



# NIFA and AFRI Updates NPGCC and NRSP6 meeting May 30, 2018

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USDA NIFA

## NIFA programs that support plant breeding/genetic research

- **Competitive programs** (typically \$50M associated with plant breeding)
  - **Agricultural and Food Research Initiative (AFRI)**, main competitive program under NIFA - \$400M (+\$25M)
  - **Non-AFRI Competitive Programs**
    - SCRI: Specialty Crop Research Initiative (\$80M)
    - OREI: Organic Agriculture Research and Extension Initiative (\$20M)
    - SARE: Sustainable Agriculture Research and Education – \$35M (+\$8M)
    - Commodity-specific:
      - Canola (\$0.825M)
      - Potato -\$2.5M (+\$0.25M)
      - Alfalfa (\$2.25M)
    - SBIR: Small Business Innovation Research - ~\$27M

## NIFA programs that support plant breeding/genetic research

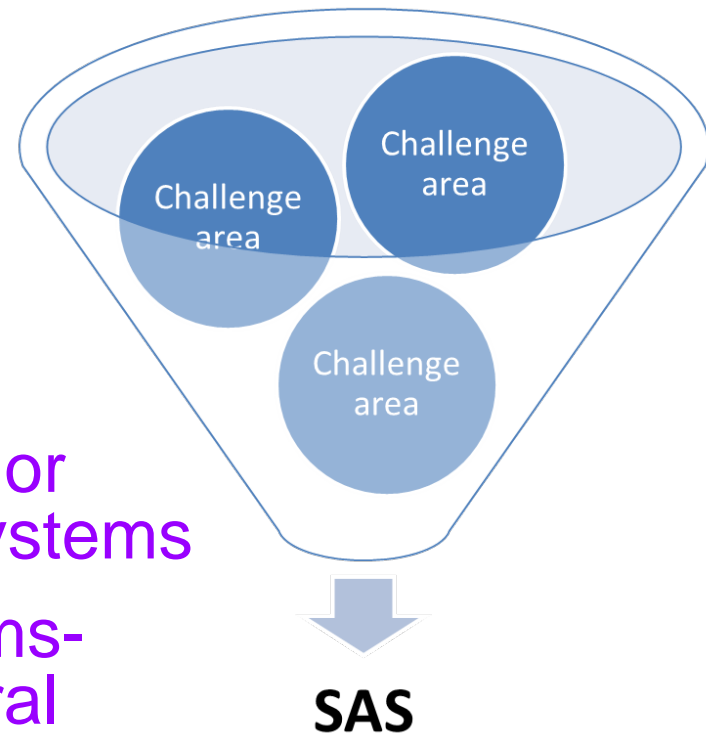
- **Capacity/formula programs**  
(typically about \$20M associated with plant breeding)
  - Hatch (research) - \$244M
  - McIntire-Stennis (forestry) - \$34M
  - Evans-Allen (1890 institutions) - \$54M
  - Smith-Lever (extension) - \$300M

## Organization of AFRI

- Aligned with the 6 Farm Bill priorities
- Three Requests for Applications (RFAs)
  1. Sustainable Agricultural Systems
  2. Education and Workforce Development
  3. Foundational and Applied Science

## Sustainable Agricultural Systems

- New RFA for 2018
- No more challenge areas – combined here
- Large integrated projects (research, education and extension) that address major challenges of agricultural systems
- Up to \$10 million per systems-level Coordinated Agricultural Project (CAP) grant



## Sustainable Agricultural Systems

- 25-Year Goals

- Increase agricultural total factor productivity growth from 1.5% to 2% per year
- Improve water and nitrogen use efficiency by 50%
- Reduce crop losses due to environmental stress and pests, or diseases by 20%
- Produce 50 billion gallons of biofuels and biobased chemicals and bioproducts
- Reduce food-borne illnesses to 8.5 cases/100,000

## Education and Workforce Development

- Postdoctoral Fellowships and Predoctoral Fellowships – individual applies
- Research and Extension Experiences for Undergraduates (REEU) – institution applies for a group of fellowships
- Professional Development for Secondary School Teachers and Education Professionals – training and continued education of K-14 ag teachers

