Small Business Innovation Research Program Phase I

FY 2018 Request for Applications (RFA)

APPLICATION DEADLINE: October 5, 2017

ELIGIBILITY: See Part III, A of RFA

United States Department of Agriculture

National Institute of Food and Agriculture

NATIONAL INSTITUTE OF FOOD AND AGRICULTURE; U.S. DEPARTMENT OF AGRICULTURE

Small Business Innovation Research Program Phase I

PHASE I ANNOUNCEMENT

CATALOG OF FEDERAL DOMESTIC ASSISTANCE: This program is listed in the Catalog of Federal Domestic Assistance under 10.212 Small Business Innovation Research.

DATES: Applications must be received by **5 p.m. Eastern Time** on October 5, 2017. Applications received after this deadline will normally not be considered for funding (see Part IV, C of this RFA). Comments regarding this request for applications (RFA) are requested within six months from the issuance of this notice. Comments received after that date will be considered to the extent practicable.

STAKEHOLDER INPUT: We at the National Institute of Food and Agriculture (NIFA) seek your comments about this RFA. We will consider your comments when we develop the next RFA for the program, if applicable, and we'll use them to 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)). Submit your written stakeholder comments by the deadline set forth in the DATES portion of this notice via email to Policy@nifa.usda.gov. (This email address is only for receiving comments regarding this RFA and ***not*** for requesting information or forms.) In your comments, please state that you are responding to the Small Business Innovation Research Program – Phase I RFA.

EXECUTIVE SUMMARY: NIFA requests applications for the Small Business Innovation Research (SBIR) Program Phase I for fiscal year (FY) 2018. This RFA is being released prior to the passage of an appropriations act for FY 2018. Enactment of additional continuing resolutions or an appropriations act may affect the availability, level of funding or cause potential funding delays for this program.

This notice identifies the objectives for SBIR Phase I projects, deadline dates, funding information, eligibility criteria for projects and applicants, and application forms and associated instructions needed to apply for a SBIR Phase I grant.

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PART I—FUNDING OPPORTUNITY DESCRIPTION

A. Legislative Authority and Background

The Small Business Innovation Research program was established under the Small Business Innovation Development Act of 1982 (P.L. 97-219) with the purpose of strengthening the role of innovative small business concerns in Federally-funded research and development (R&D).

In December 2000, Congress passed the Small Business Research and Development Enhancement Act (P.L. 102-564). The program was reauthorized until September 30, 2008 by the Small Business Reauthorization Act of 2000 (P.L. 106-554). Subsequently, Congress passed numerous extensions and authorizations, the most recent of which extends the SBIR program through 2022.

This program is administered by the National Institute of Food and Agriculture (NIFA) of the United States Department of Agriculture (USDA).

This program is subject to the provisions found at 7 CFR Part 3403. These provisions 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.

B. Purpose and Priorities

The USDA NIFA invites science-based small business firms to submit research applications under this program solicitation entitled "Small Business Innovation Research Program (SBIR) - Phase I, Fiscal Year 2018." Firms with strong scientific research capabilities in any of the topic areas described in Part I are encouraged to participate. USDA NIFA will support high-quality research or research and development (R/R&D) applications containing advanced concepts related to important scientific problems and opportunities that could lead to significant public benefit and commercialization of an innovation.

Objectives of the SBIR program include stimulating technological innovation in the private sector, strengthening the role of small businesses in meeting Federal research and development needs, increasing private sector commercialization of innovations derived from USDA-supported research and development efforts, and fostering and encouraging participation by women-owned and socially and economically disadvantaged small business firms in technological innovation.

This SBIR RFA aligns with Strategic Goal 1. (Objecties1.1, 1.2 and 1.3); Strategic Goal 2. (Objectives 2.1, 2.3, and 2.4); Strategic Goal 3. (Objective 3.1 and 3.2); and Strategic Goal 4. (Objectives 4.1, 4.2, 4.3 and 4.4) of the USDA Strategic Plan found at https://www.ocfo.usda.gov/usdasp/sp2014/usda-strategic-plan-fy-2014-2018.pdf. This SBIR RFA aligns with the USDA Research, Education, and Economics (REE Action Plan) by addressing Goals 1, 2, 3, 4, 5, 6, and 7 found at (http://nifa.usda.gov/resource/ree-action-plan).

USDA NIFA SBIR Program is aligned with the National Institute of Food and Agriculture (NIFA) Strategic Plan (http://nifa.usda.gov/resource/nifa-strategic-plan-fy2014-fy2018) and specifically addresses Goal 1 (sub-goal 1.1, 1.2, 1.3, 1.4, 1.5, 1.6 and 1.7).

C. SBIR Phase I topic areas

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 are encouraged to indicate in their application if the proposed research aligns with agriculturally–related manufacturing technology, energy efficiency and alternative and renewable energy or if there is an alignment with NIFA Strategic Plan Goal 1 Science; see Part 1B. Applicants should pay attention to specific instructions located within each of the topic area descriptions when developing their application. Each topic area description provides background information, FY 2018 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. All Phase I applications should give the reviewing community a brief vision of where the PD expects the project to be at the end of Phase II (entering Phase III commercialization). Applications exceeding the budget limitation or exceeding the page limit or not meeting the formatting requirements will be excluded from NIFA review. Questions regarding the suitability of research for a specific topic area should be directed to the appropriate National Program Leader (NPL) identified in the topic area below.

8.1 Forests and Related Resources

Contact Dr. Charles Cleland, NPL for SBIR Forests and Related Resources at ccleland@nifa.usda.gov or (202) 401-6852 regarding questions about the topic area or to arrange a telephone consultation.

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. This topic area meets the NIFA Strategic Goal 1: Science; Catalyze exemplary and relevant research, education and extension programs; SUB-GOAL 1.2: Advance the development and delivery of science for agricultural, forest, and range systems adapted to climate variability and to mitigate climate impacts; and SUB-GOAL 1.3: Optimize the production of goods and services from working lands while protecting the Nation's natural resource base and environment.

FY 2018 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

- The applicants are strongly encouraged to contact the NPL regarding the suitability of research topics.

- 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.

8.2 Plant Production and Protection - Biology

Contact Dr. Robert Nowierski, NPL for SBIR Plant Production and Protection - Biology at rnowierski@nifa.usda.gov or (202)401-4900 regarding questions about the suitability of research topics or to arrange a telephone consultation.

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. This topic area supports the NIFA Strategic Plan Goal 1 Science: Catalyze exemplary and relevant research, education and extension programs; SUB-GOAL 1.1: Advance our Nation's ability to achieve global food security and fight hunger.

FY 2018 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, insect pests, and abiotic stress on crop plants; and increasing plant resistance to plant pathogens, insect 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 crops from insect and nematode pests and diseases, including the development of decision aid systems that are information extensive and time sensitive.

Other Key Information

- 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. Applications that deal with non-biological engineering technologies should be sent to topic area 8.13 Plant Production and Protection-Engineering.

- 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.

- Applications that deal with the genetic improvement and production of algae should be

submitted to the 8.7 Aquaculture topic area.

8.3 Animal Production and Protection

Contact Dr. Robert Smith, NPL for SBIR Animal Production and Protection at rsmith@nifa.usda.gov or (202) 401-4892 regarding questions about the topic area or to arrange a telephone consultation.

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, 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. And 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. This topic area supports the NIFA Strategic Plan Goal 1 Science: Catalyze exemplary and relevant research, education and extension programs; SUB-GOAL 1.1: Advance our Nation's ability to achieve global food security and fight hunger.

FY 2018 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 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 does not include manure management.

Other Key Information

- 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 may be submitted under topic area 8.5 Food Science and Nutrition.

- Applications dealing with aquaculture species should be submitted under topic area 8.7 Aquaculture.

8.4 Air, Water and Soils

Contact Dr. Karelyn Cruz, National Program Leader for SBIR Air, Water and Soils at karelyn.cruz@nifa.usda.gov or (202) 604-7742 regarding questions about the topic area or to arrange a telephone consultation.

