

Agriculture and Food Research Initiative Competitive Grants Program

Modifications Pages: 15, 66, and 77

Foundational and Applied Science Program

Fiscal Year (FY) 2018 Request for Applications (RFA)

LETTER OF INTENT DEADLINE: Varies by Program Area

APPLICATION DEADLINE: Varies by Program Area

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

AGRICULTURE AND FOOD RESEARCH INITIATIVE COMPETITIVE GRANTS PROGRAM

FOUNDATIONAL AND APPLIED SCIENCE PROGRAM

INITIAL ANNOUNCEMENT

CATALOG OF FEDERAL DOMESTIC ASSISTANCE: This program is listed in the Catalog of Federal Domestic Assistance under 10.310.

DATES FOR LETTERS OF INTENT AND APPLICATIONS: The Program Area Descriptions section in Part I, C., identifies the applicability of a Letter of Intent (LOI) and, if applicable, the deadline date for its submission (a LOI is not required for conference grants). In these instances, it must be received by **5:00 p.m. Eastern Time** on the deadline date. Applications must be received by **5:00 p.m. Eastern Time** on the deadline date indicated in the Program Area Descriptions section in Part I, C. Applications received after this deadline will normally not be considered for funding (see Part IV, C). 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 request for applications (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 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 this RFA.

Visit the [NIFA website](#) to access a factsheet on the Center of Excellence (COE) designation process, including COE criteria, and a list of programs offering COE opportunities in fiscal year (FY) 2018. You may also review a recording of COE outreach webinars held in February and March of 2015. We will update COE webpages as appropriate.

NIFA solicits proposed topics for [Agriculture and Food Research Initiative](#) (AFRI) RFAs from eligible state and national commodity boards on an ongoing basis. Topics must relate to the established AFRI six 2014 Farm Bill priority areas. NIFA received topics from eligible commodity boards through August 8, 2017, for incorporation into FY 2018 RFAs. Topics submitted by the commodity boards that aligned with NIFA priorities were chosen for inclusion in selected program areas of this RFA. Details on general information and topic submission resources for inclusion in future AFRI RFAs can be found at: <http://nifa.usda.gov/commodity-boards>.

Applicants are encouraged to view the Program Area Descriptions beginning in Part I, C., of this RFA for additional details on commodity board-specific priorities and submission of applications relevant to these priorities.

EXECUTIVE SUMMARY: The Agriculture and Food Research Initiative (AFRI) is America's flagship competitive grants program that provides funding for fundamental and applied research, education, and extension projects in the food and agricultural sciences. In this RFA, NIFA requests applications for six AFRI priority areas through the Foundational and Applied Science Program for FY 2018. The goal of this program is to invest in agricultural production research, education, and extension projects for more sustainable, productive and economically viable plant and animal production systems. The global agricultural output needs to be expanded significantly to meet the food needs of the population expected in 2050; thus, it is imperative to develop innovative, safe and sustainable management strategies for livestock, crops, and critical underlying resources.

In FY 2018, applications are sought in the following priority areas:

1. Plant health and production and plant products;
2. Animal health and production and animal products;
3. Food safety, nutrition, and health;
4. Bioenergy, natural resources, and environment;
5. Agriculture systems and technology; and
6. Agriculture economics and rural communities

The amount available for new grants in this FY 2018 Foundational and Applied Science Program RFA is approximately \$182 million.

This RFA solicits for Standard Grants, Collaborative Grants, Conference Grants, Food and Agricultural Science Enhancement (FASE) Grants, whereas project types solicited in this RFA are Research, Extension and Integrated Research, Education and/or Extension projects. Grant types and project types solicited vary by program area priority and not all grant types are solicited within each program area priority. See Part I, C (Program Area Descriptions) for grant and project types solicited by each specific program area priority, and Part II, C., for a description of each individual grant type and project type.

This notice identifies the objectives for AFRI projects, deadline dates, funding information, eligibility criteria for projects and applicants, and application forms and associated instructions needed to apply for an AFRI Foundational and Applied Science Program grant.

Significant changes described in this RFA include the addition of new program area priorities within the Plant health and production and plant products; Animal health and production and animal products; Bioenergy, natural resources, and environment; Agriculture systems and technology; and the Agriculture economics and rural communities program areas. Changes also include addition of 11 specific priorities for co-funding with the Washington State Potato Commission, National Potato Promotion Board, Kansas Wheat Commission, National Peanut Board, Cattlemen's Beef Promotion and Research Board, Illinois Corn Marketing Board, American Egg Board, The Cotton Board, and Oregon Wine Board.

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PART I—FUNDING OPPORTUNITY DESCRIPTION

A. Legislative Authority

Section 2(b) of the Competitive, Special, and Facilities Research Grant Act (hereafter referred to as the Act) (7 U.S.C. 3157), as amended, authorizes the Agriculture and Food Research Initiative (AFRI), a competitive grant program to provide funding for fundamental and applied research, education, and extension to address food and agricultural sciences in the following six 2014 Farm Bill priority areas:

1. Plant health and production and plant products;
2. Animal health and production and animal products;
3. Food safety, nutrition, and health;
4. Bioenergy, natural resources, and environment;
5. Agriculture systems and technology; and
6. Agriculture economics and rural communities.

To the maximum extent practicable, NIFA, in coordination with the Under Secretary for Research, Education, and Economics (REE), will make grants for high priority research, education, and extension, taking into consideration, when available, the determinations made by the National Agricultural Research, Extension, Education, and Economics Advisory Board (NAREEEAB) pursuant to the Competitive, Special, and Facilities Research Grant Act (7 U.S.C. 3157). The Secretary delegates the authority to the Under Secretary in 7 CFR 2.21 and the Under Secretary delegates it to NIFA.

B. Purpose and Priorities

The purpose of AFRI is to support research, education, and extension work by awarding grants to solve key problems of local, regional, national, and global importance in sustaining conventional, organic, and urban agricultural systems. These include farm efficiency, profitability and sustainability, ranching, bioenergy, forestry, aquaculture, rural communities and entrepreneurship, human nutrition, mitigating impacts of biotic and abiotic constraints on food production, food safety, mitigating food waste and food loss, physical and social sciences, home economics and rural human ecology, biotechnology, and classical breeding. Through this support, AFRI advances knowledge in both fundamental and applied sciences important to agriculture. It also allows AFRI to support education and extension activities that deliver science-based knowledge to end users, allowing them to make informed, practical decisions. This AFRI RFA provides funding for research-only, extension-only, and integrated research, education, and/or extension projects addressing the six priorities identified in Part I, A.

Food and agricultural systems are under the constraints of a growing population, pressure on natural resources, challenges of climate variability and change, and complex demands of ensuring nutritional security and food safety in a global economy. Addressing these challenges requires research, education, extension, and integrated programs in concert with agroecological approaches that increase agricultural and natural resource sustainability. The term "sustainable agriculture" (7 U.S.C. 3103) means a combined system of plant and animal production practices

having a site-specific application that will, over the long-term, achieve the following goals: 1) satisfy human food and fiber needs; 2) enhance environmental quality and the natural resource base upon which the agricultural economy depends; 3) make the most efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls; 4) sustain the economic viability of farm operations; and 5) enhance the quality of life for farmers and society as a whole. AFRI encourages projects addressing enhancement of sustainability of agricultural systems.

NIFA supports global engagement that advances U.S. agricultural goals. To attain the agency's goals for U.S. agriculture, global competence of our nation's agricultural workforce, and safe and nutritious food security in a growing world, NIFA recognizes that collaboration with international partners through AFRI can contribute to advances in U.S. agriculture. In an increasingly interconnected world, these U.S. advances may have global importance. Thus, applications in response to this RFA may include collaborations with international partners, but may only be submitted by eligible U.S. institutions. Such applications may include subcontracts to international partners or other institutions and must clearly demonstrate benefits to the U.S. Additional guidance on including international activities is provided on the [AFRI International Partnerships website](#).

Stakeholder Input

For information on stakeholder input related to AFRI program, visit <https://nifa.usda.gov/resource/afri-stakeholder-feedback>.

Background

AFRI is NIFA's flagship competitive grants programs for food and agricultural sciences, and funding is offered through the Foundational and Applied Science, Sustainable Agricultural Systems, and Education and Workforce Development Requests for Applications for addressing critical societal issues.

This AFRI RFA aligns with Strategic Goals 2, 3, 4, 5, 6, and 7 of the [USDA Strategic Goals](#).

This AFRI RFA aligns with the [USDA Research, Education, and Economics \(REE\) Action Plan](#). Program Areas in this AFRI RFA draw from specific actionable items defined in the REE Action Plan including: Goals 1, Sustainable Intensification of Agricultural Production; 2, Responding to Climate and Energy Needs; 3, Sustainable Use of Natural Resources; 4, Nutrition and Childhood Obesity; 5, Food Safety; and 7, Rural Prosperity/Rural-Urban Interdependence. NIFA may also solicit additional applications for the usage of AFRI funds through other announcements, including supplemental AFRI RFAs or RFAs issued in conjunction with other federal agencies. Such announcements will be made public in the same manner as this announcement. Other sources of NIFA funding for work relevant to this RFA can be found at www.nifa.usda.gov/afri.

This AFRI RFA is also aligned with the [NIFA Strategic plan](#), and specifically addresses Strategic Goal 1: Science-Catalyze exemplary and relevant research, education, and extension programs (Subgoals 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, and 1.7).

C. Program Area Descriptions

Program area (Available funding in millions)

- a. Plant health and production and plant products (\$43.9)
- b. Animal health and production and animal products (\$36.8)
- c. Food safety, nutrition, and health (\$26.2)
- d. Bioenergy, natural resources, and environment (\$21.7)
- e. Agriculture systems and technology (\$19.5)
- f. Agriculture economics and rural communities (\$22.9)
- g. Crosscutting programs (\$11.0)
 1. Critical agricultural research and extension; and
 2. Exploratory research

a. Plant Health and Production and Plant Products

Background

Plant production, protection, and the development of new plant products are critical to the sustainability and competitiveness of U.S. agriculture, and our nation's economic preeminence. The Plant health and production and plant products program area was established with the recognition that increasing knowledge of plant systems and the various factors that affect productivity will help U.S. producers and consumers face critical challenges in areas such as nutritional security, stewardship of natural resources, bioenergy, climate variability, organic production, loss of agricultural land, challenges to pollinator health, and increasing global competition. Future improvements to production systems will require a greater understanding of complex, inter-related factors, across a wide range of scales. These include investigations of plant and pest biology at molecular, cellular, and whole-organism levels as well as innovative and environmentally-sound approaches to improve plant performance and provide protection from biotic and abiotic stressors. Additionally, there is a critical need to help mitigate the ecological footprint of agriculture; the National Institute of Food and Agriculture (NIFA) has articulated a vision of significantly reducing energy, water, and nitrogen use and greenhouse gas production. Applications must incorporate ways to develop approaches that will contribute to the measurable reduction of the overall ecological footprint of row crop agriculture.

Applications submitted to this program area must justify the choice of organism or system in terms of its importance to agriculture. The use of model systems is allowed, but applicants must describe the relevance of model system development to specific crop species, and must also describe how results obtained from model systems will be transferred to agriculturally-important organisms during the project period. In addition, this program area supports research on beneficial organisms such as animal pollinators, biological control agents, and plant-associated microbes.

The Plant health and production and plant products program area addresses the following priorities of the 2014 Farm Bill: A. Plant Health and Production and Plant Products (subpriorities: i. plant genome structure and function; ii. molecular and cellular genetics and plant biotechnology; iii. conventional breeding, including cultivar and breed development, selection theory, applied quantitative genetics, breeding for improved food quality, breeding for

improved local adaptation to biotic stress and abiotic stress; iv. plant pest interactions and biocontrol systems; v. crop plant response to environmental stresses; and vi. [improved] nutrient qualities of plant products); D. Bioenergy, Natural Resources, and Environment (subpriorities: i. fundamental structures and functions of ecosystems; ii. biological and physical bases of sustainable production systems; iii. global climate effects on agriculture; iv. forestry; and biological diversity); and F. Agriculture Economics and Rural Communities (subpriority: iv. choices and applications of technology).

In addition to the program area priorities described below, the [Plant Biotic Interactions](#) program area priority will be offered separately through an interagency program with the National Science Foundation. The NIFA program contact for the Plant Biotic Interactions program is Dr. Ann Lichens-Park (202) 401-6460, apark@nifa.usda.gov.

Total Program Funds – Approximately \$43.9 million

Program Area Key Information Applicable to ALL Plant Health and Production and Plant Products Program Area Priorities:

- All applications must adhere to the requirements in Part IV.
- Applications from and collaborations with minority-serving institutions, small to mid-sized institutions, and/or institutions within the Established Program to Stimulate Competitive Research (EPSCoR) states are welcome in this program area.
- Applications that include collaborations with international partners may also be submitted. For information on NIFA partnerships that may be of interest to applicants, see the [AFRI International Partnerships website](#).
- Applications with highly complex, large scale, transdisciplinary, and integrated research, education, and extension projects that incorporate foundational knowledge from this program area priority should be submitted to the Sustainable Agricultural Systems (SAS) Program Area (A9201) described in the [AFRI SAS RFA](#).
- **New in FY 2018:** The Food and Agriculture Cyberinformatics and Tools (FACT) initiative solicits applications that 1) focus on fundamental or core big data analytics and tool development, and/or 2) apply big data concepts to specific science domains or across domains and sectors for any of the Plant health and production and plant products program area priorities. Applicants should submit a letter of intent (LOI) to the FACT Program Area Priority (A1541) by the LOI deadline (July 25, 2018), described below in this RFA. The LOI is a prerequisite to submit an application for the FACT initiative. The title of the FACT project for the LOI and the application must begin with “FACT: full title....”.

Program Area Priorities – Each application must address at least one of the following seven program area priorities:

1. Foundational Knowledge of Agricultural Production Systems

Program Area Priority Code – A1102

Proposed Budget Requests –

- Budgets for Standard Grants, Strengthening Standard Grants, and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to five years.**

- Conference and Food and Agricultural Science Enhancement (FASE) grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding the budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects only

Requested Grant Types – Standard, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Letters of Intent not required for this program area priority

Application Deadline – August 9, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contacts – Dr. Mathieu Ngouajio (202) 401-4895 or mngouajio@nifa.usda.gov and Dr. Robert Nowierski (202) 401-4900 or rnowierski@nifa.usda.gov

Program Area Priority –

This program area priority supports research to advance our knowledge of agricultural production systems, including croplands, rangelands, and managed forests across the rural-urban continuum from conventional open-fields to protected built environments, using experimental manipulations of system components, technological interventions, system analyses, and modeling including agroecological approaches. Research supported under this priority will address critical or process-limiting dynamics that occur among and within the various management components of the production system, and will lead to the development of innovative sustainable solutions to problems limiting or threatening the productivity, efficiency, profitability, and natural resources stewardship of the proposed production system.

Applications must address one or more of the following:

- Investigate how multiple management components of agricultural production systems can be integrated to enhance soil-crop-atmospheric processes or resilience to various biotic and abiotic stressors and improve product quality and/or productivity.
- Investigate how production systems can alter the structure of microbial communities associated with plants, soils or other growing media and determine how the alterations affect plant nutrient uptake and utilization, resilience to weeds, insects, diseases, weather extremes, and other stressors and/or affect productivity and/or product quality.
- Investigate how changes in cropping systems, including diversification or intensification, affect crop performance, soil health, and other outcomes beneficial to system resilience.
- Conduct syntheses and meta-analyses of existing data or develop new or extend existing models to derive general principles about the function and properties of agricultural production systems.

Program Area Priority Additional Information:

- Appropriate plant-based systems for study include food and fiber crops, grasslands, rangelands, and managed forests. Conventional, organic, and protected systems including hydroponics, aquaponics, aeroponics, vertical farming, and other controlled environment agricultural systems are appropriate for study.
- The production system studied could include key management components, such as: integrated crop management, soil or other growing media fertility, soil health,

- agronomic practices, cover cropping, biodiversification, economics, and integrated management of target pests (including arthropods, nematodes, pathogens and weeds).
- Development of innovative production systems to optimize the production of plant-based products are welcome in this program area priority. Plant-based products may include but are not limited to oil, fiber, nutraceuticals, nutrients, proteins, juices, resins, and biopesticides.
 - Applicants with applications focused solely on:
 - Management of pests or beneficial species should consider submitting to the Pests and Beneficial Species in Agricultural Production Systems Program Area Priority (A1112), described below in this RFA.
 - Microbiome function should consider submitting to the Agricultural Microbiomes in Plant Systems and Natural Resources Program Area Priority (A1402), described in this RFA.
 - This program area priority does not support projects focused on livestock. Please refer to the Animal health and production and animal products program area, described below in this RFA.

2. Pests and Beneficial Species in Agricultural Production Systems

Program Area Priority Code – A1112

Proposed Budget Requests –

- Budgets for Standard Grants, Collaborative Grants, Strengthening Standard Grants, and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to five years.**
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Applications exceeding the budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects only

Requested Grant Types – Standard, Collaborative, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Letters of Intent not required for this program area priority

Application Deadline – August 14, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contacts – Dr. Mary Purcell-Miramontes (202) 401-5168 or mpurcell@nifa.usda.gov and Dr. Rubella Goswami: (202) 401-0628 or rubella.goswami@nifa.usda.gov

Program Area Priority –

This program area priority supports research to: 1) elucidate the fundamental ecological, molecular, biological, or chemical processes affecting plant-associated pests or associated organisms (arthropods, arthropod-vectors of plant diseases, microbes, nematodes, weeds or vertebrate pests of crops); 2) promote healthy populations of beneficial organisms and microorganisms associated with pests (e.g., symbionts, mycorrhizal fungi, endophytes or biological control agents) in agricultural production systems (agronomic and horticultural crops, managed forests and rangelands in rural or urban agro-ecosystems); and 3) increase our understanding of multi-trophic interactions between plants, pests, or beneficial species. Studies involving invasive, newly emerging, or established pest species are encouraged. This

research is expected to lead to the development of innovative and environmentally-sound strategies to manage agriculturally-important plant pests.

Applications must address one or more of the following:

- Interactions of plant pests or beneficial species with biotic or abiotic (environmental) factors affecting their abundance and spread. Factors may include, but are not limited to, other plant pests or beneficial species, climate variability, plant compounds, pesticides, toxins or contaminants. Molecular, organismal, population, and/or community levels of research are appropriate.
- Effects of behavioral, communication, semiochemical, or defense signaling systems of pests or beneficial species.
- Movement or dispersal dynamics of pests or beneficial organisms, including pests that vector plant diseases. This could include epidemiological factors that influence disease spread, the influence of agronomic practices on weed populations, and research on fundamental aspects of weed biology that impact reproductive biology, seedbank dynamics, and other aspects of population dynamics.
- Mechanisms of pest resistance to pesticides or toxins in genetically-modified plants (e.g., fungicides, herbicides, insecticides, Bt toxin) and development of strategies to mitigate resistance and/or crop failure.
- Fundamental research that leads to biologically-based pest management approaches to manage pests and/or sustain beneficial species.

In addition to the priorities listed above, NIFA and the Washington State Potato Commission, on behalf of a consortium including the Idaho Potato Commission and Oregon Potato Commission, are seeking to co-fund projects to examine soil-borne pathogens that induce tuber blemishes on potatoes. Applications must address the following priority:

- Examine the biology of soil-borne pathogens that induce tuber blemishes on potatoes and their relevant ecological interactions in agricultural soils that contribute to disease suppression. The research should focus on one or more of the following pathogens: *Helminthosporium solani*, *Spongospora subterranean*, Potato mop top virus, *Colletotrichum coccodes*, *Rhizoctonia solani*, *Streptomyces* spp.

Applicants seeking funding through this commodity board co-funded priority must provide a letter of support from the commodity board directly to the NIFA Program Contact within 60 calendar days after the application submission deadline. When seeking a letter of support, applicants must submit their entire application to the **Washington State Potato Commission** and request a letter that specifically indicates that the Washington State Potato Commission supports the application for co-funding. To obtain a letter of support or for further questions, please contact the **Washington State Potato Commission** representative (Dr. Andrew Jensen (509) 760-4859 or ajensen@potatoes.com). Additionally, applicants must state in the last sentence of their application's Project Summary section that the proposal is submitted in response to this specific commodity board topic.

