Dear All -

We are writing to share a significant funding opportunity with awards ranging from $650,000 to $800,000 in funding through the USDA's Agriculture and Food Research Initiative (AFRI). This award would fund and/or expand a number of existing Annandale-based initiatives and opens avenues for global collaboration. Based on existing work at Bard and areas of curricular/research interest, we have summarized the relevant program areas within this extensive announcement to facilitate the process of identifying potential opportunities for funding your work. We are sharing this widely due to the breadth of program areas and cross-cutting nature of the offerings.

We are sensitive to the many demands and challenges across the College as we persist during this pandemic. If anything described below resonates, please reach out for discussion as our office is prepared to offer substantial support throughout the planning, writing and submission process.

Funding areas include but are not limited to: soil health; water quality; small-scale agriculture, including research and education, the impacts of COVID-19 on community food systems, and regional food systems; improving 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. This RFA will give priority to projects that focus on the impacts of COVID-19 on rural youth, families, communities and entrepreneurs; and food security, among others.

In addition, there are several cross-cutting program areas that encourage interdisciplinary collaboration. Those include: Agricultural Microbiomes in Plant Systems and Natural Resources; Critical Agricultural Research and Extension (CARE) involving 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; and Data Science for Food and Agricultural Systems (DSFAS) that 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.

Deadlines and award amounts vary, but are generally June 2021 in amounts that average $650-800,000.

Next Steps:
Please review the attached summary and RFP for more information. Given the timeframe, our office can work with you to manage the process over the next 10 months to minimize the work involved in preparing an application and optimize opportunities for success.

Please reach out to me directly by email or phone with any questions at 845-758-7260 or jbardfield@bard.edu

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Summary of Award

**Agriculture and Food Research Initiative (AFRI) Competitive Grants Program**
**Foundational and Applied Science Program**

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 including:

- farm efficiency, profitability and sustainability;
- bioenergy;
- rural communities and entrepreneurship;
- human nutrition;
- mitigating impacts of biotic and abiotic constraints on food production;
- mitigating food waste and food loss;
- physical and social sciences;
- biotechnology

Through this support, AFRI advances knowledge in both fundamental and applied sciences important to agriculture. Funding this work also allows AFRI to support education and extension activities that deliver science-based knowledge to end users, allowing them to make informed, practical decisions.

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. 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, applicants to this RFA may include collaborations with international partners. However, only eligible U.S. institutions may apply. Such applications may include subawards to international partners or other institutions and must clearly demonstrate benefits to the U.S.

**Food Safety Nutrition and Health (beginning on page 30)**

**d. Food and Human Health**
**Program Area Priority Code:** A1343
**Proposed Budget Requests:**
• ̲Budgets for Standard Grants, Strengthening Standard Grants, and New Investigator Grants must not exceed **$650,000** total per project (including indirect costs) for project periods of three to five years. See "Program Area Priority Additional Information" for opportunity to request **$800,000** for applications that include specific types of partnerships for this priority only.
• ̲Conference and FASE Grants must adhere to the guidelines outlined in Part II, C(2) of this RFA.
• ̲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:** required only for Conference Grant applications. The LOI must be submitted a minimum of 195 days before the conference begins.
**Application Deadlines:**
• _**2021:** Thursday, June 10, 2021 (5:00 p.m. Eastern Time)

**Program Area Priority:**
NIFA requests proposals that investigates the nutrients and contaminants in food and their impact on the gut microbiota in an effort to improve human health.
Applicants must address at least one of the following:
• _Enhance the nutritional value of foods through improved bioavailability of vitamins, minerals, and bioactive components and improved absorption of vitamins, minerals, and bioactive components including nanoscale delivery;
• _Investigate the multi-directional impact of food composition and structure (including micro- and nano-structures) on human gut health (i.e., nutrient absorption rates, secondary metabolites, pathogen interaction, physiological indications, sensory signaling, etc.) to assess the safety, quality, and nutritional value of foods; and/or
• _Investigate the role of the food components or contaminants on the human gut microbiome and its metabolites, and the subsequent impact on human health.

**Bioenergy, Natural Resources, and Environment (beginning on page 37)**

**a. Soil Health (p39)**

**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 three to four years.
• _Conference and FASE Grants must adhere to the guidelines outlined in Part II, C(2) of this RFA.
• _Requests exceeding budgetary guidelines will not be reviewed.

