



REQUEST FOR APPLICATIONS

Small Business Innovation Research (SBIR)

Program Phase I

FUNDING YEARS:	Fiscal Years 2020 and 2021
APPLICATION DEADLINES:	FY20: October 23, 2019 and FY21: October 1, 2020
LETTER OF INTENT DEADLINE:	Not Required
AWARD AMOUNT:	Not Applicable
ASSISTANCE LISTING NUMBER:	10.212

INITIAL ANNOUNCEMENT

National Institute of Food and Agriculture, United States (U.S.) Department of Agriculture (USDA)

Assistance Listing (AL). The Small Business Innovation Research (SBIR) program Phase I is listed in the beta.SAM.gov Assistance Listings [formerly known as the Catalog of Federal Domestic Assistance (CFDA)] number 10.212.

Table 1: Key Dates and Deadlines

Task Description	Deadline
Application:	5:00 P.M. Eastern, FY20: October 23, 2019 and FY21: October 1, 2020
Letter of Intent:	Not Required
Applicants Comments:	Within six months from the issuance of this notice <i>(NIFA may not consider comments received after the sixth month)</i>

Stakeholder Input. The National Institute of Food and Agriculture (NIFA) seeks comments on all request for applications (RFAs) so it can deliver programs efficiently, effectively, with integrity, and with a focus on customer service. NIFA considers comments, to the extent possible when developing RFAs and use comments to help meet the requirements of [Section 103\(c\)\(2\) of the Agricultural Research, Extension, and Education Reform Act of 1998 \(7 U.S.C. 7613\(c\)\(2\)\)](#). Applicants may submit written comments to Policy@nifa.usda.gov (email is for comments only). Please use the following subject line: Response to the Small Business Innovation Research Program Phase I RFA.

EXECUTIVE SUMMARY

This notice identifies the objectives for the Small Business Innovation Research (SBIR) Program Phase I projects, deadlines, funding information, eligibility criteria for projects and applicants, and application forms, and associated instructions.

The USDA SBIR program focuses on transforming scientific discovery into products and services with commercial potential and/or societal benefit. Unlike fundamental research, the USDA SBIR program supports small businesses in the creation of innovative, disruptive technologies and enables the application of research advancements from conception into the market.

Different from most other investors, the USDA SBIR Program funds early or "seed" stage research and development that has a commercial potential. The program provides equity-free funding and entrepreneurial support at the earliest stages of company and technology development.

NIFA requests applications for SBIR Program Phase I for fiscal years (FYs) 2020 and 2021. NIFA released this RFA prior to the passage of an appropriations act for FY 2020 and 2021. Enactment of additional continuing resolutions or an appropriations act may affect the availability, level of funding or cause potential funding delays for this program.

TABLE OF CONTENTS

INITIAL ANNOUNCEMENT..... 2

EXECUTIVE SUMMARY 3

PART I. FUNDING OPPORTUNITY DESCRIPTION 6

A. Legislative Authority6

B. Purpose and Priorities6

C. Topic Area Description7

D. Potential Outcome22

PART II. AWARD INFORMATION 23

A. Available Funding23

B. Application Restrictions23

C. Project Types23

D. Ethical Conduct of Funded Projects23

PART III. ELIGIBILITY INFORMATION..... 25

A. Eligibility Requirements25

B. Cost Sharing or Matching26

PART IV. APPLICATION AND SUBMISSION 27

A. Method of Application27

B. Small Business Administration (SBA) Registration28

C. Content and Form of the Application28

D. Funding Restrictions.....39

PART V. APPLICATION REVIEW REQUIREMENTS 40

A. NIFA’s Evaluation Process40

B. Evaluation Criteria.....41

C. Proprietary Information43

D. Rights in Technical Data44

E. Copyrights44

F. Patents and Inventions45

G. Research Involving Special Considerations45

H. Grantee Commitments.....46

I. Additional Information46

J. Organizational Management Information.....47

K. Application Disposition.....47

PART VI. AWARD ADMINISTRATION 48

A. General48

B. Administrative and National Policy Requirements.....48

C. Expected Program Outputs and Reporting Requirements48

PART VII. OTHER INFORMATION 50

A. Use of Funds and Changes in Budget.....50

B. Confidential Aspects of Applications and Awards50

C. Regulatory Information50

APPENDIX I: AGENCY CONTACTS 51

APPENDIX II: GLOSSARY OF TERMS..... 52

APPENDIX III: DEFINITIONS 53

TABLE OF TABLES

Table 1: Key Dates and Deadlines..... 2
Table 2. Steps to Obtain Application Materials..... 27
Table 3: Help and Resources 27
Table 4: Key Application Instructions..... 29

PART I. FUNDING OPPORTUNITY DESCRIPTION

A. Legislative Authority

The National Defense Authorization Act for Fiscal Year 2017 (Pub. L. 114–328, §1834(a) Extension of SBIR and STTR programs) amended the SBIR Small Business Act (15 U.S.C. 638(m) to September 30, 2022. The Small Business Administration (SBA), through the SBIR Policy Directive, provides policy. A main purpose of the legislation is to stimulate technological innovation and increase private sector commercialization. The USDA SBIR program is therefore in a unique position to meet both the goals of USDA and the purpose of the SBIR legislation by transforming scientific discovery and innovation into both social and economic benefit, and by emphasizing private sector commercialization.

The SBIR program is Congressionally mandated and intended to support scientific excellence and technological innovation through the investment of federal research funds to build a strong national economy by stimulating technological innovation in the private sector; strengthening the role of small business in meeting federal research and development needs; increasing the commercial application of federally supported research results; and fostering and encouraging participation by socially and economically disadvantaged and women-owned small businesses.

B. Purpose and Priorities

Because the USDA program currently has no specific procurement focus, the USDA offers ten (10) solicitation topic areas that to permit a broad spectrum of eligible and innovative science- and technology-based small businesses to compete for funding. The topics are detailed within this solicitation. The National Institute of Food and Agriculture (NIFA), of the United States Department of Agriculture (USDA), administers this program.

This program is subject to the provisions found at 7 CFR Part 3403; which set forth procedures to be followed when submitting grant applications, rules governing the evaluation of applications and the awarding of grants and regulations relating to the post-award administration of grant projects.

The USDA NIFA SBIR carries out the program in three separate phases, and this program solicitation is only for the preparation and submission of Phase I applications. The aim of a Phase I project should be to demonstrate technical feasibility of the proposed innovation and thereby bring the innovation closer to commercialization. Proposals will describe the development of an innovation that demonstrates the following characteristics:

1. Involves a high degree of technical risk – for example, has never been attempted and/or successfully achieved and, is still facing technical hurdles (that the USDA-funded Research and Development (R&D) work is intended to overcome);
2. Has the potential for significant commercial impact and/or societal benefit, as evidenced by: having the potential to disrupt the targeted market segment; having good product-market fit (as validated by customers); removing barriers to entry for competition; offering potential for societal benefit (through commercialization under a sustainable business model);
3. Phase I awards may not exceed \$100,000 for a period normally not to exceed eight (8) months; and

4. The Phase I application will concentrate on research that will significantly contribute to proving the scientific or technical feasibility of the approach or concept, describe the potential market for the innovation and will be a prerequisite to further USDA SBIR support in Phase II.

Phase II applications continue the R&D developed under Phase I to commercialize the innovation. Phase II will require a more comprehensive application, outlining the proposed effort in detail and the commercialization strategy for the effort. Only prior Phase I grant recipients are eligible to submit a Phase II application at the conclusion of the Phase I grant period. USDA NIFA SBIR typically announces the Phase II RFA in late November or early December with a deadline in early March. USDA NIFA recognizes that Phase I and II awards may not be sufficient in either dollars or time for the firm to complete the total R/R&D and the commercialization activities required to bring the project results to a marketplace. Therefore, completion of the research under these circumstances may have to be carried into Phase III.

Phase III refers to work that derives from, extends, or logically concludes effort(s) performed under prior SBIR funding, but is funded by sources other than the SBIR Program. Phase III work is typically oriented towards commercialization of the SBIR innovation or technology.

The SBIR program Phase I is aligned with the following [USDA Strategic Goals](#):

1. Strategic Goal 2: Maximize the Ability of American Agricultural Producers To Prosper by Feeding and Clothing the World;
2. Strategic Goal 3: Promote American Agriculture Products and Exports
3. Strategic Goal 4: Facilitate Rural Prosperity and Economic Development;
4. Strategic Goal 5: Strengthen the Stewardship of Private Lands Through Technology and Research;
5. Strategic Goal 6: Ensure Productive and Sustainable Use of Our National Forest System Lands; and
6. Strategic Goal 7: Provide all Americans Access to a Safe, Nutritious, and Secure Food Supply.

C. Topic Area Description

Applicants are encouraged to submit applications that address the research priorities stated for each topic area described in this RFA (see topic areas 8.1 through 8.13 below). Applicants need to pay attention to specific instructions located within each of the topic area descriptions when developing their application. Each topic area description provides background information, research priorities, and other key information. Although applicants should apply to the topic area they deem most appropriate, USDA NIFA reserves the right to shift applications between topic areas when necessary to achieve the most effective review. If an application is shifted from one topic area to another, NIFA will notify the applicant. Applicants should direct questions regarding the suitability of research for a specific topic area to the appropriate National Program Leader (NPL) identified in the topic area below.

NIFA is soliciting applications under the following topic areas:

1. Topic Area 8.1, Forests and Related Resources;
2. Topic Area 8.2, Plant Production and Protection (Biology);
3. Topic Area 8.3, Animal Production and Protection;
4. Topic Area 8.4, Conservation of Natural Resources;
5. Topic Area 8.5, Food Science and Nutrition;

6. Topic Area 8.6, Rural and Community Development;
7. Topic Area 8.7, Aquaculture;
8. Topic Area 8.8, Biofuels and Biobased Products (*There are no Topic Areas 8.9 through 8.11*);
9. Topic Area 8.12, Small and Mid-Size Farms; and
10. Topic Area 8.13, Plant Production, and Protection (Engineering).

Topic Area 8.1, Forests, and Related Resources

Background. The Forests and Related Resources topic area aims to address the health, diversity and productivity of the Nation's forests and grasslands to meet the needs of present and future generations through the development of environmentally sound approaches to increase productivity of forest lands, improve sustainability of forest resources, and develop value-added materials derived from woody resources. New technologies are needed to enhance the protection of the Nation's forested lands and forest resources and help to ensure the continued existence of healthy and productive forest ecosystems. Proposals focused on sustainable bioenergy and development of value-added biofuels from woody biomass, and on the influence of climate change on forest health and productivity are strongly encouraged. Proposals that utilize nanotechnology in their approach to developing new wood-based products or that utilize wood-based nano-materials are also encouraged.

To meet the identified needs in forestry and wood utilization, the program's long-term goals (10 years) are to achieve increased utilization of woody resources for value-added products from wood; healthy and sustainable forest ecosystems that are more resilient to wildfires and the impact of pathogens and insects; improved environmental and economic methods of sustainable harvesting; and improved growth and yield of forest species that will lead to more efficient use of forested lands.

Research Priorities. Examples of appropriate subtopics for research applications from small businesses include, but are not limited to the following:

1. ***Growth and Yield.*** Improving growing stock, tissue culture, genetic manipulation or vegetative reproduction of forest trees, and other means of increasing the regenerative abilities of forests; developing systems to increase the survival of newly planted trees through mechanical, physical or chemical means that are environmentally safe and through improved nutrient/water utilization; reducing the adverse impact of pathogens and insects by developing better methods to monitor infestations and improved control strategies for combating insects and pathogens that attack important woody species.
2. ***Increasing the Utility of Forest-Grown Material.*** Research to improve the yield of lumber, pulp fiber and specialty chemicals from trees; utilizing a greater percentage of the tree through improved techniques of production, for the creation of new or improved reconstituted products; developing better methods for manufacturing wood-based products and testing products for performance and durability; and developing improved methods for the production of paper.
3. ***Reducing Ecological Damage by Forest Operations.*** Research to reduce soil erosion, compaction, water degradation or other alterations caused by harvesting and/or other forest operations, provisions for the economic recovery of resources from forests while raising potential productivity and reducing impacts to the ecological structure of the area of operation.

4. **Urban Forestry.** Research to promote the growth of forested land in urban areas, such as greenways, parks, and strategically planted urban trees, to address problems of forest fragmentation, the introduction of invasive species, and the impact of urban-forested land on air and water quality and quality of life improvements.
5. **Climate Change.** Research to address the issue of ecosystem adaptation to climate change, ways to enhance carbon sequestration and reduce greenhouse gas emissions, development of decision support tools for forest managers and markets for forest ecosystem services.
6. **Developing Technology that Facilitates the Management of Wildfires on Forest Lands.** Research that provides systems for detecting and managing wildfires; systems for reducing fuel loads in forests; tools and equipment for improving the efficacy and safety of fire fighters on the ground and in the air; and communication and navigation systems for improving the coordination of fire management activities.
7. **Sustainable Bioenergy and Development of Value-Added Products from Forest Resources.** Research for development of improved methods for the conversion of forest biomass into cellulosic biofuels (e.g. ethanol, biobutanol, jet aviation) and biobased products, including intermediate chemicals; development of new wood-based composite materials; development of local scale energy conversion projects that generate electricity and/or useful heat; and development of technologies that will mitigate carbon release from combustion.

Other Key Information.

1. Applicants are strongly encouraged to contact the NPL regarding the suitability of research topics. Contact Dr. Charles Cleland, NPL for SBIR Forests and Related Resources at ccleland@nifa.usda.gov or (202) 401-6852 or SBIR@Nifa.usda.gov regarding questions about the suitability of research topics or to arrange a telephone consultation.
2. Applications that deal with the development of biofuels derived from non-woody agricultural crops should be submitted under topic area 8.8 Biofuels and Biobased Products.

Topic Area 8.2, Plant Production, and Protection (Biology)

Background. The objective of this topic area is to examine novel ways of enhancing crop production and protection by applying biological approaches to develop new methods for plant improvement, apply traditional plant breeding methods and new technologies to develop new food and non-food crop plants, develop plant characteristics that reduce the harmful impact of plant pests and biotic stresses, as well as new genotypes of existing crop plants with characteristics that allow for their use in new commercial applications.

Research Priorities. Examples of appropriate subtopics for research applications from small businesses include, but are not limited to the following:

1. **Plant improvement.** Improved crop production using traditional plant breeding and biotechnology, including but not limited to, molecular biology, and mutagenesis, genomics, tissue culture, and/or embryogenesis to produce crops with new or improved quality, yield, agronomic, horticultural, value-added, and/or economic traits. Topics may include, but not limited to:

- a. Improvement of commercial floriculture production. Biological and/or technological approaches to improve the competitiveness of U.S. production of flowering potted plants, bedding plants, seasonal crops, annuals, perennials, and cut flowers.
 - b. Development of new crops. Development of new crop plants as sources of food, non-food industrial or ornamental products.
2. ***Pollinators and crop production.*** Projects that address the health and success of domesticated and natural pollinators of economically important crops.
3. ***Plant protection against abiotic and/or biotic stresses.*** Reduced the impact of plant pathogens, arthropod pests, and abiotic stress on crop plants; and increasing plant resistance to plant pathogens, arthropod pests, and abiotic stress. Topics may include, but are not limited to:
 - a. Improved plant disease diagnostics. Accurate, rapid, and cost-effective identification of causal agents in specialty crop plants at the earliest possible stage relative to manifestation of disease.
 - b. Bio-Based approaches. To protect organically grown and conventional crops from insect and nematode pests and diseases using bio-based approaches, including the development of decision aid systems that are information extensive and time sensitive.

