRED
charles.amburn@us.army.mil
407 384 3901 Orlando, FL
4.2.3 Immersive Learning
Mr. Douglas Maxwell
HRED
douglas.b.maxwell@us.army.mil
407 384 5097 Orlando, FL
4.2.4 Synthetic Environments
Mr. Julio De La Cruz
HRED
julio.delacruz@us.army.mil
407 384 3733 Orlando, FL
4.2.5 3D Holography Modeling and Simulation
Mr. Matthew Hackett
HRED
matthew.g.hackett@us.army.mil
407 384 5349 Orlando, FL
4.2.6 Training Application Environments: Ground
4.2.6.1 Embedded Simulation and Training for Combat Systems
Ms. Latika Eifert
HRED
latika.eifert@us.army.mil
407 384 5338 Orlando, FL
4.2.6.2 Tactical Engagement Simulation Sensor Technology
Mr. Frank Tucker
HRED
frank.tucker2@us.army.mil
407 384 5448 Orlando, FL
4.2.6.3 Indoor Position, Location and Tracking for Live Training
Mr. Frank Tucker
HRED
407 384 3835 Orlando, FL
4.2.7 Training Application Environments
Mr. Jack Norfleet
HRED
jack.norfleet@us.army.mil
407 384 3835 Orlando, FL
4.2.8 Training Application environments Dismounted Soldier
Mr. Pat Garrity
HRED
pat.garrity@us.army.mil
407 384 3663 Orlando, FL
4.2.9 Advanced Situational / Battlespace Awareness
4.2.9.1 Adversarial Reasoning
Mr. Jerry Speer
HRED
jerry.speer@us.army.mil
407 384 3835 Orlando, FL
4.2.9.2 Emerging Modeling and Simulation Technologies
Mr. Jerry Speer
HRED
4.3 Human systems Integration
4.3.1 Human Systems Integration
Dr. Pam Savage-Kneipshiel
HRED
pamela.a.savage-kneipshiel.civ@us.army.mil
410 278 5916 APG, Md
4.3.2 Human Robotic Interaction
Dr. Don Headley
HRED
donald.b.headley.civ@us.army.mil
410 278 5919 APG, Md

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

5.1 Ballistic vulnerability Analysis and Assessment
Ballistics and NBC Division - AMSRD-ARL-SL-B
5.1.1 Vulnerability Research and Analysis for Under-body
Mr. Michael Tegtmeyer
SLAD
michael.b.tegtmeyer.civ@us.army.mil
410 278 6074 APG, Md
5.2 Electronic and Information Warfare Vulnerability / Information and Electronic Protection Division - AMSRD-ARL-SL-E
5.2.1 RF Directed Energy /High Power Microwave
Mr. Daniel Williams
SLAD
daniel.s.williams52.civ@us.army.mil
575 678 4694 White Sands, NM
5.2.2 RF Digital Models/Simulations
Mr. Jose Gonzalez
SLAD
jose.m.gonzalez158.civ@us.army.mil
575 678 5309 White Sands, NM
Examples of RDEC Solicitations
What: This Broad Agency Announcement (BAA) is intended to fulfill requirements for scientific study and experimentation directed toward advancing state-of-the-art technologies and/or increasing knowledge and understanding as a means of eliminating current technology barriers.

A. Combat Feeding Equipment and Systems
B. Combat Ration Research and Development
C. Warfighter Systems Technologies
D. Shelters and Life Support Technologies for Contingency Basing
E. Airdrop–Advanced Personnel and Cargo Airdrop Systems
F. Textile Technologies
G. Modeling and Simulation
H. Warfighter Advanced Technologies
I. Technology Enabled Capability Demonstrations (TECDs)

When: Effective from 1 March 2013–31 March 2015
Where: Solicitation Number: BAA W911QY-13-R-0032
Edgewood Chemical and Biological Center

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

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

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

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

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

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

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

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

Where: W15P7T-13-R-A424, Amended 31 October 2013
Corps of Engineers (CoE)
ARMY ENGINEER RESEARCH AND DEVELOPMENT CENTER (ERDC)

