



NIFA Updates NPGCC June 1, 2017

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USDA NIFA

Fiscal Year 2017



- Congress increased the appropriation for several competitive programs above the 2016 levels
 - Agriculture and Food Research Initiative - \$375M (+\$25M)
 - SARE – \$27M (+\$2.3M)
 - Potato Research - \$2.25M (+\$250K)
 - Alfalfa and Forage Research - \$2.25M (+\$250K)
 - Crop Protection/Pest Management - \$20M (+\$2.8M)

Opportunities through IBCE



- Agriculture and Food Research Initiative
 - Foundational Bioenergy, Natural Resources, and Environment (BNRE)
 - Resilient Agroecosystems in a Change Climate Challenge Area
 - Sustainable Bioenergy and Bioproducts Challenge Area
 - Water for Food Production Systems Challenge Area
- Biomass Research and Development Initiative
- Hatch
- McIntire-Stennis
- Small Business Innovation Research

Capacity

- Hatch
 - Many projects annually (+100) that include breeding as part of the Climate Change cross cuts. Projects focus on heat stress, drought, cold tolerance, etc.
 - This is a significant contribution to the Agroclimatology Portfolio.

- McIntire-Stennis: State forestry research

- *Sustainable Agroecosystems: Functions, Processes and Management A1401*
- Standard grants to support research projects of \$500K for up to 5 years.
 - Nutrient Cycles and Management
 - Soil Health and Microbial Communities
 - Bioenergy and Multifunctional Landscapes

Due: July 21, 2017

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- *Networks for Synthesis, Data Sharing and Management A1411*
- Standard grants to support research projects of \$450K for up to 5 years.
- Project that emphasis networking and data sharing management in reactive nitrogen OR soil health and microbiomes
 - Synthesis work should be through coordinating networking activities in the context of sustainable crop, livestock, or forest productivity

Due: July 21, 2017

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AFRI Resilient Agroecosystems in a Change Climate Challenge Area



- *Climate, Land Use, and Land Management A3171*
- Standard grants to support integrated projects of \$1.2M for up to 5 years.
 - Impacts of climate variability on the bio-physical and biogeochemical components of food and/or fiber systems
 - Potential adaptation and mitigation strategies that can make food and/or fiber production more resilient and sustainable
 - Drivers, effects, vulnerabilities, or resiliencies of the socio-economic system relative to sustainability of agricultural production in the context of climate variability

Due: July 13, 2017

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AFRI Sustainable Bioenergy and Bioproducts Challenge Area



- Biomass Feedstock Genetic Development and Evaluation A6152
- Standard grants to support integrated projects of \$1.0M for up to 5 years.
 - Support long-term plant breeding and evaluation for biomass feedstock crop development
 - Does not set parameters on how to define a feedstock
 - Must leverage existing public plant breeding infrastructure

Due: June 28, 2107

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AFRI Water for Food Production Systems Challenge Area



- CAP grants to support integrated projects of \$5.2M for up to 5 years to support a systems approach
 - Use of transformative discoveries such as classical/conventional breeding as well as genomics, nanotechnology, sensors, modeling, microbiome manipulation, and data driven decision tools to develop drought- and flood-tolerant cultivars, intensify food production, improve crop and livestock health, or reduce overall water use across food production systems

LOI Due: May 17, 2107

Due: August 2, 2107

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Biomass Research and Development Initiative

- Joint with DOE. Will be released soon.
- Development of technologies and processes necessary for abundant commercial production of biofuels at prices competitive with fossil fuels
- Feedstock development
- Biofuels and biobased product development

Due: TBD

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Small Business Innovation Research

- NIFA manages the program for the entire USDA
- For small businesses, but they are encouraged to include faculty members, ARS and FS scientists, etc. as consultant or coPI as part of a subaward
- Two steps: Phase I followed by Phase II
- Several relevant program areas
 - Forests and Related Resources
 - Plant Production and Protection – Biology
 - Plant Production and Protection – Engineering
 - Biofuels and Biobased Products

Due: Completed for 2017. Phase I will be due first week of October for 2018

<https://nifa.usda.gov/sbir>

Agricultural and Food Research Initiative (AFRI)

FY2016 funding opportunities

- Foundational: Plant Breeding for Agricultural Production*
- Food Security: Phenomics and Breeding (food crops and animal)
- **IWYP: NIFA-International Wheat Yield Partnership**
- ELI: Education and Literacy Initiative, Fellowships*
- Interagency programs:
 - **Early Concept Grants for Exploratory Research EAGER (with NSF)**
 - Plant Feedstock Genomics for Bioenergy (with DOE)*

