

August 2014

**AN INFORMAL GUIDE TO KEY
UNITED STATES DEFENCE RESEARCH
AGENCY FUNDING FOR
AUSTRALIAN RESEARCHERS**

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Purpose of the Paper

Disclaimer: This paper is produced in the Embassy of Australia, Education and Science Office as an informal guide for Australian researchers on key U.S. defence research agencies' funding.

This paper provides general guidance to apply for funding from four key US defence research agencies– Air Force Office of Scientific Research (AFOSR), Army Research Office (ARO), Office of Naval Research (ONR) and Defence Advanced Research Projects Agency (DARPA).

It is consolidated from agencies' websites and publications and uses information from various meetings with those agencies over 2013-14. It is an attempt to spread the knowledge gained by this office across the Australian science and research community.

This guide is not endorsed by the AFOSR, ARO, ONR or DARPA.

The Office is aware of additional basic research funding within other defence/security agencies' and have listed these agencies' websites in Appendix B for information. If you require further guidance on the Appendix B agencies, please contact the Education and Science Office at the Embassy of Australia.

Intellectual Property and Publishing of US Funded Fundamental Research

It is the US Federal Government policy that to the maximum extent possible, the products of fundamental research remain unrestricted. Fundamental research means basic and applied research in science and engineering, the results of which ordinarily are published and shared broadly within the scientific community, as distinguished from proprietary research and from industrial development, design, production, and product utilization, the results of which ordinarily are restricted for proprietary or national security reasons. Therefore the US government does not typically have a need for pre-publication approval if the program information is considered fundamental research and intellectual property resulting from the funded research therefore remains with the funded institution/individual.

This guide complements a similar paper produced by the Education and Science Office encompassing an initial guide to seven National Science Foundation (NSF) programmes of interest for Australian researchers.

It is essential that any applicants from Australia appreciate that a close reading of the respective agency websites and engagement with Agency program managers is essential in applying for funding partnerships.

Feedback on this paper is welcome.

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Air Force Office of Scientific Research (AFOSR)

Mission:

“Discover, shape, and champion basic science that profoundly impacts the future Air Force”

Their role:

The [Air Force Office of Scientific Research \(AFOSR\)](#) is one of the technology directorates within the Air Force Research Lab (AFRL) and manages the **basic research investment** for the U.S. Air Force (USAF).

AFOSR:

- Funds excellent basic research, here and abroad;
- Is highly efficient;
- Defines the future of the US Air Force;
- Probes today’s technology limits and ultimately leads to future Air Force technologies;
- Attracts the most creative minds to fields of critical Department of Defence (DoD) interest;
- Creates a knowledgeable workforce in fields of critical DoD interest.

The Air Force Office of Scientific Research (AFOSR) currently awards nearly 1,500 grants and contracts to more than 200 academic institutions, 160 commercial firms, and more than 250 intramural programs within AFRL's nine other technology directorates.

With its staff of highly trained scientists and engineers, AFOSR manages the Air Force basic research program via three key partnerships.

- 1) **“The University Connection:** *University research is a great place for developing and mentoring future scientists and engineers in areas that contribute to our national Defence and economic security. These connections provide an opportunity for international partnerships and project funding”;*
- 2) **“Small Business Technology Transfer:** *This program is designed to provide an incentive for small companies, academic institutions, and non-profit research institutions to transfer emerging technical ideas from the lab to the marketplace. US based businesses only”;* and
- 3) **“Air Force Intramural Research:** *AFOSR works closely with the other AFRL Technical Directorates to nurture and support quality research and, where advantageous, integrate intramural and external research efforts to transition the latest basic research discoveries onto the next levels in the research and development chain. This is restricted to US based researchers only due to Defence Lab restrictions for foreign researchers”.*



Research Focus:

The focus of AFOSR is on research areas that offer significant and comprehensive benefits to US national warfighting and peacekeeping capabilities. However, Australian researchers should not be dissuaded if they cannot see a direct link from their research to warfighting applications, the range of AFOSR's funding of basic scientific research is very broad.

These areas are organized and managed in five scientific departments:

1) **Dynamical Systems and Control Division**

Leads the discovery and development of the fundamental and integrated science that advances future air and space flight.

2) **Quantum and Non-Equilibrium Processes Division**

Leads the discovery and transition of foundational physical science to enable air, space, and cyber power.

3) **Information, Decision and Complex Networks Division**

Leads the discovery and development of advancement in space situational awareness, autonomy, and cyber for the U.S. Air Force.

4) **Complex Materials and Devices Division**

Leads the discovery and development of the fundamental and integrated science that provides novel options that increase operational flexibility and performance of systems and environments of relevance to the U.S. Air Force.