**Requested Project Types:** Research Projects only

**Application Deadline:**
• _**2021:** Thursday, June 10, 2021 (5:00 p.m. Eastern Time)

**Program Area Priority:**
Healthy soils function as a living system and sustain plant and animal productivity while maintaining or enhancing water and air quality and promoting plant, animal and human health. Soils are the foundation of a healthy ecosystem and, hence, it is imperative to improve our understanding of the physical and biogeochemical interactions and processes within and between the soil and the environment. This will lead to the development of tools, practices, techniques and/or innovations for improving soil health and the resilience and sustainability of agricultural production systems and ecosystem services. Practices include soil-based enhancement of nutrient and water efficiencies, reduced inputs, and a reduction in chemicals of environmental concern. The goal of the Soil Health program area priority is to support research projects that will contribute to:

a) foundational and applied research to advance scientific understanding of soil physical and biogeochemical processes and interactions;

b) the assessment, development and adoption of models, decision support tools and new management/conservation practices and/or processes that will lead to improving or maintaining soil health and productivity while maintaining or improving environmental health and sustainability of our natural resource base;

c) a focus on the interactions between the social and human dimensions with environmental and economic dimensions is encouraged. Proposed projects that are primarily fundamental science must explain how a better understanding of the fundamental processes will lead to strategies to improve overall soil health and the resilience and sustainability of agricultural production systems and ecosystem services.

Applications may address one or more of the following:
• _Evaluation of the effects of management practices on soil microbial community's function and their contribution to healthy soils and sustainable agroecosystems; or
• _Assessment and/or development of innovative and/or appropriate (in the environmental, cultural and economic context) approaches, practices, techniques, tools and technologies that enhance the understanding and/or management of the physical and biogeochemical processes that contribute to soil health and agricultural resilience and sustainability.

## b. Water Quantity and Quality (p41)

**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 three to four years.
• _Conference and FASE Grants must adhere to the guidelines outlined in Part II, C(2) of this RFA.
• _Requests exceeding budgetary guidelines will not be reviewed.

**Requested Project Types:** Research Projects only

**Application Deadlines:**
• _**2021:** Thursday, June 10, 2021 (5:00 p.m. Eastern Time)

**Program Area Priority:**
The U.S. is committed to the proper management of agricultural practices and improved efficiency of agricultural water use to protect water quality and increase water and food security (U.S. Global Water Strategy, 2017). USDA-NIFA will provide competitive support to improve water science, management and technologies, water conservation and water use efficiency; promote common data exchange formats and access to data for decision-making, improve forecasting and model water related systems. Practically, USDA-NIFA seeks applications to:

1) reduce the freshwater demand (both groundwater and surface water) for irrigation and the nutrient demand for maximum crop production by substituting the use of other technologies, management practices and/or other water sources (recycled wastewater, brackish groundwater, agricultural return flow and produced water from industry) while retaining appropriate soil health (managed salinity, adequate infiltration) and eliminating accelerated erosion from farm fields and

2) improve nutrient management and reduce nutrient load to surface or groundwater.

Applications **MUST** address at least one of the following:

• _Reduction of the use of freshwater and improve agricultural resilience/sustainability by innovative approaches, tools and technologies.

• _Evaluation of the physical and biogeochemical interactions, fluxes, fate and transport, transformation, and storage of single or multiple nutrients, pathogens or chemicals of environmental concern (CEC) of a variety of sources as it relates to agroecosystem productivity and on associated natural resources and environment. Applications to this priority should include: 1) Predictive and/or hindcasting tools to assess control technologies to mitigate excess nutrient, pathogens, and/or CEC movement; or 2) Improve process-based models to analyze nutrient, and/or CEC life cycles in agroecosystems, rangelands, grasslands and forests.

• _Mitigation of soil salinity from the use of lower quality water sources in agriculture through: 1) The application of novel technologies involving plants, animals, soil and/or water; and 2) Improve our knowledge of the benefits and costs of treating water sources for irrigation of crops and other water uses in agriculture.

• _Conservation of surface and groundwater quantity through research of agroecosystems. How do we ensure the right crop in the right place with the right water (e.g., availability of nontraditional water sources)? What are the key farming decisions that improve water use under irrigation (e.g., whole farm multipliers, legacy effects and providing a step-change in farm management that manages variable climate risks)?

• _Mitigation and/or measurement of soil erodibility and erosion to sustain agroecosystems. Given the demand for greater agricultural production to 2050 coupled with a reduced water footprint, what are the key elements to conserve our natural resource base while farming more marginal landscapes?