Background

The Air, Water and Soils topic area aims to develop and commercialize technologies and innovations for conserving, monitoring and protecting air, water and soil resources while sustaining optimal farm and forest productivity. Climate variability, natural resources conservation (air, water and soils) and food security are major focal points of this topic area. We encourage new technologies and innovations that will help improve soil; reduce soil erosion; improve water and air quality; enable plant and animal production systems to adapt to changing climatic conditions; and conserve and use water more efficiently. This topic area supports the NIFA Strategic Plan Goal 1 Science: Catalyze exemplary and relevant research, education and extension programs; SUB-GOAL 1.2: Advance the development and delivery of science for agricultural, forest, and range systems adapted to climate variability and to mitigate climate impacts; and SUB-GOAL 1.3: Optimize the production of goods and services from working lands while protecting the Nation's natural resource base and environment.

FY 2018 Research Priorities:

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

1. **Water Quality and Conservation**

Develop new and improved technologies to optimize water management conservation at both the farm level and at a watershed scale, monitor the quality of surface water and groundwater resources for biotic and abiotic pollutants, including animal manure and pharmaceuticals, develop improved methods for the reuse of waste water, including the remediation and restoration of water resources that impact agriculture and forestry operations, and promote watershed restoration.

2. **Irrigation**
   Develop improved irrigation technologies for both farming and landscaping applications that will provide more efficient and cost-effective delivery of water and chemicals. Develop new irrigation methods that allow for more efficient use of water including accurate delivery of water to where it is needed.

3. **Soil Erosion**
   Develop better methods for preventing soil erosion by wind and surface water runoff and for monitoring wind erosion and sediment transport.

4. **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 the physical and chemical structure of soil.

5. **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.

Other Key Information

- The applicants are strongly encouraged to contact the NPL regarding the suitability of research topics.

8.5 Food Science and Nutrition

Contact Dr. Jodi Williams, NPL for SBIR Food Science and Nutrition at jwilliams@nifa.usda.gov or (202) 720-6145 regarding questions about the topic area or to arrange a telephone consultation.

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 characteristics of food; 2) improve methods for the processing and packaging of food products to improve the quality and nutritional value of foods; and 3) develop programs or products that increase the consumption

of healthy foods and reduce childhood obesity. The outcome of a successful project is a proof of concept for a marketable item 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 food-borne illness, obesity and enhance the nutritional quality and value of foods. This topic area supports the NIFA Strategic Plan Goal 1 Science: Catalyze exemplary and relevant research, education and extension programs; SUB-GOAL 1.1: Advance our Nation's ability to achieve global food security and fight hunger; SUB-GOAL 1.5: Combat childhood obesity by ensuring the availability of affordable, nutritious food and providing individuals and families science-based nutritional guidance; and SUB-GOAL 1.6: Reduce the incidence of food-borne illness and provide a safer food supply.

FY 2018 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 rapid detection of food borne hazards (microorganisms, chemicals, toxins) during pre- and post-harvest processing and distribution.

2. **Food Quality-Engineering**
   Developing innovative food processing and packaging technologies and materials that reduce post- harvest losses in produce while maintaining safety and quality.

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 interactive programs for nutrition educators and teachers to increase nutrition awareness and improve health to address 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.

Other Key Information

- The applicants are strongly encouraged to contact the NPL regarding the suitability of research topics.

- Improvements of current commercial methods should address high false positive and high false negative rates associated with PCR based methods for detection of food borne pathogens in produce and high false negative rates associated with immunoassays for detection of Salmonella.

- If proposing a new rapid bacterial detection test, the test should be designed to detect at least 1 colony forming unit (cfu)/25grams of food using approaches that reduce or eliminate enrichment and should be designed to allow for sampling of large volumes of food.

- Projects that promote value-added products and processes are encouraged.

- Projects that address functional foods to promote health are encouraged.

- 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.

- 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.

- Applicants who have received previous SBIR funding should address outcomes for those projects.

- 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).

8.6 Rural and Community Development

Contact Mr. Brent Elrod, NPL for SBIR Rural and Community Development at belrod@nifa.usda.gov or (202) 445-5456 regarding questions about the topic area or to arrange a telephone consultation.

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 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. This topic area supports the NIFA Strategic Plan Goal 1 Science: Catalyze exemplary and relevant research, education and extension programs; SUB-GOAL 1.7: Ensure the development of human capital, communities, and a diverse workforce through research, education, extension and engagement programs in food and agricultural sciences to support a sustainable agriculture system.

FY 2018 Research Priorities:

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

1. **Development of services and information and managerial systems that improve the efficiency and effectiveness of Local Governments and Public and Private Institutions**
   Topics may include educational programs, including 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; improved health care delivery; appropriate educational, transportation and communication technologies and services; and marketing of new information and technologies.

2. **Development of technologies and services that protect or enhance the environment while promoting economic development**
   Topics may include technologies and services, including proposals to catalyze activities for harnessing big data to synthesize new knowledge, to 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, 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.

Other Key Information

- The applicants are strongly encouraged to contact the NPL regarding the suitability of research topics.

- If funded, projects are expected to 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.

- Applications dealing with on-farm production agriculture research should be submitted to topic area 8.12 Small and Medium Sized Farms.

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

8.7 Aquaculture

Contact Dr. Gene Kim, NPL for SBIR Aquaculture at Gene.W.Kim@nifa.usda.gov, (202) 401-1108 regarding questions about the topic area or to arrange a telephone consultation.

Background

The Aquaculture topic area aims to develop new technologies that will enhance the knowledge and technology base necessary for the expansion of the domestic aquaculture industry as a form of production agriculture. 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. Emphasis is placed on research leading to improved production efficiency and increased competitiveness of private sector, commercial aquaculture in the United States. Studies on commercially important, or potentially 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 safety of farmed seafood.

To meet these identified needs in aquaculture, the program priorities include: improved aquaculture production resulting from improved reproductive efficiency in fish and shellfish; improved aquaculture production resulting from genetic improvement in fish and shellfish; improved aquaculture production resulting from improved animal health; improved aquaculture production with reduced water usage and improved production efficiencies; and cost-effective production of algae for use as aquaculture feed and as a source of valuable human food supplements. This topic area supports the NIFA Strategic Plan Goal 1 Science: Catalyze exemplary and relevant research, education and extension programs; SUB-GOAL 1.3: Optimize

the production of goods and services from working lands while protecting the Nation's natural resource base and environment.

FY 2018 Research Priorities:

Examples of appropriate subtopics for research applications from small businesses include**, but are 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 aquacultural stocks including: genetic mechanisms of sex determination; genetic basis for inheritance of commercially important traits, such as growth, cold tolerance, and pathogen 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 aquacultural stocks and utilization of crossbreeding and hybridization.

3. **Integrated Aquatic Animal Health Management**
   Novel or innovative approaches to reducing acute and chronic losses related to aquatic animal health in aquaculture production systems through an integrated holistic approach including: physiological stress related to the quality of the aquatic production system; 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 aquacultural 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 systems including: identification of new species with improved nutritional profile for use in feeding to other aquacultural species or as a source of valuable human food supplements; development of improved bioreactor technology; and development of better methods for harvesting algal biomass.

Other Key Information

- The applicants are strongly encouraged to contact the NPL regarding the suitability of research topics.

- 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

- 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.

8.8 Biofuels and Biobased Products

Contact Dr. Toby Ahrens, NPL for SBIR Biofuels and Biobased Products at toby.ahrens@nifa.usda.gov or (202) 401-6050 regarding questions about the suitability of research topics or to arrange a telephone consultation.

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. This topic area supports the NIFA Strategic Plan Goal 1 Science: Catalyze exemplary and relevant research, education and extension programs; SUB-GOAL 1.4: Contribute to U.S. energy independence and enhance other agricultural systems through the development of regional systems for the sustainable production of optimal biomass (forests and crops) for the production of bioenergy and value-added bio-based industrial products.

FY2018 Priority Research Areas

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

- Applications that include software development or other data-intensive technologies are encouraged to apply for topics related to the Priority Research Areas listed above.

