

Genome to Phenome: An USDA Blueprint for Improving Animal Production

November 15-16, 2017



This workshop is supported by AFRI grant 2017-67015-26907 project accession 1013525:
USDA NIFA, the ARS Office of National Programs and the National Agricultural Library.



Genome to Phenome: An USDA Blueprint for Improving Animal Production

This workshop is an effort to update the previous report developed by the animal genomics community under the leadership of Dr. Ronnie Green (USDA-ARS) and Dr. Muquarrab Qureshi (USDA-NIFA) titled "Blueprint for USDA Efforts in Agricultural Animal Genomics 2008 – 2017". Over the last decade the vision outlined in this document has served to guide intra- and extramural research programs at USDA and in the broader international community. This workshop will revisit the progress made and develop meaningful and tangible goals for the next decade in developing the second generation blueprint for the animal genomics community.



- **About the Genome to Phenome Meeting**

- **Dates**

November 15-16, 2017

- **Venue**

USDA National Agricultural Library Beltsville, Maryland

- **Program**

Updated program is available

- **Hotels**

A meeting rate has been negotiated at a near-by hotel. Hotel/booking information will be provided upon your registration

- **Contact**

Click to send feedbacks.

- **Outcome**

- **NEWS:** The USDA Announces New Vision for Animal Genomics. (by Sandra Avant, May 16, 2019)

- **PAPER:** Genome to Phenome: Improving Animal Health, Production, and Well-Being – A New USDA Blueprint for Animal Genome Research 2018–2027. (by Caird Rexroad et al., Front Genet. 2019; 10: 327)



Acknowledgements

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Participants

- ▶ **University - faculty, post-doc, students**
- ▶ **Federal Agency - USDA, NSF**
- ▶ **Industry - Swine, dairy**
- ▶ **International**
 - ▶ **Canada**
- ▶ **Numerous disciplines/industries**

Program

November 15, 2017 (Wednesday)

08:30 AM *Registration Open*

09:00 AM **Welcome**

Dr. Caird Rexroad (USDA-ARS), Dr. Jeff Vallet (USDA-ARS) and
Dr. Adele Turzillo (USDA-NIFA), Dr. Lakshmi Matukumalli (USDA-NIFA)

09:05 AM **Logistics**

Dr. Caird Rexroad (USDA-ARS)

09:10 AM **The 2008 Blueprint for USDA Efforts in Agricultural Animal Genomics**

Dr. Ronnie Green (Chancellor, University of Nebraska)



10:20 AM **Implementing Blueprint at the USDA**

Dr. Jeffrey Silverstein (USDA-ARS)



Dr. Parag Chitnis (USDA-NIFA)



10:40 AM **Implementing the Blueprint with Federal and International Partners (Introductions)**

Dr. Jennifer Weller (DBI, NSF)
Dr. Neelakanta Ravindranath (NICHD) and
Dr. Dan Gilchrist (NHGRI, NIH)
Dr. Ramana Madupu (DOE)
Dr. Lindsay Parish (USAID)
Dr. Tim Kurt (FFAR)
Dr. Jean-Charles Cavitte (European Commission)
Dr. David Bailey (Genome Canada)