Other Key Information.

1. Applicants are strongly encouraged to contact the NPL regarding the suitability of research topics. Contact Dr. Robert Nowierski, NPL for SBIR Plant Production and Protection (Biology) at rnowierski@nifa.usda.gov or (202) 401-4900 or SBIR@Nifa.usda.gov regarding questions about the suitability of research topics or to arrange a telephone consultation.
2. Phase I applications involving the development of transgenic crops would benefit by the inclusion of a brief description of the proposed path to commercialization, including an understanding of what will be needed to clear regulatory consideration. Phase II applications involving the development of transgenic crops should have an expanded section on how regulatory considerations will be met and market entry attained.
3. Applications that deal with non-biological engineering technologies should be submitted to topic area 8.13 Plant Production and Protection-Engineering.
4. Applications that deal with the genetic improvement and production of woody biomass feedstock crops should be submitted to the 8.1 Forest and Related Resources topic area.
5. Applications that deal with the genetic improvement and production of algae should be submitted to the 8.7 Aquaculture topic area.

Topic Area 8.3, Animal Production, and Protection

Background. The Food and Agriculture Organization (FAO) of the United Nations predicts that feeding the world's growing population will require a doubling of global food production by 2050. Fulfilling this need will require new technologies to improve both productivity and efficiency of food animals. The Animal Production and Protection topic area aims to develop innovative, marketable technologies that will provide significant benefit to the production and protection of agricultural animals. New technologies for rapid detection, point-of-care, treatment, and prevention of disease are needed to improve productivity and enhance the biosecurity of our herds and flocks. Better technologies are also needed to develop and enhance alternatives to the

use of antibiotics since pathogen resistance and human sensitivity to residue food products derived from animals have become of increasing concern. To meet increasing consumer demand for value-added animal products, innovative technologies are needed to address the challenges presented by non-conventional management systems and strategies. In addition, there is an urgent need for technologies that decrease the impact of animal agriculture on the environment and optimize use of our natural resources. Technological advances in animal production and protection will not only enhance the safety of the Nation's food supply and contribute to environmental stewardship, they will also allow American producers to remain competitive in the global marketplace and contribute to global food security.

Research Priorities. Development of marketable technologies designed for use in agriculturally important animals that will:

1. ***Improve production efficiency.*** Areas of interest include improved fertility, increased feed efficiency, and translation of genomic information into practical use and benefit.
2. ***Improve the safety and/or quality of end products derived from animals.*** These technologies must be applicable in the pre-harvest environment.
3. ***Improve animal health and well-being.*** Examples of these technologies include new rapid, more accurate, point-of-care oriented and competitively priced diagnostics, therapeutics, vaccines and other immunization methods, biosecurity management tools, traceability methods, and animal handling methods and developing alternatives to the use of antibiotics.
4. ***Improve the productivity of animals in modified conventional or alternative animal production systems.*** Examples include non-confinement housing, pasture-based feeding systems, and organic systems.
5. ***Mitigate the impacts of animal agriculture on the natural environment.*** Areas of interest include technologies that decrease greenhouse gas emissions or reduce the excretion of phosphorus and nitrogen, but do not include manure management.

Other Key information.

1. Applicants are strongly encouraged to contact the NPL regarding the suitability of research topics. Contact Dr. Robert M. Smith, NPL for SBIR Animal Production and Protection at rsmith@nifa.usda.gov or (202) 401-4892 or SBIR@Nifa.usda.gov regarding questions about the suitability of research topics or to arrange a telephone consultation.
2. Applications that deal with post-harvest technologies for products derived from animals will not be accepted for review under this program area. Applications that deal with post-harvest technologies for foods derived from animals should be submitted under topic area 8.5 Food Science and Nutrition. Applications that deal with post-harvest technologies for non-food products derived from animals should be submitted under topic area 8.8 Biofuels and Biobased Products.
3. Applications dealing with aquaculture species should be submitted under topic area 8.7 Aquaculture.

Topic Area 8.4, Conservation of Natural Resources

Background. The objective of this topic area is the conservation of natural resources (soil, water, and air) on landscapes that produce agricultural, natural and forest/rangeland goods and services. The goal of the program is to commercialize innovative technologies that are developed with the

purpose to conserve, monitor, improve, and/or protect the quality and/or quantity of natural resources while sustaining optimal farm and forest productivity and profitability. We encourage new technologies and innovations that will help improve soil health, reduce soil erosion, improve water and air quality, improve nutrient management and conserve and water use efficiency.

Research Priorities. Examples of appropriate subtopics for research applications from small businesses include, but are not limited to, the following:

1. ***Water Quality and Quantity.*** Develop new and innovative technologies to improve water management and conservation at the farm- and watershed-scales, and monitor the quality of surface water and groundwater resources for biotic and abiotic pollutants. Create improved technologies focused on the use of nontraditional water sources (treated wastewater, agricultural return flows and produced water from minerals extraction) for agricultural irrigation, and improve irrigation technologies to provide superior timing, distribution and cost-effective delivery of water and nutrients for the optimal growth of crops.
2. ***Soil Health.*** Develop new technologies for measuring soil physical, chemical, and biological properties including, but not limited to, soil nutrient content, microbial functional activity related to nutrient cycling, methods to remediate degraded soils, and methods for monitoring and preventing soil erosion by wind and water.
3. ***Air Resources.*** Develop new and improved technologies to monitor air quality and reduce air pollution stemming from agricultural enterprises, including manures from livestock and poultry production systems.
4. ***Nutrient Management.*** Develop new or improved macro- and/or micronutrient management practices or technologies that help maximize plant productivity while minimizing negative environmental impacts. Innovative and revolutionary enhanced efficiency fertilizers are encouraged.

Other Key Information

1. Applicants are strongly encouraged to contact the NPL regarding the suitability of research topics. Contact Dr. Karelyn Cruz, National Program Leader for SBIR Conservation of Natural Resources at karelyn.cruz@nifa.usda.gov or (202) 604-7742 or SBIR@Nifa.usda.gov regarding questions about the suitability of research topics or to arrange a telephone consultation.
2. Applications that include software development or other data-intensive technologies are encouraged to apply for topics related to the Priority Research Areas listed above.
3. Applications that address animal manure or carcass waste for the production of biofuels and biobased products should be submitted to the 8.8 Biofuels and Biobased Products topic area.
4. Technologies for the rapid detection of food borne hazards (microorganisms, chemicals, toxins) during pre- and post-harvest processing and distribution should be submitted to the 8.5 Food Science and Nutrition topic area.
5. Applicants should demonstrate that the proposed technology is innovative and not redundant with what is currently available. If similar technologies exist, the applicant should provide a comparison table contrasting your technology with others.

Topic Area 8.5, Food Science, and Nutrition

Background. The Food Science and Nutrition topic area aims to fund projects that support research focusing on developing new and improved processes, technologies, or services that address emerging food safety, food processing and nutrition issues. The program will fund projects to: 1) increase the understanding of the physical, chemical, and biological properties of food; 2) improve methods for the processing and packaging of food products to improve the quality, safety and nutritional value of foods, and to reduce food waste; 3) develop technologies for rapid and sensitive detection of pathogens and toxins in foods, and 4) develop programs or products that increase the consumption of healthy foods and reduce obesity, or alleviate urban and rural food deserts. The outcome of a successful project is a proof of concept for a marketable product or patented process.

The long-term goals (10 years) of the program are to commercialize the production of useful new food products, processes, materials, and systems that reduce foodborne illness, obesity, enhance the nutritional quality and value of foods and/or bridge socioeconomic gaps in access to healthy foods.

Research Priorities. Examples of appropriate subtopics for research applications from small businesses include, but are not limited to, the following:

1. **Food Safety.** Developing technologies for the detection or mitigation of foodborne hazards (microorganisms, chemicals, toxins) during pre- and post-harvest processing and distribution.
2. **Food Quality-Engineering.** Developing innovative processing and packaging technologies or materials (specifically biodegradable materials) that reduce post-harvest losses in foods while maintaining safety, quality and/or extending shelf life of the product.
3. **Food Quality-Science.** Understanding the physical, biological, and chemical interactions and functionality of food in order to develop affordable food ingredients and/or food formulations that contribute to the development of high quality foods.
4. **Nutrition-Education.** Developing and implementing effective programs for educators and parents to foster healthy nutritional choices to combat obesity among children.
5. **Nutrition-Science.** Improve functionality and efficacy of foods, nutrients, and/or dietary bioactive components in promoting health.
6. **Nutrition, Food Safety and Quality Data Tools.** Development of software tools and technologies that collect and analyze nutrient data, food safety, and food quality data to enable producers, consumers, and retailers make healthy choices and/or alleviate food deserts.

Other Key Information

1. Applicants are strongly encouraged to contact the NPL regarding the suitability of research topics. Contact Dr. Jodi Williams, NPL for SBIR Food Science and Nutrition at jjwilliams@nifa.usda.gov or (202) 720-6145 or SBIR@Nifa.usda.gov regarding questions about the suitability of research topics or to arrange a telephone consultation.
2. Improvements of current commercial methods should address high false positive and high false negative rates associated with nucleic acid-based methods for detection of

food-borne pathogens in produce and high false negative rates associated with immunoassays for detection of Salmonella.

3. New rapid detection tests should be designed to detect at least one cfu/25g of food using approaches that reduce or eliminate enrichment and should be designed to allow for sampling of large volumes of food.
4. Projects on novel screening methods for threat agents need strong letters of support from the appropriate Federal agency that will be the end user of the technology.
5. Projects that promote value-added products and processes are encouraged.
6. Projects that address functional foods to promote health are encouraged.
7. Projects that exclusively focus on nutritional supplements rather than food ingredients will not be considered.
8. Projects that focus on technologies for improving cost benefit and model-based analyses, including distribution, warehousing, and retailing systems as they relate to the economy are acceptable.
9. Applicants who have received previous SBIR funding should address outcomes for those projects.
10. Projects should include appropriate collaborations with experts in the field of investigation (i.e., a food scientist or nutritionist as a part of the development team for the project).

Topic Area 8.6, Rural and Community Development

Background. The objective of this topic area is to improve the quality of life in rural America by creating and commercializing technologies that address important economic and social development issues or challenges in rural America. Projects must explicitly discuss the specific rural problem or opportunity that will be examined and how the proposed science-based technology will successfully address the problem or opportunity. Applications must also include an objective to assess the impacts of the proposed project on the environment or the socio-economic development of rural areas. The applications need not be centered on agriculture, but may be focused on any area that has the potential to provide significant benefit to rural Americans. USDA seeks a balanced portfolio that appropriately mixes high risk, high reward innovations with new applications of existing technologies.

Research Priorities. Examples of appropriate subtopics for research applications from small businesses include, but are not limited to, the following:

1. ***Development of services, information, and managerial systems that improve the efficiency and effectiveness of Local Governments and Public and Private Institutions.*** Topics may include educational programs, including virtual platforms, apps and gaming, which address the specific needs of people in rural areas (e.g., development of entrepreneurship and workforce skills); use of big data in community development planning; new housing designs or ways to improve function and outcomes of existing designs; improved health care delivery, including mobile or virtual health applications; innovative transportation and communication technologies and services that increase access to services for rural people; and marketing of new information and technologies to rural audiences.
2. ***Development of technologies and services that protect or enhance the environment while promoting economic development.*** Topics may include science-based innovations

that explore the vast natural resources and amenities in rural communities with a focus on renewable energy. Examples may include technologies and services for harnessing big data to synthesize and communicate new knowledge for rural people, to help them make predictive decisions, and to foster data-driven innovation in agriculture, ecosystem protection, sustainable practices, food loss and waste reduction, energy conservation, and alternative energy source development – such as wind and solar energy (excluding biofuels).

3. ***Reducing the vulnerabilities of rural communities from hazards*** (excluding intentional acts such as terrorism). Procedures and data-enabled solutions are needed to make rural communities more sustainable to natural or unintentional hazards such as food-borne illnesses, food contamination, droughts, wildfires, hurricanes, climate variability, through better preparation, forecast and warning, response and rebuilding phases of hazard mitigation, including communication.
4. ***Development of technologies and services that specifically address the needs of youth, the elderly, disabled persons, military veterans, and the low-income sector of the rural population***. Efforts are needed that will enhance human capital development, build earnings capacity, increase labor force participation and/or promote job creation to the most vulnerable populations in rural communities, use augmented reality and promote workforce development in rural communities, and promote food security, including issues of access to adequate amounts and quality of foods.
5. ***Increasing opportunities for employment and income generation in rural communities***. Topics may include, but are not limited to, creative place making, recreational economies, rural tourism, agri-tourism, e-commerce innovations that connect producers with markets, and off-farm value-added agricultural development.
6. ***Expanding broadband access in rural communities***. Rural broadband access is a major expansion opportunity. Topics may include, but are not limited to, exploration of white space and other spectrum in rural communities; technologies that increase rural bandwidth, connection speed, quality, and reach; initiatives that increase awareness, adoption, and diffusion of broadband among rural people; and opportunities to increase investment in rural broadband infrastructure.

Other Key Information

1. Applicants are strongly encouraged to contact the NPL regarding the suitability of research topics. Contact Dr. Charles Cleland, NPL for SBIR Rural and Community Development at ccleland@nifa.usda.gov or (202) 401-6852 or SBIR@Nifa.usda.gov regarding questions about the suitability of research topics or to arrange a telephone consultation.
2. Because this topic area addresses impact on rural communities, community letters of support are highly encouraged.
3. If funded, projects are expected to be science-based and enhance the environmental and economic vitality of rural communities. Therefore, applications must contain an objective to assess the impacts of the proposed project on the environment or the socio-economic development of rural areas.
4. Projects are expected to provide evidence of the rural market to be served. Moreover, PDs should identify any barriers to commercialization and discuss how they propose to address them during this and all future phases.
5. Applications dealing with on-farm production agriculture research should be submitted to

topic area 8.12 small and mid-sized farms.

6. Applications dealing with the development of biofuels and biobased products should be submitted to topic area 8.8 Biofuels and Biobased Products.

Topic Area 8.7, Aquaculture

Background. The Aquaculture topic area funds research projects with the overall goal of leading to improved production efficiency and increased competitiveness of private sector, commercial aquaculture in the United States. This topic area aims to develop new technologies that will enhance the knowledge and technology base necessary for the expansion of the domestic aquaculture industry. Seafood production from the wild is under increased pressure due to overfishing, and therefore aquaculture is increasingly an important source of farmed seafood and an important contributor to food security. Studies on commercially important species of fish, shellfish, and aquatic plants from both freshwater and marine environments are included. In this context, new technologies are needed to improve production efficiency, protect aquaculture species against disease, and ensure the quality of farmed seafood.

