

ANNOUNCEMENT



DEPARTMENT OF DEFENSE (DoD)

FISCAL YEAR (2018) BILATERAL ACADEMIC RESEARCH INITIATIVE (BARI) PILOT PROGRAM

Fiscal Year 2018

Funding Opportunity Announcement W911NF-18-S-0007 Amendment 2



**Issued by the U.S. Army Contracting Command-Aberdeen Proving Ground Research
Triangle Park Division
on behalf of the Army Research Office
and the
Under Secretary of Defense for Research and Engineering
(Research Directorate)**

**Issued: 6 June 2018
Applications Due: 6 July 2018**

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I. OVERVIEW OF THE FUNDING OPPORTUNITY

A. Required Overview Content

Federal Awarding Agency Name(s)

This Department of Defense (DoD) program will be administered through the Army Research Office (ARO).

Funding Opportunity Title

FISCAL YEAR (2018) BILATERAL ACADEMIC RESEARCH INITIATIVE (BARI) PILOT PROGRAM

Announcement Type

This is the initial announcement

Funding Opportunity Number

W911NF-18-S-0007

Catalog of Federal Domestic Assistance (CFDA) Number and Title

12.431 – Basic Scientific Research

Key Dates

Schedule of Events		
Event	Date	Time
Questions Regarding Proposals*	15 June 2018	4:00 PM Local Time (Durham, NC)
Proposals Due	6 July 2018	4:00 PM Local Time (Durham, NC)
Notification of Selection for Award**	31 July 2018	
Estimated US award date**	30 September 2018	
Estimated start date of US grant**	30 September 2018	

Estimated UK contract award date**	30 September 2018	
Estimated UK contract start date**	30 September 2018	

* Questions submitted after the Q&A deadline as noted in the table above may not be answered. The due date for submission of the application will not be extended.

** These dates are estimates as of the date of this announcement.

B. Additional Overview Information

This Funding Opportunity Announcement (FOA) is issued under paragraph 6.102(d)(2) of the Federal Acquisition Regulation (FAR), which provides for the competitive selection of basic and applied research proposals, and 10 U.S.C. 2358, which provides the authority for issuing a Grant under this announcement for basic research. The definitions of basic research may be found at 32 CFR 22.105.

This FOA is for the Bilateral Academic Research Initiative Pilot Program (BARI), which is jointly sponsored by the US Office of the Secretary of Defense (OSD) and the United Kingdom's (UK's) Ministry of Defense (MOD). The BARI program addresses high risk basic research as an international collaboration. This research should attempt to understand new phenomena or produce discoveries that would have significant impact on enabling new and improved operational technologies of interest to the US and UK militaries. The program is in its pilot year and the goal is to produce significant scientific breakthroughs with far reaching consequences in the field of artificial intelligence. Proposals focused on specific devices or components are beyond the scope of this FOA.

The Department of Defense (DoD) agencies and Ministry of Defense agencies involved in this program reserve the right to select one or none of the proposals submitted in response to this announcement for award. The participating DoD agencies and MOD Agencies will provide no funding for direct reimbursement of proposal development costs.

Technical and cost proposals (or any other material) submitted in response to this FOA will not be returned. Unless noted in an offeror's proposal to the contrary, unsuccessful proposals will be retained for six (6) months from declination and then properly destroyed. It is the policy of participating DoD agencies and MOD agencies to treat all proposals as sensitive, competitive information and to disclose their contents only for the purposes of evaluation.

An applicant may withdraw a proposal at any time before award by written notice or by email. Notice of withdrawal shall be sent to the Grants Officer identified in Section G, of this FOA. Withdrawals are effective upon receipt of notice by the Grants Officer.

II. DETAILED INFORMATION ABOUT THE FUNDING OPPORTUNITY

A. Program Description

The BARI program supports basic research in science and engineering stemming from interactive collaborative efforts between U.S. institutions of higher education (hereafter referred to as "U.S. universities") and U.K. institutions of higher education (hereafter referred to as "U.K. universities") that is of potential interest to U.S. DoD and UK MOD. The program is focused on international collaborative research efforts where teams from the United States and the United Kingdom combine unique skillsets and approaches to provide rapid advances in scientific areas of mutual interest to the U.S. DoD and UK MOD. In the inaugural year of this program, this area is artificial intelligence and collaborative decision making.

Each proposal submitted under this FOA will be a joint US/UK proposal, with a US research team and a UK research team collaborating on a research solution. A single proposal will be submitted, by the US Research Team, for the two research teams. The single proposal must show that the proposed research is collaborative and interactive between the research teams and provide a distinct budget for the US Research Team (in US Dollars) and a distinct budget for the UK Research Team (in Pounds). The two principal investigators (PI's), one belonging to the US Research Team and one belonging to the UK Research Team, will work with the US and UK technical points of contact (POCs) to insure the research stays collaborative as the research progress.

The FY 2018 BARI competition is for research that falls within the purview of the topic:
Novel Artificial Intelligence Frameworks in Support of Collaborative Complex Decision Making.

A joint cognitive system is defined as “a system that can modify its behavior based on experience so as to achieve specific anti-entropic ends” (Hollnagel & Woods, 2005, p. 22) and is a blend of human and machine cognition rather than humans and machines being two separate and distinct parts that make up a system. In their review of future teamwork models Sycara and Lewis (2004) listed the following three principle roles future intelligent technologies that work with humans may have:

- ‘virtual personal assistant’: supporting human team members to complete their own tasks, e.g. a virtual assistant that is assigned to a specific human team member.
- ‘virtual team assistant’: facilitating teamwork by supporting all the human team members in team coordination and coordinating activities.
- ‘virtual human’: behaving as an equal team member that can reason as well as its human team mates.

