

FUNDING OPPORTUNITY ANNOUNCEMENT
OVERVIEW INFORMATION

This is a special Funding Opportunity Announcement (FOA) sponsored by the Air Force Office of Scientific Research (AFOSR). AFRL/AFOSR recognizes the importance of diversity of thought in scientific and technological discovery and is therefore initiating the Basic Research National Science Portal (NSP) Initiative. The NSPs are designed to capitalize on the demonstrated excellence at Historically Black Colleges and Universities/ Minority Serving Institutions/ Tribal Colleges (HBCU/MSI/TCs) and build their research capacity while stimulating and accelerating scientific projects addressing critical Department of the Air Force (DAF) identified areas. The NSPs will create partnerships with the participating institutions in achieving mutually beneficial results.

This FOA is a pilot for the NSPs and is intended to (1) attract faculty and students to conduct cutting-edge basic research in the technical areas listed in Section 1, (2) build capacity needed to support this research and (3) attract students to pursue studies leading to STEM careers, including in government, the defense industry, and academia.

AFRL/AFOSR anticipates making at least three (3) awards of $750,000 to $1,500,000 per year per award for a maximum of three years. Awards will be in the form of project grants. All funding projects are based on availability of funds.

Proposers are encouraged to confer with the designated AFRL/AFOSR Program Officer(s) prior to submitting a full proposal. We will evaluate proposals using an internal review panel. AFRL/AFOSR reserves the right to select and fund all, some, or none of the proposals from one, two, or all the topics below.

White papers briefly summarizing the proposing institution's ideas are encouraged but not required. Submit white papers to our whitepaper portal, which is linked below. The topic points of contact (POCs) will coordinate to provide feedback to white papers.

The proposals will need to include a data management plan, outlining 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, outside the awardee and beyond the lifetime of the grant. This precondition is modeled on the National Science Foundation Data Management Plan requirement (e.g., https://nsf.gov/eng/general/ENG_DMP_Policy.pdf).

Webinar Rescheduled: AFRL/AFOSR will be hosting the Basic Research National Science Portals Pilot (NSPP) Funding Opportunity Announcement (FOA) Informational Webinar. The primary purpose of the webinar is to provide additional insight regarding the topics referenced in this FOA. Please see the webinar registration link and agenda provided below. Please see the attached Webinar presentation slides in the "Related Documents" section on grants.gov.

AGENDA
Wednesday, 19 April 2023 1300-1435 ET
Zoom Webinar (General Attendees):
https://www.zoomgov.com/webinar/register/WN_fBjW8DuxQU-fR0WVExBVsg
Webinar ID: 160 143 7580 • Passcode: 62517744* *Webinar will open to general attendees at 1255*

Start	End	Duration	Description / Topic	Speaker
1300	**1315**	15 min	**Opening Remarks and Overview of AFRL Basic Research National Science Portals Program**	**Dr. Irina Pala** AFRL/AFOSR Deputy Division Chief, Science & Engineering Division
1315	**1325**	10 min	**Acquisitions Overview for Funding Opportunity Announcement**	**Mr. Calvin Scott** AFRL/AFOSR Senior Procurement Analyst, Contracting Division
1325	**1340**	15 min	**Technical Topic: Directed Energy**	**Dr. John Luginsland** AFRL/AFOSR Program Officer, Science & Engineering Division
1340	**1350**	10 min	Break	
1350	**1405**	15 min	**Technical Topic: Fluid Surface Material Interaction**	**Dr. Gregg Abate** AFRL/AFOSR Program Officer, Science & Engineering Division
1405	**1425**	20 min	**Technical Topic: Data Models: Machine Learning for Scientific Discovery**	**Dr. Fariba Fahroo and Dr. Ali Sayir** AFRL/AFOSR Program Officer, Science & Engineering Division
1425	**1435**	10 min	**Final Remarks from Science & Engineering Division**	**Dr. Irina Pala** AFRL/AFOSR Deputy Division Chief, Science & Engineering Division
1435			**Adjourn**	

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

Fiscal Year (FY) 2023 National Science Portal Pilot (NSPP)

3. ANNOUNCEMENT TYPE

Amendment

4. FUNDING OPPORTUNITY NUMBER

FOA-AFRL-AFOSR-2023-0009 Amendment 0005

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 to the address(es) listed under section G.2. of this FOA not later than **21 April 2023 at 11:59 PM Eastern Time** to be considered. The Government will respond to any pre-proposal inquiries or questions via public posting no later than COB on **25 April 2023**.

White papers must be received by submitting to https://community.apan.org/wg/afosr/p/submitawhitepaper by **01 May 2023 at 11:59 PM Eastern Time**.

Anticipated Schedule of Events*		
Event	**Date**	**Time**
Questions Regarding Eligibility and Technical Requirements**	4/21/2023	
Pre-proposal inquiries or questions posted to grants.gov	4/25/2023	
White Papers Due (not required but strongly recommended)	5/1/2023	5:00 PM Eastern Time

Notifications of Initial Evaluations of White Papers*	5/15/2023	
Proposals Due Date	6/12/2023	

*These dates are estimates as of the date of this announcement.
**Questions submitted after the Q&A deadline may not be answered.

IMPORTANT NOTE: White Papers are OPTIONAL but strongly recommended.

White papers should minimally articulate:

1. An initial list of members of the proposed team with a complete bio or CV for each (CVs and/or bios will not count against page limit). Each Bio/CV must include all publications by the proposed member.

2. Current & Pending Support (no page limit; will not count against page limit): Applicants are required to provide information on all current and pending support for ongoing projects and proposals, including subsequent funding in the case of continuing contracts, grants, and other assistance agreements. Applicants shall provide the following information of any related or complementary proposal submissions from whatever sources (e.g., AFOSR, Federal, State, local or foreign government agencies, public or private foundations, industrial or other commercial organizations).