Program Area Priority Additional Information:

- **Research on pollinators is no longer included in this program area priority.**
Applicants should consider applying to the Pollinator Health: Research and Application Program Area Priority (A1113), which is described below in this RFA.
- Consider applying to the [Plant Biotic Interactions](#) Program for research on plant-biotic interactions using molecular approaches; this interagency program is offered by NIFA and the National Science Foundation.
- Project applications focused primarily on the development of pest or beneficial species management strategies or tactics, not fundamental mechanisms, may be more appropriate for the CARE Program Area described below in this RFA or the Applied Research and Development Program Area of the [Crop Protection and Pest Management](#) Program.
- Applications for research on pests of livestock or pests of humans (e.g., vectors of human diseases or nuisance pests such as flies, bed bugs, cockroaches, and termites) are not supported by this program area priority. Please refer to the Animal health and production and animal products program area, described below in this RFA to review funding opportunities for research on pests of livestock, or to the [Crop Protection and Pest Management](#) Program to review funding opportunities for projects focused on nuisance pests in urban or rural systems.
- In addition, applications on big data analytics and tool development are solicited to support a genomics data network and cyberinfrastructure. Projects associated with the initiative to sequence 5000 arthropod genomes (i5K) should link with the [National Agricultural Library's i5k workspace](#). Such applications must be submitted to the FACT Program Area Priority (A1541; see below) within this RFA. A letter of intent is required for all FACT applications, and that the title of FACT applications must begin with "FACT: full title....".
- NIFA may partner with Ireland and Northern Ireland under the U.S.–Ireland Research and Development Partnership to solicit collaborative research applications in the Pests and Beneficial Species in Agricultural Production Systems Program Area Priority. For more information including FAQs about this program, visit the [NIFA, Ireland, and Northern Ireland partnership page](#). Applicants submitting to this partnership must select Collaborative as the grant type and their title of the application should begin as "TRI-PARTITE: full title....".

3. Physiology of Agricultural Plants

Program Area Priority Code – A1152

Proposed Budget Requests –

- Budgets for Standard Grants, Strengthening Standard Grants, and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to five years.**
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding the budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects only

Requested Grant Types – Standard, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Letters of Intent not required for this program area priority

Application Deadline – July 25, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contacts – Dr. Liang-Shiou Lin (202) 401-5045 or

llin@nifa.usda.gov and Dr. Shing Kwok (202) 401-6060 or skwok@nifa.usda.gov

Program Area Priority –

This program area priority will support projects that use molecular, biochemical, whole-plant, agronomic or eco-physiological approaches to understand and improve plant productivity or performance through studies on:

- Plant growth and developmental processes.
- Mechanisms of plant response to abiotic stresses, including water use efficiency.
- Photosynthetic efficiency, carbon assimilation, and source-sink relationship.
- Primary and secondary metabolism in agriculturally-important plants and associated weeds, with particular relevance to nutritional quality of food and feed and economically-important traits including traits with potential benefits in weed management.
- Nutrient uptake (macronutrients and/or micronutrients), assimilation, accumulation and/or utilization, particularly increased efficiency in using nitrogen or phosphorus.
- Harnessing plant biochemistry and biodiversity to develop bio-based plant products. Bio-based products may include but are not limited to oils, fibers, pharmaceuticals, nutraceuticals, industrial chemicals, proteins, resins, and/or biopesticides.

In addition to the priorities listed above, NIFA and the National Potato Promotion Board are seeking to co-fund projects to investigate the structural features of potato starch and its interactions with other macromolecules for potato processing. Applications must address the following priority:

- Investigate potato starch to fill knowledge gaps in understanding the structure of potato starch and interactions associated with desired sensory attributes.

Applicants seeking funding through this commodity board co-funded priority must provide a letter of support from the commodity board directly to the NIFA Program Contact within 60 calendar days after the application submission deadline. When seeking a letter of support, applicants should submit their entire application to the **National Potato Promotion Board** and request a letter that specifically indicates that the National Potato Promotion Board supports the application for co-funding. To obtain a letter of support or for further questions, please contact the **National Potato Promotion Board** representative (Mr. Ryan J. Krabill (303) 873-2319 or ryan@potatoesusa.com). Additionally, applicants must state in the last sentence of their application's Project Summary section that the proposal is submitted in response to this specific commodity board topic.

Program Area Priority Additional Information:

- Studies of plant-microbe interactions in nutrient use are not appropriate for this program area priority.
- Conference applications that would bring together private research organizations, industry, and university researchers to promote the development of a sustainable bio-based products industry are encouraged.

4. **Plant Breeding for Agricultural Production**

Program Area Priority Code – A1141

Proposed Budget Requests –

- Budgets for Standard Grants, Strengthening Standard Grants, and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to five years.**
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding the budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects only

Requested Grant Types – Standard, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Letters of Intent not required for this program area priority

Application Deadline – July 25, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contacts – Dr. Ed Kaleikau (202) 401-1931 or

ekaleikau@nifa.usda.gov and Dr. Liang-Shiou Lin (202) 401-5045 or llin@nifa.usda.gov

Program Area Priority –

This program area priority will support public breeding efforts to improve crop productivity, efficiency, quality, performance, and/or local adaptation. Conventional/classical and/or genomics-enabled plant breeding will be supported.

Applications must address one or more of the following:

- Pre-breeding and germplasm enhancement
- Locally adapted cultivar development
- Selection theory
- Applied quantitative genetics and phenomics
- Participatory breeding

In addition to the priorities identified above, NIFA and various commodity boards are seeking to co-fund research projects relevant to the respective commodity board. Each application must address one of the following priorities:

- Develop innovative technologies and approaches that enable wheat breeders to address the prevalence and impact of viruses on the wheat crop (e.g., wheat streak mosaic, barley yellow dwarf, and soil-borne and spindle streak complexes) using novel approaches, including but not limited to the application of proteomics, metabolomics, and/or genomics to identify and mobilize high-value resistance within hard winter wheat germplasm; pre-breeding and germplasm enhancement through identification and mobilization of novel viral resistance traits leading to cultivar development; development and application of tools to predict phenotype from genotype to accelerate enhancement of finished wheat varieties with improved resistance; or the development of screening technologies for virus detection. **Kansas Wheat Commission** representative: Mr. Will Zorrilla (785) 539-0255 or wzorrilla@earthsharvest.org.

- Utilize technologies, tools and methods to access and mobilize genes within collections of wild wheat species for germplasm enhancement and elite cultivar development, including value-added health and/or nutritional attributes for the consumer and defense against biotic and/or abiotic threats. **Kansas Wheat Commission** representative: Mr. Will Zorrilla (785) 539-0255 or wzorrilla@earthsharvest.org.
- Identify genetic markers to develop improved cultivars and breeding lines of peanuts with superior disease and nematode resistance, drought tolerance, desirable flavor characteristics, increased shelf life, better nutritional qualities, preferred size and shape to facilitate processing, and other desirable traits. The research should leverage the success in sequencing and mapping the peanut genome, the core collection, wild species outside the core collection and introgression lines, and will support improvement of peanut cultivars through conventional breeding methods using marker-assisted selection. **National Peanut Board** representative: Ms. DeMarquise Wilson (678) 424-5750 or dhwilson@nationalpeanutboard.org.

Applicants seeking funding through these commodity board co-funded priorities must provide a letter of co-funding support from the commodity board directly to the NIFA Program Contact within 60 calendar days after the application submission deadline. When seeking a letter of co-funding support, applicants must submit their entire application to the **respective commodity board listed above and request a letter that specifically indicates that the commodity board supports the application for co-funding**. To obtain a letter of co-funding support or for further questions, please contact the respective commodity board representative listed above. Additionally, applicants must state in the last sentence of their application's Project Summary section that the proposal is submitted in response to the specific commodity board topic listed above.

Program Area Priority Additional Information:

- Choice of plant species and objectives must be justified in terms of importance to agricultural food and fiber production systems in the United States.
- Applications to breed crops to create new bio-based products, decrease food borne illnesses and enhance food safety, or adapt to future stressors (e.g., heat, drought, pests and pathogens, etc.) are encouraged.
- Research that incorporates training of field-based plant breeders is encouraged.
- Relevance to cultivar development should be clearly justified, demonstrable and specific.
- Release or distribution of germplasm: Researchers must consult with the relevant National Plant Germplasm System (NPGS) curator to determine whether and how to deposit germplasm, transgenic plants, mutants, plant populations, etc., into the NPGS or stock center. Project directors must confer with the crop curators and crop germplasm committees early in the application development process regarding the desirability of depositing genetic stocks and experimental plant populations generated by NIFA funding in NPGS gene banks. More information is available at the [NPGS website](#).
- Conventional/classical breeding research that incorporates development of publicly available cultivars bred to be adapted to the soils, climates, and farming systems of farmers of all regions is encouraged.

- Conference grants must focus on at least one of the following: 1) a workshop that brings together experts in plant breeding, food safety and related sciences to identify the challenges and opportunities in **breeding for vegetable crops** to decrease bacterial food borne illnesses and enhance food safety, and/or 2) plant breeding research and education to provide graduate student interaction with geneticists, breeders and other scientists, and promote careers in plant breeding, genetics and genomics.
- Plant breeding, genetics and genomics researchers with expertise and interest in social implications of emerging technologies are encouraged to consider submitting their applications to the Social Implications of Food and Agricultural Technologies Program Area Priority (A1642), described below in this RFA.
- Applicants with applications on big data analytics and tool development to support a plant breeding data network and cyberinfrastructure with the requirement to convert large amounts of data into knowledge and applications through computer analytics, modeling and simulations should submit a letter of intent to FACT Program Area Priority (A1541; see below) by the LOI deadline (July 25, 2018), described in this RFA.

5. **Pollinator Health: Research and Application**

Program Area Priority Code – A1113

Proposed Budget Requests –

- Budgets for Standard Grants, Strengthening Standard Grants, and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to four years.**
- Budgets for Standard Grants, and Strengthening Standard Grants addressing the research coordination network priority below must not exceed **\$750,000 total per project (including indirect costs) for project periods of up to five years.**
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding the budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects only

Requested Grant Types – Standard, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Requested Grant Types for Research Coordination Networks - Standard and FASE (Strengthening Standard) Grants only

Letters of Intent not required for this program area priority

Application Deadline – September 6, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contact – Dr. Mary Purcell-Miramontes (202) 401-5168 or mpurcell@nifa.usda.gov

Program Area Priority –

This program area priority supports basic and applied research to promote healthy populations of animal pollinators (e.g., bees, wasps, flies, moths, butterflies, beetles, bats, and birds). Several factors are significantly impacting the health of pollinator populations such as pests, diseases, pesticides, pollutants or toxins, nutritional deficits; effects of climate variability, agricultural intensification, nutritional deficits, habitat loss; reduced species or genetic diversity; as well as pollinator or crop management practices. These factors pose a

serious risk to crops that depend on pollinators for production of marketable commodities and would ultimately impact food security.

Applications must address one or more of the following:

- Better understand the factors that influence the abundance, diversity or function of selected species or groups of pollinators. Numerous disciplinary approaches will be considered (ecological, behavioral, genomic, physiological, biophysical, sociological, etc.).
- Develop and evaluate innovative tools, strategies or technologies to facilitate efforts to increase pollinator health and/or sustain diverse populations. Targeted multi-year monitoring of selected species in the context of research will be considered.
- Evaluate pest management practices to ensure protection of pollinators and other beneficial species (i.e., integrated pest and pollinator management).

Research Coordination Network for a National Native Bee Monitoring Plan:

In addition to the priorities listed above, applications are solicited to develop a network of researchers and practitioners to foster national-level coordination of efforts to more reliably assess the status and trends of native bee species on a national scale. The purpose is not to fund research itself, but the broad coordination of ongoing research efforts already funded. It is anticipated that one award will be made for this priority. Partnerships with existing Federal, state government and individual efforts to monitor and/or map distributions of bee populations are encouraged. Connections with existing biological inventories or networks should also be emphasized. Network activities may include but are not limited to development of minimum standards and methods for data collection, plans for species identification (e.g., traditional morphological vs. molecular approaches), integration of data sets, plans for long term data management, data storage and data sharing; linkages with publicly-accessible databases for collection information, tool development, sampling methods and plans for data curation. The most competitive applications will describe in the Project Narrative: (1) A vision to build linkages among key monitoring efforts that facilitate collaboration and positive synergies and (2) a compelling process to achieve that vision.

Program Area Priority Additional Information:

- For research coordination network applications, a management plan must be included which clearly delineates the specific roles and responsibilities of individuals, agencies or private industries or land managers (e.g., research coordination, leveraging additional funds or other resources, sharing data and information, or citizen engagement).
- Applications with an extension component are not supported in this program area priority. These projects may be more appropriate for the CARE Program Area described below in this RFA or program areas within the [Crop Protection and Pest Management Program](#).

6. Agricultural Microbiomes in Plant Systems and Natural Resources

Program Area Priority Code – A1402

Proposed Budget Requests –

- Budgets for Standard Grants, Strengthening Standard Grants, and New Investigator Grants must not exceed **\$750,000 total per project (including indirect costs) for project periods of up to four years.**
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects only

Requested Grant Types - Standard, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Letter of Intent Deadline – July 18, 2018 (5:00 p.m. Eastern Time)

Application Deadline – September 26, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contacts – Dr. Rachel Melnick (202) 401-4980 or rmelnick@nifa.usda.gov and Dr. Ann Lichens-Park (202) 401-6460 or apark@nifa.usda.gov

Program Area Priority –

Microbiomes have profound impacts on agricultural production systems as well as human, animal, plant, and environmental health. Microbiome research is critical for improving agricultural productivity, sustainability of agricultural ecosystems, safety of the food supply and meeting the challenge of feeding a rapidly growing world population. Better understanding of microbiomes will help reduce the use of chemicals (pesticides, antibiotics, and biocides) in food production, lead to the development of safer alternatives for the management of agriculturally-important pests and diseases, optimize nutrient utilization efficiency, and reduce environmental footprints. Understanding the multipartite interactions among the host, environment, and the microbiome is critical for improving and sustaining agricultural productivity and quality in plant systems and associated natural resources. Plant productivity includes biotic factors affecting plant health such as either pests, diseases or vectors as well as abiotic factors (water, soil health), etc. Research supported by this program area priority will help fill major knowledge gaps in characterizing agricultural microbiomes and microbiome functions across agricultural production systems, and natural resources through cross-cutting projects. This research will capitalize on the convergence of low-cost sequencing and “omics” technologies, manipulation of microbiome composition and of phage and microbial genes (transposons, integrons), genome editing tools, and other novel tools for studying microbiota’s structure and function.

Applications must address one of the following:

- Characterize molecular mechanisms and signal exchange involved in microbiome assembly and interactions in various environments or physiological states such as stress, diseases or growth stages; or
- Functionally characterize microbiomes and microbiome metabolites in conferring specific host phenotypes (such as disease resistance or drought tolerance), optimization of environmental processes (such as water uptake, nutrient cycling or carbon sequestration), and/or host-microbiome interactions (such as host influences on microbiome composition).

Program Area Priority Additional Information:

- Development of innovative new technologies to address the priorities above is encouraged, such as high throughput metabolomics, nano-arrays, 3D modeling, new analytical technologies, experimental tools, and metadata standards.
- Applications must be relevant to both 1) Plant health, production and plant products, and 2) Bioenergy, natural resources, and environment program areas described in this RFA.
- Projects that involve metagenomics sequencing of microbial communities without addressing function are not appropriate for this program area priority.
- Projects looking at the influence of production system management on the structure of microbial communities associated with plants, soil or other growing media, should be submitted to Foundational Knowledge of Agricultural Production Systems Program Area Priority (A1102).
- If your project does not consider both plant systems and natural resources, please consider reviewing the
 - Sustainable Agroecosystems: Functions, Processes and Management Program Area Priority (A1401), or
 - The [Plant Biotic Interactions](#) program, offered as an interagency program by NIFA and the National Science Foundation. The NIFA program contact for the Plant Biotic Interactions program is Dr. Ann Lichens-Park (202) 401-6460 or apark@nifa.usda.gov.

7. Agricultural Biosecurity Coordination Network

Program Area Priority Code – A1181

Proposed Budget Requests –

- Budgets for Standard Grants and Strengthening Standard Grants must not exceed **\$1,000,000 total per project (including indirect costs) for project periods of up to five years.**
- FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding budgetary guidelines will not be reviewed.
- This program area priority anticipates supporting one project in FY 2018.

Requested Project Types – Research Projects, Extension Projects, or Integrated (research, education and/or extension) Projects only

Requested Grant Types – Standard and FASE (Strengthening Standard) Grants only

Letter of Intent Deadline – July 24, 2018 (5:00 p.m. Eastern Time)

Program Area Priority e-mail address for Submission of Letter of Intent – biosecurity@nifa.usda.gov

Application Deadline – September 27, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contacts – Dr. Rubella Goswami (202) 401-0628 or rubella.goswami@nifa.usda.gov and Dr. Peter Johnson (202) 401-1896 or pjohnson@nifa.usda.gov

Program Area Priority –

Tactical sciences are scientific assets that protect the integrity, reliability, and sustainability of the U.S. food and agriculture system from an array of known and potential threats from

pests and diseases impacting plants and animals. Current tactical science efforts are supported and conducted by a variety of public and private organizations, and NIFA provides research, extension and education support in three broad areas:

- Detection and diagnostics;
- Regulatory systems; and
- Development and deployment of new tools and management strategies for crop and animal protection

The goal of this program area priority is to facilitate greater sharing of knowledge and technologies, interoperability of program resources, and coordination of technical expertise among components of the U.S. tactical sciences system. The desired result is a collaborative framework that facilitates joint planning and implementation of tactical science efforts to narrow existing gaps in food and agricultural defenses and increase our national capacity to prevent, rapidly detect and respond to biological threats to the U.S. food supply. Supported activities and impacts will take place at regional and national levels, and across the public and private sectors.

Examples of activities that may be funded by this program area priority include, but are not limited to: planning activities that increase readiness of biosecurity systems; the identification of biosecurity weaknesses and knowledge gaps; the development of information sharing platforms; and efforts to engage stakeholders in tactical science efforts through workshops, meetings and communication/outreach.

The most competitive applications will describe at least two components in the Project Narrative:

- (1) Vibrant VISION to build linkages among key tactical science efforts that facilitates collaboration, mutual learning, and positive synergies. This vision is expected to foster a more integrated and coordinated infrastructure for the development and delivery of tactical sciences to strengthen plant and animal agricultural biosecurity, protect the U.S. food and agricultural system, and minimize serious disruptions to the continuity of business and trade.
- (2) Sound PROCESS to guide and achieve that vision, including a clear roadmap that also includes at a minimum, specific and measurable milestones for year one.

Applications must describe the process/procedures the team will use to:

- Engage tactical sciences programs across the public and private sectors through a framework that results in positive synergies;
- Achieve integration across the plant and animal tactical sciences;
- Prioritize tactical science knowledge gaps;
- Establish effective communication among the agricultural biosecurity team;
- Increase awareness of agricultural biosecurity threats and tactical science efforts among partners and stakeholders; and,
- Lay a foundation to sustain an agricultural biosecurity coordination network beyond the period of the grant.

b. Animal Health and Production and Animal Products

Background

Animal health and production play critical roles in the sustainability and competitiveness of U.S. agriculture. Livestock, poultry, equine, and aquaculture species contribute significantly to the nation's economy, global food production, and food security. For U.S. agriculture to remain globally competitive, a better understanding of the critical biological and physiological mechanisms underlying nutrition, growth, reproduction, and health in these species is needed. Basic and applied research at the genetic, genomic, molecular, cellular, microbiome, and organ systems levels, combined with applied research approaches, is essential to control and prevent animal diseases, reduce animal health and production costs, enhance nutritional quality of animal products, and minimize environmental impacts. New knowledge gained from this research will lead to better management strategies for both conventional and organic production systems to enhance production efficiency, improve animal health and welfare, and develop high quality animal products for human use. These strategies may include the application of biotechnology, conventional/classical breeding, and breed development. Additionally, there is a critical need to help mitigate the ecological footprint of agriculture; the National Institute of Food and Agriculture (NIFA) has articulated a vision of significantly reducing energy, water, and nitrogen use and greenhouse gas production. Applications must incorporate ways to develop approaches that will contribute to the measurable reduction of the overall ecological footprint of animal agriculture.

