



FUNDING OPPORTUNITY ANNOUNCEMENT

OVERVIEW INFORMATION

This Funding Opportunity Announcement (FOA) describes a newly proposed initiative of the Air Force Research Laboratory (AFRL) concerning the University Center of Excellence (COE) in “Extreme Neuromorphic Materials and Computing.” The University COE is defined as a joint effort among Air Force Office of Scientific Research (AFOSR), Air Force Research Laboratory Technology Directorates (AFRL TDs), and an outstanding university team to perform high-priority collaborative research which addresses research objectives of the United States Air Force (USAF) and the United States Space Force (USSF). The proposed COE is a joint project between AFOSR, AFRL Information Directorate (AFRL/RI), and AFRL Materials and Manufacturing Directorate (AFRL/RX).

AFOSR anticipates making at least one grant award of up to \$1,000,000 per year per award, for a maximum of five years. The base period is for three years, which a consortium of AFOSR, AFRL/RI, and AFRL/RX intends to incrementally fund, followed by an option to extend an additional two years provided the COE passes a midterm review. All funding decisions are at the Government’s discretion and are subject to the availability of funds.

Proposers are highly encouraged to confer with the designated AFOSR Program Officers as soon as possible. AFOSR will evaluate proposals relying on a peer review panel and the criteria specified in section E: “Application Review Information.” AFOSR will not provide funding for reimbursement of proposal or application costs associated with responding to this FOA.

White Papers briefly summarizing the proposing institution’s ideas are highly encouraged. The AFOSR Program Officers will coordinate with the Technical Representatives of the sponsoring AFRL TDs, i.e., AFRL/RI and AFRL/RX, to provide feedback to white papers and will share responsibility for ensuring the success of a COE.

Proposals may choose to include a data management plan that outlines how samples and data collected in the program will be stored and managed. This includes, but is not restricted to, issues such as: standards for data and metadata collection, content and format, data archiving, database management, and data sharing within and outside the COE. This is modeled on the National Science Foundation Data Management Plan.

Hyperlinks have been embedded within this document and appear as underlined, and or blue-colored words in the midst of paragraphs. The reader may “jump” to the linked section within this document by “clicking” (CTRL + CLICK, or CLICK).

SUMMARY FUNDING OPPORTUNITY INFORMATION

1. FEDERAL AWARDING AGENCY NAME

Air Force Office of Scientific Research
875 North Randolph Street, STE 325, Room 3112
Arlington, VA 22203

2. FUNDING OPPORTUNITY TITLE

CENTER OF EXCELLENCE (COE): Extreme Neuromorphic Materials and Computing

3. ANNOUNCEMENT TYPE

Amendment

4. ANNOUNCEMENT NUMBER

FOA-AFRL-AFOSR-2023-0012 Amendment 0002

5. CATALOG OF FEDERAL DOMESTIC ASSISTANCE (CFDA) NUMBER

12.800 Air Force Defense Research Sciences Program

6. KEY DATES

Pre-proposal inquiries and questions must be received in writing by electronic mail not later than **29 June 2023 at 11:59 PM Eastern Time (ET)** to be considered.

White papers are highly encouraged and must be submitted electronically at <https://community.apan.org/wg/afosr/p/submitawhitepaper> by **20 July 2023 at 11:59 PM Eastern Time** to be considered. White paper evaluation is meant to initially assess the capability of a proposed effort and is NOT a selection process. White papers can be up to 8 pages in length plus references. White papers should adequately articulate:

1. An initial list of members of the proposed team with a short bio or CV for each (CVs and/or bios will not count against page limit).
2. The main technical components of the proposed research and how it aligns with the goals of the solicitation.
3. The specific proposed activities to establish a relationship with AFRL/RI, AFRL/RX, and AFOSR.
4. The specific plans to educate students/postdoctoral fellows, expose them to research opportunities with AFRL TDs, and ultimately further the interests of the USAF/USSF.

The Government will respond to white papers before COB on **3 August 2023**.

Proposals must be received electronically through Grants.gov by **28 August 2023 at 11:59 PM Eastern Time** to be considered.

We anticipate that the Government will notify proposers of selection or non-selection for award by **8 November 2023**.

TABLE OF CONTENTS

A. PROGRAM DESCRIPTION	7
1. SUMMARY	7
2. BACKGROUND.....	7
3. OBJECTIVES AND RESEARCH CONCENTRATION AREAS	10
4. UNIVERSITY CENTER OF EXCELLENCE	12
B. FEDERAL AWARD INFORMATION	15
C. ELIGIBILITY INFORMATION.....	16
1. ELIGIBLE APPLICANTS.....	16
a. Qualified and Responsible United States Educational Institutions	16
b. HBCU/MI, Tribal College and University Applicants Encouraged	16
c. Ineligible Entities	16
2. COST SHARING OR MATCHING	16
3. OTHER	16
a. Research Personnel Facility Access Requirements and Restrictions.....	17
b. Acknowledgment of Support and Disclaimer Requirements.....	17
c. Expectation of Public Dissemination of Research Results	17
d. Conflict of Interest	18
D. APPLICATION AND SUBMISSION INFORMATION	19
1. ADDRESS TO REQUEST APPLICATION PACKAGE.....	19
2. CONTENT AND FORM OF APPLICATION SUBMISSION	19
a. Pre-proposal Inquiries and Questions	19

b. The Application as a Whole.....	19
c. Proposal Format.....	20
d. Proposal Length.....	21
e. No Confidential or Proprietary Information	21
f. Electronic Form and Proposal Attachments	21
3. GRANTS.GOV APPLICATION SUBMISSION AND RECEIPT PROCEDURES	22
a. Electronic Delivery	22
b. How to Register to Apply through Grants.gov	22
c. How to Submit an Application to AFOSR via Grants.gov	23
4. COMPONENT PIECES OF THE APPLICATION	25
a. SF 424 (R&R) Application for Federal Assistance.....	25
b. SFLLL Disclosure of Lobbying Activities Form.....	26
c. Certification Regarding Lobbying Form	27
d. R&R Other Project Information Form.....	27
e. R&R Publicly Releasable Project Summary / Abstract.....	28
f. Project Narrative.....	28
g. Bibliography and References Cited	30
h. R&R Senior / Key Person Profile Form	31
i. R&R Budget Form.....	31
j. R&R Sub award Budget Form.....	32
k. Budget Justification	32
l. R&R Project / Performance Site Locations Form	33
m. Data Management Plan (Required).....	33
n. R&R Personal Data Form.....	33
5. INFORMATION YOU MUST SUBMIT IF SELECTED FOR POSSIBLE AWARD	34
6. UNIQUE ENTITY IDENTIFIER (UEI), CAGE, AND SYSTEM FOR AWARD MANAGEMENT (SAM)	34
a. SAM Registration Required.....	34
b. SAM Exemption or Exceptions Not Available Under This Announcement.....	35
c. Questions about SAM Registrations and Updates	35
d. Consequences of Non-Compliance with SAM Registration Requirements	35

7. SUBMISSION DATES AND TIMES.....	35
a. Pre-Proposal Inquiries and Questions Deadline.....	35
b. How Submission Time for Pre-Proposal Inquiries and Questions is Determined	35
c. Effect of Missing Pre-Proposal Inquiries and Questions Deadline.....	35
d. Proposal Submission Deadline	36
e. How Proposal Submission Time is Determined	36
f. Grants.gov Tracking Number is Application Receipt	36
g. Effect of Missing the Proposal Submission Deadline.....	36
8. INTERGOVERNMENTAL REVIEW	36
9. FUNDING RESTRICTIONS.....	37
a. Proposal Preparation Costs	37
b. Air Force Office of Scientific Research No-cost Extension (NCE) Policy	37
c. Prohibition on Contracting with Entities that Require Certain Internal Confidentiality Agreements or Statements--Representation.....	37
d. Other Submission Requirements	38
E. APPLICATION REVIEW INFORMATION.....	38
1. CRITERIA	38
a. Principal Evaluation and Selection Criteria	38
b. Additional Evaluation and Selection Criteria	38
2. REVIEW AND SELECTION PROCESS.....	39
a. Merit-based, Competitive Procedures.....	39
b. Cost Analysis for Reasonableness and Realism	39
3. DISCLOSURE OF ADMINISTRATIVE PROCESSING BY CONTRACTOR PERSONNEL 39	
4. NO GUARANTEED AWARD.....	39
F. FEDERAL AWARD ADMINISTRATION INFORMATION	40
1. SELECTION NOTICES	40
a. Electronic Notification.....	40
b. Selection for Possible Award Does Not Authorize Work.....	40
2. AWARD NOTICIES.....	40
a. Federal Award Document.....	40
b. Electronic Federal Award Distribution.....	40
3. ADMINISTRATIVE AND NATIONAL POLICY REQUIREMENTS.....	40

a. Reporting of Matters Related to Recipient Integrity and Performance	40
b. Agency Review of Risk Posed by Applicants	40
c. Cross-Cutting National Policy Requirements	41
d. Acknowledgment of Research Support	41
e. Disclaimer Language for Research Materials and Publications	42
f. Uniform Administrative Requirements, Cost Principles, and Audit Requirements	42
g. DoD Research and Development General Terms and Conditions	42
h. Conditions of Award for Recipients Other Than Individuals	42
i. Minimum Record Retention Requirements	42
4. REPORTING	43
a. Monitoring and Reporting Program Performance	43
b. Technical Performance Report Format	43
c. Department of Defense (DD) Form 882 Report of Inventions and Subcontracts	43
d. Standard Form (SF) 425 Federal Financial Report	44
e. Electronic Payment Requests and Electronic Payment	44
f. Property Reports	44
g. Other Reports	44
h. Electronic Submission of Reports	44
G. AGENCY CONTACTS	45
1. TECHNICAL INQUIRES AND QUESTIONS	45
2. GENERAL INQUIRIES AND QUESTIONS	45
H. OTHER INFORMATION	46
1. OMBUDSMAN	46
2. GRANTS AND CONTRACTING OFFICERS AUTHORITY	46
3. ADDITIONAL FUNDING OPPORTUNITIES	46

A. PROGRAM DESCRIPTION

1. SUMMARY

The Air Force Office of Scientific Research (AFOSR) seeks unclassified proposals from educational institutions in the United States for the University Center of Excellence (COE) in “Extreme Neuromorphic Materials and Computing.”