- Applications that deal with developing value-added biofuels (including ethanol) and biobased products from forest biomass should be sent to the 8.1 Forest and Related Resources topic area.

- Applications that deal with developing biofuels and bioenergy that will improve the sustainability of small and mid-size farms should be sent to the 8.12 Small and Mid-Size Farms topic area.

- 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.

- 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.

- Applications that deal with the genetic improvement, production, or feedstock logistics of photosynthetic algae should be submitted to the 8.7 Aquaculture topic area.

- 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.

- Animal manure and carcass waste are considered acceptable feedstocks for applications to the 8.8 Biofuels and Biobased Products topic area.

- Microbial approaches must demonstrate a credible path to industrially-relevant conversion rates, yields, and titers.

8.12 Small and Mid-Size Farms

Contact Dr. Denis Ebodaghe, National Program Leader for SBIR Small and Mid-Size Farms at debodaghe@nifa.usda.gov or (202) 401-4385 regarding questions about the topic area or to arrange a telephone consultation.

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.

Food safety, climate change, food security and sustainable bioenergy diversification of agricultural production systems and increased efficiency of farm operations and economies of scale are all important program priorities in this topic area. Additionally these areas meet the NIFA Strategic Plan Goal 1 Science: Catalyze exemplary and relevant research, education and extension programs SUB-GOAL 1.1: Advance our Nation's ability to achieve global food security and fight hunger; SUB-GOAL 1.3: Optimize the production of goods and services from working lands while protecting the Nation's natural resource base and environment; and SUB-GOAL 1.7: Ensure the development of human capital, communities, and a diverse workforce through research, education, extension and engagement programs in food and agricultural sciences to support a sustainable agriculture system.. Proposals are encouraged that focus on one or more of these priorities and are appropriately scaled so as to apply to the needs and capabilities of small farmers.

To meet these identified needs in the small and mid-size farm sector, the program's long-term goals (10 years) are to achieve improvements in sustainability and profitability of small farms with increased production of specialty crops and specialty animals; improved farm management skills in small farmers that leads to more sustainable and profitable small farms; better stewardship of natural resources through adoption of more sustainable farming

practices; enhanced utilization of renewable energy sources and more focus on energy efficiency and energy conservation; and better educated small farmers who are better able to operate their farms on a sustainable and profitable basis.

FY 2018 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. **Natural Resources and Renewable Energy**
   Efforts are needed to develop farming methods scaled appropriately for small farms that are directed at more efficient use of natural resources. Particular emphasis is needed to develop better ways to utilize renewable energy sources, such as wind, solar, and geothermal energy, and to promote improved energy efficiency and conservation in farming operations.

5. **Educational Outreach**
   Efforts are needed to develop new tools to ensure that the next generation of small farmers has access to the information and resources they need to operate their small farms on a

sustainable and profitable basis.

6. **Urban Farming**
   In recent years there has been increasing interest in the establishment of small farms in urban areas on roof tops, in abandoned building 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

- All Phase I applications should give the reviewing community a brief vision of where the PD expects the project to be at the end of Phase II (entering Phase III commercialization).

- 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.

- The applicants are strongly encouraged to contact the NPL regarding the suitability of research topic.

8.13 Plant Production and Protection - Engineering

Contact Dr. Rachel Melnick, National Program Leader for SBIR Plant Production and Protection Engineering at rmelnick@nifa.usda.gov or (202) 401-4980 regarding questions about the suitability of research topics or to arrange a telephone consultation.

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. Projects that promote energy conservation or efficiency in food and fiber systems are strongly encouraged. Engineering projects must describe the system need; design specifications, and functionality and reliability; and cost benefit analysis. Where feasible, describe the testing metrics, experimental design, and materials and methods to collect and analyze data on the metrics. This topic area supports the NIFA Strategic Plan Goal 1 Science: Catalyze exemplary and relevant research, education and extension programs; SUB-GOAL 1.1: Advance our Nation's ability to achieve global food security and fight hunger; SUB-GOAL 1.2: Advance the development and delivery of science for agricultural, forest, and range systems adapted to climate variability and to mitigate climate impacts; and SUB-GOAL 1.3: Optimize the production of goods and services from working lands while protecting the Nation's natural resource base and environment.

FY 2018 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 and in organic systems.**
      Projects to reduce manual labor, maintain quality, reduce food safety issues, reduce waste streams, and select for quality and consumer preference.
   c. **Cyber-physical systems to support precision agriculture.**
      Projects that accelerate the integration of cyber-physical systems into precisions agriculture including methods, tools, hardware, and software components.

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 engineered technical solutions for monitoring, detection, and management of pests and abiotic stresses at the earliest stage of their manifestation. Projects on diagnostics submitted to this area should focus on engineering, not biological solutions.

3. **Energy conservation**
   Develop crop management systems, farm and greenhouse structures, and waste utilization strategies that promote energy conservation and efficiency, including the development of technology for the economic use of alternative/renewable energy resources.

4. **Pollinators and crop production**
   Engineering technologies that address the health and success of domesticated and natural pollinators of economically important crops.

Other Key Information

- Applications that deal with irrigation and related technology should be sent to the 8.4 Air, Water and Soils topic area.

- Applications that deal with the feedstock logistics of woody biomass (including short rotation crops like willow and poplar) should be submitted to the 8.1 Forest and Related Resources topic area.

- 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 Agriculturally-related Manufacturing Technology and Energy Efficiency and Alternative and Renewable Energy as two cross-cutting 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. Special consideration will be given to applications that address one or more of these priorities under the Project Narrative (Part IV, C.3b(1)).

Agriculturally-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 agriculturally-related manufacturing technology. Since manufacturing impacts 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 impact 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. Three-phase Program

The USDA NIFA SBIR program is carried out in three separate phases. Phase I is to determine the scientific or technical feasibility of ideas submitted by applicants on research topic areas described in this solicitation. This program solicitation is only for the preparation and submission of Phase I applications. Phase I awards may not exceed $100,000 for a period normally not to exceed eight (8) months. However, longer grant periods, of up to 20 months, may be considered if the proposed research project will require more than 8 months to complete. The Phase I application should concentrate on research that will significantly contribute to proving the

scientific or technical feasibility of the approach or concept and will be a prerequisite to further USDA SBIR support in Phase II.

Phase II applications promote principal R/R&D and the potential 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 February. USDA NIFA recognizes that Phase 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.

The purpose of Phase III is to stimulate technological innovation and the national return on investment from research through the pursuit of commercialization objectives resulting from the USDA NIFA-supported work carried out in Phases I and II. Federal SBIR funds may not be used to support Phase III projects. However, firms are strongly encouraged to secure Phase III funding from their own resources or from other public and private sources. Additionally, Phase III is to be conducted by the small business firm, including joint ventures and limited partnerships.

E. 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. Phase I applications should contain a description of any potential commercial application(s) and whether or not the small business concern will attempt to secure follow-on, non-SBIR funding to pursue the commercial development of the expected products from the proposed research. Additionally if a Phase I applicant has received a prior Phase II grant from the USDA NIFA SBIR Program, the applicant is requested 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

This RFA is being released prior to the passage of an appropriations act for FY 2018. Enactment of continuing resolutions or an appropriations act may affect the availability, level and timing of funding for this program.

There is no commitment by USDA NIFA to fund any particular application or to make a specific number of awards.

The Automated Standard Applications for Payment System (ASAP), operated by the Department of Treasury's Bureau of the Fiscal Service, is the designated payment system for awards resulting from this RFA. For more information see https://www.fiscal.treasury.gov/fsservices/gov/pmt/asap/asap_home.htm.

B. Types of Applications

New application. This is a project application that has not been previously submitted to the SBIR Phase I Program. USDA NIFA will review all new applications competitively using the screening for administrative requirements, review panel evaluation of applications using evaluation criteria and selection process described in Part V—Application Review Requirements.

Resubmission. This is a project application that has been previously submitted to the SBIR Phase I Program. USDA NIFA will review all resubmission applications competitively using the screening for administrative requirements, review panel evaluation of applications using evaluation criteria and selection process described in Part V—Application Review Requirements.