FY2017*

- Challenge Area: Water for Food Production Systems*
- Foundational: Social Implications of Emerging Technologies*
- FACT: Food and Agriculture Cyberinformatics and Tools Initiative - conference grants, foundational and challenge areas*

AFRI Plant Breeding for Agricultural Production, FY2016

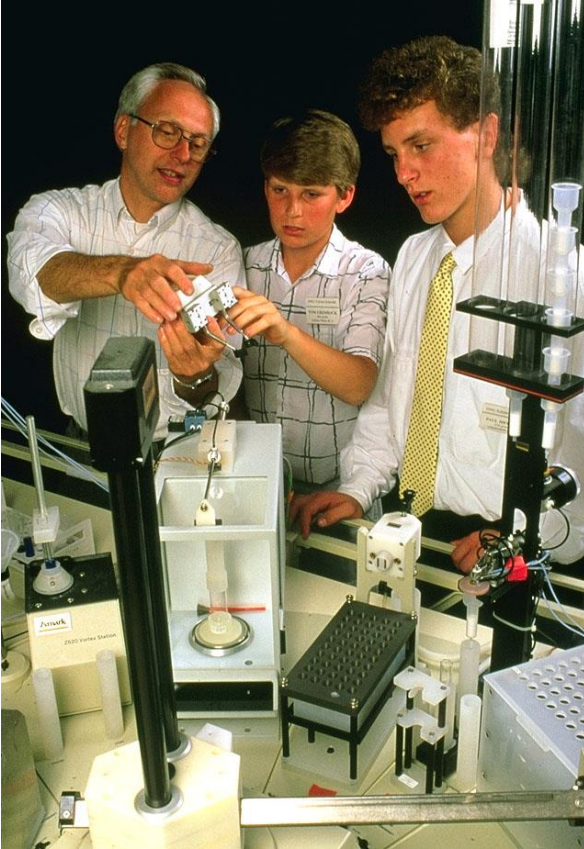
- Research:
 - Pre-breeding and germplasm enhancement;
 - Cultivar development;
 - Selection theory;
 - Applied quantitative genetics; and/or
 - Participatory breeding;
- Commodity Board Topic (1:1 match):
 - Breeding for genetic resistance to wheat viruses
 - Environmental influence on phenomics in corn improvement and production
 - FY2017: National Peanut Board - Develop and implement genetic and genomic tools to breed for improvements in aflatoxin resistance, disease resistance, size and shape, flavor, nutrient content, or drought tolerance, etc.
- Conference Grants:
 - (i) Public-private collaboration in plant breeding; (i) plant breeding research and education to provide graduate student interaction with geneticists, breeders etc, and promote careers in plant breeding, genetics and genomics.

- **Breeding and Phenomics of Food Crops and Animals**
 - Tools and methods for high-throughput phenotyping
 - Predictive phenotyping for new and improved plant cultivars or animal breeds
 - Predictive modeling for precision plant and/or animal breeding
 - Informatics tools - software interfaces, bioinformatics pipelines, and quantitative genetic analysis methods for breeding
 - [Commodity Board Topic \(1:1 match\): Novel pre-breeding applications for quality enhancement in hard red winter wheat](#)
- **Research Coordination Networks**
 - Outline a vision and process for conducting a series of workshops, networking events, and breakout sessions to address barriers associated with the development of high-throughput phenotyping for the plant or animal communities.

Breakthroughs for wheat breeding using new technologies and also discoveries that lead to significantly greater yield

- Deployment of genome editing technologies to create novel variation
- Enhancing photosynthesis leading to high impact changes in the deposition of carbon compounds during plant development.
- High throughput production of double haploids from all wheat genotypes.
- Development of methods of measuring yields and other important phenotypic traits in field plots using new technologies.
- Development of practical systems for implementation of hybrid wheat breeding programs leading to commercial production of hybrids.

AFRI Food, Agriculture, Natural Resources and Human Sciences Education Literacy Initiative (ELI), FY2016



- Offering individual fellowships for pre-, and post-doctoral students to prepare the next generation of research, education, and extension professionals; expanded now to undergraduates in FY 2015
- Projects to align with the NIFA's AFRI Challenge Area and Foundational Program areas
- **Undergraduate fellowships: \$300K up to four years**; one award per host institution; 3 proposal submissions/institution
- **Pre-doctoral fellowships: \$95K for two years** of support (stipend, tuition, fees, fringe, supplies, travel, etc.)
- **Post-doctoral fellowships: \$152K for two years** of support (primarily salary; also supplies, travel, institutional allowance, professional development, etc.)