Research Priorities. To address identified needs or constraints that limit U.S. aquaculture, the following are provided as examples of appropriate subtopics for research applications from small businesses, including, but not limited to, the following:

1. **Reproductive Efficiency.** Novel or innovative approaches to improve reproductive efficiency in aquaculture species including: greater control of maturation, ovulation and fertilization; improved gamete and embryo storage; improved larval rearing techniques; enhanced reproductive performance of broodstock; improved methods for cryopreservation of sperm and embryos; and methods to control sex determination.
2. **Genetic Improvement.** Novel or innovative approaches to improve production efficiency through genetic improvement of aquaculture species including: genetic mechanisms of sex determination; genetic basis for inheritance of commercially important traits, such as growth, temperature tolerance, and disease susceptibility; identification of major genes affecting performance; application of molecular biology and genomics and the integration of this technology into breeding programs; and performance evaluation of aquaculture species and utilization of crossbreeding and hybridization.
3. **Integrated Aquatic Animal Health Management.** Novel or innovative approaches to reducing losses due to aquatic animal health in aquaculture production systems, including: physiological stress related to the aquatic production system environment; genetic, environmental, and nutritional components of aquatic health management; control of predation in aquaculture production systems; development of new vaccines or immunization procedures to enhance resistance to infectious diseases and parasites; development of diagnostic tests for specific diseases that pose a health hazard; and development of improved treatment methods for acute or chronic health problems caused by specific infectious or non-infectious agents, parasites, injuries and chemical and toxic agents.
4. **Improved Production Systems and Management Strategies.** Novel or innovative approaches to improve existing or alternative production system design and management strategies including: development of biological, engineering and economic design criteria and models; enhancement of water quality in existing production systems through aeration, flow patterns, etc.; characterization, handling and treatment of effluent from

aquaculture production systems; improved harvesting methods and strategies; and improved operating efficiencies for recirculation systems.

5. **Algal Production Systems.** Novel or innovative approaches to improve the efficiency of algal production and feedstock logistics including identification of new (or improved) species with improved nutritional profile for use in aquaculture feed, human food, or food supplements; development of improved bioreactor technology; and development of new methods for harvesting algal biomass.

Other Key Information

1. Applicants are strongly encouraged to contact the NPL regarding the suitability of research topics. Contact Dr. Gene W. Kim, NPL for SBIR Aquaculture at Gene.W.Kim@nifa.usda.gov, (202) 401-1108 or SBIR@Nifa.usda.gov regarding questions about the suitability of research topics or to arrange a telephone consultation.
2. For aquaponics, unless the focus is on developing significant technological improvements, proposals that deal with applying current aquaponics technology should be submitted to 8.12 Small and Mid-Size Farms.
3. Applications that deal with the development of new food products derived from aquaculture species should be submitted under topic area 8.5 Food Science and Nutrition.
4. Applications that deal with biomass conversion or development of new products from algae should be submitted to the 8.8 Biofuels and Biobased Products topic area.

Topic Area 8.8, Biofuels, and Biobased Products

Background. The objective of this topic area is to promote the use of non-food biobased products and biofuels by developing new or improved technologies that will lead to increased competitiveness of value-added products from agricultural materials. This research will lead to new opportunities to diversify agriculture and enhance agriculture's role as a reliable supplier of raw materials to industry. Historically, appropriate research areas have included development of improved technology for converting agriculturally derived raw materials into useful industrial products; development of new products from new industrial crops; and improving the effectiveness or cost-competitiveness of industrial products derived from agricultural materials in comparison to non-agriculturally derived products. In order to enhance the impact of the program, acceptance of applications will be limited to select Research Priority Areas.

Research Priorities. Examples of appropriate subtopics for research applications from small businesses include, but are not limited to, the following:

1. ***New Non-food Biobased Products from New Industrial Crops.*** Identification of markets and development of new biobased products and processes from new industrial crops or microbes. These products should be economically competitive and have environmental sustainability benefits compared to similar products on the market.
2. ***New Processes for the Manufacture of Industrial Products, Chemicals, or Biofuels.*** New processes for the production of biobased industrial products, chemicals, or biofuels that will be competitive with the cost and performance of equivalent petroleum-based products. Support for biofuel projects includes the sustainable conversion of crops and agricultural residues into biofuels (conventional, cellulosic, or advanced biofuels) or coproducts that will improve the economic feasibility of production of those biofuels. Technologies must seek to minimize adverse environmental impacts such as energy use,

water use, harmful byproducts, and life cycle carbon emissions in comparison to incumbent products.

Other Key Information

1. Applicants are strongly encouraged to contact the NPL regarding the suitability of research topics. Contact Dr. Charles Cleland, NPL for SBIR Forests and Related Resources at ccleland@nifa.usda.gov or (202) 401-6852 or SBIR@Nifa.usda.gov regarding questions about the suitability of research topics or to arrange a telephone consultation.
2. Applications that include software development or other data-intensive technologies are encouraged.
3. Applications that deal with developing value-added biofuels (including ethanol) and biobased products from forest biomass should be submitted to the 8.1 Forest and Related Resources topic area.
4. Applications that deal with developing biofuels and bioenergy that will improve the sustainability of small and mid-size farms should be submitted to the 8.12 Small and Mid-Size Farms topic area.
5. Applications that deal with the genetic improvement or production of biomass feedstock crops except for woody biomass and algae should be submitted to the 8.2 Plant Production and Protection (Biology) topic area.
6. Applications that deal with the genetic improvement, production, or feedstock logistics of woody biomass feedstock crops should be submitted to the 8.1 Forest and Related Resources topic area.
7. Applications that deal with the genetic improvement, production, or feedstock logistics of photosynthetic algae should be submitted to the 8.7 Aquaculture topic area.
8. Applications that deal with the engineering aspects of the planting, production, or post-harvest handling of biomass feedstock crops should be submitted to the 8.13 Plant Production and Protection – Engineering topic area.
9. Animal manure and carcass waste are considered acceptable feedstocks for applications to the 8.8 Biofuels and Biobased Products topic area.
10. Microbial approaches must demonstrate a credible path to industrially relevant conversion rates, yields, and titers.

NOTE: *There are no Topic Areas 8.9 through 8.11.*

Topic Area 8.12, Small and Mid-Size Farms

Background. The Small and Mid-Size Farms topic area aims to promote and improve the sustainability and profitability of small and mid-size farms and ranches (where annual sales of agricultural products are less than \$250,000 for small farms and \$500,000 for mid-size farms - hereafter referred to as small farms). The vast majority of farms in this country are small and they play an important role in the agricultural sector. The viability and sustainability of small farms is important to the Nation's economy and to the stewardship of our biological and natural resources. While some small farms are located in urban areas, most small farms are located in rural areas, and these farms are critical to sustaining and strengthening the leadership and social fabric of rural communities. Applicants are strongly encouraged to emphasize how their project would contribute to the well-being of rural communities and institutions. In particular, applicants

should emphasize how the results of their project would be disseminated to other small farmers and provide benefit to the small farm community.

Research Priorities. Examples of appropriate subtopics for research applications from small businesses include, but are not limited to, the following:

1. ***New Agricultural Enterprises.*** Efforts are needed to develop new agricultural enterprises that are small scale and focused on specialty farm products, both plant and animal, and on innovative ways to market these farm products through direct marketing, such as farmers markets or cooperatives where the financial return to the farmer is optimized or through specialty market outlets that offer a higher financial return. Emphasis is encouraged for organic and natural foods, specialty animal products, such as free-range poultry or natural beef, non-food specialty crops, such as medicinal herbs and value-added food, and non-food products.
2. ***Development of New Marketing Strategies.*** Efforts are needed to develop appropriate new strategies for marketing agricultural, forestry and aqua cultural commodities and value-added products produced by small farms in local, regional, national and international markets, including the assessment of consumer demand; identification of desired product characteristics, including packaging and processing methods; development of new and innovative utilization of existing production and processing technologies; and the promotion of efficient assembling, packing, processing, advertising and shipping methods.
3. ***Farm Management.*** Efforts are needed to develop tools and skills that are appropriate for small farms that will enhance the efficiency and profitability of small farms. New tools are also needed that will enhance farm safety. Development of new risk management tools to facilitate better planning is needed. Development of improved farm level life-cycle assessment tools that help small to mid-sized farms 1) improve operations through resource efficiency and 2) quantify ecosystem services provided is needed. Innovative ways to promote agro-tourism as a way to enhance farm profitability is encouraged.
4. ***On Farm Natural Resources and Renewable Energy.*** Efforts are needed to promote improved energy efficiency and conservation in farming operations through scaled up technologies and innovations that reduce operation costs, increase efficiency and increase profits while utilizing natural resources. Particular emphasis is needed to develop better ways to utilize on farm renewable energy sources, such as wind, solar, and geothermal energy. Innovations should be scalable to multiple farm markets and not only focused on an individual farm.
5. ***Urban Farming.*** In recent years, there has been increasing interest in the establishment of small farms in urban areas on rooftops, in abandoned buildings and in vacant lots. Efforts are needed to explore ways to make urban farming more energy efficient, environmentally sustainable, and profitable. The most appropriate crops for urban farms need to be determined. Procedures that would increase the establishment of new urban farms need to be developed.

Other Key Information

1. Applicants are strongly encouraged to contact the NPL regarding the suitability of research topics. Contact Dr. Denis Ebodaghe, National Program Leader for SBIR Small and Mid-Size Farms at debodaghe@nifa.usda.gov or (202) 401-4385 or

SBIR@Nifa.usda.gov regarding questions about the suitability of research topics or to arrange a telephone consultation.

2. New Technologies and Innovations that address conservation of natural resources and renewable energy should be submitted to Topic Area 8.4 Conservation of National Resources.
3. For aquaponics, unless the focus is applying current aquaponics technology, proposals that deal with developing significant technological improvements should be submitted to 8.7 Aquaculture.

Topic Area 8.13, Plant Production, and Protection (Engineering)

Background. The objective of this topic area is to enhance crop production in both conventional and organic systems by creating and commercializing engineering technologies that enhance system efficiency and profitability and that protect crops from pests and pathogens in economically and environmentally sound ways. Engineering projects **must** describe the system need; design specifications, and functionality and reliability; and cost benefit analysis. Where feasible, projects should describe the testing metrics, experimental design, and materials and methods to collect and analyze data on the metrics. Projects must address solutions that are scalable to address problems in commercial agriculture. Applications to the 8.13 topic area should focus on engineering solutions that directly improve crop production and protection. Applications proposing topics outside of crop production and protection should contact the NPL to ensure that that project is a fit in the program area. Applications for the Phase I program must address early stage, proof of concept research as is specified in this RFA. Adaptation of existing technologies to new crops, regions, pest, etc. must require significant innovation as to fit the proof of concept nature of the Phase I program.

Research Priorities. Examples of appropriate subtopics for research applications from small businesses include, but are not limited to, the following:

1. **Improved crop production methods or strategies.** Enhance the efficiency of crop production by utilizing innovative methods and equipment for planting, growing, and harvesting crop plants that optimize inputs and reduce operational costs. Topics may include but are not limited to:
 - a. Technologies that enhance commercial horticulture production. Projects to improve the competitiveness of U.S. commercial horticulture production including flowering potted plant, bedding plant, cut flower production, seasonal crops, annuals, and perennials.
 - b. Production, harvesting, and postharvest handling of specialty crops. Projects to reduce manual labor needs, maintain or improve quality, improve handling, and reduce postharvest loss.
 - c. Cyber-physical systems to support precision agriculture. Projects that accelerate the integration of cyber-physical systems into precision agriculture including methods, tools, hardware, and software components. Projects should focus on developing new innovation that are improvements compared to existing technologies.
 - d. Controlled environment agriculture. Projects that develop crop management systems, greenhouse structures, and controlled environmental agriculture systems that promote energy conservation and efficiency, including the development of technology for the

- economic use of renewable energy resources. Projects should take into account the optimal conditions required for plant production, not only the reduction of energy.
2. ***Plant protection against abiotic and/or biotics stresses.*** Reduce the impact of plant pathogens, insect pests, weeds, and abiotic stresses on crop plants. Topics may include *but are not limited to:*
 - a. Improved chemical application technology. Projects that increase product efficacy, worker safety, and reduce off-target drift of applied chemicals.
 - b. Monitoring, detection, and management. Projects that provide technical solutions for monitoring, detection, and management of pests and abiotic stresses at the earliest stage of their manifestation. Projects on diagnostics, decision support systems, and machine-assisted detection of plant pathogens and pests submitted to this area should focus on engineering methods, decision support analysis, and diagnostic output leading to mitigation of abiotic and biotic stresses. Projects should address known or emerging abiotic or biotic stresses that are reducing yields in commercial systems.
 3. ***Pollinators and crop production.*** Engineering technologies that address the health and success of domesticated and natural pollinators of economically important crops.

Other Key Information

1. Applicants are strongly encouraged to contact the NPL regarding the suitability of research topics. Contact Dr. Rachel Melnick, National Program Leader for SBIR Plant Production and Protection Engineering at rmelnick@nifa.usda.gov or (202) 401-4980 or SBIR@Nifa.usda.gov regarding questions about the suitability of research topics or to arrange a telephone consultation.
2. Applications that deal with the feedstock logistics of woody biomass (including short rotation crops like willow and poplar) or rangeland and grassland management should be submitted to the 8.1 Forest and Related Resources topic area.
3. Applications that deal with genetic engineering for improved crop production and protection should be submitted to 8.2 Plant Production and Protection – Biology.
4. Applications that deal with irrigation technology and decision support for irrigation should be submitted to 8.4 Conservation of Natural Resources topic area.
5. Applications that deal with the production of algae for biofuel production should be submitted to the 8.7 Aquaculture topic area.

In addition to the areas listed above, USDA NIFA recognizes Agricultural-related manufacturing technology and energy efficiency and alternative and renewable energy as two crosscutting priorities with relevance to all areas listed in this program solicitation. The USDA NIFA encourages applicants to address these priorities, as appropriate, within their applications. However, these are not meant to be standalone topic areas.

Agricultural-related Manufacturing Technology. On February 26, 2004, the President issued Executive Order 13329 (69 FR 9181) entitled “Encouraging Innovation in Manufacturing.” In response to this Executive Order, USDA NIFA encourages the submission of applications that deal with some aspect of agricultural-related manufacturing technology. Since manufacturing affects all aspects of agriculture and rural development, applications dealing with manufacturing could be submitted to any of the topic areas.

Energy Efficiency and Alternative and Renewable Energy. In an effort to find alternatives to fossil fuels and to reduce overall energy usage, the USDA established research on energy efficiency and alternative and renewable energy as a high priority. Such research includes development of new energy crops, improved methods for producing biofuels, such as ethanol, butanol, and biodiesel, producing hydrogen and other fuel gases from agricultural waste, and more efficient use of energy in agricultural production and in rural communities. Energy issues affect all aspects of agriculture and rural development and thus applications dealing with energy efficiency and alternative and renewable energy could be submitted to any of the topic areas.