C. Project Types

Phase I applications may not request more than $100,000 for a period normally not to exceed 8 months. The anticipated period of performance is listed below.

	Start	End
Phase I	6/1/2018	2/28/2019

D. Responsible and Ethical Conduct of Research

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 shall, upon request, make available to NIFA the policies, procedures, and

documentation to support the conduct of the training. See http://nifa.usda.gov/responsible-and-ethical-conduct-research for more 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 at https://www.usda.gov/oig/hotline.htm or at (800) 424-9121.

PART III—ELIGIBILITY INFORMATION

A. Eligible Applicants

Each applicant submitting an application must qualify as a Small Business Concern (SBC) for R/R&D purposes at the time of selection (see definitions in section Part VIII). 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 of the PD's/PI's time is spent in the employ of the small business. Primary employment with the small business precludes the applicant as a full-time employee with another organization. While the PD/PI must work more than one-half 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.

(A) 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.

(B) 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.

(C) Benchmark

All Phase I applicants must meet a minimum benchmark rate for converting Phase I awards into Phase II awards to be eligible to submit a Phase I application. Any company that has received at least 20 Phase I awards, regardless of the awarding agency, during the five-year period (Fiscal Year 2013 through 2018) 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.

PART IV—APPLICATION AND SUBMISSION INFORMATION

A. Electronic Application Package

Only electronic applications may be submitted via Grants.gov to NIFA in response to this RFA. We urge you to submit early to the Grants.gov system. For information about the pre-award phase of the grant lifecycle see http://www.grants.gov/web/grants/learn-grants/grants-101/pre-award-phase.html.

New Users of Grants.gov

Prior to preparing an application, we recommend that the Project Director/Principal Investigator (PD/PI) first contact an Authorized Representative (AR, also referred to as Authorized Organizational Representative, or AOR) to determine if the organization is prepared to submit electronic applications through Grants.gov. If not (e.g., the institution/organization is new to the electronic grant application process through Grants.gov), then the one-time registration process must be completed **PRIOR** to submitting an application. It can take as long as four weeks to complete the registration process so it is critical to begin as soon as possible. In such situations, the AR should go to **"Register," in the top right corner of the Grants.gov web page (or go to** http://www.grants.gov/web/grants/register.html**), for information on registering the institution/organization with Grants.gov.** Part II,1 of the NIFA Grants.gov Application Guide contains detailed information regarding the registration process. Refer to item 2, below, to locate the "NIFA Grants.gov Application Guide."

Steps to Obtain Application Package Materials

To receive application materials:

1. You must download and install a version of Adobe Reader compatible with Grants.gov to access, complete, and submit applications. For basic system requirements and download instructions, see http://www.grants.gov/web/grants/applicants/adobe-software-compatibility.html. Grants.gov has a test package that will help you determine whether your current version of Adobe Reader is compatible.

2. To obtain the application package from Grants.gov, go to http://www.grants.gov/web/grants/applicants/download-application-package.html and enter the funding opportunity number

   Funding Opportunity Number: USDA-NIFA-SBIR-006365

   From the search result, click "Select Package" to access the application package. A Grant Application Package is tied to a particular funding opportunity. You may submit an application ONLY to the particular funding opportunity to which the Grant Application Package is associated.

   Contained within the application package is the "NIFA Grants.gov Application Guide." This guide contains an introduction and general Grants.gov instructions, information

about how to use a Grant Application Package in Grants.gov, and instructions on how to complete the application forms.

If you require assistance to access the application package (e.g., downloading or navigating Adobe forms) **or submitting the application,** refer to resources available on the Grants.gov website (http://www.grants.gov/web/grants/applicants/applicant-tools-and-tips.html). Grants.gov assistance is also available at:

Grants.gov customer support
800-518-4726 Toll-Free or 606-545-5035
Business Hours: 24 hours a day, 7 days a week. Closed on federal holidays.
Email: support@grants.gov

Grants.gov iPortal (see https://grants-portal.psc.gov/Welcome.aspx?pt=Grants): Top 10 requested help topics (FAQs), Searchable knowledge base, self-service ticketing and ticket status, and live web chat (available 7 a.m. - 9 p.m. EST). Have the following information available when contacting Grants.gov:

- Funding Opportunity Number (FON)
- Name of agency you are applying to
- Specific area of concern

B. Small Business Administration (SBA) Registration

All companies that are submitting an application to any SBIR solicitation are required to register with the SBIR company registry. In addition all companies must update their commercialization status through the SBIR company registry as well. Supporting documentation must be included in a company's application as a PDF file and attached under Field 12. Add Other Attachments. Information related to the steps necessary to register with the SBIR company registry through SBA.gov can be found at http://www.sbir.gov/registration.

C. Content and Form of Application Submission

You should prepare electronic applications following Parts V and VI of the NIFA Grants.gov Application Guide. This guide is part of the corresponding application package (see Section A of this part). The following is **additional information** you need to prepare an application in response to this RFA. **If there is discrepancy between the two documents, the information contained in this RFA is overriding.**

Note the attachment requirements (e.g., PDF) in Part III, Section 3 of the guide. ANY APPLICATIONS THAT ARE NON-COMPLIANT WITH THE REQUIREMENTS (e.g., content format, PDF file format, file name restrictions, and no password protected files) WILL BE EXCLUDED FROM NIFA REVIEW. Grants.gov does not check for NIFA required attachments or whether attachments are in PDF format; see Part III, Section 6.1 of the guide for how to check the manifest of submitted files. Partial applications will be excluded from NIFA review. We will accept subsequent submissions of an application until

close of business on the closing date in the RFA (see Part V, 2.1 of the NIFA Grants.gov Application Guide for further information).

For any questions related to the preparation of an application, review the NIFA Grants.gov Application Guide and the applicable RFA. If assistance is still needed for preparing application forms content, contact:

- Email: electronic@nifa.usda.gov
- Phone: 202-401-5048
- Business hours: Monday through Friday, 7 a.m. – 5 p.m. EST, excluding federal holidays.

Phase I applications must address only scientific research activities. **A small business must not propose technical assistance, demonstration projects, classified research, or financial assistance to start or create a company or patent applications**. Many of the research projects supported by the SBIR program lead to the development of new products 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 potential commercialization of the innovation being researched under Phase I (see Field 8. Project Narrative, Section 9. Potential Post Application). 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 should be completed prior to the Phase I application and should 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 should 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.

Modifications to the application will not be accepted after the closing date of this program solicitation unless indicated below. 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.**

1. SF 424 R&R Cover Sheet

Information related to the questions on this form is dealt with in detail in Part V, 2 of the NIFA Grants.gov Application Guide. See Part V, Section 2.18 of the NIFA Grants.gov Application Guide for the required certifications and assurances (e.g., Prohibition Against Entities Requiring Certain Internal Confidentiality Agreements).

Field 5. Please note: 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. In most circumstances, the following dates should be used for these fields:

	Start	**End**
Phase I	6/1/2018	2/28/2019

Field 17. Complete Certification – Please refer to the NIFA Grants.gov 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. No attachments should be added.

2. SF 424 R&R Project/Performance Site Location(s)

Detailed information related to the questions on this form is available in Part V, 3 of the NIFA Grants.gov Application Guide.

3. R&R Other Project Information Form

Specific instructions for the application is provided below. For those fields not identified below, detailed information related to the questions are available in Part V, 4 of the NIFA Grants.gov Application Guide.

Field 7. Project Summary/Abstract.

See Part V. 4.7 of NIFA Grants.gov Application Guide for further instructions and a link to the template.

1 PAGE is the Page Limit for the Summary/Abstract – (PDF Format is Required)

In the project abstract, include a description of the problem or opportunity, project objectives, and a description of the effort. Provide another paragraph discussing the anticipated results and potential commercial applications of the proposed research. **The project summary/abstract of successful applications may be published by USDA NIFA and, therefore, should not contain proprietary information. A template for the project summary can be found at https://nifa.usda.gov/resource/application-support-templates.**

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 even if single or double spaced. Applications that exceed required page limits will be excluded from review.

