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Japan Science and Technology Agency (JST)

JST to fund six research projects under the AI-ENGAGE joint call (Advancing Innovations for Empowering NextGen AGriculturE)

The Japan Science and Technology Agency (JST) will fund new collaborative international research projects through AI-ENGAGE (Advancing Innovations for Empowering NextGen AGriculturE) under the Moonshot Research and Development Program.

This joint call for proposals was held by JST, the U.S. National Science Foundation (NSF) of the United States, the Commonwealth Scientific and Industrial Research Organization (CSIRO) of Australia, and the Indian Council of Agricultural Research (ICAR) of India. The call was held in alignment with the Joint Statement from the 2023 Quad Leaders' Summit, where the leaders of Japan, the United States, Australia and India endorsed support for joint research among the four countries to advance innovation in agriculture through emerging technologies.

A total of 46 proposals were submitted to the call, and six projects have been adopted. The projects to be adopted were jointly decided by JST, NSF, CSIRO and ICAR through joint panel reviews and evaluations conducted by experts from the participating countries.

The research projects commenced on October 1, 2025, and will last for three years (36 months).

For further details, please refer to the website below.

https://www.jst.go.jp/moonshot/ai-engage/en/a_application/202409/index.html

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“Empowering Science, Inspiring Futures”

Our world faces unprecedented global challenges — such as climate change, energy crises, and emerging infectious diseases — that demand innovative solutions. JST will rise to these challenges through “Science and Technology,” as a national research and development agency that plays a central role in implementing Japan’s science, technology, and innovation policy. We support fundamental research and startups to create new value, develop R&D strategies, foster the next generation of talent, disseminate vital information, and manage the Japan University Fund. Like a compass guiding ships through turbulent waters, JST will chart the way towards a vibrant and secure future by empowering science through a multifaceted approach.

Appendix 1

Number of applications and awarded projects

Program Title	Applications	Awarded
AI-ENGAGE (Advancing Innovations for Empowering NextGen AGriculturE) Technical Lead*: CHIBA Kazuhiro (President, Tokyo University of Agriculture and Technology)	46	6

*Acting as the head of the Japanese side of AI-ENGAGE, Technical Lead manages the Japanese part of each international collaborative research project (the portion undertaken by the Japanese team in international collaborative research) to advance cooperation with other countries.

<Number of applications broken down by team size (3 countries and 4 countries)>
*The international research collaboration teams were required to consist of at least three countries from Japan, the U.S., Australia and India.

	Teams involving all four countries	Teams involving three countries (Teams with Japan)	Total (Teams with Japan)
Application	29	17 (9)	46 (38)
Awarded	5	1 (1)	6 (6)

Appendix 2

Abstracts of awarded projects

(Affiliations and positions are correct as of the time of application)

	Project Title	Principal Investigators	Position and Institution	Research Project Abstract
1	Image-based Phenotyping and Multi-omic Prediction Schemes for Horticultural Crop Improvement	Sachiko ISOBE (Japan)	Professor, Graduate School of Agricultural and Life Sciences, The University of Tokyo	This study aims to improve horticultural crops using image-based phenotyping and multi-omics prediction schemes. Specifically, the Japanese team will conduct high-precision trait assessments, including fruit size, shape, count, weight, quality evaluation, and vegetative growth, using 3D modeling of strawberries and mini-drones in greenhouse environments. They will also evaluate the predictive ability of genomic selection models leveraging RNA-Seq data. Meanwhile, the U.S. team will focus on tomatoes, and the Indian team will focus on onions, developing non-destructive evaluation methods using RGB and spectral imaging and advancing trait prediction through deep learning models. The Australian team will collaborate on developing trait evaluation methods across all target crops, with a particular focus on strawberries. Through this international collaboration, the project aims to innovate high-throughput phenotyping methods, predictive breeding models, and foster international information sharing and researcher training.
		Gregory Vogel (United States)	Assistant Professor, Plant Breeding and Genetics Section, College of Agriculture and Life Sciences, Cornell University	
		Bettina Berger (Australia)	Node Director, Australian Plant Phenomics Network, University of Adelaide	
		Jiffinvir Singh Khosa (India)	Vegetable Breeder, Department of Vegetable Science, College of Horticulture and Forestry, Punjab Agricultural University	