The University COE is defined as a joint effort among AFOSR, Air Force Research Laboratory Technology Directorates (AFRL TDs), and an outstanding university or team of universities to perform high-priority collaborative research. The proposed COE is a joint project between AFOSR, AFRL Information Directorate (AFRL/RI), and AFRL Materials and Manufacturing Directorate (AFRL/RX), referred to collectively as “we, our, or us” or “AFRL” in this announcement. This COE is anticipated to extend the research interests and capabilities of AFRL on the subject area and provide opportunities for a new generation of US scientists and engineers to address United States Air Force (USAF) and United States Space Force (USSF) research needs. Proposals must not contain any proprietary information.

We will consider proposals for up to five (5) years with a three-year (3) base period and a two-year (2) option period.

We will evaluate proposals relying on a peer review panel organized in consultation with the Technical Representatives of AFRL TDs and the criteria specified in section E: “Application Review Information.”

We anticipate making at least one award of up to **\$1,000,000** per year per award, for a maximum of five years, under this competition for a team proposal with no more than five universities, **supporting up to seven faculty researchers with 90% of total budget allocated for the support of no more than six core faculty researchers.**

AFRL invites proposals for research in the areas described in detail below. The schedule for this announcement is given in Section B, Federal Award Information. This research effort will consist of multidisciplinary teams of researchers with the skills needed to address the relevant research challenges necessary to meet the program’s goals. Multi-investigator teaming is encouraged **with up to seven faculty researchers including no more than six core members supported by 90% of total budget.** University teaming (up to five) is allowed. Under no circumstances will the Government help to create teams.

2. BACKGROUND

In DoD missions, the exponential growth of data demands advanced data analysis capabilities with higher processing performance, lower energy dissipation, and better system scalability. During the past twenty years, the artificial intelligence (AI) and data processing computation demand has doubled every 3.5 months while performance of the processors has doubled roughly only every 3.5 years (and likely not continue due to the end of Moore’s Law). In addition, the intrinsic limitations of von Neumann architecture based on CMOS technology are prohibiting our computing platforms from meeting future AI and autonomy computation

requirements. These limitations have motivated emerging research areas in neuromorphic computing inspired by the architecture and working mechanism of the human brain, which is widely recognized as the ultimate computing engine with extremely high energy efficiency, reliable performance, efficient learning, and robust cognitive abilities.

The human brain's cognitive functions emerge from the collective processing capability of simple computing elements, i.e., neurons, synapses, and dendrites. In such biological neural networks, spike sequences carry both spatial and temporal information for communication and processing. Moreover, neurons operate asynchronously in an event-driven manner, and biological neural networks demonstrate very energy-efficient information processing. Such biological neural networks have initially been simulated via software-only approaches, and the scale of simulated networks usually is small due to high communication overhead and limited parallelizable computing with conventional hardware. The artificial neural network (ANN) approach loosely models neuron functionality and the massive connection of neurons in a biological brain, but ANN ignores a lot of essential features of biological neural networks. Such a simplification makes the training process quite subtle, inefficient, and sensitive. Although ANNs have obtained substantial successes in many applications such as image and speech recognition, the incredibly high computing cost required by training and poor support of in-hardware learning emerge as the main obstacles.

Neuromorphic models differ from their ANN counterparts in that they encode information via the temporal activation of neurons and precise emission of spikes. Over the past few years, many research efforts have been devoted to neuromorphic models to harness their higher computational potential. These efforts have focused on developing algorithms such as Widrow-Hoff type supervised plasticity rules for precise temporal spike-train recognition, back-propagation approximations for powerful data-driven learning, and spike-timing-dependent plasticity (STDP) for scalable temporal learning in progressively deeper neural architectures. CMOS based hardware has been built to implement the neuromorphic models and shown limited architectural design perspectives. The most visible examples are IBM's TrueNorth neurosynaptic processor and Intel's Loihi neuromorphic chip. CMOS devices and circuits, as the building elements for these hardware systems, were not created or optimized for neuromorphic computing purposes in the first place. Therefore, the existing approaches are not able to address the following deep scientific and technological gaps:

Gap 1: Next generation bio-inspired materials with neuromorphic dynamics. Bio-inspired materials that can fundamentally enable bio-realistic algorithms and models are still under-researched despite progress with metal oxides, polymer composites, photonics and biomolecules under the DARPA SyNAPSE program, and recent AFOSR Multidisciplinary University Research Initiative (MURI) programs. When relating these materials to CMOS devices, it is important to recognize that CMOS technologies were created for logic operation and arithmetic computation, and thus their dynamics are not well matched with the dynamics that are critical for neuromorphic computing. The dynamics of neurons, synapses and dendrites come from ion diffusion, which is not present in CMOS devices. Consequently, CMOS-based synapses and neurons require complex and bulky circuits built with transistors. Compared with the $10\ \mu\text{m}^2$ neuron area, $0.001\ \mu\text{m}^2$ synaptic area, and $\sim 2\ \text{fJ}$ synaptic operation energy in biological systems, the CMOS-based elements are 20 times, 400 times and 2,000 times larger, respectively. Novel intelligent materials, such as memristive materials providing ion diffusion

dynamics, could offer such desirable dynamics to implement bio-inspired algorithms and models efficiently.

Gap 2: Neuromorphic dynamics and robustness in extreme environments. Extending the above-described efficient computational capability in extreme environments is critical for numerous DoD applications, from sensing and decision making in UAVs to long term operations of satellites. The direct exposure of edge computing devices to challenging operational environment makes them susceptible to corrosive, erosive, and high-temperature environments, limiting their practical applications. Therefore, it is timely and of great dividend to accelerate materials development and optimize reliability and durability of materials and devices for harsh environment applications. Such understanding will provide criteria and guidance for new material investigations.

Gap 3: Innovative circuits to serve as required computing elements. The bio-inspired intelligent materials need to be built into new circuits as required computing elements that can implement the bio-realistic algorithms and models. These circuits do not need be strictly electronic, and may incorporate materials with favorable dynamics in electronic, photonic, and microwave circuits, and may also be hybrids of different modalities. Different from the traditional linear circuits built with CMOS devices, bio-realistic circuit designs should be highly nonlinear and rich in dynamics, which present great opportunities and challenges in unconventional circuit designs. There is a lack of research to take advantage of the intrinsic nonlinear dynamics in designing novel circuit elements to efficiently and faithfully emulate synapses, neurons, and dendrites.

Gap 4: Scalable computing architecture for real world applications. Even with more capable and suitable devices and circuits, there is a lack of research and existing knowledge on how to construct a scalable architecture for real-world problems. It requires co-designs and co-optimizations across different layers to incorporate the desired properties of the new materials and circuits to realize an efficient, reliable, and scalable computing system. Taking reliability in extreme environments as an example, the stochastic nature of spike patterns is an important dynamical feature of robust neuron functions. A spiking-based model without stochastic elements will have not only limited performance potentials in probabilistic inference related applications but also lower resiliency to extreme external conditions and robust performance in real-world applications. The neuromorphic dynamics of the new materials would be intrinsically stochastic and can serve as the stochastic elements to solve this issue if appropriately incorporated into the new architecture designs.

Gap 5: Methods to realize bio-realistic algorithms and models. The algorithms and models used in biological neural networks (and their co-evolution with the underlying “wetware”) are likely why the brain is so efficient in performing many tasks such as learning. The back-propagation learning in a deep neural network (DNN) model requires a substantial amount of high-precision computing and memory, which are not affordable, especially for edge and Internet of Things (IoT) devices with limited resources. Therefore, most of the existing architectures only support inferencing functions of pre-trained neural networks that may not function well in real environments with dynamic data flows and characteristics because they cannot adapt to changes. State-of-the-art bio-plausible model research outcomes will need to be fully leveraged to identify key computing elements and neuromorphic dynamics that can

guide novel materials and circuits research.

Focusing on overcoming the science and technology gaps 1, 2, and 3 mentioned above, this COE will investigate, discover and design (1) revolutionary brain-inspired materials and devices, (2) robust neuromorphic materials in extreme environments, and (3) more compact and capable computing elements; while continuously incorporating state-of-the-art research outcomes in scalable and reliable architectures and bio-plausible algorithms. It will also foster close collaboration with faculty members (to open pipelines for continuing research and strengthening in-house expertise), as well as their graduate students (as a means of recruiting talents), from top universities.

3. OBJECTIVES AND RESEARCH CONCENTRATION AREAS

This COE aims at high-risk, high-reward basic research that will address the hardest challenges currently facing neuromorphic computing. Specifically, the basic research objectives of this COE include: (1) Discover materials and devices with dynamics to enable bio-realistic algorithms and models; (2) Discover and design materials resistant to extreme environments; (3) Design innovative circuits based on neuromorphic materials to realize computing elements required by brain-inspired algorithms and models. In addition, this COE will leverage outside research to (1) Incorporate scalable, reliable architectures for bio-realistic algorithms and models and (2) Understand bio-realistic algorithms and models to identify key computing elements and neuromorphic dynamics.

Research Objective 1: Existing research and demonstrations of computing with memristive materials and devices are mostly limited to using their steady-state (static) behaviors for learning and inference. However, dynamics of ion motion in a biological neural network play a pivotal role in implementing neuroscience principles for the brain, which represents the most efficient and intelligent computing system ever known. Such dynamic properties can naturally encode temporal information and are highly desirable for implementing bio-realistic neural networks for applications such as time sequence prediction and natural language understanding. As with the corresponding biological components, memristive materials function based on particle motion. This makes it possible for memristive materials to generate dynamics like those in biological systems, leading to materials capable of implementing advanced learning and memory functions. The emphasis of biological ion dynamics here requires new memristive materials to be different from the existing ones used for static, non-volatile memories. More specifically, both the mobile species and materials that host the mobile species need to be discovered for memristive materials with tunable activation energies and a variety of particle motion dynamics. Different from previous studies for steady-state properties, where only the static resistance states are relevant, the entire temporal switching process, i.e., the switching dynamics, should be utilized for computing and needs to be fully investigated and modeled. This imposes much greater challenges in characterizing, understanding, and modeling the memristive materials. For example, novel *in-situ* material characterization methods with very high temporal and spatial resolutions may be needed to reveal the microscopic picture of element migrations.