5) **Energy, Power and Propulsion Division**

Leads the discovery and development of innovative fundamental science addressing a broad spectrum of energy-related issues.

To what extent do they fund international research?

AFOSR is constantly looking for innovative scientific research around the globe and to champion basic science that will create revolutionary breakthroughs to profoundly impact future U.S Air Force warfighting and peacekeeping capabilities. **AFOSR seeks unclassified proposals that do not contain proprietary information and expect the research to be fundamental.**

As a part of the Air Force Research Laboratory (AFRL), AFOSR's technical experts foster and fund research within AFRL, universities worldwide, and industry laboratories to ensure the transition of research results to support US Air Force needs.

AFOSR's International Office based in Arlington, Virginia serves as the International Point of Contact for AFOSR. Their role includes establishing international research initiatives with world-class scientists and institutions to support AFOSR core and external programs, identifying and advocating international opportunities to work

with AFOSR, providing technology security screening and training for international efforts to include AFOSR and all of the Air Force Research Laboratory (AFRL), administering the Engineer and Scientist Exchange Program (ESEP) for SAF/IA, and conducting the Window-on-Europe, Asia, and Americas Programs. AFOSR has three detachments located in Tokyo, London and Santiago to provide direct interchange with members of the scientific and engineering community and encourage the establishment of beneficial relationships between Air Force scientists and engineers and their foreign counterparts within their respective geographical and technical areas of responsibility. Their primary focus is to discover and facilitate the discovery of world-class fundamental research relevant to Air Force needs.

The Asian Office of Aerospace Research & Development (AOARD), located in Tokyo, covers Australia in its geographical area of responsibility. AOARD staff often travel to Australia to visit universities and research facilities to develop relationships and discover cutting edge science and technology for future potential AFOSR funding and partnerships.

Applying for funding or approaching AFOSR:

To integrate and support AFOSR's fundamental research with discoveries of emerging foreign science AOARD operates three main programs:

- Research Grants and Contacts, to directly support foreign research of Air Force interest. This can be in the form of 1-year seed funding before seeking more long term funding through an AFOSR Program Manager;
- Window on Science (WOS), which brings foreign researchers to meet with AFRL scientists and engineers to share their research; and
- Conference Support, to promote the interchange of science between the Air Force and the world.

In order to access these programs you must go through the AOARD main point of contact for each program area as per the table below (as of July 2014). The table contains links that can direct you to each program for a better understanding of who the most appropriate contact would be in relation to your area of research:

Area of Research	Main Point of Contact
Materials and Organic Chemistry	Ken Caster, Ph.D. Asian Office of Aerospace Research and Development (AOARD) Office: +81-4-2511-2000 AOARD.Materials.Chemistry@us.af.mil
Synthetic Biology and Biochemistry	Lt Col Jermont Chen, Ph.D Asian Office of Aerospace Research and Development (AOARD) Office: +81-4-2511-2000 afosr.aoard@us.af.mil

Area of Research	Main Point of Contact
Sensors and Device Physics	Seng Hong, PhD, PE Asian Office of Aerospace Research and Development (AOARD) Office: +81-4-2511-2000 afosr.aoard@us.af.mil
Combustion and Aerothermal Science	Lt Col David Hopper, Ph.D. Asian Office of Aerospace Research and Development (AOARD) Office: +81-4-2511-2000 afosr.aoard@us.af.mil
Nanoscience, Power, and Energy	Lt Col Tammy Low, Ph.D. Asian Office of Aerospace Research and Development (AOARD) Office: +81-4-2511-2000 afosr.aoard@us.af.mil
US-Korea Nano Bio Info Technology (NBIT) Program	Lt Col Tammy Low, Ph.D. Asian Office of Aerospace Research and Development (AOARD) Office: +81-4-2511-2000 afosr.aoard@us.af.mil
Novel Nanomagnetic Materials	Misoon Mah, Ph.D. Asian Office of Aerospace Research and Development (AOARD) Office: +81-4-2511-2000 AOARD.nano.magnetics@us.af.mil
Information Sciences	Lt Col Brian Sells Asian Office of Aerospace Research and Development (AOARD) Office: +81-4-2511-2000 AOARD.Information.Science@us.af.mil
Space and Hypersonics	Ingrid Wysong, Ph.D. Asian Office of Aerospace Research and Development (AOARD) Office: +81-4-2511-2000 aoard.space@us.af.mil
Physics	Lt Col Matthew Zickafoose Asian Office of Aerospace Research and Development (AOARD) Office: +81-4-2511-2000 AOARD.Physics@us.af.mil

Contacts details for the Director of AOARD are as follows:

Misoon Mah, Ph.D.
Director
Email: misoon.mah@us.af.mil
Phone: +81-4-2511-2000 (office)

Additional Programs

The following additional programs are managed separately.