Field 8. Project Narrative – (PDF Format is Required)

16 PAGES is the Page Limit for the Project Narrative (The only exception to this page limit requirement will be found in the directions as noted below under (1) Response to Previous Review.) NOTE: The USDA NIFA SBIR Program encourages applicants to only include information pertaining to the items listed below.

Applicants **must not** include additional information such as cover sheets, table of contents, reference listings, budgets, and appendices **unless the applicant intends for these to be considered in the page count.**

Applicants that do not address the items listed below risk being excluded from NIFA review.

IT IS THE RESPONSIBILITY OF THE APPLICANT TO REVIEW THE PROJECT NARRATIVE ATTACHMENT FOR PAGE LIMIT AND PDF COMPLIANCE BEFORE SUBMISSION.

1. Response to Previous Review –For applicants who are submitting an application in which the project described was previously submitted to the SBIR program, but not funded, the page limit for the Project Narrative is increased to 17 pages to permit a one page response to the previous reviews. Applicants should 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 16 page limit of the Project Narrative so that the Project Narrative does not exceed a total of 17 pages when including the Response to Previous Review.**

2. Responsiveness to USDA NIFA SBIR Program Priorities. Please indicate if the application has a connection to agriculturally–related manufacturing technology, energy efficiency and alternative and renewable energy. Provide a brief explanation of how the application is related to the area indicated.

   Identification and Significance of the Problem or Opportunity – Clearly state the specific technical problem or opportunity addressed and its importance.

3. Background and Rationale – Indicate the overall background and technical approach to the problem or opportunity and the part that the proposed research plays in providing needed results. As a part of this section, it is critical that applications adequately cite relevant scientific literature. Moreover, all citations provided must be properly referenced in the Bibliography & References Cited as a separate attachment (see Field 9).

4. 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 R&D effort. State the anticipated results of the approach if the project is successful. This should 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.

5. 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.

6. 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 should be linked with the technical objectives of the research and the questions the effort is designed to answer. This section should constitute a substantial portion of the project narrative and can include graphics, tables, charts, etc...

7. 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. The applicant must persuade reviewers that he or she is aware of related research 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 a new product, process, service, or technology or to substantial improvement of an existing product, process, service, or technology.

8. Potential Post Application – Describe the commercialization potential of the proposed research after Phase I funding. In addition, indicate whether there appears to be a potential use of the proposed research by the Federal Government. Include a description of the proposing company (e.g., date founded, number of employees, and its field of interest). What are the major competitive products in this field, and what advantages will the proposed research have over existing technology in application, performance, technique, efficiency, or cost?

9. Satisfying the Public Interest - Specify how the proposed research will satisfy one or more of the following NIFA strategic goals: (more information can be found at http://nifa.usda.gov/resource/nifa-strategic-plan-fy2014-fy2018)

GOAL 1: SCIENCE Catalyze exemplary and relevant research, education and extension programs

a) SUB-GOAL 1.1: Advance our Nation's ability to achieve global food security and fight hunger.
b) SUB-GOAL 1.2: Advance the development and delivery of science for agricultural, forest, and range systems adapted to climate variability and to mitigate climate impacts.
c) SUB-GOAL 1.3: Optimize the production of goods and services from working lands while protecting the Nation's natural resource base and environment.
d) SUB-GOAL 1.4: Contribute to U.S. energy independence and enhance other agricultural systems through the development of regional systems for the sustainable production of optimal biomass (forests and crops) for the production of bioenergy and value-added bio-based industrial products.
e) SUB-GOAL 1.5: Combat childhood obesity by ensuring the availability of affordable, nutritious food and providing individuals and families science-based nutritional guidance.
f) SUB-GOAL 1.6: Reduce the incidence of food-borne illness and provide a safer food supply.
g) SUB-GOAL 1.7: Ensure the development of human capital, communities, and a diverse workforce through research, education, extension and engagement

Field 9. Bibliography & Cited References – (PDF Format is Required)

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. The references should be listed in alphabetical order using the last name of the first author.

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 facility not owned and operated by the applicant, see Field 12 for additional information.

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.

Field 12. Add Other Attachments
See Part V. Section 4.12 of the NIFA Grants.gov Application Guide (Field 12 on the form) for instructions regarding mandatory Felony Convictions or Tax Delinquent Status. A template for the project summary can be found at https://nifa.usda.gov/resource/application-support-templates. The following are additional instructions for documentation that may be required for your application.

1. **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.

2. **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 should be described in detail. **Only one third (1/3) of the grant based on expenditures can 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**.

3. **Letters of Support** – General letters of support from potential end-users of the technology or from individuals/organizations that want to express support for the application should be uploaded in Field 12.

4. **Duration Exceeds Normal Project Period** – The proposed duration of Phase I projects should normally not 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.

5. **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.

6. **Statement as to 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.

7. **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."

4. R&R Senior/Key Person Profile (Expanded)

Applicants must fill out a profile for the PD and anyone who will be supported by the budget. Detailed information related to the questions on this form is available in Part V, 5 of the NIFA Grants.gov Application Guide. This section of the guide includes instructions about senior/key person profile requirements, and details about the biographical sketch, and the current and pending support, and conflict of interest, including a link to a suggested template for the current and pending support. 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. Templates for required forms can be found at **https://nifa.usda.gov/resource/application-support-templates**. **Applicants *MUST* include the current and pending support form as an attachment in the application. The PD and Co-PDs *MUST* also include a conflict of interest form. Templates for required forms can be found at https://nifa.usda.gov/resource/application-support-templates.**

5. R&R Personal Data

As noted in Part V, 6 of the NIFA Grants.gov Application Guide, the submission of this information is voluntary and is not a precondition of award. Part V.6 also notes the importance and use of the information.

6. R&R Budget

Detailed information related to the questions on this form is available in Part V, 7 of the NIFA Grants.gov Application Guide.

A Research and Related Budget form must be completed 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.**

Applicants must request a federal budget that is reasonable and must not exceed a ceiling of $100,000. 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 will be returned without review.**

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.

Field C. Equipment Description - Performing organizations are expected to have appropriate facilities, suitably furnished and equipped. However, funding for items of equipment may be requested provided that 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 - Applicants must reference the NIFA Grants.gov Application Guide for directions.

Fields F 1-10. Other Direct Costs - Applicants must reference the NIFA Grants.gov Application Guide for directions.

Field G. Direct Costs - Applicants must reference the NIFA Grants.gov Application Guide for directions.

Fields H 1-4. Indirect Costs - For further information and instructions regarding indirect costs, refer to Part V, section 7.9 of the NIFA Grants.gov Application Guide. Additional guidance on indirect cost calculation for application to USDA NIFA can be found at https://nifa.usda.gov/indirect-costs. USDA NIFA does not have a cap on Indirect Costs for SBIR grants.

Field J. Fee - Applicants must reference the NIFA Grants.gov 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 – (PDF Format is Required) - 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.**

(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 are expected to have appropriate facilities, be suitably furnished and equipped. However, funding for items of equipment may be requested, provided that 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 should be indicated in general terms with estimated costs.

(4) Travel - The type and extent of travel and its relationship to the project should be specified. Funds may be requested for field work 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 should 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 amount of 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 $608/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, section 7.9 of the NIFA Grants.gov 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.

7. R&R Subaward Budget Attachment

Information related to the questions on this form is dealt with in detail in Part V, 8. of the NIFA Grants.gov 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.

You should note that the check application feature in the Grants.gov application package will not check the Subaward budget forms. However, once the application is submitted to Grants.gov, Grants.gov will validate the subaward budget forms for

compliance. If the subaward budget forms fail the Grants.gov validation, the application will be rejected and an email will be sent to the applicant notifying them of this problem. USDA NIFA will not accept late applications due to a non-compliant subaward budget form. You must plan ahead and submit early in order to correct any problems you may have with your submission to Grants.gov.

