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Request for Information: Development of a 2025 National Artificial Intelligence Research and Development Strategic Plan

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Submitter Information

Organization: The Good Food Institute

General Comment

Please see the attached file for a 2-page response from The Good Food Institute.

Attachments

GFI 2025 NSF AI RFI response

May 28, 2025

NSF NITRD NCO
Attn: Mr. Faisal D'Souza
2415 Eisenhower Avenue
Alexandria, VA 22314

RE: Docket ID No. NSF-2025-OGC-0001 Request for Information on the Development of a 2025 National Artificial Intelligence (AI) Research and Development (R&D) Strategic Plan
Submitted by: Erin Rees Clayton, PhD / The Good Food Institute (GFI)
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Thank you for requesting public comment on the development of a national AI R&D strategic plan. GFI is a nonprofit think tank focused on food biomanufacturing, food and agriculture innovation, national security, economic development, and public health. We work with federal policymakers, research funders, companies, and scientists to support the R&D and commercialization of biotechnologies to enhance protein security. In July 2024, we convened a virtual workshop with 147 members of the food science and computational research communities to identify ways to leverage AI for protein diversification. The following recommendations are derived from the output of that workshop and highlight foundational R&D needs for a national AI strategy that will advance American science across a variety of sectors to improve the nation's well-being.

We recommend that the 2025 National AI R&D Strategic Plan:

1. **Invest in foundational data infrastructure** that includes structured, open-access repositories to support biotechnology, food, and agriculture AI research, among other applications.
2. **Fund pre-competitive AI research to develop predictive bioprocess modeling, real-time monitoring, and digital twins** that advance national and food security, including through the upcycling of plant biomass and discovery of new plant and microbial protein and oil sources.
3. **Fund AI research and training to advance rural prosperity** on topics including accelerated crop breeding for value-added traits and new crop discovery.

Invest in foundational data infrastructure

Foundational data infrastructure is essential for the development and use of AI tools, given the requirement for large amounts of high-quality data. The United States has made critical investments in data infrastructure in the past, such as the National Center for Biotechnology Information (NCBI) created during the Reagan administration. Further investments in data infrastructure will be necessary to ensure U.S. companies and researchers have access to the data they need to train their AI. As other countries continue to invest in AI applications for biotechnology, food, and agriculture, the United States

must build the world's strongest data infrastructure. These investments will allow our innovators to fully benefit from AI and ensure America remains the bread basket of the world. The overwhelming response from attendees of GFI's workshop was a need for structured, open-access datasets. The private sector is not filling these data needs, and thus the United States is not realizing the full potential of AI for biotechnology, food, and agriculture.

Fund pre-competitive AI/Machine Learning (ML) research

The United States should lead in developing **predictive bioprocess modeling, real-time monitoring, digital twins, and other AI tools that serve pre-competitive applications across food security, biotechnology**, and other sectors, particularly those underfunded by industry. U.S. leadership and national security is threatened by our reliance on foreign imports and competition with other nations. For example, the United States is dependent upon imports of palm and coconut oil. Biotechnology and AI can change this. Through AI for biotechnology investments, the United States can reduce its dependence on foreign food oils by producing ingredients using microalgae, yeast, or crops. AI can transform cellular agriculture and plant-based production of proteins and food oils by enabling:

- **Predictive bioprocess modeling** for optimizing yields, reducing costs, and scaling production efficiently.
- **Real-time monitoring and digital twins** for fermentation and cell culture systems, supporting precision control.
- **Upcycling of agricultural byproducts** into value-added protein and food oil inputs through AI-optimized pathways.
- **Discovering and engineering new plant and microbial protein and oil sources**, especially from underutilized crops and food-safe microbes.

Fund AI/ML research and training to advance rural prosperity

The United States should prioritize **AI/ML research and training to advance rural prosperity by ensuring the national AI strategy includes the needs of the food and agriculture sector**. It is essential that our AI/ML tools and training programs create new market opportunities for existing crops and new crop development and are made accessible to and usable by small-scale farmers and producers. Competition over export markets for agricultural commodities with other countries threatens the livelihoods of U.S. farmers. At the 2025 USDA Agricultural Outlook Forum, the USDA Chief Economist stated that U.S. farmers can enter new markets either through geography or new products. AI tools offer the potential for farmers to expand their market opportunities through the development of new products. AI can advance rural prosperity by enabling:

- **Crop breeding for value-added traits,** allowing farmers to expand the markets available for existing crops, utilizing AI tools like rapid phenotyping, predicting phenotypes from genotypes and ancestry, and optimizing breeding schemes.
- **Development of new crops** through discovery, engineering, and breeding of plant, algal, and fungal species.

Thank you for your consideration and for the opportunity to submit these comments.