Research Objective 2: The direct exposure of edge computing devices to challenging

operational environment makes them susceptible to corrosive, erosive and high-temperature environments, limiting their practical applications. One major challenge for memristors in harsh environments is performance degradation caused by high temperature and/or radiation. In addition, a significantly crucial application of memristors is the realization of artificial synapses for brain-inspired computing, where the radiation and other extreme environmental effects have remained unexplored. Understanding the materials degradation under extreme environments on memristor performance metrics would enable us in designing memristive materials which are resistant to extreme environments.

Research Objective 3: The rich dynamics of new materials may enable different types of neuromorphic devices and circuits, implemented in a variety of circuit modalities. For instance, the delay time and relaxation time of a volatile devices are important to realize a faithful artificial neuron and synapse, respectively. Concepts from the random recurrent neural network (RNN) and reservoir computing communities may offer alternative paths to exploit the inherent nonlinear dynamics of neuromorphic circuitry and devices. Reservoir computing is a powerful machine learning method based on RNNs that use topological diversity and nonlinearity in dynamical processes to perform computational mappings. Instead of tuning the weights throughout the entire RNN to achieve a target mapping (an expensive and numerically unstable process), only the readout layer of the network is trained, using inexpensive linear regression methods. In addition, the diversity requirement of the network properties may inherently exploit variations in fabrication and operation of experimental systems. These advantages open the door to embedding RNN-like functionality in unconventional physics and hardware, allowing a reservoir to directly serve as the sensor platform and data processor at the edge of a system. Exploring how reservoir computing concepts can be integrated and complement bio-inspired, neuromorphic approaches is a potential, additional direction for this objective. Finally, dynamical devices that have large fanout and can be readily stacked to realize 3D circuit designs, which are necessary for a complex computing system with massive connectivity and computing, would be a great advantage.

Leverage Outside Research 1: A biological neural network is a complex system with rich dynamics that maps signals in time and space. Their efficiency can be attributed to the biological mechanisms of the neuron, dendrite, and synapse dedicated to these tasks. Realizing the same dynamics in a circuit is a more complicated ordeal. As mentioned before, current silicon implementations of neurosynaptic dynamics involve intricate circuit topologies composed of multiple devices. However, these circuits require large amounts of chip area, consume a lot of power, and are more susceptible to noise and device variation. The COE shall leverage circuit and architecture solutions that have a low complexity but can faithfully emulate the complex dynamics involved in biologically-plausible neurosynaptic computation and learning. Such hardware will take advantage of novel neuronal, dendritic and synaptic circuits that are able to capture and store temporal information as well as modulate spiking voltage inputs in a predictable way. It could mimic the behavior in a biological circuit, such as in some models where the timing relationships of pre-synaptic and post-synaptic spikes alter the weight of a synapse, modulating the effect of the pre-synaptic neuron on the post-synaptic neuron. Auxiliary circuits and architectures would be necessary to leverage these devices properly, enable

system scaling, and virtually integrate with algorithms and applications. For example, given a network of novel neuron and synaptic circuits, a recurrent spiking neural network architecture would require auxiliary circuits for denoising, encoding, and decoding spiking data, a methodology for storing spike times, and a pipeline or schedule for transferring the data between layers. At the system level, predictable, replicable, and robust function and performance are expected. Close dialogue and co-design of materials, devices, circuits, architectures, and algorithms are important.

Leverage Outside Research 2: It is well established that neurons communicate information via “spikes” (or action potentials). Spiking neural networks (SNNs) are increasingly common algorithms that use simulated spikes to encode and communicate information and attempt to mimic the signals found in biological brains. The use of spikes is not only biologically-inspired but also improves the overall efficiency of the model. However, debates continue among neuroscientists regarding whether neurons use precise spike timing or frequency to encode information, the functions of noisy, probabilistic population codes, and whether every spike carries true information. Effective information representation is expected to correlate with the neuromorphic dynamics and the corresponding circuit scheme based on intelligent materials. It is clear that a biologically-plausible substitute for back-propagation is needed. Such a substitute would ideally be a multi-layer algorithm capable of training SNNs constructed of various types of connections and data representations that supports both supervised and unsupervised learning. The COE shall leverage and incorporate the algorithms that are not only biologically realistic but also efficient to realize in hardware. An efficient learning rule is likely to take advantage of the dynamics of the neurons and synaptic circuits implemented in developed technologies. Bio-inspired systems are poised to excel in continuous time, thinking-with-context applications, such as processing sensory information and navigating in the real-world environment. During and beyond this COE, the ultimate research objective is to create processing and learning algorithms and systems that can adapt to time-varying contexts and environments by leveraging combined spatial and temporal information.

4. UNIVERSITY CENTER OF EXCELLENCE

Proposals for this multidisciplinary COE are sought that articulate the technical details of the proposed research and the planned mechanisms to educate a new generation of professionals. This COE is focused on the fundamental understanding of two interrelated scientific challenges concerning (a) the discovery of new intelligent multifunctional materials allowing robust neuromorphic dynamics in extreme environments and (b) more effective multidisciplinary design of the neuromorphic computing devices emulating the biological systems of synapses, neurons, and dendrites in terms of learning abilities, energy efficiency, and reliable performance. In implementing the COE, multi-investigator teaming across departments and disciplines is highly encouraged with a particular emphasis on transformative concepts over incremental efficiency gains. Developing students with cross-expertise and the ability to effectively communicate between these technical communities is paramount.

We expect researchers from the COE to work collaboratively with the AFRL researchers to address critical USAF and USSF challenges. The COE researchers will coordinate research projects with AFRL researchers, share information and best practices, author joint studies and

publications, and provide a number of learning opportunities and applications for students and the defense community overall. Regular interactions, joint conferences, workshops, and other research exchange activities are expected. AFRL is open to leveraging the existing resources at AFRL TDs as well as AFOSR, including National Research Council (NRC) Summer Faculty Fellowship and Post-Doctoral programs. In this manner, educational institution staff and students with the appropriate credentials can be hosted at AFRL with minimal additional administrative overhead, in a coordinated fashion with the existing visiting faculty and summer research programs. Applicants are encouraged to consider providing personnel exchange opportunities that can foster AFRL activities that parallel graduate research groups at universities, i.e., closely integrated researchers under research advisors geared toward journal and conference paper publication and thesis/dissertation accomplishment.

AFRL is seeking both traditional and innovative approaches that strengthen and result in long term research collaborations with academia. Described below is what a strong proposal should provide.

4.1 Technical Details of Proposed Research

A strong proposal should outline, as specifically as possible, the technical details of the proposed research. In addition, proposals should articulate how research goals align with the research objectives outlined in the previous section. Proposers can enhance or deviate from these topics if they provide reasonable technical arguments and if they are still addressing the required objectives. Efforts integrating a variety of approaches are preferred to those using a single approach, especially as these may provide increased opportunities for information and technology transfer to AFRL.

4.2 Investigator Qualifications

In line with the basic research vision of this COE, proposals should highlight the following qualifications of the proposed academic collaborators:

1. Strong history of published research that is both principled and foundational in the fields of brain-inspired dynamic nanomaterials, materials for extreme environments, non-linear computing circuits, and neuromorphic computing circuits and systems.
2. Expertise within the academic team covering the range of computer science, materials science, and electrical engineering with potential contributions from mathematics and/or physics.
3. Strong history of applying principled neuromorphic models, self-learning algorithms, dynamic data analytics, and/or hardware systems for learning to real-world problem settings.
4. Willingness to collaborate on and commit resources to jointly defined projects with AFRL scientists and engineers (S&Es).

4.3 Interactions and Information Exchange

Proposals should address plans for the following interactions between AFRL S&Es and academic collaborators:

1. One or more research projects, jointly defined by the academic collaborators and S&Es at AFRL that are in line with collaborators' expertise, AFRL interest, and the goals of this proposed COE.
2. Commitment from academic collaborators of graduate students and/or post-doctorate associates to work on the aforementioned project(s) both at the academic institutions and

embedded with S&Es at AFRL, working on USAF and USSF data and learning tasks.

3. A yearly workshop, independent of annual meetings, where topics are jointly defined by the academic collaborators and AFRL S&Es. Such a workshop would be organized by the academic collaborators, include invited speakers, and be located at an AF/DoD facility.

4. If applicable, how the COE will leverage other institutional resources to expand the participation of students and postdoctoral fellows in the COE, establish dedicated facility and office space, and/or other means of promoting research.

Proposers are encouraged to confer with the designated points of contact as soon as possible. Their contact information can be found at the end of this announcement. Coordination with AFOSR, AFRL/RI, and AFRL/RX prior to proposal submission is encouraged but is not required.

4.4 Access to DoD Resources

Proposals may request access to AFRL facilities or DOD high performance computing resources in order to conduct the proposed research. Proposals should make this request in accordance with the instructions given in the D.4.g. Project Narrative section of this announcement. If authorized, there is no cost to the research for these resources.

Applicants are advised that routine access of educational institution researchers to AFRL/RI and AFRL/RX buildings and facilities is limited to U.S. citizens. Individuals eligible for access are subject to background checks. Section C.3.a. Research Personnel Facility Access Requirements and Restrictions provides more information.

Award(s) under this FOA are not restricted to U.S. citizens, but access to DoD facilities is limited for non-US citizens, which could add coordination challenges. An objective of this COE is to establish relationships between researchers at the performing universities and the relevant AFRL Directorates. If relevant, proposals should include information on U.S. and non-U.S. personnel, describing their roles in the research effort.

B. FEDERAL AWARD INFORMATION

AFOSR anticipates making one award under this announcement, through an issued grant. Any award made under this competition will support a University Center of Excellence (COE) in “Extreme Neuromorphic Materials and Computing,” and is subject to availability of funds. AFOSR executes discretionary research and development funds appropriated to the USAF and the USSF for awards. AFOSR can only make an award if sufficient funds are available.

The anticipated period of performance is a three-year base period, with one two-year option to continue performance. As a result, the total period of performance if all options are exercised is five (5) years.

AFOSR anticipates making at least one grant award of up to \$1,000,000 per year per award, for a maximum of five years. The base period is for three years, which the AFOSR intends to incrementally fund, followed by an option to extend an additional two years provided the COE passes a midterm “go/no-go” review at the 2.5-year point. All funding decisions are at the Government’s discretion and are subject to the availability of funds.

This plan means proposers should plan on not more than \$5,000,000 in funding for the entire five-year duration if all options are exercised; however, the total amount of funding and resources made available to fund a successful proposal may vary based on the quality of proposals received, and funds availability.

AFOSR reserves the right to select and fund for award all, some, part, or none of the proposals received. There is no guarantee of an award.