However, when it comes to decision making, humans do certain things better than machine teammates, such as:

- a) **Understanding Context** – Humans are able to exercise nuanced judgement and moderate decisions based on different contexts
- b) **Applying Lessons** – Humans can learn lessons in one setting and apply these lessons to novel problems

- c) **Inventing the new** – Humans can apply conscious critical thought, or – depending on the timeframe – make up something up on the fly and adapt it.
- d) **Versatility** – In addition to the human ability to respond to new situations, humans tend to outperform machines at switching between different types of tasks without requiring re-engineering.

The US DoD and UK MOD are interested in proposals from academic teams that build frameworks for new AI agents that allow the exploration of the ‘virtual human’ with an emphasis on developing behaviors and process for true teaming with human counterparts. For example, AI agents capable of effective teamwork must have specialized knowledge structures and processes that will enable machines to form accurate expectations for tasks, coordinate their actions with other humans and machines, and adapt their behavior appropriately to human teammates. Teaming capabilities are an essential step towards a more general-AI that is capable of true human-machine teaming. Within the defense context, the “virtual human” model leads to eight high-level capability requirements for intelligent machine teammates:

1. Be Informative – convey the right information, the right way, at the right time
2. Be Transparent and Trusted – explain actions, decisions, and recommendations
3. Be Social – demonstrates and understands cooperative team working behaviors. This includes the ability to sense and reason about human social signals and produce realistic and effective social signaling
4. Recognize Limitations – manage uncertainty, risk, consequences, and contingencies
5. Recognize Others – their needs, goals, beliefs, abilities, and activities
6. Communicate – using situated dialogue, gesture, gaze, and touch
7. Learn, Adapt, and Accept Instruction – regarding context, environment, self, and others
8. Do what is “Right” – with respect to authority, responsibility, and morality

The goal is to progress beyond collaborative human-machine sense making; to develop approaches that might also enable collaborative decision making and intelligence analysis to support the activities of planning, plan refinement, and mission execution. Ultimately, humans and technology should provide individual personal assistance, or, in larger groups, both humans and machines should provide the substance of team membership.

This announcement is looking for new AI development strategies and **must apply a multi-disciplinary approach** incorporating state-of-the-art science in relevant fields to include but not limited to: cognitive science, neuroscience, computer science, human and social sciences, applied math, etc.

This research should:

- enable better communication and collaboration between humans and machines, especially in the context of hybrid teams in the workplace

- encourage new forms of AI computation drawing on human cognitive and social sciences, especially for decision making tasks where humans currently outperform machines
- build an enduring Trans-Atlantic Academic Alliance for Human Machine Teaming research

The goal is to step towards general-AI. This means to find ways that an AI can create and organize conceptual knowledge, create sub-goals and conduct hierarchical planning. General AI also means learning how to reproduce cross-modal information retrieving/processing: perceptions, temporal/spatial sequences, associations, abstractions, concepts.

Interest areas include:

- Innovative proposals that consider technology and human capability
- Proposals that enable the advantages of a machine operating as part of a human team, for examples to improve collaborative decision making
- Technical solutions take account of the overall team context that is essential for the AI to be part of human machine team
- Novel Artificial Intelligence Frameworks that are informed by cognitive and social sciences
- Proposals that include a means for an enduring Trans-Atlantic Academic Alliance

Interest areas do not include:

- Proposals which attempt to replace the human component or relegate it to a role which does not exploit human strategic level thinking
- Proposals which fail to take account of the previously identified pitfalls with human-machine teaming solutions such as lack of trust, inability of technology to understand its limits of capability, uncertainty, unpredictability and bias without transparency to human team members

Illustrative research challenges

Listed below are potential research challenges that could be addressed in proposals:

1. Research towards human-aware AI, i.e., machine awareness of human states and intent. This includes building internal models of human teammate's states and intentions, models of team process and cognition or theory of mind.
2. Research related to building mutual trust between human and machine agents, and understanding the influence agents exert on human decision-making.
3. Research to understand fundamental teaming processes and development of machines capabilities similar behaviors seen in high-performing human teams. This includes the study of team performance and dynamics, and understanding the effects of these processes.

4. Understanding how intelligent and embodied agents might influence human counterparts' behavior and decisions. How do various behaviors, design features, social signals affect people in terms of trust, willingness to cooperate, and compliance with AI?

US DoD TPOC: Dr. Richard Riecken, richard.riecken@us.af.mil, 703-696-9736

UK MOD TPOC: Ms. Fiona Butcher, fdbutcher@dstl.gov.uk +44 (0) 1980 954306

ARO BARI POC: Dr. James Harvey, james.f.harvey.civ@mail.mil, 919-549-4260.

References

Hollnagel E and Woods DD (2005) Joint cognitive systems: foundations of cognitive systems engineering. CRC Press, Boca Raton ICAO

Sycara, K. and Lewis, M. (2004) Integrating agents into human teams. In E. Salas and S. Fiore, editors, Team Cognition: Understanding the Factors that Drive Process and Performance. American Psychological Association.

B. Federal Award Information

The ACC-APG RTP will award one Grant to the lead institution of the US Research Team which will only fund research performed by the US Research Team. The UK will make a corresponding award to fund performance under the selected proposal by the UK Research Team. Information regarding the UK Research Team award can be found in section II.I.

A Grant is defined as follows:

a legal instrument that, consistent with 31 U.S.C. 6304, is used to enter into a relationship:

- a. The principal purpose of which is to transfer a thing of value to the recipient to carry out a public purpose of support or stimulation authorized by a law or the United States, rather than to acquire property or services for the Federal Government's direct benefit or use.
- b. In which substantial involvement is not expected between the Federal Government and the recipient when carrying out the activity contemplated by the grant.
- c. No fee or profit is allowed.