3. The main technical components of the proposed research and how it aligns with the goals of the solicitation.

4. The specific proposed activities with a demonstrated understanding of the basic science needs.

Government will respond on white paper determination before COB on **15 May 2023**.Proposals must be received electronically through Grants.gov by **12 June 2023 at 11:59 PM Eastern Time** to be considered.

We anticipate that we will notify proposers of selection or non-selection for award no later than **28 August 2023**.

TABLE OF CONTENTS

FUNDING OPPORTUNITY ANNOUNCEMENT 1
OVERVIEW INFORMATION 1
SUMMARY FUNDING OPPORTUNITY INFORMATION 3
A. PROGRAM DESCRIPTION 9
1. SUMMARY 9
2. BACKGROUND 10
3. OBJECTIVE AND RESEARCH CONCENTRATION AREAS 11
4. TECHNICAL DETAILS OF PROPOSED RESEARCH 15
a. Access to DoD Resources 16
B. FEDERAL AWARD INFORMATION 16
C. ELIGIBILITY INFORMATION 17
1. ELIGIBLE APPLICANTS 17
a. Covered Educational Institutions 17
b. Ineligible Entities 18
2. COST SHARING OR MATCHING 18
3. OTHER 18
a. Acknowledgment of Support and Disclaimer Requirements 18
b. Expectation of Public Dissemination of Research Results 18
c. Representation for Tax Delinquency, Felony Conviction and Internal Confidentiality Agreements 19
d. Conflict of Interest 19
e. Research Personnel Facility Access Requirements and Restrictions 20
D. APPLICATION AND SUBMISSION INFORMATION 20
1. ADDRESS TO REQUEST APPLICATION PACKAGE 20
2. CONTENT AND FORM OF APPLICATION SUBMISSION 21
a. Pre-proposal Inquiries and Questions 21
b. The Application as a Whole 21
c. Proposal Format 22
d. Proposal Length 23

e. No Confidential or Proprietary Information 24
f. Electronic Form and Proposal Attachments 24
3. GRANTS.GOV APPLICATION SUBMISSION AND RECEIPT PROCEDURES 24
a. Electronic Delivery 24
b. How to Register to Apply through Grants.gov 24
c. How to Submit an Application to AFOSR via Grants.gov 27
4. COMPONENT PIECES OF THE APPLICATION 28
a. SF 424 (R&R) Application for Federal Assistance 28
b. Representation for Tax Delinquency, Felony Conviction, and Internal Confidentiality Agreements 29
c. SFLLL Disclosure of Lobbying Activities Form 30
d. Certification Regarding Lobbying Form 30
e. R&R Other Project Information Form 30
f. R&R Publicly Releasable Project Summary / Abstract 31
g. Project Narrative 31
h. Bibliography and References Cited 34
i. R&R Senior / Key Person Profile Form 34
j. R&R Budget Form 35
k. R&R Sub award Budget Form 35
l. Budget Justification 35
m. R&R Project / Performance Site Locations Form 37
n. Data Management Plan (Required) 37
o. R&R Personal Data Form 38
5. INFORMATION YOU MUST SUBMIT IF SELECTED FOR POSSIBLE AWARD 38
6. UNIQUE ENTITY IDENTIFIER (UEI), CAGE, AND SYSTEM FOR AWARD MANAGEMENT (SAM) 39
a. SAM Registration Required 39
b. SAM Exemption or Exceptions Not Available Under This Announcement 39
c. Questions about SAM Registrations and Updates 39
d. Consequences of Non-Compliance with SAM Registration Requirements 39
7. SUBMISSION DATES AND TIMES 39
a. Pre-Proposal Inquiries and Questions Deadline 39
b. How Submission Time for Pre-Proposal Inquiries and Questions is Determined 40

c. Effect of Missing Pre-Proposal Inquiries and Questions Deadline 40
d. Proposal Submission Deadline 40
e. How Proposal Submission Time is Determined 40
f. Grants.gov Tracking Number is Application Receipt 40
g. Effect of Missing the Proposal Submission Deadline 40
8. INTERGOVERNMENTAL REVIEW 41
9. FUNDING RESTRICTIONS 41
a. Proposal Preparation Costs 41
b. Air Force Office of Scientific Research No-cost Extension (NCE) Policy 41
c. Prohibition on Contracting with Entities that Require Certain Internal Confidentiality Agreements or Statements--Representation 41
d. Other Submission Requirements 42
E. APPLICATION REVIEW INFORMATION 42
1. CRITERIA 42
a. Principal Evaluation and Selection Criteria 42
b. Additional Evaluation and Selection Criteria 43
2. REVIEW AND SELECTION PROCESS 43
a. Merit-based, Competitive Procedures 43
b. Cost Analysis for Reasonableness and Realism 43
3. DISCLOSURE OF ADMINISTRATIVE PROCESSING BY CONTRACTOR PERSONNEL 44
4. NO GUARANTEED AWARD 44
F. FEDERAL AWARD ADMINISTRATION INFORMATION 44
1. SELECTION NOTICES 44
a. Electronic Notification 44
b. Selection for Possible Award Does Not Authorize Work 44
2. AWARD NOTICIES 44
a. Federal Award Document 44
b. Electronic Federal Award Distribution 44
3. ADMINISTRATIVE AND NATIONAL POLICY REQUIREMENTS 44
a. Reporting of Matters Related to Recipient Integrity and Performance 45
b. Agency Review of Risk Posed by Applicants 45
c. Cross-Cutting National Policy Requirements 46