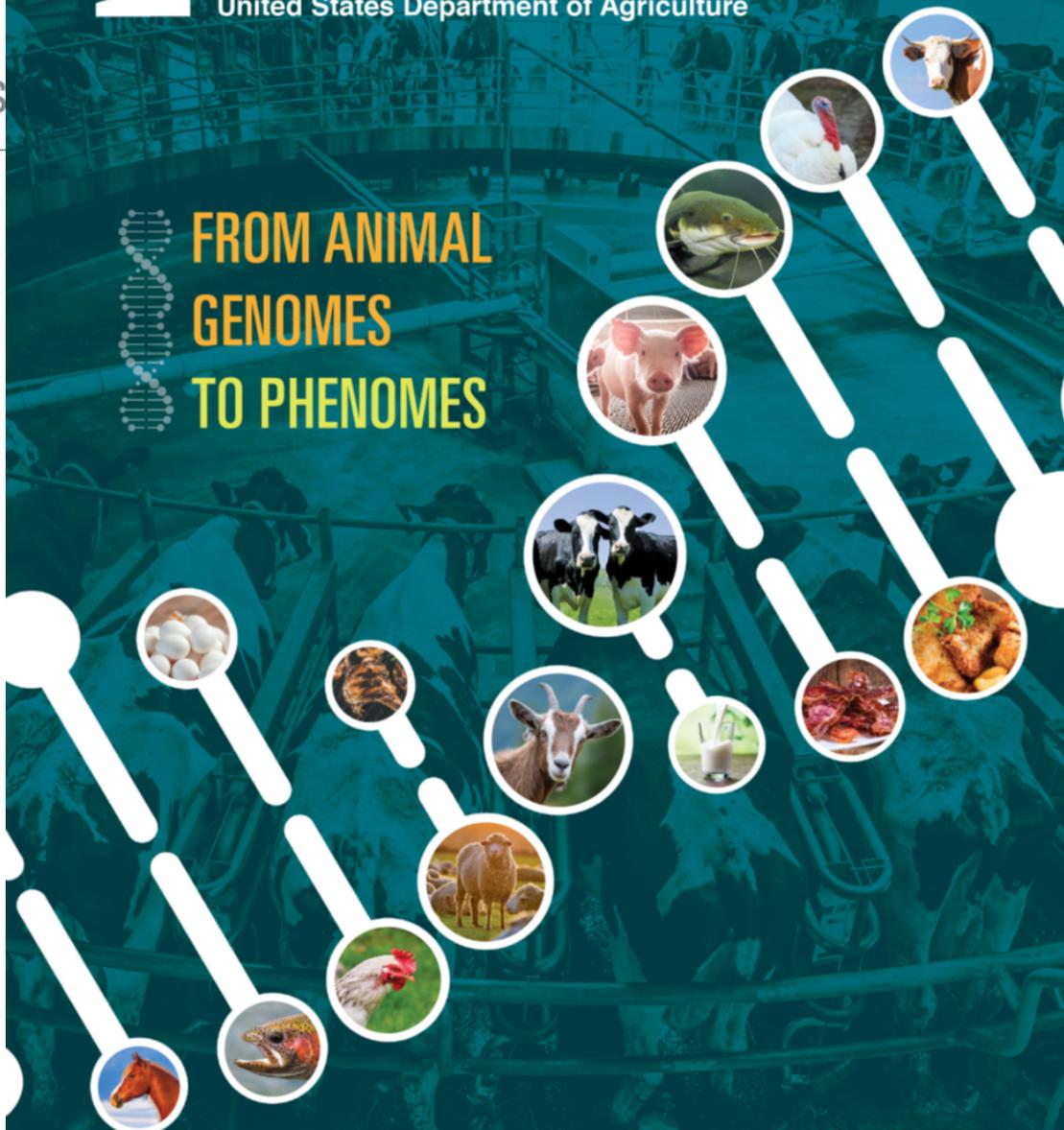
09:50 AM **Developing a Next Generation Blueprint**

Dr. Caird Rexroad (USDA-ARS)