**Agriculture Economics and Rural Communities (p51)**

**a. Small and Medium-Sized Farms  (p52)**
**Program Area Priority Code:** A1601
• _Standard Grants, Strengthening Standard Grants and New Investigator Grants must not exceed **$650,000** total per project (including indirect costs) for project periods of three to five years.

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

**Application Deadlines:**
• _**2021:** Thursday, June 24, 2021 (5:00 p.m. Eastern Time)

**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 scope of this program area priority includes, but is not limited to projects that:
• _Advance the production, profitability and post-harvest handling of specialty crops including high value-niche market crops such as hemp (if approved in your state), medicinal, aromatic, and essential oils.

• _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.
• _Examine the impacts of COVID-19 on small farm profitability, especially related to new costs related to direct delivery models, new markets and changing demand.
• _Identify and develop affordable small farm appropriate digital agriculture tools that improve production, labor management and farm profitability.
• _Outreach efforts that create opportunities for entry and farm viability for young, beginning, socially-disadvantaged, veteran, or immigrant farmers and ranchers. Such efforts should address issues such as farm succession, transition, entry, and profitability through tools that ensure that the next generation of small and medium-sized farmers 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, including issues related to heir property, 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. Such efforts could also include direct to consumer markets.
• _Develop effective strategies and tools to assist small and medium-sized forest/woodland owners in managing and sustaining their timberland.
• _Research and develop effective strategies and tools to assist small and medium-sized farmers in making decisions about participating in livestock or crop production contracts.
• _Research and develop effective strategies to aid in the development of efficient local and regional food systems.
• _Evaluate and implement strategies to enhance access to markets by small and medium-sized farms.
• _Research and outreach efforts that develop new tools to ensure that the next generation of small and medium-sized farmers have access to the information and resources they need to operate their farms on a sustainable and profitable basis.
• _Examine the challenges of small and medium-sized farms to increase profitability, sustain farming as a livelihood, and transition to the next generation. Efforts could address issues such as production diversification and sustainability; barriers to markets and effects of social media; farmer savings behavior, financial decision-making and retirement; farm family resource allocation; and intrafamily succession.

### d. Rural Economic Development (p57)
• _Standard Grants, Strengthening Standard Grants and New Investigator Grants must not exceed **$650,000** total per project (including indirect costs) for project periods of three to five years.

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

**Application Deadlines:**
• _**2021:** Thursday, June 17, 2021 (5:00 p.m. Eastern Time)

**Program Area Priority:**
This program area priority supports rigorous theoretical and empirical efforts to create and examine innovative approaches for advancing economic opportunities for rural entrepreneurs and communities, with an aim to promote rural prosperity and well-being. The intent of the program area priority is 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. This RFA will give priority to projects that focus on the impacts of COVID-19 on rural youth, families, communities and entrepreneurs.

Projects can be either integrated (to include extension and/or education, along with research) 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. This program area priority focuses mainly on entrepreneurs, small businesses, and other local-level employers and services who are important sources of employment, and/or on other issues "beyond the farm gate."

The emphasis of this program area priority includes, but are not limited to:
• _Examine the impacts of COVID-19 on household and community food security.
• _Explore place-making assets, including cultural amenities, performing arts and the aesthetic character of rural communities, and their importance and impacts on rural livability, new resident attraction and retention, and economic development and prosperity.
• _Identify strategies for economic growth in regions of persistent extreme poverty that can directly or indirectly impact public-health crises including COVID-19, opioid abuse and suicide.
• _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 how broadband availability can directly or indirectly impact public-health crises including COVID-19, opioid abuse and suicide.

**Crosscutting Programs (p59)**

**Background**
Crosscutting programs address two or more of the following six priority areas:
• _Plant health and production and plant products;
• _Animal health and production and animal products;
• _Food safety, nutrition, and health;
• _Bioenergy, natural resources, and environment;
• _Agriculture systems and technology; and
• _Agriculture economics and rural communities.