The AFRI Animal health and production and animal products program area addresses the following priorities within the 2014 Farm Bill: B. Animal Health and Production and Animal Products - Animal systems (subpriorities i. aquaculture; ii. cellular and molecular basis of animal reproduction, growth, disease, and health; iii. animal biotechnology; iv. conventional breeding, including breed development, selection theory, applied quantitative genetics, breeding for improved food quality, breeding for improved local adaptation to biotic stress and abiotic stress, and participatory breeding; v. identification of genes responsible for improved production traits and resistance to disease; vi. improved nutritional performance of animals; vii. improved nutrient qualities of animal products and uses; viii. the development of new and improved animal husbandry and production systems that take into account production efficiency, animal well-being, and animal systems applicable to aquaculture; ix. the research and development of surveillance methods, vaccines, vaccination delivery systems, or diagnostic tests for pests and diseases including epizootic diseases in domestic livestock [including deer, elk, other animals of the family Cervidae and bison], and zoonotic diseases [including bovine brucellosis and bovine tuberculosis] in domestic livestock or wildlife reservoirs that present a potential concern to public health; and x. the identification of animal drug needs and the generation and dissemination of data for safe and effective therapeutic applications of animal drugs for minor species and minor uses of such drugs in major species).

Total program funds – Approximately \$36.8 million

Program Area Key Information applicable to ALL Animal Health and Production and Animal Products Program Area Priorities:

- All applications must adhere to the requirements in Part IV.
- Applications from and collaborations with minority-serving institutions, small to mid-sized institutions, and/or institutions within the EPSCoR states are welcome in this program area.
- Applications that include collaborations with international partners may also be submitted. For information on NIFA partnerships that may be of interest to applicants, see the [AFRI International Partnerships website](#).
- Applicants must justify the use of experimental model systems. Applications that primarily use non-agricultural or non-aquaculture species as models (*i.e.*, encompassing greater than 50% of the work proposed) will not be considered.
- When appropriate, applicants must include statistical power analyses and describe the experimental design, experimental unit, replication and sample size for each experimental group.
- Applications with highly complex, large scale, transdisciplinary, and integrated research, education, and extension projects that incorporate foundational knowledge from this program area priority should be submitted to the Sustainable Agricultural Systems (SAS) Program Area (A9201) described in the [AFRI SAS RFA](#).
- **New in FY 2018:** The Food and Agriculture Cyberinformatics and Tools (FACT) initiative solicits applications that 1) focus on fundamental or core big data analytics and tool development, and/or 2) apply big data concepts to specific science domains or across domains and sectors for any of the Animal health and production and animal products program area priorities. Applicants should submit a letter of intent (LOI) to the FACT Program Area Priority (A1541) by the LOI deadline (July 25, 2018), described below in this RFA. The LOI is a prerequisite to submit an application for the FACT initiative. The title of the FACT project for the LOI and the application must begin with “FACT: full title....”.

Program Area Priorities – Each application must address at least one of the following seven program area priorities.

1. Animal Reproduction

Program Area Priority Code – A1211

Proposed Budget Requests –

- Budgets for Standard Grants, Strengthening Standard Grants, and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to five years.**
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects only

Requested Grant Types – Standard, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Letter of Intent not required for this program area priority

Application Deadline – July 26, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contact – Dr. Mark Mirando (202) 401-4336 or
mmirando@nifa.usda.gov

Program Area Priority –

Cellular, molecular, genomic/genetic or whole-animal aspects of animal reproduction relevant to improving reproductive efficiency or enhancing reproductive management, especially focusing on:

- Gonadal function (including production, function, and preservation of gametes);
- Hypothalamic-pituitary axis;
- Embryonic and fetal development (including interaction between the conceptus and its uterine environment); or
- Microbiome of the reproductive tract.

Program Area Priority Additional Information:

- Applications to study effects of nutritional plane on reproductive performance are appropriate for this program area priority (A1211). Applications to study effects of nutritional plane during gestation on subsequent growth performance or lactation of the offspring should be submitted to the Animal Nutrition, Growth and Lactation Program Area Priority (A1231). Applications to study effects of nutritional plane during gestation on immune function or susceptibility to disease of the dam or offspring should be submitted to the Animal Health and Disease Program Area Priority (A1221).
- Applicants are encouraged to review the [Dual Purpose with Dual Benefit: Research in Biomedicine and Agriculture Using Agriculturally Important Domestic Animal Species](#) interagency grant program for an additional funding opportunity on select topics in animal reproduction.

2. Animal Nutrition, Growth and Lactation

Program Area Priority Code – A1231

Proposed Budget Requests –

- Budgets for Standard Grants, Collaborative Grants, Strengthening Standard Grants, and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to five years.**
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects only

Requested Grant Types – Standard, Collaborative, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Letter of Intent not required for this program area priority

Application Deadline – July 26, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contact – Dr. Steven Smith (202) 401-6134 or
sismith@nifa.usda.gov

Program Area Priority –

Cellular, molecular, genomic/genetic or whole-animal aspects of nutrition, growth and lactation, especially focusing on:

- Nutrient utilization and efficiency, including influence and impact of the gastrointestinal microbiome;
- Innovative approaches to feed formulation or use of novel alternative feedstuffs;
- Improving the quality and efficiency of producing meat, milk, eggs, and animal fiber; or
- Metabolic disorders and nutritional deficiencies affecting production of meat, milk, eggs, and animal fiber.

Program Area Priority Additional Information:

- Applications focused on the effects of metabolic disorders (e.g., hepatic lipidosis, ketosis, post-parturient hypocalcemia, displaced abomasum, insulin resistance) and nutrient deficiencies on meat, milk and egg production are appropriate for this program area priority (A1231). Applications focused on the effects of metabolic disorders and nutrient deficiencies on immune function or susceptibility to disease should be submitted to the Animal Health and Disease Program Area Priority (A1221).
- Applications to study effects of nutritional plane during gestation on subsequent growth performance or lactation of the offspring are appropriate for this program area priority (A1231). Applications focused on effects of nutritional plane on reproductive performance should be submitted to the Animal Reproduction Program Area Priority (A1211). Applications to study effects of nutritional plane during gestation on immune function or susceptibility to disease of the dam or offspring should be submitted to the Animal Health and Disease Program Area Priority (A1221).
- NIFA may partner with Ireland and Northern Ireland under the U.S.–Ireland Research and Development Partnership to solicit collaborative research applications in the Animal Nutrition, Growth and Lactation Program Area Priority. For more information including FAQs about this program, visit the [NIFA, Ireland, and Northern Ireland partnership page](#). Applicants submitting to this partnership should select Collaborative as the grant type and their title of the application should begin as “TRI-PARTITE: full title....”.
- Applicants are encouraged to review the [Dual Purpose with Dual Benefit: Research in Biomedicine and Agriculture Using Agriculturally Important Domestic Animal Species](#) interagency grant program for an additional funding opportunity on select topics in animal nutrition, growth and lactation.

3. Animal Well-Being

Program Area Priority Code – A1251

Proposed Budget Requests –

- Budgets for Standard Grants, Collaborative Grants, Strengthening Standard Grants, and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to five years**. See “Program Area Priority Additional Information” for opportunity to request \$650,000 for applications that includes specific types of partnerships.
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects only

Requested Grant Types – Standard, Collaborative, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Letter of Intent not required for this program area priority

Application Deadline – July 26, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contacts – Dr. Peter Johnson (202) 401-1896 or pjohnson@nifa.usda.gov and Dr. Margo Holland (202) 401-5044 or mholland@nifa.usda.gov

Program Area Priority –

Evaluation of current management practices and development of new management practices that reduce animal stress and optimize sustainable production efficiency, especially focusing on:

- Behavioral and/or physiological methods to objectively measure animal stress and well-being;
- Prevention or alleviation of pain or stress associated with management practices, including stocking density, handling and transportation; or
- Methods of humane slaughter or on-farm euthanasia.

Program Area Priority Additional Information:

- Applications that address animal welfare with a significant engineering component such as the design, manufacture, and operation of structures, technologies, machines, processes, and/or systems should be submitted to the Agriculture systems and technology program area priority: Agricultural Engineering (A1521), described in this RFA.
- NIFA may partner with Ireland and Northern Ireland under the U.S. – Ireland Research and Development Partnership to solicit collaborative research applications only focusing on the first two focus areas of Animal Well Being Program Area Priority. For more information including FAQs about this program, visit the [NIFA, Ireland, and Northern Ireland partnership page](#). Applicants submitting to this partnership should select Collaborative as the grant type and their title of the application should begin as “TRI-PARTITE: full title....”.
- Applications that include collaboration with minority-serving institutions, small to mid-sized institutions, institutions in EPSCoR states, and/or international partners will be funded up to \$150,000 above the listed budget maximum of \$500,000 (i.e., up to \$650,000) under a pilot program. Applications that include such partnerships should begin their title as “PARTNERSHIP: full title....”. Applications submitted for U.S.-Ireland Tripartite Collaborative grants are ineligible for U.S. funding above the program maximum.

4. Animal Health and Disease

Program Area Priority Code – A1221

Proposed Budget Requests –

- Budgets for Standard Grants, Collaborative Grants, Strengthening Standard Grants, and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to five years**. See “Program Area Priority

Additional Information” for opportunity to request \$650,000 for applications that includes specific types of partnerships.

- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects only

Requested Grant Types – Standard, Collaborative, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Letter of Intent not required for this program area priority

Application Deadline – July 26, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contacts – Dr. Peter Johnson (202) 401-1896 or pjohnson@nifa.usda.gov and Dr. Margo Holland (202) 401-5044 or mholland@nifa.usda.gov

Program Area Priority –

Cellular, molecular, genomic/genetic or whole-animal aspects of animal health and disease, with emphasis on maintaining healthy agricultural animals to ensure a safe and adequate food supply. Diseases may be endemic or foreign, and topics of study may include viruses, bacteria, prions, external parasites, pests, or internal parasites of importance to agricultural animals including aquaculture species. Non-infectious diseases are also included, as well as wildlife reservoirs of disease that present a potential threat to agricultural animals.

Areas of basic and/or applied research include, but are not limited to, the following:

- **Maintenance of homeostasis** such as:
 - Understanding microbiomes, including what affects them (e.g., environment, genetics, nutrition, management) and/or how they can be influenced to support or improve animal health;
 - Improving innate immunity for robust, immediate defense against disease; or
 - Understanding physiological processes that support or disturb health, including ways to reduce harmful disruptions leading to disease.
- **Disease prevention and/or control** such as:
 - New or improved vaccines;
 - New or improved diagnostic tools;
 - Breeding animals for disease resistance; or
 - More effective management approaches.
- **Therapeutic interventions for disease reduction or treatment** such as:
 - Alternatives to current antimicrobial treatments, including antibiotics and anthelmintics (Applicants interested in identifying international collaborators/partnerships for this area are encouraged to review the Joint Programming Initiative on Antimicrobial Resistance (JPIAMR) [Supported Projects website](#); or
 - Animal drugs for minor species and minor uses of such drugs in major species.

In addition to the priorities listed above, standard research applications for *the development & implementation of* a “U.S. Animal Vaccinology Research Coordination Network” are also solicited. The purpose of this Network is to leverage U.S. expertise in vaccinology of agricultural animals and encourage mutually beneficial international linkages to accelerate the development of new vaccine tools and technologies. The purpose is NOT to fund research itself, but the broad coordination of ongoing research efforts already funded.

U.S. Animal Vaccinology Research Coordination Network

- Budgets for Network applications are limited to a maximum of \$100,000/year for 5 years (\$500,000 total, including indirect costs). NIFA anticipates a maximum of one award.
- Applications must be titled: “U.S. Animal Vaccinology Research Coordination Network - Abbreviation of Lead Organization Name” (e.g., “U.S. Animal Vaccinology Research Coordination Network-UXX”)
- The most competitive applications will describe at least two components in the Project Narrative:
 - (1) A clear vision that will foster a more cohesive, multi-disciplinary, multi-species U.S. animal vaccinology community; and (2) a compelling process to achieve that vision.
- Applications must describe the process/procedures the team will use to:
 - Include members of U.S. vaccinology research communities working on ruminants, swine, poultry, equine, and aquaculture species into one multi-species network to jointly advance this field. Applications that do not include research representatives from all five communities will not be reviewed.
 - Link with one or more international groups (such as the [UK Veterinary Vaccinology Network](#)) to leverage expertise and resources.
 - Address unmet community needs slowing development of safe and efficacious vaccines for animals of agricultural importance. Proposed activities may:
 - Facilitate sharing of existing and new knowledge (e.g., more robust distribution of reagents and resources or establishment of new research partnerships);
 - Facilitate gap analysis, identification of high impact research priorities, and discussion of new technologies; and/or
 - Identify innovative, synergistic activities that will benefit U.S. vaccinology efforts.
 - Communicate effectively with the larger communities (such as a website or list server).
 - Identify how the network could be sustained beyond 5 years.
- **NOTE:** Although the focus of this Network is on next generation vaccines, bottlenecks and opportunities associated with more conventional vaccine approaches may be addressed if high impact is anticipated. The purpose of this award is NOT to support research projects; such applications should be submitted to the Animal Health and Disease Program Area Priority (A1221) listed above.
- Applicants are encouraged to consider including one or more links with relevant industry and other stakeholders or partners, such as the human vaccinology research community (One Health approach).

Program Area Priority Additional Information:

- If diagnostic tests are developed, applicants must provide a validation plan.
- Applications to study effects of nutritional plane during gestation on immune function or susceptibility to disease of the dam or offspring are appropriate for this program area priority (A1221).
- Applications focused on the effects of metabolic disorders (e.g., hepatic lipidosis, ketosis, post-parturient hypocalcemia, displaced abomasum, insulin resistance) and nutrient deficiencies on immune function or susceptibility to disease are appropriate for this program area priority (A1221). Applications focused on the effects of metabolic disorders and nutrient deficiencies on meat, milk and egg production should be submitted to the Animal Nutrition, Growth and Lactation Program Area Priority (A1231).
- NIFA may partner with Ireland and Northern Ireland under the U.S. – Ireland Research and Development Partnership to solicit collaborative research applications in the Animal Health and Disease Program Area Priority. For more information including FAQs about this program, visit the [NIFA, Ireland, and Northern Ireland partnership page](#). Applicants submitting to this partnership should select Collaborative as the grant type and their title of the application should begin as “TRI-PARTITE: full title....”.
- Applications that include collaboration with minority-serving institutions, small to mid-sized institutions, institutions in EPSCoR states, and/or international partners will be funded up to \$150,000 above the listed budget maximum of \$500,000 (i.e., up to \$650,000) under a pilot program. Applications that include such partnerships should begin their title as “PARTNERSHIP: full title....”. Applications submitted for U.S.-Ireland Tripartite Collaborative grants are ineligible for U.S. funding above the program maximum.
- Applicants are encouraged to review the [Ecology and Evolution of Infectious Diseases](#) and the [Dual Purpose with Dual Benefit: Research in Biomedicine and Agriculture Using Agriculturally Important Domestic Animal Species](#) interagency grant programs for additional funding opportunities on select topics in animal health and disease.

5. Tools and Resources - Immune Reagents for Agricultural Animals

Program Area Priority Code – A1223

Proposed Budget Requests –

- Budgets for Standard Grants, Strengthening Standard Grants, and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to five years.**
- FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects only

Requested Grant Types – Standard and FASE (Strengthening Standard, New Investigator) Grants only

Letter of Intent not required for this program area priority

Application Deadline – July 26, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contacts – Dr. Peter Johnson (202) 401-1896 or pjohnson@nifa.usda.gov and Dr. Margo Holland (202) 401-5044 or mholland@nifa.usda.gov

Program Area Priority –

Development of publicly accessible immunological reagents which can be used to study challenges affecting the health, management, and production of agriculturally-relevant animals. Although NIFA and other funders have been supporting this area for several years, more commodity-specific reagents are needed, including those that are more difficult and time consuming to develop. Examples include, but are not limited to, monoclonal or polyclonal antibodies to host immune cells (T and B lymphocytes, neutrophils, NK cells, macrophages, dendritic cells, etc.); antibody classes; bioactive recombinant cytokines and chemokines; and antibodies to and receptors for cytokines and chemokines. Reagents should be applicable to the study of more than one disease (*i.e.*, no pathogen-specific reagents).

Applicants must:

- Address one of the following two species groups
 - Swine
 - Equine

NOTE: Applications addressing ruminants, poultry and aquaculture species will NOT be accepted in FY 2018. Funding to develop reagents for those three species groups was recommended to be awarded in FY 2015-FY 2017.

- Clearly outline methods that will be used to determine the U.S. immunology research communities' highest priority needs for the chosen species group. Applications should target areas in which research efforts to study the immunology of disease are hindered due to a lack of necessary reagents.
- Describe a strong management and implementation plan that
 - includes standard operating procedures; and
 - addresses quality control and quality assurance of developed reagents to ensure sensitivity and specificity, and describes distribution and maintenance of the developed reagents, including a plan that guarantees sustainability and avoids loss of developed reagents.
- Make all reagents publicly available, reasonably priced, and readily accessible.
- Describe how the project management structure will connect with principal national stakeholders and/or partners for the particular species group (such as through an advisory committee or professional association). Strong linkages with the larger community will help ensure a high degree of accountability for community needs, facilitate synergies, and avoid unnecessary duplication. International linkages are encouraged when appropriate.
- For project renewals only, provide a clear summary of deliverables, outcomes, products, and documentation of significant value for the larger research community to justify consideration for additional funding.

Program Area Priority Additional Information:

- A maximum of one award (either swine or equine) is anticipated in FY 2018.
- To foster mutual learning and synergies among projects, AFRI will facilitate networking among current awardees each year through one project director meeting at a location to be determined and three video conferences. Each award team will share their progress to date (e.g., timeline metrics, including any ongoing challenges and problems solved) and next steps, and also consider collaboration opportunities among award teams for mutual benefit.

6. Tools and Resources - Animal Breeding, Genetics and Genomics

Program Area Priority Code – A1201

Proposed Budget Requests –

- Budgets for Standard Grants, Collaborative Grants, Strengthening Standard Grants, and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to five years.**
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects only

Requested Grant Types – Standard, Collaborative, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Letter of Intent not required for this program area priority

Application Deadline – July 26, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contact – Dr. Lakshmi Kumar Matukumalli (202) 401-1766 or lmatumalli@nifa.usda.gov and Dr. Mark Mirando (202) 401-4336 or mmirando@nifa.usda.gov

Program Area Priority –

Development of community genetic and genomic tools and resources, including software, experimental protocols and breeding methods, genome-wide catalog of functional elements to expedite the discovery of causal genetic variants which can be applied to advance basic biology and improve health and production of agricultural animals. Tools and resources may focus on:

- Discovery of genome-wide functional elements in both coding and non-coding regions of the genome. Functional elements include genes, RNA transcripts, DNA and RNA regulatory elements (including enhancers, promoters, insulators), differential splicing, translation, and RNA stability; or
- Development of genomic and epigenomic datasets (e.g., RNA-seq, ChIP-seq, DNase-seq) based on biochemical assays that have been developed and widely used by the research community to study chromatin architecture and gene regulation.
- Novel quantitative genetic methods including selection theory and modeling;
- Development of national and regional breeding strategies to address biotic and abiotic stresses (including climate variability), genetic diversity, germplasm storage and characterization, and crossbreeding or genome modifications;
- Development of new selection methods that use a combination of genomics, epigenomics, functional genomics, and microbiome data;

- Development of new phenotypes for improving selection criteria and/or development of new high-throughput methods for on-farm recording of traits;
- Systems approaches using genomics for simultaneous improvement of multiple traits that may include microbiome(s).