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

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

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

**Where:** BAA W912HZ-14-BAA-01
<table>
<thead>
<tr>
<th><strong>Naval Applied Research / Advanced Technology programs</strong></th>
</tr>
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<tbody>
<tr>
<td><strong>Office of Naval Research</strong></td>
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<tr>
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<tr>
<td><strong>Naval Research Laboratory (NRL)</strong></td>
</tr>
<tr>
<td>Washington DC</td>
</tr>
<tr>
<td>Stennis MS</td>
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<tr>
<td>Monterey CA</td>
</tr>
<tr>
<td><strong>Navy Medical Research Ctr, Bethesda MD</strong></td>
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<tr>
<td><strong>Naval Postgraduate School, Monterey CA</strong></td>
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<tr>
<td><strong>Naval Surface Warfare Center (NSWC)</strong></td>
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<tr>
<td>Dahlgren Division VA</td>
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<tr>
<td>Carderock Div MD and PA</td>
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<tr>
<td>Crane Division IN</td>
</tr>
<tr>
<td>Indian Head Division MD</td>
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<tr>
<td>Port Hueneme Division CA</td>
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<tr>
<td>Panama City Division FL</td>
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<tr>
<td><strong>Naval Air Warfare Center (NAWC)</strong></td>
</tr>
<tr>
<td>Aircraft Div, Patuxent River, MD</td>
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<tr>
<td>Weapons Div, China Lake CA</td>
</tr>
<tr>
<td><strong>Naval Undersea Warfare Center (NUWC)</strong></td>
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<tr>
<td>Div Newport, Newport RI</td>
</tr>
<tr>
<td>Div Keyport, Pudget Sound WA</td>
</tr>
<tr>
<td><strong>Space and Naval Warfare Systems Center</strong></td>
</tr>
<tr>
<td>San Diego CA</td>
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</tbody>
</table>
National Research Council
Postdoctoral Fellowship Program
(also a good way to ascertain basic/applied research interests)
http://nrc58.nas.edu/RAPLab10/Opportunity/Programs.aspx

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

Naval Medical Research Center/ Naval Health Research Center

Naval Postgraduate School

Naval Research Laboratory
http://nrc58.nas.edu/RAPLab10/Opportunity/Opportunities.aspx?LabCode=34
ONR
Examples of Applied Research and Advanced Technology Opportunities

Examples of BAAs addressing 6.2/6.3 funding opportunities
ONR BAA 14-003 Aluminum Alloy Corrosion Control and Prevention
ONR BAA 14-006 Electronic Warfare Technology
ONR BAA 14-008 Joint Non-Lethal Weapons
ONR BAA 14-009 Adv Analytics and Data Science for Naval Warfare Planning and Execution
ONR BAA 15-0005 Solid State, High Power Laser Weapon Demonstrator
ONR BAA 15-0008 Accelerating the Development of Small Unit Decision Making

Future Naval Capabilities (ONR program with 6.2/6.3 funding)
• Capable Manpower: Intuitive systems and personnel tools for matching Sailors and Marines to the right jobs and training for mission-essential competencies
• Enterprise and Platform Enablers: Cross-cutting technologies to lower acquisition, operations and maintenance costs
• Expeditionary Maneuver Warfare: Naval ground forces with special emphasis on regular and irregular warfare
• Force Health Protection: Medical equipment, supplies and procedures to reduce morbidity and mortality when casualties occur
• FORCEnet: C4ISR; networking; navigation; decision support; and space technologies that provide an architectural framework for naval warfare in the information age
• Power & Energy: Energy security, efficient power and energy systems, high energy, pulse power
• Sea Basing: Logistics, shipping and at-sea transfer technologies that provide operational independence
• Sea Shield: Missile defense, antisubmarine warfare, mine warfare and fleet/force protection technologies that provide global defensive assurance
• Sea Strike: Weapons, aircraft and expeditionary warfare technologies that provide precise and persistent offensive power

ONR
Innovative Naval Prototypes

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

Current INPs

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

What:
The Naval Air Systems Command, Propulsion and Power Engineering Department, Patuxent River, MD conducts applied and advanced research and development programs designed to meet projected propulsion and power technology needs for future Naval air vehicles.

Offerors must first submit White Papers (WPs), giving an overview (as applicable) of the technical approach, risks, milestones, and a Rough Order of Magnitude (ROM) of costs. If invited, offerors may submit a Formal Technical and Cost Proposal.

The Government contemplates award of a Cost Reimbursable contract vehicle which may be a Cost-Plus Fixed-Fee (CPFF), or other Cost or Cost Sharing arrangement.

The technologies developed and demonstrated under this Broad Agency Announcement will significantly increase mission performance, operational capabilities and affordability of Naval aircraft. The technical areas in which research and development are contemplated for Fiscal Year 2015 are:

BAA 121. Advanced Aircraft Power Systems  
BAA 122. Fuel Technology  
BAA 123. Aircraft Energy Conservation and Environmental Compliance  
BAA 124. Propulsion and Power System, Condition Based Maintenance, Prognostics, Diagnostics, and Health Monitoring

When: Open until 13 Nov 2015

Where: FBO Solicitation Number: N68335-09-R-0204
Awards may take the form of contracts or cooperative agreements.

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

Areas of Interest:
Aerospace Science Research
  A. Advanced aerospace propulsion
  B. Naval Aviation technology (design tools and analysis)
  C. Combat safe insensitive munitions
  D. Energetic Materials
  E. Advanced combustion
  F. High-energy dense oxidizers
  G. High-speed weapons
  H. Batteries and power systems

Air Warfare and Naval Weapons Applications
  A. Enhanced weapons systems
  B. Future naval capabilities
  C. High-Speed Weapons technology
  D. High-density reactive materials

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

Where: Solicitation number N68936-14-R-0147
What:
The requests for white papers for specific topics will be transmitted via Topic Calls issued as amendments to this this BAA. Each Topic Call will specify the due date for the requested white papers. The following identifies NSWCDD TC areas for informational purposes only. Not all technologies identified will be the subject of Topic Calls and some Topic Calls may be responsive to more than one TC.