8. Supplemental Information Form

Detailed information related to the questions on this form is available in Part VI, 1 of the NIFA Grants.gov Application Guide.

a. **Field 2. Program to which you are 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

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.

b. **Field 8. Conflict of Interest List**. See Part VI, 1.8 of the NIFA Grants.gov Application Guide for further instructions. A template can be found at https://nifa.usda.gov/resource/application-support-templates. A conflict of interest attachment is required for USDA NIFA SBIR applications. Title the attachment as 'Conflict of Interest' in the document header and save file as 'ConflictofInterest'.

9. SBIR/Small Business Technology Transfer Program (STTR) Information

Information related to the questions on this form is dealt with in detail in Part VI, 3 of the NIFA Grants.gov Application Guide unless otherwise noted below.

Program Type – Select SBIR only. USDA NIFA does not offer a STTR program.
SBIR/STTR Type – Select Phase I. The USDA NIFA SBIR program does not offer a Fast-Track Option.

Field 1. Did you certify that at the time of award your organization will meet the eligibility criteria for a small business as defined in the funding opportunity announcement? – Enter yes or no.

Field 2. Does this application include subcontracts with Federal laboratories or any other Federal Government agencies? Enter yes or no. **If yes, insert the names of the Federal laboratories/agencies.**

Field 3. Are you located in a HUBZone? – Enter yes or no.

Field 4. Will all research and development on the project be performed in its entirety in the United States? – Enter yes or no. **If no, provide an explanation in an attached PDF file** (this is required information).

Field 5. Has the applicant and/or Project Director/Principal Investigator submitted applications for essentially equivalent work under other Federal program solicitations or received other Federal awards for essentially equivalent work? – Enter yes or no. **If yes, insert the names of the other Federal agencies** (this is required information).

Field 6. Disclosure Permission Statement: If this application does not result in an award, is the Government permitted to disclose the title of your proposed project, and the name, address, telephone number and e-mail address of the official signing for the applicant organization to organizations that may be interested in contacting you for further information (e.g., possible collaborations, investment)? – Enter yes or no.

Field 7. Commercialization Plan – Leave this section blank.

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

> **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 shall 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.
>
> **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 in the preceding five fiscal years 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:

1. Company & Phase II Grant Information
2. Partnership-Related Activities
3. Funding: Describe any funding and third-party investments
4. Revenue & Sales
5. Intellectual Property Assets
6. Other Success Indicators (Employees, Acquisitions, Return on Investment (ROI), etc.…)
7. Company Achievements

USDA NIFA SBIR shall 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]".

Field 9. Will the Project Director/Principal Investigator have his/her primary employment with the small business at time of award? – Check Yes or No.

Fields 10-11. STTR-Specific Questions – Do not respond to these questions. They are not applicable to the USDA NIFA SBIR program**.**

D. Submission Dates and Times

We recommend that you conduct an administrative review of the application before submission of it via Grants.gov to ensure that it complies with all preparation instructions including page limits. An application checklist is included in Part VII of the NIFA Grants.gov Application Guide to assist with this review.

Instructions for submitting an application are included in Part IV, Section 1.9 of the NIFA Grants.gov Application Guide.

Applications must be received by Grants.gov by **5 p.m. Eastern Time on October 5, 2017**. Applications received after this deadline will not be considered for review or funding.

If you have trouble submitting an application to Grants.gov, you should FIRST contact the Grants.gov Help Desk to resolve any problems. Keep a record of any such correspondence. See Part IV. A for Grants.gov contact information.

Applicants must allow additional time for electronic submission and plan ahead to allow time for correction of technical errors identified by Grants.gov. It is recommended that applicants begin submitting their completed application at least one day prior to the deadline. The USDA NIFA SBIR Program will rarely accept late applications. **Exceptions are only made for delays due to natural disasters or technical problems experienced by Grants.gov that impacts the entire applicant community.** Documentation of the problem will be required. Exceptions made for technical problems will be for Grants.gov system failures prior to the deadline that impacts the entire applicant community. Applicants who have problems with their submissions to Grants.gov must call the Grants.gov help desk to resolve the problems and keep a record of the following:

1. Grants.gov Tracking Numbers
2. Case numbers provided by Grants.gov
3. Any correspondence with Grants.gov regarding the submission problem
4. Any correspondence with SAM and Dunn and Bradstreet during the registration process

Once the application is successfully submitted to Grants.gov the applicant must forward the information above via email to sbir@nifa.usda.gov. Information obtained from the case number and correspondence will be used to verify if the submission problem was due to a Grants.gov system failure that impacted the entire applicant community or due to a problem with the applicant. This information will be used to determine the final decision to accept or not accept a late application.

We send email correspondence to the AR regarding the status of submitted applications. We strongly encourage you to provide accurate email addresses, where designated, on the SF-424 R&R Application for Federal Assistance.

If the AR has not received correspondence **from NIFA** regarding a submitted application within 30 days of the established deadline, contact the Agency Contact identified in Part VII of the RFA and request the application number assigned to the application. **Failure to do so may result in the application not being considered for funding by the peer review panel. Once the application has been assigned an application number, you should cite this number on all future correspondence.**

E. Other Submission Requirements

You should follow the submission requirements noted in Part IV, Section 1.9 of the NIFA Grants.gov Application Guide.

It is anticipated that the evaluation of SBIR Phase I applications will require approximately six months from October 5, 2017, 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 within approximately 6 months.

For information about the **status of a submitted application**, see Part III, Section 6 of the NIFA Grants.gov Application Guide.

PART V—APPLICATION REVIEW REQUIREMENTS

A. General

We evaluate each application in a two-part process. First, we screen each application to ensure that it meets the administrative requirements as set forth in this RFA. Second, a technical review panel will evaluate applications that meet the administrative requirements. Members of the panel will review the applications individually and then convene as a panel to deliberate on providing NIFA with recommendation on which applications to fund.

We select external peer reviewers based upon their training and experience in relevant scientific, business, or commercialization fields, taking into account the following factors:

- the level of relevant formal scientific, technical education, extension experience, or business experience of the individual, as well as the extent to which an individual is engaged in relevant research and commercialization activities;
- the need to include experts from various areas of specialization within relevant scientific research and development fields;
- the need to include other experts (e.g., producers, range or forest managers/operators, and consumers) who can assess relevance of the applications to targeted audiences and to program needs;
- the need to include experts from a variety of organizational types (e.g., colleges, universities, industry, state and federal agencies, and private profit and non-profit organizations) and geographic locations;
- the need to maintain a balanced composition with regard to minority and female representation and an equitable age distribution; and
- the need to include reviewers who can judge the effective usefulness of each application to end users and the general public.

After each peer review panel has completed its deliberations and provided a recommendation, the responsible program staff of the USDA NIFA SBIR program will determine if the panel recommendations can be supported from currently available funds or be declined due to insufficient funds or unfavorable review. **Recommendations to fund or not fund an application will be final and the decision cannot be contested by the applicant.** Phase I applicants will have an opportunity to resubmit the application under the next Phase I cycle.

USDA NIFA SBIR program reserves the right to negotiate with the PD/PI 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.

We will send copies of reviews, not including the identity of reviewers, and a summary of the panel comments to the PD after the review process has been completed. NIFA reserves the right to triage applications based on an unfavorable review. Triaged applications will receive at a minimum the individual review comments.

B. Evaluation Criteria

We will use the evaluation criteria below to review applications submitted in response to this RFA:

Initial Screening Criteria

To avoid any misunderstandings, 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:

(A) The proposing firm must qualify as a small business concern.

(B) 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.

(C) The proposed budget must be within the dollar ceiling identified in this RFA.

(D) The proposed Phase I research must fall within one of the USDA NIFA SBIR topic areas.

(E) An application must contain adequate scientific/technical information clearly stating the research plan and objectives. USDA NIFA reserves the right not to submit for review any application that it finds to have insufficient scientific/technical information.

(F) It is clear that the project director will work a minimum of 51 percent of his/her time for the small business firm during the period of the grant and that the small business firm will conduct a minimum of one-half of the research effort. However the project director may spend less than 50 percent of his/her time on the Phase II project.