Program Area Priority Additional Information:

- Applicants with applications on big data analytics and tool development to support animal breeding data network and cyberinfrastructure with the requirement to convert large amounts of data into knowledge and applications through computer analytics, modeling and simulations should submit a letter of intent to FACT Program Area Priority (A1541) by the LOI deadline.
- This program area priority is limited to the development of tools and resources. Applications that propose study of genomic variation and relevance to function and phenotype for improved animal health or production (e.g., selecting within a breed for a specific trait of interest), conventional/classical animal breeding, breed development, or applied quantitative genetics should be directed to program area priorities 1, 2, 3, or 4 identified above.
- Projects should demonstrate strong community support and coordination with domestic and international partners, commodity groups and/or consortia.
- For projects that involve functional annotation of genomes, priority will be given to species other than cattle, swine, and chicken.
- NIFA may partner with Ireland and Northern Ireland under the U.S. – Ireland Research and Development Partnership to solicit collaborative research applications in the Tools and Resources – Animal Breeding, Genetics and Genomics Program Area Priority. For more information including FAQs about this program, visit the [NIFA, Ireland, and Northern Ireland partnership page](#). Applicants submitting to this partnership should select Collaborative as the grant type and their title of the application should begin as “TRI-PARTITE: full title....”.

7. Agricultural Biosecurity Coordination Network

This program area priority will facilitate greater sharing of knowledge and technologies, interoperability of program resources, and coordination of technical expertise among components of the U.S. tactical sciences system. The desired result is a collaborative framework that facilitates joint planning and implementation of tactical science efforts to narrow existing gaps in food and agricultural defenses and increase our national capacity to prevent, rapidly detect and respond to biological threats to the U.S. food supply. Supported activities and impacts will take place at regional and national levels, and across the public and private sectors. A complete description of this new cross-disciplinary program area priority, A1181 is included above under the **Plant health and production and plant products** program area. Note that a letter of intent is required for this program area priority.

c. Food Safety, Nutrition, and Health

Background

Human health is affected by the safety, quality, and nutritional value of food. Knowledge generated from this program will enhance the microbial, chemical, and physical safety and quality of foods by improving: 1) control strategies and detection methodologies for foodborne contaminants; 2) understanding of the interaction of food, foodborne contaminants, and food ingredients with the human gut microbiome; 3) manufacturing, processing, and packaging technologies that enhance food safety and food quality; 4) understanding of the impact of antimicrobials used in the food chain; and 5) the bioavailability of nutrients during digestion and absorption as they relate to human health. In addition, knowledge generated from this program will help improve our understanding of the food-related choices and behaviors of growers, producers, processors, and consumers and how they are influenced by socio-economic and other incentives in ways that enhance the safety, quality, and nutrient value of the food supply.

The AFRI Food safety, nutrition, and health program area addresses the following priorities of the 2014 Farm Bill: C. Food Safety, Nutrition, and Health - Nutrition, food safety and quality, and health (subpriorities i. microbial contaminants and pesticide residues relating to human health; ii. links between diet and health; iii. bioavailability of nutrients; iv. postharvest physiology and practices; and v. food manufacturing technologies).

Total Program Funds – Approximately \$26.2 million

Program Area Key Information applicable to ALL Food Safety, Nutrition, and Health Program Area Priorities:

- All applications must adhere to the requirements in Part IV.
- Applications from and collaborations with minority-serving institutions, small to mid-sized institutions, and/or institutions within the EPSCoR states are welcome in this program area.
- Applications that include collaborations with international partners may also be submitted. For information on NIFA partnerships that may be of interest to applicants, see the [AFRI International Partnerships website](#).
- Use of trans-disciplinary teams, including social and behavioral scientists and economists, is encouraged, where appropriate.
- Applications with highly complex, large scale, transdisciplinary, and integrated research, education, and extension projects that incorporate foundational knowledge from this program area priority should be submitted to the Sustainable Agricultural Systems (SAS) Program Area (A9201) described in the [AFRI SAS RFA](#).
- **New in FY 2018:** The Food and Agriculture Cyberinformatics and Tools (FACT) initiative solicits applications that 1) focus on fundamental or core big data analytics and tool development, and/or 2) apply big data concepts to specific science domains or across domains and sectors for any of the Food safety, nutrition, and health program area priorities. Applicants should submit a letter of intent (LOI) to the FACT Program Area Priority (A1541; see below) by the LOI deadline (July 25, 2018), described in this RFA. The LOI is a prerequisite to submit an application for the FACT initiative. The title of the FACT project for the LOI and the application must begin with “FACT: full title....”.

Program Area Priority – Each application must address at least one of the following five program area priorities:

1. Improving Food Safety

Program Area Priority Code – A1331

Proposed Budget Requests –

- Budgets for Standard Grants, Strengthening Standard Grants, and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to five years.**
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects only

Requested Grant Types - Standard, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Letters of Intent not required for this program area priority

Application Deadline – August 1, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contact – Dr. Isabel Walls (202) 401-6357 or iwalls@nifa.usda.gov and Dr. Max Teplitski (202) 734-1808 or max.teplitski@nifa.usda.gov

Program Area Priority –

Applications must address one or more of the following:

- Develop or improve, and validate novel strategies for detecting foodborne contaminants (viable or infectious human pathogens, chemicals, toxins) from foods. Validation studies that include food sampling strategies appropriate for the foodborne contaminants are required.
- Investigate the role of the human gut microbiome on the safety of food, food ingredients or food additives. This may include the investigation of both pre- and probiotics.
- Develop and validate novel strategies for control of persistent foodborne pathogens or other contaminants. Studies that define the genetic mechanisms underlying formation of persistent populations are invited as long as they ultimately contribute to the development of control strategies for these foodborne pathogens or contaminants.

Program Area Priority Additional Information:

- The project narrative must include discussion and justification of the foodborne contaminants to be studied as a food safety threat.
- Applicants are encouraged to address the development of control strategies or identifying and promoting development of economic and other incentives that lead to behavioral changes promoting food safety in their applications.
- Control strategies could include plant or animal breeding to improve food safety.
- Applicants with applications on (1) fundamental or core analytics and tool development for big data related to food safety; or (2) collection, sharing, application and management of big data to improve food safety should submit a letter of intent to the FACT Program Area Priority (A1541) by the LOI deadline.

- Applications addressing Antimicrobial Resistance should be submitted to the Understanding Antimicrobial Resistance Program Area Priority (A1362).
- Projects focused on nano-based sensing mechanisms and smart sensors for accurate, reliable and cost-effective early and rapid detection of pathogens, allergens, chemicals and contaminants in foods, plant and animal production systems, water and soil and the agricultural production environment should be submitted to the Nanotechnology for Agricultural and Food Systems Program Area Priority (A1511) described in this RFA.

2. **Improving Food Quality**

Program Area Priority Code – A1361

Proposed Budget Requests –

- Budgets for Standard Grants, Strengthening Standard Grants, and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to five years.**
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects only

Requested Grant Types – Standard, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Letters of Intent not required for this program area priority

Application Deadline – July 31, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contact – Dr. Melvin Carter (202) 720-7166 or melvin.carter@nifa.usda.gov and Dr. Jodi Williams (202) 720-6145 or jwilliams@nifa.usda.gov

Program Area Priority –

Applications must address one or more of the following:

- Improve our knowledge and understanding of the chemical, physical, and biological properties of foods and food ingredients. Knowledge gained should be used to improve the quality, shelf-life, convenience, nutrient value or sensory attributes of food.
- Evaluate the impact of foods and food ingredients on the gut microbiome to promote human health and well-being. Projects should address the physical, biological and/or chemical interactions of foods and food ingredients on the human gut microbiome. Sensory attributes of all foods and ingredients should be addressed where appropriate.

Program Area Priority Additional Information:

- Applications that address food loss and waste are encouraged.
- Applications that address the chemical, physical, and biological properties of foods and food ingredients, identifying and promoting the development of economic and other incentives that lead to healthier consumer choices are encouraged.
- Applications addressing 1) food safety as it relates to contaminants or hazards; and 2) physical, biological, and/or chemical interactions of foodborne pathogens on the human gut microbiome should be submitted to the Improving Food Safety Program Area Priority (A1331).

3. **Understanding Antimicrobial Resistance**

Program Area Priority Code - A1362

Proposed Budget Requests –

- Budgets for Standard Grants, Collaborative Grants, Strengthening Standard Grants, and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to five years.**
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects only

Requested Grant Types – Standard, Collaborative, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Letters of Intent not required for this program area priority

Application Deadline – July 25, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contact – Dr. Mervalin Morant (202) 401-6602 or

mmorant@nifa.usda.gov and Dr. Max Teplitski (202) 734-1808 or

max.teplitski@nifa.usda.gov

Program Area Priority –

Research project applications must address at least one of the following:

- Develop and assess new or enhanced methods, tools or technologies to track and monitor the fate, transport, or role of antimicrobial resistant (AMR) pathogens or their genes, or metabolites or antibiotic residuals in the environment, including soil, air or water;
- Develop, assess, and validate accurate, reliable, cost effective early and rapid detection tools for critical antimicrobial resistant pathogens, or their genes in foods, food products, and food ingredients;
- Improve our knowledge and understanding of the basic science that underpins the development of alternatives to antimicrobials currently used in agriculture that will improve the safety of the food supply, while minimizing the emergence or spread of antimicrobial resistance; or
- Determine and evaluate potential risks and links between the use of antimicrobials, and antimicrobial residues, in the food chain and their direct impact on human health.

In addition to the priorities listed above, NIFA and Cattlemen's Beef Promotion and Research Board, on behalf of a consortium including the National Cattlemen's Beef Association (NCBA), are seeking to co-fund projects on understanding links to public health outcomes resulting from the use of antimicrobials during beef production. Applications must address the following priority:

- Investigate how the use of antimicrobials in beef production impacts the risk of development of antimicrobial resistance in the production environment as well as the likelihood of impacting public health.

Applicants seeking funding through this commodity board co-funded priority must provide a letter of support from the commodity board directly to the NIFA Program Contact within 60

calendar days after the application submission deadline. When seeking a letter of support, applicants should submit their entire application to the **Cattlemen's Beef Promotion and Research Board** and request a letter that specifically indicates that the Cattlemen's Beef Promotion and Research Board supports the application for co-funding. To obtain a letter of support or for further questions, please contact the **Cattlemen's Beef Promotion and Research Board** consortium representative at NCBA (Dr. Mandy Carr Johnson (303) 850-3399 or mcarr@beef.org). Additionally, applicants must state in the last sentence of their application's Project Summary section that the proposal is submitted in response to this specific commodity board topic.

Program Area Priority Additional Information:

- Research project applications must focus on resistance to clinically-relevant antimicrobials.
- Tools and techniques for molecular typing of pathogens are appropriate for this program area priority.
- Projects focused on nano-based tools, techniques or technologies for detection or identification of AMR pathogens, their genes, metabolites or antibiotic residuals should be submitted to the Nanotechnology for Agricultural and Food Systems Program Area Priority (A1511).
- Projects investigating off-label use of antimicrobials are not appropriate for this program area priority.
- The impact of alternative strategies to traditional antimicrobials used in the food chain or in humans must be considered. For example, these strategies should not create selection pressure favoring the development of antimicrobial resistance to antibiotics used in humans, veterinary medicine, or in the food chain.
- Use of alternatives to current anthelmintics and antibiotic therapies for mastitis should be submitted to the Animal Health and Disease Program Area Priority (A1221).
- Where applicable, applications may address socio-economic and human behavioral changes that may impact the use of antimicrobials across the food chain.
- Applicants interested in identifying international collaborators or partnerships for this program may refer to the Joint Programming Initiative on Antimicrobial Resistance (JPIAMR) [supported projects website](#).
- Applicants with applications on (1) fundamental or core analytics and tool development for big data related to AMR; or (2) collection, sharing, application and management of big data to understand AMR should submit a letter of intent to the FACT Program Area Priority (A1541) by the LOI deadline.
- While development of vaccines that prevent certain diseases can be one way to decrease antimicrobial resistance, this program does not support research on the development of vaccines for controlling animal diseases. Applications that address vaccine development for animal diseases should be submitted to the Animal health and production and animal products program area priority, Animal Health and Disease (A1221) described in this RFA.
- Applications that primarily focus on the detection, isolation, identification or control of foodborne pathogens are not appropriate for this program area priority (A1362).
- NIFA may partner with Ireland and Northern Ireland under the U.S. – Ireland Research and Development Partnership to solicit collaborative research applications in the

Understanding Antimicrobial Resistance Program Area Priority. For more information including FAQs about this program, visit the [NIFA, Ireland, and Northern Ireland partnership page](#). Applicants submitting to this partnership must select Collaborative as the grant type and their title of the application should begin as “TRI-PARTITE: full title....”.

4. Food Manufacturing Technologies

Program Area Priority Code – A1363

Proposed Budget Requests –

- Budgets for Standard Grants, Collaborative Grants, Strengthening Standard Grants, and New Investigator Grants must not exceed **\$1 million total per project (including indirect costs) for project periods of up to four years.**
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding budgetary guidelines will not be reviewed.

Requested Project Types – Integrated (research, education and/or extension) Projects only

Requested Grant Types – Standard, Collaborative, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Letters of Intent not required for this program area priority

Application Deadline – July 25, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contact – Dr. Hongda Chen (202) 401-6497 or

hchen@nifa.usda.gov and Dr. Melvin Carter (202) 720-7166 or

melvin.carter@nifa.usda.gov

Program Area Priority –

Food manufacturing technologies are primarily focused on developing and implementing comprehensive strategies that increase productivity, improve quality, and reduce the costs of producing, processing, and packaging food and food products. Food manufacturing encompasses engineering, processing technologies, packaging, sanitation, robotics, nanotechnology, sensors, high-speed automation, mathematical modeling, computer simulation, and quality/safety inspections of food and food products.

Applications must address the following:

- Develop innovative food manufacturing technologies that increase productivity, improve quality, and reduce the costs of producing, processing, and packaging food and food products, without compromising food safety, nutrient composition, and nutritional value, using a multi-disciplinary approach.
- Develop innovative educational, training, or extension resources that evaluate consumer and industry understanding, acceptance and behavior towards new food manufacturing technologies, trends and innovations.

Program Area Priority Additional Information:

- Applicants are encouraged to develop applications addressing the following:
 - New and innovative food manufacturing technologies designed to develop new or improved food products with increased nutrient value, safety, and quality;

- Development of manufacturing technologies to improve energy and water use efficiency towards environmental and economic sustainability;
- Improve sanitation and prevent cross-contamination in food manufacturing;
- Streamlining logistics, enhancing sustainability, and/or utilizing waste stream by-products; or
- Development of innovative food technologies to improve shelf life and minimize food waste and loss.
- Applicants with applications on (1) fundamental or core analytics and tool development for big data related to Food Manufacturing Technologies; or (2) collection, sharing, application and management of big data to understand Food Manufacturing Technologies should submit a letter of intent to the FACT Program Area Priority (A1541) by the LOI deadline.
- NIFA may partner with Ireland and Northern Ireland under the U.S. – Ireland Research and Development Partnership to solicit collaborative research applications in the Food Manufacturing Technologies Program Area Priority. For more information including FAQs about this program, visit the [NIFA, Ireland, and Northern Ireland partnership page](#). Applicants submitting to this partnership should select Collaborative as the grant type and their title of the application should begin as “TRI-PARTITE: full title....”.

5. **Function and Efficacy of Nutrients**

Program Area Priority Code – A1341

Proposed Budget Requests –

- Budgets for Standard Grants, Strengthening Standard Grants, and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to five years.**
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects only

Requested Grant Types – Standard, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Letters of Intent not required for this program area priority

Application Deadline – August 9, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contact – Dr. Deirdra Chester (202) 401-5178 or dnchester@nifa.usda.gov

Program Area Priority –

Applicants must address at least one of the following:

- Investigate the role of bioactive components of food in preventing inflammation or promoting gut health.
- Investigate the role of the human gut microbiome on nutrient uptake, utilization and efficiency and their overall impacts on human health and well-being.

Program Area Priority Additional Information:

- Justification must be provided for the relationship of the bioactive component(s) being studied to human health outcomes and/or the health of the human gut microbiome.

- Priority will be given to applications that use a whole food approach or that address health effects of a combination of two or more bioactive components found in food. The whole food approach may also be one that adds enrichment, fortification or micro- and nano-encapsulation to enhance bioavailability of bioactive components in food.
- This program area priority does not support:
 - Research on the development of dietary supplements, research on dietary therapies for existing disease, or for the establishment, expansion, or maintenance of dietary databases.
 - Survey research on the nutritional status of population groups or sub-groups.
- Applicants are encouraged to review the [Food Specific Molecular Profiles and Biomarkers of Food and Nutrient Intake, and Dietary Exposure](#) interagency grant program for additional funding opportunity on select topics in nutrition.

d. Bioenergy, Natural Resources, and Environment (BNRE)

Background

The BNRE program area supports foundational and applied research and integrated projects to promote, improve, and maintain healthy agro-ecosystems and the natural resources that are essential to the sustained long-term production of agricultural goods and services.

Emerging production systems for biomass feedstocks for the production of biopower, biofuels, chemicals, and other biobased products need to be developed and used in agricultural landscapes in ways that enhance or do not degrade the natural resource base or other production systems.

Sustainable management of agroecosystems requires the maintenance of the supporting natural resources and ecosystem services (ecosystem services are the benefits people obtain from ecosystems that fall into four categories of supporting, provisioning, regulating and cultural, including genetic resources, water quality, air quality, pollinator habitat, carbon sequestration, nutrient cycling and recreation). Development and deployment of sustainable agroecological practices requires an understanding of the interactions among physical, chemical, biological, socioeconomic, and human factors and their response to natural and anthropogenic changes. Science-based information that integrates these complex interactions is needed to make decisions to support agricultural production and their associated natural resources and ecosystem services, and to avoid critical thresholds of irreversible damage or loss. Additionally, there is a critical need to help mitigate the ecological footprint of agriculture; the National Institute of Food and Agriculture (NIFA) has articulated a vision of significantly reducing energy, water, and nitrogen use and greenhouse gas production. Applications must incorporate ways to develop approaches that will contribute to the measurable reduction of the overall ecological footprint of agriculture.

Microbiome research is critical for improving agricultural productivity, sustainability of agricultural ecosystems, safety of the food supply and meeting the challenge of feeding a rapidly growing world population. Better understanding of microbiomes will help reduce the use of chemicals (pesticides, antibiotics, and biocides) in food production, develop safer alternatives to control plant diseases, optimize nutrient utilization efficiency, reduce environmental footprints, and control pests.

Goals of this program area are to: 1) discover new and improved methods that take an interdisciplinary or systems approach to understand and assess working lands (farm, forest, range, pasture, livestock, etc.) for increased health, resilience and productivity; 2) provide new information and improved understanding that can be used to develop production practices and systems that achieve substantial reductions in their environmental footprints; 3) improve biomass feedstock crop genetic development, sustainable production and post-harvest logistics to enhance system integration into multifunctional agricultural and natural resource landscapes; and 4) improve the understanding of agricultural microbiomes and their function and response to environmental change in plant systems and natural resources.

The AFRI Bioenergy, natural resources, and environment program area addresses the following priorities within the 2014 Farm Bill: D. Bioenergy, Natural Resources and the Environment (sub priorities i. fundamental structures and functions of ecosystems; ii. biological and physical bases of sustainable production systems; iii. minimizing soil and water losses and sustaining surface water and ground water quality; iv. the effectiveness of conservation practices and technologies designed to address nutrient losses and improve water quality; v. global climate effects on agriculture; vi. forestry; and vii. biological diversity.

This program area seeks to improve the understanding of fundamental processes and interactions among the economic, environmental, and social pillars of sustainability in actively managed agro-ecosystems, including rangelands, and forests. This program area anticipates funding a suite of projects that reflects diverse spatial and temporal scales, geographic diversity, and multiple types of production systems.

Total Program Funds – Approximately \$21.7 million

Other Program Area Key Information applicable to ALL Bioenergy, Natural Resources and Environment (BNRE) priority areas:

- All applications must adhere to the requirements in Part IV.
- Applications from and collaborations with minority-serving institutions, small to mid-sized institutions, and/or institutions within the EPSCoR states are welcome in this program area.
- Applications that include collaborations with international partners may also be submitted. For information on NIFA partnerships that may be of interest to applicants, see the [AFRI International Partnerships website](#).
- All applications should justify the choice of the systems under study in terms of importance to sustainability of agroecosystems and preservation.
- Projects focused on long-term research data are highly encouraged to partner with research programs and institutions with existing networks such as the USDA Long-Term Agroecosystem Research Network (LTAR), NSF Long Term Ecological Research (LTER), USDA Forest Service Experimental Forests and Ranges, USDA Forest Service Forest Inventory and Analysis, [USDA National Agricultural Library Ag Data Commons](#), USDA Climate Hubs, or others.
- Applicants may include international collaboration that will help achieve their program objectives. Applicants are welcome to identify potential foreign collaborators using their

own networks or contacts, or utilize partnerships that NIFA has developed (see the [AFRI International Partnerships website](#)).