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

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

Where: NSWCDD BAA N00178-14-Q-1200
What: White papers are initially sought to preclude unwarranted effort on the part of the offeror in preparing full technical and cost proposals without an initial assessment of the operational, technical and logistical feasibility of the concept.

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

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

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

When: Anytime during BAA lifetime.

Where: NWPT.NUWC_NPT_59_BAA_Proposal_Submittal@navy.mil
What: Research and technology where risk and payoff are both very high, and Success may provide dramatic advances for military roles and missions.

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

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

How much: ~$M as warranted

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

Where: http://www.darpa.mil/Opportunities/Universities/
http://www.darpa.mil/Opportunities/Universities/Young_Faculty.aspx
## DARPA Advanced Development 6.02xxxE
### FY2105 Budget Request

<table>
<thead>
<tr>
<th>Program Element Title</th>
<th>FY2016</th>
<th>FY2015</th>
<th>FY2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBT - Materials and Biological Technology</td>
<td>167</td>
<td>160</td>
<td>201</td>
</tr>
<tr>
<td>BT - Biomedical Technology</td>
<td>115</td>
<td>112</td>
<td>100</td>
</tr>
<tr>
<td>BW - Biological Warfare Defense</td>
<td>53</td>
<td>45</td>
<td>25</td>
</tr>
<tr>
<td>IT - Information and Communications Technology</td>
<td>340</td>
<td>334</td>
<td>400</td>
</tr>
<tr>
<td>ELT - Electronics Technology</td>
<td>233</td>
<td>179</td>
<td>183</td>
</tr>
<tr>
<td>TT - Tactical Technology</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Naval Warfare</td>
<td>51</td>
<td>34</td>
<td>33</td>
</tr>
<tr>
<td>Advanced Land Systems Technology</td>
<td>71</td>
<td>71</td>
<td>58</td>
</tr>
<tr>
<td>Advanced Tactile Technology</td>
<td>37</td>
<td>23</td>
<td>16</td>
</tr>
<tr>
<td>Aeronautics Technology</td>
<td>31</td>
<td>61</td>
<td>54</td>
</tr>
<tr>
<td>Network Centric Technology</td>
<td>129</td>
<td>116</td>
<td>81</td>
</tr>
</tbody>
</table>
### DARPA Applied Research Budget 0603XXXE