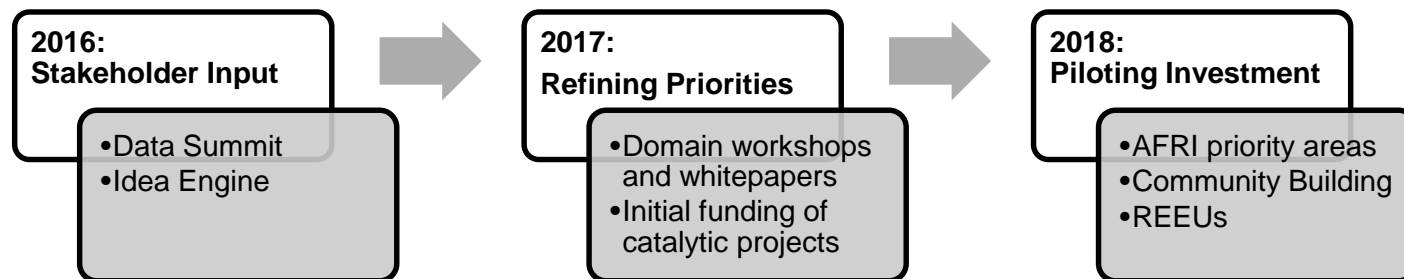
## Foundational and Applied Science: Program Areas directly aligned with the Farm Bill Priorities for AFRI

- Plant health and production, plant products
- Animal health and production, animal products
- Food safety, nutrition, and health
- Bioenergy, natural resources, environment
- Agriculture systems and technology
- Agriculture economics and rural communities



## What is **FACT**?

- Targeted investments in data science, infrastructure, and cross disciplinary data driven decision making
  - Data-driven advances in agriculture and the food production system;
  - Cross-sector advances in data applications;
  - Data-driven advances to address societal well-being and consumer demands;
  - Data management and application;
  - Developing a data literate workforce and end-user; and
  - Big data in communication, property rights, and communities



# What is **Microbiome**?

Goal: Understand the multipartite **interactions** among the host, environment, and the microbiome to help improve and sustain agricultural productivity and quality in plant systems and associated natural resources.

Research will help fill major knowledge gaps in characterizing agricultural microbiomes and microbiome functions across agricultural production systems, and natural resources through **cross-cutting projects**.

- Sustainable Agroecosystems: Functions, Processes and Management
- Bioenergy Feedstock Logistics
- Agricultural Microbiomes in Plant Systems and Natural Resources
- Networks for Synthesis, Data Sharing, and Management

## Plant Breeding for Agricultural Production FY 2018 program priorities

- Supports public breeding efforts to improve crop productivity, efficiency, quality, performance, and/or local adaptation. Both conventional/classical and genomics-enabled plant breeding will be supported.
- Applications must address one or more of the following priorities:
  - Pre-breeding and germplasm enhancement
  - Cultivar development
  - Selection theory
  - Applied quantitative genetics and phenomics
  - Participatory breeding

## Plant Breeding for Agricultural Production FY 2018 priorities (cont)

- Commodity Board co-funding topics:
  - Kansas Wheat Commission:
    - (1) Develop innovative technologies/approaches to enable wheat breeders to address the prevalence and impact of viruses
    - (2) Utilize technologies/tools/methods to access and mobilize genes within collections of wild wheat species
  - National Peanut Board:
    - (1) Identify genetic markers to develop improved cultivars & breeding lines with superior biotic/abiotic and quality traits
- Conference:
  - Workshop that brings together experts in plant breeding, food safety and related sciences to identify the challenges/opportunities in breeding vegetable crops to decrease bacterial food borne illnesses and enhance food safety

## Plant Breeding for Agricultural Production FY 2018 priorities (cont)

- FACT initiative: Proposals on big data analytics and tool development to support a plant breeding data network and cyberinfrastructure should submit a letter of intent to the FACT Program Area Priority.
- Additional information:
  - 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 [www.ars-grin.gov/npgs/index.html](http://www.ars-grin.gov/npgs/index.html).*

# AFRI Plant Health and Production and Plant Products (PHPPP)



## Examples of projects funded by Plant Breeding for Agricultural Production Program

<b>Project director</b>	<b>institution</b>	<b>Project title</b>
Patrick Byrne	Colorado State University	PLANNING CONFERENCE TO DEVELOP STRATEGIES FOR TRAINING THE NEXT GENERATION OF U.S. PLANT GENE BANK MANAGERS
Peggy Ozias-Akins	University of Georgia	NATIONAL ASSOCIATION OF PLANT BREEDERS ANNUAL MEETING: "SUSTAINING AGRICULTURE THROUGH GENETIC ENHANCEMENT"
Bill Tracey	University of Wisconsin	IPR AND PUBLIC BREEDING: FACILITATING PUBLIC-PRIVATE PARTNERSHIPS
Ethalinda Cannon	Iowa State University	CHARACTERIZING THE USDA PEANUT CORE COLLECTION THROUGH GENOTYPE AND PHENOTYPE INFORMATION