- **National Research Council (NRC) Resident Research Associateships:** Provides support to scientists (including senior foreign nationals) to work in US government laboratories (including AFRL) for one to two years. For more information on how to apply for this program please review the [NRC website](#).
- **Engineer and Scientist Exchange Program:** Provides an opportunity for US Department of Defence (DoD) (military and civilian) scientists to conduct research in foreign government laboratories and for foreign government (military and civilian) scientists to work in US DoD laboratories. International Agreements are in place for Australia, Canada, Egypt, France, Germany, Greece, Israel, Japan, Korea, Netherlands, Norway, Portugal, Singapore, Spain, Sweden, and the United Kingdom. See ESEP Program or contact Mr. Phil Gibber at 703-696-7323 or at esep@afosr.af.mil.

Broad Agency Announcements

AFOSR also funds longer term international research projects and partnerships by soliciting research proposals through a [Broad Agency Announcement \(BAA\)](#) that outlines the Air Force Defence Research Sciences program supporting nearly forty major research areas. To apply for AFOSR funding opportunities listed in the BAA, visit www.grants.gov. All application forms and instructions are provided on the site. You can search grants.gov by Catalogue of Federal Domestic Assistance (CFDA) numbers 12.800, 12.630 and 12.910, as they are specific for AFOSR. There you can also search for opportunities by all grant issuing Federal Agencies.

Before considering a proposal in response to a BAA you should engage with the AFOSR Program Manager of that technical area to define the scope of the research proposal as early as possible. This is important in order to establish yourself with the Program Manager and increase your chance of success. A White Paper is then required to be submitted as per the BAA.

Engaging with AFOSR Program Managers

AFOSR Program Managers are open to meeting Australian researchers who are travelling to the US and wish to discuss their research in a particular area. If there is a particular Program Manager you believe fits well with your research you can approach them directly or you can approach the AFOSR International Office point of contact to set up meetings with a range of Program Managers that may be interested.

The Program Managers under each of AFOSR's five scientific departments can be found here:

- [Dynamical Systems and Control Division](#) (8 subdivision research areas/Program Managers)
- [Quantum and Non-Equilibrium Processes Division](#) (8 subdivision research areas/Program Managers)
- [Information, Decision and Complex Networks Division](#) (11 subdivision research areas/Program Managers)
- [Complex Materials and Devices Division](#) (9 subdivision research areas/Program Managers)

- [Energy, Power and Propulsion](#) (6 subdivision research areas/Program Managers)
- [Basic Research Initiatives](#), involving multidisciplinary topics (14 subdivision research areas/Program Managers)

Program Managers also hold yearly Program Reviews and Workshops where researchers are invited to attend (registration required) and meet with the Program Manager and other researchers who have been funded within the specific research portfolio to discuss future partnerships. These run throughout the year and dates are posted on the [AFOSR website](#).

AFOSR also hold a yearly Spring Review (usually held in March) where Program Officers from AFOSR Technical Divisions present briefings that highlight basic research programs beneficial to the Air Force. This is a good way to meet Program Managers and gauge what types of research is being funded. International researchers are encouraged to attend.

Army Research Office (ARO)

Mission:

"Provide the underpinning science, technology, and analysis that enable full-spectrum operations."

Their role:

The U.S. Army Research Laboratory's Army Research Office (ARO) mission is to serve as the Army's premier extramural basic research agency in the engineering, physical, information and life sciences; developing and exploiting innovative advances to insure the Nation's technological superiority.



Research Focus:

Initiates the scientific and far reaching technological discoveries in extramural organizations: educational institutions, nonprofit organizations, and private industry.

The Army Research Office (ARO) Extramural Basic Research Consists of:

- Computing Science: Information and Software Assurance, Computational Architectures and Visualization and Information Processing and Fusion
- Chemistry: Organic and Inorganic Chemistry, Polymer Chemistry and Physical and Theoretical Chemistry
- Electronics: Solid State and Electromagnetics, Sensors and Detectors and Optoelectronics
- Environmental Sciences: Terrestrial Science, Habitation Science and Atmospheric
- Life Sciences: Microbiology, Molecular Genetics and Neurosciences
- Network Science: Intelligence Networks, Decision and Neuro-Sciences, Communications and Human Networks and Multi-agent Network Control
- Materials Sciences: Mechanical Behavior of Materials, Synthesis and Processing of Materials and Physical Properties of Materials
- Mathematics: Modeling of complex systems, Probability and Statistics and Cooperative Mathematics
- Mechanical Sciences: Blast and Fragment Protection, Active Control and Structural Dynamics
- Physics: Condensed Matter Physics, Atomic and Molecular Physics and Optical Physics and Imaging Science

Funding for non-US based research

Single Investigator (SI): ARL's Single Investigator Program, executed through the Army Research Office, typically supporting 900 academic principal investigators per year, allows the Army to leverage world-class

academic expertise, rapidly exploit novel scientific opportunities, and provides the venue to have many minds working multiple pathways.

