ONR Announcement N00014-23-S-F006

Class of 2024 Vannevar Bush Faculty Fellowship (VBFF) Program

Deadlines

White Paper Inquiries and Questions
01 September 2023

White Papers must be received no later than
29 September 2023 (Friday) at 05:00 PM Eastern Time

Full Proposal Inquiries and Questions
02 February 2024 at 5:00 PM Eastern Time

Full Proposals must be received no later than
16 February 2024 (Friday) at 05:00 PM Eastern Time

Amendment 1 updates the full proposal deadline and revises the Research and Related budget justification section on page 32 to add the requirement to include vendor quotes for any proposed capital equipment. This amendment supersedes all previous versions.

SPECIAL NOTE: DO NOT USE THE FEDCONNECT MESSAGE CENTER FOR QUESTIONS OR RESPONSES RELATED TO THIS FOA. PLEASE USE THE CONTACT INFORMATION LISTED IN SECTION G. FEDERAL AWARDING AGENCY CONTACTS.

Contents

I. Overview of the Research Opportunity

This publication constitutes a Funding Opportunity Announcement (FOA) as contemplated in the Department of Defense Grant and Agreement Regulations (DoDGARS) 32 CFR 22.315(a). The ONR reserves the right to fund all, some, or none of the proposals received under this FOA. ONR provides no funding for direct reimbursement of proposal development costs. Technical and budget proposals (or any other material) submitted in response to this FOA will not be returned. It is the policy of ONR to treat all white papers and proposals submitted under this FOA as sensitive competitive information and to disclose their contents only for the purposes of evaluation.

Hyperlinks have been embedded within this document and appear as underlined, blue-colored words. The reader may "jump" to the linked section by clicking the hyperlink.

Information regarding the Basic Research Office, at the Office of the Under-Secretary of Defense for Research & Engineering (OUSD(R&E)) can be found at: https://basicresearch.defense.gov/About/

Information regarding the Vannevar Bush Faculty Fellowship program and list of past recipients can be found at: https://basicresearch.defense.gov/Programs/Vannevar-Bush-Faculty-Fellowship/

Information regarding the white paper submission and submission process can be found at: https://dod-basicresearch.nvision.noblis.org/program/vbff

A. Overview

1. Federal Awarding Agency Name

Office of Naval Research
One Liberty Center
875 N. Randolph Street
Arlington, VA 22203-1995

2. Funding Opportunity Title

Class of 2024 Vannevar Bush Faculty Fellowship (VBFF) program

3. Announcement Type

Amendment 1

4. Funding Opportunity Number

N00014-23-S-F006

5. Catalog of Federal Domestic Assistance (CFDA Numbers)

12.300 - Department of Defense (DoD), Department of the Navy, Office of the Chief of Naval Research, Basic and Applied Research

6. Key Dates

Anticipated Schedule of Events *		
Event	**Date (DD/MM/YEAR)**	**Time (Local Eastern Time)**
RunGrants website opens for registration and submission https://dod-basicresearch.nvision.noblis.org/program/vbff	03 July 2023	
VBFF Webinar For details and registration, please visit https://dod-basicresearch.nvision.noblis.org/program/vbff	27 July 2023	3:00 PM Eastern Time
RunGrants Registration (strongly suggested by) & Deadline for Questions regarding White Paper and Documents*	15 September 2023	05:00 PM Eastern Time
Deadline for submitting White Paper and supporting Documentation to RunGrants https://dod-basicresearch.nvision.noblis.org/program/vbff	29 September 2023	05:00 PM Eastern Time
Notification of Invitation for Full Proposal	15 December 2023†	
Deadline for Questions regarding Full Proposal and Documents*	02 February 2024	05:00 PM Eastern Time
Full Proposal Submission (by invitation only) electronically on Grants.gov website	16 February 2024	05:00 PM Eastern Time

& Confidential Letters of Recommendation (REQUIRED) via email to Ms. Paula Barden at paula.d.barden.ctr@us.navy.mil		
Notification of Selection of Award	10 May 2024†	
Start Date of Grant	01 July – 30 August 2024†	

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

IMPORTANT NOTE: Registration on RunGrants is mandatory and can be accomplished at the time of white paper submission, but applicants are strongly encouraged to register prior to the deadline for white paper submission. White Papers are MANDATORY. Proposal submission is on Grants.gov and by invitation only.

7. Grants Officer

The Grants Officer for this announcement is identified in Section G.2.

II. DETAILED INFORMATION ABOUT THE RESEARCH OPPORTUNITY

A. Program Description

Background

Before World War I, Dr. Vannevar Bush (1890-1974) was a professor and Dean of Engineering at the Massachusetts Institute of Technology, and founded a large defense and electronics company. He was a forward-thinking policymaker who, during World War II, went on to serve as the director of the U.S. Defense Department's Office of Scientific Research and Development, coordinating the work of thousands of scientists in the service of ending the war. In his 1945 report to the President of the United States, Science, "The Endless Frontier", Bush called for an expansion of government support for science, and he pressed for the creation of the National Science Foundation (NSF). Dr. Bush was concerned about how the scientific research supported by the Department of Defense (DoD) during WWII could be sustained with a focus on peacetime goals. He believed that basic research was "the pacemaker of technological progress". "New products and new processes do not appear full-grown", Bush wrote. "They are founded on new principles and new conceptions, which in turn are painstakingly developed by research in the purest realms of science".

Dr. Bush's life work embodies the spirit of this research program, formerly known as the National Security Science and Engineering Faculty Fellowship (NSSEFF). Therefore, in his in his honor, the name was changed to the Vannevar Bush Faculty Fellowship (VBFF) program (https://www.defense.gov/News/Article/Article/955536/dod-debuts-vannevar-bush-faculty-fellowship).

Research Objectives

The VBFF program is sponsored by the Basic Research Office, Office of the Under Secretary of Defense for Research and Engineering (USD (R&E)). VBFF supports innovative basic research within academia, as well as opportunities intended to develop the next generation of scientists and engineers for the defense workforce.

The Office of Naval Research (ONR) manages the VBFF program for USD (R&E). To accomplish this task, ONR is soliciting proposals for the VBFF program through this FOA. This FOA seeks distinguished researchers for the purpose of conducting innovative basic research in areas of interest to the DoD and fostering long-term relationships between the VBFF Fellows and the DoD.

As defined by the DoD, 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. 050105.A) (http://comptroller.defense.gov/Portals/45/documents/fmr/Volume_02b.pdf) The DoD's basic research program invests broadly in many scientific fields to ensure that it has early cognizance of

new scientific knowledge.

VBFF is oriented towards bold and ambitious "blue sky" research that may lead to extraordinary outcomes such as revolutionizing entire disciplines, creating entirely new fields, or disrupting accepted theories and perspectives.

The objectives of the program are to:

- Support unclassified basic scientific and engineering research that could be the foundation for future revolutionary new capabilities for DoD.
- Educate and train student and post-doctoral researchers for the defense workforce.
- Foster long-term relationships between university researchers and the DoD.
- Familiarize university researchers and their students with DoD's current and projected future challenges.
- Increase the number of talented technical experts that DoD can call upon.

This FOA is for single investigator grant proposals for basic research. All awardees will receive a research grant and the title of VBFF Fellow. VBFF Fellows and their students are provided with opportunities that are designed to enhance their understanding of DoD's critical research needs and interact with DoD senior Science and Technology (S&T) program leaders. Fellows and their students are expected to participate in VBFF activities scheduled throughout the year, as much as possible. These activities may include an orientation meeting, site visits to DoD labs, technical workshops, and an annual meeting to report the progress of VBFF–sponsored research. VBFF Fellows may also be encouraged to serve as members of DoD advisory boards, panels, or groups. For a list of current and past VBFF or NSSEFF Fellows, refer to: https://basicresearch.defense.gov/Programs/Vannevar-Bush-Faculty-Fellowship/.

SCIENTIFIC AREAS

The proposed research must satisfy the primary program objective of ambitious scientific exploration, as highlighted in Section A.2.b, with the potential for revolutionizing the scientific and technical (S&T) foundations of the future capabilities within the DoD. To that effect, this program is interested in a broad spectrum of scientific areas, described below. Submitted proposals must identify which of those areas it best corresponds to. Innovative ideas that do not fall under any of the defined categories in that list are also welcome, and can be submitted under the "Other" category. Proposals that are multi-disciplinary and are not perfectly matched to one of those categories should identify a primary and secondary one. An expert review panel will be assigned to each category, but the VBFF Program Director and staff have the discretion to share the white papers and proposals across different review panels, for the purpose of obtaining a comprehensive and high-quality technical review of the overall submission. See also Section G for more details on the review process.

Proposed research should focus on developing a deep understanding of fundamental phenomena. Device development or equipment construction or integration is not a suitable goal in itself; if proposed, it must be integral to research that will advance scientific knowledge. Risk-taking is encouraged; however, all proposals must demonstrate solid judgment and rationale. The applicants are strongly encouraged to consult the Proposer's Guidelines document, which can be found at the

white paper submission website: https://dod-basicresearch.nvision.noblis.org/program/vbff

1. Area 1: Applied Mathematics and Computational Science

Advances in mathematics and their implementation on advanced information systems provide the basis for critical capabilities across a broad range of DoD applications. These range from numerical simulations of physical systems with extreme complexities of scale and structure, to revolutionary approaches to Artificial Intelligence (AI) enabling abstract reasoning abilities that match or exceed that of humans. Advanced mathematical concepts underlying future AI systems more accurately belong in Area 2 described below, and while there can be significant overlap, this section is principally focused on areas in Applied Mathematics that can enable revolutionary computational and modeling capabilities of various types, for the purpose of simulation and design of complex physical and engineered systems. These may include optimization, uncertainty quantification, numerical analysis, applied analysis, stochastics and statistics, as well as applied geometry and topology, applied category theory, or other.

The predictive simulation of complex natural environments or engineered systems is one of the critical computational problems of interest to the DoD. Of particular interest are extreme cases of multi-physics and multi-scale problems, as well as conditions that prevent the usual reductionist approaches, such as global interactions or far-from-equilibrium conditions, including those that also challenge traditional data representations. Engineered systems of interest can be connected or distributed, and controlled dynamics can be local and global, optimizing the distribution of decision-making, or its synthesis. The range of approaches of potential interest is broad, and can include, for example: discrete, continuous and hybrid representation spaces and dynamics; sub-scale dynamics; model discovery and/or reduction; stochasticity and uncertainty; control and decision-making; optimization; composition; symmetry, geometry and topology. This is not an exhaustive list: mathematical and computational approaches that can provide revolutionary capabilities in spanning scales and domains under a broad range of conditions, as well as redefine computational paradigms for emerging fields of science, are welcome under this topic.

The ability to obtain accurate solutions at very high rates is a key and enabling step for the design, analysis and manufacturing of future platforms and networks for national defense. Transformative, ‘blue-sky’ research in this topical area can therefore enable visionary concepts, such as simulating complete virtual copies of highly complex engineered or natural systems for accurate and time-relevant predictions. It can also stimulate advances in other scientific fields by creating new levels of understanding of physical phenomena which can be difficult to accurately measure or reproduce in laboratory conditions. For example, understanding and predicting the dynamics and aging of materials under various environmental conditions is a challenging problem with a high impact on the life cycle and cost of military systems, but there are many examples of grand-challenge problems of high interest to the DoD. We emphasize that this topic is not looking for algorithm design and incremental advances in computational speed, but for fundamental and disruptive mathematical approaches. Rare and extreme events in natural and engineered systems can also have a profound impact on platform design and survivability, and fundamental advances in the long-term prediction of extreme events in a variety of physical, engineered or networked systems, are also of interest. These are just a few examples, and the DoD is interested in a broad range of applications, from physical, chemical, and biological systems to artificial constructs (e.g., networks, robotics, aircrafts

and other platforms).

This program is looking for new and comprehensive ideas, which may or may not be listed above, but with the potential to radically alter our frameworks and visions for advanced computing in the service of scientific discovery and modeling. All revolutionary approaches in applied mathematics and computing are of potential interest, as long as they can be argued to radically transform our abilities in information science, for enabling important, future DoD capabilities.

As a final note, although this research area is not restricted to computing performed on large-scale platforms, it is not concerned with new computer architectures, the design and manufacture of those being better suited elsewhere in this announcement. Similarly, quantum algorithms belong to the area of quantum information sciences (Area 5), but can be considered here as part of a general computational framework, e.g., leveraging quantum formalism or hybrid algorithmic approaches.