Develop and enable breakthrough technologies for animal and plant phenomics and microbiomes

- Support innovative approaches for phenotyping and microbiome characterizations;
- Address critical gaps in tools available for characterizing plant and animal phenotypes and microbiomes;
- Understand the role of microbiomes in plants and animals.

Plant Feedstock Genomics for Bioenergy (with DOE), FY2016



- Discovery and characterization of key plant genes/alleles that confer disease resistance/tolerance
- Research to develop new cultivars of regionally adapted energy feedstocks with enhanced biomass yield and resistance/tolerance to pathogens
- perennial grasses, sorghum, energy cane, woody biomass, and oilseed crops

FY 2016: Awards through AFRI Plant Breeding Funding Opportunities



- Plant Breeding for Agricultural Production: Awarded ~\$5.8M to fourteen research projects and six conference grants.
 - 5 corn commodity board research projects submitted. 3 funded. 1 co-funded as 1:1 match.
 - Iowa State U, Low-cost nitrate sensors to populate genotype-informed yield prediction models for next generation breeders
 - Conferences: e.g. National Association of Plant Breeders; Intellectual Property Rights and Plant Breeding
- Food Security breeding and phenomics of crops: Awarded ~\$4.8M to six research projects
 - 1 wheat commodity board research project submitted. 1 co-funded as 1:1 match.
 - Kansas State U, An integrated omics approach to accelerating wheat quality improvement
- New joint activity between the NSF and NIFA awarded ~\$1.94M to seven Early Concept Grants for Exploratory Research (EAGER) to develop and enable breakthrough technologies for plant phenomics and microbiomes.

FY 2016: Awards through AFRI Plant Breeding Funding Opportunities (cont'd)



- New NIFA International Wheat Yield Partnership program awarded ~\$15.4M to seven continuation grants on breakthrough technologies for breeding, genetics, and genomics of wheat yield.
- NIFA/DOE Plant Feedstocks Genomics for Bioenergy Program awarded ~\$2M to two research projects aimed at accelerating genetic breeding programs to improve plant feedstocks for the production of biofuels, biopower, and biobased products.
- NIFA Fellowships grant program awarded ~\$551K to three post-doctoral fellows and one pre-doctoral fellow to educate the next generation of plant breeders.

- Use of transformative discoveries such as classical/conventional breeding as well as genomics, nanotechnology, sensors, modeling, microbiome manipulation, and data-driven decision tools to develop drought- and flood-tolerant cultivars, intensify food production, improve crop and livestock health, or reduce overall water use across food production systems.

AFRI Social Implications of Emerging Technologies, FY2017



- Assess the broad social, ethical, legal and other potential impacts that gene drive/genome editing technologies may pose for society, agricultural markets, consumer preferences, and other domains.
- Involve a range of disciplines including scientists, legal scholars, bioethicists, social scientists and researchers from the humanities, the general public, and other stakeholders to assess the technology's merits and risks and pursue an open and effective means to involve the public in deliberation over these issues.

- Data Science in Agriculture Summit - NIFA convened a summit in October 2016 to identify the frontiers and future of data in agriculture and build on existing U.S. government-wide efforts and investments in Big Data.
- All AFRI Foundational Program priorities welcome submission of workshop applications that address the FACT Initiative>>>focus on identifying priorities and bottlenecks in generating, managing and integrating data in a specific domain of the food and agricultural system.

AFRI Exploratory Research Program



- 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.
- Letters of intent accepted throughout the year
- Full proposal by invitation; must be submitted by 60 days after invitation
- Limited to 7 pages and \$100,000 (including indirect cost) for up to 2 years; not renewable
- Can address any topic area under AFRI Foundation Program



- Addresses critical challenges and opportunities to improve the Nation's agricultural and food systems. These problems may be local, regional, or national, and may call for one or more scientific disciplines.
- Funded projects are expected to produce results that lead to practices that are rapidly adopted by end-users.
- Integrated research and extension projects
- \$300,000 (including indirect cost) for up to 3 years; not renewable
- Can address any topic area under AFRI Foundation Program