- Projects focused on data integration for decision making such as organizing and managing large data sets that include sustainability factors, and their interactions to assess risk, valuation of biodiversity and ecosystem services for landscape planning, and management or to make key policy and on farm decisions are highly encouraged to include reference sources from the Millennium Ecosystem Assessment, LTAR/LTER databanks, USDA Climate Hubs, and/or the [USDA Life Cycle Assessment \(LCA\) Digital Commons](#).
- Where appropriate, projects may focus on developing, combining and accessing models and approaches for applying adaptive management strategies for more efficient and faster responses to shifting climate and other unforeseen natural or man-made events that affect agriculture and food production.
- The BNRE program area invites applications for conferences and workshops that consider the three pillars of sustainability and interactions among the components. Conferences/workshops might include topics such as: science innovation for sustainable agro-ecosystems, adaptive management, data management and decision making using the USDA LCA Digital Commons, long-term data for decision making, and new research collaborations or Science, Technology, Engineering and Mathematics through minority-serving institutions.
- Applications with highly complex, large scale, transdisciplinary, and integrated research, education, and extension projects that incorporate foundational knowledge from this program area priority should be submitted to the Sustainable Agricultural Systems (SAS) Program Area (A9201) described in the [AFRI SAS RFA](#).
- **New in FY 2018:** The Food and Agriculture Cyberinformatics and Tools (FACT) initiative solicits applications that 1) focus on fundamental or core big data analytics and tool development, and/or 2) apply big data concepts to specific science domains or across domains and sectors for any of the Bioenergy, natural resources, and environment program area priorities except Network for Synthesis, Data Sharing and Management Program Area Priority (A1490). Applicants must submit a letter of intent (LOI) to the FACT Program Area Priority (A1541) by the LOI deadline (July 25, 2018), described in this RFA. The LOI is a prerequisite to submit an application for the FACT initiative. The title of the FACT project for the LOI and the application must begin with “FACT: full title....”.

Program Area Priorities – Each application must address at least one of the following four Program Area Priorities:

1. Sustainable Agroecosystems: Functions, Processes and Management

Program Area Priority Code – A1401

Proposed Budget Requests –

- Budgets for Standard Grants, Strengthening Standard Grants, and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to four years.**
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects or Integrated (research, education and/or extension) Projects only

Requested Grant Types - Standard, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Letter of Intent not required for this program area priority

Application Deadline – August 1, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contacts – Dr. Michael Bowers (202) 401-4510 or mbowers@nifa.usda.gov, Dr. Nancy Cavallaro (202) 401-5176 or ncavallaro@nifa.usda.gov, and Dr. Karelyn Cruz (202) 401-6417 or karelyn.cruz@nifa.usda.gov

Program Area Priority -

This priority area calls for research and integrated projects that will lead to one or more of the specific program goals listed: a) foundational research to advance scientific understanding of processes and interactions, b) development of models and decision support tools, and/or c) the assessment and development of new management/conservation practices and/or processes. The project should lead to substantial improvements in soil health (microbiome, water, nutrients, carbon, chemicals of environmental concern, etc.) or improved ecosystem services from agricultural production by addressing the impacts of changes in management practices and shifts in crop composition at local and landscape scales. Applicants may focus on the interactions between the social and human dimensions with environmental and economic dimensions. Proposed projects that are primarily fundamental science must explain how a better understanding of the fundamental processes will help sustain ecosystem services or help inform actions to achieve improved efficiencies and diminished negative impacts on natural resources.

Applications may address one of the following:

- Improve soil health and agricultural resilience/sustainability by using *innovative approaches, tools and technologies* to enhance the understanding of the physical and biogeochemical processes affecting the fluxes, fate and transport, transformation, and storage of the critical components of agroecosystems, as well as chemicals and agents that threaten them; or
- Enable development and evaluation of innovative management practices and novel systems to maintain or improve productivity while enhancing ecosystem services by addressing either:
 - the connection of ecosystem components to production system functionality, productivity, socioeconomic viability, sustainability, biodiversity and the production of other ecosystem services; or
 - new approaches that significantly increase the output or value of more than one ecosystem service, each compared with the current management system for the region.

Program Area Priority Additional Information:

- Projects that address multiple integrated functions, (for example food, feed and fiber production as well as wildlife habitat and native species preservation) across the landscape are encouraged.

- Applicants addressing nutrient cycles and management or chemicals of environmental concern (CEC) should include one of the following:
 - Predictive and/or hindcasting tools to assess control technologies to mitigate excess nutrient, and/or CEC movement; or
 - Improve process-based models to analyze nutrient, and/or CEC life cycles in agroecosystems, rangelands, and forests.

2. **Bioenergy and Biobased Product Feedstock Logistics**

Program Area Priority Code – A1414

Proposed Budget Requests –

- Budgets for Standard Grants, Strengthening Standard Grants, and New Investigator Grants must not exceed **\$1,000,000 total per project (including indirect costs) for project periods of up to four years.**
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects only

Requested Grant Types – Standard, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Letter of Intent not required for this program area priority

Application Deadline – August 1, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contacts – Dr. William Goldner (202) 445-3470 or wgoldner@nifa.usda.gov

Program Area Priority –

Efficient and effective feedstock logistics are critical if low-density biomass is to be converted into liquid transportation fuels or biobased products on a commercial scale in a manner which reduces adverse impacts to the environment. Strategies are needed to develop equipment and systems to harvest, collect, store, pre-process, and transport higher amounts and varieties of biomass.

Applications may address one of the following:

- Harvesting or residual collection technologies and practices to increase environmental, economic, and social benefits while maximizing productivity and collating with current agricultural/forest practices;
- Equipment testing/demonstration, optimizing harvest and storage strategies;
- Unique pre-processing technologies that have transformational potential for improving biorefinery infrastructure economics; or
- Development and optimization of economical and environmentally sound materials handling technology for transitioning wet or dry biomass into a conveyable pre-processed feedstock at the interface/introduction site of biorefineries.

Program Area Priority Additional Information:

- Applicants addressing bioenergy feedstock logistics should include a focus on terrestrial non-food biomass resources.
- Alignment with the [2016 Billion-Ton Report: Advancing Domestic Resources for a Thriving Bioeconomy](#).

- A technical-economic analysis of the proposed logistical system to support commercialization efforts.
- Applications focused on conversion technologies (biological, thermochemical, catalytic, etc.) should be submitted to the Bioprocessing and Bioengineering Program Area Priority (A1531) within the Agriculture Systems and Technology Program Area of this RFA.

3. Agricultural Microbiomes in Plant Systems and Natural Resources

This program area priority will support research to increase our understanding of the multipartite interactions between the host, environment, and microbiome with the end-goal of improving and sustaining agricultural productivity and quality in plant systems and associated natural resources. A complete description of the new cross-disciplinary (Agricultural Microbiomes in Plant Systems and Natural Resources) program area priority, A1402 is included in the **Plant health, production and plant products program area** described in this RFA; Note that a letter of intent is required for this program area priority.

4. Networks for Synthesis, Data Sharing, and Management

Program Area Priority Code – A1490

Proposed Budget Requests –

- Budgets for Standard Grants, Strengthening Standard Grants, and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to five years.**
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects only

Requested Grant Types – Standard, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Letter of Intent not required for this program area priority

Application Deadline – August 8, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contact – Dr. Nancy Cavallaro (202) 401-5176 or ncavallaro@nifa.usda.gov and Dr. Rachel Melnick (202) 401-4980 or rmelnick@nifa.usda.gov

Program Area Priority –

Emphasis is on networks that will lead to increased knowledge and synthesis of existing data and resources, and data sharing and management. Projects should use primarily data and information already available or being collected rather than spending a substantial portion of award funds to collect new data. Emphasis should be on bringing together and analyzing current data from diverse sources to achieve new, broader knowledge and chart new directions or opportunities of research for accelerated scientific understanding or decision support tools for enhanced agroecosystem sustainability. The proposed synthesis work should be through coordination of networking activities around one of the research themes in the context of sustainable crop, livestock, or forest productivity. Moreover, these projects should foster communication that promotes collaboration among research, education, and extension faculty and research agencies and institutions with common interests across disciplinary, geographical, and organizational boundaries; and/or collaborations among

institutions or among faculty at large research facilities and at small, mid-sized, and minority-serving institutions. Projects may be regional, national or international in scope. Outcomes of this priority include: coordination of the development of new data bases, tools and methods; minimizing isolation and maximizing cooperation so as to eliminate unnecessary duplication of efforts; and synthesis products such as reports communities of practice, and decision support tools.

Applications may address one of the following:

- Sustainable crop, livestock (including aquaculture of fish for food) or forest productivity while maintaining or improving water quantity and/or quality;
- Sustainable productivity as it relates soil health and soil properties; or
- An improved understanding of the impacts of increasing agricultural productivity of other key ecosystem services.

Program Area Priority Additional Information:

- Each project must include a clearly defined management plan that includes a description of the specific roles and responsibilities of the PD or Coordinator and other members of the group or network. The management plan should include provisions for flexibility that allows the structure or the group to change over time as membership and the network's foci evolve.
- Proposed projects are expected to involve generation of community resources such as databases.
- Coordination with existing Federal databases is encouraged.

e. Agriculture Systems and Technology (AST)

Background

This program area emphasizes the interrelationships between agricultural systems components to develop the next generation of engineered systems, products, processes, and technologies. AST blends biological, physical, and social sciences, thus, leading to sustainable, competitive, and innovative solutions for United States and global agriculture and food systems, encompassing both conventional and organic production. To the extent possible, applicants are encouraged to incorporate interdisciplinary sciences. By doing so, projects are more likely to incorporate varying dimensions of sustainability (economic, environmental, and social) and have a greater impact on agricultural problems. The broad list of topics encompassed by this area includes, but is not limited to, new uses and products from traditional and nontraditional crops, animals, byproducts, and natural resources; robotics, automation, precision and geospatial technologies, energy efficiency, computing, and expert systems; new hazard and risk assessment and mitigation measures; and water quality, irrigation, and management. Additionally, there is a critical need to help mitigate the ecological footprint of agriculture; the National Institute of Food and Agriculture (NIFA) has articulated a vision of significantly reducing energy, water, and nitrogen use and greenhouse gas production. Applications must incorporate ways to develop approaches that will contribute to the measurable reduction of the overall ecological footprint of agriculture.

The Agriculture systems and technology program area addresses the following priorities within the 2014 Farm Bill: E. Agriculture Systems and Technology - Engineering products and processes (subpriorities i. new uses and new products from traditional and nontraditional crops, animals, byproducts, and natural resources; ii. robotics, energy, efficiency, computing, and expert systems; iii. new hazard and risk assessment and mitigation measures; and iv. water quality and management).

Total Program Funds – Approximately \$19.5 million

Program Area Key Information applicable to ALL Agriculture Systems and Technology priority areas:

- All applications must adhere to the requirements in Part IV.
- Applications from, and collaborations with, minority-serving institutions, small to mid-sized institutions, and/or institutions within the EPSCoR states are welcome in this program area.
- Applications that include collaborations with international partners may also be submitted. For information on NIFA partnerships that may be of interest to applicants, see the [AFRI International Partnerships website](#).
- While this program area encourages conference grant applications on any topic related to the program area priorities below, this program area is particularly interested in conference or workshop applications that bring together stakeholders, researchers, extension specialists, educators, and technology providers to:
 - Create a roadmap for developing and delivering the next generation of agricultural technologies, including but not limited to precision agriculture, cyber-physical systems, information management, and nanotechnology. These technologies should be smarter, more user-friendly, and readily adaptable to a wide variety of crops and producers (including small-scale or limited-resource) and their unique needs (with little modification) in support of sustainable production practices and systems; or
 - Advance the understanding and application of transformative systems approaches to enhance agricultural and food system sustainability. By “transformative systems” we mean those that offer major and synergistic advances toward the multiple goals of sustainability—productivity, profitability, environmental, and social dimensions. A conference/workshop should bring together state-of-the-art knowledge on how to identify and assess transformative systems, advance the science involved, and produce a summary of its conclusions for publication and other distribution. This program area encourages applicants to draw from knowledge of systems science and transformational change in fields outside of agriculture including the social and policy sciences, law, and humanities, but with a focus on their application to agricultural and food systems.
- Applicant must describe the potential of the proposed work to support or achieve substantial gains in efficiencies of production; the probability that the application of technology will resolve constraints or result in positive impacts; and potential outcomes in terms of expected social and environmental benefits of research (see Part I, B.). Both transformative and incremental solutions are encouraged.
- Applicants are also encouraged to consider the [National Robotics Initiative](#) and the [Cyber-Physical Systems](#) interagency programs.

- Applications with highly complex, large scale, transdisciplinary, and integrated research, education, and extension projects that incorporate foundational knowledge from this program area priority should be submitted to the Sustainable Agricultural Systems (SAS) Program Area (A9201) described in the [AFRI SAS RFA](#).
- **New in FY 2018:** The Food and Agriculture Cyberinformatics and Tools (FACT) initiative solicits applications that 1) focus on fundamental or core big data analytics and tool development, and/or 2) apply big data concepts to specific science domains or across domains and sectors for any of the Agriculture systems and technology program area priorities. Applicants must submit a letter of intent (LOI) to the FACT Program Area Priority (A1541) by the LOI deadline (July 25, 2018). The LOI is a prerequisite to submit an application for the FACT initiative. The title of the FACT project for the LOI and the application must begin with “FACT: full title....”.

Program Area Priorities – Each Application must address at least one of the following four program area priorities:

1. Agricultural Engineering

Program Area Priority Code – A1521

Proposed Budget Requests –

- Budgets for Standard Grants, Strengthening Standard Grants, and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to four years.**
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects, or Integrated (research, and education and/or extension) Projects only

Requested Grant Types – Standard, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Letter of Intent not required for this program area priority

Application Deadline – July 27, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contacts – Dr. Steven Thomson (202) 603-1053 or steven.j.thomson@nifa.usda.gov, Ms. Charlotte Kirk Baer (202) 720-5280 or cbaer@nifa.usda.gov, and Dr. Wesley Dean (202) 689-4286 or wesley.dean@nifa.usda.gov

Program Area Priority –

This program area priority focuses on engineered devices, technologies, and tools to improve agriculturally relevant plant, animal, forestry, and natural resource systems. Applications must have a significant engineering component. Engineering is defined as *the application of scientific and mathematical principles to practical ends such as the design, manufacture, and operation of efficient and sustainable structures, technologies, machines, processes, and systems*. Some broad emphasis areas include, but are not limited to:

- Enable engineering, sensing, computing, modeling, automation, and information systems for: forestry and natural resources, plant and animal production and protection, and post-harvest inspection, handling, processing, packaging, and distribution;

- Develop and test the implementation of tools and precision technologies for monitoring, measurement, and detection in agricultural systems;
- Explore the use or development of advanced computational or engineering methods and technologies for navigation, mining, management, visualization, understanding, and communication of agricultural systems data that enable more effective use of big data;
- Improve water management and efficiency of energy and water use;
- Develop and test risk assessment and mitigation measures applicable to agriculture (in particular, reduce hazards to agricultural workers that can include assistive technologies); and/or
- Refine the long-term sustainability of agricultural and forestry systems that balance productivity along with economic, environmental, and social outcomes.

Program Area Priority Additional Information:

- Applications that deal with improving food quality, safety, or nutritional value should be submitted to the Food safety, nutrition, and health program area, described in this RFA.
- All applications dealing with nano-scale science and technology should be submitted to the Nanotechnology for Agricultural and Food Systems Program Are Priority (A1511), described in this RFA.

2. Bioprocessing and Bioengineering

Program Area Priority Code – A1531

Proposed Budget Requests –

- Budgets for Standard Grants, Strengthening Standard Grants, and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to four years.**
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects only

Requested Grant Types – Standard, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Letter of Intent not required for this program area priority

Application Deadline – July 27, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contacts – Dr. Steven Thomson (202) 603-1053 or steven.j.thomson@nifa.usda.gov and Ms. Charlotte Kirk Baer (202) 720-5280 or cbaer@nifa.usda.gov

Program Area Priority –

This program area priority focuses on engineered products and processes to improve agriculturally relevant plant, animal, forestry, and natural resource systems. Applications must have a significant engineering component. Engineering, in the context of this program priority, is defined as *the application of engineering principles and tools to biological materials or systems to create usable, tangible, economically viable products and processes.* Some broad research emphasis areas include, but are not limited to:

- Improve the production efficiency and capacity of biomass, biofuels, feedstock, bioenergy, and bio-based products;

- Advance or expand utilization of waste and byproducts generated in agricultural and food systems;
- Engineer new or improved products and processes that make use of materials from agricultural origin (including, but are not limited to, bioplastics and biocomposites); or
- Refine the long-term sustainability of agricultural and forestry processing systems that balance productivity along with economic, environmental, and social outcomes.

Program Area Priority Additional Information:

- Applications that deal with improving food quality, safety, or nutritional value should be submitted to the Food safety, nutrition, and health program area in this RFA.
- All applications dealing with nano-scale science and technology should be submitted to the Nanotechnology for Agricultural and Food Systems Program Area Priority (A1511).
- Applications dealing with feedstock improvements for bioproducts (e.g., improvements to plants for production of bioproducts, including ‘-omics’ approaches) should be submitted to the Plant health, production and plant products program area of this RFA. Microbial approaches can be submitted to this program area priority (A1531).

3. Nanotechnology for Agricultural and Food Systems

Program Area Priority Code – A1511

Proposed Budget Requests –

- Budgets for Standard Grants, Strengthening Standard Grants, and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to four years.**
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects only

Requested Grant Types – Standard, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Letter of Intent not required for this program area priority

Application Deadline – August 9, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contacts – Dr. Hongda Chen (202) 401-6497 or

hchen@nifa.usda.gov, Dr. Mervalin Morant (202) 401-6602 or mmorant@nifa.usda.gov, and Dr. James Dobrowolski (202) 401-5016 or jdobrowolski@nifa.usda.gov

Program Area Priority –

Nanoscale science, engineering, and technology embrace opportunities in a wide range of critical challenges facing agriculture and food systems. This program area priority encourages applications in the following broad areas: innovative ideas and fundamental sciences to develop nanotechnology enabled solutions for food and nutrition security through improved productivity, quality, and biodiversity; improved nutritional value of feeds, feed additives, and more effective therapies that significantly impact animal health and wellness; enhanced food safety and biosecurity; and increased protection for natural resources, the environment, and agricultural ecosystems. The program area priority includes, but is not limited to:

- Novel uses and high value-added products of nano-biomaterials from agricultural and forest origins for food and non-food applications. Note: Applications primarily addressing packaging, food contact surfaces, food safety, agrochemicals, environment, health, or other aspects of agriculture and food production will be acceptable, whereas applications addressing how engineered nanomaterials affect nutritional or quality attributes of food are not solicited in this RFA;
- Nanoscale-based sensing mechanisms and smart sensors for accurate, reliable and cost-effective early and rapid detection of pathogens, allergens, insects, diseases, chemicals, and contaminants in foods, plant and animal production systems, water, soil and the agricultural production environment; Portable and field deployable sensors and devices for real-time detection and screening to identify targets requiring no additional laboratory analyses are encouraged;
- Monitoring physiological biomarkers for optimal crop or animal productivity and health;
- Cost effective, distributed sensing networks for intelligent and precise application of agricultural inputs (e.g., fertilizer, water, and chemicals) with the Internet of Agricultural Things (i.e., cyber-physical systems) and the science and tools of big data;
- Appropriate environmental, health and safety assessments of engineered nanoparticles applied in food and agricultural systems including characterization of hazards, exposure levels, transport and fate of the engineered nanoparticles or nanomaterials in foods, crops, soils (and soil biota), water, and livestock. This may also include animal feed formulations and processes that utilize novel nanomaterials or develop new nanostructured materials or nanoparticles that are bio-persistent in digestive pathways; or
- Discovery and characterization of nanoscale phenomena, processes, and structures relevant and important to agriculture and food.