2. Area 2: Networks and Artificial Intelligence

New mathematical concepts are sought to model the extreme complexity of networks in a rapidly changing, stochastic and adversarial environment. This includes their dynamics, optimization, and resilience, and may involve a wide range of physical interactions, as well as information resource management, cybersecurity, and social and psychological interactions with human agents. Complex networks of interest are also found in biological, chemical and socio-technical systems, as well as in the combination of multiple domains. For example, the physical, biological and ecological networks affected by climate change interact with social, cultural and economic networks, leading to potential amplification and acceleration of effects and couplings. There are multiple cases of couplings between networks and across domains that are of high interest to the DoD, and this topic calls for rigorous and very novel approaches to solve such problems at scale, with the potential for generalizability to a wide range of applications.

This topic also calls for novel approaches in Machine Learning (ML) and Artificial Intelligence (AI). While AI is also covered in Topic #3 below, the key element here is the creation and development of new mathematical approaches to ML and AI. In particular, this topic welcomes original ideas that target behavior prediction of large scale and coupled networks of autonomous machines, capable of adaptive learning and decision-making – including distributed and collective decision-making – under challenging or adversarial conditions. This includes their interactions with networks of human agents, such that both can learn and work in cooperative fashion. For example, the mathematical representation of both machine and human information and knowledge, as well as strategies and intents, towards common understanding and shared decision-making, is also of particular interest for this problem.

Standard methods in network science or machine learning are generally insufficient and of little interest in this program. Rather, we are seeking transformative and novel approaches that can address the extreme complexity of the most challenging problems, such as: combined and interacting physical and social dynamics; co-evolving agent dynamics and network topologies; non-equilibrium and open systems; uncertain games with multiple time scales and objectives, and with dynamic evolution of the rules of the game. Higher levels of data and knowledge representation and operations on those structures, can be needed to solve these problems. These are examples of

challenging problems of interest, and others can be suggested under this topic.

Fundamental research in this topical area may come from different fields of mathematics and computational science, e.g., from distributed optimization, geometry and topology, and multi-agent game theory, but potentially radically new ideas may be leveraged from different fields, such as statistical physics, biology, and other.

Network science also underlies advances in robotics and autonomy. Despite the widespread use of artificial neural nets (ANN), there are still many opportunities for mathematical research that can provide deep insight into the design and optimization of radically new neural nets with transformative capabilities. Such advances are needed to create AI that can ultimately match or exceed human-level reasoning abilities. Again, these new mathematical approaches may rely on inspiration from disparate fields, such as statistical physics and others, whether as closely related as neuroscience, or as remote as quantum information theory. Of particular interest are approaches that provide a reasonable pathway towards accurately and efficiently formulating key activities associated with human intelligence, including for example "common-sense" reasoning, physical "intuition" to rapidly learn constraints, or a theory of mind when interacting with other AI agents, as "collective" intelligence can provide another exponential factor in learning and adaptability. The mathematics may also be intimately related to the architecture underlying the computational processes, such as neural network topologies and non-linear thresholding, memory kernels, time delays and analog transforms. Evolutionary (not in the sense of incremental) AI concepts are also of interest, from AI training AI to adaptive neural topology and hierarchical abstraction, based on the data environment, as well as sensory and physical interactions in the case of advanced robotics. Another example of particular interest is the ability of AI to demonstrate "creativity", well beyond the constrained framework of generative networks, and into the realm of ideas and concept generation, such as those required for scientific discovery. Finally, the relation between AI as implemented by ANNs and cognitive and psychological concepts such as behavior norms, e.g., "ethical" rules, is also of interest, leading to the question of algorithmic or mathematical formalization of such rules in a robust, resilient and adaptive fashion.

It is emphasized here that this topic does not call for data analytics or software development, but for mathematical concepts and methods specifically aimed at the complexity of scale and diversity of interactions. As with all scientific areas listed in this announcement, radically new approaches are sought, rather than incremental research.

3. Area 3: Neuroscience and Fundamentals of Cognition and Intelligence

The VBFF program is interested in forward-thinking theoretical, computational, and experimental basic research in neuroscience and associated fields, which can potentially provide revolutionary insights into the foundations of brain function and development, towards a deeper and more comprehensive understanding of the neural processes underlying the various levels of cognition, including learning, reasoning, and intelligence. This improved understanding can guide the design of revolutionary approaches to Artificial Intelligence (AI), including, but not limited to, the reproduction of human-like capabilities. It also has the potential to enhance human capabilities, such as faster and more accurate information processing, more robust decision making, greater resilience, and more effective communication, including in both human-human and human-machine teams.

Fundamental research in neural activity and brain functions and development, from genetic programing of cellular growth and differentiation to mechanisms of network formation and reconfiguration, can also lead to the development of new brain-machine interfaces (BMIs) that could facilitate the integration of humans and future AI agents, offer new and enhanced sensing abilities, and allow smooth motion of motor augmentation devices (e.g., exoskeletons) or prosthetics to restore abilities after injury, or help warfighters recover from brain injury. These are examples of applications of interest, but not an exhaustive list, and other visionary applications may also be considered.

Novel neuroimaging approaches and other comprehensive and precision measures of neural activity, artificial neural network (ANN) architecture experimentations and new learning strategies, as well as improved mathematical tools, potentially provide a foundation for novel computing architectures with high-level, human-like cognitive functions. This reverse-engineering of human and/or animal brain functions into ANNs could initiate an iterative feedback loop to bootstrap our understanding of the brain, make giant steps towards general AI, and design brain-machine interfaces that can repair or augment brain functions. Recent advances in neuroscience have shown that brain activity is organized at the levels of molecules, neurons, neural circuits, and systems, presenting a particularly challenging problem in neural model design and verification. Approaches lifted from other fields of science, in particular statistical physics, dynamical systems, complexity theory, have provided insight into the brain functions and its plasticity. Fundamental research in experimental, computational and mathematical neuroscience could therefore provide key insights into perception, learning, inferential reasoning, and decision-making in future designs of ANNs, a key interest of this program.

Maintaining the effectiveness and resilience of human operators, as well as sustaining or enhancing their cognitive capabilities in stressful environments, are of high importance to the DoD. The volume of data and the pace at which processing must be accomplished is already challenging human capabilities for decision-making, and this challenge is expected to grow much further. Human operators are then called upon relying on increasingly capable and sophisticated AI systems, but such interactions can be brittle, potentially with catastrophic consequences. Although the human brain can perform extraordinary cognitive tasks (e.g., representation, association, abstraction, prediction) in incredibly robust and flexible ways, the correspondence between radically different theories of human cognition remains unclear, and the challenge is compounded when interactions with AI agents, individualized or as a collective, must be accounted for. Despite greater insight into the neural basis of some brain functions, mostly related to sensory processing, we lack a mapping between abstract thoughts or consciousness and specific neural pathways, and to make these high-level cognitive processes explainable to machines. Opportunities abound for the discovery of new theories that can rigorously link higher-level cognitive operations with lower-level mechanisms, which may include processes down at the cellular or molecular level.

At yet another level of complexity, the human brain does not mature in isolation; it is part of a body embedded in a complex physical and social environment. Human brains have developed the ability to reason using the subtle language of social interactions via physical cues or language. Understanding this ability at a fundamental level can help develop new languages and cues to interact with future AI systems, as well providing the basis for rigorous integration of human cognitive models into large scale social interaction models. Such models may eventually provide cues to the design of AI systems with social norms.

In trying to understand cognition in animals and humans, it is impossible to ignore the diversity of cells and circuits that give rise to it. The brain is composed of a myriad of cell types with unique cellular properties that integrate into neural circuits that form the basis of behavior and cognition. Understanding how cells in the brain are specified during embryonic development and the mechanisms controlling neural circuit formation could have a formidable impact in the field of neuroscience. This includes genetic control of cell differentiation, as well as bio-chemical and mechanical signaling, in a self-developing environment. Understanding and prediction, at scale, of these mechanisms can lead not only to novel treatments for brain injury and neuro-degenerative diseases through cell-type targeted therapies and cell/organoid transplantation, but also to revolutionary ANN models of brain function and cognition. It can also lay the foundational knowledge for augmenting/enhancing brain functions, or creating new ones in-vitro, whether inspired by evolutionary adaptation or tailored for artificial environments.

We emphasize that this topic calls for fundamental, 'blue-sky' research that has the potential to revolutionize our understanding of brain functions and their relationships with the structures and dynamics of neurons, neural networks, neurochemistry, as well as fundamental biological and bio-physical characteristics at the cellular and multi-cellular levels. Inspiration and approaches may come from different directions and leverage various fields of study, with greater emphasis placed on those that can transform our perspective in not only understanding functionalities of the brain and the neural systems in general and at multiple levels, but also open the possibility for revolutionary steps in enhancing their capabilities. Approaches may be in-vivo, in-silico or in-vitro, or combinations thereof, including for example: network science and complexity theory, comparative evolution, genetics, organoids, biochemistry, biophysics and materials, etc. The proposed research should not be incremental but far-reaching and visionary.

4. Area 4: Fundamentals of Bioengineering

Fundamental research in bioengineering harnesses the power of multi-disciplinary approaches to study and leverage biological processes that can transform multiple technologies of high importance to the DoD, and enable new ones. These include, for example: new sensing modalities and self-assembled sensory networks; structural biomaterials and electronics with designed functionalities; synthetic and controlled synthesis of complex living matter, e.g., artificial organs or even complete organisms; and many new capabilities that are yet to be discovered. Fundamental and far-reaching advances are required in multiple, often inter-connected research directions to enable such revolutionary abilities. These include (but are not limited to): gene-editing, epigenetics, synthetic biology, computational biology and bioinformatics, biophysics and biochemistry, and other approaches to understand and design the interaction between living matter and conventionally engineered, abiotic systems, predict biological system response and evolution, and control their functionalities ab-initio, in realistic and dynamic environments.

One of the primary objectives of bio-engineering research for the DoD has been, and still remains, the design and manufacture of complex biomaterials. This interest extends beyond bulk biochemical processes, as biological functions are also the result of collective self-organization across multiple scales, from complex bio-molecular structures to subcellular and multicellular assemblies. The formation of specialized micro-structures, the result of a complex interplay between biochemical and

physical processes, and improved understanding, prediction and control of these interactions toward revolutionary concepts of the first principles of biological processes, biomaterials, and physical structures, are of high interest.

Biomaterials are also interactive and can be subject to unpredictable environmental conditions. Precise engineering of the programmability of biochemical and biophysical functions within individual organisms or microbial consortia, and their transient response to environmental changes and stimuli, are required for safe deployment and to prevent undesired natural activity. The openness, as well as the variability of the environment and time scales, make this problem particularly difficult. For example, predictable aging of abiotic materials is already a formidable challenge, which yet still pales in comparison with that of living materials. Thus, rigorous approaches to control, verifiability and trust are also of special interest, and perceived as key enablers to widespread development of bio-engineering technology.

There is also significant interest in the interfacing of biological and abiotic systems, leading to the design and engineering of hybrid materials, components, platforms, and systems, whether for electronics, chemical processing, sensing, or other functions with transformative potential. This includes biological/DNA computing, given the potential for biological systems to read, write, storage, and process information with increasing speed and complexity, with negligible or unconventional power requirements. The leverage of biomaterials and structures for sensing, made exquisitely sensitive and optimized though eons of evolution in natural organisms, is another area where fundamental research may play a role, towards better understanding of the complex interactions and self-assembly of the sensory devices, and towards creating new pathways to similar abiotic or hybrid sensors. Generally speaking, the combination of such biological and abiotic components and functions has the potential to open a new design space for engineered systems with a revolutionary impact on DoD applications.

These are only suggested areas, and the VBFF program is interested in basic, innovative, and transformative proposals in all aspects of fundamental research in bioengineering, that are well beyond technology development. This program calls for new, transformative approaches to break the barriers limiting our understanding of underlying biological processes and to solve new or long existing problems, with far-reaching and visionary potential.

5. Area 5: Quantum Information Science

Quantum Information Science (QIS) focuses on the creation, control, manipulation, and detection of non-classical states of light and matter with the potential for exceeding classical limits in areas ranging from communications, sensing, metrology, and imaging to computing and simulation, and other applications yet to be discovered. Recent experiments have suggested that the regime of "quantum supremacy" has been reached, or is close at hand, and the field is continuously the subject of significant technological achievements and scientific discoveries, and constantly the source of surprise. There is high interest in QIS for its potential impact on DoD capabilities including, but not limited to: ensuring information security; enabling novel materials discovery and design; attaining precise navigation and positioning without GPS; greatly improving sensing (local and remote), imaging and metrology.