D. Potential Commercial Outcome

In addition to supporting scientific research and development, another program goal is to provide incentives and opportunities for small business firms to convert USDA NIFA-sponsored research into technological innovations in the private sector. All proposed research should have some potential commercial outcome therefore the application will require additional information on market opportunities as described in Part IV, Field 8, Project Narrative. Additionally if a Phase I applicant has received a prior Phase II grant from the USDA NIFA SBIR Program, the applicant is required to provide USDA NIFA with an update on the commercialization activities of the prior project (See Part IV, C. Section 9. SBIR/Small Business Technology Transfer Program (STTR) Information; Field 8. Documentation of Prior SBIR Phase II Awards).

PART II. AWARD INFORMATION

A. Available Funding

USDA NIFA plans to fund approximately fifteen (15) percent of the Phase I applications within each of the ten (10) topic areas identified in this RFA. This RFA is released prior to the passage of an appropriations act for FYs 2020 and 2021. Enactment of continuing resolutions or an appropriations act may affect the availability or level of funding for this program. USDA is not committed to fund any particular application or to make a specific number of awards. The [Automated Standard Application for Payments](#), operated by the Department of Treasury, Bureau of Fiscal Service, is the designated payment system for awards resulting from this RFA.

Awards are based on the level of funding provided to the program in FYs 2020 and 2021. USDA NIFA will only award up to two (2) SBIR Phase I awards per Small Business Concern. In the event that more than two (2) applications are recommended for an award by the peer review panels across the entire program, NIFA SBIR staff will contact the applicant and request a written determination that describes which two (2) applications should be funded under this RFA. Any applications not selected by the applicant for funding may be resubmitted to the SBIR program under a future Phase I RFA to be reviewed under the USDA SBIR competitive peer review process and procedures.

B. Application Restrictions

NIFA will evaluate applications using the criteria described in [Part V](#) of this RFA. Applications for FY 2020 and FY 2021 are limited to the following applications types:

1. *New application*: New applications will be evaluated using the criteria described in [Part V](#) of this RFA and are subject to the due dates herein (see [Appendix III](#) for definitions).
2. *Resubmitted application*: Resubmitted applications must include the respond to the previous review panel summary, and are subject to the same criteria and due dates herein. Resubmitted applicants must enter the NIFA-assigned proposal number of the previously submitted application in the *Federal Field (Field 4)* on the application form (see [Appendix III](#) for definitions).

C. Project Types

Phase I applications may not request more than \$100,000 for a period normally not to exceed 8 months. In special cases, NIFA can allow the period of performance to 20 months and may not request more than \$100,000. The planned period of performance dates are listed below, however these dates may change due to the enactment of continuing resolutions or an appropriations act.

FY2020 ~ Phase I, Start: 7/1/2020, End: 2/28/2021

FY2021 ~ Phase I, Start: 7/1/2021, End: 2/28/2022

D. Ethical Conduct of Funded Projects

In accordance with sections [2, 3, and 8 of 2 CFR Part 422](#), institutions that conduct USDA-funded extramural research must foster an atmosphere conducive to research integrity, bear primary responsibility for prevention and detection of research misconduct, and maintain and effectively communicate and train their staff regarding policies and procedures. In the event an application to NIFA results in an award, the Authorized Representative (AR) assures, through

acceptance of the award that the institution will comply with the above requirements. Award recipients must, upon request, make available to NIFA the policies, procedures, and documentation to support the conduct of the training. See [Responsible and Ethical Conduct of Research](#) for further information.

Reporting Waste, Fraud and Abuse - In the event a company or individual suspects any waste, fraud and/or abuse, the company or individual can contact the USDA Office of Inspector General (OIG)'s [hotline](#) or at (800) 424-9121.

PART III. ELIGIBILITY INFORMATION

A. Eligibility Requirements

Applicants for the SBIR program must meet all the requirements discussed in this RFA. Applicants must qualify as a Small Business Concern (SBC) for R/R&D purposes at the time of selection (see definitions in section Part VIII) Failure to meet the eligibility criteria by the application deadline may result in exclusion from consideration or, preclude NIFA from making an award. For those new to Federal financial assistance, NIFA's [Grants Overview](#) provides highly recommended information about grants and other resources to help understand the Federal awards process.

A potential grantee that is a subsidiary must show that the parent company or parent companies are also a small business entity and the parent company or parent companies must provide documentation supporting their small business status (the documentation should be included in, Other Attachments, of the Research and Related (R&R) Other Project Information form as directed by Part IV of this RFA). If the parent company or one of the parent companies is a nonprofit organization, then the subsidiary is not eligible to submit an SBIR application.

In addition, the primary employment of the Project Director/Principal Investigator (PD/PI) must be with the small business concern at the time of award and during the conduct of the proposed research. Eligible primary employment means that more than one-half (51%) of the PD's/PI's time is spent in the employ of the small business during the award period of performance. Primary employment with the small business precludes the applicant as a full-time employee with another organization or academic institution. While the PD/PI must work more than one-half (51%) of his/her time for the small business during the entire grant period, there is no time requirement for the PD's/PI's work on the proposed research. Prior Federal Employees must provide documentation that post termination requirements from Federal Service has been completed at time of submission.

Size. An SBIR awardee, combined with its affiliates, must not have more than 500 employees. The small business concern must be the primary performer of the proposed research effort. In Phase I, a **minimum of two-thirds (2/3)** of the research or analytical work, as determined by budget expenditures, must be performed by the proposing organization.

Work in the United States. For Phase I, the R/R&D work must be performed in the United States. On rare and unique circumstances, for example, a supply, material, or project requirement may not be available in the United States, agencies may allow that particular portion of the R/R&D work to be performed or obtained outside of the United States. Upon award, the Phase I awardee may request an exception as described in the award terms and conditions and submit to USDA NIFA for approval.

Benchmark. Any company that has received at least 20 Phase I awards, regardless of the awarding agency, during the five-year period (FY 2015 through 2020) must have received a minimum of five Phase II awards (25% conversion rate), regardless of the awarding agency, over the same five-year period to be eligible to submit a Phase I application in response to this solicitation. If a company has not received a SBIR award or has received less than 20 SBIR awards, this benchmark requirement does not apply.

B. Cost Sharing or Matching

No Match Required - The SBIR has *NO* matching requirement. NIFA will not factor matching resources into the review process as an evaluation criterion.

PART IV. APPLICATION AND SUBMISSION

A. Method of Application

Applicants must apply to this RFA electronically; no other method or response is accepted. The electronic application for this RFA and additional resources are available on [Grants.gov](https://www.grants.gov) and [Grants 101](#). **Table 2** provides instructions on how to obtain an electronic application. **Part II § 1** of the [NIFA Grants.gov Application Guide](#) (Application Guide) contains detailed information regarding the [Grants.gov](https://www.grants.gov) registration process.

Table 2. Steps to Obtain Application Materials

Steps	Action
Step One: Register	<i>New Users</i> to Grants.gov must register early with Grants.gov prior to submitting an application (Register Here).
Step Two: Download Adobe	Download and Install Adobe Reader (see Adobe Software Compatibility for basic system requirements)
Step Three: Find Application	Using this funding opportunity number USDA-NIFA-SBIR-006790 , search for application here: Opportunity Package . Applicants considering applying to the second year should check the USDA SBIR RFA webpage and Grants.gov after June 30, 2020 for the FY 2021 Funding Opportunity Number and Application Kit, as well as for any programmatic changes.
Step Four: Assess Readiness	Contact an AR prior to starting an application to assess the organization’s readiness to submit an electronic application.

Table 3: Help and Resources

Grants.gov Support	NIFA Support
Grants.gov Online Support Telephone support: 800-518-4726 Toll-Free or 606-545-5035 Email support: support@grants.gov Self-service customer based support: Grants.gov iPortal <i>Key Information: Customer service business Hours 24/7, except federal holidays.</i>	Email: electronic@nifa.usda.gov Phone: 202-401-5048 <i>Key Information: Business hours: Monday thru Friday, 7a.m. – 5p.m. ET, except federal holidays</i>

B. Small Business Administration (SBA) Registration

Companies that submit an application to any SBIR solicitation are required to register with the SBIR company registry. All companies are also required to update their commercialization status through the SBIR company registry. Supporting documentation must be included in a company's application as a portable document format (PDF) file and attached under Field 12 of the application. SBIR registration information is available on the [SBIR Homepage](#).

C. Content and Form of the Application

The [Application Guide](#) is part of the corresponding application package for this RFA. The RFA overrides the [Application Guide](#) if there is a discrepancy between the two documents. NIFA will accept subsequent submissions to an application until the application deadline. However, applicants that do not meet the application requirements, to include partial applications, risk being excluded from NIFA's review. NIFA will assign a proposal number to all applications that meet the requirements of this RFA. Applicants must refer to the proposal number when corresponding with NIFA. **Table 4** outlines other key instructions for applicants.

Phase I applications must address **only** scientific research activities that leads to a commercialized innovation. A small business **must** not propose technical assistance for the following:

1. Demonstration projects
2. Classified research
3. Large equipment purchases including vehicles and farm equipment
4. Construction or purchase of infrastructure, buildings or real property
5. Financial assistance to start or create a company
6. Patent applications

Many of the research projects supported by the SBIR program lead to the development of new marketable innovations based upon the research results obtained during the project. However, projects that seek funding solely for product development where no research is involved (i.e., the funds are needed to permit the development of a product based on previously completed research) will not be accepted. Research may be carried out through the construction and evaluation of a laboratory prototype, where necessary.

Phase I applications must also describe the market opportunity of the innovation being researched under Phase I (Part IV, Field 8. Project Narrative). Applications that deal principally with developing proven concepts for commercial markets or scaling up previously developed prototypes for commercial production should not be submitted unless the concepts align with topic areas 8.6: Rural and Community Development and/or 8.12: Small and Mid-Sized Farms. Efforts that are aligned with developing proven concepts for commercial markets or scaling up previously developed prototypes are considered the responsibility of the private sector and therefore are not supported by USDA NIFA unless these are submitted to topic areas 8.6 and 8.12. An application must be limited to only one research problem.

Literature surveys are to be completed prior to the Phase I application and not be proposed as part of the R&D effort. Applicants may respond to any of the topic areas listed under Part I, Section C. SBIR Phase I topic areas. The same application, however, may not be submitted under more than one topic area. Organizations may submit separate applications under different topic

areas or different applications under the same topic area outlined in this solicitation. Where similar research is discussed under more than one topic area, the applicant should choose the topic area description that is most relevant to the applicant’s research concept. Duplicate applications will not be reviewed.

The purpose of a research application is to provide a written statement that contains sufficient information to persuade members of the research community who review the application and then advise the USDA NIFA SBIR professional staff that the proposed research is a sound approach to an important scientific question and is worthy of support under the stated USDA NIFA evaluation criteria. The application is to be self-contained and written with the care and thoroughness accorded papers for publication. Each application should be reviewed carefully by the applicant prior to submission and by others knowledgeable on the subject to ensure inclusion of data essential for comprehensive evaluation.

Duplicate or Multiple Submission – duplicate or multiple submission is not allowed. NIFA will disqualify both applications if an applicant submits duplicate or multiple submissions. For those new to Federal financial assistance, NIFA’s [Grants Overview](#) provides highly recommended information about grants and other resources to help understand the Federal awards process.

Modifications to the application will not be accepted after the closing date of this program solicitation. Under some circumstances, changes, additions, or corrections may be necessary to an application submitted to the USDA NIFA SBIR program via Grants.gov before the specified program solicitation closing date. Modifications to applications will require a resubmission of the entire application package and the applicant must notify the program at sbir@nifa.usda.gov of the resubmission. Submitting changes to Grants.gov without contacting the program contact could significantly delay your application submission and may result in the application not being reviewed.

Table 4: Key Application Instructions

Instruction	References (All references are to the Application Guide)
Attachments must be in a PDF format.	Part III § 3
Check the manifest of submitted files to verify attachments are in the correct format.	Part III § 6.1
Conduct an administrative review of the application before submission.	Part VII and
Follow the submission instructions.	Part IV § 1.5
Provide an accurate email address, where designated, on the SF-424 R&R.	Part IV § 1.5
Contact the Grants.gov helpdesk for technical support, and keep a record of the correspondence.	

Instruction	References (All references are to the Application Guide)
Contact NIFA if applicant does not received correspondence from NIFA regarding an application within 30 days of the application deadline.	

SF 424 R&R Cover Sheet. See **Part V § 2** and **Part V § 2.17** of the [Application Guide](#) for the required certifications and assurances.

Field 5. The USDA NIFA SBIR program’s official correspondence will be with either the PD or AOR.

Field 12. Proposed Project Start Date and End Date. The proposed duration of Phase I projects should normally not exceed eight months, except in special, justified circumstances. The planned period of performance dates are listed below, however these dates may change due to the enactment of continuing resolutions or an appropriations act. In most circumstances, the following dates should be used for these fields:

FY2020 ~ Phase I, Start: 7/1/2020, End: 2/28/2021

FY2021 ~ Phase I, Start: 7/1/2021, End: 2/28/2022

Field 17. Complete Certification. Refer to the [Application Guide](#) for information on the certifications that are being agreed to by checking this box. **Note:** An applicant who is delinquent on Federal debts must attach explanatory information detailing all relevant particulars concerning the Federal debt in PDF format in Field 12 of the R&R Other Project Information form (Other Attachments).

Field 20. Pre-application. This is not applicable to the USDA NIFA SBIR program. Do not add attachments.

SF 424 R&R Project/Performance Site Location(s). See **Part V § 3** of the [Application Guide](#).

R&R Other Project Information Form. See **Part V § 4** of the [Application Guide](#).

1. **Field 7. Project Summary (PS)/Abstract.** The PS must show how the project goals align with the project goals of SBIR. See **Part V § 4.7** of the [Application Guide](#) for instructions and suggested templates. The PS is limited to *one, 1.5-spaced* page.

The PS must include a description of the problem or opportunity, project objectives, and a description of the effort. The PS must also include a paragraph discussing the anticipated results and potential commercial applications of the proposed research. NIFA may publish the PS of successful applications; therefore, the PS should not contain proprietary information.

It is the responsibility of the applicant to review the attachment for page limit and PDF compliance before submission. Applicants must ensure that the abstract attachment meets the required page limit. NIFA will not review applications that exceed the required page limits.

2. *Field 8. Project Narrative (PN)*. The PN must not exceed **17, 1.5-spaced** pages of written text, except as noted herein (the font size may not be smaller than 12 points, Times New Roman with at least 1-inch margins). Labels for figures and tables may use a font no smaller than 10 point. The page limits outlined here ensure fair and equitable competition. Appendices to the PN are allowed if they are directly germane to the proposed project. Do not add appendices to circumvent the page limit. Applicants **must not** include additional information such as cover sheets, table of contents, reference listings, budgets, and appendices unless the applicant intends for NIFA to consider them in the page count.