d. Acknowledgment of Research Support 46
e. Disclaimer Language for Research Materials and Publications 46
f. Uniform Administrative Requirements, Cost Principles, and Audit Requirements 46
g. DoD Research and Development General Terms and Conditions 46
h. Conditions of Award for Recipients Other Than Individuals 47
i. Minimum Record Retention Requirements 47
4. REPORTING 47
a. Monitoring and Reporting Program Performance 47
b. Technical Performance Report Format 47
c. Department of Defense (DD) Form 882 Report of Inventions and Subcontracts 48
d. Standard Form (SF) 425 Federal Financial Report 48
e. Electronic Payment Requests and Electronic Payment 48
f. Property Reports 49
g. Other Reports 49
h. Electronic Submission of Reports 49
G. AGENCY CONTACTS 49
1. TECHNICAL INQUIRES AND QUESTIONS 49
2. GENERAL INQUIRIES AND QUESTIONS 50
H. OTHER INFORMATION 50
1. OMBUDSMAN 50
2. GRANTS AND CONTRACTING OFFICERS AUTHORITY 51
3. ADDITIONAL FUNDING OPPORTUNITIES 51

A. Program Description

The Basic Research National Science Portals (NSPs) seek to accelerate DoD critical scientific areas and flood the United States with diverse STEM talent by capitalizing on the demonstrated excellence of Historically Black Colleges and Universities/ Minority Serving Institutions/ Tribal Colleges (HBCU/MSI/TCs) and building their research capacity in critical research areas. The topic areas that we seek to support with this FOA are independent from those described in our open Broad Agency Announcement (Research Interests of the Air Force Office of Scientific Research) and do not fall completely within any one research program. We seek to support multidisciplinary research efforts, creating synergies to speed DoD-relevant research and development.

This FOA is a pilot for the NSPs and is intended to (1) attract faculty and students to conduct cutting-edge **basic research** in the technical areas listed in Section 1, (2) build capacity needed to support this research and (3) attract students to pursue studies leading to STEM careers, including in government, the defense industry, and academia.

Basic and applied research are defined in the DoD Financial Management Regulation:

Basic research is systematic study directed toward greater knowledge or understanding of the fundamental aspects of phenomena and of observable facts without specific applications towards processes or products in mind. It includes all scientific study and experimentation directed toward increasing fundamental knowledge and understanding in those fields of the physical, engineering, environmental, and life sciences related to long-term national security needs. It is farsighted high payoff research that provides the basis for technological progress (DoD 7000.14-R, vol. 2B, chap. 5, para. 050201.B).

Applied research is systematic study to understand the means to meet a recognized and specific need. It is a systematic expansion and application of knowledge to develop useful materials, devices, and systems or methods. It may be oriented, ultimately, toward the design, development, and improvement of prototypes and new processes to meet general mission area requirements. Applied research may translate promising basic research into solutions for broadly defined military needs, short of system development. This type of effort may vary from systematic mission-directed research beyond that in Budget Activity 1 to sophisticated breadboard hardware, study, programming and planning efforts that establish the initial feasibility and practicality of proposed solutions to technological challenges. It includes studies, investigations, and non-system specific technology efforts. The dominant characteristic is that applied research is directed toward general military needs with a view toward developing and evaluating the feasibility and practicality of proposed solutions and determining their parameters. Applied research precedes system specific technology investigations or development. Program control of the applied research program element is normally exercised by general level of effort. Program elements in this category involve pre-Milestone B efforts, also known as Concept and Technology Development phase tasks, such as concept exploration efforts and paper studies of alternative concepts for meeting a mission need (DoD 7000.14-R, vol. 2B, chap. 5, para. 050201.C).

Detailed descriptions and the government point(s) of contact can be found below. The descriptions are intended to provide the applicant a frame of reference and are not meant to be restrictive to the possible approaches and component solutions to achieving the goals of the topic and the program. Innovative ideas addressing these research topics are highly encouraged.

Proposals from an investigator team from multiple university departments and universities are warranted to assemble the expertise necessary to address the topics. Teams are also highly encouraged to leverage industry collaborations, where appropriate, to demonstrate an ability to develop solutions that can be eventually applied to a specific application. Proposals shall name one Principal Investigator (PI) as the responsible technical point of contact. Similarly, one institution shall be the primary awardee for the purpose of award execution. The PI shall come from the primary institution. The relationship among participating institutions and their respective roles, as well as the apportionment of funds including sub-awards, if any, shall be described in both the proposal text and budget.

Concurrent with this FOA, is a stand-alone Fiscal Year 2024 Defense University Research Instrumentation Program (DURIP). DURIP is designed to improve the capabilities of accredited United States (U.S.) institutions of higher education to conduct research and to educate scientists and engineers in areas important to national defense, by providing funds for the acquisition of research equipment or instrumentation. Proposers to this NSPP FOA are strongly encouraged to submit the instrumentation portion of the proposal to the DURIP FOA. If interested in applying to the DURIP FOA, please visit Grants.gov and search for announcement number FOA-AFRL-AFOSR-2023-0005 or go direct via this link: https://www.grants.gov/web/grants/view-opportunity.html?oppId=346064

Please note that the DURIP awards follow a specific timeline that might not overlap perfectly with this NSPP FOA. If you anticipate that the delivery of the equipment necessary to enhance your research ability will be hindered by the DURIP timeline, please consider it and discuss with the research topic chief. This solicitation is research focused and the purchase of equipment should in no way deter you from achieving your research goals.

The schedule for this announcement is given in Section B, Award Information.

In fiscal year 2023, we seek proposals in three topic areas: Directed Energy, Fluid Surface Material Interaction and Data, Models: Machine Learning for Scientific Discovery. Each is described in the following section.