Program Area Priority Additional Information:

- Nanotechnology is defined by the [National Nanotechnology Initiative](#) (NNI) as “...the understanding and control of matter at dimensions between approximately 1 and 100 nanometers, where unique phenomena enable applications. Encompassing nanoscale science, engineering and technology, nanotechnology involves imaging, measuring, modeling and manipulating matter at this length scale.” Applications should contain a clear statement about how the work proposed uses nanotechnology as defined by the NNI. A proposed study working at the scale of atoms or molecules does not necessarily meet the criteria of nanotechnology. Rather, the work proposed should be based on one or more of the unique phenomena, properties, and processes that occur at the nanoscale and are dimensionally dependent. Typical examples include quantum phenomena (e.g., size quantization of electron states), dominance of surfaces; self-assembly of atoms or molecules into new materials (e.g., single wall carbon nanotubes, graphene, borophene), or collective phenomena (e.g., plasmons, phonons, because of the material being at the nanoscale). The proposed work should be based on the fundamental differences in physical, chemical, and biological behavior of materials at the nanoscale compared to bulk materials or individual atoms/molecules.

- This program area priority encourages new platforms of nanotechnology in the area of higher order assembled systems, and more complex systems that include the exploitation of bio-nano interfaces, hybrid bio-inorganic systems, systems biology, synthetic biology, and additive manufacturing technology.
- Applications, especially those with potential near term commercial impact, are encouraged to include socioeconomic analyses of anticipated benefits to agriculture, food, and society and to identify the factors that may contribute to, or hinder, adoption.
- Applications dealing with public deliberation, social acceptability, and risk perception, management, and communication about nanotechnology and nano-based food or non-food products by agricultural stakeholders (including consumers), using appropriate social science tools should be submitted to Social Implications of Food and Agricultural Technologies Program Area Priority (A1642) described in this RFA.

4. Food and Agriculture Cyberinformatics Tools (FACT)

Program Area Priority Code – A1541

Proposed Budget Requests –

- Budgets for Standard Grants, Strengthening Standard Grants, and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to four years.**
- Budgets for Standard Grants, and Strengthening Standard Grants addressing the coordination innovation networks priority below must not exceed **\$1,000,000 total per project (including indirect costs) for project periods of up to five years.**
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects, or Integrated (research, education and /or extension) Projects only

Requested Grant Types – Standard, Conference, and FASE (Strengthening Standard New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Requested Grant Types for Coordination Networks - Standard and FASE (Strengthening Standard) Grants only

Letter of Intent Deadline – July 25, 2018 (5:00 p.m. Eastern Time)

Program Area e-mail address for Submission of Letter of Intent – FACT@nifa.usda.gov

Label the attached Letter of Intent pdf file with the project director's last name. The title of the FACT project for the LOI and the application must begin with "FACT: full title...". Include the program area to which your Letter of Intent is most relevant in the subject line of your email submission (i.e., A. Plant health and production and plant products; B. Animal health and production and animal products; C. Food safety, nutrition, and health; D. Bioenergy, natural resources, and environment; E. Agriculture systems and technology; and F. Agriculture economics and rural communities).

Application Deadline – October 31, 2018, (5:00 p.m. Eastern Time)

Program Area Priority Contacts – Ms. Charlotte Kirk Baer (202) 720-5280 or cbaer@nifa.usda.gov, Dr. Nancy Cavallaro (202) 401-5176 or ncavallaro@nifa.usda.gov, Dr. Hongda Chen (202) 401-6497 or hchen@nifa.usda.gov, Dr. Ed Kaleikau (202) 401-1931 or ekaleikau@nifa.usda.gov, Dr. Lakshmi Kumar Matukumalli (202) 401-1766 or lmatumkumalli@nifa.usda.gov, Dr. Robbin Shoemaker (202) 720-5468 or rshoemaker@nifa.usda.gov, and Dr. Steven Thomson (202) 603-1053 or steven.j.thomson@nifa.usda.gov, and Dr. Ariela Zycherman (202) 531-0643 or ariela.zycherman@nifa.usda.gov

Program Area Priority –

This program area priority focuses on data science to enable systems and communities to effectively utilize data, improve resource management, and integrate new technologies and approaches to further U.S. food and agriculture enterprises. The program encourages university-based research as well as public and private partnerships.

There are many challenges associated with data in agriculture and food production. NIFA stakeholders identified at least a dozen issues that are critical to address: data infrastructure and management; applications and use of data; entities affected by data; creation, collection, provenance, and characteristics of data; training, programs, student, and knowledge needs around data; principles, and protocols associated with data; team, community, and public/private aspects of data; data producers, engineers, scientists, and researchers of data; public, corporate, and commercial entities' roles in data; privacy, security, confidentiality, and quality data; biological and interoperable data systems; bibliometrics, altmetrics, text and data mining; and data sharing, repositories, and analysis.

The program will support projects that examine the value of data for small and large farmers, agricultural and food industries, and gain an understanding of how data can impact the agricultural supply chain, reduce food waste and loss, improve consumer health, environmental and natural resource management, affect the structure of U.S. food and agriculture sectors, and increase U.S. competitiveness.

Applications for research or integrated projects must address one of the following priorities:

- Design and Implementation
 - Build scalable data infrastructure and management systems
 - Conceptualize Open Data FAIR principles: Findable, Accessible, Interoperable, and Re-usable for all experimental and research data
 - Develop standards and best practices with other government and international organizations
- Analysis
 - Develop data-integration and data-quality tools to improve analytic capability
 - Design and implement new algorithms and methods for depicting massive data
- Technologies
 - Connect multiscale data
 - Bridge real-time distributed and parallel data systems
 - Create new methodologies and frameworks for tracking and processing data
 - Identify new approaches to data archiving and sharing

- Applications and Human-Technology-Data Interactions
 - Examine scientific implications and practical aspects of how agricultural data and computer systems are accessed, designed, and used to improve human-human, human-technology, and human-decision experiences
 - Integrate visualization with statistical methods and other analytic techniques in order to support discovery and analysis
 - Engage students and professionals, teams, universities and public/private sectors
 - Develop decision-support tools that use diverse data sources and Big Data analytics modeling short-term impacts of various factors to create best value to the U S agricultural enterprise

Applications for Coordinated Innovation Networks should:

- Foster a cohesive, multi-disciplinary community that addresses bottlenecks in critical areas (e.g., high-throughput phenomics; systems modeling, access and integration of data from technologies like sensors and drones; smart cities);
- Identify innovative and synergistic activities that prioritize needs and develop data standards for efforts in critical areas;
- Bring together researchers (for research projects) or research, education, and/or extension (for integrated projects) communities working on multiple aspects of a data-supported problem into one multi-disciplinary network to collectively advance the field;
- Include robust representation of public and commercial entities from relevant disciplines (e.g., geneticists, physiologists, engineers, informaticians, modelers, economists, social scientists, extension professionals and stakeholders);
- Promote collaboration among research and education communities, both domestic and international, to leverage and facilitate sharing of expertise and resources; and
- Develop and maintain effective networking strategies for connecting the public and private sector, students, and the media to foster interest and societal engagement.

For additional resources on FACT including frequently asked questions, see the [FACT page](#).

f. Agriculture Economics and Rural Communities (AERC)

Background

The AERC program area supports rigorous social science research that informs decision making and policy design to enhance the sustainability of agricultural production systems, both conventional and organic, and related activities in rural areas, protect the environment, enhance quality of life, and alleviate poverty. Topical issues include, but are not limited to, the interactions between agriculture, environment and communities in rural areas; food security/insecurity; consumer preferences or behavior; decision-making under uncertainty; crop insurance; availability of credit and financing; market structure and performance; and policy design and impact. The AERC program area supports social and behavioral science disciplines. Interdisciplinary efforts involving social and biophysical/natural science disciplines are also invited.

The AERC program area addresses the following 2014 Farm Bill priority areas: F. Agriculture Economics and Rural Communities – Markets, trade and policy (sub priorities i. strategies for entering into and being competitive in domestic and overseas markets; ii. farm efficiency and profitability, including the viability and competitiveness of small and medium-sized dairy, livestock (including aquaculture finfish and shellfish), crop and other commodity operations; iii. new decision tools for farm and market systems; iv. choices and application of technology; v. technology assessment; and vi. new approaches to rural development, including rural entrepreneurship); and D. Bioenergy, Natural Resources, and Environment – (sub priorities ii. biological and physical bases of sustainable production system; and v. forestry).

Total Program Funds – Approximately \$22.9 million

Program Area Key Information applicable to ALL Agriculture Economics and Rural Communities Program Area Priorities:

- All applications must adhere to the requirements in Part IV.
- Applications from, and collaborations with, small to mid-sized institutions, minority-serving institutions, and/or institutions within the EPSCoR states are welcome in this program area.
- Applications that include collaborations with international partners may also be submitted. For information on NIFA partnerships that may be of interest to applicants, see the [AFRI International Partnerships website](#).
- Applications must include a section providing a justification for the system studied relevant to improving economic, social, and environmental sustainability of agriculture or rural communities.
- Applications that propose to develop, test and/or apply decision-support aids or tools are welcome.
- This program area funds the study of entrepreneurship and business development, but it will not fund the development of new business start-ups or the research and development of new technologies and tools for specific businesses to use. The [NIFA Small Business Innovation Research \(SBIR\) program](#) will entertain applications for new technologies and business development.

- Applications with highly complex, large scale, transdisciplinary, and integrated research, education, and extension projects that incorporate foundational knowledge from this program area priority should be submitted to the Sustainable Agricultural Systems (SAS) Program Area (A9201) described in the [AFRI SAS RFA](#).
- **New in FY 2018:** The Food and Agriculture Cyberinformatics and Tools (FACT) initiative solicits applications that 1) focus on fundamental or core big data analytics and tool development, and/or 2) apply big data concepts to specific science domains or across domains and sectors for any of the Agriculture economics and rural communities program area priorities except the program area priorities, Joint Economic Research Service and NIFA Program – Economic Implications and Application of Big data in Food and Agriculture (A1643) and Social Implications of Food and Agricultural Technologies (A1642). Applicants must submit a letter of intent (LOI) to the FACT Program Area Priority (A1541; see above) by the LOI deadline (July 25, 2018), described in this RFA. The LOI is a prerequisite to submit an application for the FACT initiative. The title of the FACT project for the LOI and the application must begin with “FACT: full title....”.

Program Area Priorities – Each application must address at least one of the following eight program area priorities:

1. Small and Medium-Sized Farms

Program Area Priority Code – A1601

- Standard Grants, Strengthening Standard Grants and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to four years.**
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding the budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects, or Integrated (research with education and/or extension) Projects only

Requested Grant Types – Standard, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Letter of Intent not required for this program area priority

Application Deadline – August 23, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contact – Dr. Denis Ebodaghe (202) 401-4385 or debodaghe@nifa.usda.gov

Program Area Priority –

This program area priority focuses on the development and/or adoption of new models to assist agricultural (farm, forest, or ranch) landowner/manager decision making with respect to appropriate scale management strategies and technologies to enhance economic efficiency and sustainability, including the viability and competitiveness of small and medium-sized dairy, poultry, livestock, crop, forestry, aquaculture, and other operations.

The program area priority scope includes, but is not limited to:

- Develop effective strategies to aid in the development of research, education and extension/outreach programs to meet the needs of socially disadvantaged small and medium-sized farmers;

- Outreach efforts that create opportunities for veterans to enter farming and develop new tools to ensure that the next generation of small and medium-sized farmers (including veterans) has access to the information and resources they need to operate their farms on a sustainable and profitable basis;
- Examine the varying forms of land tenure, especially among aging and beginning farmers, and identify the opportunities and obstacles to land access and land transfer for younger farmers;
- The feasibility of small to mid-scale processing for fresh fruits and vegetables, frozen fruits and vegetables, value added processing for institutional buyers, or small scale meat processing;
- Develop effective strategies and tools to assist small and medium-sized forest/woodland owners in managing and sustaining their timberland;
- The role of health insurance reform and access, especially the impact of health insurance access on the preservation of family farms; farmer quality of life; entry and retention of beginning farmers and farmworkers in the agricultural workforce; and promoting agricultural job growth; or
- The impact of regulations (existing or reformed) on farm to store food distribution.

Program Area Priority Additional Information:

- Integrated project applications must include research and at least one other function (i.e., education, extension, or both).

2. Economics, Markets and Trade

Program Area Priority Code – A1641

Proposed Budget Requests –

- Standard Grants, Strengthening Standard Grants and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to four years.**
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding the budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects only

Requested Grant Types – Standard, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Letter of Intent not required for this program area priority

Application Deadline – August 30, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contact – Dr. Robbin Shoemaker (202) 720-5468 or rshoemaker@nifa.usda.gov

Program Area Priority –

This priority research area encourages the development of theories, methods and applications of economics. It encourages applications in the following broad areas: agricultural market structure and performance; international trade; agricultural production and resource use; consumer behavior; farm labor and immigration and policy; agricultural policy design and impacts; technology development and adoption; and science and innovation policy. The program area priority scope includes, but is not limited to:

- Examine the economics of agriculture and food policy, crop insurance, price stabilization and income support. Other policy considerations include the economic implications of changes in trade or immigration policy;
- Economic and behavioral aspects of consumption or savings behavior, consumer financial decision making; agricultural production and technology adoption, and the design and implementation of policy intended to affect those behaviors;
- Economics of science and technology policy, industrial organization of science, and the role of Intellectual Property Rights, international comparisons in Research and Development activities;
- Social, behavioral and economic sources and barriers to agricultural productivity growth, the role of funding mechanisms, models for efficient funding allocation among areas of science;
- Measuring and evaluating public or private scientific effort, outputs and outcomes for effective quantitative and qualitative research evaluation;
- Examine economic factors contributing to food insecurity and potential approaches to ameliorate food insecurity, how the food system influences food insecurity and potential for a causal relationship between food insecurity and health, educational attainment, and overall economic well-being;
- Explore the relationship between widely promoted norms for healthy eating, (e.g., the Dietary Guidelines) and food production, distribution, and markets, as well as other socioeconomic, cultural, and environmental consequences.

In addition to the priorities listed above, NIFA and the Illinois Corn Marketing Board are seeking to co-fund projects to evaluate barriers to adoption of post-plant application of nitrogen on corn and cover crops. Applications must address the following priority:

- Examine and evaluate the effect of barriers, including concerns about profitability and production risks, operational difficulties, uncertainties in the practices, and other factors, on the adoption of post-plant nitrogen application and cover crop adoption to reduce nitrogen effluent from agricultural land. The research should incorporate use of [Precision Conservation Management](#) data.

Applicants seeking funding through this commodity board co-funded priority must provide a letter of support from the commodity board directly to the NIFA Program Contact within 60 calendar days after the application submission deadline. When seeking a letter of support, applicants should submit their entire application to the **Illinois Corn Marketing Board** and request a letter that specifically indicates that the Illinois Corn Marketing Board supports the application for co-funding. To obtain a letter of support or for further questions, please contact the **Illinois Corn Marketing Board** representative (Mr. Travis Deppe (309) 827-0912 or tdeppe@ilcorn.org). Additionally, applicants must state in the last sentence of their application's Project Summary section that the proposal is submitted in response to this specific commodity board topic.

3. Economic Implications and Applications of Big Data in Food and Agriculture

Program Area Priority Code – A1643

Proposed Budget Requests –

- Standard Grants, Strengthening Standard Grants and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to four years.**
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding the budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects, or Integrated (research, education and/or extension) Projects only

Requested Grant Types – Standard, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Letter of Intent not required for this program area priority

Application Deadline – August 30, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contact – Dr. Robbin Shoemaker (202) 720-5468 or rshoemaker@nifa.usda.gov

Program Area Priority –

This program area invites proposals that address issues surrounding how might Big Data influence markets, industry structure, and agricultural and food value chains. The program area priority is a joint effort between the USDA Economic Research Service (ERS) and NIFA to support the FACT initiative. Invited projects include *research only* on development and applications of big data and *integrated projects* designed to train agricultural economists in the use of data science. The program area priority scope includes, but is not limited to:

- How might big data inform decision making by agricultural producers or consumers, policy makers, and enhance market efficiency and performance.
- The value of big data to small and large farmers, various agricultural and food industries, and the role of big data in the agricultural supply chain, reduction of food waste and loss, improvements in consumer health, the environment and natural resource management, and agricultural trade and competitiveness.
- Examine the relationship between big data, agricultural markets, industry structure, and agricultural and food value chains and how big data informs decision making by agricultural producers, policy makers, and consumers and enhances market efficiency and performance.
- Identify and develop approaches for big data analytics to improve the measurement and monitoring of effluents and factors affecting environmental quality, aid in internalizing externalities, or enhance the design and implementation of policy instruments to mitigate agricultural pollution.
- Development of curricula and training of analytical and empirical techniques for advancing application of big data in food, agricultural, and natural resource management contexts.

4. Social Implications of Food and Agricultural Technologies

Program Area Priority Code – A1642

Proposed Budget Requests –

- Standard Grants, Strengthening Standard Grants and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to four years.**
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding the budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects only

Requested Grant Types – Standard, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Letter of Intent not required for this program area priority

Application Deadline – September 27, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contact – Dr. Wesley Dean (202) 689-4286 or wesley.dean@nifa.usda.gov, Dr. Robbin Shoemaker (202) 720-5468 or rshoemaker@nifa.usda.gov, Dr. Ed Kaleikau (202) 401-1931 or ekaleikau@nifa.usda.gov, and Dr. Ariela Zycherman (202) 531-0643 or ariela.zycherman@nifa.usda.gov

Program Area Priority –

Examining the social implications of technology is a way to anticipate the unforeseen and unintended consequences of technological innovation, including cultural, health, welfare, equity, ethical, and environmental impacts. A critical lesson learned from past experiences with the application of scientific discoveries and technological innovations to agricultural production is that public trust in science begins with and requires ongoing transparency and open deliberation. Technologies such as gene drives and genome editing, big data, nanotechnology, and lab grown meat, have tremendous capability in shaping the future of agriculture, requiring the scientific community to develop effective means of communicating and engaging with the public. [The National Academies of Sciences, Engineering, and Medicine](#) recommended that for these innovations to become applicable to agriculture, there should be a dialogue between scientists, legal scholars, bioethicists, social scientists, the public, and other stakeholders to assess the merits and risks of new technologies and scientific discoveries, and pursue an open and effective means to credibly engage with the public about these issues.

Research project applications must address the following:

- Assess the broad social, ethical, cultural, legal, and other potential impacts that new technologies and scientific discoveries may pose for society, agricultural markets, consumer preferences, and other domains and consider models for ameliorating challenge to the technologies.
- Involve a range of individuals including scientists, legal scholars, bioethicists, social scientists, and researchers from the humanities, the public, and other stakeholders to assess the technology's merits and risks and examine issues and modes of communication that can result in open and effective means to involve the public in deliberation over these issues.
- Technologies and scientific advancements of interest include, but are not limited to, gene editing; gene drives; the analysis of big data, and tools and approaches for

collecting big data from agricultural producers; agricultural nanotechnology, and unconventional sources of protein (e.g., lab-grown meat).

Program Area Priority Additional Information:

- Conference applications are encouraged under this program area priority.
- Projects must include multi/interdisciplinary components and/or disciplinary specialists.

5. Environmental and Natural Resource Economics

Program Area Priority Code – A1651

Proposed Budget Requests –

- Standard Grants, Strengthening Standard Grants and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to four years.**
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding the budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects only

Requested Grant Types – Standard, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Letter of Intent not required for this program area priority

Application Deadline – September 13, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contact – Dr. Robbin Shoemaker (202) 720-5468 or

rshoemaker@nifa.usda.gov

Program Area Priority –

This program area priority examines the interrelationship of natural resources and the environment with agriculture and rural communities. Research projects funded through this priority will advance economic theories, methods, tools, analyses and applications that contribute to understanding an ecological approach to agriculture (including forestry and aquaculture) embracing production and sustainable resource management simultaneously. Research topics include, but are not limited to:

- Economic impacts or implications of agriculture, resource conservation and management on the environment.
- Economics of conservation and environmental policies affecting agriculture and rural communities; the design of incentive mechanisms and policies to promote resource conservation and sustainability.
- Examine how ecosystem service valuation (ESV) can be enhanced to improve environmental policy design; how ESV is currently used and the limitations to ESV; and the potential for protocols to be developed for standardized implementation and use of ESV. Develop methodological advances in non-market valuation and meta-analysis of ecosystem services valuation.
- Experimental economic studies typically involve the use of students in lieu of actual economic agents. Examine and verify whether students are sufficiently representative of actual agents.