Despite the widespread research activity by the academic community and very substantial commercial investments, many fundamental scientific questions remain open. For instance, while entanglement is a critical quantum resource that underlies multiple subareas within QIS, the generation, characterization, manipulation, and measurement of multipartite, structured and distributed entanglement still need exploration. The uniqueness of quantum resources affords exceptional opportunities for inventions that push the boundaries of human imagination. Thus, theoretical and experimental understanding, as well as optimal harnessing of quantum resources, are pivotal for the development of multiple facets of QIS. Rigorous analysis of the parameter space where QIS can be most useful is still uncharted territory. On the theoretical side, developments of new algorithms for physically realizable quantum systems are in eager demand, in order to push well beyond the classical possibilities in all aspects of information science, including generation, retention, transformation, protection, and transmission, as well as learning, in the quantum machine learning (QML) paradigm. At the same time, significant innovations of the physical platforms are required, not simply to scale-up the number of qubits, but to extend their generalizability and practicality, as well as comprehend and exploit quantum mechanical behavior that incorporates interactions with other quantum information systems and the external environment. These couplings could be inadvertent by-products of the physical schemes, or cleverly designed to achieve optimal control and quantum coherence. Comprehensive approaches that effectively fuse theory with realistic experimental platforms are also welcome. Also of particular interest are fresh perspectives to quantum constructs that go beyond current circuit-based computational models or their theoretical equivalents, which may offer radically new concepts of quantum information processing. Furthermore, fundamental discoveries in the relationship between previously distinct disciplines, such as between quantum many-body systems and gravity in higher-dimensional space-time, raise the possibility of leveraging far-reaching ideas to create more general, hierarchical and powerful approaches to QIS (e.g. enhancing quantum computational complexity).

The VBFF program is interested in foundational theoretical and experimental concepts with broad impact that will significantly advance our understanding of quantum information and processes, and more notably, disrupt the current research directions of QIS. Approaches should be a departure from improvements aimed at narrow challenges or technological advancements of devices and components. Of particular interest are transformational ideas that reach beyond quantum analogies of classical concepts.

6. Area 6: Electronics, Photonics and Quantum Materials

Extraordinary physical phenomena in solid state materials remain a central research interest in the DoD, as nearly all new capabilities rely on advancing the state-of-the-art in material properties as well as material synthesis and processing. At its core, this topic focuses on unfettered, beyond-conventional approaches to the discovery and predictive design of materials that exhibit previously unattainable or unknown electronic, photonic and/or other quantum functionalities. This topic also seeks advances in our fundamental understanding of the material properties and characteristics, potentially opening new research directions in theoretical and computational physics, as well as new diagnostic methods with wide-ranging, transformative impact. It is expected that materials based on these new physical phenomena can ultimately lead to paradigm shifts in engineered platforms that are needed to modernize key DoD capabilities, spanning from communications to sensing, computation, and beyond.

Remarkable electronic, photonic, and quantum mechanical phenomena can arise in materials under

various circumstances, including the presence or breaking of various symmetries or quasi-symmetries (e.g., time-reversal, particle-hole, chiral, point group, etc.), existence or lifting of degeneracies, and/or manipulation, perhaps nonlinearly, by external excitations (electromagnetic waves, electric fields, magnetic fields, etc.). These new classes of materials can exhibit combinations of multiple phenomena, host various types of quasi-particles, or exhibit distinctive functionalities, including exceptionally enhanced or reduced sensitivities to external perturbations. More broadly, such classes of materials can be found within bulks, interfaces, composites, photonic systems or even mechanical (phononic) ones, as well as for multiple dimensionalities, including synthetic ones. The interplay between local and global properties (e.g., topological order, non-classical entanglement), as well as the discovery and realization of new quantum phases, are also of particular interest. Fundamental issues may include new emergent physics, non-linear interactions, wave phenomena, coherence, dissipation, transport, fermionic/bosonic topological mode couplings, or anyonic statistics. Other considerations include the material physics in far-from-equilibrium conditions, such as those arising from coupling to ultra-fast excitations, driven states, high dimensional disorder, density of states, and thermodynamic trade-offs.

Many fundamental questions still remain to be answered, and challenges to be met, before bringing these new classes of materials across the threshold of practical applications, especially for the harsh operating environments frequently found in DoD-relevant scenarios. Unorthodox static and dynamic characterization approaches need to be developed to directly probe and conclusively determine the origin of the electronic, photonic or quantum behavior. Clever approaches to the design and scalable synthesis of materials are required to provide a pathway towards future applications. Radically new theoretical and computational approaches that are highly integrated with material characterization, synthesis and processing, are necessary to discover, understand and even predict the behavior, as well as guide physical realizations.

The VBFF program is interested in all of the above, and in the discovery of new classes of electronic, photonic and quantum materials that can lead to breakthroughs for DoD capabilities of interest. Of particular interest are radically new and transformative concepts, and innovative approaches in unifying theoretical ideas, computational methods, tailored diagnostics, and precise synthesis to discover and design extraordinary physical properties of materials.

7. Area 7: Material Science

The DoD is consistently aiming to discover and exploit new materials that enable transformative functionalities and/or performance under extreme environmental or operational conditions. The discovery and ab-initio design of materials with tailored combinations of physical characteristics, such as thermal and transport properties, chemical reactivity, mechanical strength, optical or electromagnetic responses, etc., is advancing at a rapid pace, often supported by advances in Machine Learning (ML) tools. Dynamic behavior can be integrated in this ab-initio design process for far-from-equilibrium effects, extreme non-linearities, and/or ultra-fast control. Structural and physico-chemical dynamics can also lead to new capabilities in materials that can rapidly adapt to external stimuli, demonstrate geometric and topological transformations, or control phase change, towards radically new concepts of operation and platform designs, and means of survivability under these extreme conditions that are often found in DoD applications. This topic is concerned with the following question: what are the fundamental challenges to the optimization and inverse design

problems in material science? New diagnostic methods, computational approaches, and theory may be needed to obtain a deeper understanding of the physics of materials at multiple scales of length and time, and within a high-dimensional parameter space. These time scales may extend well beyond the predicted operating lifetime, and involve degradation, aging, and disposition in a sensitive environment. The material design can build upon combinations of bulk, surface, and structural properties, as well as physical interactions between atomic, electronic, photonic, chemical, and other degrees of freedom.

This is an extraordinarily complex problem that spans multiple scientific fields, but one that pushes the boundaries of material science into new regimes, opening-up new research directions. Clearly, there is a limit to the range of coupling effects and domains that can be simultaneously investigated through a single-investigator effort like the Vannevar Bush fellowship, but this program offers the opportunity to innovate deeply and create the conditions for stimulating future research and development by effecting a transformative advance in our knowledge of materials in specific directions. This may for example take the form of new diagnostics with exquisite precision, accuracy and resolution, which could revolutionize the level of our understanding of material properties and behavior. This may also be a new theoretical framework, or modeling capability that comprehensively and predictively provides a much deeper understanding of the material, at various scales and levels of structural organization.

Novel conceptual approaches to synthesis and manufacturing are also much needed to build at scale and implement these novel capabilities at a very fundamental level, embedding the properties, dynamics, and information within the material, for producing material elements and artificial structures of unimaginable complexity and performance. These may leverage processes with carefully tailored external control, to self-assembly and growth approaches with intrinsic parameters, pre-designed for providing the rules of atomic, molecular or nanoscale assembly. Such approaches have an extraordinary potential for creating new materials and properties via multi-scale combinatorial complexity, and lead to exponential growth in material discovery. Another important question is whether there are fundamental limits to the controlled synthesis of such materials, from an information-theoretic perspective, or engineering constraints, given the possibility of defects and impurities, and how to circumvent current impediments.

This VBFF program seeks unparalleled, original ideas in all these fields, beyond the state of the art in material and structural science, that can revolutionize our understanding and predictive capability at all scales, and that can generate new classes of materials with extraordinary combinations of physical characteristics.

8. Area 8: Soft Materials and Multiscale Structures

New material properties are also expected to emerge via the design and control of spatial and hierarchical architectures. By carefully controlling manufacturing parameters, from micrometers down to nanometers or even atomic scales, materials with exceptional bulk properties can be obtained. These include for example, super-lattices (e.g., Moire), heterogeneous assemblies of low-dimensional structures (2D or 1D), quantum dots, nanoparticles, or ordered arrays of nano-holes, but other and novel forms of multi-scale structural ordering, from which unexpected properties might emerge, are of potential interest as well. Such materials and structures have already found unique

applications, e.g., as meta-materials which can manipulate light in exquisite fashion for imaging, communication, or coupling amplification. Such structures and properties are also found in natural and organic materials, the result of complex sequences of bio-chemical processes during growth and embryonic development in plants and animals. This provides an opportunity for transformative advances in the creation and design of materials and complex structures with unique properties, reaching well beyond the traditional manufacturing approaches, inorganic compounds, and compositions.

These materials can be in various forms: rigid and with extreme strength and toughness, or flexible, morphing, and adaptive to multiple environmental constraints; a combination of manufactured and living matter, or components derived from processes found in natural organisms, in their physiology and their biology. Of particular interest is the ab-initio design of materials with tailored combinations of physical characteristics, such as thermal and transport properties, chemical reactivity, mechanical strength, optical or electromagnetic responses, etc.
These could lead to innovative sensing methodologies, accessing new spectral and dynamic regimes, fusing and synthesizing multi-model information, performing computation in the material and structure itself, providing automatic and reflexive control and adaptation. Such novel properties, integrated with power and control structures, may thus lead to revolutionary approaches to "soft"-robotics, where mechanical and dynamical properties, as well as sensory mechanisms and intelligence are embedded in the materials and structures. All these applications are of extreme interest to the DoD.

Dynamic behavior can also be integrated in this ab-initio design process for far-from-equilibrium effects, extreme non-linearities, and/or ultra-fast control. Structural and physico-chemical dynamics can lead to new capabilities in materials that can rapidly adapt to external stimuli, demonstrate geometric and topological transformations, or control phase change, towards radically new concepts of operation and platform designs, and means of survivability under extreme environmental conditions. The latter are an essential aspect of the problem, in what is essentially an open system, as they can be changing very rapidly, even in discontinuous fashion, creating significant challenges in the design of these materials and structures.

"Soft" materials are of special interest in this topic, whether organic or inorganic, biochemical or abiotic, or mixtures of all. The complexity of their rheological properties, and especially their potential controllability, whether programmed or as direct response to external stimuli, may open new approaches to the engineering of materials and structures. The design and optimization of their phase diagrams can yield devices with remarkable, life-like mechanical properties or novel forms of energy storage, thermal control, camouflage, or other applications of high interest. Programmed assembly and de-assembly at the molecular or nanoscopic scales can be a function of intrinsic variables, time, or specific environmental conditions. For example, one could potentially create materials that are solid or soft, yet induced to flow like liquids, diffuse or concentrate, create networks, chemically react, absorb molecules, or grasp objects like artificial versions of macrophages. In combination with novel electro-optical characteristics such as the ones described earlier in this topic, controllable soft materials can yield an entirely new spectrum of material types and properties with applications that have yet to be discovered.

These desired outcomes present formidable challenges, but also many opportunities for exploration. For example, how can self-assembly be programmed into the material design parameters? Can

biological and bio-chemical processes be leveraged to build the material across multiple structural length scales? Evolution has produced biomaterials and organisms with exceptional properties, and a natural question then becomes whether a similar process can be used in the material design process, accelerated a billion-fold, and even embedded into the material itself for environmental adaptation (e.g., evolutionary by design). Extreme biomimetic approaches may have the potential to generate materials with complex structures, realizing artificial systems indistinguishable or superior to natural ones. To achieve these objectives, comprehensive approaches and unifying theories are also desired, in order to formulate predictive design rules that would replace accidental discovery.

This topic is particularly looking for highly innovative, high-risk but high-reward ideas that have the potential to realize these visionary outcomes and create new fields of materials science.

9. Area 9: Other Fields of Research

The list of subjects provided above is by no means a comprehensive list of topics for which white papers and proposals may be accepted. Proposed research in all areas of relevance to DoD will be considered, including topics that are clearly multi-disciplinary and do not fit well with the descriptions above, as long as there is a transformative science problem to be investigated and whose solution may open new ways of thinking about the phenomena being studied. For example, fluid dynamics and plasma dynamics are absent in the topics above, yet remain core areas of high importance for their potential applications. All issues regarding information, its availability, security, capacity and speed, are of critical interest to all conventional domains of warfare, and if not already addressed in other topic areas, may possibly be relevant here. Other subjects may be proposed under this category as well, including topics are completely new and appear under-represented in the DoD's research enterprise, as long as applicants can ensure that they propose to conduct fundamental and transformative research, and can reasonably argue that it may lead to potential benefits in the long term for issues pertinent to National Defense.

B. Federal Award Information

1. Eligibility for Competition

Proposals for supplementation of existing projects are **not eligible** to compete with applications for new Federal awards under this FOA.