Grants for Institutions of Higher Education and nonprofit organizations are primarily governed by the following:

Federal statutes
Federal regulations

2 CFR Part 200, as modified and supplemented by DoD's interim implementation found at 2 CFR Part 1103

The following websites may be accessed to obtain an electronic copy of the governing regulations and guidance:

Code of Federal Regulations: <http://www.ecfr.gov>

DoD Research and Development General Terms and Conditions (Sept 2017)

The Grant awarded under this FOA will have a three (3) year period of performance. The total funding from the US DoD available for the Grant awarded from this FOA is estimated to be three (3) million dollars. The US DoD funding will be used exclusively for research performed by the US Research Team. The Grant awarded from this FOA is contingent on availability of funds, the specific topic, and the scope of the proposed work. Typical annual funding is expected to be in the range of approximately one (1) million dollars each year.

C. Eligibility Information

1. Eligible Applicants:

As a result of this BARI competition a program of international collaboration between the United States and the United Kingdom will be created. Consequently, the proposal will include two research teams, one of which will be from the U.S. and the other from the U.K. Accordingly, the BARI competition is open only to teams comprised of at least one (1) US institution of Higher Education as defined in 34 CFR 600.4 with a degree granting program in science or engineering (US University) and at least one (1) UK institution of Higher Education (UK University). Ineligible organizations, (US DoD Laboratories and Federally Funded Research and Development Centers (FFRDCs)), for the Grant, are not allowed to receive funds directly or via subaward.

2. Cost Sharing or Matching:

Cost sharing or matching is not required under this FOA and is not an evaluation factor.

D. Application and Submission Information

1. Grants.gov Application Submission and Receipt Procedures

This section provides the application submission and receipt instructions for DoD program applications. Please read the following instructions carefully and completely.

DoD is participating in the Grants.gov initiative to provide the grant community with a single site to find and apply for grant funding opportunities. For this funding opportunity,

DoD requires applicants to submit their applications online through Grants.gov. This funding opportunity may be found on Grants.gov by going to the Grants.gov Search Grants screen and entering the funding opportunity number for this FOA, W911NF-18-S-0007, in the Funding Opportunity search box. You can also search for the CFDA Number 12.431, Basic Scientific Research.

2. How to Register to Apply through Grants.gov

- a. *Instructions:* Read the instructions below about registering to apply for DoD funds. Applicants should read the registration instructions carefully and prepare the information requested before beginning the registration process. Reviewing and assembling the required information before beginning the registration process will alleviate last-minute searches for required information.

Organizations must have a Data Universal Numbering System (DUNS) Number, active System for Award Management (SAM) registration, and Grants.gov account to apply for grants.

Creating a Grants.gov account can be completed online in minutes, but DUNS and SAM registrations may take several weeks. Therefore, an organization's registration should be done in sufficient time to ensure it does not impact the entity's ability to meet required application submission deadlines.

Complete organization instructions can be found on Grants.gov here:

<https://www.grants.gov/web/grants/applicants/organization-registration.html>

- 1) *Obtain a DUNS Number:* All entities applying for funding, including renewal funding, must have a DUNS Number from Dun & Bradstreet (D&B). Applicants must enter the DUNS Number in the data entry field labeled "Organizational DUNS" on the Standard Form (SF)-424 form. For more detailed instructions for obtaining a DUNS Number, refer to:
<https://www.grants.gov/web/grants/applicants/organization-registration/step-1-obtain-duns-number.html>
- 2) *Register with SAM:* All organizations applying online through Grants.gov must register with the System for Award Management (SAM). Failure to register with SAM will prevent your organization from applying through Grants.gov. SAM registration must be renewed annually. For more detailed instructions for registering with SAM, refer to:
<https://www.grants.gov/web/grants/applicants/organization-registration/step-2-register-with-sam.html>
- 3) *Create a Grants.gov Account:* The next step is to register an account with Grants.gov. Follow the on-screen instructions or refer to the detailed instructions here:

<https://www.grants.gov/web/grants/applicants/registration.html>

- 4) *Add a Profile to a Grants.gov Account:* A profile in Grants.gov corresponds to a single applicant organization the user represents (i.e., an applicant) or an individual applicant. If you work for or consult with multiple organizations and have a profile for each, you may log in to one Grants.gov account to access all of your grant applications. To add an organizational profile to your Grants.gov account, enter the DUNS Number for the organization in the DUNS field while adding a profile. For more detailed instructions about creating a profile on Grants.gov, refer to:

<https://www.grants.gov/web/grants/applicants/registration/add-profile.html>

- 5) *EBiz POC Authorized Profile Roles:* After you register with Grants.gov and create an Organization Applicant Profile, the organization applicant's request for Grants.gov roles and access is sent to the EBiz POC. The EBiz POC will then log in to Grants.gov and authorize the appropriate roles, which may include the Authorized Organization Representative (AOR) role, thereby giving you permission to complete and submit applications on behalf of the organization. You will be able to submit your application online any time after you have been assigned the AOR role. For more detailed instructions about creating a profile on Grants.gov, refer to:

<https://www.grants.gov/web/grants/applicants/registration/authorize-roles.html>

- 6) *Track Role Status:* To track your role request, refer to:

<https://www.grants.gov/web/grants/applicants/registration/track-role-status.html>

- b. *Electronic Signature:* When applications are submitted through Grants.gov, the name of the organization applicant with the AOR role that submitted the application is inserted into the signature line of the application, serving as the electronic signature. The EBiz POC **must** authorize people who are able to make legally binding commitments on behalf of the organization as a user with the AOR role; **this step is often missed, and it is crucial for valid and timely submissions.**

3. How to Submit an Application to DoD via Grants.gov

Grants.gov applicants can apply online using Workspace. Workspace is a shared, online environment where members of a grant team may simultaneously access and edit different webforms within an application. For each funding opportunity announcement (FOA), you can create individual instances of a workspace.