Phase I Application Evaluation Criteria

The primary evaluation criteria used by reviewers are listed below. Approximately equal consideration will be given to each criterion, **except for items (A) which will receive twice the value of any of the other items:**

(A) Phase I Scientific and Technical Feasibility:
These evaluation criteria will be used for the review of all applications.

1. 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;
2. Proposed approach, procedures, or methodologies are innovative, original, clearly described, suitable, and feasible;

3. Expected results or outcomes are clearly stated, measurable, and achievable within the allotted time frame;
4. Proposed research fills knowledge gaps that are critical to the development of new innovations to address the stated problem or issue;
5. Proposed research is up-to-date on the current state of the art (i.e., literature reviews have been completed).
6. Proposed research includes Agriculturally-related Manufacturing and/or Energy Efficiency and/or Alternative and Renewable Energy technologies.

(B) Importance of the Problem: Does the application provide sufficient justification for the importance of the problem? Is the proposed project in the public interest by satisfying one or more of the strategic goals listed in this RFA?

(C) Investigator and Resource Qualifications:

1. Roles of key personnel are clearly defined;
2. Key personnel have sufficient expertise to complete the proposed project, and where appropriate, partnerships with other disciplines and institutions are established;
3. PD and Co-PD biographic information/resumes provide relevant employment history;
4. Support personnel, facilities, and instrumentation are sufficient;
5. 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;
6. Consultants, subcontractors, or CRADA cooperators that are involved in the project have provided letters verifying their willingness to participate in the project;
7. Personnel on subcontract(s) and consulting agreement(s) have defined roles and responsibilities.

(D) Budget: Is the budget appropriate for the proposed research plan? Is sufficient budget detail provided to indicate clearly how the funds would be utilized?

1. The budget is appropriate for the proposed project; and
2. There is sufficient budget detail to indicate clearly how the funds would be utilized

(E) Duplication:

1. 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 laboratory, or contains a follow-on funding commitment for Phase III, or is identified as an agriculturally–related manufacturing technology, or is an energy efficiency and alternative and renewable energy technology. In the event that two or more applications are of approximately equal merit, the existence of a CRADA with a USDA laboratory or a follow-on funding commitment for Phase III or is identified as an agriculturally–

related manufacturing technology, or is an energy efficiency and alternative and renewable energy technology will be an important consideration to break the tie.

C. Conflicts of Interest, Confidentiality

During the peer evaluation process, we take extreme care to prevent any actual or perceived conflicts of interest that may impact review or evaluation. See http://www.nifa.usda.gov/business/competitive_peer_review.html for further information about conflicts of interest and confidentiality as related to the peer review process.

D. Proprietary Information

Information contained in unsuccessful applications will remain the property of the applicant. The Government may, however, 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 provided by an applicant in an application, which constitutes a trade secret, proprietary commercial or financial information, confidential personal information or data affecting the national security, it will be treated in confidence, to the extent permitted by law. This information must be clearly marked 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 as a result 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 __ 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 four years after the end of the grant period. 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 which, 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. Applications or reports that attempt to restrict dissemination of large amounts of information may be found unacceptable by USDA NIFA.

E. 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.

F. Copyrights

With prior written permission of the Authorized Departmental Officer, the grantee normally may copyright and publish (consistent with appropriate national security considerations, if any) material developed with USDA NIFA support. USDA NIFA receives a royalty-free license for the Federal Government and requires that each publication contain the following acknowledgment and disclaimer statement:

"The project was supported by the Small Business Innovation Research program of the U.S. Department of Agriculture, grant number #. Any opinions, findings and conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the U.S. Department of Agriculture."

The last sentence may be omitted from articles published in scientific journals.

G. 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:

Bart Hewitt, Director of Planning, Accountability, and Reporting
National Institute of Food and Agriculture, USDA
STOP 2213
1400 Independence Avenue, SW
Washington, DC 20250-2213
Telephone: (202) 720-5623
Facsimile: (202) 720-7714
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 (www.iedison.gov). Specific instructions for invention reporting are contained in the agency's terms and conditions, a copy of which can be provided upon request.

H. 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 which have established such reviewing mechanisms to have this service performed.

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

(A) **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. All nonexempt research projects involving human subjects must be approved by an Institutional Review Board prior to commencing actual substantive work.

(B) **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.

I. 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.

J. Additional Information

(A) 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.

(B) 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 is in compliance with the Civil Rights Act of 1964. These forms will be provided to the small business concern by the Office of Grants and Financial Management, NIFA, 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. (If sufficient changes occur within the organization to warrant submission of new or additional information, additional forms should be requested by calling (202) 401-4986). 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 to be high risk based on organizational management, personnel, and financial information provided.

(C) 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.

(D) USDA NIFA is not responsible for any monies expended by the applicant prior to the award of any funding agreement.

(E) This RFA is not an offer by USDA NIFA and does not obligate USDA NIFA to make any specific number of awards. Also, awards under this program are contingent upon the availability of funds.

(F) Unsolicited applications will not be accepted under the SBIR program.

(G) The applicant must provide the total number of employees for the organization and its subsidiaries and/or parent company, if applicable.

K. Organizational Management Information

Specific management information relating to an applicant shall be submitted one-time, with updates on an as-needed basis. This requirement is part of the responsibility determined prior to the award of a grant identified under this RFA, if such information has not been provided previously under this or another NIFA program. We will provide you copies of forms recommended for use in fulfilling these requirements as part of the pre-award process. Although an applicant may be eligible based on its status as one of these entities, 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 involved or a determination that an applicant is not responsible based on submitted organizational management information).

L. Application Disposition

An application may be withdrawn at any time before a final funding decision is made regarding the application. Each application that is not selected for funding, including those that are withdrawn, will be retained by USDA NIFA SBIR for a period of three years.

PART VI—AWARD ADMINISTRATION

A. General

Within the limit of funds available for such purpose, the NIFA awarding official shall make grants to those responsible, 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 shall 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 at 7 CFR part 3430, subparts A through E.

B. Award Notice

The award document will provide pertinent instructions and information including, at a minimum, the information described in 2 CFR 200.210.

See http://www.nifa.usda.gov/business/awards/awardterms.html to view current NIFA award terms and conditions.

C. Administrative and National Policy Requirements

Several federal statutes and regulations apply to grant applications considered for review and to project grants awarded under this program. These may include, but are not limited to, the ones listed on the NIFA web page – http://nifa.usda.gov/federal-regulations.

NIFA Federal Assistance Policy Guide—a compendium of basic NIFA policies and procedures that apply to all NIFA awards, unless there are statutory, regulatory, or award-specific requirements to the contrary—is available at http://nifa.usda.gov/policy-guide.

Responsible and Ethical Conduct of Research

Refer to Part II, D for more information.

D. Expected Program Outputs and Reporting Requirements

The output and reporting requirements are included in the award terms and conditions (see http://www.nifa.usda.gov/business/awards/awardterms.html for information about NIFA award terms). If there are any program or award-specific award terms, those, if any, will be identified in the award.

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.

Please note: All technical reports are held confidential for a period covering four years after the termination of the project. **As such, <u>proprietary information may be included</u> 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**.