2. Contracted Fundamental Research

With regard to any restrictions on the conduct or outcome of work funded under this FOA, ONR will follow the guidance on and definition of "contracted fundamental research" as provided in the Under Secretary of Defense (Acquisition, Technology and Logistics) Memorandum of 24 May 2010. The memorandum can be found at https://www.acq.osd.mil/dpap/dars/pgi/docs/2012-D054%20Tab%20D%20OUSD%20(ATL)%20memorandum%20dated%20May%2024%202010.pdf. As defined therein the definition of "contracted fundamental research," in a DoD contractual context, includes research performed under grants and contracts that are (a) funded by RDT&E Budget Activity 1

(Basic Research), whether performed by universities or industry or (b) funded by Budget Activity 2 (Applied Research) and performed on campus at a university.

Pursuant to DoD policy, research performed under grants and contracts that are (a) funded by Budget Activity 2 (Applied Research) and NOT performed on-campus at a university or (b) funded by Budget Activity 3 (Advanced Technology Development) or Budget Activity 4 (Advanced Component Development and Prototypes) does not meet the definition of "contracted fundamental research." In conformance with the USD (AT&L) guidance and National Security Decision Directive 189 found at https://fas.org/irp/offdocs/nsdd/nsdd-189.htm, ONR will place no restriction on the conduct or reporting of unclassified "contracted fundamental research," except as otherwise required by statute, regulation or executive order. The research shall not be considered fundamental in those rare and exceptional circumstances where the applied research effort presents a high likelihood of disclosing performance characteristics of military systems or manufacturing technologies that are unique and critical to defense, and where agreement on restrictions have been recorded in the contract or grant. For certain research projects, it may be possible that although the research being performed by the prime contractor is restricted research, a subcontractor may be conducting "contracted fundamental research." In those cases, it is the prime contractor's responsibility in the proposal to identify and describe the subcontracted unclassified research and include a statement confirming that the work has been scoped, negotiated, and determined to be fundamental research according to the prime contractor and research performer.

Normally, fundamental research is awarded under grants with universities and under contracts with industry. Non-fundamental research is normally awarded under contracts and may require restrictions during the conduct of the research and DoD pre-publication review of such research results due to subject matter sensitivity. Potential applicants should consult with the appropriate DoD Technical POCs to determine whether the proposed effort would constitute fundamental or non-fundamental research.

3. Funded Amount and Period of Performance

It is anticipated that awards will be made in the form of grants to U.S. institutions of higher education (IHE) (universities). It is anticipated an individual maximum award value will be $3 million for five (5) years, with the actual amount contingent on availability of funds.

There is no guarantee that any of the proposals submitted in a particular scientific area will be recommended for funding, and more than one proposal may be recommended for funding for a particular area. The Government reserves the right to select for negotiation some, one, or none of the proposals received in response to this announcement.

- Total Amount of Funding Available: $24 million to $30 million
- Anticipated Number of Awards: 8 to 10
- Anticipated Range of Individual Award Amounts: $3 million
- Previous Year(s) Average Individual Award Amounts: $3 million
- Anticipated Period of Performance: 5 years

4. Instrument Type

In response to this FOA, ONR intends to award **grants only**.

Any assistance instrument awarded under this announcement will be governed by the award terms and conditions that conform to DoD's implementation of Office of Management and Budget (OMB) guidance applicable to financial assistance. The DoD Terms and Conditions are located at https://www.nre.navy.mil/work-with-us/manage-your-award/manage-grant-award/grants-terms-

conditions

a. *Grant:* A legal instrument consistent with 31 U.S.C. 6304, is used to enter into a relationship:
- The principal purpose of which is to transfer a thing of value to the recipient to carry out a public purpose of support or stimulation authorized by a law or the United States, rather than to acquire property or services for the Federal Government's direct benefit or use.
- Substantial involvement is not expected between the Federal Government and the recipient when carrying out the activity contemplated by the grant.
- No fee or profit is allowed.

C. Eligibility Information

1. Eligible Institutions

Only accredited U.S. institutions of higher education (universities) with doctoral degree-granting programs are eligible to apply. DoD institutions are not eligible to apply.

Historically Black Colleges and Universities (HBCUs) and Minority Institutions (MIs) are encouraged to submit proposals and join others in submitting proposals. However, no portion of this FOA will be set aside for HBCU and MI participation, due to the impracticality of reserving discrete or severable items of this research for exclusive competition among such entities.

Non-profit and for-profit organizations may collaborate on proposed research and may receive VBFF funds via subaward or subcontract. However, the VBFF program is oriented towards funding research at universities. Universities must perform the majority of the proposed work and receive the majority of funds. Although collaborators are allowed, the VBFF is a single-investigator award and the proposal and management plan should reflect this intent. It is expected that the fraction of the budget paid to collaborators would amount to no more than 20% of the total requested funding over the entire 5 years space of the proposed research. There is no restriction on unpaid collaborators. While expenses related to equipment purchase or assembly are not given a fixed limit, excessively large budgets dedicated to that purpose will require exceptional justification, and may otherwise be viewed as detrimental to the purposes of the program, as described in Section II.A.

Government agencies, DoD laboratories and universities, and Federally Funded Research and Development Centers (FFRDCs) may collaborate on proposed research but may not receive VBFF funds, directly or via subaward.

Grants to a university may be terminated if the principal investigator (PI) severs connections with the university or is unable to continue active participation in the research. Grants to a university may also be terminated if the university severs connections with the PI.

2. Eligible Individuals

Faculty with tenure at the time of proposal submission, with a record of substantial scientific contributions and the skills, knowledge, and resources necessary to conduct the proposed research as the principal investigator (PI), are invited to submit an application. The PI must be a U.S. citizen or permanent resident. Under some conditions, applicants can have a dual-appointment with other

domestic or foreign Universities, as well as non-eligible institutions such as a FFRDC. The applicants are encouraged to consult with the VBFF Program Director if unsure of their eligibility. In such cases, the time dedicated to the effort by the PI, and the associated salary, must be fully accounted for by the employing and eligible University, and reflected in the submitted management and budget plans. Applicants will be required to guarantee their eligibility at the time of proposal submission.

3. Other Eligibility Criteria

- Number of Applications: The PI may submit only one (1) application in response to this FOA. There is no limit to the number of applications that an institution may submit.

- Number of PIs: Only one (1) PI may be designated on the application. While collaborations are encouraged, co- PIs are not permitted. The lead investigator must direct the work. A collaboration may be achieved at the PI's institution or via a subaward to another institution that must satisfy the eligibility requirements and constraints described above. If the PI envisions the need for such a collaboration, or more than one collaboration, the PI must explain how the proposed team fits the single PI structure, and must include in the proposal letters from the collaborators that indicate their commitment to supporting the proposed research, including manpower availability, equipment usage and/or co-funding if applicable.

- **The intent of the VBFF program is to engage PhD students in the VBFF research under the direction of the Fellow, therefore the PI's home department should be PhD-granting.**

- Resubmissions: Applicants invited to submit full proposals who have submitted Recommendation Letters (see Sections D.6) for the VBFF program in a prior year must obtain and submit new letters. Previously submitted letters will not be retrieved. Documents dated prior to the posting date of this FOA will not be accepted.

4. Cost Sharing or Matching

Cost sharing is not expected and will not be used as a factor during the merit review of any application hereunder. However, the Government may consider voluntary cost sharing if proposed.

D. Application and Submission Information

1. Address to Request Application Package

This FOA may be accessed from the sites below. Amendments, if any, to this FOA will be posted to these websites when they occur. Interested parties are encouraged to periodically check these websites for updates and amendments.

- Grants.gov (www.grants.gov)
- ONR website (https://www.nre.navy.mil/work-with-us/funding-opportunities)

2. Content and Form of Application Submission

a) General Information

All submissions will be protected from unauthorized disclosure in accordance with applicable law and DoD/DoN regulations. Applicants are expected to appropriately mark each page of their submission that contains proprietary information.

Titles given to the submissions should be descriptive of the work they cover and not be merely a copy of the title of this announcement.

b) Application and Submission Process

The application process is completed in three stages:

(1) Online registration via RunGrants https://dod-basicresearch.nvision.noblis.org/program/vbff (REQUIRED)
(2) White Papers and Supporting Documentation submission via RunGrants (https://dod-basicresearch.nvision.noblis.org/program/vbff) (REQUIRED)
(3) Full proposal submission via grants.gov (by invitation only) and Confidential Letters of Recommendation (REQUIRED) via email to Ms. Paula Barden at paula.d.barden.ctr@us.navy.mil.

Full proposal submission is by invitation only, after review and selection of the submitted White Papers. If an Applicant does not register and submit a White Paper and Supporting Documentation before the due dates and times, the Applicant will not be eligible to participate in the remaining Full Proposal submission process and is not eligible for funding.

c) White Papers

Individual PIs must submit a Cover Page, Abstract, Basic Research Statement, White Paper, and Curriculum Vitae (CV). All documents must be submitted in PDF format in compliance with the guidelines below. When submitting the documents, the PI must upload the Cover Page, Abstract, Basic Research Statement, White Paper and CV as one PDF file.

i. Format

- Paper size – 8.5x11-inch
- Margins – 1 inch
- Spacing – single-spaced
- Font – Times New Roman, 12-point

ii. Content

(a) Cover page: Include the PI's name and university. Include a protective legend for proprietary information, if applicable.

(b) Abstract (not to exceed 300 words): Describe the research objective, technical approaches, and anticipated outcome of the specific research. A non-proprietary version of the abstract must be submitted without other restrictions. The non- proprietary abstract must be a version that is releasable to the public under the Freedom of Information Act without changes.

(c) Basic Research Statement (one (1) page limit, single-sided): Describe how the proposed research meets the DoD definition of basic research provided Section II. A. Program Description

of this announcement. Describe the extraordinary outcomes that may be achieved as a result of the proposed project.

(d) Subject Research: Identify anticipated human or animal subject research (where applicable).

(e) White paper (four (4) page limit, single-sided): Describe the basic scientific or technical research to be undertaken. Describe the technical approach. Summarize the state of the field and describe what is innovative about the proposed approach. Assuming a successful completion of the course of investigation, what results, new knowledge, or insights might it afford compared to alternate approaches other researchers in this field have taken. Include approximate yearly costs for the project in a brief statement. Reference citations are not required but may be included within the four-page limit, and can be inserted as footnotes. If used, figures are also part of the page limit.

(f) PI's Curriculum Vitae (CV) (no page limit) -The CV should include relevant experience, publications, and funding received in the area of interest, and any previous involvement and experiences with the DoD. List all previous DoD funding including project titles within the last eight years.

iii. Submissions

White papers MUST be submitted through RunGrants. The RunGrants online registration portal opens on 03 July 2023: https://dod-basicresearch.nvision.noblis.org/program/vbff. All applicants must register on the RunGrants websitein order to submit a white paper. Registration is needed to facilitate communication with the applicant, if needed. . Each applicant must provide the following information at the time of registration:

- PI's name, title, department, educational institution, phone number, and e-mail address.
- Title of the PI's proposed research topic.
- Technical subject category most appropriate for the proposed research from the list in Section II. A. Program Description. The applicant has the opportunity to also indicate on the white paper or full proposal a secondary category (and only one), in the case of a multi-disciplinary project. See more information below.

IMPORTANT NOTE: Applicants who registered in a prior competition may have to update information and login credentials.

When submitting the White Paper, the PI must also provide the title of the proposed research project, contact information (name, e-mail address, and phone number) for the Sponsored Programs Office at the university, and indicate whether he or she is a US citizen or permanent resident and a tenured faculty. In addition, the PI must select one or two (primary and secondary) scientific subject categories considered most appropriate for the proposed research from the list given in Section II. A, Program Description. If more than one, the PI must clearly indicate which is primary and which is secondary. This category designation will assist VBFF staff in assigning applications to appropriate reviewers. However, this assignment is ultimately done at the discretion of the VBFF Program Director and according to the content of the submission, in order to obtain the most accurate technical evaluations from the expert panels.

The applicant is responsible for allowing enough time to complete the registration, upload the documents and press the submit button before the deadline. An e-mail confirmation will be sent to the applicant upon receipt of the submission. The applicant is strongly encouraged to allow sufficient time prior to the deadline, and to keep the confirmation emails. In case of technical difficulties, the applicant should send an email to dod-basicresearch@noblis.org, describing the situation. Even though all attempts will be made to assure that the site is available and functional, it is the ultimate responsibility of the applicants to plan their submission well in advance in order to avoid circumstances in which the site is not available or slow, due to high service demands.

d) Full Proposals

If invited, applicants must submit a full proposal to grants.gov, and must complete the mandatory forms in accordance with the instructions provided on the forms and the additional instructions below. Files that are attached to the forms must be in Adobe Portable Document Format (.PDF); cannot contain macros; and cannot be password protected. If your attachments are not PDF, contain macros or are password protected, they will not pass ONR's automated acceptance check and will need to be resubmitted. Block 2, "Type of Application" on the SF 424 should be marked "New" on the resubmission.

i. Format for Technical Proposal

- Paper size – 8.5 x 11 inch
- Margins – 1 inch
- Spacing – single-spaced
- Font – Times New Roman, 12-point
- Page Limit – Technical Proposal: **15 pages** (see details below starting on the bottom of page 25)

NOTE: The following components are ***excluded*** from the page limit

EXCLUDED FROM PAGE COUNT
Cover page
Table of Contents
Curriculum Vitae
Letters of Support/Recommendation
Management Approach
PI time
Responsibility
Data Management Plan
References Cited
Current and Pending Support
Facilities, Equipment, and Other Resources

There are no page limitations for the budget.

ii. Content

NOTE: The electronic file name for all documents submitted under this FOA must not exceed 68 characters in length, including the file name extension.