Our authority for an award under this competition is established at 10 U.S.C. 2192(b)(1)(B) for improvement of education in technical fields, and 10 U.S.C. 4001 for basic and applied research. We discuss regulations, terms, and conditions that generally apply to our awards in Section F. Federal Award Administration Information.

KEY DATES

Schedule of Events		
Event	Date	Eastern Time
Pre-proposal inquiries and questions regarding eligibility and technical requirements **	29 June 2023	NLT 11:59 PM
Answers to questions posted	6 July 2023	
White Papers Due (highly encouraged)	20 July 2023	NLT 11:59 PM
Notifications of Evaluations of White Papers	3 Aug 2023	
Proposals due	28 Aug 2023	NLT 11:59 PM
*Notification of Selection for Award	8 Nov 2023	

*This date is an estimate as of the date of this announcement.

**Questions submitted after the Q&A deadline may not be answered.

C. ELIGIBILITY INFORMATION

1. ELIGIBLE APPLICANTS

a. Qualified and Responsible United States Educational Institutions

You are eligible to submit an application if you are a qualified and responsible educational institution in the United States as defined at 10 U.S.C. 2194, or an entity comprised of such educational institutions. Educational institution means a local educational agency, college, university, or any other nonprofit institution dedicated to improving science, mathematics, and engineering education. No other entities are eligible to submit applications under this competition. Any entities receiving subawards must meet these same criteria. Since the intent of this FOA is to fund a research center with co-located researchers and facilities, at least 40 percent of key personnel (i.e., PIs and co-PIs) for a proposed COE must be primarily employed by the institution submitting the proposal.

AFOSR reviews your application, proposal, and Office of Management and Budget (OMB) designated repositories of government-wide public and non-public data, including comments you have made, as required by 41 U.S.C. 2313 and described in [2 CFR 200.205](#) and [32 CFR 22.410](#) to assess risk posed by applicants, and confirm applicants are qualified, responsible, and eligible to receive an award.

b. HBCU/MI, Tribal College and University Applicants Encouraged

Historically Black Colleges and Universities and Minority Serving Institutions (HBCUs/MSIs) and Tribal Colleges and Universities are encouraged to submit research proposals and join others in submitting proposals. However, no funds under this announcement are reserved or otherwise set-aside for any specific entity type. The Air Force will only use the E.1. Criteria for proposal selection.

c. Ineligible Entities

None of the following entity types are eligible to submit proposals as primary award recipients under this announcement:

- (1) Federally Funded Research and Development Centers (FFRDCs)
- (2) Individual persons or people
- (3) Federal agencies (to include Military Educational Institutions)
- (4) For-profit institutions

2. COST SHARING OR MATCHING

Cost sharing or matching is neither required nor an evaluation criterion for proposals under this announcement. Leveraging other institutional resources to increase the participation of students and postdoctoral fellows in the COE and/or promote research and relationships with AFRL to benefit the COE would enhance the collaboration plan that will be evaluated as part of the DoD relevance criterion for proposals under this announcement.

3. OTHER

a. Research Personnel Facility Access Requirements and Restrictions

A key aspect of this CoE is workforce development. It is envisioned that students and post-docs working under this CoE be able to collaborate with AFRL personnel at AFRL laboratories and facilities. As such, we require that any students and post-docs funded by this CoE be U.S. citizens or permanent residents. Additionally, AFRL contains facilities and equipment that could be useful to this Center. Access to these facilities is restricted to U.S. citizens or permanent residents.

b. Acknowledgment of Support and Disclaimer Requirements

You must include the F. 3.d. Acknowledgment of Research Support on all materials created or produced under our awards. The F. 3.e. Disclaimer Language must be included on materials as required. The award document may provide additional instructions about specific distribution statements to use when you provide research materials to us. You are not eligible to submit a proposal if you cannot accept these terms.

c. Expectation of Public Dissemination of Research Results

AFOSR expects public dissemination of research results if you receive an award. This is a basic requirement for unclassified research results.

AFOSR intends, to the fullest extent possible, to make available to the public all unclassified, unlimited peer-reviewed scholarly publications and digitally formatted scientific data arising from research and programs funded wholly or in part by the DoD as described in the OUSD, AT&L Memorandum, *"Public Access to Department of Defense-Funded Research"* dated 09 Jul 2014.

AFOSR follows DoD Instruction 5230.24 and DoD Instruction 5230.27 policies and procedures to ensure broad dissemination of unclassified research results to the public and within the Government. The DoD Instruction 5230.27 policy and procedures allowing publication and public presentation of unclassified fundamental research results will apply to all research proposed under this competition unless the Program Officer gives you an explicit, written exclusion to these policies with the Grants Officer's advice and consent. All exclusions must be authorized or required by law and must cite a valid legal authority.

Your eligibility for funding cannot be determined unless this form is received.

d. Conflict of Interest

This announcement requires that all current and pending research support, as defined by Section 223 of the FY21 National Defense Authorization Act must be disclosed at the time of proposal, for all covered individuals. Such disclosure will be updated annually during the performance of any research project selected for funding, and whenever covered individual are added or identified as performing under this project. Covered Individuals are those who are listed as key personnel on proposals including but not restricted to the principal investigator or co-principal investigator.

Any decision to accept a proposal for funding under this announcement will include full reliance on the applicant's statements. Failure to report fully and completely all sources of project support and outside positions and affiliations may be considered a material statement within the meaning of the Federal False Claims Act, and constitute a violation of law.

The funding agency may conduct a pre-award conflict of interest/conflict of commitment review of any proposal selected for funding, as defined in National Science and Technology Council Guidance for Implementing National Security Presidential Memorandum 33 (NSPM-33) on National Security Strategy for United States Government-Supported Research and Development (January 2022), at p. 7 (available at <https://www.whitehouse.gov/wp-content/uploads/2022/01/010422-NSPM-33-Implementation-Guidance.pdf>). Offerors are advised that any significant conflict of interest/conflict of commitment identified may be a basis for the rejection of an otherwise awardable proposal.

Applicants for assistance are required to comply with 2 CFR 200.318(c), Codes of Conduct, to prevent real or apparent conflicts of interest in the award and administration of any contracts by which a recipient or subrecipient purchases property or services, supported by federal funds.

1) General Requirement for Disclosure

You and your organization must disclose any potential or actual scientific or non-scientific conflict of interest(s) to us. You must also disclose any potential or actual conflict(s) of interest for any sub recipient you include in your proposal. You must provide enough information for AFOSR to evaluate your disclosure. AFOSR may have to ask you more questions if more information is needed.

At AFOSR's sole discretion, you may be asked for a conflict of interest mitigation plan after you submit your proposal. Your plan is subject to AFOSR approval.

2) Scientific Conflict of Interest

Scientific collaborations on research and development projects are generally the result of close collaboration prior to the submission of applications for support. Accordingly, virtually all of these collaborations might be considered to include a

potential conflict of interest. The potential conflict is mitigated by the disclosure of these collaborations, and the list of current and pending support you provide for senior and key researchers.

You must provide a copy of all peer-reviewed publications developed or produced from research conducted with Air Force funds to the AFOSR Program Officer.

D. APPLICATION AND SUBMISSION INFORMATION

1. ADDRESS TO REQUEST APPLICATION PACKAGE

All the application forms you need are available electronically on [Grants.gov](https://grants.gov). From the "View Grant Opportunity" page, you can click on the "Application Package" tab to download the application package.

You can find the electronic application package on [Grants.gov](https://grants.gov) by searching for the announcement number shown on page one. Paper copies of this announcement will not be issued.

Please contact us at afosr.baa@us.af.mil to request a reasonable accommodation for any accessibility requirements you may have.

2. CONTENT AND FORM OF APPLICATION SUBMISSION

a. Pre-proposal Inquiries and Questions

You are encouraged to contact the Program Officer listed in section G.1. Technical Inquires and Questions before you submit your proposal.

If you need help with general matters, you should contact the individuals listed in G.2. General Inquiries and Questions.

Your pre-proposal inquiries and questions should be submitted not later than **11:59 PM Eastern Time on 29 June 2023**. AFOSR may not be able to answer questions received later. This is discussed more in section D.7. Submission Dates and Times.

The Program Officer does not have the authority to make commitments for the government. Grants and Contracting Officers acting within their warranted capacity are the only people authorized to make commitments for the Government.

b. The Application as a Whole

You must submit your proposal electronically through [Grants.gov](https://grants.gov). AFOSR will not accept or evaluate any proposal submitted by any means other than through [Grants.gov](https://grants.gov). AFOSR must receive your proposal before the D.7.d. Proposal Submission Deadline.

You must use the electronic Standard Form (SF) 424 Research and Related (R&R) Form Family, OMB Number 4040-0001. The SF 424 (R&R) Application for Federal assistance form must be your cover page. No pages may precede the SF 424 (R&R).

You must mark your application with the announcement number.

A summary of what is required for a complete proposal is summarized below:

- The forms and attachments in bold text are required with all applications
- *Some applications* require the attachments in *italic*
- More instructions are provided in D.4. Component Pieces of the Application

R&R FORM, OMB No. 4040-0001	FIELD	ATTACHMENT
SF 424 (R&R) Application for Federal Assistance, including an authorized Signature	18.	Representation for Tax Delinquency, Felony Conviction, and Internal Confidentiality Agreements
	18.	<i>SFLLL Disclosure of Lobbying Activities</i>
R&R Other Project Information Form	7.	Project Summary / Abstract
	8.	Project Narrative
	9.	Bibliography & References Cited
	10.	<i>Facilities and Other Resources</i>
R&R Other Project Information Form	11.	<i>Equipment</i>
	12.	<i>Other Attachments</i>
R&R Senior / Key Person Profile Form		Biographical Sketch Current & Pending Support
R&R Budget Form		Budget Justification
<i>R&R Sub award Budget Attachments Form</i>		<i>Sub award Budget Justification</i>
R&R Project / Performance Site Locations Form		None
<i>R&R Personal Data (Optional)</i>		None

The SF 424 (R&R) must include the signature of an authorized representative from your organization. The signature is affixed electronically by Grants.gov upon submission. This signature is considered the signature for the application as a whole.

c. Proposal Format

- Paper Size – 8.5 x 11-inch paper
- Margins – 1 inch
- Spacing – Single, 1.5, or 2.0-line spacing
- Font – Times New Roman or Garamond, 12 point

- Page Limitation – No more than twenty-five (25) single-sided pages. The cover page, table of contents, list of references, letters of support, curriculum vitae and list of on-going and pending research support are excluded from the page limitations. The pages of proposals exceeding the page limit may not be included in the evaluation.
- Attachments – Electronic Portable Document Format (PDF)
- Content – As described below

d. Proposal Length

No more than twenty-five (25) single-sided pages. You must not include elaborate brochures, reprints, or presentations beyond those sufficient to present a complete and effective proposal.