- Approximately \$110K /yr. for 3 year periods
- Continually open BAA Solicitation
- Approximately 120 new grants/year
- All US states, and more than 240 universities

Short Term Innovative Research (STIR): ARL's Short Term Innovative Research program is a continuation of the Single Investigator Program, through a continual BAA solicitation.

- \$50K limit
- Short-term, proof of principle research

Applying for funding or approaching ARO:

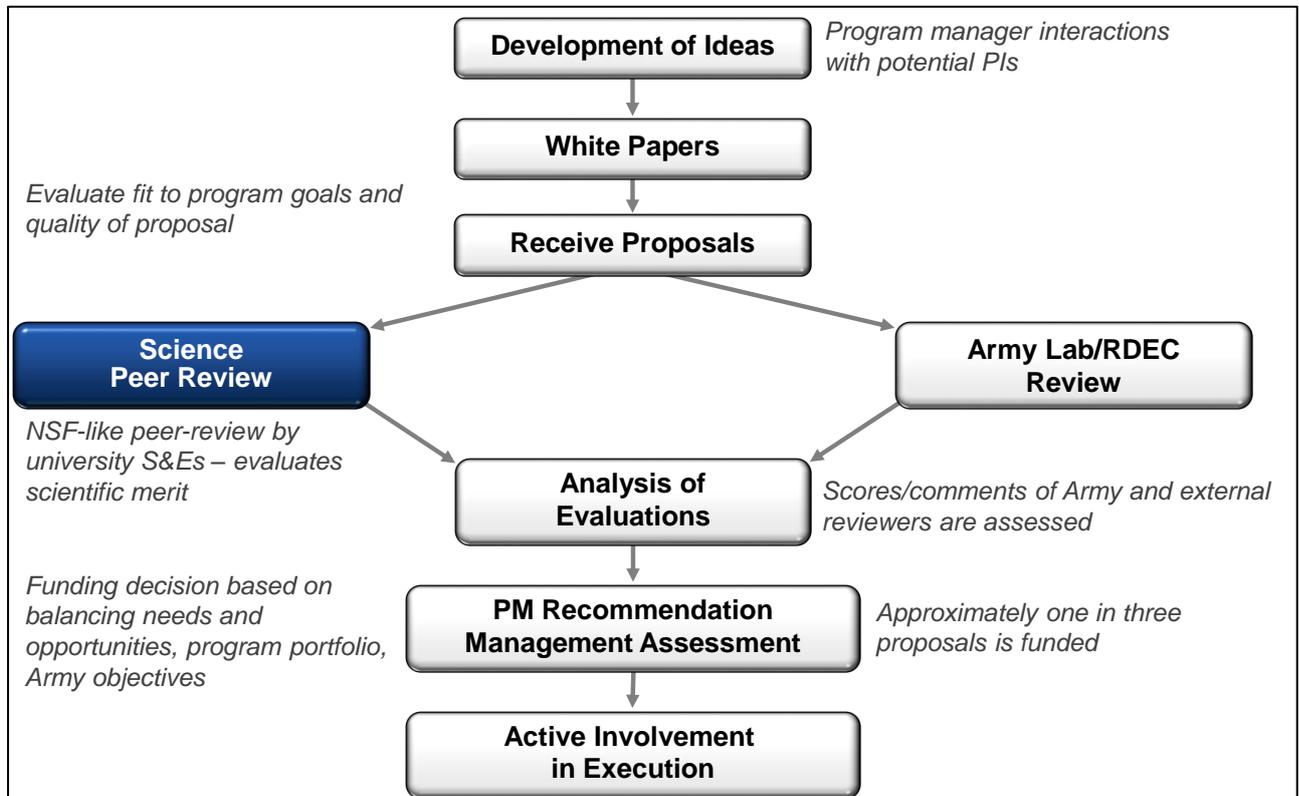
The purpose of a [Broad Agency Announcement \(BAA\)](#) is to solicit research proposals in the engineering, physical, life, and information sciences for submission to the Army Research Office (ARO) for consideration for possible funding. Proposals are expected to be for cutting-edge innovative research that could produce discoveries that would have a significant impact on enabling new and improved Army operational capabilities and related technologies. The specific research areas and topics of interest described on the website should be viewed as suggestive, rather than limiting. The ARO is always interested in considering new innovative research concepts of relevance to the Army. Interested parties are encouraged to periodically check the Army Research Laboratory website for updates and amendments to the [ARO's BAAs](#).