Mandatory SF-424 Research and Related (R&R) Family Forms

The mandatory forms are found at https://www.grants.gov/web/grants/forms.html

(1) SF-424 (R&R)

The SF-424 (R&R) form must be used as the cover page for all proposals. Complete all required fields in accordance with the "pop-up" instructions on the form and the following instructions for specific fields. Please complete the SF-424 first, as some fields on the SF-424 are used to auto-populate fields on other forms. Guidance: https://www.grants.gov/web/grants/forms/r-r-family.html.

The completion of most fields is self-explanatory with the exception of the following special instructions:

- Field 3 - Date Received by State: Leave Blank
- Field 4a - Federal Identifier: For new proposals, enter N00014.
- Field 4b - Agency Routing Number: Enter 340 [Williams, Reginald]
- Field 4c - Previous Grants.gov Tracking ID: If this submission is for a Changed/Corrected Application, enter the Grants.gov tracking number of the previous proposal submission; otherwise, leave blank.
- Field 5 – Application Information: Email address entered by the grantee on the SF424 application to create the EDA notification profile. ONR recommends that organizations provide a global business address.
- Field 7 - Type of Applicant. Complete as indicated: If the organization is a Minority Institution, select "Other" and under "Other (Specify)" note that the institution is a Minority Institution (MI).
- Field 9 - Name of Federal Agency: List the Office of Naval Research as the reviewing agency. This field is pre-populated in Grants.gov.
- Field 11 – Descriptive Title of Applicant's Project
- Field 14 – Project Director/Principal Investigator: Email address entered by the grantee on the SF424 application to create the EDA notification profile
- Field 16 - Is Application Subject to Review by State Executive Order 12372 Process? Choose "No". Check "Program is Not Covered by Executive Order 12372."
- Field 17 – Certification: All awards require some form of certifications of compliance with national policy requirements. By checking "I Agree" on the SF 424 (R&R) block 17 you agree to abide by the following statement: "By signing this application, I certify (1) to the statements contained in the list of certifications and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or

fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. code, Title 218, Section 1001).

- Field 19 – Authorized Representative: Email address entered by the grantee on the SF424 application to create the EDA notification profile.

(2) PROJECT/ABSTRACT

The project summary/abstract must identify the research problem and objectives, technical approaches, anticipated outcome of the research, if successful, and impact on DoD capabilities. Use only characters available on a standard QWERTY keyboard. Spell out all Greek letters, other non-English letters, and symbols. Graphics are not allowed and there is a one page or 4,000-character limit (including spaces), whichever is less.

Do not include proprietary or confidential information. The project summary/ abstract must be marked by the applicant as "Approved for Public Release". Abstracts of all funded research projects will be posted on the public DTIC website: https://dodgrantawards.dtic.mil/grants

(3) RESEARCH AND RELATED OTHER PROJECT INFORMATION

- Fields 1 and 1a – Human Subject Use: Each proposal must address human subject involvement in the research by completing Fields 1 and 1a of the R&R Other Project Information form. For proposals containing activities that include or may include "research involving human subject" as defined in DoDI 3216.02, prior to award, the Applicant must submit the required documentation under "Use of Human Subjects in Research" (Section F).

- Fields 2 and 2a – Vertebrate Animal Use: Each proposal must address animal use protocols by addressing Fields 2 and 2a of the R&R Other Project Information form. See Section II.F.2.b.i. for more information.

- Fields 4a through 4d – Environmental Compliance: Address these fields and briefly indicate whether the intended research will result in environmental impacts outside the laboratory, and how the applicant will ensure compliance with environmental statutes and regulations.

  Federal agencies making grant or cooperative agreement awards and recipients of such awards must comply with all applicable environmental planning and regulatory compliance requirements. The National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. § 4321 et seq. for example, requires that agencies consider the environmental impact of "major Federal actions" prior to any final agency decision. With respect to those awards which constitute "major Federal actions," as defined in 40 CFR 1508.18, federal agencies may be required to comply with NEPA and prepare environmental planning documentation such as an environmental impact statement (EIS), even if the agency does no more than provide grant funds to the recipient. Most field research funded by ONR, however, constitute activities covered by a NEPA categorical exclusion that do not require preparation of further environmental planning documentation. This is particularly true with regard to basic and applied scientific research conducted entirely within the confines of a laboratory, if the research complies with all other applicable safety, environmental and natural resource conservation laws. Questions regarding NEPA or other environmental planning or regulatory compliance issues should be referred to the technical point of contact.

- Field 7 – Project Summary/Abstract: Leave Field 7 blank; complete Form SF 424 Project Abstract. If an error message occurs when leaving Block 7 blank, upload the Project Abstract.

- Field 8 – Project Narrative: Clearly describe the research, including the objective and approach to be performed, keeping in mind the evaluation criteria. Attach the entire proposal narrative to R&R Other Project Information form in Field 8. To attach a Project Narrative to Field 8, click on "Add attachment" and attach the technical proposal as a single PDF file. Save the file as "Technical Proposal" as typing in the box is prohibited.

  The technical proposal must describe the research in sections as described below:

  - **Cover Page (not included in page limit):** This must include the words "Technical Proposal" and the following:
    - FOA Number: N00014-23-S-F006;
    - Title of proposal;
    - Identity of prime applicant and complete list of subawardees, if applicable;
    - Certification of tenure by prime applicant
    - Technical contact (name, address, phone/fax, electronic mail address);
    - Administrative/business contact (name, address, phone/fax, electronic mail address);
    - Proposed period of performance (identify both the base period and options, if included);
    - Total proposed budget

  - **Table of Contents (not included in page limit):** An alphabetical/numerical listing of the sections within the proposal, including corresponding page numbers.

  - **Statement of Objectives (limited to one (1) page):** Summarize the actual research to be completed, including goals and objectives, on one page titled Statement of Objectives. This statement of objectives may be incorporated into the award instead of the entire technical proposal. Active verbs should be used in this statement (for example, "conduct" research into a topic, "investigate" a problem, "determine" to test a hypothesis). It should not contain proprietary information.

  - **Technical Approach/Research Effort (15-page limit):** Describe the basic scientific or technical concepts that will be investigated, providing the complete research plan. Describe what is innovative about the proposed approach. Provide the proposed approach compared to alternate approaches other researchers in the field have taken. Given the successful completion, describe the results, new knowledge, or insights.

    - **Future DoD Relevance:** A description of potential DoD relevance and contributions of the effort to the agency's specific mission.
    - **Project Schedule:** A summary of the schedule of events.
    - **Reports:** The following are sample reports that are typically required under a research effort:
      - Technical and Financial Progress Reports
      - Annual Research Performance Progress Report
      - Final Report

  - **Management Approach (excluded from page limit):** Describe the overall management approach and provide rationale for participation of key team members. Describe the

planned relationships with any subawardees or collaborators. This is a single PI award; if there are subawardees or collaborators, explain how the proposed team fits the single PI structure. If appropriate, briefly describe anticipated schedule.

- **Principal Investigator Time (excluded from page limit):** PI time is required, since a high level of PI engagement is critical to the success of this program. The full proposal should include an approximate budget several trips per year to VBFF-related activities, which include attending program reviews (one per year – mandatory), interacting with service lab researchers, and participating in DoD-organized workshops. List the estimate of time the principal investigator and other senior professional personnel will devote to the research. This shall include information pertaining to other commitments of time, such as sabbatical or extended leave; and proportion of time to be devoted to this research and to other research. State the number of undergraduate students, graduate students, and postdoctoral researchers for whom each senior staff member is responsible. If the principal investigator or other key personnel is currently engaged in research under other auspices, or expects to receive support from other agencies for research during the time proposed for VBFF 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. Send any changes in this information as soon as they are known. Submit a short abstract (including title, objectives, and approach) of that research and total amount of support for both current and pending research projects.

- **Responsibility (excluded from page limit):** Applicants must provide the following information to ONR in order to assist in ONR's evaluation of the applicant's responsibility:

    - Describe how you have adequate resources or the ability to obtain such resources as required to complete the activities proposed.
    - Describe how you have the ability to comply with the grant conditions, taking into account all existing and currently prospective commitments of the applicant, nongovernmental and governmental.
    - Describe your performance history; specifically, your record in managing Federal awards and the extent to which any previously awarded amounts will be expended prior to future awards.
    - Describe your record of integrity and business ethics.
    - Describe qualifications and eligibility to receive an award under applicable laws and regulations.
    - Describe your organization, experience, accounting, and operational controls and technical skills, or the ability to obtain them (including as appropriate such elements as property control systems, quality assurance measures, and safety programs applicable to the efforts to be performed).

- **Data Management Plan (excluded from page limit):** A data management plan is a document that describes which data generated through the course of the proposed research will be shared and preserved, how it will be done, or explains why data sharing or preservation is not possible or scientifically appropriate, or why the costs of sharing or preservation are incommensurate with the value of doing so. See also: DoD Instruction 3200.12.

    - In no more than 2 pages, discuss the following:

- The types of data, software, and other materials to be produced.
- How the data will be acquired.
- Time and location of data acquisition, if 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.
- A description of dataset origin when existing data resources are used.
- A description of the standards to be used for data and metadata format and content.
- Appropriate timeframe for preservation.
- The plan may consider the balance between the relative value of data preservation and other factors such as the associated cost and administrative burden. The plan will provide a justification for such decisions.
- A statement that the data cannot be made available to the public when there are national security or controlled unclassified information concerns (e.g., "This data cannot be cleared for public release in accordance with the requirements in DoD Directive 5230.09.")"

- Field 9 – Bibliography & Referenced Cited: Upload your Bibliography/Referenced cited as a single PDF.

- Field 10 – Facilities & Other Resources: Describe facilities available for performing the proposed research and any additional facilities the applicant proposes to acquire at its own expense. Indicate government-owned facilities already possessed that will be used. (Additional equipment will not be provided unless the research cannot be completed by any other practical means.)

- Field 11 – Equipment: Describe any equipment available or any additional equipment the application proposes to acquire at its own expense. Indicate government owned equipment that will be use. Justify the need for each equipment item. (Additional equipment will not be provided unless the research cannot be completed by any other practical means.)

- Field 12 – Other Attachments: Optional, as necessary

Grants do not include the delivery of software, prototypes or other hardware deliverables.

(4) RESEARCH AND RELATED BUDGET

The applicant must use the Grants.gov forms (including the Standard Form (SF) Research and Related (R&R) Budget Form) from the application package template associated with the FOA on the Grants.gov web site located at http://www.grants.gov/. If options are proposed, the cost proposal must provide the pricing information for the option periods; failure to include the proposed costs for the option periods will result in the options not being included in the award.

The applicant shall provide a detailed cost breakdown of all costs, by cost category
A separate Adobe .pdf document shall be included in the application that provides appropriate justification and/or supporting documentation for each element of cost proposed. This document shall be attached under Section K. "Budget Justification" of the Research and Related Budget form. Click "Add Attachment" to attach.

Part 1: The itemized budget should include the following. All costs should be rounded to the nearest dollar.

- Direct Labor – Individual labor categories or persons, with associated labor hours and unburdened direct labor rates. Provide escalation rates for out years.

- Administrative and Clerical Labor – Salaries of administrative and clerical staff are normally indirect costs (and included in an indirect cost rate). Direct charging of these costs may be appropriate when a major project requires an extensive amount of administrative or clerical support significantly greater than normal and routine levels of support. Budgets proposing direct charging of administrative or clerical salaries must be supported with a budget justification which adequately describes the major project and the administrative and/or clerical work to be performed.

  Fringe Benefits and Indirect Costs (Facilities and Administration (F&A), Overhead, G&A, etc.) – The proposal should show the rates and calculation of the costs for each rate category. If the rates have been approved/negotiated by a Government agency, provide a copy of the memorandum/agreement. If the non-Federal entity has never received a negotiated indirect cost rate, they may elect to charge a de minimis rate of 10% of modified total direct costs or provide sufficient detail to enable a determination of allowability, allocability and reasonableness of the allocation bases, and how the rates are calculated. See 2 CFR 200.414(f) regarding the use of a de minimis rate.