The PN must include all of the following, or NIFA may not review it:

- a. *Response to previous review*: The response to previous review is limited to applicants who are submitting an application in which the project described was previously submitted to the SBIR program, but not funded. The response must not exceed **one, 1.5 spaced** pages. This does not count towards the page limit for the PN. Applicants need to provide a clear statement acknowledging comments from the previous review, indicating revisions, rebuttals, etc. Furthermore, the revised application should clearly indicate the changes that have been made in the project. If more than one page is required, additional pages should be taken from the 17-page limit of the PN. The total page limit of the response to previous review, including the PN is 18 pages.
- b. *Responsiveness to USDA NIFA SBIR Program Priorities*: Indicate if the application has a connection to agricultural–related manufacturing technology, energy efficiency and alternative and renewable energy. Provide a brief explanation of how the application is related to the area indicated.
- c. *Identification and Significance of the Problem or Opportunity*: Clearly state the specific technical problem or opportunity addressed and its importance.
- d. *Background and Rationale*: Indicate the overall background, technical approach, and market needs to the problem or opportunity being pursued. This must include a statement of end-user needs. Describe how the proposed research plays a part in providing needed results. As a part of this section, it is critical that applications adequately cite relevant scientific literature to demonstrate support for your proposed research. Moreover, all citations provided must be properly referenced in the Bibliography & References Cited as a separate attachment (see Field 9). USDA NIFA has the right to decline any application where there is evidence of plagiarism
- e. *Relationship with Research or Research and Development*: Discuss the significance of the Phase I effort in providing a foundation for the follow-on Phase II effort. State the anticipated results of the approach if the project is successful and address: (a) the technical, economic, social, and other benefits to the Nation and to users of the results, such as the commercial sector, the Federal Government, or other researchers; (b) the estimated total cost of the approach relative to benefits; and (c) any specific policy issues or decisions that might be affected by the results.

- f. *Technical Objectives*: State the specific objectives of the research or research and development effort. Include the technical questions needed to establish the technical feasibility of the proposed approach.
 - g. *Work Plan*: The work plan must provide an explicit, detailed description of the research or research and development approach. The plan should list the tasks to be performed, provide details of the methodology that would be used to research each task, including statistical analysis, if applicable, and indicate how and where the work will be carried out. The effort should attempt to determine the technical feasibility of the proposed concept. The work plan is linked with the technical objectives of the research and the questions the effort is designed to answer. This section will constitute a substantial portion of the project narrative and can include graphics, tables, charts, etc.
 - h. *Related Research or Research and Development*: Describe significant research or Research and Development (R&D) activities that are directly related to the proposed effort, including any conducted by the Project Director or by the proposing small business concern, how the proposed effort expands on the related work, and any planned coordination with outside sources. Describe any commercial products, services, or innovations that are already in the market and if the project relates back to that R&D. Discussion of existing innovations in the application should convince reviewers that the applicant is aware of related research and commercial innovations in the selected subject. It is critical that the applicant make a convincing case that the proposed research builds upon previous research and, if successful, will lead to the development of new innovations or to substantial improvement of an existing product, process, service, or technology.
 - i. *The Market Opportunity*: Describe the market and addressable market for the innovation. Discuss the business economics and market drivers in the target industry. How has the market opportunity been validated? Describe your customers and your basic go to market strategy to achieve the market opportunity. Describe the competition. How do you expect the competitive landscape may change by the time your product/service enters the market? What are the key risks in bringing your innovation to market? Describe your commercialization approach. Discuss the potential economic benefits associated with your innovation, and provide estimates of the revenue potential, detailing your underlying assumptions. Describe the resources you expect will be needed to implement your commercialization approach.
3. *Field 9. Bibliography & Cited References*. Provide a complete list of all references cited in the application. For each reference, provide the complete name for each author, the year of the publication, full title of the article, name of the journal or book published, volume, and the page numbers. Please list the references in alphabetical order using the last name of the first author.
 4. *Field 10. Facilities & Other Resources*. Describe the types, location, and availability of instrumentation and physical facilities necessary to carry out the work proposed. If the work will be conducted at a facility not owned and operated by the applicant, see Field 12 for additional information.
 5. *Field 11. Equipment Documentation*. Describe the types, location, and availability of equipment necessary to carry out the work proposed. Items of equipment to be purchased must be fully justified under this section. When purchasing equipment or a product under

the SBIR funding agreement, the small business should purchase only American-made items whenever possible.

6. *Field 12, Add Other Attachments.* See **Part V § 4.12** of the [Application Guide](#).
- a. *Use of Facilities or Equipment.* If university facilities, private facilities, or government laboratories are being used, there must be a letter in the application from the authorized organizational representative of the university, private facility, or government laboratory describing the arrangement and testifying that the facilities will be subject to the exclusive use and control of the applicant.
 - b. *Outside Services.* Involvement of university, government, or other outside personnel in the planning and research stages of the project as consultants or through subcontracting arrangements is permitted and may be particularly helpful to small businesses that have not previously received Federal research awards. Establishment of a Cooperative Research and Development Agreement (CRADA) with a USDA laboratory or other Federal laboratory may also be beneficial to proposing firms. If the application involves outside consultants, subcontracts, or involvement with a CRADA partner, these arrangements must be described in detail. Only one-third (1/3) of the grant based on expenditures can normally be used for outside services. Applications must include letters from proposed consultants, subcontractors, or CRADA cooperators indicating their willingness to serve in order for such participation to be considered during the application review and evaluation process.
 - c. *Letters of Support.* Letters of Support are strongly encouraged and should be included. Letters of support act as an indication of market validation and technical support for the proposed innovation and add significant credibility to the proposed effort. Letters of support demonstrate that the company has initiated dialogue with relevant stakeholders (potential customers or end users, strategic partners or investors) for the proposed innovation and that a legitimate business opportunity may exist should the technology prove feasible. The letter(s) must contain affiliation and contact information for the signatory stakeholder. Letter of support from consultants or subcontractors may be provided if they are providing a critical role in the project, such as access to facilities, equipment, or expertise. The recommended page limit for each individual letter is two pages. Letters and supporting documents from State, Local and Congressional representatives are NOT considered letters of support and should not be submitted as part of the application. Applicants must include these letters of support in a PDF format and upload to Field 12 of the R&R Other Project Information form (Add Other Attachments).

If letters of support are not appropriate for this stage of an innovation, due to business considerations, then the applicant must clearly justify why letters of support are not being included a 2-page document. The justification should relate to the technical and commercial considerations of the innovation proposed in the application.

- d. *Duration Exceeds Normal Project Period.* The proposed duration of Phase I projects will not normally exceed eight (8) months, except in special, justified circumstances. Where a proposed research project requires more than eight months to complete Phase I, a longer project period, not to exceed twenty (20) months, may be requested. An applicant of a Phase I project with an anticipated duration beyond eight months should specify and justify the length of duration in the application at the time of its submission to USDA NIFA.

- e. *Applicant is a Subsidiary.* A potential grantee that is a subsidiary must show that the parent company or parent companies are also a small business entity and the parent company or parent companies must provide documentation supporting their small business status. The parent company or companies must reside in the U.S. and cannot be a nonprofit. The subsidiary must provide documentation to support its independent viable financial status.
- f. *Statement of Delinquency on Federal Debts by Applicants for Federal Assistance.* An applicant that is delinquent on Federal debts must attach, in PDF format, explanatory information detailing all relevant particulars concerning the Federal debt.
- g. *Non-Domestic Performance Explanation.* In the budget justification, provide the purpose, the destination, method of travel, number of persons traveling, number of days, and estimated cost for each trip. If details of each trip are not known at the time of application submission, provide the basis for determining the amount requested. All Applicants **MUST** note that per the terms and conditions of the award “All foreign travel performed under this project must be approved in writing by USDA NIFA prior to departure. If foreign travel is authorized under this project, the approved budget will identify funds for this purpose. Where foreign travel is contemplated subsequent to the effective date of the project, a written request must be submitted to the USDA NIFA outlining the purpose of the proposed trip, the inclusive dates of travel, the destination, and estimated costs involved.”

R&R Senior/Key Person Profile (Expanded). Applicants must fill out a profile for the PD and anyone who the budget will support. See **Part V § 5** of the [Application Guide](#) for profile requirements, details about the biographical sketch, and suggested support templates. All biographical sketches must indicate the employment history of each PD and Co-PD for the last 10 years. Applicants must include the current and pending support form as an attachment in the application. The PD and Co-PDs must include a conflict of interest form.

R&R Personal Data. This information is voluntary and is not a precondition of award (see **Part V § 6** of the [Application Guide](#)).

R&R Budget. See **Part V § 7** of the [Application Guide](#). Applicant must complete a Research and Related Budget form for each year (or partial year) for which work is proposed under this program solicitation. Applicants must ensure that the budget provided in the R&R Budget forms matches the requested budget amount found in Field 15(a) on the SF-424 form and that this number does not exceed the budget ceiling.

Request for use of Technical and Business Assistance (TABAs): The John S. McCain National Defense Authorization Act for Fiscal Year 2019 permits SBIR Phase I awardees to enter into agreements with one or more vendors to provide Technical and Business Assistance (TABAs). USDA is able to fund TABA assistance to all USDA SBIR Phase I grantees. Grant recipients have two options for receiving TABA assistance: (1) utilize services provided by a USDA vendor or (2) identify their own TABA assistance provider.

If you wish to receive TABA assistance from a USDA-funded vendor, you do not need to include this expense in your budget. If you are awarded a Phase I grant, you will receive notification from USDA and follow-up contact from a USDA-funded vendor on what services

are available to you and how to obtain these services at no cost to your small business. If you wish to utilize your own TABA assistance provider, you are required to include this as “Other Direct Costs” in your budget, provide a detailed budget justification, and a signed letter of commitment from the provider. You may include up to \$6,500 for assistance. Please note that this commercialization assistance does not count toward the maximum grant size of \$100,000. For example, seeking commercialization assistance from your own provider could result in an increase of \$6,500 over the maximum grant limit. That is under this RFA with a maximum grant limit of \$100,000, the actual grant may increase to \$106,500 respectively. Reimbursement is limited to services received that comply with 15 U.S.C. § 638(q). In the event some or the entire amount listed is not expended on a commercialization assistance services as proposed, the remaining funds cannot be budgeted to other project costs and will be provided back to USDA. Re-budgeting of these funds is not allowable.

Indirect costs will be provided after the USDA NIFA Oversight Branch has completed a review of requested indirect costs and has made a determination on the rate as required by law. Typically, indirect costs are approved within 6 to 12 months, depending on the negotiation process and if other Federal Agencies are cognizant.

Applicants must request a federal budget that is reasonable and must not exceed a ceiling of \$100,000 or \$106,500 if requesting TABA assistance from your own vendor. If an applicant requests a fee, the combined total of “Section I - Total Direct and Indirect Costs” and “Section J – Fee” on the Research & Related (R&R) Budget form must not exceed the ceiling of this full announcement. Proposals with budgets exceeding \$100,000 or \$106,500 will be returned without review.

Field C. Equipment Description - Performing organizations are expected to have appropriate facilities, suitably furnished, and equipped. However, applicants may request funding for items of equipment if they are specifically identified with the dollar amount and adequately justified, see Field K of the R&R Budget.

Field D2. Foreign Travel Costs Funds Requested - Requests for foreign travel must be approved based on the justification provided in the application. In the budget justification, provide the purpose, the destination, method of travel, number of persons traveling, number of days and estimated cost for each trip. If details of each trip are not known at the time of application submission, provide the basis for determining the amount requested. All Applicants **MUST** note that per the terms and conditions of the award: “All foreign travel performed under this project must be approved in writing by USDA NIFA prior to departure. If foreign travel is authorized under this project, the approved budget will identify funds for this purpose. Where foreign travel is contemplated subsequent to the effective date of the project, a written request must be submitted to the USDA NIFA outlining the purpose of the proposed trip, the inclusive dates of travel, the destination, and estimated costs involved.”

Fields E 1-5. Participant/Trainee Support Costs – See the [Application Guide](#) for directions.

Fields F 1-10. Other Direct Costs – See the [Application Guide](#) for directions.

Field G. Direct Costs – See the [Application Guide](#) for directions.

Field H 1-4. Indirect costs (IDC) – See [Part IV § D](#) of this RFA for funding restrictions regarding indirect cost, and **Part V 7.9** of the [Application Guide](#) for additional information. Additional guidance on indirect cost calculation for application to USDA NIFA can be found at [USDA Indirect Cost](#). USDA NIFA does not have a cap on Indirect Costs for SBIR grants. Applicants that have a federal negotiated Indirect Cost Rate already established are eligible to take their federally negotiated indirect cost rate.

Field J. Fee - Applicants must reference the [Application Guide](#) for directions. If an applicant requests a fee, the combined total of “Section I - Total Direct and Indirect Costs” and “Section J – Fee” on the Research & Related (R&R) Budget form must not exceed the ceiling of this program solicitation. Please see Field K (6) below.

Field K. Budget Justification – A budget justification with supporting detail for each budget category as noted in items (1) through (5) of this subsection must be attached. A budget justification is required for each entity for which a Research and Related Budget Form is submitted. Budget Justification categories are as follows:

1. *Salaries and Wages.* Indicate the number and kind of personnel for whom salary support is sought, including job tasks. For key personnel, also indicate the number of work months of involvement to be supported with USDA NIFA funds, and explain how the level of compensation was established (e.g., the hourly rate of pay, the monthly rate of pay, or the yearly rate of pay).
2. *Equipment.* Performing organizations must have appropriate facilities, and have them suitably furnished and equipped. However, funding for items of equipment may be requested, if they are specifically identified with the dollar amount and adequately justified. Such requests should normally not exceed 10 percent of the budget. Equipment is defined as an article of nonexpendable, tangible personal property having a useful life of more than one year and an acquisition cost of \$5000 or more per unit. Awardees are usually allowed to retain title to equipment purchased with funding provided under a SBIR funding agreement. However, in some instances, USDA NIFA may direct the awardee to vest title to a third party. Awardees should plan to lease expensive equipment. The inclusion of equipment will be carefully reviewed and will require prior approval from NIFA per 2 C.F.R. 200.439 with respect to need, reasonableness, and appropriateness for the research proposed.
3. *Materials and Supplies.* The types of expendable materials and supplies required are indicated in this section in general terms with estimated costs.
4. *Travel.* The type and extent of travel and its relationship to the project must be specified. Funds may be requested for fieldwork or for travel to professional meetings. Requests for foreign travel may be approved by USDA NIFA based on the justification provided in the application and the terms and conditions for the grant. In the budget justification, provide the purpose, the destination, method of travel, number of persons traveling, number of days, and estimated cost for each trip. If details of each trip are not known at the time of application submission, provide the basis for determining the amount requested.
5. *All Other Direct Costs.* Other anticipated direct costs not included above must be itemized. Examples include, but are not limited to, subcontracts and consultants. See Field 12 “Other Attachments” of the R&R Other Project Information form for required documentation associated with subcontracts and consultants. A budget and budget justification stating sub-contractual and consulting costs and the rationale for the costs are

required. In Phase I, a minimum of two-thirds (2/3) of the research or analytical work, as determined by budget expenditures, must be performed by the proposing organization. Consultants' rate of pay normally cannot exceed \$629/day for an 8-hour day.