AFOSR will not consider more than the maximum number of pages in its evaluation; however, not all pages are counted. This list below is intended to help you understand how to calculate your page count.

NOT INCLUDED IN PAGE COUNT

- SF 424 (R&R) Application for Federal Assistance and all attachments except field 18 representations or disclosures
- R&R Budget and Budget Justification attachments, R&R Other Project Information Form, and all attachments
- R&R Sub award and Budget Justification attachments, R&R Senior / Key Person Profile Form, and all attachments for the personnel
- Documents that support the budget or particular items of cost R&R Project / Performance Site Locations Form
- Optional R&R Personal Data Form
- Budget related information is not included in the page count because AFOSR cannot make an award unless it can determine the cost of your proposal is reasonable and realistic and complies with 2 CFR 200 Subpart E - Cost Principles.
- *Not having enough information in your proposal to understand if your costs are reasonable and realistic is the most common reason awards are delayed.*

e. No Confidential or Proprietary Information

You must not include confidential or proprietary information in your proposal. This was also discussed earlier in section A. Program Description.

AFOSR will not consider your proposal if you include confidential or proprietary information or place restrictive markings on any part of your proposal.

f. Electronic Form and Proposal Attachments

Your application and proposal attachments must be in electronic file formats. You must use the Portable Document Format (PDF) for your attachments.

DO NOT password protect any attachments.

The website <https://www.grants.gov/web/grants/applicants/adobe-software-compatibility.html> offers a list of file converters available to convert your documents to the PDF format.

3. GRANTS.GOV APPLICATION SUBMISSION AND RECEIPT PROCEDURES

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

a. Electronic Delivery

AFOSR is participating in the Grants.gov initiative to provide the grant community with a single site to find and apply for grant funding opportunities. AFOSR encourages applicants to submit their applications online through Grants.gov.

b. How to Register to Apply through Grants.gov

Instructions: Read the instructions below about registering to apply for AFOSR 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.

The registration process can take up to four weeks to complete. Therefore, registration should be done in sufficient time to ensure it does not impact your ability to meet required application submission deadlines.

If individual applicants are eligible to apply for this grant funding opportunity, refer to: <https://www.grants.gov/help/html/help/index.htm#t=Register%2FGrantsgovVariationsForIndividualApplicants.html>

Organization applicants can find complete instructions here:
<https://www.grants.gov/grants/applicants/organization-registration.html>

1) **Obtain a UEI Number:** All entities applying for funding, including renewal funding, must have a Unique Entity Identifier (UEI). Applicants must enter the UEI number in the data entry field labeled "UEI" on the SF-424 form. Transition to the Unique Entity Identifier (UEI) from DUNS is underway; grants.gov has deployed forms compatible with the UEI. In April 2022, DUNS numbers were depreciated, the UEI is required.

The federal government stopped using DUNS number to uniquely identify entities registered in the System for Award Management (SAM). At the point, entities doing business with the federal government will use a Unique Entity Identifier (UEI) created in SAM.gov. They will no longer have to go to a third-party website to obtain their identifier. Active registrants will have their UEI assigned and viewable within SAM.gov; there is no action for registered entities to take at this time.

For more detailed instructions for obtaining a UEI number, refer to:
<https://sam.gov/content/entity-registration>

2) **Register with SAM:** In addition to having a UEI number, organizations applying online through Grants.gov must register with the System for Award Management (SAM). All organizations must register with SAM in order to apply online. Failure to register with SAM will prevent your organization from applying through Grants.gov.

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 in the registration process is to create an account with Grants.gov. Applicants must know their organization's UEI number to complete this process. Completing this process automatically triggers an email request for applicant roles to the organization's E-Business Point of Contact (EBiz POC) for review. The EBiz POC is a representative from your organization who is the contact listed for SAM. To apply for grants on behalf of your organization, you will need the Authorized Organizational Representative (AOR) role.

For more detailed instructions about creating a profile on Grants.gov, refer to:

<https://www.grants.gov/help/html/help/index.html#t=LoginAndweb%2FAddProfile.htm>

4) **Authorize Grants.gov Roles:** After creating an account on Grants.gov, the EBiz POC receives an email notifying them of your registration and request for roles. The EBiz POC will then log in to Grants.gov and authorize the appropriate roles, which may include the 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 approved as an AOR.

For more detailed instructions about creating a profile on Grants.gov, refer to:

<https://www.grants.gov/help/html/Register/AddProfile.htm>

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

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

6) **Electronic Signature:** When applications are submitted through Grants.gov, the name of the organization's AOR that submitted the application is inserted into the signature line of the application, serving as the electronic signature. The EBiz POC **must** authorize individuals who are able to make legally binding commitments on behalf of the organization as an AOR; **this step is often missed and it is crucial for valid and timely submissions.**

c. How to Submit an Application to AFOSR 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 web forms 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/apply-for-grants.htm>

Create a Workspace

Creating a workspace allows you to complete it online and route it through your organization for review before submitting.

Complete a Workspace

Add participants to the workspace, complete all the required forms, and check for errors before submission.

- (1) Adobe Reader: If you decide not to apply by filling out web forms you can download individual PDF forms in Workspace so that they will appear similar to other Standard or administering agency forms. 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 UEI number. To trigger this feature, an applicant must complete the SF-424 information first. Once it is completed, the information will transfer to the other forms.

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.

Track a Workspace

After successfully submitting a workspace package, a Grants.gov Tracking Number (GRANTXXXXXXXX) is automatically assigned to the package. The number will be listed on the Confirmation page that is generated after submission.

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

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 administering agency with tracking your issue and understanding background information on the issue.

4. COMPONENT PIECES OF THE APPLICATION

a. SF 424 (R&R) Application for Federal Assistance

The SF 424 (R&R) Application for Federal assistance form must be your cover page. No pages may precede the SF 424 (R&R).

Complete all required fields in accordance with the “pop-up” instructions on the SF 424 (R&R) form. The completion of most fields is self-explanatory. You can turn on Grants.gov “Help Mode” to provide additional instructions for forms. “Help Mode” is turned on by the icon with the pointer and question mark at the top of the form.

Below are AFOSR special instructions for completion of several SF 424 (R&R) form fields in your application:

FIELD	INSTRUCTION
2.	You may leave “Applicant Identifier” blank
3.	You may leave “Date Received by State” and “State Application Identifier” blank
9.	You must list Air Force Office of Scientific Research as the reviewing agency if Grants.gov has not pre-populated this answer
16.	You should check “No.” and “Program is Not Covered by Executive Order 12372”
17.	Select “I Agree” to certify that all statements in the proposal, your Representation for Tax Delinquency, Felony Conviction, and Internal Confidentiality Agreements are true, complete, and accurate to the best of your knowledge. <i>See section F.3. Administrative and National Policy Requirements for more information and links to the full text of these items.</i>
18.	You must attach the completed lobbying certification as described in section D.4.c. <u>Lobbying Certification and SFLD Disclosure of Lobbying Activities</u> . You may have to attach the completed <u>SFLDL Disclosure of Lobbying Activities</u> if you have lobbying activity that you must disclose.

b. SFLLL Disclosure of Lobbying Activities Form

When required, attach this disclosure to field 18 of the R&R Other Project Information Form. This attachment is not included in your page count.

If you have lobbying activity that you must disclose under 31 U.S.C. 1352

as implemented by the DoD at 32 CFR Part 28, you must attach the completed SFLLL Disclosure of Lobbying Activities.

You can find instructions for completing this form at <https://www.gsa.gov/forms-library/disclosure-lobbying-activities>

c. Certification Regarding Lobbying Form

Grant awards require a certification of compliance with a national policy mandate concerning lobbying. Grant applicants shall provide this certification by electronic submission of SF424 (R&R) as a part of the electronic proposal.

d. R&R Other Project Information Form

Complete this form as indicated. You must include all necessary attachments described below. This form is included in your page count.

FIELD INSTRUCTION
1, 1a. You must address all prospective human subject involvement by answering these questions. Additional documentation pursuant to National Policy and U.S. Air Force standards is required for all proposals with human research or involvement.
2, 2a. You must address all prospective animal subject and/or recombinant deoxyribonucleic acid (rDNA) involvement by answering these questions. Additional documentation pursuant to National Policy and U.S. Air Force standards is required for
9. Attach your D.4.h. Bibliography and References Cited
all proposals with animal or rDNA research or involvement.
4a. For any proposal that has an actual or potential impact on the environment, answer yes and provide the answers and attachments required for fields 4b, 4c, and 4d. Additional documentation in accordance with National Policy and U.S. Air Force standards is required for any proposal with an actual or potential impact on the environment.
7. Attach your D.4.f. Publicly Releasable Abstract
8. Attach your D.4.g. Project Narrative

-
10. Attach a Facilities and Other Resources description document here if you need to supplement your D.3.f. Proposal Narrative facilities and resources section.

11. You may supplement your D.4.1. Budget Justification by attaching an Equipment Justification here. Do not duplicate information included on your budget justification. If you attach an Equipment Justification, make sure you reference the attachment in your budget justification.

FIELD INSTRUCTION

12. Attach the D.3.k R&R Subaward Budget Attachments Form if applicable and not attached elsewhere. You should have budgets for all subawards proposed attached within this form before attachment.

Attach all D.3.l Subaward Budget Justifications as applicable Attach your D.3.o Data Management Plan here if applicable

e. R&R Publicly Releasable Project Summary / Abstract

You must attach the Project Summary / Abstract to field 7 of the R&R Other Project Information form. This attachment is included in your page count.

- (1) You must provide a concise abstract of 300 words or less with your proposal. You must mark this abstract **publicly releasable**. Your abstract should use terms the public can understand to describe the research objective, technical approach, anticipated outcome, and potential impact of the specific research.
- (2) Your abstract header should include the Program Officer's name and office symbol from section G.1. Technical Inquiries and Questions below.
- (3) If you receive an award, AFOSR must publish your abstract to a searchable website available to the general public in accordance with Public Law 113-235. The website address is <https://dodgrantawards.dtic.mil/grants>.

f. Project Narrative

You must attach the Project Narrative to field 8 of the R&R Other Project Information Form. The narrative must be complete and self-contained to qualify for review. This attachment is included in your page count.