**Program Area Priorities** – Each application must address at least one of the six program area priorities listed below. Details about each of the Crosscutting program area priorities are provided later in this section.
a. Agricultural Microbiomes in Plant Systems and Natural Resources
b. Critical Agricultural Research and Extension (CARE)
c. Data Science for Food and Agriculture Systems (DSFAS)
d. Inter-Disciplinary Engagement in Animal Systems (IDEAS)
e. Tactical Sciences for Agricultural Biosecurity

**a. Agricultural Microbiomes in Plant Systems and Natural Resources**

**Proposed Budget Requests:**
• _Budgets for Standard Grants, Strengthening Standard Grants, and New Investigator Grants must not exceed **$850,000** total per project (including indirect costs) for project periods of up to five years.
**Requested Project Types:** Research Projects only

**Application Deadline:**
• _**2021:** Thursday, July 15, 2021 (5:00 p.m. Eastern Time)

**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 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 of agriculture and food systems. Understanding the multipartite interactions among the host, environment, and the microbiome is critical for improving and sustaining agricultural productivity and quality in plant systems, associated natural resources, human nutrition and health. Plant productivity includes biotic factors affecting plant health such as either pests, diseases or vectors as well as abiotic factors (water, soil health). 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 crosscutting projects. Projects focusing on microbiomes associated with livestock, aquacultured animal species, or any animals other than vectors (e.g., insect or nematode) of plant-associated microbes are beyond the scope of this program area priority. Also, beyond the scope of this program are studies that do not have a strong focus on the **community of microorganisms** associated with the plant, such as studies of interactions between a single microbial species and its plant host. 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. Development of tools to expand the use of gene editing in agriculturally relevant microbes is encouraged.

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.
• _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).
• _Define genomic elements that shape functional diversity, virulence and resistance to sanitation and/or antimicrobial treatment of foodborne pathogens associated with plant foods

**Program Area Priority Additional Information:**
Projects focusing on microbiomes associated with livestock or aquacultured food-fish should be submitted to the most relevant program area priority within the Animal Health and Production and Animal Products program area in this RFA.

**b. Critical Agricultural Research and Extension (CARE)**

**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 one to three years and are not renewable.

**Requested Project Types:** Integrated (research and extension) Projects only

**Application Deadline:**
• _**2021:** Thursday, June 17, 2021 (5:00 p.m. Eastern Time)

**Program Area Priority:**
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.

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 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 priorities for AFRI**:**
**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.

## c. Data Science for Food and Agricultural Systems (DSFAS)

**Proposed Budget Requests:**
• _Budgets for Standard Grants, Strengthening Standard Grants, and New Investigator Grants must not exceed **$650,000** total per project (including indirect costs) for project periods of three to five 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.

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

**Application Deadlines:**
• _**2021:** Thursday, July 29, 2021 (5:00 p.m. Eastern Time)

**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.
Many challenges are associated with data in agriculture and food production and processing systems. NIFA stakeholders identified at least a dozen issues that are critical to address including: 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; roles of public, corporate, and commercial entities 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.

This program area priority will support projects that examine the value of data for small and large farmers, as well as the agricultural and food industries, and gain an understanding of how data can impact the agricultural and food 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. The most competitive proposals will be equally well grounded in agricultural science and data science.
Applications for research and integrated research projects must address one or more of the following data science priorities in relation to food and agricultural systems:

- _Analysis of Agricultural Data o Develop data-integration and data-quality algorithms and tools to improve analytic capability.

o Design, validate and implement new algorithms and methods for depicting and leveraging massive data.

- _Connect Multi-scale, Multi-domain or Multi-format Agricultural Data o Bridge real-time distributed and parallel data systems;

o Create new methodologies and frameworks for tracking and processing data; and/or

o Identify new approaches to data archiving and sharing that support Findable, Accessible, Interoperable, and Re-usable (FAIR) standards.

- _Agricultural Applications and Human-Technology-Data Interactions

o Examine new 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;

o Integrate visualization with statistical methods and other analytic techniques in order to support discovery and analysis;

o Engage students and professionals, teams, universities, and the public and private sectors; and /or

o Develop decision-support tools that use diverse data sources and Big Data analytics modeling of short-term impacts of various factors to create best value to the U. S. agricultural enterprise.

Within the project description, all applications must include a sustainability plan explaining how project products and services will be accessible during and after the funding period. Projects that include development of tools and platforms are strongly encouraged to provide a detailed software development plan and build upon existing tools and platforms such as R/Python and the national cyberinfrastructure (e.g. XSEDE, Science Gateways). Proposals that include development of tools and platforms should include details of software development practices such as testing and validation plans, and plans for governance, development and support of user and developer communities. Implementation of innovative and effective methods for participation of stakeholders in tools and platform development priority-setting and testing is strongly encouraged.