- Travel – The proposed travel cost **must** include the following for each trip: the purpose of the trip, origin and destination if known, approximate duration, the number of travelers, and the estimated cost per trip must be justified based on the organizations historical average cost per trip or other reasonable basis for estimation. Such estimates and the resultant costs claimed must conform to the applicable Federal cost principles. Applicants may include travel costs for the Principal Investigator to attend the annual peer reviews described in Section II of this FOA.

- Subawards/Subcontracts – Provide a description of the work to be performed by the subrecipient/subcontractor. For each subaward, a detailed cost proposal is required to be submitted by the subrecipient(s). A proposal and any supporting documentation must be received and reviewed before the Government can complete its cost analysis of the proposal and enter negotiations. The subaward/subcontractor budget justification **must** have the name of the subaward/subcontractor entity at the top.

  ONR's preferred method of receiving subcontract information is for this information to be included with the Prime's proposal. However, a subcontractor's cost proposal can be provided in a sealed envelope with the recipient's cost proposal or via e-mail directly to the ONR Program Officer at the same time the prime proposal is submitted. The e-mail should identify the proposal title, the prime applicant and that the attached proposal is a subcontract.

- Consultants – Provide a breakdown of the consultant's hours, the hourly rate proposed, and any other proposed consultant costs, a copy of the signed Consulting Agreement or other documentation supporting the proposed consultant rate/cost, and a copy of the consultant's proposed statement of work if it is not already separately

identified in the prime applicant's proposal.

- Materials & Supplies – Provide an itemized list of all proposed materials and supplies including quantities, unit prices, and the basis for the estimate (e.g., quotes, prior purchases, catalog price lists).

- Recipient Acquired Equipment or Facilities – Equipment and/or facilities are normally furnished by the Recipient. If acquisition of equipment and/or facilities is proposed, a justification for the purchase of the items must be provided. Provide an itemized list of all equipment and/or facilities costs and the basis for the estimate (e.g., quotes, prior purchases, catalog price lists). Allowable items normally are limited to research equipment not already available for the project. General purpose equipment (i.e., equipment not used exclusively for research, scientific or other technical activities, such as personal computers, laptops, office equipment) should not be requested unless they will be used primarily or exclusively for the project. For computer/laptop purchases and other general purpose equipment, if proposed, include a statement indicating how each item of equipment will be integrated into the program or used as an integral part of the research effort. Applicants must provide vendor quotes for any proposed capital equipment costs.

- Other Direct Costs – Provide an itemized list of all other proposed other direct costs such as Graduate Assistant tuition, laboratory fees, report and publication costs, and the basis for the estimate (e.g., quotes, prior purchases, catalog price lists).

- Fee/Profit – Fee/profit is unallowable under assistance agreements at either the prime or subaward level but may be permitted on contracts issued by the prime awardee.

(5) RESEARCH AND RELATED SENIOR/KEY PERSON PROFILE (EXPANDED)

To evaluate compliance with Title IX of the Education Amendments of 1972 (20 U.S.C.A § 1681 Et. Seq.), the Department of Defense is collecting certain demographic and career information to be able to assess the success rates of women who are proposed for key roles in applications in 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.

The R&R Senior/Key Person Profile (Expanded) form will be used to collect the following information for all senior/key personnel, including Project Director/Principal Investigator and Co-Project Director/Co-Principal Investigator, whether or not the individuals' efforts under the project are to be funded by the DoD:

- Degree Type and Degree Year fields as the source for career information.

- Current and Pending Support shall include a list of all current projects the individual is working on, in addition to any future support the individual has applied to receive, regardless of the source. Upload this document by clicking "Add Attachment." The following information shall be included for each current or pending project:
    - Title and objectives

- The percentage per year to be devoted to the other projects
- The total amount of support the individual is receiving in connection to each of the other research projects or will receive if the other proposals are awarded
- Name and address of the agencies and/or other parties supporting the other research projects
- Period of performance for the other research projects

- Upload the biosketch/CV/resume to the Biographical Sketch field. A full CV is required for the PI; all other Senior/Key Personnel CVs are limited to 3 pages per CV.

Additional senior/key persons can be added by selecting the "Next Person" button. Note that, although applications without these fields completed may pass Grants.gov edit checks, if ONR receives an application without the required information, ONR may determine that the application is incomplete and may cause it to be returned without further review. DoD reserves the right to request further details from the applicant before making a final determination on funding the effort.

(6) RESEARCH AND RELATED PERSONAL DATA

This form will be used by ONR as the source of demographic information, such as gender, race, ethnicity, and disability information for the Project Director/Principal Investigator and all other persons identified as Co-Project Director(s)/Co-Principal Investigator(s). Each application must include this form with the name fields of the Project Director/Principal Investigator and any Co-Project Director(s)/Co-Principal Investigator(s) completed; however, provision of the demographic information in the form is voluntary. If completing the form for multiple individuals, each Co-Director/Co-Principal Investigator can be added by selecting the "Next Person" button. The demographic information may be accessible to the reviewer, but will not be considered in the evaluation. Applicants who do not wish to provide some or all of the information should check or select the "Do not wish to provide" option.

3. Unique Entity Identifier and System for Award Management (SAM)

All applicants submitting proposals or applications **must**:

- Be registered in SAM prior to submission;
- Maintain an active SAM registration with current information at all times during which it has an active Federal award or an application under consideration by any agency;
- Complete the Financial Assistance Certification Report (Grants Certification); and
- Provide its UEI/DUNS number in each application or proposal it submits to the agency.

SAM may be accessed at https://www.sam.gov/SAM

4. Submission Dates and Times

See Section A.6 above, "Key Dates" for information.

5. Funding Restrictions

Section 889 of the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2019

Section 889 of the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2019 (Public Law 115-232) prohibits the head of an executive agency from obligating or expending loan or grant funds to procure or obtain, extend, or renew a contract to procure or obtain, or enter into a contract (or extend or renew a contract) to procure or obtain the equipment, services, or systems prohibited systems as identified in section 889 of the NDAA for FY 2019.

1. In accordance with 2 CFR 200.216 and 200.471, all awards that are issued on or after August 13, 2020, recipients and subrecipients are prohibited from obligating or expending loan or grant funds to:

   (1) Procure or obtain;
   (2) Extend or renew a contract to procure or obtain; or
   (3) Enter into a contract (or extend or renew a contract) to procure or obtain equipment, services, or systems that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system. As described in Public Law 115-232, section 889, covered telecommunications equipment is telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities).

   (i) For the purpose of public safety, security of government facilities, physical security surveillance of critical infrastructure, and other national security purposes, video surveillance and telecommunications equipment produced by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities).
   (ii) Telecommunications or video surveillance services provided by such entities or using such equipment.
   (iii) Telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, in consultation with the Director of the National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a covered foreign country.

2. In implementing the prohibition under Public Law 115-232, section 889, subsection (f), paragraph (1), heads of executive agencies administering loan, grant, or subsidy programs shall prioritize available funding and technical support to assist affected businesses, institutions and organizations as is reasonably necessary for those affected entities to transition from covered communications equipment and services, to procure replacement equipment and services, and to ensure that communications service to users and customers is sustained.

3. See Public Law 115-232, section 889 for additional information.

COVERED FOREIGN COUNTRY means the People's Republic of China.

6. Other Submission Requirements

Grants.gov Application Submission and Receipt Procedures

This section provides the application submission and receipt instructions for the Office of Naval Research (ONR) program applications. Please read the following instructions carefully and completely.

a. **Electronic Delivery**

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

b. **How to Register for Grants.gov**

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

Organizations must have an active System for Award Management (SAM) registration, and Grants.gov account to apply for grants. If individual applicants are eligible to apply for this funding opportunity, then you may begin with step 3, Create a Grants.gov Account, listed below.

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

Complete organization instructions can be found on Grants.gov here:
https://www.grants.gov/web/grants/applicants/organization-registration.html

1) *Register with SAM*: All organizations applying online through Grants.gov must register with the System for Award Management (SAM). Failure to register with SAM will prevent your organization from applying through Grants.gov. SAM registration must be renewed annually. For more detailed instructions for registering with SAM, refer to:
https://www.grants.gov/web/grants/applicants/organization-registration/step-2-register-with-sam.html

2) *Create a Grants.gov Account*: The next step in the registration process is to create an account with Grants.gov. Follow the on-screen instructions or refer to the detailed instructions here at:
https://www.grants.gov/web/grants/applicants/registration.html

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

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

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

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

ii. *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 the Office of Naval Research via Grants.gov

All attachments to grant applications submitted through Grants.Gov must be in Adobe Portable Document Format. Proposals with attachments submitted in word processing, spreadsheet, or any format other than Adobe Portable Document Format will not be considered for award.

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

Below is an overview of applying on Grants.gov. For access to complete instructions on how to apply for opportunities, refer to:
https://www.grants.gov/web/grants/applicants/apply-for-grants.html

1) *Create a Workspace*: Creating a workspace allows you to complete it online and route it through your organization for review before submitting.

2) *Complete a Workspace*: Add participants to the workspace, complete all the required forms, and check for errors before submission.

a. *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 ONR 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

b. *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.

c. *Complete SF-424 Fields First*: The forms are designed to fill in common required fields across other forms, such as the applicant name, address, and DUNS number. 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.

3) *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.

4) *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. (Foreign applicants should contact 1-606-545-5035.) 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 number. The Support Center ticket number will assist ONR with tracking your issue and understanding background information on the issue.

d. Timely Receipt Requirements and Proof of Timely Submission

i. *Online Submission.*

Confidential Letters of Recommendation must be submitted to ONR via e-mail to Ms. Paula Barden at paula.d.barden.ctr@us.navy.mil no later than 5:00 p.m. Eastern Time on 16 February 2024.

All applications must be received by **05:00 PM** Eastern Time on **16 February 2024**. Proof of timely submission is automatically recorded by Grants.gov. An electronic date/time stamp is generated within the system when the application is successfully received by Grants.gov. The applicant AOR will receive an acknowledgement of receipt and a tracking number (GRANTXXXXXXXX) from Grants.gov with the successful transmission of their application. Applicant AORs will also receive the official date/time stamp and Grants.gov Tracking number in an email serving as proof of their timely submission.

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

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

E. Application Review Information

1. Evaluation Criteria

The primary basis for selecting proposals for acceptance will be technical merit, importance to agency programs, and fund availability. To the extent appropriate, cost realism and reasonableness will also be considered when selecting proposals. ONR reserves the right to request and require any additional information and documentation after it makes the type of award instrument determination. ONR reserves the right to remove Applicant's from award consideration when the parties fail to reach agreement on award terms, conditions, and cost/price within a reasonable time, or when the Applicant fails to timely provide requested or required additional information.

The VBFF program seeks to invest in basic research and to identify challenging fundamental scientific areas of investigation that may have potential for long term benefit to DoD. Proposed research should describe cutting-edge efforts on basic scientific problems, and should focus on developing a deep understanding of fundamental phenomena and on innovations that may enable revolutionary advances in scientific knowledge white papers deemed to be applied research, as opposed to basic research, will not advance to the proposal stage of the competition.

Applicant's white papers and full proposals will be evaluated against the following criteria:

(1) Overall scientific and technical merits of the proposal and responsiveness to the topic, i.e., the degree of innovation, soundness of technical concept, Applicant's awareness of the state of the art and understanding of the scope of the problem, significance and originality of the technical approach and effort needed to address/solve the problem, and anticipated scientific impact within the field. The following areas will also be considered:

- This program should be oriented toward research that may lead to extraordinary outcomes such as: revolutionizing entire disciplines, creating entirely new fields, or disrupting accepted theories and perspectives.
- The proposed research should focus on developing a deep understanding of fundamental phenomena and on innovations that may enable revolutionary advances in scientific knowledge.

(2) The principal investigator's qualifications, ability to perform the proposed work, and the overall management approach.

- The PI should have a record of substantial scientific contributions.

(3) Potential relationship of the proposed research to the DoD mission, including the relevance to the Vannevar Bush Faculty Fellowship program objectives and priorities:

- Proposed research should investigate new and unique approaches that may enable revolutionary concepts that are critical to the future success of DoD.
- Education and training of outstanding student and post-doctoral researchers are program objectives. The proposal should have a description of how this is to be accomplished
- Evolutionary improvement to the existing state of practice or near-term tactical improvements are <u>not relevant</u> to this program.

(4) The reasonableness of proposed costs:

- Is the PI's proposed effort commensurate with the scope of the project?
- Is the number of graduate students and post-docs adequate to perform the proposed project?
- Is the travel budget appropriate for program activities?
- Is there proper justification for large capital equipment?

Letters of recommendation (up to three (3)) submitted in the proposal package can be used to help evaluate the principal investigator's qualifications and abilities. The Letters of recommendation **must** be emailed to paula.d.barden.ctr@us.navy.mil. The U.S. Government does not guarantee an award in each research area. Further, be advised that as funds are limited, otherwise meritorious proposals may not be funded.