<table>
<thead>
<tr>
<th>Program Element Title</th>
<th>FY2016</th>
<th>FY2015</th>
<th>FY2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCC - Command, Control and Communications Systems</td>
<td>227</td>
<td>243</td>
<td>239</td>
</tr>
<tr>
<td>NET - Network-Centric Warfare Technology</td>
<td>391</td>
<td>387</td>
<td>259</td>
</tr>
<tr>
<td>MT - Advanced Electronics Technologies</td>
<td>83</td>
<td>92</td>
<td>107</td>
</tr>
<tr>
<td>SEN - Sensor Technology</td>
<td>280</td>
<td>312</td>
<td>276</td>
</tr>
<tr>
<td>SPC - Space Programs and Technology</td>
<td>170</td>
<td>180</td>
<td>143</td>
</tr>
<tr>
<td>AIR - Advanced Aerospace Systems</td>
<td>178</td>
<td>130</td>
<td>145</td>
</tr>
<tr>
<td>Classified DARPA Programs</td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>Program Manager</td>
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</tr>
<tr>
<td>Richard Bagnell</td>
<td><a href="mailto:richard.bagnell@darpa.mil">richard.bagnell@darpa.mil</a></td>
<td>2010</td>
<td>high-energy lasers, electro-optic sensors, and aero-optic phenomena.</td>
</tr>
<tr>
<td>John Chapin</td>
<td><a href="mailto:john.chapin@darpa.mil">john.chapin@darpa.mil</a></td>
<td>2011</td>
<td>advanced wireless systems and associated spectrum access and spectrum sharing technologies, and advanced networking technology for dynamically changing and heterogeneous communications systems</td>
</tr>
<tr>
<td>William Conley</td>
<td><a href="mailto:william.conley@darpa.mil">william.conley@darpa.mil</a></td>
<td>2013</td>
<td>electronic protection for communications and radar systems.</td>
</tr>
<tr>
<td>John Gorman</td>
<td><a href="mailto:john.gorman@darpa.mil">john.gorman@darpa.mil</a></td>
<td>2013</td>
<td>statistical estimation and learning, advanced radar systems, and distributed sensing.</td>
</tr>
<tr>
<td>Lin Haas</td>
<td><a href="mailto:lin.haas@darpa.mil">lin.haas@darpa.mil</a></td>
<td>2012</td>
<td>positioning, navigation, and timing (PNT) and geolocation technologies</td>
</tr>
<tr>
<td>Richard Heinrichs</td>
<td><a href="mailto:richard.heinrichs@darpa.mil">richard.heinrichs@darpa.mil</a></td>
<td></td>
<td>transition DARPA technologies to the acquisition and user communities, programmatic best practices, transition strategies and plans, and program execution.</td>
</tr>
<tr>
<td>John Kamp</td>
<td><a href="mailto:john.kamp@darpa.mil">john.kamp@darpa.mil</a></td>
<td>2011</td>
<td>ISR and EW technologies and systems, optical LPD/LPI sensing and communication, new weapon technologies and effects, weapon and ISR countermeasures and counter-countermeasures, space control, and the integration of space with tactical systems</td>
</tr>
<tr>
<td>Thomas Karr</td>
<td><a href="mailto:thomas.karr@darpa.mil">thomas.karr@darpa.mil</a></td>
<td>2012</td>
<td>battle management, command and control (BMC2); autonomy, optimization and control theory; and modeling and simulation</td>
</tr>
<tr>
<td>Craig Lawrence</td>
<td><a href="mailto:craig.lawrence@darpa.mil">craig.lawrence@darpa.mil</a></td>
<td>2013</td>
<td></td>
</tr>
<tr>
<td>Program Officer</td>
<td>email</td>
<td>Start Date</td>
<td>Interests</td>
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<tr>
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</tr>
<tr>
<td>Wayne Phoel</td>
<td><a href="mailto:wayne.phoel@darpa.mil">wayne.phoel@darpa.mil</a></td>
<td>2013</td>
<td>resilient networks with a focus on protection for wireless systems</td>
</tr>
<tr>
<td>Alexander Pilipowskyj</td>
<td><a href="mailto:alexander.pilipowskyj@darpa.mil">alexander.pilipowskyj@darpa.mil</a></td>
<td>2008</td>
<td></td>
</tr>
<tr>
<td>Richard Ridgway</td>
<td><a href="mailto:Richard.ridgway@darpa.mil">Richard.ridgway@darpa.mil</a></td>
<td>2011</td>
<td>RF and microwave electronics, integrated optical components, millimeter-wave electronics and communications systems</td>
</tr>
<tr>
<td>Vincent Sabio</td>
<td><a href="mailto:vincent.sabio@darpa.mil">vincent.sabio@darpa.mil</a></td>
<td>2010</td>
<td>sensor and exploitation technology for military intelligence, surveillance, and reconnaissance (ISR) applications, with an emphasis on advanced radar systems</td>
</tr>
<tr>
<td>John Shaw</td>
<td><a href="mailto:john.shaw@darpa.mil">john.shaw@darpa.mil</a></td>
<td>2013</td>
<td>battle management, command and control (BMC2) technologies and systems, systems engineering, and large-scale optimization</td>
</tr>
<tr>
<td>Shelby Sullivan</td>
<td><a href="mailto:shelby.sullivan@darpa.mil">shelby.sullivan@darpa.mil</a></td>
<td>2014</td>
<td></td>
</tr>
<tr>
<td>Bruce Wallace</td>
<td><a href="mailto:bruce.wallace@darpa.mil">bruce.wallace@darpa.mil</a></td>
<td>2011</td>
<td>Technologies for Multifunction Millimeter wave systems</td>
</tr>
<tr>
<td>Stephen Waller</td>
<td><a href="mailto:stephen.waller@darpa.mil">stephen.waller@darpa.mil</a></td>