Below is an overview of applying on Grants.gov. For access to complete instructions on how to apply for opportunities, refer to:

<https://www.grants.gov/web/grants/applicants/workspace-overview.html>

- a. *Create a Workspace:* Creating a workspace allows you to complete it online and route it through your organization for review before submitting.
- b. *Complete a Workspace:* Add participants to the workspace to work on the application together, complete all the required forms online or by downloading PDF versions, and check for errors before submission. The Workspace progress bar will display the state of your application process as you apply. As you apply using Workspace, you may click the blue question mark icon near the upper-right corner of each page to access context-sensitive help.

- 1) *Adobe Reader:* If you decide not to apply by filling out webforms you can download individual PDF forms in Workspace. The individual PDF forms can be downloaded and saved to your local device storage, network drive(s), or external drives, then accessed through Adobe Reader.

NOTE: Visit the Adobe Software Compatibility page on Grants.gov to download the appropriate version of the software at:

<https://www.grants.gov/web/grants/applicants/adobe-software-compatibility.html>

- 2) *Mandatory Fields in Forms:* In the forms, you will note fields marked with an asterisk and a different background color. These fields are mandatory fields that must be completed to successfully submit your application.
 - 3) *Complete SF-424 Fields First:* The forms are designed to fill in common required fields across other forms, such as the applicant name, address, and DUNS Number. Once it is completed, the information will transfer to the other forms.
- c. *Submit a Workspace:* An application may be submitted through workspace by clicking the Sign and Submit button on the Manage Workspace page, under the Forms tab. Grants.gov recommends submitting your application package at least 24-48 hours prior to the close date to provide you with time to correct any potential technical issues that may disrupt the application submission.
- d. *Track a Workspace Submission:* After successfully submitting a workspace application, a Grants.gov Tracking Number (GRANTXXXXXXXX) is automatically assigned to the application. The number will be listed on the Confirmation page that is generated after submission. Using the tracking number, access the Track My Application page under the Applicants tab or the Details tab in the submitted workspace.

For additional training resources, including video tutorials, refer to:

<https://www.grants.gov/web/grants/applicants/applicant-training.html>

Applicant Support: Grants.gov provides applicants 24/7 support via the toll-free number 1-800-518-4726 and email at support@grants.gov. For questions related to the specific grant opportunity, contact the number listed in the application package of the grant you are applying for.

If you are experiencing difficulties with your submission, it is best to call the Grants.gov Support Center and get a ticket number. The Support Center ticket number will assist the DoD] with tracking your issue and understanding background information on the issue.

4. Timely Receipt Requirements and Proof of Timely Submission

Online Submission. All applications must be received by 4:00 p.m. Eastern Daylight time on 6 July 2018. Proof of timely submission is automatically recorded by Grants.gov. An electronic date/time stamp is generated within the system when the application is successfully received by Grants.gov. The applicant with the AOR role who submitted the application will receive an acknowledgement of receipt and a tracking number (GRANTXXXXXXXX) from Grants.gov with the successful transmission of their application. This applicant with the AOR role will also receive the official date/time stamp and Grants.gov Tracking number in an email serving as proof of their timely submission.

When DoD successfully retrieves the application from Grants.gov, and acknowledges the download of submissions, Grants.gov will provide an electronic acknowledgment of receipt of the application to the email address of the applicant with the AOR role who submitted the application. Again, proof of timely submission shall be the official date and time that Grants.gov receives your application. Applications received by Grants.gov after the established due date for the program will be considered late and will not be considered for funding by DoD.

Applicants using slow internet, such as dial-up connections, should be aware that transmission can take some time before Grants.gov receives your application. Again, Grants.gov will provide either an error or a successfully received transmission in the form of an email sent to the applicant with the AOR role attempting to submit the application. The Grants.gov Support Center reports that some applicants end the transmission because they think that nothing is occurring during the transmission process. Please be patient and give the system time to process the application.

5. Content and Form of Application Submission

DoD and MOD are interested in the research outlined in section II.A, Program Description, of this FOA. For this reason, the application narrative must clearly describe what research the US Research Team and UK Research Team will accomplish collaboratively as well as what will be accomplished by the US and UK research teams individually. **The submitted application must also provide detailed budget breakouts for the US Research Team, in US Dollars, and the UK Research Team, in Pounds.**

Applicants must complete all mandatory forms and any optional forms (e.g., SF-LLL Disclosure of Lobbying Activities) in accordance with the instructions on the forms and the additional instructions below. The required fields should be completed in accordance with the “pop-up” instructions on the forms. To activate the instructions, turn on the “Help Mode” (icon with the pointer and question mark at the top of the form). All attachments to Grants.gov forms must be in PDF format (Adobe Portable Document Format). Please ensure that your attachments are not password protected.

The following formatting rules apply for the file attachments except as indicated below:

- Paper size when printed – 8.5 x 11-inch white paper, one-sided
- Margins – 1 inch
- Spacing – single
- Font – No smaller than Times New Roman, 12-point font (excluding mandatory forms, which may have other font requirements)
- **Number of pages – 25: The 25-page limit applies to the technical portion of the application, which consists of the following: Project Summary/Abstract and Project Narrative. Pages exceeding this limit will not be considered in the application evaluation.**

The following SF-424 (R&R) forms and, as applicable, attachments are required for all applications:

FORM: SF-424 (R&R) (Mandatory) - The SF-424 (R&R) form is to be used as the cover page. Complete this form first to populate data in other forms. By submitting an application through Grants.gov, the AOR (identified by username and password) is providing an “electronic signature.” By “signing” the SF-424 (R&R), an applicant is providing the certification required by 32 CFR Part 28 regarding lobbying as contained in Section II.F.2 of this FOA, and the representations on tax delinquency and felony convictions and prohibition on using funds under grants and cooperative agreements with entities that require certain internal confidentiality agreements (see below regarding “Other Attachments,” Field 12). If you encounter problems, contact customer support at 1-800-518-4726 or at support@grants.gov. If you forget your user name or password, follow the instructions provided in the Credential Provider tutorial. Tutorials may be printed by right-clicking on the tutorial and selecting “Print.”