6. *Fee*. A reasonable fee, not to exceed seven percent of total Federal funds awarded (.07527 of Field I, Total Direct and Indirect Costs) is permitted under this program solicitation, but applicants are encouraged to minimize fee requests due to the small amount of funds available. All fees are subject to negotiation with USDA NIFA. If a fee is requested, the amount should be indicated in Field J "Fee" on the R&R Budget form. If an applicant requests a fee, the combined total of "Section I - Total Direct and Indirect Costs" and "Section J – Fee" on the Research & Related (R&R) Budget form must not exceed the ceiling of this program solicitation. Budget requests that exceed the ceiling of this program solicitation will be excluded from review.
7. *Indirect Costs*. See Part V § 7.9 of the [Application Guide](#) for information about requesting indirect cost.
8. *Cost Sharing*. Cost sharing is permitted for applications under this program solicitation; however, cost sharing is not required nor will it be an evaluation factor in considering the competitive merit of applications submitted.

R&R Sub-award Budget Attachment. See Part V § 8 of the [Application Guide](#). By statute, the USDA NIFA SBIR program can only allow up to one-third (1/3) of the grant funds to be used for subcontracting and consulting purposes.

Supplemental Information Form. See **Part VI § 1** of the [Application Guide](#).

1. Field 2. Program to which the applicant is applying. This refers to the SBIR topic area to which you are submitting your USDA NIFA SBIR application. For example, program code name: *Animal Production and Protection*; program code: 8.3. Accurate entry is critical.

If you have a question about which topic area is appropriate for your application, please contact the National Program Leader (NPL) in the area(s) in question. An application can only be submitted to one topic area. It is extremely important the Program Code Name and Program Code are spelled correctly and match exactly one of the topic areas indicated in Part I, section C of this program solicitation. Failure to complete these fields correctly could significantly delay the acceptance of your application into the program and the application may not be reviewed.

2. Field 8. Conflict of Interest List. See **Part VI § 1.8** of the [Application Guide](#).

Representations Regarding Felony Conviction and Tax Delinquent Status for Corporate Applicants. This is required for corporate applicants. See **Part VI § 2** of the [Application Guide](#) for a description of the term, "corporation."

SBIR/Small Business Technology Transfer Program (STTR) Information. See **Part VI § 3** of the [Application Guide](#), unless noted below.

Program Type ~ Select SBIR. USDA NIFA does not offer a STTR program
SBIR/STTR Type – Select Phase I

Field 7. Commercialization Plan. Leave blank.

Field 8. Documentation of Prior SBIR Phase II Awards – There are two documents Phase I applicants must provide:

1. **Attachment 1:** A small business firm that submits a Phase I application and has received more than 15 Phase II SBIR awards during the preceding five fiscal years must document the extent to which it was able to secure Phase III funding to develop concepts resulting from previous Phase II SBIR awards. In addition, the documentation must include the name of the awarding agency, date of award, funding agreement number, amount, topic or subtopic title, follow-on agreement amount, source and date of commitment, and current commercialization status for each Phase II award. USDA NIFA must collect and retain the information at least until the General Accounting Office submits the report required under section 105 of the Small Business Research and Development Enhancement Act of 1992.

If the applicant falls under the threshold indicated above, the applicant must provide an attachment stating that less than 15 Phase II awards have been granted to this organization/company during the preceding five fiscal years.

2. **Attachment 2: Five (5)-Page Limit.** A small business firm that submits a Phase I application and has previously received Phase II funding under the USDA NIFA SBIR Program **must** document the extent to which it was able to secure Phase III funding and commercialize the technology, product, or service funded by USDA NIFA SBIR. The documentation must include:
 - a. Business Name
 - b. Year Company was founded
 - c. Identify and name change your business has gone through with the past five years
 - d. List the parent company if you were a subsidiary or a spin-off
 - e. Percentage of company revenues for each of the past three (3) fiscal years from federal SBIR/STTR funding (include Phase I and Phase II awards).
 - f. Phase II Grant Information
 - g. Partnership-Related Activities
 - h. Funding: Describe any funding and third-party investments
 - i. Revenue & Sales that were directly attributed to the prior Phase II SBIR awards.
 - j. Intellectual Property Assets
 - k. Other Success Indicators (Employees, Acquisitions, Return on Investment etc.)
 - l. Company Achievements

USDA NIFA SBIR will collect and retain the information for its internal use. Any data provided under this section of the application may lead to USDA NIFA contacting the applicant to coordinate the development of additional information that can serve to inform the public and the Federal Government on the benefits of the USDA NIFA SBIR program to Small Businesses.

If the applicant does not have any prior USDA NIFA SBIR Phase II awards, the applicant must provide an attachment stating, “No prior USDA NIFA SBIR Phase II awards have been issued to [Insert Company Name].”

Data Management Plan. A Data Management Plan (DMP) is required for this program. Applicants should clearly articulate how the project director (PD) and co-PDs plan to manage

and disseminate the data generated by the project. The DMP will be considered during the merit review process (see [Part V § B](#) of this RFA, [Part III § 3.1](#) of the [Application Guide](#) and [NIFA's Data Management Plan](#) page).

It is anticipated that the evaluation of SBIR Phase I applications will require approximately six months from submission deadline, and no information on application status will be available until final selections have been made. Both successful and unsuccessful applicants will be notified of final award decisions via email within approximately 6 months after the submission deadline.

D. Funding Restrictions

1. ***Fully negotiated rate.*** Applicants must use the current negotiated Indirect Cost (IDC) rate established by its cognizant Federal agency (the agency that provides the most funds). If awarded, the applicant will be required to produce a negotiated IDC rate agreement from the cognizant agency in order to recover IDC. If unable to obtain a negotiated rate from its cognizant agency, the applicant is not permitted indirect cost reimbursement. Rather, the applicant may only be reimbursed for allowable direct costs. Violation of cost accounting principles is not permitted when re-budgeting or charging costs to awards. Rather, costs must be consistently charged as either indirect or direct costs.

If the applicant wants full IDC, but does not have a negotiated rate, and NIFA is the cognizant agency, the applicant must calculate an IDC rate in order to request IDC (see [Sample IDC calculations](#)). Applicants are not required to complete the IDC package during the application process. Applicants need only to calculate an IDC rate to serve as a basis for requesting IDC. If awarded, the applicant will be required to submit a complete IDC proposal package in order to obtain a negotiated rate.

2. Successful applicants must not use grant funds awarded under the authority of this RFA to renovate or refurbish research, education, or extension space; purchase or install fixed equipment in such space; or to plan, repair, rehabilitate, acquire, or construct buildings or facilities.

PART V. APPLICATION REVIEW REQUIREMENTS

A. NIFA's Evaluation Process

NIFA has two evaluation levels, 1) an individual panel review and 2) a peer panel review. NIFA selects reviewers based upon their training and experience in relevant scientific, extension, or education fields; the extent to which an individual is engaged in relevant research, education, or extension activities; the need to include experts from various areas of specialization within relevant scientific, education, or extension fields; the need to include experts from a variety of organizational types; and the need to maintain a balanced composition with regard to minority and female representation and an equitable age distribution (see [NIFA Peer Review Process](#)).

The panelist independently assesses the strengths and weaknesses of the application, evaluate the likelihood that the proposed project will have significant outcomes and impacts, and most importantly, evaluate how well the application addresses the requirements of this RFA. The panelists subsequently summarize their conclusions of the review and assign a review score as applicable.

The peer panel review commences after the individual panel review. The review is a discussion of each of the panelists summarized conclusion and score (if applicable). The conclusion of the peer panel review is a consensus final rating and ranking for each proposal.

After the evaluation process, NIFA reserves the right to negotiate with the PD and/or with the submitting organization or institution regarding project revisions (e.g., reductions in the scope of work, funding level, period, or method of support) prior to recommending any project for funding. NIFA sends applicants copies of reviews and a summary of the panel comments to the PD after the review process (this does not include the identity of reviewers).

Conflicts of interest. NIFA takes extreme care to prevent any actual or perceived conflicts of interest that may influence the review or evaluation (see [NIFA Peer Review Process for Competitive Grant Applications](#)).

Due to the competitive nature and limited funding for this program, *recommendations to fund or not fund an application will remain final, regardless of the outcome of the debriefing and applicants cannot contest the decision.* Applicants are encouraged to use the debriefing as a way to understand the outcome from the peer review of their application and to develop plans to strengthen the application for a future submission.

USDA NIFA SBIR staff will not move any application above another application that ranked higher in the panel recommendations unless an applicant that was recommended for an award has failed to meet eligibility requirements for the program or cannot pass the administrative review. In these rare cases, USDA NIFA SBIR staff have the right to not fund any additional Phase I projects or based on the panel recommendation select the next Phase I application that fell below the funding line and was next in line for funding.

Resubmitted applications are not guaranteed to be recommended for an award regardless of the number of times the application has been submitted to the USDA SBIR program. Phase I applicants that are unsuccessful of being recommended for an award will have an opportunity to

resubmit the application under the next USDA SBIR Phase I cycle and can respond to reviewer and panel comments at that time.

USDA NIFA will only award up to two (2) SBIR Phase I awards per Small Business Concern that submits multiple applications under this RFA. If a Small Business Concern submits more than two (2) applications under this RFA and in the event that more than two (2) applications are recommended for an award across the entire USDA SBIR program, NIFA SBIR staff will contact the Small Business Concern and request a written determination from the Small Business Concern that describes which two (2) applications should be funded under this RFA. Any applications not selected by the Small Business Concern for funding will be declined for funding and may be resubmitted to the SBIR program under future Phase I RFA has to be reviewed under the USDA SBIR competitive peer review process and procedures. Due to the competitive nature of the program and limited funding, resubmissions are not guaranteed to be selected for funding under future USDA SBIR RFA.

B. Evaluation Criteria

NIFA anticipates that the evaluation of SBIR Phase I applications will require approximately six months from submission deadline. No information on application status will be available until NIFA makes the final selections. NIFA will notify both successful and unsuccessful applicants of final award decisions via email. For information about the status of a submitted application, see Part III § 6 of the [Application Guide](#).

Initial Screening Criteria. Applicants should be aware that applications that do not satisfy all of the screening criteria will be returned to the proposing entity without review. Returned applications may not be resubmitted (with or without revision) under this solicitation. The initial screening criteria are the following:

1. The proposing firm must qualify as a small business concern. USDA NIFA uses the Small Business Administration (SBA) SBIR company registry certification that the applicant is to provide with the application to confirm the applicant is a small business concern;
2. The application must meet the Application Content and Format requirements as described in this RFA. This includes page length requirements, all required forms and all files in PDF;
3. The proposed budget must be within the dollar ceiling identified in this RFA;
4. The proposed Phase I project must fall within one of the USDA NIFA SBIR topic areas; and
5. An application must contain adequate scientific/technical and market opportunity information that clearly states the project plan and objectives. USDA NIFA reserves the right not to submit for review any application that it finds to have insufficient information.

Application Evaluation Criteria. NIFA will use the following criteria to evaluate this RFA. Approximately equal consideration will be given to each criterion, **except** for items 1 and 2 (Phase I Scientific and Technical Feasibility, and Market Potential), which will receive twice the value of any of the other items:

1. *Phase I Scientific and Technical Feasibility:* The extent to which:

- a. Project objectives and outcomes are clearly described, adequate, and appropriate. All project components (i.e., research and commercialization) are reflected in one or more project objectives;
 - b. Proposed approach, procedures, or methodologies are innovative, original, clearly described, suitable, and feasible;
 - c. Expected results or outcomes are clearly stated, measurable, and achievable within the allotted time frame requested by the applicant;
 - d. Proposed research fills knowledge gaps that are critical to the development of new innovations to address the stated problem or issue;
 - e. Proposed research is up-to-date on the current state of the art (i.e., literature reviews have been completed);
 - f. Proposed research includes Agriculturally-related Manufacturing and/or Energy Efficiency and/or Alternative and Renewable Energy technologies; and
 - g. Proposed research includes documentation to support access to facilities, equipment, or expertise.
2. *Market Potential:*
- a. Proposed research demonstrates that the outcome of the proposed activity will lead to a marketable product, service or process that warrants significant USDA SBIR support;
 - b. Proposed research has adequate information to validate the market opportunity and demonstrates an understanding of business economics and market drivers in the target industry;
 - c. Proposed research demonstrates that the team is well-balanced between technical and business skills;
 - d. The proposing firm has successfully commercialized SBIR supported innovations where prior awards have been made; and
 - e. The application demonstrates that the company has initiated dialogue with relevant stakeholders (potential customers or end users, strategic partners or investors) for the proposed innovation and that a legitimate business opportunity may exist should the technology prove feasible through the inclusion of letters of support. The application clearly justify why letters of support are not being included due to business considerations as it relates to the technical and commercial aspects of the innovation.
3. *Importance of the Problem:* The application provides sufficient justification for the importance of the problem and that the proposed project in the public interest.
4. *Investigator and Resource Qualifications:*
- a. Roles of key personnel are clearly defined;
 - b. Key personnel have sufficient scientific and business expertise to complete the proposed project, and where appropriate, partnerships with other disciplines and institutions are established;
 - c. PD and Co-PD biographic information/resumes provide relevant employment history;
 - d. Support personnel, facilities, and instrumentation are sufficient;
 - e. A clear plan is articulated for project management, including time allocated for attainment of objectives and delivery of products, maintenance of partnerships and collaborations, and a strategy to enhance communication, data sharing, and reporting among members of the project team;

- f. Consultants, subcontractors, or CRADA cooperators that are involved in the project have provided letters verifying their willingness to participate in the project; and
 - g. Personnel on subcontract(s) and consulting agreement(s) have defined roles and responsibilities.
5. *Budget*: The budget is appropriate for the proposed research plan, and the application provides sufficient budget detail to indicate clearly how the funds would be utilized.
 6. *Duplication*:
 - a. There is no duplication of any ongoing or previous research by the small business firm or by other researchers; and
 - b. Application clearly indicates how the proposed technology would differ significantly from existing innovations.

Additional factors that will be considered in the review process are whether an application involves a CRADA with a USDA or other Federal laboratory or contains letters of support that demonstrate that the company has initiated dialogue with relevant stakeholders (potential customers or end users, strategic partners or investors) for the proposed innovation and that a legitimate business opportunity may exist should the technology prove feasible. In the event that two or more applications are of approximately equal merit, the existence of a CRADA with a USDA or other Federal laboratory or a follow-on funding commitment for Phase III will be an important consideration to break the tie.

C. Proprietary Information

Information contained in unsuccessful applications will remain the property of the applicant. The Government may retain copies of all applications. Public release of information in any application submitted will be subject to existing statutory and regulatory requirements. If proprietary information is in an application, to include a trade secret, proprietary commercial or financial information, confidential personal information, or data affecting the national security, NFIA will treat it in confidence, to the extent permitted by law. This information must be clearly marked and **inserted** by the applicant with the term “confidential proprietary information,” and the following legend must appear on each PDF attachment submitted as a part of the application: “These data shall not be disclosed outside the Government and shall not be duplicated, used or disclosed in whole or in part for any purpose other than evaluation of this application. If a funding agreement is awarded to this applicant because of or in connection with the submission of these data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the funding agreement and pursuant to applicable law. This restriction does not limit the Government’s right to use information contained in the data if it is obtained from another source without restriction. The data subject to this restriction are contained on pages (insert pages) of this application.”