<td>2014</td>
<td>innovative technology and systems integration solutions for U.S. air dominance</td>
</tr>
<tr>
<td>Program Manager</td>
<td>email</td>
<td>start date</td>
<td>Interests</td>
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</tr>
<tr>
<td>Robert Arbach</td>
<td><a href="mailto:robert.arbach@darpa.mil">robert.arbach@darpa.mil</a></td>
<td>2009</td>
<td>Aircraft Fuel Efficiency, Aircraft Systems, and Rapid Manufacturing</td>
</tr>
<tr>
<td>Ashish Bagai</td>
<td><a href="mailto:ashish.bagai@darpa.mil">ashish.bagai@darpa.mil</a></td>
<td>2012</td>
<td></td>
</tr>
<tr>
<td>Travis Blake</td>
<td><a href="mailto:travis.blake@darpa.mil">travis.blake@darpa.mil</a></td>
<td>2009</td>
<td>Advanced ground based space domain awareness sensors and data processing</td>
</tr>
<tr>
<td>Mitchell Clapp</td>
<td><a href="mailto:michell.burnsideclaopp@darpa.mil">michell.burnsideclaopp@darpa.mil</a></td>
<td>2011</td>
<td>Advanced operational space applications and analysis and design in thermodynamics and heat transfer</td>
</tr>
<tr>
<td>Jerome Dunn</td>
<td><a href="mailto:jerome.dunn@darpa.mil">jerome.dunn@darpa.mil</a></td>
<td>2013</td>
<td>advanced munitions, counter-swarm, distributed unmanned sensor networks and counter-mine technologies</td>
</tr>
<tr>
<td>Larry Gunn</td>
<td><a href="mailto:larry.gunn@darpa.mil">larry.gunn@darpa.mil</a></td>
<td>2013</td>
<td>space system and technology development</td>
</tr>
<tr>
<td>Mark Gustafson</td>
<td><a href="mailto:mark.gustafson@darpa.mil">mark.gustafson@darpa.mil</a></td>
<td>2012</td>
<td>advanced aircraft and weapons with specific interests in propulsion, advanced technologies, hypersonics, and X-planes</td>
</tr>
<tr>
<td>Jean-Charles Lede</td>
<td><a href="mailto:jena-charles.lede@darpa.mil">jena-charles.lede@darpa.mil</a></td>
<td>2013</td>
<td>autonomous/unmanned air vehicle systems, cooperative systems, counter UAS and counter-swarms, and operations in contested and denied environments</td>
</tr>
<tr>
<td>Scott Littlefield</td>
<td><a href="mailto:scot.littlefield@darpa.mil">scot.littlefield@darpa.mil</a></td>
<td>2011</td>
<td>autonomous/unmanned air vehicle systems, cooperative systems, counter UAS and counter-swarms, and operations in contested and denied environments</td>
</tr>
<tr>
<td>John Losinski</td>
<td><a href="mailto:john.losinski@darpa.mil">john.losinski@darpa.mil</a></td>
<td>2011</td>
<td>Space system program management and technology development</td>
</tr>
<tr>
<td>Program Manager</td>
<td>Email</td>
<td>Start Date</td>
<td>Interests</td>
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<tr>
<td>Arthur Mabbett</td>
<td><a href="mailto:arthur.mabbett@darpa.mil">arthur.mabbett@darpa.mil</a></td>
<td>2010</td>
<td>aeroacoustics and noise control; blast modeling and vehicle survivability; smart/guided munitions; air defense; supersonic aerodynamics; unmanned aerial vehicles and flapping wing flight</td>
</tr>
<tr>
<td>Kevin Massey</td>
<td><a href="mailto:kevin.massey@darpa.mil">kevin.massey@darpa.mil</a></td>
<td>2013</td>
<td>space-based imagers, sensor data processing, and increasing the resilience of the U.S. space architecture through disruptive technology</td>
</tr>
<tr>
<td>Lindsay Millard</td>
<td><a href="mailto:lindsay.millard@darpa.mil">lindsay.millard@darpa.mil</a></td>
<td>2014</td>
<td>manned and unmanned teaming in complex environments, biomimetic unmanned systems and technologies to improve the performance and capability of dismounted ground forces</td>
</tr>
<tr>
<td>Christopher Orlowski</td>
<td><a href="mailto:christopher.orlowski@darpa.mil">christopher.orlowski@darpa.mil</a></td>
<td>2014</td>
<td>robotic servicing of satellites.</td>
</tr>
<tr>
<td>Daniel Patt</td>
<td><a href="mailto:daniel.patt@darpa.mil">daniel.patt@darpa.mil</a></td>
<td></td>
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<tr>
<td>Gordon Roesler</td>
<td><a href="mailto:gordon.roesler@darpa.mil">gordon.roesler@darpa.mil</a></td>
<td>2014</td>
<td>supporting access to and through space; unmanned air vehicles, energy generation and storage, hypersonics</td>
</tr>
<tr>
<td>Jess Sponable</td>
<td><a href="mailto:jess.sponable@darpa.mil">jess.sponable@darpa.mil</a></td>
<td>2012</td>
<td>maritime and propulsion sciences to including corrosion, propulsion, hydrodynamics, computational methods and manufacturing</td>
</tr>
<tr>
<td>Christopher Warren</td>
<td><a href="mailto:christopher.warren@darpa.mil">christopher.warren@darpa.mil</a></td>
<td>2013</td>
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</tbody>
</table>
Defense Threat Reduction Agency (DTRA) and
USSTRATCOM Center for Combating WMD (SCC-WMD)
www.dtra.mil
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
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