All, some, one, or none of the applicants may be contacted after the full proposal review process by phone by the Director of the Basic Research Office, USD (R&E) to clarify certain aspects of their proposed research

2. Review and Selection Process

a. Evaluation

White papers and proposals submitted under this FOA are evaluated through a peer or scientific review process. Evaluation will use merit-based competitive procedures according to Department of Defense Grant and Agreement Regulations (DoDGARs) citation of 32 C.F.R Sec 22.315. White papers and proposals will be evaluated by Government personnel and Non-Government reviewers. Non-Government reviewers will include university faculty and staff researchers. Each reviewer is required to sign a conflict-of-interest and confidentiality statement attesting that the reviewer has no known conflicts of interest, and that application and evaluation information will not be disclosed outside the evaluation panel. The names and affiliations of reviewers are not disclosed.

White papers that best fulfill the evaluation criteria will be identified by members of the white paper evaluation panels and recommended to the Assistant Secretary of Defense for Research & Engineering (USD (R&E)). USD (R&E) will invite individual PIs to submit full proposals. Feedback on white papers will be provided to those invited to submit a full proposal, and may also be provided to unsuccessful applicants at the White Paper stage

Proposals that best meet the evaluation criteria will be recommended for funding. The Government reserves the right to select and fund for award some, one, or none of the proposals in response to this announcement.

Employees of commercial firms under contract to USD (R&E) and ONR may be used to process white papers and proposals. By submitting a proposal, applicants consent to allowing access to their proposals by these support contractors, whose contracts include nondisclosure agreements prohibiting contractor employees from disclosing any information submitted by others.

b. Options

The Government will evaluate options for award purposes by adding the total cost for all options to the total cost for the basic requirement. Evaluation of options will not obligate the Government to exercise the

options during contract or grant performance. The Government reserves the right to exercise options at time of award.

c. Evaluation Panel

White papers, technical and cost proposals submitted under this FOA will be protected from unauthorized disclosure. The VBFF Program Director and other Government scientific experts will perform the evaluation of technical proposals. Restrictive notices notwithstanding, one or more support contractors may be utilized as subject-matter-expert technical consultants. However, proposal selection and award decisions are solely the responsibility of Government personnel. Each support contractor's employee having access to technical and cost proposals submitted in response to this FOA will be required to sign the Non-Disclosure Agreement (NDA) for Contractor Support prior to receipt of any proposal submissions. This NDA includes third-party beneficiary language giving the submitter of proprietary information a right of direct action against the contractor employee and/or his/her employer in the event that the NDA is violated.

3. Recipient Qualifications

a. Recipient Qualifications

The Grants Officer is responsible for determining a recipient's qualification prior to award. In general, a Grants Officer will award grant, cooperative agreements, or TIAs only to qualified recipients that meet the standards at 32 CFR 22.415. To be qualified, a potential recipient must:

i. Have the management capability and adequate financial and technical resources, given those that would be made available through the grant or cooperative agreement, to execute the program of activities envisioned under the grant or cooperative agreement;
ii. Have a satisfactory record of executing such programs or activities (if a prior recipient of an award);
iii. Have a satisfactory record of integrity and business ethics; and
iv. Be otherwise qualified and eligible to receive a grant or cooperative agreement under applicable laws and regulations. Applicants are requested to provide information with proposal submissions to assist the Grants Officer's evaluation of recipient qualification.

b. FAPIIS

In accordance with Office of Management and Budget (OMB) guidance in parts 180 and 200 of Title 2, CFR, it is DoD policy that DoD Components must report and use integrity and performance information in the Federal Awardee Performance and Integrity Information System (FAPIIS), or any successor system designated by OMB, concerning grants, cooperative agreements, and TIA's as follows:

If the total Federal share will be greater than the simplified acquisition threshold on and Federal award under a notice of funding opportunity (see 2 CFR 200.88 Simplified Acquisition Threshold):

i. The Federal awarding agency, prior to making a Federal award with a total amount of Federal share greater than the simplified acquisition threshold, will review and consider any information about the applicant that is in the designated integrity and performance system accessible through SAM (currently FAPIIS) (see 41 U.S.C. 2313);

ii. An applicant, at its option, may review information in the designated integrity and performance systems accessible through SAM and comment on any information about itself that a Federal awarding agency previously entered and is currently in the designated integrity and performance system accessible through SAM;
iii. The Federal awarding agency will consider any comments by the applicant, in addition to the other information in the designated integrity and performance system, in making a judgment about the applicant's integrity, business ethics, and record of performance under Federal awards when completing the review of risk posed by applicants as described in 2 CFR 200.205 Federal awarding agency review of risk posed by applicants.

F. Federal Award Administration Information

1. Federal Award Notices

a. Email

All applicants will receive a notification email advising if their proposal has been selected or not selected for award.

Applicants whose proposals are recommended for award may be contacted by a Grant Specialist to discuss additional information required for award. This may include representations and certifications, revised budgets or budget explanations, and/or other information as applicable to the proposed award.

The notification e-mail must not be regarded as an authorization to commit or expend funds. The Government is not obligated to provide any funding until a Government Grants Officer, as applicable, signs the award document.

The award document signed by the Grants Officer is the official and authorizing award instrument.

b. Electronic Document Access (EDA)

Office of Naval Research (ONR) award/modification documents are only available via the Department of Defense (DoD) Electronic Document Access System (EDA) within the Procurement Integrated Enterprise Environment (PIEE) (https://piee.eb.mil/piee-landing/).

2. Administrative and National Policy Requirements

a. Export Control

Applicants should be aware of recent changes in export control laws. Applicants are responsible for ensuring compliance with all U.S. export control laws and regulations, including the International Traffic in Arms Regulation (ITAR)(22 CFR Parts 120 - 130) and Export Administration Regulation (EAR) (15 CFR Parts 730 – 774), as applicable. In some cases, developmental items funded by the Department of Defense are now included on the United States Munition List (USML) (22 CFR Part 121) and are therefore subject to ITAR jurisdiction. In other cases, items that were previously included on the USML have been moved to the EAR Commerce Control List (CCL). Applicants should address in their proposals whether ITAR or EAR restrictions apply to the work they are proposing to perform for ONR.

The ITAR and EAR are available online at http://www.ecfr.gov/cgi-bin/ECFR?page=browse. Additional information regarding the President's Export Control Reform Initiative can be found at https://export.gov/ecr/index.asp.

Applicants must comply with all U.S. export control laws and regulations, including the ITAR and EAR, in the performance of any award or agreement resulting from this FOA. Applicants shall be responsible for obtaining any required licenses or other approvals, or license exemptions or exceptions if applicable, for exports of hardware, technical data, and software (including deemed exports), or for the provision of technical assistance.

b. Requirements Concerning Live Organisms:

i. Use of Animals:

The DoD policies and requirements for the use of animals in DoD-supported research are described in the current version of DoD Instruction 3216.01, Use of Animals in DoD Conducted and Supported Research and Training and its implementing instruction, DHA-MSR 6025.02, "The Care And Use Of Animals In DoD Research, Development, Test, And Evaluation (RDT&E) Or Training Programs," the version of which is current at the time of award. If animals are to be utilized in the research effort proposed, the Applicant must submit a Full Appendix or Abbreviated Appendix (see Guidance link below) with supporting documentation (such as copies of Institutional Animal Care and Use Committee (IACUC) Approval, IACUC Approved Protocol, and most recent United States Department of Agriculture (USDA) Inspection Report) prior to award. For assistance with submission of animal research related documentation, contact the ONR Animal Use Administrator at (703) 696-4318. Guidance: https://www.nre.navy.mil/work-with-us/how-to-apply/compliance-and-protections

ii. Use of Human Subjects in Research:

1. Applicants must protect the rights and welfare of individuals who participate as human subjects in research awarded pursuant to this FOA and must comply with the requirements of the Common Rule at 32 CFR part 219 (the DOD implementation of 45 CFR part 46) and applicable provisions of DoD Instruction 3216.02, Protection of Human Subjects and Adherence to Ethical Standards in DoD-Conducted and -Supported Research (April 15, 2020, the DON implementation of the human research protection program contained in SECNAVINST 3900.39E Change 1, (or its replacement), 10 USC 980 "Limitation on Use of Humans as Experimental Subjects," and when applicable, Food and Drug Administration (FDA) and other federal and state law and regulations.

2. For proposals containing activities that include or may include "research involving human subjects" as defined in DoDI 3216.02, prior to award, the Applicant must submit documentation of:

   (a) Approval from an Institutional Review Board (IRB) (IRB-approved research protocol, IRB-approved informed consent document, documentation showing the IRB considered the scientific merit of the research and other material considered by the IRB); proof of completed human research training (e.g., training certificate

for the principal investigator, and institutional verification that the principal investigator, co-investigators, and research support personnel have received appropriate training to be considered qualified to execute the research); and the Applicant's Department of Health and Human Services (DHHS)-issued Federal Wide Assurance (FWA#), including notifications of any FWA suspensions or terminations.

(b) Any claimed exemption under 32 CFR 219.104), including the category of exemption, supporting documentation considered by the Applicant's institution in making the determination (e.g., protocol, data collection tools, advertisements, etc.). The documentation shall include a short rationale supporting the exemption determination. This documentation should be signed by the IRB Chair or IRB vice Chair, designated IRB administrator or official of the Applicant's human research protection program.

(c) Any determinations that the proposal does not contain activities that constitute research involving human subjects or contains only activities that are deemed not to be research under 32 CFR 219.102(1), including supporting documentation considered by the Applicant's institution in making the determination. This documentation should be issued by the IRB Chair or IRB vice Chair, designated IRB administrator or official of the Applicant's human research protection program.

(d) Documentation must be submitted to the ONR Human Research Protection Official (HRPO), by way of the ONR Program Officer. The HRPO retains final judgment on whether the documentation satisfies the use of human subjects in research requirements. For assistance with submission of human subject research related documentation, contact the ONR Human Research Protection Official (HRPO) at (703) 696-4318.

(e) Grant awards and any subawards or modifications will include a statement indicating successful completion of the HRPO review. Research involving human subjects must not be commenced under any contract award or modification or any subcontract or grant subaward or modification until awardee receives notification from the Contracting or Grants Officer that the HRPO has approved the assurance as appropriate for the research under the award or modification and that the HRPO has reviewed the protocol and accepted the IRB approval or determination for compliance with Federal, DoD and DON research protection requirements. The Government will not reimburse or otherwise pay for work performed in violation of this requirement. See, DFARS 252.235-7004. Guidance: https://www.nre.navy.mil/work-with-us/how-to-apply/compliance-and-protections/research-protections/human-subject-research.

c. Biosafety and Biosecurity Requirements:

Applicants must comply with applicable provisions of the current version of DODM 6055.18, Safety Standards for Microbiological and Biomedical Laboratories, including ensuring compliance with standards meeting at least the minimum applicable requirements of the current edition of Centers for Disease Control and Prevention, "Biosafety in Microbiological and Biomedical Laboratories (BMBL)," and National Institutes of Health, "The NIH Guidelines for Research Involving

Recombinant or Synthetic Nucleic Acid Molecules (NIH Guidelines)."

d. Research Involving Recombinant (rDNA) or Synthetic Nucleic Acid Molecules:

Applicants must not begin performance of research within the scope of "The NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules (NIH Guidelines)" until receiving notice from the Contracting or Grants Officer that ONR has reviewed and accepted the Applicant's documentation. In order for ONR to accomplish that review, an applicant must provide the Contracting or Grants Officer, generally as part of an original proposal prior to award, sufficient documentation to enable the review, including:

(1) A written statement that the Applicant is in compliance with NIH Guidelines. This statement should be made by an official of the institution other than the Principal Investigator and should be on university or company letterhead.
(2) Evidence demonstrating that the proposed research protocol has been approved (or determined exempt from the NIH Guidelines) by an Institutional Biosafety Committee (IBC); and a copy of the Department of Health and Human Services (DHHS) Letter of Approval of the IBC, or the most recent letter from DHHS stating the IBC is in compliance with the NIH Guidelines. For assistance with requirements involving countries outside the United States, please contact the ONR HRPO at (703) 696-4318.

e. Institutional Dual Use Research of Concern:

As of September 24, 2015, all institutions and United States Government (USG) funding agencies subject to the United States Government Policy for Institutional Oversight of Life Sciences Dual Use Research of Concern must comply with all the requirements listed therein. If your research proposal directly involves certain biological agents or toxins, contact the cognizant Technical Point of Contact. U.S. Government Science, Safety, Security (S3) guidance may be found at http://www.phe.gov/s3/dualuse.

f. Department of Defense High Performance Computing Program:

The DoD High Performance Computing Program (HPCMP) furnishes the DoD S&T and RDT&E communities with use-access to very powerful high performance computing systems. Awardees of ONR grants and other assistance instruments may be eligible to use HPCMP assets in support of their funded activities if ONR Program Officer approval is obtained and if security/screening requirements are favorably completed. Additional information and an application may be found at https://www.hpc.mil/.

g. Project Review Meetings and Program Review Meetings:

Individual Project Review Meetings between the DoD and the performer may be held as necessary. Project Review Meetings typically last approximately one day. Typically, there are 2 in-person Project Review Meetings each year. Additional Project Review Meetings are likely, but these will be accomplished by video telephone conferences, telephone conferences, or web-based collaboration tools.