REEport

Grantees are to submit initial project information and annual and summary reports to NIFA's electronic, Web-based inventory system, REEport, 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. More information about REEport can be found at https://nifa.usda.gov/resource/reeport-guide-project-directors Please note: Reports submitted via REEport will be placed in the USDA Current Research Information System (CRIS) database. CRIS is an online public database meant to provide information to the general public on all awards made by USDA NIFA. **As such, <u>proprietary information should not be included in these reports</u>. Additionally a REEPort 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.**

PART VII—AGENCY CONTACTS

Applicants and other interested parties are encouraged to contact:

Dr. Charles Cleland (ccleland@nifa.usda.gov)
Telephone: (202) 401-6852
8.1 Forests and Related Resources

Dr. Robert Nowierski (rnowierski@nifa.usda.gov)
Telephone: (202) 401-4900
8.2 Plant Production and Protection- Biology

Dr. Robert Smith (rsmith@nifa.usda.gov)
Telephone: (202) 401-4892
8.3 Animal Production and Protection

Dr. Karelyn Cruz (karelyn.cruz@nifa.usda.gov)
Telephone: (202) 401-6417
8.4 Air, Water, and Soil

Dr. Jodi Williams (jwilliams@nifa.usda.gov)
Telephone: (202) 720-6145
8.5 Food Science and Nutrition

Mr. Brent Elrod (belrod@nifa.usda.gov)
Telephone: (202) 690-3468
8.6 Rural Development

Dr. Gene Kim (Gene.W.Kim@nifa.usda.gov)
Telephone: (202) 401-1108
8.7 Aquaculture

Dr. Toby Ahrens (toby.ahrens@nifa.usda.gov)
Telephone: (202) 401-6050
8.8 Biofuels and Biobased Products

Dr. Denis Ebodaghe (debodaghe@nifa.usda.gov)
Telephone: (202) 401-4385
8.12 Small and Mid-Size Farms

Dr. Rachel Melnick (rmelnick@nifa.usda.gov)
Telephone: (202) 401-4980
8.13 Plant Production and Protection – Engineering

Questions of a general nature about this SBIR solicitation should be sent to sbir@nifa.usda.gov or can be directed to:

Mr. Scott Dockum (sdockum@nifa.usda.gov)
Telephone: (202) 720-6346
SBIR Program Coordinator

Mr. Elden Hawkes (sbir@nifa.usda.gov)
Telephone: (202) 401-4002
SBIR Program Specialist

PART VIII—OTHER INFORMATION

A. Use of Funds; Changes

1. 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.

2. 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:

- **i.** Change in the scope or the objective of the project or program (even if there is no associated budget revision requiring prior written approval).
- **ii.** Change in a key person specified in the application or the federal award.
- **iii.** The disengagement from the project for more than three months, or a 25 percent reduction in time devoted to the project, by the approved project director or principal investigator.
- **iv.** The inclusion, unless waived by the federal awarding agency, of costs that require prior approval in accordance with 2 CFR 200 Subpart E—Cost Principles of this part 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 Part 31, "Contract Cost Principles and Procedures," as applicable.
- **v.** The transfer of funds budgeted for participant support costs as defined in §200.75 Participant support costs to other categories of expense.
- **vi.** Unless described in the application and funded in the approved federal awards, the subawarding, transferring or contracting out of any work under a federal award, including fixed amount subawards as described in §200.332 Fixed amount subawards. This provision does not apply to the acquisition of supplies, material, equipment, or general support services.
- **vii.** Changes in the approved cost-sharing or matching provided by the non-federal entity.
- **viii.** The need arises for additional federal funds to complete the project.

The awardee will be subject to the terms and conditions identified in the award. See http://www.nifa.usda.gov/business/awards/awardterms.html for information about NIFA award terms.

B. Confidential Aspects of Applications and Awards

When an application results in an award, it becomes a part of the record of NIFA transactions, available to the public upon specific request. Information that the Secretary of Agriculture determines to be of a confidential, privileged, or proprietary nature will be held in confidence to the extent permitted by law. Therefore, any information that the applicant wishes to have

considered as confidential, privileged, or proprietary should be clearly marked within the application. We will retain for three years a copy of an application that does not result in an award. Such an application will be released only with the consent of the applicant or to the extent required by law. An application may be withdrawn at any time prior to the final action thereon.

C. Regulatory Information

For the reasons set forth in the final Rule related Notice to 2 CFR Part 415, Subpart C, this program is excluded from the scope of the 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.

D. Definitions

Please refer to 7 CFR 3430, Competitive and Noncompetitive Non-formula Financial Assistance Programs--General Award Administrative Provisions and 7 C.F.R. 3403, Small Business Innovation Research Program for applicable definitions for this NIFA grant program.

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, who 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
This term has the same meaning as set forth in 13 CFR part 121—Small Business Size Regulations, section 121.103. Further information about SBA's affiliation rules and a guide on affiliation is available at www.SBIR.gov and www.SBA.gov/size.

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 Authorized Representative (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.

Covered Small Business Concern
A small business that:

(1) Was not majority-owned by multiple venture capital operating companies (VCOCs), hedge funds, or private equity firms on the date on which it submitted an application in response to a solicitation under the SBIR program; and

(2) Is majority-owned by multiple venture capital operating companies, hedge funds, or private equity firms on the date of the SBIR award.

Department
The United States Department of Agriculture.

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 (HUBZone)
A small business concern meeting the following criteria:

(A) Located in a "historically underutilized business zone" or HUBZone area located in one or more of the following:

(1) A qualified census tract (as defined in section 42(d)(5)(C)(i)(l) of the Internal Revenue Code of 1986); or
(2) A qualified "non-metropolitan county" (as defined in section 143(k)(2)(B) of the Internal Revenue Code of 1986); or
(3) On an Indian Reservation- Land within the boundaries of a federally recognized Indian Reservation.

(B) Owned and controlled by one or more U.S. Citizens; and

(C) 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 or General & Administrative (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, express 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
Encompasses improvements in existing methods or processes as well as wholly new processes, machines, or systems. Four main areas include:

(A) Unit process level technologies that create or improve manufacturing processes, including:

1. Fundamental improvements in existing manufacturing processes that deliver substantial productivity, quality, or environmental benefits; or
2. Development of new manufacturing processes, including new materials, coatings, methods, and associated practices.

(B) Machine level technologies that create or improve manufacturing equipment, including:

1. 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
2. New apparatus and equipment for manufacturing, including additive and subtractive manufacturing, deformation and molding, assembly and test, semiconductor fabrication, and nanotechnology.

(C) Systems level technologies for innovation in the manufacturing enterprise, including:

1. Advances in controls, sensors, networks, and other information technologies that improve the quality and productivity of manufacturing cells, lines, systems, and facilities;
2. Innovation in extended enterprise functions critical to manufacturing, such as quality systems, resource management, supply change integration and distribution, scheduling, and tracking; or
3. 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.

(D) Environment or societal level technologies that improve workforce abilities, productivity, and manufacturing competitiveness, including:

1. Technologies for improved workforce health and safety, such as human factors and ergonomics; or
2. Technologies that aid and improve workforce manufacturing skill and technical excellence, such as educational systems incorporating improved manufacturing knowledge and instructional methods.

Outcomes
The measure of long-term, eventual, program impact.

Outputs
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 Research or Research and Development (R/R&D) needs and interests in broad and selected areas, as appropriate to the agency, and requests applications from small business concerns in response to these needs and interests.

Project Director / Principal Investigator (PD/PI)
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
The total length of time approved by the Department for conducting the research project as outlined in an approved grant award. Also referred to as the period of performance.

Research or Research and Development (R/R&D)

R/R&D means any activity which is:

(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.

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 (SBC)
A concern that meets the requirements set forth in 13 CFR 121.702 (available at https://www.gpo.gov/fdsys/granule/CFR-2011-title13-vol1/CFR-2011-title13-vol1-sec121-702).

Small Business Entity

A small business entity is typically defined as a sole proprietorship, partnership, corporation, and S corporation. A Limited Liability Company (LLC) is a business structure allowed by state statute.

Small and Mid-Size Farms
Small Farms are defined as farms or ranches with less than $250,000 in annual agricultural sales. Mid-Size Farms are defined as farms or ranches with less than $500,000 in annual agricultural sales.

Socially and Economically Disadvantaged Small Business Concern
A socially and economically disadvantaged small business concern is one:

(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.

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.

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
A women-owned small business concern is a SBC:

(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.

E. Materials Available on the Internet

SBIR program information will be made available on the NIFA website at https://nifa.usda.gov/program/small-business-innovation-research-program-sbir. The following are among the materials available on the web page:

1. Phase I & Phase II Solicitations
2. USDA SBIR Eligibility Requirements
4. Small Business Innovation Research (SBIR) Grantee Resources
5. Advancing NIFA Basic Research Findings to Commercial Applications
6. Commercialization Plan Guidance for Phase II Applications
7. Government Agencies and Programs Promoting Public-Private Technology Transfer