1. Directed Energy

Topic: Extreme Light, Heat and Sound: New Vistas in Controlling Brillouin, Raman, and Thermal Instabilities in Novel Lasing Materials

Background: Our understanding of the complex interaction of light and matter has dramatically advanced in the last decade. With applications as diverse as remote sensing, manufacturing, high-

precision metrology, and directed energy, the next-generation of high-power and high-energy lasers must manage the nonlinear interactions of light, sound, and heat to produce spatially and temporally coherent sources of bright light across the electromagnetic spectrum. This is a highly multi-scale and multi-physics problem which needs researchers from disciplines such as material science, physics, mathematics, atomic spectroscopy, and engineering. We seek proposals to advance our knowledge of the nonlinear instabilities, such as Brillouin, Raman, and Thermal/Transverse Mode, as well as in the instability's impact in next-generation novel lasing materials. Stand-alone experimental, theoretical, or simulation proposal are acceptable and mixed theory, simulation, and experimental proposals are encouraged.

The Department of the Air Force routinely requires robust high-power and high-energy laser systems with highly consistent output to perform various missions, including long-range sensing, additive manufacturing including in-orbit systems, and long-range directed energy sources that combine range with the deep magazine of a laser system. These requirements create requirements for materials that can support both high peak and average power operations with narrow linewidth and good spatial beam quality across the range of the electromagnetic spectrum. This effort is particularly focused at extending and enhancing our understanding of nonlinear laser instabilities to new wavelengths and lasing materials. It is anticipated that co-designing the material system with aspects of instability control will speed the development of new lasers for a wide variety of U.S. Air and Space Forces missions.

Objective: In this effort, we seek to identify both mechanisms and materials that can be used to produce high-power/energy coherent sources of electromagnetic radiation at wavelengths of interests for such uses as directed energy missions, manufacturing, and long-range remote sensing, imaging, and ranging. Figures of merit such as high-power/energy output, narrow linewidth, and high beam quality can all be enhanced through mitigation and control of phenomena such as Stimulated Brillouin Scattering (SBS), Stimulated Raman Scattering (SRS), and Transverse Mode Instability (TMI). Techniques that develop new advanced materials and exploit novel spatial and temporal pumping are especially encouraged under this call.

Research Concentration Areas: Suggested research areas include, but are not limited to:
1. Novel theoretical approaches to modeling multi-scale laser-matter instabilities.
2. Modeling and engineering of novel pumping schemes for instability control
3. Identification of specific materials features that promote or inhibit instability grown (examples include intrinsic material phonon energy, scattering losses, etc)
4. Assessment of laser system design using novel materials
5. Development of novel laser-quality materials
5. Construction and laboratory demonstration of novel lasing systems
6. Verification, validation, and uncertainty quantification of novel lasing systems

Anticipated Resources: It is anticipated that awards under this topic will total an average of $1.5M per year for 3 years supporting up to five faculty researchers. Exceptions warranted by specific proposal approaches should be discussed with the Program Officers during the white paper phase of the solicitation. All funding projects are based on availability of funds.

AFOSR Topic Chief:
Primary: Dr. John Luginsland (john.luginsland@us.af.mil)

2. Fluid Surface Material Interaction

Background: The fundamental flow physics at the interface between a fluid (air) and material surface drive the physics governing many important macroscopic phenomena including laminar-to-turbulent transition, drag, flow separation and reattachment, and heat transfer. Numerous studies (see references section) on flow texturing (e.g., riblets), surface porosity, and "architected" materials (phononic, resonant, meta-, etc.) have opened new and unexplored paths to control fluid-structure interactions. Fundamental understanding at a basic research level from the microscopic to macroscopic perspectives in both fluid physics and material science is needed to address this topic.

Advances in material science and manufacturing have developed engineered surfaces and textures that suggest smooth, rigid surfaces may not be the ideal interface for an air vehicle. Engineered material surfaces with functional surface properties (e.g., riblets or porosity) can provide superior performance in a number of engineering areas such as reduced drag and turbulent transition delay. Additionally, non-rigid surfaces with functional sub-surface structures have been shown in limited cases to respond to the local flow unsteadiness and to delay the growth of instabilities. Challenges remain in understanding how an engineered surface finish, or sub-surface phononic structure, can couple to the fluid dynamics and improve performance. There is very limited understanding in how heterogeneity in texture scale, or inhomogeneity in spatial distribution, or porosity and permeability affect the very near wall flow. Moreover, there is only a nascent understanding for how sub-surface phononic structures can couple to turbulent flow unsteadiness. This close-coupled interaction requires a need for collaboration between the materials science, manufacturing, and structures communities with the fluid physics and aerodynamics communities. These advances in materials and manufacturing now make it possible to imagine bespoke surfaces with textures and sub-structures tailored to interact with the wall bounded flows. This topic will help lay the scientific foundation for an air vehicle of the future wherein the surface and subsurface structure will vary around the vehicle and will passively manage the flow in each location to achieve the desired level of performance.

The topic, by definition, is multidisciplinary as it requires expertise of material and manufacturing scientists, fluid physicists, and fluid dynamists with expertise in experimental, analytical, and numerical approaches across all disciplines. Without this multidisciplinary effort with emphasis on basic research, the vision of this topic would not be realized. Laboratory and flight demonstrations have shown the favorable interaction of engineered surfaces to reduce drag and delayed transition. However, the vision supported by this topic aims to uncover the physical interaction observed so it can be leveraged, modeled, and, ultimately, incorporated into air vehicle designs.

Objectives: To make foundational advancements in our understanding and predictive capabilities of fluid-material interfaces to enable the development of novel surface treatments, architected subsurface structures, and/or metamaterials to improve air vehicle performance over a broad range of flight conditions. The research should exploit advances in flow field measurement capabilities, emerging concepts in digital manufacturing, passive meta-surface/structure design, and sophisticated data-driven analysis.