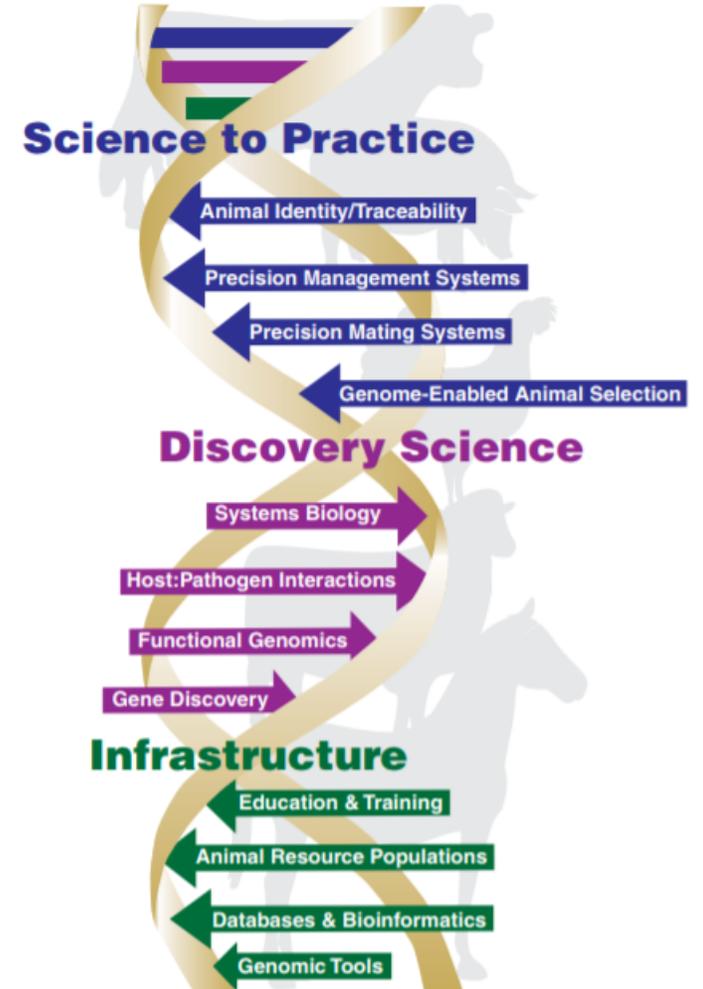




**FROM ANIMAL
GENOMES
TO PHENOMES**



**Blueprint for USDA
Efforts in Agricultural
Animal Genomics
2008–2017**



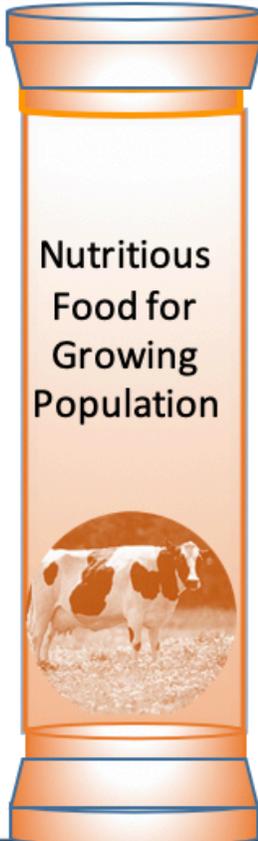
USDA

Animal Genome Blueprint 2018-27

Science to Practice



Nutritious Food for Growing Population



Sustainable Animal Agriculture



Animal Fitness and Welfare



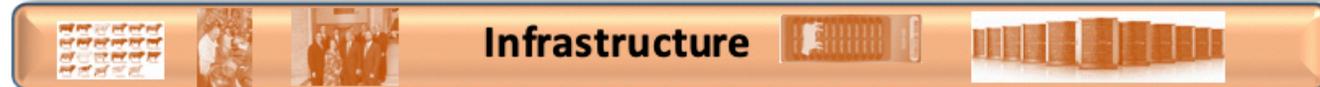
Consumer Needs and Choices



Discovery Science



Infrastructure



Science to Practice

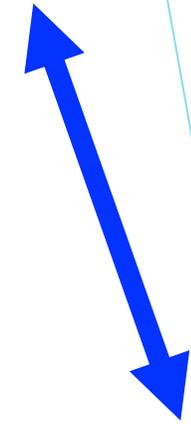
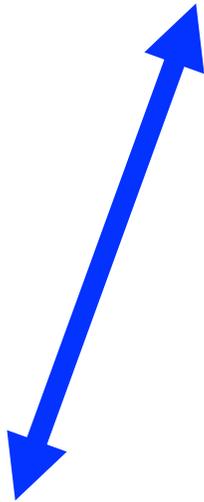
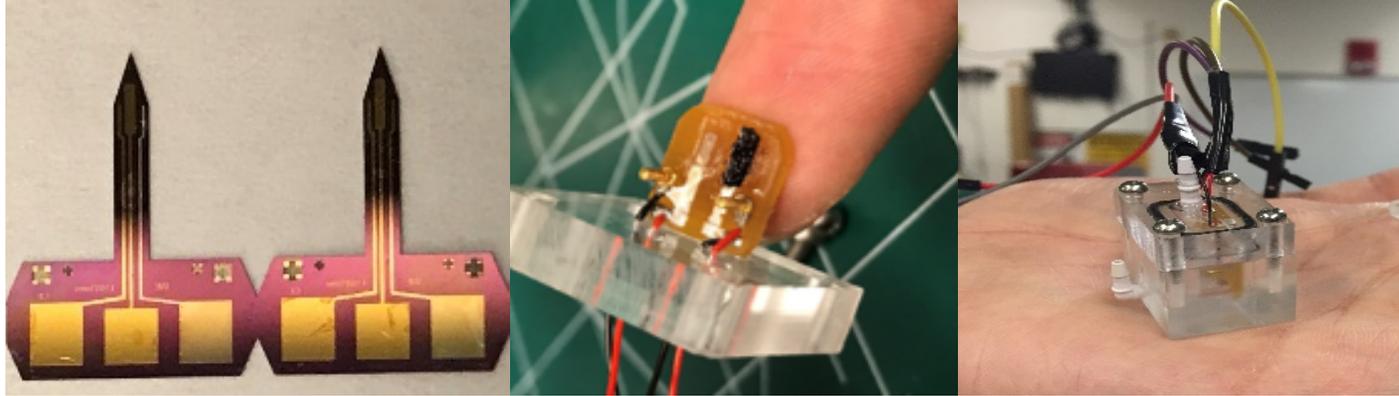
- ▶ Genomic Selection in U.S. Animal Agriculture: Commercial Implementation of Genomic Technology
- ▶ Implementing Genome Science Into Animal Production
- ▶ Optimizing Animal Production Through Precision Breeding and Management

DISCOVERY SCIENCE

- ▶ Understanding Genome Biology to Accelerate Genetic Improvement of Economically Important Traits
- ▶ Reducing the Effects of Animal Diseases
- ▶ Applying Precision Agriculture Technologies to Animal Phenotyping
- ▶ Harnessing the Microbiome to Improve the Efficiency and Sustainability of Animal Production

INFRASTRUCTURE

- ▶ Training the Next Generation of Animal Scientists
- ▶ Developing Advanced Genomic Tools, Technologies, and Resources for Agricultural Animals
- ▶ Creating Big Data Tools and Infrastructure for Animal Production
- ▶ Advancing Biotechnology to Improve the Sustainability and Efficiency of Animal Production