FORM: SF-424 Research & Related Other Project Information (Mandatory) – Complete questions 1 through 6 and attach a file for items 7, 8, and, as applicable, 12. Under this FOA, applicants are not required to provide attachments for items 9, 10, and 11. The files **must** comply with the following instructions:

Project Summary/Abstract (Field 7 on the form) (Mandatory) – The Project Summary/Abstract must be no longer than a single page. The abstract must be marked that it is publicly releasable, as abstracts for all awarded applications will be placed on a DoD website(s) searchable by the public. The abstract should provide a concise description of the equipment/instrumentation requested, using terminology the public can

understand, and the research/research-related education that it will support. The header of the abstract should identify the PI, the institution, and the application title.

To attach a project summary/abstract, click “Add Attachment.”

Project Narrative (Field 8 on the form) – The project narrative must address the following:

1. Indicate the DoD Agency(ies) and MOD Agency(ies) for which the proposed research is relevant, and provide suggested Agency assignment(s) information in the following format:
 - a. DoD Agency(ies) and MOD Agency(ies) to evaluate the application, if known
 - b. Scientific Division(s) or Directorate(s), if known, and
 - c. Technical Area(s)/Program Manager(s), if known.
2. Describe the research and explain how it will help the DoD and MOD meet its goals and objectives outlined in II.A.

To attach the project narrative, click “Add Attachment.”

Other Attachments (Field 12 on the form) – To include any other relevant attachments, all of which must be in PDF format, click “Add Attachment.” This must include completed representations on tax delinquency and felony convictions (included as part of the application package for this FOA).

To evaluate compliance with Title IX of the Education Amendments of 1972 (20 U.S.C. A§ 1681 Et. Seq.), the Department of Defense is collecting certain demographic and career information to be able to assess the success rates of women who are proposed for key roles in applications in science, technology, engineering, or mathematics disciplines. To enable this assessment, each application must include the following two forms completed as indicated.

FORM: SF-424 Research & Related Senior/Key Person Profile (Expanded) (Mandatory) – The Degree Type and Degree Year fields on the Research and Related Senior/Key Person Profile (Expanded) form will be used by DoD as the source for career information. In addition to the required fields on the form, applicants must complete these two fields for all individuals that are identified as having the project role of PD/PI or Co-PD/PI on the form. Additional senior/key persons can be added by selecting the “Next Person” button.

Biographical sketches are required for the PI and for other key personnel (not to exceed three (3) pages each). These will not be included in the page count. Be sure to include education and the year in which each degree was received.

To attach biographical sketches, click “Add Attachment.”

FORM: SF-424 (R&R) Personal Data (Mandatory) - This form will be used by DoD as the source of demographic information, such as gender, race, ethnicity, and disability information for the Project Director/Principal Investigator and all other persons identified as Co-Project Director(s)/Co-Principal Investigator(s). Each application must include this form with the name fields of the Project Director/Principal Investigator and any Co-Project Director(s)/Co-Principal Investigator(s) completed; however, provision of the demographic information in the form is voluntary. If completing the form for multiple individuals, each Co-Project Director/Co-Principal Investigator can be added by selecting the “Next Person” button. The demographic information, if provided, will be used for statistical purposes only and will not be made available to merit reviewers. Applicants who do not wish to provide some or all of the information should check or select the “Do not wish to provide” option.

FORM: SF-424 (R&R) Research & Related Budget (Mandatory) – Complete Sections A through H and attach a budget justification in Section L. Do not include any amount for fee under Section J. The budget must be consistent with a 36-month period of performance (assume a proposed start date of 30 September 2018) and include the total amount requested and a breakdown by cost element. The budget justification should provide additional data (not included in Sections A through H) by element of cost, sufficient to meet the guidance provided below and allow for meaningful evaluation. The budget justification should indicate the time frames in which these activities would take place.

To attach the budget justification at Section L, click “Add Attachment.”

Note: Be sure that the total amount requested in the budget agrees with the amount entered in Block #15 of the Cover Page (Form SF-424 (R&R)).

FORM: SF-LLL Disclosure of Lobbying Activities (Optional) - This form is applicable if any funds other than federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the application for a grant under this FOA. If the applicant has lobbying activity to disclose, complete this form and include it with the other Grants.gov forms in the application package.

6. Unique Entity Identifier and System for Award Management

Each member of the US Research Team listed on the proposal submitted to this FOA is required to (a) be registered in SAM prior to submitting its application; (b) provide a valid DUNS number in its application; and (c) continue to maintain an active SAM registration with current information at all times during which it has an active federal award or an application or plan under consideration by a federal agency.

ACC-APG-RTP Division on behalf of the ARO and OSD, as the awarding office for awards under this FOA, will not make an award to an applicant until the applicant has complied with all applicable DUNS and SAM requirements. If an applicant has not fully complied with the requirements by the time ACC-APG-RTP Division is ready to make an award, the evaluation panel will determine that the applicant is not qualified to receive an award and use that determination as a basis for making an award to another applicant.

7. Submission Dates and Times

- a. Applications must be received by 4:00 p.m. Local Time (Research Triangle Park NC), 6 July 2018.

Applicants are responsible for submitting their applications in sufficient time to allow them to reach Grants.gov by the specified time. To minimize the possibility of a late submission due to unexpected network or equipment issues, DoD recommends that applications be submitted at least two days prior to the date and time indicated above. If the application is received by Grants.gov after the exact time and date specified as the deadline for receipt, it will be considered “late” and will not be considered for review. Acceptable evidence to establish the time of receipt by Grants.gov includes documentary evidence of receipt maintained by Grants.gov.

If an emergency or unanticipated event interrupts normal federal government processes so that applications cannot be received by Grants.gov by the exact time specified in this FOA, and the situation precludes amendment of the FOA closing date, the time specified for receipt of applications will be deemed to be extended to the same time of day specified in this FOA on the first work day on which normal federal government processes resume.