Research Concentration Areas: Suggested research areas include, but are not limited to:

(1) fluid physics research focused on wall-bounded shear flows over novel surface interfaces (i.e., porosity/patterning/texturing) and architected materials.

(2) materials and manufacturing research and development focused on resonant/metastable/metamaterials and their coupling to fluid interactions.

(3) elucidation of the effect of scale (i.e., Reynolds number), imposed pressure gradients and surface curvature, and three-dimensionality (i.e., finite span wing) on the fluid-surface interactions over a range of flow field conditions (angle of attack, unsteadiness, etc.)

(4) understanding of the effects of engineered surfaces and/or surfaces texturing on surface obstacles and features such as cavities, protuberances, corners, etc.

(5) development of models and tools that will lead to engineering approaches for design.

(6) understating the complex 3D topologies spanning multiple length scales in polymers and metals.

Anticipated Resources: It is anticipated that awards under this topic will range approximately $750,000 to $1,500,000 per year per award for a maximum of three years supporting up to five faculty researchers. Exceptions warranted by specific proposal approaches should be discussed with the Program Officers during the white paper phase of the solicitation. All funding projects are based on availability of funds.

AFOSR Topic Chiefs:
Primary: Dr. Gregg Abate (gregg.abate@us.af.mil)
Additional: Dr. Douglas Smith (douglas.smith.82@us.af.mil)
Lt. Col. Matthew Krisak (matthew.krisak@us.af.mil)

Please email all topic chiefs with any technical inquiries you may have, but address your proposal to the primary topic chief.

References:

1. G. D. Bixler and B. Bhushan. Fluid drag reduction with shark-skin riblet inspired microstructured surfaces. Advanced Functional Materials, 23(36):4507–4528, 2013.
2. M. Itoh, S. Tamano, R. Iguchi, K. Yokota, N. Akino, R. Hino, and S. Kubo. Turbulent drag reduction by the seal fur surface. Physics of Fluids (1994-present), 18(6):065102, 2006.
3. J. Jimenez, M. Uhlmann, A. Pinelli, and G. Kawahara. Turbulent shear flow over active and passive porous surfaces. Journal of Fluid Mechanics, 442:89–117, 2001.
4. M. I. Hussein, S. Biringen, O. R. Bilal and A. Kucala, "Flow stabilization by subsurface phonons," Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences , vol. 471, no. 2177, p. 20140928 , 2015.

5. Caleb J. Barnes, Carson L. Willey, Kevin Rosenberg, Albert Medina and Abigail T. Juhl. "Initial Computational Investigation Toward Passive Transition Delay Using a Phononic Subsurface," AIAA 2021-1454. AIAA Scitech 2021 Forum. January 2021.

6. Efstathiou, C., & Luhar, M. (2020). Turbulent boundary layers over streamwise-preferential porous materials. arXiv preprint arXiv:2006.00182.

7. Chavarin, A., Efstathiou, C., Vijay, S., & Luhar, M. (2020). Resolvent-based design and experimental testing of porous materials for passive turbulence control. arXiv preprint arXiv:2004.08779.

8. Dynamic Roughness for Manipulation and Control of Turbulent Boundary Layers: An Overview. Beverley J. McKeon, Ian Jacobi, and Subrahmanyam Duvvuri. AIAA Journal 2018 56:6, 2178-2193

3. Data, Models: Machine Learning for Scientific Discovery

Background: The recent advances in computational algorithms and high-performance computing platforms have made computational science and engineering (CSE) an essential and enabling field for modeling, simulation, and design of complex engineering systems. These computational advances along with dramatic improvement of sensor technologies providing data and machine learning techniques for data-driven modeling have resulted in emergence of a new discipline called “Scientific Machine Learning (SciML).” While the use of machine learning techniques utilizing data from experiments or simulations has been prevalent in certain scientific communities (e.g., material science), SciML as a multidisciplinary field using scientific computing, machine learning and mathematical modeling has flourished in many physical and engineering sciences. In these areas where SciML is used for discovery, the existing machine learning techniques which are application agnostics are not suitable since the models should respect or incorporate physical laws or other known knowledge constraints of the specific field. Also, in many scientific areas the available data could be high-dimensional, noisy, multiscale, and heterogenous. Issues such as interpretability and robustness of these data-driven techniques in the context of scientific discovery must be seriously addressed as they are essential to the task of reliable scientific modeling. In the past few years, the framework of Physics-Informed Machine Learning, (PIML) or using the computational power of Deep Neural Networks, the Physics-Informed- Neural Networks (PINNs) has changed and influenced the landscape of SciML. But this influential framework is still under active development and refinement to respond to some of the fundamental questions remaining in SciML: given partial information about the physics or constraints in the model, and noisy, sparse data, how we can develop reliable and predictive models. So, even with this early promise of SciML, there are key challenges that remain and should be addressed by the computational math and domain scientists. Since SciML as a hybrid (data, physics-based) predictive modeling field is multidisciplinary, this topic in this area presents an excellent opportunity for enhancing the research capabilities within the HBCU/Mis Universities which have strong mathematics and data science departments and allows these researchers in close collaboration with science and engineering departments to fundamentally transform the engineering and science research at these institutions.

Objective: The objective of this topic is to bring together experts from applied and computational mathematics, statistics, optimization, and machine learning to team with domain scientists in a field of the team's choosing to develop a comprehensive and rigorous framework for developing machine learning and computational algorithms to utilize available data and knowledge about the system to perform model discovery, predictive simulation, and analysis tools for complex systems. The possible scientific domains include materials, environmental and life sciences, chemistry, or physics.