The following research programs are included in the ARO's BAAs -

- [BAA - Chemical Sciences](#)
- [BAA - Computing Sciences](#)
- [BAA - Electronics](#)
- [BAA - Environmental Sciences](#)
- [BAA - Life Sciences](#)
- [BAA - Materials Science](#)
- [BAA - Mathematical Sciences](#)
- [BAA - Mechanical Sciences](#)
- [BAA - Network Sciences](#)
- [BAA - Physics](#)

The Process

The chart below depicts the general process of approaching ARO to apply for funding; the chart is further explained in more detail below:



Development of Ideas:

Australian scientists contemplating submission of a white paper or proposal are strongly encouraged to contact the appropriate Technical Point of Contact (TPOC). The TPOC's name, telephone numbers, and email address are listed immediately after each research area of interest, on the Broad Agency Agreement (BAA). (current BAA is found at : [insert URL])

If the technical area of ARO cannot be identified the general contact for ARO is (as of August 2014):

Dr Stephen J. Lee

Chief Scientist (ST), Office of the Director

Email: stephen.j.lee28.civ@mail.mil

Phone: +1 (919) 549-4365

White Papers:

If an offeror, in this case an Australian Researcher, elects to submit a white paper, it should be prepared in accordance with the instructions contained in the BAA. Upon receipt, a white paper will be evaluated and the offeror will be advised of the results. Offerors whose white papers receive a favorable evaluation

(approximately 1 in 10) may be encouraged to prepare a complete proposal in accordance with instructions contained in this BAA. It is important to note that the costs of white papers and/or complete proposals in

response to this BAA are not considered an allowable direct charge to any award resulting from this BAA or any other award.

Proposals:

The ARO prefers proposals to cover a 3-year period and include a brief summary of work contemplated for each 12-month period so that awards may be negotiated for an entire 3-year program or for individual 1-year increments of the total program. Proposals may be submitted at any time.

Evaluation:

The Army Lab/RDEC and a Science Peer Review is conducted to determine the technical merit; army relevance; desired participation and the goals and quality of the proposal.

Analysis of Evaluations:

Scores and comments of Army and external reviewers are assessed.

PM Recommendation and Management Assessment:

The Funding decision is generally based on balancing needs and opportunities, the program portfolio and the army's objectives. **Approximately 1 in 3 proposals are funded.**

Active Involvement in Execution:

The final stage of the funding process before the research officially begins.

Office of Naval Research (ONR)

Mission:

“To plan, foster, and encourage scientific research in recognition of its paramount importance to future Naval power and national security.”



Their role:

To meet current and emerging warfighter needs and deliver future force capabilities, the Office of Naval Research invests in 90 percent of its portfolio in mid- and long-term research while allowing for responsive, limited near-term technology insertions.

Research Focus:

Office of Research: The Discovery and Invention portfolio makes broad investments in basic and applied research that will increase fundamental knowledge, foster opportunities for breakthroughs and provide technology options for future naval capabilities and systems. Discovery and Invention programs nurture creativity and seek a balance between risk, opportunity and potential naval impact and makes up 45% of the ONR budget spent on science and technology.

Office of Technology: Transition of technologies to the fleet and the acquisition community is a top priority. ONR emphasizes transition centric programs and methodologies under the Office of Technology including efforts covering manufacturing methods used to build naval warfare systems, programs that stimulate advantageous government-industry partnerships and an investment portfolio focusing on requirements pull by the fleet and acquisition.

Departments: The majority of the ONR program is executed through six science and technology departments (codes 30-35 as listed below) with 30-40 Program Managers per code. Department portfolios span basic research, applied research and advanced technology development.

1. Code 30- Expeditionary Maneuver Warfare and Combating Terrorism Department: This department develops and transitions technologies to enable the Navy-Marine Corps team to win and survive on the battlefield, today and tomorrow.
2. Code 31- Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance Department: This department's sponsored programs focus on experimental and

theoretical research and technology in these areas with applications across near-, mid-, and far-term applications.

3. Code 32- Ocean Battlespace Sensing Department: Explores science and technology in the areas of oceanographic and meteorological observations, modeling and prediction in the battlespace environment; submarine detection and classification (anti-submarine warfare); and mine warfare applications for detecting and neutralizing mines in both the ocean and littoral environment.
4. Code 33- Sea Warfare and Weapons Department: This department develops and delivers technologies that enable superior warfighting and energy capabilities for naval forces, platforms and undersea weaponry.
5. Code 34- Warfighter Performance Department: This department enhances warfighter effectiveness and efficiency through bioengineered and biorobotic systems, medical technologies, improved manpower, personnel, training and system design.
6. Code 35- Naval Air Warfare and Weapons Department: Supports the Navy's power projection needs, fostering the technology development of naval aircraft, structures, propulsion, autonomy, energetics, directed energy and electric weapons.