6. Center for Behavioral and Experimental Economics for Agri-Environmental and Risk Management Policy Research

Program Area Priority Code – A1655

Proposed Budget Requests –

- Standard Grants, Strengthening Standard Grants and New Investigator Grants must not exceed **\$1,000,000 total per project (including indirect costs) for project periods of up to four years.**
- FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding the budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects only

Requested Grant Types – Standard and FASE (Strengthening Standard, New Investigator, Seed, Equipment, and Sabbatical) Grants only

Letter of Intent not required for this program area priority

Application Deadline – September 13, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contact – Dr. Robbin Shoemaker (NIFA) (202) 720-5468 or rshoemaker@nifa.usda.gov

Program Area Priority –

NIFA and ERS invite proposals for a competitive grant to establish and fund a Center for Behavioral and Experimental Economics for Agri-Environmental and Risk Management Policy Research. The center will employ and advance the use of behavioral and experimental economics to conduct research on how policies and programs can influence the provision of ecosystem services from agricultural resources, the management of risk, and other aspects of food and agricultural policy. The center will examine or support research efforts that address issues such as:

- The design and implementation of natural resource and conservation policy, agricultural risk management strategies and policy.
- Enrollment and participation in various risk management or conservation programs.
- Adoption and management of resource conserving and risk mitigation production practices.

7. Valuing Environmental Benefits from Natural Resource Conservation Programs

Program Area Priority Code – A1654

Proposed Budget Requests –

- Standard Grants, Strengthening Standard Grants and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to four years.**
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding the budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects only

Requested Grant Types – Standard, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only

Letter of Intent not required for this program area priority

Application Deadline – September 13, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contact – Dr. Robbin Shoemaker (202) 720-5468 or rshoemaker@nifa.usda.gov

Program Area Priority –

This program area priority is designed to enhance our understanding of the roles of payments for ecosystem services and/or payments for conservation practices which play to protect or improve ecosystem services. Research is needed to assess the value of public benefits associated with changes in ecosystem services arising from the use of agricultural management practices. Development of such methods are necessary for advancing the ability to design and implement mechanisms to manage and protect agriculturally related natural resources. As such this priority area will support creating greater knowledge and confidence in the linkages between agricultural management practices and ecosystem service outcomes that contribute to human well-being. This is a joint effort between Natural Resource Conservation Service (NRCS) and NIFA.

Priority areas of research include:

- Studies filling knowledge gaps in habitat and biodiversity outcomes for wildlife and pollinators that provide aesthetic, recreational, and other services to the general public, and pollination and/or pest control services to agricultural producers.
- Develop the ability to value environmental benefits at aggregate scales to advance the science of nonmarket benefit evaluation. Assessment of the value of ecosystem service improvements arising from national environmental quality, conservation protection or enhancement efforts at national or aggregate scales.
- Assessment of changes in value of benefits from improvements in wildlife habitat and biodiversity outcomes from changes in conservation management practices on actively managed agricultural land that provide aesthetic and recreational services to the general public at national or regional scales. Priority will be given to assessments that also include a variety of natural resource indicators such as estimates of changes in rangeland or pasture forage, crop yields, soil carbon, sediment loss from water and wind erosion, nutrient loss from water movement, and soil moisture levels from adoption of range, pasture and cropland conservation management practices.
- Assessment of changes in the value of benefits from changes in ecosystem services resulting from the adoption of conservation management on range and pasture at national or regional scales. Priority will be given to efforts that include a variety of natural resource indicators such as estimates of changes in forage, stocking rates, soil carbon, sediment loss from water and wind erosion, nutrient loss from water movement, and soil moisture levels.

8. Innovation for Rural Entrepreneurs and Communities

Program Area Priority Code – A1661

- Standard Grants, Strengthening Standard Grants and New Investigator Grants must not exceed **\$500,000 total per project (including indirect costs) for project periods of up to four years.**
- Conference and FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding the budgetary guidelines will not be reviewed.

Requested Project Types – Research Projects, or Integrated (research with education and /or extension) Projects only

Requested Grant Types – Standard, Conference, and FASE (Strengthening Standard, New Investigator, Strengthening Conference, Seed, Equipment, and Sabbatical) Grants only
Letter of Intent not required for this program area priority

Application Deadline – July 31, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contact – Dr. Robbin Shoemaker (202) 720-5468

rshoemaker@nifa.usda.gov, Dr. Wesley Dean (202) 689-4286 or

wesley.dean@nifa.usda.gov, and Dr. Toija Riggins (202) 720-2297 or

toija.riggins@nifa.usda.gov

Program Area Priority –

Rural businesses and communities in the U.S are facing new and emerging opportunities and challenges arising from, for example, bioenergy and natural gas developments, demographic shifts, and advances in technology and communication. This program area priority is designed to support rigorous theoretical and empirical efforts to create and examine innovative approaches for advancing economic opportunities for rural entrepreneurs and communities. Projects can be either integrated or research only. Projects may evaluate the institutional, social, or economic factors affecting decision making and policy development to enhance the economic growth and well-being of rural communities.

Projects may also explore strategies to promote community and regional innovation in youth entrepreneurship, workforce development and address community and human capital challenges, poverty and income inequality, including through the promotion of Science, Technology, Engineering and Mathematics/ Science, Technology, Engineering, Agriculture/Arts and Mathematics (STEM/STEAM), in rural areas. This program area priority focuses mainly on entrepreneurs and small businesses who are important sources of employment, and/or on other issues “beyond the farm gate” (for projects that focus mainly on farms, see program area priority, Small and Medium-Sized Farms (A1601).

The emphasis of this program area priority includes, but are not limited to:

- Improve the understanding of the factors and conditions that enhance economic opportunities for food, agricultural and rural businesses through tools and methods from the various social sciences, (i.e., sociology, demography, economics, geography, etc.). Studies that focus on women, and ethnic and/or racial minority groups are of interest.
- Access to health care and health insurance including research on rural medical care and treatment delivery strategies and infrastructure such as telemedicine; the challenges surrounding the rural opioid crisis.
- Examine the socioeconomic determinants of household and community food security; why some regions, communities, and demographic groups have higher levels of food insecurity than others; and the potential relationship between labor force participation, wage legislation, and food insecurity status.
- Examine approaches to expanding local and regional food systems, such as through food hubs and intermediated markets. Identify strategies for scaling up from direct marketing to regional markets, and improving efficiencies while maintaining the benefits of local identity.

- Examine transportation, energy, health, and other infrastructure-related decisions and their implications for agricultural and rural communities. Explore the role of alternative firm ownership structures rural economic development.
- Examine the private and public returns to expanding broadband infrastructure into rural areas, the barriers to broadband deployment and adoption and the mechanisms that might ameliorate those factors. Examine the potential relationship between access to broadband and health outcomes, educational attainment, entrepreneurship, and job growth.
- Examine self-employment/non-farm proprietorship and explore the factors that spur the growth and survival of these entrepreneurial efforts or factors that contribute to their demise. Identify and assess policies that promote the sustainability of these establishments, and the unique challenges faced by women, and ethnic and racial minorities or recent immigrants.

Program Area Priority additional Information:

- Integrated project applications must include research and at least one other function (i.e., education, extension, or both)

g. Crosscutting Programs

1. Critical Agricultural Research and Extension (CARE)

Background

This program area addresses critical challenges and opportunities that research and extension, together, can address to improve our nation's agricultural and food systems. Despite prior investments in basic and applied research, critical problems continue to impede the efficient production of agriculturally-important plants and animals, for producing safe and nutritious foods, and to meet environmental challenges for agriculture. These problems may be local, regional, or national, and may call for work focused on one or more scientific disciplines. However, all need immediate attention to meet producer and consumer needs. Finding and implementing solutions to these critical problems require partnership and close coordination among researchers, extension experts, and practitioners in food and agricultural enterprises. Funded projects are expected to produce results that lead to practices, tools, and technologies that are rapidly adopted by end-users.

The AFRI CARE Program Area addresses the following priorities of the 2014 Farm Bill: A. Plant health and production and plant products; B. Animal health and production and animal products; C. Food safety, nutrition, and health; D. Bioenergy, natural resources, and environment; E. Agriculture systems and technology; and F. Agriculture economics and rural communities.

Total Program Funds – Approximately \$7 million

Program Area Key Information:

- All applications must adhere to the requirements in Part IV, in this RFA. If submitting an integrated Research and Extension application, please refer to specific content requirements for integrated applications. Applications that do not adhere to these requirements will not be reviewed.
- A justification of how the project addresses a critical stakeholder need must be included in the Project Narrative of the full application.
- Strict focus on short- to medium-term application of results is a requirement of this program area.
- Applications must demonstrate that outcomes of the project period can be implemented within 2 years after the grant ends.
- Applications from and collaborations with minority serving institutions, small to mid-sized institutions, and/or institutions within the EPSCoR states are welcome in this program area.
- Applications that include collaborations with international partners may also be submitted. For information on NIFA partnerships that may be of interest to applicants, see the [AFRI International Partnerships website](#).
- In the full application, a letter of support must be included from the stakeholder(s) which details their role and their degree of interest in implementing projected outcomes.

Program Area Code – A1701

Program Area Code Name – Critical Agricultural Research and Extension

Proposed Budget Requests –

- Standard Grants, Strengthening Standard Grants and New Investigator Grants must not exceed **\$300,000 total per project (including indirect costs) for project periods of up to 3 years and are not renewable.**
- FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding the budgetary guidelines will not be reviewed.

Requested Project Types – Integrated (research and extension) Projects; Research Projects for the commodity board co-funded priorities only

Requested Grant Types – Standard and FASE (Strengthening Standard and New Investigator) Grants only

Letter of Intent Deadline – July 25, 2018 (5:00 p.m. Eastern Time)

Program Area e-mail address for Submission of Letter of Intent – criticalag@nifa.usda.gov

Label the attached Letter of Intent pdf file with the project director's last name. Include the program area priority to which your Letter of Intent is most relevant in the subject line of your email submission (i.e., A. Plant health and production and plant products; B. Animal health and production and animal products; C. Food safety, nutrition, and health; D. Bioenergy, natural resources, and environment; E. Agriculture systems and technology; and F. Agriculture economics and rural communities).

Application Deadline – October 22, 2018 (5:00 p.m. Eastern Time)

Program Area Priority Contact – Ms. Charlotte Kirk Baer (202) 445-3426 or cbaer@nifa.usda.gov and Dr. James Dobrowolski (202) 401-5016 or jdobrowolski@nifa.usda.gov

Program Area Priority –

This program area priority is designed to support integrated activities based on rigorous research combined with effective extension and involvement of stakeholders to develop and rapidly apply new knowledge or practices resulting in improved well-being of the people, communities, plants, and animals involved in, and affected by, agriculture and food-production systems.

The program area priority seeks applications that: focus on a clear, time-sensitive, stakeholder-identified need or problem for agriculture; explain the magnitude (e.g., unexpected losses of income or employment, acres affected, estimated or actual economic costs to specified agricultural or food system, private industry, land owners, rural communities, adverse effects on the environment, risk of disease or illnesses) of the problem and the rationale for targeting it; describe a meaningful approach for blending research and extension expertise and other outreach and implementation approaches throughout the project to address principal objectives; provide evidence that the project is aligned to Farm Bill priorities listed above; state expected solutions or improvements and how these will be assessed and measured; address the potential cost of a proposed solution and describe how it can be scaled to be sustainable in the short term and long term; and explain how the project will strengthen agricultural and food-production systems and how results will be adopted or applied at a local, regional, or national level.

Each application must address one or more of the six Farm Bill priorities for AFRI.

In addition to the priorities identified above, NIFA and various commodity boards are seeking to co-fund research projects relevant to the respective commodity board. Each application must address one of the following priorities:

- Investigate protein-based meals or snacks, including the nutritional value of eggs, on the academic and/or behavioral effects of K-12 school-aged children. The research will help inform scientists, extension experts, educators and practitioners on the value of foods, such as eggs, within schools, particularly those in nutritionally-vulnerable low-income communities. **American Egg Board** representative: **Dr. Mickey Rubin (224) 563-3720 or mrubin@eggnutritioncenter.org**
- Identify novel approaches to improve beef's tenderness, juiciness and/or flavor without mechanical tenderization. **Cattlemen's Beef Promotion and Research Board** representative, on behalf of a consortium including the National Cattlemen's Beef Association (NCBA): Dr. Mandy Carr Johnson (303) 850-3399 or mcarr@beef.org.
- Develop and utilize genetic, genomic, and/or molecular tools to breed for improvements in resistance to *Fusarium oxysporum* f. sp. *vasinfectum* race 4 (FOV4) in Upland Cotton. **The Cotton Board** representative: Mr. William Gillon (901) 271-1340 or bgillon@cottonboard.org.
- Develop innovative irrigation management practices and monitoring strategies to conserve shrinking water supplies and mitigate plant water stress in dry farmed and irrigated vineyards, in order to promote both plant health and improve fruit quality. **Oregon Wine Board** representative: Ms. Marie Chambers (503) 228-8336 or marie@oregonwine.org.

Applicants seeking funding through these commodity board co-funded priorities must provide a letter of co-funding support from the commodity board directly to the NIFA Program Contact within 60 calendar days after the application submission deadline. When seeking a letter of co-funding support, applicants must submit their entire application to the **respective commodity board listed above and request a letter that specifically indicates that the commodity board supports the application for co-funding**. To obtain a letter of co-funding support or for further questions, please contact the respective commodity board representative listed above. Additionally, applicants must state in the last sentence of their application's Project Summary section that the proposal is submitted in response to the specific commodity board topic listed above.

2. Exploratory Research

Background

The Exploratory Research Program Area seeks ideas for research that demonstrate extraordinary novelty with potential to position U.S. agriculture at the global forefront. These ideas will provide quantum leaps in our knowledge and capabilities in agriculture and food production. They will address challenges that have never been addressed before or challenges that have been addressed, but where new and risky ideas could promise high potential impact. This program area provides support for research projects that need to develop proof of concept for untested ideas that will lead to creative and positive disruption of the agricultural norm.

Projects must be potentially transformative and not incremental in nature. Projects must demonstrate the research characteristics described above and not be suitable for submission to other program area priorities under AFRI.

Each application must address one or more of the following:

- Extraordinarily novel or innovative ideas that have high potential impact;
- Application of new knowledge or new approaches to unsolved challenges that may result in dramatic improvements;
- Tools required to have a paradigm shift in the field; or
- Rapid response to natural disasters and unanticipated events affecting agriculture.

Projects that represent incremental advances, modification, or variations on previous research are not appropriate for this program area. Projects that have been previously submitted and reviewed in another NIFA competitive program will not be considered unless the project was identified in a prior review to be suitable for the Exploratory Research Program Area.

The AFRI Exploratory Research Program Area addresses the following priorities of the 2014 Farm Bill: A. Plant health and production and plant products; B. Animal health and production and animal products; C. Food safety, nutrition, and health; D. Bioenergy, natural resources, and environment; E. Agriculture systems and technology; and F. Agriculture economics and rural communities.

Total Program Funds – Approximately \$4 million

Program Area Key Information:

- All applications must adhere to the requirements in Part IV unless specific instructions are given under this program area or by the program area contact.
- Applications from, and collaborations with, minority serving institutions, small to mid-sized institutions, and/or institutions within the EPSCoR states are welcome in this program area.
- Applications that include collaborations with international partners may also be submitted. For information on NIFA partnerships that may be of interest to applicants, see the [AFRI International Partnerships website](#).
- The Project Narrative is limited to a maximum of 7 pages, and must have a clearly articulated and compelling justification for the topical area, and a brief description of methods to be used, anticipated results, next steps, and plans for seeking sustained funding.
- With the exception of the shorter Project Narrative page length, the application must adhere to the grant application requirements set out in this RFA and in the NIFA Grants.gov Application Guide.
- The letter of intent and the application must include a clear description as to why the project is uniquely suited for the Exploratory Research Program Area, and not suitable for other program area priorities under AFRI.
- Resubmission of applications submitted to the Exploratory Research Program Area in previous years will not be accepted.

Program Area Code – Provided upon invitation to submit the grant application after acceptance of the Letter of Intent.

Program Area Code Name – Exploratory Research

Proposed Budget Requests –

- Budgets for Standard and Strengthening Standard Grants must not exceed **\$200,000 total per project (including indirect costs) for project periods of up to two years and are not renewable.**
- FASE Grants must adhere to the guidelines outlined in Part II, C. 2.
- Requests exceeding the budgetary guidelines will not be reviewed.

Requested Project Types- Research Projects only

Requested Grant Types – Standard and FASE (Strengthening Standard) Grants only

Letter of Intent Deadline – Accepted anytime throughout the year; See Part IV, A for instructions.

Program Area e-mail address for Submission of Letter of Intent –

exploratory@nifa.usda.gov

Label the attached Letter of Intent pdf file with the project director's last name. Include the program area priority to which your Letter of Intent is most relevant in the subject line of your email submission (i.e., A. Plant health and production and plant products; B. Animal health and production and animal products; C. Food safety, nutrition, and health; D. Bioenergy, natural resources, and environment; E. Agriculture systems and technology; and F. Agriculture economics and rural communities).

Application Deadline – Submission of a full grant application is dependent on the encouragement to submit a grant application based on assessment of the Letter of Intent and availability of funds. Upon receiving encouragement to submit a full grant application, applicants must submit the full application within 60 calendar days.

Program Area Priority Contacts – Dr. Liang-Shiou Lin (202) 401-5045 or llin@nifa.usda.gov and Dr. Melvin Carter (202) 720-7166 or melvin.carter@nifa.usda.gov

Program Area Priorities –

Applications must be relevant to one or more of the six Farm Bill priorities for AFRI.

Program Area Additional Information:

Review criteria for the Exploratory Research Program Area include (in descending order of emphasis):

- The scientific merit of the proposed activity;
 - Does the project describe a sound scientific approach that can be accomplished by requisite and qualified personnel within two years to address an important agricultural issue?
 - Appropriateness of the proposed research for developing proof-of-concept of new and untested ideas including high risk research that leads to a significant change in the field;
- To what extent is the proposed project innovative and what is the potential for the proposed work to result in quantum leaps in its respective field of agriculture?

- Relevance of the project to sustainable U.S. agriculture, the environment, human health and well-being, and rural communities.
 - Does the project propose to address challenges that have never been addressed before and if so, what is the potential for major advancement?
 - Does the project propose to tackle known challenges in a unique way and if so, what is the potential for major breakthroughs? and
- The applicant's previous experience and background along with the proposed activities.

PART II—AWARD INFORMATION

A. Available Funding

The amount available to support the AFRI program in FY 2018 is approximately \$400 million. NIFA anticipates \$182 million will be available to support program areas in this AFRI RFA.

Of the total amount available to make awards for the AFRI program, no less than 30 percent will be made available to fund integrated research, education, and extension projects. Of the AFRI funds allocated to research activities, no less than 60 percent will be directed toward grants for fundamental (or basic) research and 40 percent toward grants for applied research. Of the AFRI funds allocated to fundamental research, not less than 30 percent will be directed toward research by multidisciplinary teams. It is expected that no less than 15 percent of the FY 2018 funds will be made available for Food and Agricultural Science Enhancement (FASE) Grants, and no more than two percent of the funds available for fundamental research will be made available for Equipment Grants (see Part II, C., for information about FASE and Equipment Grants).

Of the \$182 million available to support the program areas in this RFA, no less than 11.25% will be made available for FASE grant types under the FASE program.