	Project Title	Principal Investigators	Position and Institution	Research Project Abstract
2	Harnessing AI for Precision Genomic Selection Models in Wheat	Hiroyoshi IWATA (Japan)	Professor, Graduate School of Agricultural and Life Sciences, The University of Tokyo	Wheat is an essential crop for global food security, providing a crucial source of nutrition, particularly in developing countries. This study aims to improve wheat's stress resistance and productivity by applying genomic selection (GS). GS constructs predictive models using whole-genome markers to estimate traits such as resistance and productivity, enabling rapid selection based on predictions. This project integrates haplotype analysis, the integration of GWAS, multi-trait models, and genotype × environment interactions, leveraging AI and machine learning (ML) for advanced modeling. Specifically, the project utilizes wheat data provided by an Indian group, in collaboration with a U.S. group experienced in combining GWAS with GS, and a Japanese group with expertise in developing GS models using AI and ML. Together, they aim to develop precise and versatile GS modeling methods, substantially enhancing wheat breeding efficiency.
		Zhiwu Zhang (United States)	Associate Professor, Department of Crop and Soil Sciences, Washington State University	
		Dwijesh Mishra (India)	Senior Scientist, Division of Agricultural Bioinformatics, Indian Agricultural Statistics Research, Indian Council of Agricultural Research (ICAR)	

	Project Title	Principal Investigators	Position and Institution	Research Project Abstract
3	Bridging Global Knowledge and Local Needs through AI for Enhanced Agricultural Production, Sustainability and Resiliency (BRIDGE)	Masayuki HIRAFUJI (Japan)	Project Professor, Graduate School of Agricultural and Life Sciences, The University of Tokyo	The growing global population and the continuous decrease in available arable land increasingly challenge the agriculture sector. Insect and weed pests and plant diseases are responsible for considerable losses in global crop yields. Escalating environmental pressures—including extreme weather patterns and biological threats from insects, weeds, and pathogens—pose significant risks to crop productivity. This highlights the critical need and value for collaborative efforts between countries by leveraging expertise and resources across borders. International collaboration can accelerate the adoption of sustainable practices in plant pest management, pesticide use, and technological innovation. Our global-to-local cyber-agricultural system will enable real-time monitoring and early detection of agricultural threats while adapting global insights to local conditions and farming practices with timely and cost-effective mitigation. The framework will incorporate transfer learning techniques to modify existing AI models trained on global datasets to account for regional variations in pest pressures, disease manifestations, and weed species, ensuring their effectiveness in diverse Indo-Pacific agricultural environments.
		Arti Singh (United States)	Associate Professor, Department of Agronomy, Iowa State University	
		Scott Chapman (Australia)	Professor, School of Agriculture and Food Sustainability, University of Queensland	
		Alka Arora (India)	Professor, Division of Computer Applications, Indian Agricultural Statistics Research Institute, Indian Council of Agricultural Research (ICAR)	

	Project Title	Principal Investigators	Position and Institution	Research Project Abstract
4	Smart Scout: Empowering Farmers to Monitor and Manage Soybean Lodging and Estimate Yield Using Flexible AI-Enabled Systems	Eiji MORIMOTO (Japan)	Associate Professor, Graduate School of Agricultural Science, Kobe University	This research aims to develop a groundbreaking AI-enabled cultivation navigation system tailored to soybean cultivation, referred as “Smart Scout”. The Japanese team will take the lead in developing an AI model designed to automatically identify crop lodging. The developed AI model's output will be compared against yield and quality data collected from participating countries to establish a comprehensive harvest-time database. The US team will contribute by developing a mobile, AI-enabled computer vision system for real time crop monitoring during the growing season. The Indian team will be tasked with developing yield estimation model, data visualization techniques, and decision support applications utilizing the AI modules developed by all participating nations. Australia will serve as a testing ground, conducting comprehensive field trials at a demonstration farm to evaluate the practical application of the AI technologies developed by the Quad countries.
		Ajay Sharda (United States)	Professor, Carl and Melinda Helwig Department of Biological and Agricultural Engineering, Kansas State University	
		Justine Baillie (Australia)	Lecturer, School of Agriculture and Environmental Science, The University of Southern Queensland	
		Peeyush Soni (India)	Associate Professor, Department of Agricultural and Food Engineering, Indian Institute of Technology Kharagpur	