Research Concentration Areas: Given the wealth of research in Neural Networks computing and some foundational work in SciML, the motivation behind this topic is not to just use existing codes and ideas to new unexplored physical sciences, but to give an opportunity to the participating teams to explore and develop new mathematical and computational frameworks that could enhance existing methodologies for scalable, predictive modeling. To reach this goal, one of the key concentration areas should be Uncertainty Quantification to account for different sources of uncertainty (data, models, parameters), model fidelity quantification in the case of reduced order modeling, or multi-

fidelity models and errors and uncertainties due to neural network computing (if NNs are used for computing). Issues such as computational cost, training cost, scalability, formulation of proper computing architectures (as in neural networks or other computing networks) should be seriously considered.

Depending on the particular scientific field, developing benchmark problems and checking the efficiency and accuracy of the methods on these benchmark problems will be quite beneficial. Also, while the methods developed are application-aware, generalizability and applicability of the methods to other scientific and engineering fields should be explored and addressed.

Anticipated Resources: It is anticipated that awards under this topic will total an average of $1.5M per year for 3 years, supporting up to six faculty researchers. Exceptions warranted by specific proposal approaches should be discussed with the Program Officers during the white paper phase of the solicitation. All funding projects are based on availability of funds.

AFOSR Topic Chiefs:
Primary: Dr. Fariba Fahroo (fariba.fahroo@us.af.mil)
Additional: Dr. Ali Sayir (ali.sayir.2@us.af.mil)

Please email all topic chiefs with any technical inquiries you may have, but address your proposal to the primary topic chief.

4. TECHNICAL DETAILS OF PROPOSED RESEARCH

The proposal submission process has two stages:

- Applicants are strongly encouraged to submit a white paper; and
- Applicants must submit a proposal through Grants.gov.

Prospective awardees are encouraged to submit white papers to minimize the labor and cost

associated with the production of detailed proposals that have very little chance of being selected for funding. Based on an assessment of the white papers, the responsible Research Topic Chief will provide informal feedback notification to the prospective awardees to encourage or discourage submission of proposals. The Research Topic Chief may also, on occasion, provide feedback encouraging re-teaming to strengthen a proposal.

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 topic being addressed. Because of the breadth of research that spans our challenge categories, it is anticipated that groups that submit proposals will include researchers of diverse technical perspectives and technical backgrounds. Finally, efforts integrating a variety of approaches are preferred to those using a single approach, especially as these may provide increased opportunities for technology transfer.

a. 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 buildings and facilities is limited to U.S. citizens. Individuals eligible for access are subject to background checks.

B. FEDERAL AWARD INFORMATION

Through this competition, AFOSR intends to award approximately $12 million, subject to the availability of funds. Awards will be in the form of project grants.

AFOSR expects projects to be completed within the three-year performance period. Requests for no-cost extensions will not be automatically granted. Any such request must be fully justified and submitted sufficiently in advance of the end of the performance period for AFOSR to give it due consideration and determine whether to approve or deny the request. Applications for renewal or supplemental awards will not be considered under this FOA.

Typical annual funding per grant will range from $750,000 to $1.5M per year. Any proposer wishing to submit a proposal outside of this range should discuss their research plan with the relevant Program Officer during the whitepaper phase of this FOA. 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.

The anticipated period of performance is a three-year base period.

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.

Awards are made under the authority of 10 U.S.C. 4001 in the form of grants, or cooperative agreements. We rely on discretionary appropriated funds for this program. We select what kind of award instrument we can use based on requirements in the Federal Grant and Cooperative Agreement Act 31 U.S.C. 6301 – 31 U.S.C. 6308. We discuss regulations, terms, and conditions that generally apply to our awards in Section F. Federal Award.

C. ELIGIBILITY INFORMATION

1. ELIGIBLE APPLICANTS

a. Covered Educational Institutions

You are eligible to submit an application and be the submission team lead if you are a Historically Black Colleges and Universities and Minority Serving Institutions (HBCUs/MSIs) or Tribal College and University.

PI eligibility for this competition is open only to "covered educational institutions," which are defined as:

a. institutions of higher education eligible for assistance under Title III or V of the Higher Education Act of 1965 (20 U.S.C. 1051 et seq.); or

b. accredited post-secondary minority institutions.

Eligible applicants include community colleges or other two-year degree granting institutions meeting the definition of a "covered educational institution."

Enrollments, accreditation, and other factors may affect an institution's eligibility in any Given year. With the exception of HBCUs and Tribal Colleges and Universities (TCUs), an Institution must apply to the Department of Education (DoEd) each year for Title III or Title V eligibility to meet the eligibility criterion above. A copy of the DoEd letter dated April 2021 or later that certifies the institution's eligibility for Title III or Title V assistance must be included with each application submitted under this FOA. The eligibility letter will not be included in the page limitation of the application.

If the DoEd eligibility letter is not submitted with the application, the applicant will be deemed ineligible and the application will not be considered for funding.

No other entities are eligible to submit applications under this competition. However, lead proposals may include participation of other institutions of higher education or for-profit companies through the use of subawards or subcontracts, whichever is determined appropriate in accordance with requirements under 2 CFR 200.331.

We will review 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. 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
5) All institutions other than Historically Black Colleges and Universities and Minority Serving Institutions (HBCUs/MSIs) or Tribal College and University

2. COST SHARING OR MATCHING

Cost sharing or matching is neither required nor an evaluation criterion for proposals under this announcement. You may propose voluntary committed or uncommitted cost sharing or matching, for example, additional support for students. Any voluntary committed cost sharing amount will be included in the total award value.

3. OTHER

a. 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.

b. 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 DoD Instruction 3200.12, "DoD Scientific and Technical Information Program (STIP)."