- b. **Application Receipt Notices** - As indicated in 2. above, Grants.gov will provide a series of emails to the applicant confirming submission and receipt of the application. Applicants can track the status of their applications at <http://www.grants.gov/web/grants/applicants/track-my-application.html>.

8. Intergovernmental Review

There is no requirement for intergovernmental review under this FOA.

9. Funding Restrictions

Funding provided by the US DoD will only be used for the US Research Team. Funding provided by the UK Research Team will only be used for the UK Research Team.

10. Other Submission Requirements

An applicant may withdraw an application at any time before award by written notice or by email. Notice of withdrawal shall be sent to the Grants Officer identified in Section II.G of this FOA. Withdrawals are effective upon receipt of notice by the Grants Officer.

E. Application Review Information:

1. Evaluation Criteria

Proposals submitted in response to this FOA will be evaluated using the factors listed below:

Overall scientific and technical merits of the proposal and responsiveness to the topic (i.e., the degree of innovation, soundness of technical concept, Applicant's awareness of the state of the art and understanding of the scope of the problem, significance and originality of the technical approach and effort needed to address/solve the problem, and anticipated scientific impact within the field and the likelihood of exploitation in future research).

The following areas will also be considered within the overall scientific and technical merits (in descending order of importance): (1) project design that integrates different technical disciplines to co-deliver research outputs, (2) the Applicant's capabilities, related experience, facilities, techniques or unique combinations of these which are integral factors for achieving the proposal objectives and the qualifications, capabilities and experience of the proposed Principal Investigator (PI), team leader and key personnel who are critical to achieving the proposal objectives, (3) value of the interactive collaboration within US and UK teams, between teams, and the integration of students in the research.

AND

Potential US DoD/UK MOD relevance and contribution to US DoD/UK MOD mission

2. Review and Selection Process

All proposals are treated as procurement sensitive and are disclosed only for the purpose of evaluation. The proposals submitted will be evaluated by a joint staff of US and UK Government subject matter experts who will evaluate proposals using the above criteria. Proposals **will not** be evaluated against each other.

3. Anticipated Announcement and Federal Award Dates

It is anticipated that the awardee will be notified on 31 July 2018. The Grant is expected to be awarded on 30 September 2018.

4. Recipient Qualification

- a. Prior to making an award under this FOA in an amount greater than the simplified acquisition threshold, which currently is \$150,000, the DoD Grants Officer must review and consider any information about the applicant that is in the designated integrity and performance system accessible through SAM (currently the Federal Awardee Performance and Integrity Information System (FAPIIS)) (see 41 U.S.C. 2313).
- b. An applicant may, at its option, review information currently in FAPIIS (accessible through SAM) and comment on any information about itself that a Federal awarding agency (DoD or other federal awarding agency) previously entered.
- c. DoD will consider any comments by the applicant, in addition to the other information in FAPIIS, in making a judgment about the applicant's integrity, business ethics, and record of performance under federal awards when completing the review of risk posed by applicants as described in 2 CFR 200.205, Federal awarding agency review of risk posed by applicants, as implemented by DoD at 2 CFR part 1103.

F. Federal Award Administration Information

1. Federal Award Notices

The notification e-mail regarding a successful application must not be regarded as authorization to commit or expend DoD funds. A grant award signed by the DoD Grants Officer is the authorizing document. Applicants whose applications are recommended for negotiation of award will be contacted by a DoD Contract/Grant Specialist to discuss any additional information required for award. This may include representations and certifications, revised budgets or budget explanations, or other information as applicable to the proposed award. The actual award start date will be determined at this time.

2. Administrative and National Policy Requirements

- a. Each award under this announcement will be governed by the general award terms and conditions in effect at the time of the award that conform to DoD's implementation of OMB guidance applicable to financial assistance in 2 CFR part 200, "Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards." The DoD Research and Development General Terms and Conditions (latest version, September 2017) are located at <https://www.onr.navy.mil/Contracts-Grants/submit-proposal/grants-proposal/grants-terms-conditions>.

These terms and conditions are incorporated by reference in this announcement.

- b. You must comply with all applicable national policy requirements. The key national policy requirements that may relate to an award under this FOA are included in the terms and conditions specified in paragraph 2.a above.
- c. By electronically signing the SF-424, the applicant affirms its agreement with the following certification.

Certification Required for Grant Award

The certification at Appendix A to 32 CFR Part 28 regarding lobbying is the only certification required at the time of application submission for a grant award. The certification is as follows:

“By signing and submitting an application that may result in the award of a grant exceeding \$100,000, the prospective awardee is certifying, to the best of his or her knowledge and belief that:

- (1) No federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- (2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employ of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit SF-LLL, “Disclosure of Lobbying Activities” in accordance with its instructions.
- (3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, and loans, or cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, Title 31, U.S. Code. Any person who fails the required certification shall be subject to a civil penalty or not less than \$10,000.00 and not more than \$100,000.00 for each failure.

d. Representations Required for Grant Award

Appropriations Provisions on Tax Delinquency and Felony Convictions

Check either “is” or “is not” for each of these two representations, as appropriate for the proposing institution, include the AOR signature and point of contact information, and attach the representation page to Field 12 of the SF-424 Research & Related Other Project Information form. The page for these representations is provided with the application materials that are available for download at Grants.gov.

Representations

The applicant is () is not () a “Corporation” meaning any entity, including any institution of higher education, other nonprofit organization, or for-profit entity that has filed articles of incorporation. If the applicant is a “Corporation” please complete the following representations:

(1) The applicant represents that it is () or is not () a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

(2) The applicant represents that it is () is not () a corporation that was convicted of a criminal violation under any Federal law within the preceding 24 months.