The funds will be awarded through a grant for performance periods of up to five years. NIFA may choose to issue a grant on a continuation basis. A continuation award is an award instrument by which NIFA agrees to support a specified level of effort for a predetermined period of time with a statement of intention to provide additional support at a future date, provided that performance has been satisfactory, appropriations are available for this purpose, and continued support would be in the best interest of the federal government and the public. There is no commitment by 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

In FY 2018, you may submit applications to one of the program areas in this RFA as one of the three types of requests: (1) New Application; (2) Renewal Application; or (3) Resubmitted Application.

- (1) **New application.** This is a project application that has not been previously submitted to NIFA. We will review all new applications to ensure they meet administrative requirements and all applications will be competitively evaluated by a review panel using criteria and selection processes described in Part V—Application Review Requirements.
- (2) **Renewal application.** This is a project application that requests additional funding for a project beyond the period that was approved in an original or amended award.

Applications for renewed funding must contain the same information as required for new applications; they also must contain a Progress Report (see Project Narrative, Part IV). We must receive the renewal applications by the relevant due dates. We will evaluate renewal applications in competition with other pending applications in the program area priority to which they are assigned, and will be reviewed according to the same evaluation criteria (Part V, B.) as new applications. If you are submitting renewal application, enter the NIFA-assigned award number of the previously-funded application in the Federal Identifier (Field 4.a. of the SF 424 (R&R) form).

- (3) **Resubmitted application.** This is an application that was submitted previously to NIFA but not funded. Project Directors (PDs) must respond to the previous review panel summary (see Response to Previous Review, Part IV, C). We must receive resubmitted applications by the relevant due dates. We will evaluate resubmitted applications in competition with other pending applications in the appropriate program priority area to which they are assigned, and review them according to the same evaluation criteria (Part V, B.) as new applications. A renewal application that was submitted previously but not funded and is being resubmitted is also considered as Resubmitted application; however, PDs must include a Progress Report (see 2 above) and a Response to Previous Review. If you are resubmitting an application, enter the NIFA-assigned proposal number of the previously-submitted application in the Federal Identifier (Field 4.a. of the SF 424 (R&R) form).

C. Project Types and Grant Types

1. **Project Types.** Applicants must propose one of the AFRI project types specified within the relevant program area descriptions in Part I, C., of this RFA. Only project types specifically solicited under each program area or program area priority described in Part I, C., of this RFA will be considered for review. A detailed description of the project types available across AFRI is located on the [NIFA website](#).
2. **Grant Types.** Applicants must select the appropriate AFRI grant type specified within the relevant Program Area Descriptions in Part I, C., of this RFA. Only grant types specifically solicited under each program area or program area priority described in Part I, C., of this RFA will be considered for review. A detailed description of the grant types available across AFRI is located on the [NIFA website](#).

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.

PART III—ELIGIBILITY INFORMATION

A. Eligible Applicants

Applications may only be submitted by eligible entities. Eligibility is linked to the project type as specified below.

1. Research, Education or Extension Projects

Eligible applicants for single-function Research, Education or Extension Projects include: a) State Agricultural Experiment Station; b) colleges and universities (including junior colleges offering associate degrees or higher); c) university research foundations; d) other research institutions and organizations; e) Federal agencies, f) national laboratories; g) private organizations or corporations; h) individuals who are U.S. citizens, nationals, or permanent residents; and i) any group consisting of two or more entities identified in a) through h). Eligible institutions do not include foreign and international organizations.

2. Integrated Projects

Eligible applicants for Integrated Projects include: a) Colleges and universities; b) 1994 Land-Grant Institutions; and c) Hispanic-serving agricultural colleges and universities (see <https://nifa.usda.gov/hispanic-serving-agricultural-colleges-and-universities-hsacu>).

For item a) under Integrated Projects, the terms "college" and "university" mean an educational institution in any state which i) admits as regular students only persons having a certificate of graduation from a school providing secondary education, or the recognized equivalent of such a certificate; ii) is legally authorized within such state to provide a program of education beyond secondary education; iii) provides an educational program for which a bachelor's degree or any other higher degree is awarded; iv) is a public or other nonprofit institution; and v) is accredited by a nationally recognized accrediting agency or association. A research foundation maintained by a college or university is eligible to receive an award under this program.

3. Food and Agricultural Science Enhancement Grants

[Part II, C. 2](#), contains the eligibility details for Food and Agricultural Science Enhancement (FASE) Grants. Note that under FASE program, New Investigator, Strengthening Standard, Strengthening Conference, Seed, Equipment and Sabbatical Grants are solicited in this RFA.

Applicants must respond to the program area priorities and deadlines found in Part I, C., of this RFA. Grant recipients may subcontract to organizations not eligible to apply provided such organizations are necessary for the conduct of the project. Failure to meet an eligibility criterion by the application deadline may result in the application being excluded from consideration or, even though an application may be reviewed, will preclude NIFA from making an award (see Part III B).

B. Request for Determination of Status

1. Minority–Serving Institution

If an institution is applying for a Strengthening Grant (see [Part II, C. 2](#)) and wants the Secretary to consider a group, beyond one included in the minority definition (see Part VIII, D.), then documentation (see below) must be submitted as part of the requestor’s Letter of Intent (if required) and the full application package (Part IV, C) by the applicable program area or program area priority deadline. The documentation will be used to verify the institution that meets the enrollment criteria for a minority-serving institution and the Secretary of Agriculture (or designated individual) will use the information to determine whether the group or groups identified are qualified as a minority group for the purpose of receiving a Strengthening Grant under the FASE program (for Strengthening Grants information, refer to <https://nifa.usda.gov/sites/default/files/resource/AFRI-Grant-Types.pdf>).

Documentation must be included in the order specified below:

- a. A description of each minority group being served;
- b. Data or studies supporting this group’s designation as a minority group; and
- c. Data indicating that enrollment of the minority group(s) exceeds 50 percent of the total enrollment at the academic institution, including graduate and undergraduate and full-and part-time students.

2. Multi-Campus Institution

[Table 1](#) is a listing of institutions that are not eligible for any strengthening funds except those institutions located in an Established Program to Stimulate Competitive Research (EPSCoR) State (see Part II, C. 2). If an ineligible institution consists of multiple campuses that are not listed, those individual campuses may request an exemption by providing information on their independent administration or independent accreditation. If an exemption is approved, then the campus is eligible for strengthening funds. To request an exemption, the documentation (see below) must be submitted as part of the Letter of Intent (if required) and the full application package (Part IV, C). The documentation will be used to, for example, verify the campus is administratively independent of the listed institution.

A letter, signed by the Authorized Representative (AR), must be included documenting to support the institution is:

- a. independent of the main campus, either through accreditation or administration and
- b. eligible as a small and mid-sized or minority-serving institution due to enrollment and total federal funds received for science and engineering research and development.

C. Cost Sharing or Matching

If an applied **Research** (see Part VIII, D) or **Integrated Project** with an applied research component, is commodity-specific and not of national scope, the grant recipient is required to match the USDA funds awarded on a dollar-for-dollar basis from non-federal sources with cash and/or in-kind contributions. NIFA may waive the matching funds requirement based on submitted document (see Part IV, C., 6), for a grant if we determine that:

- a. The results of the project, while of particular benefit to a specific agricultural commodity, are likely to be applicable to agricultural commodities generally; or
- b. The project involves a minor commodity, the project deals with scientifically important research, and the grant recipient is unable to satisfy the matching funds requirement.

For Equipment Grants: The amount of Federal funds provided may not exceed 50 percent of the cost of the equipment acquired using funds from the grant, or \$50,000, whichever is less. Grantees are required to match 100 percent of Federal funds awarded from non-Federal sources. NIFA may waive all or part of the matching requirement if all three of the following criteria are met: 1) application is from a college, university, or research foundation maintained by a college or university that ranks in the lowest one third of such colleges, universities, and research foundations on the basis of Federal research funds received (see [Table 2](#), following Part VIII, for eligibility); 2) the equipment to be acquired costs not more than \$25,000; and 3) the equipment has multiple uses within a single research project or is usable in more than one research project. To be considered for this waiver, the budget justification (see Part IV, C., 6) must include a letter signed by the institution's AR addressing the noted criteria.

D. Center of Excellence

Pursuant to Section 7214 of the Agricultural Act of 2014 (Pub. L. 113-79), NIFA will recognize and provide priority in the receipt of funding to applications from "centers of excellence" that carry out research, extension, and education activities that relate to the food and agricultural sciences. NIFA held listening sessions in July 2014 and accepted written comments from stakeholders to inform NIFA's implementation of the COE provision. Information from the webinars and a summary of the input are available on NIFA's website at <http://nifa.usda.gov/centers-excellence>.

A COE is composed of one or more of the following entities that provide financial or in-kind support to the COE.

- (1) State agricultural experiment stations;
- (2) Colleges and universities;
- (3) University research foundations;
- (4) Other research institutions and organizations;
- (5) Federal agencies;
- (6) National laboratories;
- (7) Private organizations, foundations, or corporations;
- (8) Individuals; or
- (9) Any group consisting of two or more of the entities described in (1) through (8).

COE designation is available only for the **standard grant** and the **Coordinated Agricultural Project (CAP) grant** applications submitted to the program areas or program area priorities in the Foundational and Applied Science, and Sustainable Agricultural Systems RFAs. If applicable, Part IV, C., of the RFA contains additional requirements for COE consideration. Note that CAP grants are not solicited in this RFA.

PART IV—APPLICATION AND SUBMISSION INFORMATION

A. Letter of Intent

If a program area or program area priority within this RFA requires a Letter of Intent (LOI), then a LOI is a prerequisite for submission of an application. Refer to the Program Area Descriptions beginning in Part I, C for LOI deadlines for a specific program area or program area priority. For detailed guidance on LOI submission, see [LOI Instructions](#).

B. 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 AR 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 two 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-AFRI-006609

Click “Search”. On the displayed page, click the corresponding link to continue. 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 (<https://www.grants.gov/web/grants/applicants.html>). Grants.gov assistance is also available at:

Grants.gov customer support (<https://www.grants.gov/web/grants/support.html>)
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 7:00 a.m. – 9:00 p.m. Eastern Time).

Have the following information available when contacting Grants.gov:

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

C. Content and Form of Application Submission

Application and submission information for AFRI Foundational and Applied Science RFA applications are available as a separate document on the [NIFA website](#).

D. Submission Dates and Times

1. Letter of Intent

The Letter of intent if applicable, must be received at NIFA by **5:00 p.m. Eastern Time on the dates indicated in the Program Area Descriptions beginning in Part I, C.**, and in the format specified in Part IV, A. The LOI (if applicable) is a prerequisite for the submission of a full application.

2. Full Application

Applications must be received by Grants.gov by **5:00 p.m. Eastern Time on the dates indicated in the Program Area Descriptions beginning in Part I, C.**

Applications received after this deadline will normally not be considered for funding.

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.

An application checklist is included in Part VII of the NIFA Grants.gov Application Guide to assist with this review.

You should check the application for completeness. The application should be checked for the following required items, which must include:

- Project Summary/Abstract
- Project Narrative
- Bibliography & References Cited
- Logic Model for Integrated Program
- Management Plan for Integrated Program
- Data Management Plan
- Facilities & Other Resources
- Curriculum Vitae
- Conflict of Interest Lists
- Current and pending support
- Budget
- Budget Justification
- Felony and Tax Certification Form

This is not an exhaustive list of required items; it only serves to highlight items that may be overlooked. **Failure to include any of the three critical required documents of Project Summary/Abstract, Project Narrative, or Bibliography & References Cited sections as PDF attachment will result in the application not being reviewed or considered for funding by NIFA.**

Instructions for submitting an application are included in Part IV, Section 1.5 of the NIFA Grants.gov Application Guide.

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.

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 proposal 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 a proposal number, you should cite this number on all future correspondence.**

E. Funding Restrictions

Section 713 of the Consolidated Appropriations Act, 2018 (Pub. L. 115-141) limits indirect costs to 30 percent of the total federal funds provided (or 42.857 percent of total direct costs) under each award. When preparing budgets, you should limit your request for the recovery of indirect costs to the lesser of your institution's official negotiated indirect cost rate or the equivalent of 30 percent of total Federal funds awarded. See Part V section 7.9 of the NIFA Grants.gov Application Guide for further indirect cost information.

You may not use grant funds awarded under this authority to renovate or refurbish research, education, or extension space; purchase or install fixed equipment in such place; or the plan, repair, rehabilitate, acquire, or construction of buildings or facilities.

F. Other Submission Requirements

You should follow the submission requirements noted in Part IV, Section 1.5 in the document entitled "NIFA Grants.gov Application Guide."

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

Multiple submissions

In accordance with Part III, Section 5 of NIFA Grants.gov Application Guide, duplicate, essentially duplicate or predominantly overlapping applications submitted to one or more program areas within the AFRI (including FASE Grants) in any one fiscal year will not be reviewed. In addition, applicants may not submit to AFRI an application that is considered duplicate, essentially duplicate, or predominantly overlapping with an application submitted to another NIFA program in the same fiscal year.

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 scientific peer-review process will be used to technically evaluate applications that meet the administrative requirements using a review panel.

Scientific Peer Review Process:

Reviewers will be selected for the review panel based upon their training and experience in relevant scientific, extension, or education fields, taking into account the following factors:

- the level of relevant formal scientific, technical education, or extension experience of the individual, as well as the extent to which an individual is engaged in relevant research, education, or extension activities;
- the need to include experts from various areas of specialization within relevant scientific, education, or extension fields;
- the need to include 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 producers and the general public.

After each peer review panel has completed its deliberations, the responsible program staff will recommend that your project is either approved for support from currently available funds or declined due to insufficient funds or unfavorable review.

NIFA reserves the right to negotiate with the PD/PI and/or 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 AFRI project for funding.

We will send copies of reviews, *not* including the identity of reviewers, and a summary (if applicable) of the review panel comments to the PD after the review process has been completed.

B. Evaluation Criteria

Detailed evaluation criteria for each project types, grant types, exploratory research projects and center of excellence are outlined in the [AFRI-Evaluation Criteria](#). We will use the appropriate evaluation criteria to review applications submitted in response to this RFA.

C. Conflicts of Interest and 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. 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).

E. 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 the agency 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>.

D. Responsible and Ethical Conduct of Research

Refer to Part II, D for more information.

E. 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, they will be identified in the award.

PART VII—AGENCY CONTACTS

For general questions related to the AFRI Programs, applicants and other interested parties are encouraged to contact:

AFRI Program Office:

Dr. Parag Chitnis, Deputy Director, Institute of Food Production and Sustainability
 Vacant, Deputy Director, Institute of Food Safety and Nutrition

Dr. Muquarrab Qureshi, Deputy Director, Institute of Youth, Family, and Community

Dr. Louis Tupas, Deputy Director, Institute of Bioenergy, Climate, and Environment

Telephone: (202) 401-5022

Fax: (202) 401-6488

E-mail: AFRI@nifa.usda.gov

Specific questions pertaining to technical matters may be directed to the appropriate Program Area Priority Contacts:

Program Area	Program Area Contact
Plant Health and Production and Plant Products	Rubella Goswami (202) 401-0628; rubella.goswami@nifa.usda.gov Peter Johnson (202) 401-1896; pjohnson@nifa.usda.gov Ed Kaleikau (202) 401-1931; ekaleikau@nifa.usda.gov Shing Kwok (202) 401-6060; skwok@nifa.usda.gov Ann Lichens-Park (202) 401-6460; apark@nifa.usda.gov Rachel Melnick (202) 401-4980; rmelnick@nifa.usda.gov Liang-Shiou Lin (202) 401-5045; lin@nifa.usda.gov Mathieu Ngouajio (202) 401-4895; mngouajio@nifa.usda.gov Robert Nowierski (202) 401-4900; rnowierski@nifa.usda.gov Mary Purcell-Miramontes (202) 401-5168; mpurcell@nifa.usda.gov
Animal Health and Production and Animal Products	Margo Holland (202) 401-5044; mholland@nifa.usda.gov Peter Johnson (202) 401-1896; pjohnson@nifa.usda.gov Lakshmi Kumar Matukumalli (202) 401-1766; lmatumkumalli@nifa.usda.gov Mark Mirando (202) 401-4336; mmirando@nifa.usda.gov Steven Smith (202) 401-6134; sismith@nifa.usda.gov
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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

This program is not subject to the provisions 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](#), for applicable definitions for this NIFA grant program.

For the purpose of this program, the following additional definitions are applicable:

Applied Research means research that includes expansion of the findings of fundamental research to uncover practical ways in which new knowledge can be advanced to benefit individuals and society.

Food and Agricultural Science Enhancement (FASE) Grants mean funding awarded to eligible applicants to strengthen science capabilities of Project Directors, to help institutions develop competitive scientific programs, and to attract new scientists into careers in high-priority areas of National need in agriculture, food, and environmental sciences. FASE awards may apply to any of the three agricultural knowledge components (i.e., research, education, and extension). FASE awards include Pre- and Postdoctoral Fellowships, New Investigator grants, and Strengthening grants.

Limited institutional success means institutions that are not among the most successful universities and colleges for receiving Federal funds for science and engineering research. A list of successful institutions will be provided in the RFA.

Minority-serving institution means an accredited academic institution whose enrollment of a single minority or a combination of minorities exceeds fifty percent of the total enrollment, including graduate and undergraduate and full- and part-time students. An institution in this instance is an organization that is independently accredited as determined by reference to the current version of the *Higher Education Directory*, published by Higher Education Publications, Inc., 6400 Arlington Boulevard, Suite 648, Falls Church, Virginia 22042 (703-532-2300).

Minority means Alaskan Native, American Indian, Asian-American, African-American, Hispanic American, Native Hawaiian, or Pacific Islander. The Secretary will determine on a

case-by-case basis whether additional groups qualify under this definition, either at the Secretary's initiative, or in response to a written request with supporting explanation.

Multidisciplinary project means a project on which investigators from two or more disciplines collaborate to address a common problem. These collaborations, where appropriate, may integrate the biological, physical, chemical, or social sciences.

Small and mid-sized institutions are academic institutions with a current total enrollment of 17,500 or less including graduate and undergraduate and full- and part-time students. An institution, in this instance, is an organization that possesses a significant degree of autonomy. Significant degree of autonomy is defined by being independently accredited as determined by reference to the current version of the *Higher Education Directory*, published by Higher Education Publications, Inc., 6400 Arlington Boulevard, Suite 648, Falls Church, Virginia 22042 (703-532-2300).

Strengthening Grants mean funds awarded to institutions eligible for FASE Grants to enhance institutional capacity, with the goal of leading to future funding in the project area, as well as strengthening the competitiveness of the investigator's research, education, and/or extension activities. Strengthening grants consist of Standard, Coordinated Agricultural Project and Conference Grant types as well as Seed Grants, Equipment Grants, and Sabbatical Grants.

Transdisciplinary Team is composed of investigators from multiple disciplines that cross boundaries using holistic approaches to address complex challenges that cannot be solved using single-disciplinary approaches.

USDA EPSCoR States (Established Program to Stimulate Competitive Research, formerly Experimental Program to Stimulate Competitive Research) mean States which have been less successful in receiving funding from AFRI, having a funding level no higher than the 38th percentile of all States based on a 3-year average of AFRI funding levels, excluding FASE Strengthening funds granted to state agricultural experiment stations and degree-granting institutions in EPSCoR States and small, mid-sized, and minority-serving degree-granting institutions. The most recent list of USDA EPSCoR States is provided at <https://nifa.usda.gov/sites/default/files/resource/AFRI-Grant-Types.pdf>.

E. Materials Available on the Internet

AFRI program information will be made available on the NIFA website at www.nifa.usda.gov/funding/afri/afri.html. The following are among the materials available on the NIFA website:

1. Stakeholder Input
2. Requests for Applications
3. AFRI Abstracts of Funded Projects
4. AFRI Annual Synopsis
5. Frequently Asked Questions
6. Interagency Programs

TABLE 1. Most Successful Universities and Colleges

Any institution listed in [Table 1](#) is not eligible for Strengthening Grants from the FASE program unless they are located in an EPSCoR state.

TABLE 2. Lowest One Third of Universities and Colleges Receiving Federal Funds

The [lowest one third of universities and colleges receiving Federal funds](#) used to determine eligibility for possible waiver of matching funds requirement for Equipment Grants.

FIGURE 1. Flow Chart for Strengthening Grant Eligibility

The [flow chart](#) will help to determine your eligibility to apply for strengthening grants.