AFOSR follows DoD Directive 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.

c. Representation for Tax Delinquency, Felony Conviction and Internal Confidentiality Agreements

You must complete the "Representation for Tax Delinquency, Felony Conviction, and Internal Confidentiality Agreements" provided with the Grants.gov package. More specific information about this requirement is provided in section D.4.b.

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 materials 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 the National Security Strategy for United States Government-Supported Research and Development (NSPM-33). 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 AFRL/AFOSR to evaluate your disclosure. AFRL/AFOSR may have to ask you more questions if more information is needed.

At AFRL/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 AFRL/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 DAF funds to the AFOSR Program Officer.

You are not eligible to submit a proposal if you cannot accept these terms.

e. Research Personnel Facility Access Requirements and Restrictions

AFRL contains facilities and equipment that could be useful to the proposed research. Access to these facilities will be restricted to US citizens.

D. APPLICATION AND SUBMISSION INFORMATION

1. ADDRESS TO REQUEST APPLICATION PACKAGE

All the application forms you need are available electronically on 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 by searching for the announcement number shown on page one. Paper copies of this announcement will not be issued.

Please contact us at denise.johnson.19@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 individual listed in G.2. General Announcement Questions.

Your pre-proposal inquiries and questions should be submitted not later than **11:59 PM Eastern Daylight Time on 21 April 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. AFOSR will not accept or evaluate any proposal submitted by any means other than through 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 *italics.*
- 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.**	**Certification Regarding Lobbying Form or** SF-LLL Disclosure of Lobbying Activities Per instructions in D.4
R&R Other Project Information Form	**7.**	**Project Summary / Abstract**
	8.	**Project Narrative**
	9.	**Bibliography & References Cited**
	10.	*Facilities and Other Resources*
	11.	*Equipment*
	12.	*Other Attachments*
R&R Senior / Key Person Profile Form (Expanded)		**Biographical Sketch**
		Current & Pending Support
R&R Personal Data Form		**None**
R&R Budget Form		**Budget Justification**
R&R Subaward Budget Attachments Form		*Subaward Budget*
R&R Project / Performance Site Locations Form		**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. You are still required to submit any documentation, including disclosure of any unpaid delinquent tax liability or a felony conviction under any Federal law (see FAR 52.209-11). 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
Current & Pending Support (no page limit; will not count against page limit): Applicants are required to provide information on all current and pending support for ongoing projects and proposals, including subsequent funding in the case of continuing contracts, grants, and other assistance agreements. Applicants shall provide the following information of any related or complementary proposal submissions from whatever sources (e.g., AFOSR, Federal, State, local or foreign government agencies, public or private foundations, industrial or other commercial organizations).

- 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 should use the Portable Document Format (PDF) for your attachments.

DO NOT password protect any attachments.

The website http://www.grants.gov/help/download_software.jsp offers a list of file convertors 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.htm

Organization applicants can find complete instructions here: https://www.grants.gov/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 the DUNS number to uniquely identify entities registered in the System for Award Management (SAM). At that 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.

   This transition allows Federal Agencies to streamline the entity identification and validation process, making it easier and less burdensome for entities to do business with the federal government.

   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.htm#t=LoginAndMyAccount%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/help/Register/AddProfile.htm

5) ***Track Role Status***: To track your role request, refer to: https://www.grants.gov/applicants/registration/track-role-status.html

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.html

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's 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.

For additional training resources, including video tutorials, refer to: https://www.grants.gov/web/grants/applicants/applicant-training.html

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

If you are experiencing difficulties with your submission, it is best to call the Grants.gov

Support Center and get a ticket number. The Support Center ticket number will assist the 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. *See section F.3. Administrative and National Policy Requirements for more information and links to the full text of these items.*
18.	You must attach the completed D.4.b. Representation for Tax Delinquency, Felony Conviction, and Internal Confidentiality Agreements. You must attach the completed lobbying certification as described in section D.4.c. Lobbying Certification and SFLL Disclosure of Lobbying Activities. You may have to attach the completed SFLLL Disclosure of Lobbying Activities if you have lobbying activity that you must disclose.

b. Representation for Tax Delinquency, Felony Conviction, and Internal Confidentiality Agreements

You must attach this representation to field 18 of the SF 424 (R&R). This attachment is not included in your page count.

You must complete and attach the "Representation for Tax Delinquency, Felony Conviction, and Internal Confidentiality Agreements" provided with the Grants.gov package. AFOSR cannot make an award if this information is not provided.

1) If you answer "is" a corporation with a felony conviction and/or "is" a corporation with a felony conviction on this representation, you may not be eligible for an award if your proposal is selected. You should contact us right away to discuss your situation to find out if you can submit your application.

2) If you do not attach this form to the SF 424, AFOSR may request the representation after you submit your application, but we are not required to do so. AFOSR may deem your application ineligible for selection by citing an authority listed or referenced in DoD Class Deviation (CD) 2016-O0002 or CD 2015-O0005 and make an award to someone else.

c. 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

d. 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.

e. 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 INSTRUCTIONS	
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 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.
9.	Attach your D.4.h. Bibliography and References Cited
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.4.g. Project Narrative facilities and resources section.
11.	You may supplement your D.4.l. 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 INSTRUCTIONS	

f. 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.

g. 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 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 an 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 Personnel**

As described in section C.3.e. 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:

- Full name and any other names used;
- Country or countries of citizenship;

- Date and place of birth;
- Permanent Resident Card (Green Card) type; and
- Green Card issue and expiration date.

h. 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.

i. R&R Senior / Key Person Profile Form

You must attach a full biography and comprehensive list of all publications (vitae) for each Senior / Key Person, whether or not the individuals' efforts under the project are to be funded by the DoD. 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 Act (NDAA) for FY 2019, 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.