NOTE: If an applicant responds in the affirmative to either of the above representations, the applicant is ineligible to receive an award unless the agency suspension and debarment official (SDO) has considered suspension or debarment and determined that further action is not required to protect the Government’s interests. The applicant therefore should provide information about its tax liability or conviction to the agency’s SDO as soon as it can do so, to facilitate completion of the required considerations before award decisions are made.

OMB CONTROL NUMBER: 0704-0494

OMB EXPIRATION DATE: 11/30/2019

AGENCY DISCLOSURE NOTICE

The public reporting burden for this collection of information is estimated to average 5 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to the Department of Defense, Washington Headquarters

Services, Executive Services Directorate, Directives Division, 4800 Mark Center Drive, East Tower, Suite 02G09, Alexandria, VA 22350-3100 [0704-0494].

Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

Prohibition on Contracting with Entities that Require Certain Internal Confidentiality Agreements

Agreement with the representation below will be affirmed by checking the “I agree” box in block 17 of the SF-424 (R&R) as part of the electronic application submitted via Grants.gov. The representation reads as follows:

By submission of its application, the applicant represents that it does not require any of its employees, contractors, or subrecipients seeking to report fraud, waste, or abuse to sign or comply with internal confidentiality agreements or statements prohibiting or otherwise restricting those employees, contractors, subrecipients from lawfully reporting that waste, fraud, or abuse to a designated investigative or law enforcement representative of a Federal department or agency authorized to receive such information

Note that: (1) the basis for this representation is a prohibition in Section 743 of the Financial Services and General Government Appropriations Act, 2015, Pub. L. 113-235) on provision of funds through grants and cooperative agreements to entities with certain internal confidentiality agreements or statements; and (2) Section 743 states that it does not contravene requirements applicable to SF-312, Form 4414, or any other form issued by a Federal department or agency governing the nondisclosure of classified information.

3. Reporting Requirements

- a. Recipient of the US Grant must submit a final financial report using the SF-425, Federal Financial Report, and a final technical report describing how acquired equipment/instrumentation furthered achievement of the objectives in the approved application.
- b. If the total federal share of the award exceeds \$500,000, the reporting requirements reflected in Appendix II to Part 200 of Title 2 CFR will be included in the terms and conditions of the award.

G. Federal Awarding Agency Contacts

1. Questions of a technical or programmatic nature shall be directed to one of the following:

US DoD TPOC: Dr. Richard Riecken, Richard.riecken@us.af.mil, 703-696-9736

UK MOD TPOC: Ms. Fiona Butcher, fdbutcher@dstl.gov.uk +44 (0) 1980 954306

ARO BARI POC: Dr. James Harvey, james.f.harvey.civ@mail.mil, 919-549-4260.

2. Questions of a business or administrative nature are to be directed to the Grants Officer:

Mr. William Creech
Grant Officer
US Army Contracting Command-Aberdeen Proving Ground
RTP Division
william.a.creech3.civ@mail.mil

3. Comments or questions submitted should be concise and to the point, eliminating any unnecessary verbiage. In addition, the relevant part and paragraph of the announcement should be referenced.

H. Other Information

Applications must not include any information that has been identified as classified national security information under authorities established in Executive Order 12958, Classified National Security Information.

Applicants are advised that employees of commercial firms under contract to the government may be used to administratively process applications. By submitting an application, an applicant consents to allowing access to its application(s) by support contractors. These support contracts include nondisclosure agreements prohibiting their contractor employees from disclosing any information submitted by applicants.

I. UK Specific Information (Not Applicable to the US award)

1. Equipment: Normally under MOD contracts assets procured during by the contractor become MOD property.
2. UK contracts fee/profit: UK applicants will be entitled to charge a fair and reasonable fee/profit, which shall be included in the price breakdown and justified for the proposed work. Direct Labor for UK Applicants: Under a Contract it is recognized UK Academia are entitled to charge the Full Economic Cost (FEC) and therefore a comprehensive price breakdown will be required.
3. The UK Government operates a Statement of Good Standing declaration and the following will be required to be confirmed by any UK Applicant:
 - a. We confirm, to the best of our knowledge and belief, that [insert potential supplier] including its directors or any other person who has powers of representation, decision or control of [insert potential supplier] has not been convicted of any of the following offences:

- i. conspiracy within the meaning of section 1 or section 1A of the Criminal Law Act 1977 or article 9 or 9A of the Criminal Attempts and Conspiracy (Northern Ireland) Order 1983, or in Scotland the Offence of conspiracy, where that conspiracy relates to participation in a criminal organization as defined in Article 2 of Council Framework Decision 2008/841/JHA;
- ii. involvement in serious organized crime or directing serious organized crime within the meaning of section 28 or 30 of the Criminal Justice and Licensing (Scotland) Act 2010;
- iii. corruption within the meaning of section 1 of the Public Bodies Corrupt Practices Act 1889 or section 1 of the Prevention of Corruption Act 1906*;
- iv. the offence of bribery;
- v. bribery within the meaning of section 1, 2 or 6 of the Bribery Act 2010;
- vi. bribery or corruption within the meaning of section 68 and 69 of the Criminal Justice (Scotland) Act 2003;
- vii. fraud, where the offence relates to fraud affecting the financial interests of the European Communities as defined by Article 1 of the Convention relating to the protection of the financial interests of the European Union*, within the meaning of:
 - (a) the common law offence of cheating the Revenue;
 - (b) the common law offence of conspiracy to defraud;
 - (c) fraud or theft within the meaning of the Theft Act 1968* the Theft Act (Northern Ireland) 1969*, the Theft Act 1978* or the Theft (Northern Ireland) Order 1978*;
 - (d) fraud within the meaning of section 2, 3 or 4 of the Fraud Act 2006;
 - (e) in Scotland, the offence of fraud;
 - (f) in Scotland, the offence of theft;
 - (g) fraudulent trading within the meaning of section 458 of the Companies Act 1985, article 451 of the Companies Act (Northern Ireland) Order 1986 or section 993 of the Companies Act 2006;
 - (h) fraudulent evasion within the meaning of section 170 of the Customs and Excise Management Act 1979 or section 72 of the Value Added Tax Act 1994*;
 - (i) an offence in connection with taxation in the European Union within the meaning of section 71 of the Criminal Justice Act 1993;
 - (j) destroying, defacing or concealing of documents or procuring the execution of a valuable security within the meaning of section 20 of the Theft Act 1968* or section 19 of the Theft Act (Northern Ireland) 1969* or making, adapting, supplying or offering to supply articles for use in frauds within the meaning of section 7 of the Fraud Act 2006;
 - (k) in Scotland the offence of uttering; or
 - (l) in Scotland, the criminal offence of attempting to pervert the course of justice;
- viii. money laundering within the meaning of section 93A, 93B, or 93C of the Criminal Justice Act 1988, section 45, 46 or 47 of the Proceeds of Crime (Northern Ireland) Order 1996 or the Money Laundering Regulations 2003 or money laundering or terrorist financing within the meaning of the Money Laundering Regulations 2007*;
- ix. terrorist offences or offences linked to terrorist activities, as defined in Articles 1 and 3 of Framework Decision 2002/475/JHA*;
- x. an offence in connection with proceeds of drug trafficking within the meaning of section 49, 50 or 51 of the Drug Trafficking Act 1994; or
- xi. in Scotland, the offence of incitement to commit any of the crimes described in Regulation 23(1);