To what extent do they fund international research?

ONR is constantly looking for innovative scientific and technological solutions to address current and future Navy and Marine Corps requirements. ONR seeks to do business with educational institutions, nonprofit and for-profit organizations, and government agencies with ground-breaking ideas, pioneering scientific research and novel technology developments which includes directly funding research projects within institutions overseas. ONR finds funds and manages a national and global network of researchers and innovators. With an annual budget of ~\$2 billion ONR has invested in research in all 50 US States and over 70 countries. ONR conducts research in more than 350 academic institutions, Navy Warfare Centers, the Naval Research Laboratory and other federal and university research centers.

ONR Global, a subdivision of ONR, has six offices outside the US and aims to identify promising research opportunities around the world and has an international science and technology strategy for fostering international collaboration. ONR Global's associate directors promote collaboration with international scientists while science advisors identify fleet/force needs and implement technology solutions.

An Associate Director out of the ONR Global Singapore office specifically covers Australia, however any of the ONR Global Associate Directors may engage with Australian universities and research facilities in order to discover cutting edge science and technology for future potential ONR funding and partnerships.

Applying for funding or approaching ONR:

ONR Global sponsors programs including: short-term scientist visits to the US; research projects via grants; conferences and workshops that address research topics of interest to the Navy and Marine Corps.

- [Naval International Cooperative Opportunities Program \(NICOP\)](#): provides 1 year seed funding (\$25k – \$100k) for new ideas to benefit from emerging international S&T, support transformational initiatives of the Naval Research Enterprise and accelerate the introduction of new S&T into the NRE. After initially engaging with ONR Global’s Associate Director for Australia (listed below) there is a two stage submission process involving a White Paper and then a Full Proposal requirement.
- [Visiting Scientists Program](#): supports short-term travel opportunities for foreign/international scientists to the United States to socialise new S&T ideas or findings with the NRE. For example after receiving money through the NICOP researchers have the opportunity to travel to the US to meet with ONR Program managers to discuss securing future longer term funding if it fits within the NRE.
- [Collaborative Science Program \(CSP\)](#): supports foreign or international workshops, conferences, and seminars of naval interest by providing financial support.

The ONR Global Associate Director that covers Australia is available to provide assistance. The Associate Director covering Australia (as of July 2014) –

Dr. Cung Vu

Associate Director – ONR Global

Email: cung.vu.civ@mail.mil

ONR also provides longer term research project funding through Broad Agency Announcements (BAAs) requesting funding proposals in broad technical areas. Funding through the BAAs is facilitated through ONR’s Program Managers who are dedicated to each technical area under code 30- 35 or an area of research not currently addressed by ONR’s programs but is seen to be of strategic importance.

Broad Agency Announcements (BAAs) and submission forms can be found on the [ONR website](#) and each announcement provides technical and contracting points of reference.

1. Proposal process: Before considering a proposal in response to a BAA you should engage with the appropriate ONR Program Manager of that BAA’s technical area to define the scope of the research proposal as early as possible. This is important in order to establish yourself with the Program Manager and increase your chance of success.
2. After discussion with the Program Officer, a White Paper must be submitted directly to the cognisant ONR Science and Technology Department.
3. After the White paper consideration and response full proposals can then be submitted electronically to ONR through www.grants.gov

Defence Advanced Research Projects Agency (DARPA)

Mission:

“To prevent strategic surprise from negatively impacting U.S. national security and create strategic surprise for U.S. adversaries by maintaining the technological superiority of the U.S. military”



Their role:

Today, Defence Advanced Research Projects Agency (DARPA) is helping to build a future in which we can do extraordinary things. Fully control the electromagnetic spectrum for communications, sensing, and imaging. Provide precise and accurate position and timing that isn't dangerously reliant on GPS. Wield cyber as a military capability with confidence in our own cybersecurity. Increase access to and through space by lowering its cost. Open new operational regimes with advanced platforms and weapons. To build a strong foundation for tomorrow's military systems, DARPA is catalyzing an advanced technology base in new areas of information technology, electronics, and materials science, as well as new technologies emerging from the biological sciences. By making pivotal investments in new technology-driven ideas for the United States, DARPA imagines and makes possible new capabilities for overcoming the multifaceted threats and challenges that lie ahead. This makes a better, more secure future possible. In an uncertain world, with constrained budgets, providing these new capabilities is more important than ever.