	Project Title	Principal Investigators	Position and Institution	Research Project Abstract
5	HARVEST: Holistic AI-powered Agricultural Response Validation and Early Prediction System across Territories	Hirozumi YAMAGUCHI (Japan)	Professor, Graduate School of Information Science and Technology, The University of Osaka	The HARVEST project promoted in this study aims to develop an AI framework that collects agricultural data using wireless communications, sensors, UGVs, and drones, and analyzes it through multimodal fusion, machine learning, and generative AI. The project's objective is to empower farmers and stakeholders by enabling early predictions such as crop yield forecasting, disease and pest detection, drought control, climate adaptation, precise fertilization, and sustainable pest management through AI, while establishing technologies adaptable to diverse environments through collaboration among the U.S., Japan, Australia, and India. In this project, the Japanese team will develop technologies to create a digital twin environment utilizing 3D sensing and AI models, enabling efficient crop growth monitoring and management. Through the collaboration of teams from the four countries, the project is expected to pioneer new AI applications in agriculture.
		Sajal Das (United States)	Daniel St. Clair Endowed Chair Professor, Computer Science, Missouri University of Science and Technology	
		Marimuthu Palaniswami (Australia)	Professor, Department of Electrical and Electronic Engineering, The University of Melbourne	
		Kesavan Subaharan (India)	Principal Scientist & Head, Division of Germplasm Conservation and Utilisation, National Bureau of Agricultural Insect Resources, Indian Council of Agricultural Research (ICAR)	

	Project Title	Principal Investigators	Position and Institution	Research Project Abstract
6	DEVA: Disease Detection and Effective Control Using Versatile UAVs and UGVs in Apple Orchards	Tofael AHAMED (Japan)	Associate Professor, Institute of Life and Environmental Sciences, University of Tsukuba	This proposal aims to develop an integrated system combining UAVs, UGVs, and advanced data-driven methods for disease detection, mapping, and management in apple orchards. Specifically, the Japanese team will focus on developing a disease detection system using UAV-mounted cameras and sensors with machine learning for disease classification. The American team will design a UGV-based precision spraying system for targeted pesticide application, minimizing chemical use and enabling UAV-assisted aerial spraying and biological pest control. The Indian team will lead crop health monitoring and generate geo-referenced disease severity maps, while developing a cloud-based platform for integrating UAV and UGV data and recommending preventive measures. The Australian team will contribute to optimizing the disease detection algorithms by analyzing multi-spectral and thermal imaging data. Through collaborative research, UAV and UGV systems will be integrated for effective disease monitoring and site-specific interventions. The outcomes will revolutionize orchard management, enhance sustainability and benefit stakeholders worldwide.
		Yu She (United States)	Assistant Professor, School of Industrial Engineering, Purdue University	
		Bin Chen (Australia)	Lecturer, School of Computing and Information Systems, The University of Melbourne	
		Madan Kumar Jha (India)	Professor and Head, Department of Agricultural and Food Engineering, Indian Institute of Technology Kharagpur	

Annex

Abstract of the joint call for proposals

1. Participating countries and funding agencies and countries
The Japan Science and Technology Agency (JST), Japan
The U.S. National Science Foundation (NSF), the United States
The Commonwealth Scientific and Industrial Research Organization (CSIRO), Australia
The Indian Council of Agricultural Research (ICAR), India

2. Application requirements:
The international research collaboration team must consist of at least three countries from Japan, the U.S., India and Australia.

3. Applicant eligibility (Japan side):
Researchers (PIs and Co-PIs) on the Japan side must be affiliated with universities, public institutions or private companies that are legally registered and operate in Japan.

4. Research period:
The scheduled research period is 3 years from October 2025 to September 2028.

5. Amount of funding (JST):
Up to 60 million JPY (including indirect costs) to the Japan-side team per project.

6. Selection process and criteria:
In this call for proposals, NSF, as the designated lead agency, coordinated the selection process to ensure efficient management. Proposals were evaluated through a Merit Review Process using the criteria outlined in the NSF Proposal & Award Policies & Procedures Guide (PAPPG). The projects were awarded based on the evaluation outcomes by relevant experts and subsequent discussions by JST and other participating funding agencies.

*Below is an excerpt from NSF's PAPPG:
https://nsf-gov-resources.nsf.gov/files/nsf24_1.pdf#page=110

Intellectual Merit	The Intellectual Merit criterion encompasses the potential to advance knowledge.
Broader Impacts	The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements were considered during the review of both criteria:

(1) What is the potential for the proposed activity to:

a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and

b. Benefit society or advance desired societal outcomes (Broader Impacts)?

(2) To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?

(3) Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?

(4) How well qualified is the individual, team, or organization to conduct the proposed activities?

(5) Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?