Failure to submit this information may cause the proposal to be returned without further review. Additionally, DoD reserves the right to request additional details from the proposer before making a final determination on the funding effort.

This information may be used to support protection of intellectual property, controlled

information, key personnel, and information about critical technologies relevant to national security. Additionally, this information may be used to limit undue influence, including foreign talent programs, by countries that desire to exploit the United States' technology within the DoD research, science and technology, and innovation enterprise.

j. 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.

k. 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.

l. 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	Round trip	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**

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**. As part of this solicitation, proposers can apply for equipment to support research conducted under NSP. Alternatively, proposers can also consider submitting the instrumentation request under AFOSR's Defense University Research Instrumentation Program (DURIP). Information for the DURIP program is listed below:

   https://www.afrl.af.mil/About-Us/Fact-Sheets/Fact-Sheet-Display/Article/2282120/afosr-funding-opportunities-university-research-initiative-uri/#anchor1

   This solicitation is research focused, and the purchase of equipment should in no way deter you from achieving your research goals. Proposers should anticipate that the equipment necessary to enhance their research ability will be hindered by delivery time and expectations of how the equipment will help; please consider the timeframe of such a request.

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 Principal 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

m. 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.

n. Data Management Plan (Required)

A Data Management Plan is required with your application. 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:

- 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;
- How the data will be acquired;
- Time and location of data acquisition if they are scientifically pertinent;
- How the data will be processed;
- The file formats and the naming conventions that will be used;
- A description of the quality assurance and quality control measures during collection, analysis, and processing;
- If existing data are to be used, a description of their origins;
- A description of the standards to be used for data and metadata format and content;
- Plans and justifications for archiving the data;
- The timeframe for preservation; and

- If for legitimate reasons the data cannot be preserved, the plan must include a justification citing such reasons.

o. 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.amrdec.army.mil/safe/.

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, 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 and telephone at (866) 606-8220 or (324) 206-7828.

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 **21 April 2023 at 11:59 PM Daylight Time.** Responses will be posted by **25 April 2023** at 11:59 PM. Technical responses will be emailed by **25 April 2023** at 11:59 PM.

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 (denise.johnson.19@us.af.mil).

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

AFOSR will not provide responses or answers to late inquires or questions.

d. Proposal Submission Deadline

AFOSR must receive your white paper by **01 May 2023 at 5:00 PM Eastern time** for it to be considered.

AFOSR must receive your proposal electronically through Grants.gov not later than **12 June 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

Grant.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://www.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 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:

- The technical merits of the proposed research.
- 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.

- Potential of the proposed project to develop HBCU/MSI/TC research capabilities or enhance existing research capabilities and to broaden the research base in support of national defense.

b. Additional Evaluation and Selection Criteria

Additional evaluation criteria are shown below. This criterion is less important than the combined principal selection criteria.

- 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 proposals 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 use 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 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 NOTICIES

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, 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 200.205(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 200.213 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. We can provide a generic model grant or cooperative agreement upon request.

If we publish updated terms and conditions, the updated terms and conditions may apply to any grant made 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 200.333, 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 200.328. 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 required reports, or providing reports after required due dates, could lead to being considered ineligible for future awards.

b. Technical Performance Report Format

(1) Federal-wide Research Progress Performance Report (RPPR) Format (All grant awards)

We now use the Federal-wide Research Progress Performance Report (RPPR) for annual and final research performance reports. The reporting requirements will be detailed in the grant award documents.

(2) ANSI Standard Z39.18-2005 (all non-grant awards)
Use the AFRL Scientific & Technical Reports – Preparation, Presentation and Preservations Format Guidelines (June 2010) for your final report unless your award states different requirements. You can download the AFRL standard guide from the Related Documents tab in Grants.gov for this announcement.

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

(1) Invention Reports

(a) You must provide at least a final invention report on DD Form 882. We may ask for annual reports. Our award documents specify the due date. You can get the form at http://www.dtic.mil/whs/directives/forms/eforms/dd0882.pdf.

(b) 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.

d. 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 PIEE questions or problems, you can get help by telephone at (866) 618-5988, or by electronic mail at disa.global.servicedesk.mbx.eb-ticket-requests@mail.mil, or via the Internet at: 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 200.329 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 must 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.

Topic 1: Directed Energy

DR. JOHN LUGINSLAND, AFOSR/RTB
Email: john.luginsland@us.af.mil

DR. MICHAEL YAKES, AFOSR/RTB
Email: michael.yakes@us.af.mil

DR. FARIBA FAHROO, AFOSR/RTA
Email: fariba.fahroo@us.af.mil

Topic 2: Fluid Surface Material Interaction

DR. GREGG ABATE, AFOSR/RTA
Email: gregg.abate@us.af.mil

DR. DOUGLAS SMITH, AFOSR/IO
Email: douglas.smith.82@us.af.mil

LT.COL. MATTHEW KRISAK, AFOSR/RTA
E-mail: matthew.krisak@us.af.mil

Topic 3: Data, Models: Machine Learning for Scientific Discovery

DR. FARIBA FAHROO, AFOSR/RTA
Email: fariba.fahroo@us.af.mil

DR. ALI SAYIR, AFOSR/RTB
Email: ali.sayir.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.

MS. DENISE M. JOHNSON, AFOSR/RBK
GRANTS OFFICER
Email: denise.johnson.19@us.af.mil

MR. CALVIN SCOTT, AFRL/RBKC
SENIOR PROCUREMENT ANALYST
Email: calvin.scott@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 with 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/afrl/afosr. confirm this hyperlink if this the correct website!

Thank you for your interest in this announcement.