You must clearly describe the research, including the research objective and approach. Your project narrative will be evaluated using the criteria listed in section E.1. Criteria. You should show strength in as many of the evaluation and selection areas as practicable to demonstrate maximum competitiveness.

You shall describe any environmental impacts of your research outside the laboratory in any appropriate narrative section, including how you will ensure compliance with environmental statutes and regulations.

Your narrative shall include the following elements:

(1) Statement of Objectives

You must summarize your proposed research on a single page titled “Statement of Objectives.” AFOSR may decide to incorporate your statement of objectives into the award instead of incorporating the whole technical proposal.

You should use active verbs when you prepare the statement of objectives, e.g., “conduct” research in a subject area, “investigate” a problem, “determine” to test a hypothesis.

(2) Research Effort

(a) You should describe the research you plan in detail. State the research objectives and approach, and the relationship and comparable objectives to research progress elsewhere. Describe your research team’s knowledge in the field and provide a bibliography and list of literature citations. Discuss the nature of the expected results.

(b) The adequacy of this information will influence the overall evaluation in accordance with the criteria and procedures specified in section E. Application Review Requirements.

(3) Principal Investigator (PI) and Senior Personnel Time

(a) You must provide estimate of time the principal investigator and other senior professional personnel will devote to the research. Your estimate must include information pertaining to the proportion of time anticipated devoted to this research, to other research, and to other commitments of time such as sabbatical, extended leave, and teaching duties.

(b) State the number of graduate students for whom each senior staff member is responsible.

(c) If your principal investigator or other key personnel have current, pending, or expected research supported by other sponsors or agencies during the period you seek our support, state the title of the other research, the proportion of time to be devoted to it, the amount of support, name of agency, dates, etc.

You must attach a list of Current and Pending Support for each person listed on the D.4.i. R&R Senior / Key Person Profile Form. Each abstract should include research title, objectives, approach, and budget for both present and pending research projects.

Send any changes to this information to us as those changes become known.

(4) Your Facilities

- (a) Describe the facilities available for performing the proposed research, and any additional facilities or equipment the organization proposes to acquire at its own expense for the work.
- (b) Indicate any government-owned facilities that will be used. Indicate any government-owned equipment possessed presently that will be used. The facilities contract number, or in absence of a facilities contract, the specifics of the facilities or equipment, and the number of the award under which they are accountable are required.

(5) Government Furnished Equipment

You may list any special Government-owned property or test equipment required to complete the research. When possible and practicable, give a description or title for each item, the current location, and an estimated cost as applicable. If you do not have information about individual items, group items you require by class and provide an estimate of values.

(6) High-Performance Computing Requirements

You may be eligible to use DOD high-performance computing resources at no cost to your research. You should address utilization of this program if you need high-performance computing cycles to meet the needs of your research. This program provides access to a range of state-of-the-art high-performance computing assets and user training opportunities that can be used in some of our awards; special terms and conditions apply. You can review the details, capabilities, and requirements of the program at <http://www.hpc.mil>.

AFOSR Program Officers will help you establish an account if your proposal is selected for an award and can answer questions before you submit your proposal.

(7) Disclosure of Foreign National and Dual Citizenship Personnel

As described in section C.3.a. Research Personnel Facility Access Requirements and Restrictions, you must identify any planned foreign national personnel, including information to support permanent resident status with work authorization. The following foreign national personal data must be included:

- (1) Full name and any other names used;
- (2) Country or countries of citizenship;
- (3) Date and place of birth;
- (4) Permanent Resident Card (Green Card) type; and
- (5) Green Card issue and expiration date.

g. Bibliography and References Cited

You must attach your narrative Bibliography and References to field 9 of the R&R Other Project Information Form. This attachment is included in your page count.

h. R&R Senior / Key Person Profile Form

You must attach a short biographical sketch and list of significant publications (vitae) for each Senior / Key Person. You must also attach a list of current and pending support as discussed in Principal Investigator (PI) and Senior Personnel Time. This form is not included in your page count.

You must list all key persons proposed for the research on the R&R Senior/Key Person Profile Form. Key persons are generally the PI, any Co-PIs, and senior staff. This information is used to evaluate the qualifications of you and your research team.

To evaluate compliance with Title IX of the Education Amendments of 1972 (20 U.S.C. A subsection 1681 Et. Seq.), the DoD 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 STEM disciplines. In addition, the National Defense Authorization (NDAA) for FY2019, Section 1286, directs the Secretary of Defense to protect intellectual property, controlled information, key personnel, and information about critical technologies relevant to national security and limit undue influence, including foreign talent programs by countries that desire to exploit United States' technology within the DoD research, science and technology, and innovation enterprise. To enable this assessment, each applicant must include this form completed as indicated.

The Degree Type and Degree Year Fields 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.

i. R&R Budget Form

This form is not included in your page count.

You shall provide all information requested. You must estimate the total research project cost.

You must categorize funds by year and provide separate annual budgets for projects lasting more than one year.

A budget justification must be attached.

You must include enough budget related information in your proposal to support your costs as reasonable and realistic, and in compliance with 2 CFR 200 Subpart E - Cost Principles.

Not having enough information in your proposal to understand if your costs are reasonable and realistic is the most common reason awards are delayed.

j. R&R Sub award Budget Form

This form is not included in your page count. Attachments to this form are not included in your page count.

If you plan any sub award(s), you must provide a budget and budget justification using the same requirements established for your prime budget and budget justification.

AFOSR cannot make an award to you unless we can determine the sub award cost is reasonable and realistic and complies with 2 CFR 200 Subpart E – Cost Principles.

Not having enough information in your sub award budget(s) or budget justification(s) can cause significant delays for awards.

k. Budget Justification

This attachment is not included in your page count.

You must provide a detailed budget justification for each year that clearly explains the need for each item. The entire budget justification and supporting documentation must be combined into a single file and attached to field K of the R&R Budget Form.

- (1) You should itemize travel. State the purpose of each trip proposed, the number of trips, the number of travelers, the destination, the duration, and the basis for calculating costs such as airlines and hotels.

Below is a sample of the travel portion:

TRAVEL	Unit	Trips	Travelers	Nights	Days	Unit Cost	Total Travel
Airfare	roundtrip	1	1			\$900.00	\$900.00
Lodging	day	1	1	3		\$75.00	\$225.00
Per Diem	day	1	1		3	\$40.00	\$120.00
Automobile Rental	day	1	1		3	\$45.00	\$135.00
Subtotal Travel		4	4	3		\$1,060	\$1,380.00

- (2) You should itemize materials, supplies, and equipment. List all material/equipment by type and kind with associated costs. Indicate what your costs are based on, such as vendor quotes, historical data and/or engineering estimates. **You should include vendor quotes and/or catalog pricing data.**
- (3) If you have any sub award(s), you should describe how you determined sub award costs were determined fair and reasonable. Your business office usually makes this

determination.

DHHS/ONR Rate Agreement:

- (4) If you use a Government rate agreement to propose indirect cost rates and/or fringe benefit rates, you should attach a copy of the agreement you used.
- (5) Helpful Cost Principle Reference Information
 - (a) 2 CFR 200, Subpart E – Cost Principles
 - (b) General Provisions for Selected Items of Cost in 2 CFR 200.420 through 2 CFR 200.475

l. R&R Project / Performance Site Locations Form

This form is included in your page count.

You shall complete all information as requested. You must include the ZIP+4 for each performance location you list.

m. Data Management Plan (Optional)

You can decide if you want to include a Data Management Plan with your application. If you do, attach your Data Management Plan to field 12 of the R&R Other Project Information Form.

Your “Data Management Plan” should be two (2) pages or less in length and discuss:

- (a) The types of data, software, and other materials to be produced in the course of the project, and include a notation marking items that are publicly releasable;
- (b) How the data will be acquired;
- (c) Time and location of data acquisition if they are scientifically pertinent;
- (d) How the data will be processed;
- (e) The file formats and the naming conventions that will be used;
- (f) A description of the quality assurance and quality control measures during collection, analysis, and processing;
- (g) If existing data are to be used, a description of their origins;
- (h) A description of the standards to be used for data and metadata format and content;
- (i) Plans and justifications for archiving the data;
- (j) The timeframe for preservation; and
- (k) If for legitimate reasons the data cannot be preserved, the plan must include a justification citing such reasons.

n. R&R Personal Data Form

This attachment is not included in your page count.

To evaluate compliance with Title IX of the Education Amendments of 1972 (20 U.S.C. A subsection 1681 Et. Seq.), The DoD 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 STEM disciplines. To enable this assessment, each applicant must include this form completed as indicated.

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, provisions 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 this information should check or select the “Do not wish to provide” option.

5. INFORMATION YOU MUST SUBMIT IF SELECTED FOR POSSIBLE AWARD

The AFOSR Grants Officer may request additional necessary information from you during negotiations, or as required to inform their consideration for award.

“You must respond promptly”.

If you do not fully comply with our information requests by the time AFOSR is ready to make an award, AFOSR may determine that you are not qualified to receive an award and use that determination as a basis for making an award to another applicant.

Foreign national personnel may be asked to provide a copy of the front and back of their green card by secure means such as <https://safe.apps.mil/>

If your proposal includes human, animal, or rDNA use or involvement, you must submit all documentation requested during negotiations or you may not receive an award.

6. UNIQUE ENTITY IDENTIFIER (UEI), CAGE, AND SYSTEM FOR AWARD MANAGEMENT (SAM)

a. SAM Registration Required

As required in 2 CFR 25.110 all applicants, unless exempted, must:

- (1) Be registered in SAM.gov before submitting its application;

- (2) Provide a valid unique entity identifier; and
- (3) Continue to maintain an active SAM registration with current information at all times any Federal award is active, or any application is under consideration by a Federal awarding agency.

A Commercial and Government Entity (CAGE) code is obtained or specified as part of the SAM registration process. A CAGE code is required.

b. SAM Exemption or Exceptions Not Available Under This Announcement

AFOSR will not issue an Agency level exemption to SAM registration under 2 CFR 25.110(d)(1) for applicants under this announcement.