In addition to Project Review Meetings, Program Review Meetings may be held to provide a forum for reviews of the latest results from individual project experiments and any other incremental project progress towards major demonstrations. Program Review Meetings are generally held once per year and last two to three days. For cost estimating purposes, applicants should anticipate meetings to be held at or near ONR, Arlington VA.

The Government sometimes finds it advantageous to hold Program Review Meetings at a performer's facility. Applicants interested in hosting such meetings should include an estimated cost and the following language in their proposals, which become part of any award (note: if a contract is awarded, use of the facility will be included as an option):

[Name of entity] offers the use of its facilities for a DoD Program Review Meeting to discuss the status of programs related to the subject of this proposal. Such meetings may include attendees representing multiple research efforts. The meetings will discuss only "contracted fundamental research" as provided in the Under Secretary of Defense (Acquisition, Technology and Logistics) Memorandum of 24 May 2010, the results of which are open to the public. No fee will be charged Program Review Meeting attendees. [Name of entity] understands it will not be asked to host a Performance Review Meeting more than once per year, if at all.
Applicants are not required to include the foregoing term in their proposals, and whether they do or not will not affect their selection for award.

h. Federal Funding Accountability and Transparency Act of 2006:

The Federal Funding Accountability and Transparency Act of 2006 (Public Law 109-282), as amended by Section 6202 of Public Law 110-252 and expanded by the Digital Accountability and Transparency Act of 2014 (Public Law 113-101), requires that all agencies establish requirements for recipients reporting information on subawards and executive total compensation as codified in 2 CFR Part 170. Any company, non-profit agency or university that applies for financial assistance (either grants, cooperative agreements or TIAs) as either a prime or sub-recipient under this FOA must provide information in its proposal that describes the necessary processes and systems in place to comply with the reporting requirements identified in 2 CFR Part 170 Appendix A. Entities are required to meet reporting requirements unless an exception or exemption applies. Please refer to 2 CFR Part 170, including Appendix A, for a detailed explanation of the requirements, exceptions, and exemptions.

i. Financial Assistance Certification:

The Federal Assistance Certifications Report is an attestation that the entity will abide by the requirements of the various laws and regulations and the supplemental at Section F.2.iv above. Therefore, as applicable, you are still required to submit any documentation, including the SF LLL Disclosure of Lobby Activities (if applicable), and disclosure of any unpaid delinquent tax liability or a felony conviction under any Federal law.

j. Certifications Regarding Restrictions on Lobbying:

Grant awards greater than $100,000 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 submitted via https://www.grants.gov/(complete Block 17). The following certification applies likewise to each grant seeking federal assistance funds

exceeding $100,000:

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

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

k. Certifications Regarding the Prohibition on Using Funds with Entities that Require Certain Internal Confidentiality Agreements (Grant Information Circular (GIC) 19-02 November 2019) (Supplement to SF424 (R&R), block 17, Financial Assistance Certifications and Representations)

By checking "I Agree" on the SF 424 (R&R) block 17 you agree to abide by the following statement: "By signing this application, I certify (1) to the statements contained in the list certifications and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. code, Title 218, Section 1001).

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

l. Certification Regarding Disclosure of Funding Sources (Supplement to SF424, block 17, Financial Assistance Certifications and Representations

By checking "I Agree" on the SF 424 (R&R) block 17 you agree to abide by the following statement: "By signing this application, I certify the proposing entity is in compliance with Section 223(a) of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021 which requires that: (a) the PI and other key personnel certify that the current and pending support provided on the proposal is current, accurate and complete; (B) agree to update such disclosure at the request of the agency prior to the award of support and at any subsequent time the agency determines appropriate during the term of the award; and (c) the PI and other key personnel have been made aware of the requirements under Section 223(a)(1) of this Act. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. code, Title 218, Section 1001).

m. Conflict of Interest

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 nonscientific conflict of interest(s) to us. You must also disclose any potential or actual conflict(s) of interest for any identified sub recipient you include in your application. We may have to ask you more questions if we need more information.

   At our discretion, we may ask you for a conflict of interest mitigation plan after you submit your application. Your plan is subject to our 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, these collaborations should be considered when considering potential conflicts 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. Therefore, you must include in your list of current and pending support all collaborators, even if they did not formally provide support.

n. Code of Conduct

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 supported by federal funds. This provision will be incorporated into all assistance instruments awarded under this FOA.

o. Peer Review

In the case of proposals funded as basic research, ONR may utilize peer reviewers from academia, industry, and Government agencies to assist in the periodic appraisal of performance under the awards, as outlined in ONR Instruction 3966.1A. Such periodic peer reviews monitor the quality of funded basic research efforts. The reviews are used in part to determine which basic research projects will receive continued ONR funding. Peer reviewers who are not U.S. Government employees must sign nondisclosure agreements before receiving full or partial copies of proposals and reports submitted by the basic research performers. Applicants may include travel costs for the Principal Investigator (PI) to attend the peer review. Peer reviews may consider information derived from individual project or program review meetings (see FOA Section F.2.a.viii for further guidance).

p. Prohibition on Procurement of Foreign-Made Unmanned Aircraft Systems

Commercial Off The Shelf Unmanned Aircraft Systems (COTS UAS) may not be purchased pursuant to this grant or contract or other transaction agreement for prototype until a waiver per the Deputy Secretary of Defense Memorandum "Unmanned Aerial Vehicle Cybersecurity Vulnerabilities," May 23, 2018 is obtained by the cognizant ONR Program Officer.

(1) A waiver is not required when the research is supported via a grant award AND it is unclassified and funded with either basic research funds (i.e., 6.1) or applied research funds (i.e., 6.2) and performed on campus by a university. A waiver must be obtained for all other grants and assistance agreements.

(2) Notwithstanding 1.a. above, a waiver is required for all efforts (regardless of award or funding type) that involve interactions with military personnel, DoD property, or DoD facilities; work conducted by US Government laboratories, UARCs, or FFRDCs; or are Public Aircraft Operation (PAO), classified, or explore specific military utility. For these efforts, a Cyber Security waiver or Authority to Operate (ATO) and Cyber Vulnerability Assessment must be obtained.

(3) A waiver is required for all contract awards and other transaction agreements. For these efforts, a Cyber Security waiver or ATO and Cyber Vulnerability Assessment must be obtained.

Prospective performers or current performers are required to notify the cognizant ONR Program Officer of any anticipated COTS UAS purchase that may be subject to waiver at time of white paper, proposal submission or award changes. Performers shall provide documentation specifying the details including the type of drone, effort, location, etc.

Performers will agree to cooperate and provide additional information as requested to support the waiver and cyber vulnerability assessment.

In no event shall federal funding be expended or purchase made pursuant to any award subject to waiver requirement, unless and until performer is notified by ONR that the waiver, cyber vulnerability and other requirements have been met.

3. Reporting

a. If the Federal share of any Federal award may include more than $500,000 over the period of performance, the post award reporting requirements, Award Term and Condition for Recipient Integrity and Performance Matters (2 CFR Part 200 Appendix XII), is applicable as follows:

i. Reporting of Matters Related to Recipient Integrity and Performance

a) General Reporting Requirement. If the total value of your currently active grants, cooperative agreements, and procurement contracts from all Federal awarding agencies exceeds $10,000,000 for any period of time during the period of performance of this Federal award, then you as the recipient during that period of time must maintain the currency of information reported to the System for Award Management (SAM) that is made available in the designated integrity and performance system (currently the Federal Awardee Performance and Integrity Information System (FAPIIS)) about civil, criminal, or administrative proceedings described in paragraph 2 of this award term and condition. This is a statutory requirement under 41 U.S.C. 2313. All information posted in the designated integrity and performance system on or after April 15, 2011, except past performance reviews required for Federal procurement contracts, will be publicly available.

ii. Proceedings About Which You Must Report. Submit the information required about each proceeding that:

a) Is in connection with the award or performance of a grant, cooperative agreement, or procurement contract from the Federal Government;
b) Reached its final disposition during the most recent five-year period; and
c) Is one of the following:
    1) A criminal proceeding that resulted in a conviction, as defined in paragraph 5 of this award term and condition;
    2) A civil proceeding that resulted in a finding of fault and liability and payment of a monetary fine, penalty, reimbursement, restitution, or damages of $5,000 or more;
    3) An administrative proceeding, as defined in paragraph 5. of this award term and condition, that resulted in a finding of fault and liability and your payment of either a monetary fine or penalty of $5,000 or more or reimbursement, restitution, or damages in excess of $100,000; or
    4) Any other criminal, civil, or administrative proceeding if:
        a. It could have led to an outcome described in paragraph 2.c. (1), (2), or (3) of this award term and condition;
        b. It had a different disposition arrived at by consent or compromise with an acknowledgment of fault on your part; and
        c. The requirement in this award term and condition to disclose information about the proceeding does not conflict with applicable laws and regulations.

iii. Reporting Procedures. Enter in the SAM Entity Management area the information that SAM requires about each proceeding described in paragraph 2 of this award term and condition. You do not need to submit the information a second time under assistance awards that you received if you already provided the information through SAM because you were required to do so under Federal procurement contracts that you were awarded.

iv. Reporting Frequency. During any period of time when you are subject to the requirement in paragraph 1 of this award term and condition, you must report proceedings information through SAM for the most recent five-year period, either to report new information about any proceeding(s) that you have not reported previously or affirm that there is no new information to report. Recipients that have Federal contract, grant, and cooperative agreement awards with a cumulative total value greater than $10,000,000 must disclose semiannually any information about the criminal, civil, and administrative proceedings.

v. Definitions. For purposes of this award term and condition:

a) Administrative proceeding means a non-judicial process that is adjudicatory in nature in order to make a determination of fault or liability (e.g., Securities and Exchange Commission Administrative proceedings, Civilian Board of Contract Appeals proceedings, and Armed Services Board of Contract Appeals proceedings). This includes proceedings at the Federal and State level but only in connection with performance of a Federal contract or grant. It does not include audits, site visits, corrective plans, or inspection of deliverables.
b) Conviction, for purposes of this award term and condition, means a judgment or conviction of a criminal offense by any court of competent jurisdiction, whether entered upon a verdict or a plea, and includes a conviction entered upon a plea of nolo contendere.
c) Total value of currently active grants, cooperative agreements, and procurement contracts includes—
    1) Only the Federal share of the funding under any Federal award with a recipient cost share or match; and
    2) The value of all expected funding increments under a Federal award and options, even if not yet exercised.

b. Post Award Reporting Requirements

The post award reporting requirements can be found under the relevant ONR Addendum to the DoD R&D General Terms and Conditions and ONR Programmatic Requirements located at the following link: https://www.nre.navy.mil/work-with-us/manage-your-award/manage-grant-award/grants-terms-conditions.

G. Federal Awarding Agency Contacts

All UNCLASSIFIED communications shall be submitted via e-mail to the Technical Point of Contract (POC) with a copy to the designated Business POC, as designated below.

Comments or questions submitted should be concise and to the point, eliminating any unnecessary verbiage. In addition, the relevant part and paragraph of the Funding Opportunity Announcement FOA) should be referenced. Questions submitted within 2 weeks prior to a deadline may not be answered, and the due date for submission of the white paper and/or full proposal will not be extended.

1. **Questions of a technical nature and DoD relevance** should be submitted to:

   Name: Jean-Luc Cambier, PhD
   Title: VBFF Program Director
   Organization: Office of the Under Secretary of Defense for Research and Engineering
   Email Address: jeanluc.cambier.civ@mail.mil

2. **Questions of a programmatic nature** should be submitted to:

   Point of Contact Name: Reginald G. Williams, PhD
   Title: Program Officer
   Division Title: Warfighter Performance
   Division Code: 34
   Address: 875 North Randolph Street
   Email Address: reginald.g.williams5.civ@us.navy.mil

3. **Questions regarding Grants proposal submissions** should be submitted to:

   Anastasia Lenfest, Grants Officer
   Office of Naval Research
   ONR Code 253
   One Liberty Center
   875 N. Randolph Street
   Arlington, VA 22203-1995
   Email Address: anastasia.e.lenfest.civ@us.navy.mil