Awards issued prior to January 20, 2025, were funded under previous Administrations and may not reflect the priorities and policies of the current Administration.

United States Department of Agriculture
Project Initiation

Project Data for Accession Number 1033371

Project Title

SAFER AG 2.0:SAfety for Emerging Robotics and Autonomous Agriculture Workshop

Project Details

Sponsoring Institution National Institute of Food and Agriculture	**Project Status** ACTIVE
Funding Source NIFA Non Formula	**Grant Year** 2025
Grant No. 2025-67021-44040	**Cumulative Award Amt.** $49,692.00
Proposal No. 2024-09294	**Multistate No.** (N/A)
Project Start Date Dec 01, 2024	**Project End Date** Nov 30, 2026
Program Code [A1521] Agricultural Engineering	

Project Director

Issa, S.

Recipient Organization

UNIVERSITY OF ILLINOIS
506 S WRIGHT ST
Urbana, ILLINOIS 618013620

Performing Department

(N/A)

Non Technical Summary

Robotics and new technologies are transforming farms and the nature of farmworkers' tasks. As we embrace innovation, we must ensure that our progress does not inadvertently jeopardize the health and safety of farmworkers. Currently, over 500 autonomous machines are in use, covering more than 1 million acres of farmland across 40 countries. Given the rapid pace of technological advancement and the ongoing need for such initiatives, efforts should be made to ensure farmworker safety and health in the era of autonomous and artificial intelligence-based technology. There is a regulatory, social work, and research gap in adopting AI and new technologies in agriculture and ensuring farmworkers' safety and health. The first step in addressing this gap is to gather agricultural safety and health experts, government officials, farm workers, and industry stakeholders to discuss their concerns, needs, and future directions. In 2022, a national effort was conducted under the Safety for Emerging Robotics and Autonomous Agriculture Workshop at the University of Illinois Urbana-Champaign. This workshop will build on the results of the first workshop

and focus on four key gaps identified: human-robot interaction research, risk management techniques & liability, workforce development & training, and standard design guidelines & implementation. This workshop will cover multiple priorities for the Engineering for Agricultural Production and Processing priority (A1521) within the Agricultural Systems and Technology program area, including risk assessment and mitigation, and technological barriers to adoption. Expected outcomes include developing a national research & outreach agenda to address agricultural safety in the age of autonomy.

Animal Health Component

Animal Health Component: 0%

Research Effort Categories

Basic	0%
Applied	100%
Developmental	0%

Classification

Knowledge Area (KA)	Subject of Investigation (SOI)	Field of Science (FOS)	Percent
402	5310	2020	30%
723	5310	2020	50%
608	5310	2020	20%

Knowledge Area

[402] Engineering Systems and Equipment

[723] Hazards to Human Health and Safety

[608] Community Resource Planning and Development

Subject Of Investigation

[5310] Machinery and equipment

Field Of Science

[2020] Engineering

Keywords

Agricultural safety, Workshop, Autonomous agricultural equipment, SAFER AG

Goals / Objectives

The researchers of the proposed workshop believe four areas need investigation and the objective of this workshop would be to address each of these areas:Occupational safety as it relates to human-robot interactions of autonomous machinery. This includes evaluating design principles and hazards associated with human-robot interactions and

development of autonomous incident database.Risk management techniques and liabilities. This includes a review of existing risk assessment techniques in addressing safety of autonomous machines, liability concerns of autonomous machines and addressing risk management gaps among small manufacturers.Standards and design guidelines. This includes addressing standards maturity, limitation of standards for non-standard robotics and applicability of consensus standards.Workforce development and training. This includes linking industry and academia to discuss course and program development, educating engineers on the safety standards associated with their technology, emphasis on safety and standard training for students, and development of credentials (certificates and degrees) associated with autonomous machinery and safety.Our proposed conference aims to bring together representatives from groups that include farm operators, academia, industry, and governmental interests to discuss and distribute current information, gaps in knowledge, and research needs that connect to issues such as risk, insurability, regulations and policy, workforce, and societal implications. The long-term goal of this workshop would be to continue to improve safety on farmlands across the US.

Project Methods

The conference will be held at the Funk Agricultural Library in Urbana, IL on Dec 3rd and 4th with an expected attendance of 50?100individuals. The first day will follow a conference style and will include presentations and panel discussion on human robot interaction research & development, standards guidelines & development, risk techniques & liability, and workforce development & training needs (Table 2). The presentations will then be followed by soliciting feedback from all attendees on each of the four tracks and documenting their needs.Day 2 will start with a demonstration of autonomous systems in agriculture. Attendees will interact with various digital technologies, including sensors, robotic platforms, and preview for upcoming technologies. The remaining part of the day will be formatted as a workshop with four tracks. Discussion facilitators will lead the discussion to cover the research needs and gaps in each of the four tracks. To guide the discussion, a list of questions will be prepared in advance and shared with the attendees. Notes will be recorded for each track and will be used to generate guidelines and research plans for each of the tracks. These findings will be published online and companion articles published in relevant journals.In addition, a one-day training on ISO 25119 (functional safety) or the newly revised ISO 18497 (highly autonomous agriculture machinery) will be offered either one day before the workshop. This training will allow agricultural safety and health specialists to better relate to the work conducted by agricultural and electrical engineers to ensure the safety of autonomous systems.