You must comply with SAM registration requirements and include a UEI and CAGE code on your application or AFOSR cannot make an award.

c. Questions about SAM Registrations and Updates

You can get questions about SAM registration and entity updates answered by live chat at <https://www.fsd.gov/fsd-gov/home.do> telephone at (866) 606-8220 or (324) 206-7828. Top help topics for SAM.gov are available at https://www.fsd.gov/fsd-gov/learning-center-system.do?sysparm_system=SAM.

d. Consequences of Non-Compliance with SAM Registration Requirements

AFOSR cannot make an award to you unless you comply with SAM requirements. If you are non-compliant, AFOSR may determine you are not qualified to receive an award and use that determination to make an award to someone else as authorized by 2 CFR 25.205(b). You cannot receive payments without an active SAM record and CAGE code.

7. SUBMISSION DATES AND TIMES

a. Pre-Proposal Inquiries and Questions Deadline

You must submit all pre-proposal inquiries and questions not later than **29 June 2023 at 11:59 PM Eastern Time**. Responses will be posted/emailed by **6 July 2023 at 11:59 PM Time**.

b. How Submission Time for Pre-Proposal Inquiries and Questions is Determined

AFOSR uses the date and time stamp on your email to determine when you submitted pre-proposal correspondence. These emails should be directed to the contact listed at the end of this FOA for general inquiries and questions (valencia.thornton@us.af.mil)

c. Effect of Missing Pre-Proposal Inquiries and Questions Deadline

AFOSR may not be able to provide responses or answers to late inquiries or questions.

d. Proposal Submission Deadline

AFOSR must receive your white paper by **20 July 2023 at 11:59 PM Eastern Time** for it to be considered.

AFOSR must receive your proposal electronically through Grants.gov not later than **28 August 2023 at 11:59 PM Eastern Time** to be considered for selection. This is the final due date. AFOSR recommends that you submit applications early.

You are responsible for making sure your application is submitted, received, and validated by Grants.gov before the application deadline. If you submit your application late, your proposal is not eligible for consideration.

e. How Proposal Submission Time is Determined

AFOSR uses the system-generated Grants.gov time stamp to determine when you submitted your successfully validated proposal. Grants.gov policies and procedures for application submission and processing apply. *AFOSR will only accept applications submitted electronically through Grants.gov.*

f. Grants.gov Tracking Number is Application Receipt

Grants.gov generates a confirmation page when you submit your application. A second confirmation is provided by email when your application has passed Grants.gov validations and the status is updated from received to validated.

The confirmation page includes a system-generated Grants.gov tracking number; this serves as your receipt. You should keep a copy of all confirmations.

You can verify the submission time and application status with your tracking number through Grants.gov at <https://grants.gov/applicants/track-my-application.html>.

g. Effect of Missing the Proposal Submission Deadline

Grants.gov will not accept your proposal after the submission deadline. AFOSR will not accept proposals submitted other than electronically through Grants.gov.

8. INTERGOVERNMENTAL REVIEW

N/A - This program is excluded from coverage under Executive Order (E.O.) 12372.

9. FUNDING RESTRICTIONS

a. Proposal Preparation Costs

AFOSR will not reimburse proposal or application costs under this FOA. Your proposal or application preparation costs are not considered an allowable direct charge to any award under this announcement.

b. Air Force Office of Scientific Research No-cost Extension (NCE) Policy

AFOSR grants NCE's only in situations in which the extension is truly warranted and properly documented. AFOSR requires prior written approval to extend the period of performance, without additional funds, beyond the expiration date of the grant. For an extension to be granted recipients are to provide notice in writing, and with the supporting reasons, and revised expiration date, at least **thirty (30)** days prior to the expiration of the award, and Standard Form (SF) 425 Federal Financial Report with amount of remaining funds. In no event will the period of performance be extended merely for the purpose of using unobligated balances. Institutions should make every effort to ensure work is completed on time. If an institution deems an NCE is truly warranted, it should submit its request for an extension and supporting reasons to the relevant Program Officer. You should make every effort to ensure work is completed on time.

c. Prohibition on Contracting with Entities that Require Certain Internal Confidentiality Agreements or Statements--Representation

(a) *Definition.* As used in this provision--

“Internal confidentiality agreement or statement”, “subcontract”, and “subcontractor”, are defined in the clause at [52.203-19](#), Prohibition on Requiring Certain Internal Confidentiality Agreements or Statements.

(b) In accordance with section 743 of Division E, Title VII, of the Consolidated and Further Continuing Appropriations Act, 2015 (Pub. L. 113-235) and its successor provisions in subsequent appropriations acts (and as extended in continuing resolutions), Government agencies are not permitted to use funds appropriated (or otherwise made available) for agreements with an entity that requires employees or sub recipients of such entity seeking to report waste, fraud, or abuse to sign internal confidentiality agreements or statements prohibiting or otherwise restricting such employees or sub recipients from lawfully reporting such waste, fraud, or abuse to a designated investigative or law enforcement representative of a Federal department or agency authorized to receive such information.

(c) The prohibition in paragraph (b) of this provision does not contravene requirements applicable to Standard Form 312, (Classified Information Nondisclosure Agreement), Form 4414 (Sensitive Compartmented Information Nondisclosure Agreement), or any other form issued by a Federal department or agency governing the nondisclosure of classified information.

(d) *Representation.* By submission of its offer, the Grantor represents that it will not require its employees or sub recipients to sign or comply with internal confidentiality

agreements or statements prohibiting or otherwise restricting such employees or sub recipients from lawfully reporting waste, fraud, or abuse related to the performance of a Government agreement to a designated investigative or law enforcement representative of a Federal department or agency authorized to receive such information (e.g., agency Office of the Inspector General).

(e) Agreement with the representation above will be affirmed by checking the “I agree” box in block 17 of the SF424 as part of the electronic proposal submitted via Grants.gov.

d. Other Submission Requirements

If Grants.gov rejects your electronic application submission for any reason, you must correct all errors and resubmit your application before the D.7.d. Proposal submission deadline.

E. APPLICATION REVIEW INFORMATION

1. CRITERIA

You should show strength in as many of the evaluation and selection areas as practicable to demonstrate maximum competitiveness.

a. Principal Evaluation and Selection Criteria

The two (2) principal selection criteria are specified in [32 CFR 22.315\(c\)](#). The principal selection criteria are of equal importance to each other. The combined principal selection criteria are more important than the additional evaluation and selection criterion. The principal selection criteria are:

- (1) The technical merits of the proposed research.
- (2) Potential relationship of the proposed research and development to Department of Defense missions. This will be assessed based on the merits of the proposed collaboration plan and the potential for transition to AFRL development efforts.

b. Additional Evaluation and Selection Criteria

An additional evaluation criterion is shown below. This criterion is less important than the combined principal selection criteria.

- (1) The applicant, principal investigator, team leader, and key personnel qualifications, capabilities, related experience, facilities, and research techniques considered individually and in combination that are integral to achieving DoD objectives for this program.

No further criteria or criterion will be used for proposal selection

2. REVIEW AND SELECTION PROCESS

a. Merit-based, Competitive Procedures

Proposals will be subjected to a peer or programmatic review. The peer review will use internal and external reviewers to assess technical merit and Air Force relevance of the proposal.

The programmatic review assesses the technical quality of the proposal, relevance of the proposed research to the portfolio descriptions in this FOA, relevance of the work to Air Force and DoD needs, and the potential of the research balanced against the available funding resources of a given portfolio. Selection for award consideration will be made based on the outcome of these reviews.

AFOSR anticipates selecting one proposal for possible funding on a competitive basis according to 10 USC 4141, and 10 USC 2374 using the merit-based, competitive procedures described in [32 CFR 22.315](#), incorporated here by reference.

You should show strength in as many of the evaluation and selection areas as practicable to demonstrate maximum competitiveness.

b. Cost Analysis for Reasonableness and Realism

If your proposal is selected for possible award, AFOSR will analyze the cost of the work for realism and reasonableness. The cost of your proposal is considered but is not an evaluation factor or criterion.

AFOSR must make sure the costs you propose are reasonable, realistic, and allocable to this work before AFOSR can make an award. All costs must be allowable to be reasonable. AFOSR may analyze your technical and cost information at the same time.

3. DISCLOSURE OF ADMINISTRATIVE PROCESSING BY CONTRACTOR PERSONNEL

AFOSR uses support contractor personnel to help it with administrative proposal processing. The contractor personnel are employees of commercial firms that have a contract with AFOSR. AFOSR makes sure all of its support contracts include nondisclosure agreements that prohibit disclosure of any information you submit to other parties.

4. NO GUARANTEED AWARD

AFOSR does not guarantee that any award will be made under this competition.

F. FEDERAL AWARD ADMINISTRATION INFORMATION

1. SELECTION NOTICES

a. Electronic Notification

If your proposal is selected for possible award, an email will be sent to the principal investigator.

b. Selection for Possible Award Does Not Authorize Work

Our selection notice **is not** an authorization to start work and **is not** an award guarantee. AFOSR will contact your business office to get answers to any questions it has about your proposal and negotiate specific award terms. Negotiations may result in funding levels that are less than those in the proposal.

2. AWARD NOTICES

a. Federal Award Document

A grant or contract signed by a warranted Grants or Contracting Officer is the only official notice that an award has been made.

b. Electronic Federal Award Distribution

AFOSR sends award documents to your business office by email. This is called award distribution. AFOSR always ask your business office to forward the award to the Principal Investigator indicated on the award document.

3. ADMINISTRATIVE AND NATIONAL POLICY REQUIREMENTS

a. Reporting of Matters Related to Recipient Integrity and Performance

You must report recipient integrity and performance information as required by Appendix XII to 2 CFR Part 200 – Award Term and Condition for Recipient Integrity and Performance Matters, incorporated here by reference. You should read the full text of this award term now using the link above to make sure you understand our requirements. You can also find this term at <http://www.ecfr.gov>.

b. Agency Review of Risk Posed by Applicants

(1) AFOSR must review information available about you and entities included in your proposal through the Office of Management and Budget (OMB) designated repositories of government- wide eligibility qualification and financial integrity information. Our risk review is required by 41 U.S.C. 2313 and includes both public and non-public information. You must be qualified as described at 32 CFR 22.415 Standards to receive an award.

(2) AFOSR must consider the non-public segment of the Federal Awardee Performance and Integrity Information System (FAPIIS) for all awards exceeding the

current simplified acquisition threshold of \$250,000.