When: 22 Dec 2014 for FY2015 competition in HDTRA1-14-CHEM-BIO

Where: HDTRA1-14-CHEM-BIO-BAA
HDTRA1-09-14-FRCWMD-BAA

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<td>6.2</td>
<td>226</td>
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<td>6.3</td>
<td>133</td>
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Chemical/Biological Technologies Department
FY2014 - FY2016 Program Build

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

When: Dec 2014 for the amended call in Nov 2014

Where: HDTRA1-14-CHEM-BIO-BAA, Amendment 10
Diagnostics, Detection, and Disease Surveillance Division
CBA-01 Vertical Flow Paper-based Devices as Point of Need Multiplex Diagnostic and Surveillance
CBA-02 Fieldable Tests for Early Exposure Response Program: Viral vs Bacterial Biomarkers
CBA-03 Portable Field Analytical Platform for Detection/Diagnosticcs of Protein Targets - Ebola
CBA-04 Biosurveillance Analytics and Applications for the Biosurveillance Ecosystem (BSVE)
CBA-05 Wearable Early Warning

Translational Medicine Division (CBM)
CBM-01 Vaccines Directed Against Francisella Tularensis
CBM-02 Platform Technologies for Rapid and Translational Vaccine Design
CBM-03 Vaccines Directed Against Burkholderia Species
CBM-04 Novel Medical Countermeasures Development Targeting Staphyloccocus Enterotoxin
CBM-05 Novel Medical Countermeasures Development Targeting Filoviridae Pathogenesis
CBM-06 Overcoming Mechanisms of Antimicrobial Resistance and Biothreat Bacteria
CBM-07 Investigation of Next Generation Adjuvants for Biodefense Vaccines

Advanced and Emerging Threat Division (CBS)
CBS-01 Discovery of New Central Nervous System Accessible Acetylcholinesterase Reactivators
CBS-02 Alternative Manufacturing Porcesses for Protein-based Medical Countermeasures
CBS-03 Therapeutics and Clinical Strategies for Cutaneous Injury from Chem Warfare Agent Exposure
CBS-04 Media Scoping Study

Physical Science and Technology Division (CBT)
CBT-01 Bio-inspired Catalytic Systems for Chemical/Biological Remediation
DTRA
Fundamental Research

**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

**Where:** HDTRA1-09-14-FRCWMD-BAA, Amendment 18
https://www.dtrasubmission.net/portal/
DTRA
Non-Traditional Agent (NTA) Initiatives

What: Research specifically in the area of Advanced and Emerging Threats to support the CB 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 Thrusts of Enabling Science, Threat Activity Sensing and Reporting

How Much: Up to 3 years

When: White paper due 10 Apr 2013

Where: HDTRA1-14-17-NTA, attachment 9
DTRA R&D Innovation Office
Science and Technology New Initiatives

What: This Broad Agency Announcement (BAA) is an extramural endeavor focused on innovative research and development (R&D) activities and related study efforts that advance technical state-of-the-art or increase knowledge and understanding of overarching challenges for combating WMD. Investigations are limited to projects starting at or between Technology Readiness Levels (TRL) 2-5.

Two general categories of projects will be considered: 1) Technical investigations to advance state-of-the-art in materiel; and 2) Technically-based studies to inform the employment of or investment in future combating WMD capabilities.

The white paper and proposal selection process will be conducted based upon a technical peer review.

Topics of interest:
- TA1. Chemical/Biological. Develop, demonstrate, and transition timely and effective chemical and biological defense solutions
- TA2. Counter WMD. Develop, demonstrate, and transition innovative technologies and capabilities to actively counter the full spectrum of chemical, biological, radiological, nuclear and explosive (CBRNE) threats
- TA3. Radiation/Nuclear. Develop, demonstrate and transition technologies and capabilities to mitigate the threat and/or effects of nuclear and radiological events
- TA4. Reachback and Decision Support. Develop, demonstrate and transition CBRNE decision support technologies and capabilities for planning, operations, and post event analysis to combatant commands, OSD, Joint Staff, intelligence community, command elements, and other U.S. government and first responders
- TA5. Treaty Verification/Compliance. Develop, demonstrate and transition technologies supporting monitoring, compliance and verification efforts related to treaties such as the Comprehensive Test-Ban Treaty (CTBT), Strategic Arms Reduction Treaty (START), Fissile Material Cutoff Treaty (FMCT), and the Biological and Chemical Weapons Conventions. Technologies
- TA6. Research and Technology Studies. Develop innovative products that encourage new thinking, address current technology gaps, identify developing threats, and improve operational capabilities to respond to WMD threats supporting these topics

When: Monthly

Where: HDTRA1-11-16-RDIS-BAA
http://www.dtrasubmission.net
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.DFSCOE-RDTE@mail.mil.
What: Emergent Research and Development Requirements
DLA requests interested parties to submit a five page white paper. White papers may be based on fundamental R&D; concept formulation; assessment of system and subsystem requirements and processes; development, analysis and evaluation of concepts, systems and subsystems; development of associated industrial capabilities support techniques and processes; development of associated manufacturing techniques and processes; modeling and simulation; simulation-based acquisition; integrated data environments and product data managers; and development of operational systems.

The particular emergent requirements that are the subject of this BAA are:
   Medical Logistics
   Aged Backorder Reduction

When: Due Date Aug 25, 2014
Where: BAA0003-10 (modified)

What: Weapon System Sustainment Program (WSSP)
The objective of the RDSS II Program will be to structure, execute and coordinate individual STPs to support the Weapon System Sustainment Program (WSSP). DLA's WSSP has been in existence in some form since Fiscal Year 2000, first as the Aging Aircraft Program, then the Aging Systems Program, and now the WSSP. It is part of DLA's Logistics R&D program. The mission of the WSSP is to conduct research and development projects directed toward improving existing DLA processes that can provide tools and methods to help DLA improve delivery of parts and services to DLA's customers. The mission is accomplished through sharply-focused STPs. DCSO-P intends to award one or more contracts with a one-year base period and four one-year option periods.