Any other legend may be unacceptable to the Government and may constitute grounds for removing the application from further consideration without assuming any liability for inadvertent disclosure. The Government will limit dissemination of such information to within official channels.

USDA NIFA, by law, is required to make the final decision as to whether the information is required to be kept in confidence. Information contained in unsuccessful applications will remain the property of the applicant. However, USDA NIFA will retain for three years one file copy of

all applications received. Public release of information for any application submitted will be subject to existing statutory and regulatory requirements. The legislation reauthorizing the SBIR Program strengthened the protection of awardee firms relative to maintaining confidentiality of proprietary information for a period of twenty years after the end of the grant period (See § 8(b)(4) of the SBIR/STTR Policy Directive). However, any application, which is funded, will be considered an integral part of the award and normally will be made available to the public upon request through the Freedom of Information Act, except for designated proprietary information.

The inclusion of proprietary information is discouraged unless it is necessary for the proper evaluation of the application. If proprietary information is to be included, it should be limited, set apart from other text on a separate page, and keyed to the text by numbers. It should be confined to a few critical technical items that, if disclosed, could jeopardize the obtaining of foreign or domestic patents. Trade secrets, salaries, or other information that could jeopardize commercial competitiveness should be similarly keyed and presented on a separate page. USDA NIFA may find applications or reports that attempt to restrict dissemination of large amounts of information unacceptable.

D. Rights in Technical Data

Rights in technical data, including software developed under the terms of any funding agreement resulting from an application submitted in response to this solicitation, shall remain with the grantee. However, the Government shall have the limited right to use such data for Governmental purposes and shall not release such data outside the Government without permission of the grantee for a period of four years from completion of the project under which the data were generated. Effective at the conclusion of the four-year period, the Government shall retain a royalty-free license for Governmental use of any technical data delivered under the agreement, whether patented or not.

E. Copyrights

Grantees also should assert copyright in scientific and technical articles based on data produced under the grant where necessary to effect journal publication or inclusion in proceedings associated with professional activities. Journal or other copyright practices are acceptable unless the copyright policy prevents the grantee from making copies for its own use. Proper acknowledgement of public funding in published scientific articles, manuscripts, presentations and press releases is critical for the success of the agency's programs.¹⁵ Please use the following language to acknowledge NIFA support in such publications and associated presentations, as appropriate:

“This research was supported [in part] by the intramural research program of the U.S. Department of Agriculture, National Institute of Food and Agriculture, [insert program type, e.g., Hatch/Evans-Allen/McIntire-Stennis, etc., and accession number, if applicable].”

The recipient must also include a disclaimer in all publications and presentations stating the following:

“The Findings and Conclusions in This Preliminary [Publication/Presentation/Blog] Have Not Been Formally Disseminated by the U. S. Department of Agriculture and Should Not Be Construed to Represent Any Agency Determination or Policy.”

Presentations should include this disclaimer on the title slide in similar font and size to the name and title of the presenter.

If the grantee plans to issue a press release concerning the outcome of NIFA grant-supported research, they should notify NIFA in advance to allow for coordination. Publications resulting from work performed under a NIFA grant-supported project must be included as part of the annual or final progress report submitted to NIFA. When publications are available electronically, electronic access information should be provided.

F. Patents and Inventions

Allocation of rights to inventions shall be in accordance with 35 U.S.C. 202-206 and the Department of Commerce implementing regulations entitled “Rights to Inventions Made by Nonprofit Organizations and Small Business Firms under Government Grants, Contracts and Cooperative Agreements” at 37 C.F.R. Part 401. These regulations provide that small businesses normally may retain the principal worldwide patent rights to any invention developed with USDA NIFA support. USDA NIFA receives a royalty-free license for Federal Government use, reserves the right to require the patentee to license others in certain circumstances, and requires that anyone exclusively licensed to sell the invention in the United States must normally manufacture it domestically. To the extent authorized by 35 U.S.C. 205, USDA NIFA will not make public any information disclosing a USDA-supported invention for a four-year period to allow the grantee a reasonable time to file an initial patent application. Additional information may be obtained by contacting:

Robert (Bob) Green, Director of Planning, Accountability, and Reporting
National Institute of Food and Agriculture STOP 2213
1400 Independence Avenue, SW
Washington, DC 20250-2213
Telephone: (202) 720-0747, Facsimile: (202) 720-7714. Email: bayhdole@nifa.usda.gov

SBIR awardees must report inventions to the awarding agency within two months of the inventor’s report to the awardee. The reporting of inventions must be made through submission to Interagency Edison ([iEdison](#)). Specific instructions for invention reporting are contained in the agency’s terms and conditions, a copy of which can be provided upon request.

G. Research Involving Special Considerations

A number of situations frequently encountered in the conduct of scientific research require the submission of special information for a particular project. Since some types of research targeted for SBIR support have high probability of involving human subjects at risk or vertebrate animals, special instructions follow:

If the proposed research will involve human subjects at risk or vertebrate animals, the application must so indicate by checking “Yes” on the RR_OtherProjectInfo form found in section IV. Further, in the event that the project is funded, the applicant may be required to have the research plan reviewed and approved by the appropriate review board or committee. It is suggested that applicants contact local universities, colleges, or nonprofit research organizations that have established such reviewing mechanisms to have this service performed.

Guidelines to be applied and observed when conducting such research are outlined below:

1. *Human Subjects at Risk* - Regulations issued by the Department of Agriculture to be used in safeguarding the rights and welfare of human subjects used in research supported with USDA grant funds are contained in 45 CFR Part 46 and USDA regulations set forth in 7 CFR Part 1c. An Institutional Review Board must approve all nonexempt research projects involving human subjects prior to commencing actual substantive work.
2. *Animal Care* - The performing organization must comply with the Animal Welfare Act (7 U.S.C., 2131-2156); Public Law 89-544, 1996 and the regulations issued by the Department of Agriculture in 9 CFR parts 1, 2, 3, and 4. In the case of domesticated farm animals housed under farm conditions, the grantee must adhere to the principles stated in the Guide for the Care and Use of Agricultural Animals in Agricultural Research and Teaching, Federation of Animal Sciences Societies, 1999. In the event a project involving the use of living vertebrate animals results in a grant award, funds will be released only after a qualified Institutional Animal Care and Use Committee has approved the project.

H. Grantee Commitments

Upon issuance of a research grant by USDA NIFA, the awardee will be required to make certain legal commitments through acceptance of the award document and the terms and conditions attached thereto, as well as any project-specific terms or conditions outlined.

I. Additional Information

1. This RFA is intended for informational purposes and reflects current planning. If there is any inconsistency between the information contained herein and the terms of any resulting SBIR funding agreement, the terms and conditions of the funding agreement are controlling.
2. Before the award of an SBIR funding agreement, USDA NIFA requires the submission of certain organizational management, personnel, and financial information to assure responsibility of the applicant, including certification that the proposing organization complies with the Civil Rights Act of 1964. The Office of Grants and Financial Management, NIFA will provide these forms to the small business concern, prior to the forwarding of the funding agreement for acceptance. The information contained in both forms must normally be submitted on a one-time basis only. It is anticipated that all Phase I awardees will be required to submit the above information. Please note that USDA NIFA will not issue an award until all requested organizational management and financial information has been received. Delaying or failing to submit this information could result in the application not being funded.

Under Federal law, it is USDA NIFA's responsibility to ensure Federal funds are disbursed in accordance with Federal regulations. USDA NIFA reserves the right to enact additional oversight controls on awardees deemed high risk based on organizational management, personnel, and financial information provided.

3. If an applicant or a grantee is contemplating any type of transaction involving the entity (i.e. merger, spin-off or sale), it is advised that the applicant or the grantee contact one of the SBIR NPLs (see Part VII of the RFA) for knowledge of how the transaction may affect a potential grant or the grant, as applicable.

4. USDA NIFA is not responsible for any monies expended by the applicant prior to the award of any funding agreement.
5. This RFA is not an offer by USDA NIFA and does not obligate USDA NIFA to make any specific number of awards. In addition, awards under this program are contingent upon the availability of funds.
6. Unsolicited applications will not be accepted under the SBIR program.
7. The applicant must provide the total number of employees for the organization and its subsidiaries and/or parent company, if applicable.

J. Organizational Management Information

Applicants must submit specific management information relating to an applicant prior to an award, and update the information as needed. Applicants may only have to update their information if they had previously provided the information under this or another NIFA program. NIFA provides the requisite forms during the pre-award process. Although an applicant may be eligible for award under this program, there are factors that may exclude an applicant from receiving federal financial and nonfinancial assistance and benefits under this program (e.g., debarment or suspension of an individual, or a determination that an applicant is not responsible).

K. Application Disposition

Applicants may withdraw at any time before NIFA makes a final funding decision. NIFA will retain all applications for 3 years, including withdrawn applications and unfunded applications.

PART VI. AWARD ADMINISTRATION

A. General

Within the limit of funds authorized, the NIFA awarding official will make grants to responsible and eligible applicants whose applications are judged most meritorious under the procedures set forth in this RFA. The date specified by the NIFA awarding official as the effective date of the grant must be no later than September 30 of the federal fiscal year in which the project is approved for support and funds are appropriated for such purpose, unless otherwise permitted by law. The project need not be initiated on the grant effective date, but as soon thereafter as practical so that project goals may be attained within the funded project period. All funds granted by NIFA under this RFA may be used only for the purpose for which they are granted in accordance with the approved application and budget, regulations, terms and conditions of the award, applicable federal cost principles, USDA assistance regulations, and [NIFA General Awards Administration Provisions, 7 CFR part 3430, subparts A through E](#).

Award Notice. The award document will provide pertinent instructions and information as described in [2 CFR 200.210](#) (see [NIFA's Terms and Conditions](#)).

B. Administrative and National Policy Requirements

Several federal statutes and regulations apply to grant applications and the projects outlined in this RFA (some are listed here: [Federal Regulations](#)). Unless specifically noted by statute or award-specific requirements, [NIFA Policy Guide](#) applies to all NIFA awards.

C. Expected Program Outputs and Reporting Requirements

SBIR Phase I Technical Reports. For all Phase I awards, an interim technical progress report must be submitted at approximately the mid-point in the project. In addition, a comprehensive final technical report must be submitted within 90 days following expiration of the Phase I grant. These reports will be submitted electronically per the award terms and conditions.

All technical reports are held confidential for a period covering four years after the termination of the project. As such, proprietary information may be included in the interim and final technical reports when necessary to provide the USDA NIFA SBIR staff adequate information to evaluate the outcome of the project.

REEReport. Grantees must submit initial project information and annual and summary reports to NIFA's electronic, Web-based inventory system, REEReport, that facilitates both grantee submissions of project outcomes and public access to information on federally funded projects. The details of these reporting requirements are included in the award terms and conditions (see [REEReport Guide for Project Directors](#)). Reports submitted via REEReport will be placed in the USDA Current Research Information System (CRIS) database. CRIS is an online public database meant to provide information to the public on all awards made by USDA NIFA. As such, proprietary information should not be included in these reports. REEReport only accepts text and grantees should not try to upload graphics, file, or non-text information. Additionally a REEReport submission does not meet the requirements for the interim and final technical report, as these are additional reports required under the terms and conditions for the grant.

Federal Financial Management Requirements. Grantees must comply with applicable federal financial management requirements included in the award's terms and conditions, 7 CFR 3403, 48 CFR part 31 and 2 CFR part 200. Below is a list of major requirements. Failure to comply

could trigger significant audit liability and require global reconstruction of the grantees accounting system.

Separation of Funds. To avoid commingling of funds, grantees must establish a unique account(s) in their accounting system to capture and accumulate funding and related costs of the grant, apart from other federal and non-federal grants, projects and cost centers.

Timekeeping. To support direct and indirect labor charges, grantees must maintain hourly timesheets that encompass all hours worked and not worked on a daily basis. The timesheet should identify the: (a) grant, project or cost center being worked on; (b) number of hours worked on each; (c) description of work performed; and (d) Paid Time Off (PTO) hours. The total hours recorded each day should coincide with an individual's employment status in accordance with established policy (i.e., full-time employees work 8 hours each day, etc.).

Paid Time Off (PTO). Grantees must not charge a grant for time if the time was not spent directly working on the grant. Therefore, PTO (i.e., vacation, holiday, sick and other paid leave) is not recoverable directly from grants, but may be allocated to all grants, projects, and cost centers over an entire cost accounting period.

Full-Time University and other Organization Appointments. The effort and compensation of individuals budgeted to work on grants, but whom also hold full-time appointments at a university or another organization, may not exceed 100 percent. If applicable, it is necessary to: (a) obtain a letter releasing the individual from their full-time appointment. The release should be reflected in the organizations official payroll distribution system; (b) limit effort on the grant to time periods not covered by the full-time appointment; (c) or remove and replace with alternative research personnel. In addition, the primary employment of the Project Director/Principal Investigator (PD/PI) must be with the small business concern at the time of award and during the conduct of the proposed research. Eligible primary employment means that more than one-half (51%) of the PD's/PI's time is spent in the employ of the small business during the award period of performance. Primary employment with the small business precludes the applicant as a full-time employee with another organization or academic institution. While the PD/PI must work more than one-half (51%) of his/her time for the small business during the entire grant period, there is no time requirement for the PD's/PI's work on the proposed research.

Owners of Closely Held Corporations (Limited Liability Companies, Partnerships, S-Corporations, etc.). Owners of closely held corporations whose compensation are charged directly or indirectly to federal awards, must take their compensations in the form of W-2 supported salaries, or guaranteed payments in order to: (a) trigger expense recognition in the accounting system; (b) ensure all compensation is reflected in grant-specific ledgers; and (c) to create a clear audit trail.

Consistent Treatment of Costs. Grantees must treat costs consistently across all federal and non-federal grants, projects, and cost centers. For example, grantees may not direct-charge federal grants for costs typically considered indirect in nature, unless done consistently. Examples of indirect costs include administrative salaries, rent, accounting fees, utilities, etc. In most cases, the cost to develop an accounting system adequate to justify direct charging of the aforementioned items outweighs the benefits. As a result, use of an indirect cost rate is the most effective mechanism to recover these costs and not violate federal financial requirements of consistency, allocability, and allowability. Additional guidance on indirect cost calculations can be found at [USDA Indirect Cost](#).

PART VII. OTHER INFORMATION

A. Use of Funds and Changes in Budget

Delegation of fiscal responsibility. Unless the terms and conditions of the award state otherwise, awardees may not in whole or in part delegate or transfer to another person, institution, or organization the responsibility for use or expenditure of award funds.