## Physiology of Agricultural Plants FY 2018 program priorities

- This program will support projects that use molecular, biochemical, whole-plant, agronomic or eco-physiological approaches to 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
  - Nutrient uptake assimilation, accumulation and utilization
  - Harnessing plant biochemistry and biodiversity to develop bio-based plant products.
  - **Investigate potato starch to fill knowledge gaps in understanding the structure of potato starch and interactions associated with desired sensory attributes (National Potato Promotion Board priority)**



# AFRI Plant Health and Production and Plant Products (PHPPP)



## Examples of projects funded by Physiology of Agricultural Plants Program

Project director	Institution	Project title
Kimberly Novick	Indiana University	<b>Drought impacts</b> on species-specific carbon uptake and growth in Eastern U.S. hardwood forests
Kaiyu Guan	University of Illinois	Parsing Multiple Mechanisms of <b>High Temperature Impacts on Soybean Yield</b> Combining Infrared Heating Experiments and Process-Based Modeling
Jonathan Lynch	Penn State University	Optimizing root metaxylem phenotypes to improve <b>drought tolerance in maize</b>
Endang Septiningsih	Texas A&M University	Enhancement of <b>flooding tolerance</b> : Physiological and molecular characterization of qSUB8.1 and its interaction with SUB1

# New Interagency Funding Opportunity



United States Department of Agriculture  
National Institute of Food and Agriculture



- **Dear Colleague Letter: NSF-USDA-BBSRC Joint Funding Opportunity - Early Concept Grants for Exploratory Research (EAGERs) to Develop Breakthrough Ideas and Enabling Technologies to Advance Crop Breeding and Functional Genomics**
- **2-page summary due March 14, 2018, Proposals due July 16**

## Potential Research Areas:

- Advancing **genome editing** to generate new phenotypes
- Achieving reliable and high throughput production of **doubled haploids** to accelerate breeding
- Controlling and understanding meiotic **recombination** to enable whole genome manipulation
- Modifying **epigenetic inheritance** to facilitate phenotypic changes
- Understanding mechanisms of **heterosis** to exploit hybrid vigor

# Non-AFRI competitive programs:

- **Specialty Crop Research Initiative (SCRI)**
  - Research in **plant breeding**, genetics, genomics, and other methods to improve crop characteristics, such as: **environmental responses and tolerance**
  
- **Organic Agriculture Research and Extension Initiative (OREI)**
  - Facilitating the development and improvement of organic agriculture production, **breeding**, and processing methods.

# Non-AFRI competitive programs (continued)

- **Potato Breeding Research**
  - supports potato research that focuses on the development and testing of superior commercial potato varieties using **classical breeding and advanced molecular and biotechnological approaches**
- **Supplemental and Alternative Crops (canola)**
  - **Testing germplasm and breeding** to develop superior performing canola varieties that increase productivity, profitability, and adaptation to an expanded range of U.S. growing environments
- **Alfalfa and Forage Research Program**
  - Increase alfalfa forage and seed yields and forage quality through improved management practices, **plant breeding**, and other strategies to reduce biotic and **abiotic stresses** and costs of production

# NIFA IMPACTS

**NIFA IMPACTS**

*share your*  
**SCIENCE!**

Partner with NIFA to highlight your discoveries and accomplishments!

FOLLOW @USDA\_NIFA & TWEET YOUR STORIES USING #NIFAIMPACTS
 E-MAIL IMPACTSTORIES @NIFA.USDA.GOV
 OR CALL THE IMPACTS COORDINATOR: 202-720-6133

## ILLUSTRATE

*to the American people* how research, education, and extension are improving lives.

## REPORT

*to Congress* that NIFA-funded projects are making a difference.

## INFORM

*state and local governments* about the ways their partnership betters their communities.

## COMMUNICATE

*to partners and stakeholders* the opportunities available to educate the next generation.

## ENABLE

USDA *Leadership* to make sound decisions regarding mission priorities.