CLIN 0001 STP COORDINATION AND MANAGEMENT
CLIN 0002 Short Term Projects (STPs)
Contract Line Item Numbers (CLINs).

How Much: Subject to availability of funds, the Government plans to invest up to $50 million during Fiscal Years 2015- 2020 for funding research in response to this BAA. STP durations typically range from four months to 24 months.

PROGRAM: Weapon System Sustainment Program (WSSP)
When: DUE DATE: 04-29-14
Where: BAA-0001-14
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.
What: USSOCOM has a long-term goal to develop technologies to meet Special Operations Forces (SOF) mission requirements. The intent is to accelerate the delivery of these innovative capabilities to the SOF warfighter. Those challenges are 1) trade space between weight, protection, power, and mobility; 2) cost; and 3) system component integration.

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

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

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

What: Pursues hi-risk / hi-payoff solutions to “intractable” environ problems
Focuses on cross-service requirements
Published Statements of Need (SON) to identify topics of interest
Core Solicitation for full scale efforts
Exploratory Development Proposals (SEED) for up to $150K for 1 year
SERDP is 6.3 (tech develop) [ESTCP is 6.4 (field demonstration)]

How Much: Core ~$200-300K for clean-up to ~$750 – 1000K for munitions mgmt
When: Core Solicitation Preproposals ~Jan 08 2015 for FY2016 solicitation
SEED Proposals ~Mar 10 2015 for FY2016 solicitation
Where: For FY 2016 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

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<tr>
<td>ESTCP</td>
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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
DOD Advanced Manufacturing Opportunities

SBIR/STTR
Rapid Innovation Fund (RIF)
ManTech
Innovative Manufacturing Institutes (IMI)
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>
<th></th>
<th>SBIR</th>
<th>STTR</th>
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<tbody>
<tr>
<td>Phase I: Project feasibility</td>
<td>6 months, up to $150,000</td>
<td>12 months, up to $100,000</td>
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<tr>
<td>Phase II: Project development to prototype</td>
<td>2 years, up to $1,000,000</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>
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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

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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


For a listing if SBIR program managers: http://sbir.us/pm.html
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

<p>|                                | SBIR       | STTR       |</p>
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<td>Set-Aside of Agency Budget</td>
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<td>0.3%</td>
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<td>FY10 SBIR/STTR Budget</td>
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<td>$150K/1 yr</td>
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<td>Phase II</td>
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<td>&lt; 33.3%</td>
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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](http://www.dodsbir.net/rif/SignIn.asp) (release date of 19 May 2014)

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

**FULL PROPOSALS due date:** Jan 15 2015

**Where:** [http://www.dodsbir.net/rif/SignIn.asp](http://www.dodsbir.net/rif/SignIn.asp)
The Strategic thrusts are:
1. A responsive and balanced manufacturing technology investment portfolio to meet DoD requirements
2. Active support for a highly connected and collaborative defense manufacturing enterprise
3. Active support for a strong institutional focus on manufacturability and manufacturing process maturity
4. Active support for a healthy, sufficient, and effective defense manufacturing infrastructure and workforce

The overall ManTech program is overseen by the office of Manufacturing and Industrial Base Policy (MIBP) within OSD AT&L, however each component ManTech program is managed individually by Air Force, Army, Navy, Defense Logistics Agency and the Defense-wide Manufacturing Science and Technology (MDS&T)

DMS&T was established in FY08 to complement each service’s ManTech program. The goal is to focus on cross-cutting defense manufacturing needs – those that are beyond the ability of a single service to address – and to stimulate the early development of manufacturing processes and enterprise business practices concurrent with S&T development to achieve the largest cost-effective impact.
Innovation Manufacturing Institutes
http://www.manufacturing.gov/nnmi.html

What: The National Network for Manufacturing Innovation (NNMI) consists of linked Institutes for Manufacturing Innovation (IMIs) with common goals, but unique concentrations. Here industry, academia, and government partners are leveraging existing resources, collaborating, and co-investing to nurture manufacturing innovation and accelerate commercialization.

As sustainable manufacturing innovation hubs, the institutes will:
• Develop advanced manufacturing technologies that will "lift all ships," creating, showcasing and deploying new capabilities that can increase commercial productivity.
• Help businesses who otherwise couldn't invest in advanced manufacturing research, by bringing together the best talents and capabilities from the public and private sector into a proving ground for cutting-edge technology.
• Build a pipeline of talent that can support advanced manufacturing.

The Institutes are given on the order of $75-100M over 5 years; at least as much matching funds are expected from non-federal sources.

As if 2015 DOD currently sponsors 5 Institutes (additive manufacturing, digital manufacturing and design, lightweight metals, integrated photonics, and flexible hybrid electronics) and is considering a sixth.