Research Focus:

DARPA's research is split between 6 technology offices which each have specific programs of interest. Six of these technology offices are represented in the Figure A: DARPA Organisation

Figure A:



Adaptive Execution Office (AEO): is a support office of DARPA not a technology Office.

Defence Sciences Office (DSO): explores the constantly changing research landscape to identify and accelerate potentially game-changing technologies for national security. DSO pursues new technologies and creates new research communities that bring together:

- new discoveries within and across the frontiers of physics, chemistry, and math;
- new materials or phenomena, and the models to predict and tools to build them;
- new approaches to understanding, predicting, designing, and developing complex systems in fields such as autonomy, robotics, and manufacturing.

Main Areas Covered: Physical Sciences, Materials, Mathematics, Training and Human Effectiveness, Biological Warfare Defence and Biology.

Information Innovation Office (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.

Main Areas of interest: Global ISR, Cyber, Social Networks, Computational Social Science, Language Transparency, Edge Finding and Training/Education.

Microsystems Technology Office (MTO): supports DARPA's mission of creating and preventing strategic surprise by investing in areas such as microelectromechanical systems (MEMS), electronics, computing, photonics and biotechnology.

Main Areas of interest: Basic Science Core, Devices, Integration, Power, Architectures and Application.

Strategic Technology Office (STO): is focused on technologies that enable fighting as a network to increase military effectiveness, cost leverage, and adaptability. STO's areas of interest include: Battle Management, Command and Control (BMC2); Communications and Networks; Intelligence, Surveillance, and Reconnaissance (ISR); Electronic Warfare (EW); Positioning, Navigation, and Timing (PNT); and Foundational Strategic Technologies and Systems. NOTE: Many of the Broad Agency Announcements involving this office will not accept international proposals due to the restricted nature of the research being conducted. Please read the BAA in detail before considering your proposal (more tips below).

Tactical Technology Office (TTO): will rapidly develop new prototype military capabilities that create an asymmetric technological advantage and provide U.S. forces with decisive superiority and the ability to overwhelm our opponents. 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. Main Areas of interest: Advanced Weapon Systems, Advanced Platforms and Advanced Space Systems.

NOTE: Many of the Broad Agency Announcements involving this office will not accept international proposals due to the restricted nature of the research being conducted. Please read the BAA in detail before considering your proposal (more tips below).

A further research program not shown on the diagram at Figure A: DARPA Organisation is:

Biological Technologies Office (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.

To what extent do they fund?

DARPA's research focus is in advanced science and technology that is informed, but not driven by, the Department of Defence's international engagement strategy. DARPA pursues world-class technologies around the globe with no country priorities. Ultimately DARPA seeks revolutionary change (not evolutionary

extensions or incremental gain), high payoff research that bridges the gap between fundamental discoveries and ultimate military use. If the outcome of the project proposal is certain, with only dollars and time needed to complete the work, it may not be a program suitable for DARPA as they are interested in compelling outcomes that provide new capability. It is also not enough to have a good idea, it requires a plausible technical approach.

Although foreign participants and/or individuals may participate in DARPA's research projects this is reliant on the eligibility outlines in each Broad Agency Announcement due to necessary non-disclosure agreements, security regulations, export control laws, and other governing statutes, as applicable.

Applying for funding or approaching DARPA:

Each of DARPA's technology offices solicit research proposals through Broad Agency Announcements (BAAs) and it is important to determine which technology office your research falls under.

Although each technology office has a number of BAAs which will be for very specific programs, there are two types of BAA's which these offices release you should be aware of:

- **Office-wide BAAs:** Typically each technology office has one 'Office-wide' BAA which serves to capture ideas that do not fall within the other more specific BAAs. Office-wide BAAs are usually open for one year or more and as a result submitting a proposal in response to these BAAs often is very reliant on timing and therefore can be harder to have a successful proposal. This is because program funds are dictated by the program managers within the technology office and in receiving a proposal it is a gamble whether a Program Manager has gaps in their research portfolio that have not yet been filled by a proposal received earlier in the Office-wide BAAs timeline.
- **Program Specific BAAs:** These are released at various times throughout the year depending on the specific technical need of the programs within each technology office. **These Program Specific BAAs are open for 30 days and are often better for proposals as it is more specific to the Program Managers needs and therefore it is more likely to be considered compared to the Office-wide BAAs.**

These solicitations are available at -

- http://www.darpa.mil/Opportunities/Solicitations/DARPA_Solicitations.aspx ; and
- www.FedBizOpps.gov Alerts can be set up through this website so you are notified when new DARPA solicitations are released.