xii. any other offence within the meaning of Article 39(1) of the Defence and Security Procurement Directive 2009/81/EC as defined by the national law of any member State.

* including amendments to the legislation

b. [Insert potential supplier] further confirms to the best of our knowledge and belief that it:

- i. being an individual, is a person in respect of whom a debt relief order has not been made, is not bankrupt or has not had a receiving order or administration order or bankruptcy restrictions order or debt relief restrictions order made against him or has not made any composition or arrangement with or for the benefit of his creditors or has not made any conveyance or assignment for the benefit of his creditors or does not appear unable to pay or to have no reasonable prospect of being able to pay, a debt within the meaning of section 268 of the Insolvency Act 1986, or article 242 of the Insolvency (Northern Ireland) Order 1989, or in Scotland has not granted a trust deed for creditors or become otherwise apparently insolvent, or is not the subject of a petition presented for sequestration of his estate, or is not the subject of any similar procedure under the law of any other state;
- ii. being a partnership constituted under Scots law, has not granted a trust deed or become otherwise apparently insolvent, or is not the subject of a petition presented for sequestration of its estate;
- iii. being a company or any other entity within the meaning of section 255 of the Enterprise Act 2002 has not passed a resolution or is not the subject of an order by the court for the company's winding up otherwise than for the purpose of bona fide reconstruction or amalgamation, nor had a receiver, manager or administrator on behalf of a creditor appointed in respect of the company's business or any part thereof or is not the subject of similar procedures under the law of any other state?
- iv. has not been convicted of a criminal offence relating to the conduct of its business or profession, including, for example, any infringements of any national or foreign law on protecting security of information or the export of defense or security goods;
- v. has not committed an act of grave misconduct in the course of its business or profession, including a breach of obligations regarding security of information or security of supply required by the contracting authority in accordance with Regulation 38 or 39 of the DSPCR during a previous contract;
- vi. has not been told by a contracting authority, that the Potential Provider does not to possess the reliability necessary to exclude risks to the security of the United Kingdom*;
- vii. has fulfilled obligations relating to the payment of social security contributions under the law of any part of the United Kingdom or of the member State in which it is established;
- viii. has fulfilled obligations relating to the payment of taxes under the law of any part of the United Kingdom or of the member State in which it is established.

4. The anticipated contract will be outside the scope of both the Public Contracts Regulations 2015 and the Defence and Security Public Contracts regulations 2011, due to specific procedural rules pursuant to an international agreement or arrangement concluded between the United Kingdom and a State which is not a member State;

5. The DSTL anticipates utilizing the DSTL Short Form Contract and a copy can be requested by contacting the UK MOD TPOC.

6. The total amount of funding from the UK MOD for the three years award resulting from this BARI FOA is estimated to be £1.5 million pounds pending out-year appropriations. This MOD funding is intended to be in the form of a Contract exclusively for research performed at U.K. institutions. The BARI contract award is contingent on availability of funds, the agreement of terms and conditions of contract, the specific topic, and the scope of the proposed work. Typical annual funding per Contract is expected to be in the range of approximately £0.5 million pounds each year for U.K. institutions."

7. Use of Human Subjects in UK Research

Due to the fact that this competition is asking for solutions which explicitly include human-machine interaction, there is a significant chance of proposed solutions requiring MOD ethical scrutiny, especially if human subjects are to be involved in any demonstrations, assessments and experiments.

All research involving human participation conducted or sponsored by any UK government department is subject to ethical review under procedures outlined in Joint Service Publication 536 'Ministry of Defence Policy for Research Involving Human Participants', irrespective of any separate ethical procedures (eg from universities or other organisations). This ensures that acceptable ethical standards are met, upheld and recorded, adhering to nationally and internationally accepted principles and guidance.

The following definitions explain the areas of research that require approval:

clinical: conducting research on a human participant, including (but not limited to) administering substances, taking blood or urine samples, removing biological tissue, radiological investigations, or obtaining responses to an imposed stress or experimental situation

non-clinical: conducting research to collect data on an identifiable individual's behaviour, either directly or indirectly (such as by questionnaire or observation) All proposals must declare if there are potential ethical issues.

Successful proposals will be supported through the ethical review process; however, an outline of your research methods must be included in your proposal to help this process.

More information on the application process ethical approval for MOD research involving humans can be found at: <https://www.gov.uk/guidance/apply-for-ethical-approval-for-mod-research-involving-humans>

8. Use of Animals in UK Research

Animal use should not be included in the UK Research.