When: No formal schedule

Where: AFRL has issued the solicitations for the last several IMIs, but Army and Navy have also been engaged.
Back-up / Supplement
Other S&T Programs (Beyond DRS)

**Acronyms**

CDMRP  Congressional Directed Medical Research Programs  
DMRDP  Directed Medical Research and Development Program  
MURI  Multidiscipline University Research Initiative  
HEL MRI  High Energy Laser, Multidisciplinary Research Initiative  
GICUR  Government-Industry Cosponsorship of University Research  
DURIP  Defense University Research Instrumentation Program  
DTRA  Defense Threat Reduction Agency  
CBDP  Chemical, Biological Defense Program  
HPC  High Performance Computing  
YIP  Young Investigator Program  
PECASE  Presidential Early Career Award in Science and Engineering  
NDSEG  National Defense Science and Engineering Graduate  
NDEP  National Defense Education Program  
STTR/SBIR  Small Business Technology Transfer / Small Business Innovative Research  
DEPSCOR  Defense Experimental Program to Stimulate Competition
DoD R&D Considered Essential for:

- Fund military unique/critical technology, such as
  - Armored vehicles
  - Combat aircraft
  - Missiles
  - Submarines
  - Guns and munitions
  - Infectious diseases
  - Combat casualty care
  - Night vision
  - Automatic target recognition
  - Radiation hardened electronics

- Provide military advantage and options to future warfighters

- Focus/influence private sector research on military needs

- Sponsor long term, high risk and/or breakthrough research

- Educate future scientists and engineers

- Enable smart buyers

- Hedge against technological surprise
Military Research Payoff

Death Rates In America’s Major Wars

- Mexican War: 18.88%
- Civil War: 16.27%
- Spanish-American War: 2.48%
- World War I: 2.62%
- World War II: 0.86%
- Korean War: 0.98%
- Vietnam War: 0.98%
- Gulf War: 0.08%

http://www.va.gov/opa/fact/index.htm
World of R&D 2010
Size of circle reflects the relative amount of annual R&D spending by the country noted.

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

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.
FY14 DoD S&T Budget Request

Total FY13 S&T Request = $11.86B
Army = 2,210  Navy = 1,980  AF = 2,222  DARPA = 2,746  ChemBio = 508  DTRA = 492  OSD = 1,071  Other DA = 632

Total FY14 S&T request = $11.98B

*DoN Civ Pay is $71.3M in BA 6 and is in addition to $2,033M S&T

Distribution Statement A: Approved for public release; distribution is unlimited
FY13 and FY14 RDT&E Budget Request Comparison
- in Then Year Dollars -

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

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

PBR13 S&T is 17.0% of RDT&E

PBR14 S&T is 17.7% of RDT&E
DoD Basic Research 2014 PBR

**Constant Dollars ($B) and % of RDT&E**

- **FISCAL YEAR**
  - 1984
  - 1988
  - 1992
  - 1996
  - 2000
  - 2004
  - 2008
  - 2012
  - 2016

- **Total RDT&E**
  - $67.5B

- **Pie Chart**
  - Basic Research
    - $2.2B, 3%
  - Operational Systems Development
    - $25.5B, 38%
  - Advanced Technology Development
    - $5.2B, 8%
  - Advanced Component Development & Prototypes
    - $12.1B, 18%
  - RDT&E Management Support
    - $4.3B, 6%
  - System Development & Demonstration
    - $13.7B, 20%
  - Applied Research
    - $4.6B, 7%
DoD Basic Research is 6% of Overall Federal Agency Support

Total $32.9B

- NASA 16%
- NSF 16%
- DOE 13%
- DOD 6%
- DHHS 50%
- Other 1%
  - Smithsonian 1%
  - Veterans Affairs 1%
  - Agriculture 3%
  - Commerce 1%
Recipients of DoD S&T Funds

*Includes non-profit institutions, State & local govt., & foreign institutions

Source: National Science Foundation Report (PBR08)
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From NSF Federal R&D Funding
Capability Priorities for FY13-17

Complex Threats

- Electronic Warfare / Electronic Protection
- Cyber Science and Technology
- Counter Weapons of Mass Destruction

Force Multipliers

- Data-to-Decisions
- Autonomy
- Engineered Resilient Systems
- Human Systems
High Interest Basic Science Areas

- Synthetic Biology
- Human Behavior Modeling
- Novel Engineered Materials
- Cognitive Neuroscience
- Quantum Information Science
- Nanoscience
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%

5 ⇒ 20 Years . . .
Navy and Marine Corps
After Next
- Idea Exploration
- Naval Unique
- Naval Essential

~48%

Exploitation & Deployment

Discovery & Invention

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

From Dr. Starnes Walker (ex) ONR TD
Revolutionary Advances

Adaptive Optics and Lasers

Stealth

Night Vision

GPS

Phased Array Radar

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

- Service Labs/Centers
- Expanded Resource Base
- Universities
- Interagency
- Link to the Warfighter
- New Ideas, Knowledge
- Industry
- DARPA
- Maximum National Security Payoff
- International
- Coalition Capability
- Innovation, Transition

From OSD R&D Overview, Dr. Lewis Sloter