TIP: Since 2010 all BAA's must state whether the type of research is considered to be fundamental or of a restricted/classified level. Internationals should only consider applying when a BAA states the intention for fundamental research to be conducted. To find BAAs that are for fundamental research and therefore not restricted for international proposals –

- Once you open the PDF of the specific BAA, use the search function (Ctrl F) to search for Fundamental Research. If the BAA can consider international proposals it will state one of the following:

“As of the date of publication of this BAA, the Government cannot identify whether or not the work under this BAA may be considered fundamental research and may award both fundamental and non-fundamental.”

Or:

“As of the date of publication of this BAA, the Government expects that program goals as described herein may be met by proposers intending to perform fundamental research. The Government does not anticipate applying publication restrictions of any kind to individual awards for fundamental research that may result from this BAA.”

- If the BAA is restricted and fundamental research will not be considered a part of the research conducted and international proposals will not be considered it will state the following:

“As of the date of publication of this BAA, the Government expects that program goals as described herein either cannot be met by proposers intending to perform fundamental research or the proposed research is anticipated to present a high likelihood of disclosing performance characteristics of military systems or manufacturing technologies that are unique and critical to defence. Therefore, the Government anticipates restrictions on the resultant research that will require the contractor to seek DARPA permission before publishing any information or results relative to the program.”

Important Pre-proposal Information:

The program manager is key to the success of approvals. Communication attempts should be made with the program manager to discuss the specifics of the intended proposal.

Program Managers also hold Industry/Proposer’s Days before the release of new BAAs. During these events Program Managers run through the soon to be released BAA and specifies what they are interested in for the program and the requirements for proposals. This is a good opportunity to meet and engage with the Program Manager for an initial discussion of your research and network with those already funded to gauge whether your research is a good fit or there is potential to collaborate with others there on a proposal. If an Industry/Proposer’s Day is being held it will be issued via a BAA on [DARPA’s website](#) or through www.FedBizOpps.gov Each Program Manager will also have them listed under “News and Events” within the specific Technology Office’s landing page (E.g. BTO, DSO, I2O, MTO, STO or TTO page).

White Papers:

White papers are the initial ideas submitted to a DARPA program manager and are not considered proposals. These papers permit the presenter to make a detailed written explanation of the idea/concept. In submitting a white paper; it must be prepared in accordance with the instructions contained in the BAA.

If proposals do not exactly comply with the requests of the BAA they will not be considered by the Program Manager due to US federal contracting regulations. This includes page and word limits.

Foreign participants and/or individuals may participate to the extent that such participants comply with any necessary non-disclosure agreements, security regulations, export control laws, and other governing statutes, as applicable.

Appendix A

AFOSR related websites:

General website- www.wpafb.af.mil/afrl/afosr/

AFOSR funding opportunities- www.grants.gov

Program Reviews and Workshops- https://community.apan.org/afosr/p/workshops_and_reviews.aspx

APAN web site- (<https://community.apan.org/afosr/w/researchareas/10151.asian-office-of-aerospace-research-and-development.aspx>)

ARO related websites

General website- www.arl.army.mil

Updates and amendments to BAA- www.fbo.gov

ARO funding opportunities- www.grants.gov

ONR related websites:

General website- www.onr.navy.mil

ONR Global website- www.onr.navy.mil/global

ONR funding opportunities-www.grants.gov

DARPA related websites:

General website- www.darpa.mil/default.aspx

Industry/Proposer's Day advice- www.FedBizOpps.gov

Appendix B

Website links for additional basic research funding within other defence/security agencies':

Army Medical and Materials Command (AMMC):

<http://www.army.mil/info/organization/unitsandcommands/commandstructure/amc/>

Army Research Institute for Behavioural and Social Science (ARI):

<https://sslweb.hqda.pentagon.mil/ari/default.aspx>

Defence Medical Research and Development Program (DMRDPP):

<http://cdmrp.army.mil/dmrdp/>

Congressionally Directed Medical Research Program (CDMRP):

<http://cdmrp.army.mil/>

Telemedicine and Advanced Technology Research Center (TATRC):

<http://www.tatrc.org/>

US Department of Veterans Affairs:

<http://www.research.va.gov/funding/default.cfm>

Air Force Research Laboratory (AFRL):

<http://www.wpafb.af.mil/AFRL/>

Defence Threat Reduction Agency (DTRA):

<http://www.dtra.mil/>

Naval Research Laboratory and Warfare Centers:

<http://www.nrl.navy.mil/about-nrl/mission/>

Defence Forensics and Biometrics Agency (DFBA):

<http://www.biometrics.dod.mil/>

MINERVA (social science):

<http://minerva.dtic.mil/overview.html>

SERDP/ESTCP – Department of Defence's Environmental Research Programs

<http://www.serdp.org/>

Rapid Innovation Fund:

www.defenseinnovationmarketplace.mil/RIF.html