Changes in Budget or Project Plans. In accordance with [2 CFR 200.308](#), awardees must request prior approval from NIFA for the following program or budget-related reasons (the awardee is subject to the terms and conditions identified in the award):

1. Change in the scope or the objective of the project or program without prior written approval (even if there is no associated budget revision requiring);
2. Change in a key person specified in the application or the federal award;
3. Disengagement from the project for more than three months, or a 25 percent reduction in time devoted to the project;
4. Inclusion of costs that require prior approval in accordance with [2 CFR 200 Subpart E \(Cost Principles\)](#), or [45 CFR Part 75 Appendix IX, \(Principles for Determining Costs Applicable to Research and Development under Awards and Contracts with Hospitals\)](#), or [48 CFR](#), unless waived by the federal awarding agency,
5. [Part 31, \(Contract Cost Principles and Procedures\)](#);
6. Transfer of funds budgeted for participant support costs to other categories of expense ([§200.75 Participant support costs](#));
7. Sub-awarding, transferring or contracting out of any work under a federal award, including fixed amount sub-awards (see [§200.332, Fixed Amount Sub-awards](#)), unless described in the application and funded in the approved federal awards. This provision does not apply to the acquisition of supplies, material, equipment, or general support services;
8. Changes in the approved cost-sharing or matching provided by the non-federal entity; and
9. The need for additional federal funds to complete the project.

B. Confidential Aspects of Applications and Awards

When an application results in an award, it becomes a part of NIFA transaction records, which are available to the public. Information that the Secretary of Agriculture determines to be confidential, privileged, or proprietary in nature will be held in confidence to the extent permitted by law. Therefore, applicants should clearly mark any information within the application they wish to have considered as confidential, privileged, or proprietary. NIFA will retain a copy of an application that does not result in an award for three years. Such an application will be released only with the consent of the applicant or to the extent required by law. An applicant may withdraw at any time prior to the final action thereon.

C. Regulatory Information

This program is not subject to the provisions of [Executive Order 12372](#), which requires intergovernmental consultation with state and local officials. Under the provisions of the [Paperwork Reduction Act of 1995 \(44 U.S.C. Chapter 35\)](#), the collection of information requirements contained in this notice have been approved under [OMB Document No. 0524-0039](#).

APPENDIX I: AGENCY CONTACTS

Programmatic Contacts

Name	Email	Telephone
Dr. Charles Cleland 8.1 Forests and Related Resources 8.6 Rural and Community Development 8.8 Biofuels and Biobased Products	ccleland@nifa.usda.gov	(202) 401-6852
Dr. Karelyn Cruz 8.4 Air, Water, and Soil	karelyn.cruz@nifa.usda.gov	(202) 401-6417
Dr. Denis Ebodaghe 8.12 Small and Mid-Size Farms	debodaghe@nifa.usda.gov	(202) 401-4385
Dr. Gene Kim 8.7 Aquaculture	Gene.W.Kim@nifa.usda.gov	(202) 401-1108
Dr. Rachel Melnick 8.13 Plant Production and Protection – Engineering	rmelnick@nifa.usda.gov	(202) 401-4980
Dr. Robert Nowierski 8.2 Plant Production and Protection- Biology	rnowierski@nifa.usda.gov	(202) 401-4900
Dr. Robert Smith 8.3 Animal Production and Protection	rsmith@nifa.usda.gov	(202) 401-4892
Dr. Jodi Williams 8.5 Food Science and Nutrition	jwilliams@nifa.usda.gov	(202) 720-6145

Administrative Contacts

Name	Email	Telephone
Mr. Elden Hawkes Questions of a general nature about this SBIR solicitation	sbir@nifa.usda.gov	(202) 401-4002

NIFA's Mailing Address:

National Institute of Food and Agriculture
800 9th Street, SW
Washington, DC 20024

APPENDIX II: GLOSSARY OF TERMS

Name	Acronyms
Agriculture and Food Research Initiative	AFRI
Assistance Listing (formerly known as Catalog of Federal Domestic Assistance)	AL (formerly CFDA)
Authorized Representative	AR
Agricultural Research, Extension, and Education reform Act of 1998	AREERA
Coordinated Agricultural Project	CAP
Catalog of Federal Domestic Assistance	CFDA
Center of Excellence	COE
Cooperative Research and Development Agreement	CRADA
Data Management Plan	DMP
General & Administrative	(G&A)
Historically Underutilized Business Zone	HUBZone
Limited Liability Company	LLC
National Institute of Food and Agriculture	NIFA
Project Director	PD
Principal Investigator	PI
Request for Application	RFA
Research and Development	R/R&D
Research, Education, and Economics	REE
Small Business Concern	SBC
United States Department of Agriculture	USDA
Venture capital operating companies	VCOC

APPENDIX III: DEFINITIONS

Refer to 7 CFR 3430 [Competitive and Noncompetitive Non-formula Federal Assistance Programs – General Award Administrative Provisions](#) for additional definitions.

Terms	Definitions
Ad hoc Reviewers	Experts or consultants qualified by training and experience in particular scientific or technical fields to render expert advice on the scientific technical merit of the grant applications in those fields. They review on an individual basis one or several of the eligible applications submitted to this program in their area of expertise and who submit to the Department written evaluations of such applications.
Affiliate	As set forth in 13 CFR Part 121—Small Business Size Regulations, § 121.103. Further information about SBA's affiliation rules and a guide on affiliation is available at SBIR STTR and Size Standards .
Applicant	The organizational entity that, at the time of award, will qualify as a small business concern and that submits a grant application for a funding agreement under the SBIR program
Authorized Departmental Officer	The Secretary or any employee of the Department who has the authority to issue or modify grant instruments on behalf of the Secretary
Authorized Organizational Representative	The president, director, chief executive officer or other designated official of the applicant organization who has the authority to commit the resources of the organization, also referred to as the AR.
Budget Period	Interval of time into which the project period is divided for budgetary and reporting purposes.
Commercialization	The process of developing marketable products, processes, technologies, or services and the production and delivery (whether by the originating party or others) of the products, processes, technologies, or services for sale to or use by the Federal government or commercial markets.
Continuation Award	An award instrument by which NIFA agrees to support a specified level of effort for a predetermined period with a statement of intention to provide additional support at a future date; subject to satisfactory performance, the availability of funds, and support is in the best interest of the federal government and the public.
Commercialization	The process of developing marketable products, processes, technologies, or services and the production and delivery (whether by the originating party or others) of the products, processes, technologies, or services for sale to or use by the Federal government or commercial markets

Terms	Definitions
Covered Small Business Concern	A small business that is not majority-owned by multiple VCOCs, hedge funds, or private equity firms on the date on which it submits an application in response to a solicitation under the SBIR program or on the date of the SBIR award.
Cooperative Research and Development Agreement	A legal agreement between a federal agency and one or more non-federal parties. Purpose is to foster federal/private collaborations to bring new technology to the marketplace. Used Federal government wide. Allows non-federal party the right to negotiate an exclusive license to CRADA inventions.
Direct Costs	Costs that occur in direct support of a single project or that can be clearly identified, segregated, and billed directly to the project via the companies' accounting system.
Essentially Equivalent Work	Occurs when (1) substantially the same research is proposed for funding in more than one grant application submitted to the same Federal agency; (2) substantially the same research is submitted to two or more different Federal agencies for review and funding consideration; or (3) a specific research objective and the research design for accomplishing an objective are the same or closely related in two or more applications or awards, regardless of the funding source.
Fee	The amount of profit a company will receive from the grant.
Funding Agreement	Any contract, grant, or cooperative agreement entered into between any Federal agency and any small business concern for the performance of experimental, developmental or research work, including products or services funded in whole or in part by the Federal Government.
Grant	A financial assistance mechanism providing money, property or both to an eligible entity to carry out the approved project or activity, and substantial programmatic involvement by Government is not anticipated.
Grantee	The small business concern designated in the grant award document as the responsible legal entity to whom the grant is awarded under this part, also referred to as an "awardee."
Historically Underutilized Business Zone	<p>A small business concern meeting the following criteria:</p> <ol style="list-style-type: none"> 1. Located in a "historically underutilized business zone" or HUBZone area located in one or more of the following: <ol style="list-style-type: none"> a. A qualified census tract (as defined in section 42(d)(5)(C)(i)(1) of the Internal Revenue Code of 1986); b. A qualified "non-metropolitan county" (as defined in section 143(k)(2)(B) of the Internal Revenue Code of 1986); or c. On an Indian Reservation- Land within the boundaries of a federally recognized Indian Reservation. 2. Owned and controlled by one or more U.S. Citizens; and

Terms	Definitions
	3. At least 35 percent of its employees must reside in a HUBZone.
Indirect Costs	Costs which occur in support of more than one objective and therefore cannot be identified readily and specifically with a particular project, often called overhead, F&A, or G&A
Innovation	A new or improved item having marketable potential including (1) development of new technologies; (2) refinement of existing technologies; or (3) development of new applications for existing technologies.
Intellectual Property	The separate and distinct types of intangible property that are referred to collectively as “intellectual property,” including but not limited to: patents, trademarks, copyrights, trade secrets, SBIR technical data (as defined in this section), ideas, designs, know-how, business, technical and research methods, other types of intangible business assets, and all types of intangible assets either proposed or generated by a small business concern as a result of its participation in the SBIR program.
Joint Venture	An association of concerns with interests in any degree or proportion by way of contract expresses or implied, consorting to engage in and carry out a single specific business venture for joint profit, for which purpose they combine their efforts, property, money, skill or knowledge, but not on a continuing or permanent basis for conducting business generally. A joint venture is viewed as a business entity in determining power to control its management.
Manufacturing Related	<p>Encompasses improvements in existing methods or processes as well as wholly new processes, machines, or systems. Four main areas include:</p> <ol style="list-style-type: none"> 1. Unit process level technologies that create or improve manufacturing processes, including: <ol style="list-style-type: none"> a. Fundamental improvements in existing manufacturing processes that deliver substantial productivity, quality, or environmental benefits; or b. Development of new manufacturing processes, including new materials, coatings, methods, and associated practices. 2. Machine level technologies that create or improve manufacturing equipment, including: <ol style="list-style-type: none"> a. Improvements in capital equipment that create increased capability, such as accuracy or repeatability, increased capacity through productivity improvements or cost reduction or increased environmental efficiency, such as safety, energy efficiency and, environmental impact; or b. New apparatus and equipment for manufacturing, including additive and subtractive manufacturing, deformation and molding, assembly and test, semiconductor fabrication, and

Terms	Definitions
	<p>nanotechnology.</p> <ol style="list-style-type: none"> 3. Systems level technologies for innovation in the manufacturing enterprise, including: <ol style="list-style-type: none"> a. Advances in controls, sensors, networks, and other information technologies that improve the quality and productivity of manufacturing cells, lines, systems, and facilities; b. Innovation in extended enterprise functions critical to manufacturing, such as quality systems, resource management, supply change integration and distribution, scheduling, and tracking; or c. Technologies that enable integrated and collaborative product and process development, including computer-aided and expert systems for design, tolerance development, process and materials selection, life cycle cost estimation, rapid prototyping, and tooling. 4. Environment or societal level technologies that improve workforce abilities, productivity, and manufacturing competitiveness, including: <ol style="list-style-type: none"> a. Technologies for improved workforce health and safety, such as human factors and ergonomics; or b. Technologies that aid and improve workforce manufacturing skill and technical excellence, such as educational systems incorporating improved manufacturing knowledge and instructional methods.
Matching	The process through which a grant recipient matches awarded USDA funds with cash and in-kind contributions on a dollar-for-dollar basis. The matching funds must derive from non-Federal sources.
New Application	An application not previously submitted to a program.
Outcome	The measure of long-term, eventual, program impact
Output	The measures of near-term program impact.
Peer Review Group	Experts or consultants, qualified by training and experience in particular scientific or technical fields to give expert advice on the scientific and technical merit of grant applications to those fields, who assemble as a group to discuss and evaluate all of the eligible applications submitted to this program in their area of expertise.
Program Solicitation	A formal request for applications whereby a Federal agency notifies the small business community of its R/R&D needs and interests in broad and selected areas, as appropriate to the agency, as appropriate

Terms	Definitions
	to the agency, and requests applications from small business concerns in response to these needs and interests.
Project Director / Principal Investigator	An individual designated by the applicant to provide the scientific and technical direction to a project supported by the funding agreement
Prototype	A model of something to be further developed, which includes designs, protocols, questionnaires, software, and devices.
Project Period	A model of something to be further developed, which includes designs, protocols, questionnaires, software, and devices.
Renewal Application	A project application that seeks additional funding for a project beyond the period that was approved in an original or amended award.
Research or Research and Development	<p>R/R&D activity is:</p> <ol style="list-style-type: none"> 1. A systematic, intensive study directed toward greater knowledge or understanding of the subject studied; 2. A systematic study directed at applying new knowledge to meet a recognized need; or 3. A systematic application of knowledge toward the production of useful materials, devices and systems or methods, including design, development, and improvement of prototypes, and new processes to meet specific requirements.
Research Project Grant	The award by the Department of funds to a grantee to assist in meeting the costs of conducting for the benefit of the public an identified project, which is intended and designed to establish, discover, elucidate, or confirm information or the underlying mechanisms relating to a research topic area identified in the annual solicitation of applications.
Resubmitted Application	A previously submitted project application that was not funded.
Resubmitted Renewal Application	A project application that requests additional funding for a project beyond the original period of performance.
SBIR Participants	Business concerns that have received SBIR awards or that have submitted SBIR applications.
SBIR Technical Data	All data generated during the performance of an SBIR award.
SBIR Technical Data Rights	The rights a small business concern obtains in data generated during the performance of any SBIR award that an awardee delivers to the Government during or upon completion of a federally funded project and to which the government receives a license.
Small Business Concern	A concern that meets the requirements set forth in 13 CFR 121.702

Terms	Definitions
Small Business Entity	A small business entity is typically defined as a sole proprietorship, partnership, corporation, and S corporation. A LLC is a business structure allowed by state statute.
SBIR	Small Business Innovation Program
Small Farms	Farms or ranches with less than \$250,000 in annual agricultural sales.
Mid-sized Farms	Mid-sized farms are farms or ranches with less than \$500,000 in annual agricultural sales.
Socially and Economically Disadvantaged Small Business Concern	<p>A socially and economically disadvantaged small business concern is one:</p> <ol style="list-style-type: none"> 1. Which is at least 51 percent owned by (i) an Indian tribe or a native Hawaiian organization or (ii) one or more socially and economically disadvantaged individuals; and 2. Whose management and daily business operations are controlled by one or more socially and economically disadvantaged individuals. <p>For purposes of this solicitation, a socially and economically disadvantaged individual is defined as a member of any of the following groups: Black Americans, Hispanic Americans, Native Americans, Asian-Pacific Americans, Subcontinent Asian Americans, other groups designated from time to time by the Small Business Administration (SBA) to be socially disadvantaged, or any other individual found to be socially and economically disadvantaged by the SBA pursuant to Section 8(a) of the Small Business Act, 15 U.S.C. 637(a). Note: The certification of socially and economically disadvantaged small business is for statistical purposes only.</p>
Subcontract	Any agreement, other than one involving an employer-employee relationship, entered into by an awardee of a funding agreement calling for supplies or services for the performance of the original funding agreement.
United States	The 50 states, the territories, and possessions of the Federal Government; the Commonwealth of Puerto Rico; the District of Columbia; the Republic of the Marshall Islands; the Federated States of Micronesia; and the Republic of Palau.
Women-owned Small Business Concern	<p>A women-owned small business concern is a SBC:</p> <ol style="list-style-type: none"> 1. Which is at least 51 percent owned by one or more women; and 2. Whose management and daily business operations are controlled by one or more women. Note: Certification of women-owned small business is for statistical purposes only.