(3) At a minimum, the information in the system for a prior Federal award recipient must demonstrate a satisfactory record of executing programs or activities under Federal grants, cooperative agreements, or procurement awards; and integrity and business ethics. We will consider any comments you provide, in addition to the other information in the designated integrity and performance system, when making our risk judgment about your integrity, business ethics, and record of performance under Federal awards.

(a) AFOSR may make an award to a recipient who does not fully meet our standards as described at 2 CFR 200.206(a)(2) if it is determined that the information is not relevant to the current Federal award under consideration or there are specific conditions that can appropriately mitigate the effects of the non-Federal entity's risk in accordance with 2 CFR 200.208 Specific conditions.

(4) AFOSR must comply with the guidelines on government-wide suspension and debarment described in 2 CFR 200.214, and must require you to comply with these provisions for all work AFOSR funds.

These provisions restrict Federal awards, sub-awards and contracts with certain parties that are debarred, suspended or otherwise excluded from or ineligible for participation in Federal programs or activities.

c. Cross-Cutting National Policy Requirements

You must comply with all applicable national policy requirements as a condition of award. Key national policy requirements may be found in the DoD Research and Development General Terms and Conditions (DoD T&C); and Appendix B to 32 CFR Part 22 – Suggested Award Provisions for National Policy Requirements that Often Apply, incorporated here by reference.

d. Acknowledgment of Research Support

You must acknowledge support provided by the Government in all materials based on or developed under our awards. The requirement extends to copyrighted and non-copyrighted materials published or displayed in any medium.

The following language must be used unless the award document provides different instructions:

“This material is based upon work supported by the Air Force Office of Scientific Research under award number FAXXXX-XX-X-XXXX”.

You must require any sub-recipients or subcontractors under your award to include this acknowledgment, too.

e. Disclaimer Language for Research Materials and Publications

Some materials based on or developed under our awards must include special disclaimer language. You must include this language in all materials except scientific articles or papers published in scientific journals unless your award document provides different instructions: *“Any opinions, findings and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the U.S. Department of Defense.”*

f. Uniform Administrative Requirements, Cost Principles, and Audit Requirements

Our grants are governed by the guidance in [Title 2, Code of Federal Regulations \(CFR\) Part 200](#), “Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards” as modified and supplemented by the Department of Defense’s (DoD) interim implementation in 2 CFR Part 1103 [79 FR 76047, December 19, 2014] and 2 CFR Part 1125. Provisions of [Chapter 1, Subchapter C of Title 32, CFR](#), “DoD Grant and Agreement Regulations” other than parts 32 and 33 continue to be in effect and apply as stated.

These regulations are incorporated by reference into this announcement.

g. DoD Research and Development General Terms and Conditions

Our domestic grants are subject to the current (at time of award) “DoD Research and Development General Terms and Conditions” (DoD T&C) found at [DoD Research and Development General Terms and Conditions](#).

These terms and conditions are incorporated by reference into this announcement. If AFOSR publishes updated terms and conditions, the updated terms and conditions may apply to any award under this announcement.

h. Conditions of Award for Recipients Other Than Individuals

You must agree to comply with the requirements at [2 CFR Part 182, Subpart B “Requirements for Recipients Other Than Individuals”](#) as a condition of award.

i. Minimum Record Retention Requirements

You must keep records related to our awards for at least three years after completion and the final Federal Financial Report is submitted. This requirement is described further in [2 CFR 200.334](#) incorporated here by reference. The DoD T&C OAR Article II. Records retention [and access](#) describes additional requirements.

Sometimes records must be retained for more than three years.

4. REPORTING

a. Monitoring and Reporting Program Performance

All of our awards require at least annual and final technical performance reports as required in [2 CFR 200.329](#). The DoD T&C REP Article I. Performance reporting will apply to grant or cooperative agreement awards. Some of our awards require more frequent technical reports.

You must provide your reports on time. Our awards include a schedule specifying the latest date for submission of each required report. Failure to provide reports, or providing reports after required due dates, could lead to being considered ineligible for future awards.

b. Standard Form (SF) 298 Report Documentation Page

- 1) You may use a SF 298 Report Documentation Page for interim progress reports.
- 2) You must use a completed SF 298 Report Documentation Page as the first page of the final report. You can download an electronic SF 298 from <http://www.gsa.gov/portal/forms/download/116146>.

c. Technical Performance Report Format

[Federal-wide Research Progress Performance Report \(RPPR\) Format](#) is used for interim, annual, and final research performance reports. These reporting requirements will be detailed in the grant award documents.

d. Department of Defense (DD) Form 882 Report of Inventions and Subcontracts

1. Invention Reports

- 1) You must provide at least a final invention report on DD Form 882. AFOSR may ask for annual reports. Our award documents specify the due date. You can get the form at <https://www.esd.whs.mil/Portals/54/Documents/DD/forms/dd/dd0882.pdf>.
- 2) You must submit invention reports even if you do not have a patent to report.

2. Sub-Award and Subcontract Reporting

You must use the DD Form 882 to tell us about any subawards or subcontracts. Your award will provide specific instructions. You can get the form at <http://www.dtic.mil/whs/directives/forms/eforms/dd0882.pdf>.

e. Standard Form (SF) 425 Federal Financial Report

Our awards require a final SF 425 Federal Financial Report. You can get the form at <https://www.grants.gov/forms/post-award-reporting-forms.html>.

- (1) If you request any advance payment(s) under your award, you must submit quarterly SF 425 reports for the life of the grant. Our awards include specific instructions.
- (2) You do not have to submit quarterly SF 425 reports if you only request payments by reimbursement.

e. Electronic Payment Requests and Electronic Payment

You must register to use Wide Area Work Flow (WAWF) for payment. Payment requests shall be made electronically using an SF270 through the WAWF application in the Procurement Integrated Enterprise Environment (PIEE) e-Business Suite at <https://piee.eb.mil>. The website includes registration instructions. All payments must be made using the electronic funds transfer (EFT) method.

If you have WAWF or iRAPT questions or problems, you can get help by telephone at (866) 618-5988 or (801) 605-7095, or the website <https://piee.eb.mil/xhtml/unauth/web/homepage/vendorCustomerSupport.xhtml>.

f. Property Reports

If AFOSR furnishes any property owned by the Government under an award, you must submit periodic property status reports as described in [2 CFR 200.330](#) and further implemented by the DoD T&C [REP Article III. Reporting on Property](#).

g. Other Reports

Our Program Officers may ask for informal technical reports as needed. AFOSR uses these informal reports for program purposes, such as preparation for meetings and other technical purposes. AFOSR highly recommends you provide this information in a timely manner by electronic mail directly to the Program Officer.

h. Electronic Submission of Reports

You must plan on submitting reports electronically. **You can submit most reports through the internet application detailed in the grant award document.** Some reports must be sent using electronic mail. Our award documents provide specific instructions that you must follow.

G. AGENCY CONTACTS

1. TECHNICAL INQUIRES AND QUESTIONS

You should submit all questions in writing by electronic mail. You should include the FOA number in the subject line.

If you submit a question by telephone call, fax message, or other means, you may not receive a response.

You should include the announcement number in the subject line.

Dr. B. L. (“Les”) Lee, AFOSR/RTB
Program Officer for Mechanics of Multifunctional Materials and Microsystems
Co-Lead for Working Group on “Adaptive and Morphing Systems”
email: byung.lee@us.af.mil

Dr. Frederick A. Leve, AFOSR/RTA
Program Officer for Dynamical Systems and Control Theory
Lead for Working Group on “Autonomy”
email: frederick.leve@us.af.mil

Dr. Qing Wu, AFRL/RI
Senior Scientist for Processing and Exploitation
email: qing.wu.2@us.af.mil

Mr. Clare Thiem, AFRL/RITB
Senior Electronics Engineer
email: clare.thiem@us.af.mil

Dr. Ajit Roy, AFRL/RXEEC
Principal Materials Research Engineer
email: ajit.roy@us.af.mil

Dr. Sabyasachi Ganguli, AFRL/RXEEG
Materials Research Engineer
email: sabyasachi.ganguli.2@us.af.mil

2. GENERAL INQUIRIES AND QUESTIONS

You must send all general questions about this announcement to us by email. Your questions will generally be consolidated with other questions and posted on Grants.gov so everyone gets the same information. AFOSR may provide an individual response by email if your question does not apply to anyone else.

Valencia Thornton
Grants and Contracting Officer
Email: valencia.thornton@us.af.mil

H. OTHER INFORMATION

1. OMBUDSMAN

- (a) An ombudsman has been appointed to hear and facilitate the resolution of concerns from offerors, potential offerors, and others for this acquisition. When requested, the ombudsman will maintain strict confidentiality as to the source of the concern. The existence of the ombudsman does not affect the authority of the program officer, grants officer, contracting officer, or source selection official. Further, the ombudsman does not participate in the evaluation of proposals, the source selection process, or the adjudication of protests or formal grant or contract disputes. The ombudsman may refer the party to another official who can resolve the concern.
- (b) Before consulting with an ombudsman, interested parties must first address their concerns, issues, disagreements, and/or recommendations to the grants or contracting officer for resolution. Consulting an ombudsman does not alter or postpone the timelines for any other processes (e.g., agency level bid protests, GAO bid protests, requests for debriefings, employee-employer actions, contests of OMB Circular A-76 competition performance decisions).
- (c) If resolution cannot be made by the GO, concerned parties may contact the AFRL Ombudsman, Director of Contracting, HQ AFRL/PK. The AFRL Alternate Ombudsman is the Deputy Director of Contracting, HQ AFRL/PK. Please send an email to afrl.pk.workflow@us.af.mil the subject of "Ombudsman".
- (d) The ombudsman has no authority to render a decision that binds the agency.
- (e) Do not contact the ombudsman to request copies of the solicitation, verify offer due date, or clarify technical requirements. Such inquiries shall be directed to the Grants or Contracting Officer.

2. GRANTS AND CONTRACTING OFFICERS AUTHORITY

Grants and Contracting Officers acting within their warranted capacity are the only individuals legally authorized to make commitments or bind the Government.

No other individuals are authorized to make commitments or otherwise bind us.

3. ADDITIONAL FUNDING OPPORTUNITIES

AFOSR posts new funding opportunities throughout the year looking for today's breakthrough science for tomorrow's Air Force. You can find more information about Air Force Office of Scientific Research interests and funding opportunities on our website at <http://www.wpafb.af.mil>.

Thank you for your interest in this announcement.