- ▶ Characterizing and Preserving Genetic Diversity for the Future of Animal Production



Implementation of Blue Print

- ▶ Industry Perspective (8:15-9:30)
- ▶ Break (9:30-10)
- ▶ Academic Perspective (10:00-11:15)
- ▶ Wrap-up

- ▶ High Priority Areas

AFRI Program Priorities

- New AFRI Program priorities :
 - Agricultural Innovations through Genome Editing
 - Interdisciplinary Engagement in Animal Sciences (IDEAS)
- Functional Annotation of Animal Genomics (FAANG)
- Breakthrough technologies in Plant and Animal Phenomics and Microbiome (NIFA-NSF)
- Comparative Genomics (NIFA-NIH)

Big Data, Data Science, AI

- Food and Agriculture Cyberinformatics and Tools (FACT)
 - FACT: Developing a Virtual Dairy Farm Brain: The Next Big Leap in Dairy Farm Management Using Coordinated Data Ecosystems
 - FACT: Enhanced phenotypic prediction of dairy cattle performance combined with an economic tool to improve replacement and breeding decision-making at the individual and herd level
- National Robotics Initiative (Interagency)
 - NRI: INT: COLLAB: Rumen Understanding through Millipede-Engineered Navigation and Sensing (RUMENS). Richard Voyles (Purdue) and Robin White (Virginia Tech)
- Cyber-physical Systems (NIFA-NSF)
 - CPS: Medium: Collaborative Research: Closed Loop Sustainable Precision Animal Agriculture Richard Voyles (Purdue) and Robin White (Virginia Tech)
- Artificial Intelligence and Machine Learning (NIFA-NSF)
 - Planning proposal or full proposal
 - Up to \$6M
 - Proposal Deadline: January 28, 2020