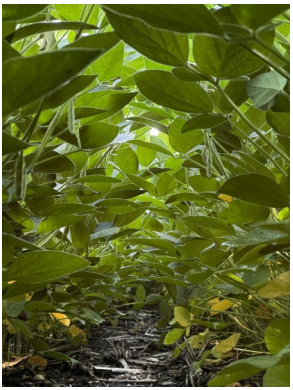
2026 Stakeholder Report

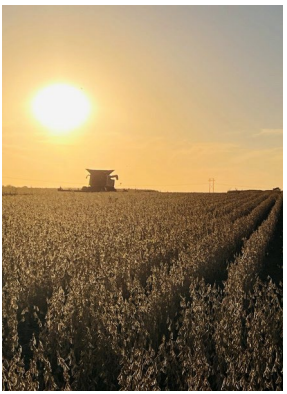
IOWA SOYBEAN RESEARCH CENTER

In collaboration with the Iowa Soybean Association









IOWA STATE UNIVERSITY

About the ISRC

The Iowa Soybean Research Center (ISRC) works in partnership with the Iowa Soybean Association, industry, farmers and researchers at Iowa State University. The goal of this collaborative effort is to identify and fund research in the areas of soybean production and protection. The center involves and helps coordinate research, teaching and extension activities of faculty and staff who work in the areas of soybean biology, breeding, economics, precision agriculture, production and pest management at Iowa State and researchers at the Iowa Soybean Association's Research Center for Farming Innovation.

Research Focus

ISRC-funded research includes traditional and multidisciplinary problem-solving approaches, molecular research and machine learning and artificial intelligence tools to accelerate and enhance research efforts. Specific research areas for the ISRC are identified by the center's Industry Advisory Council.

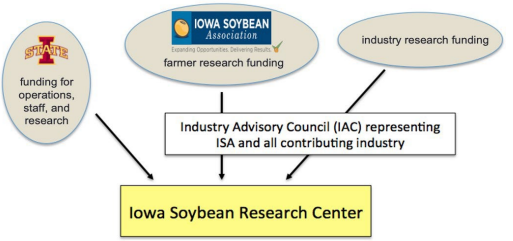
Funding

Financial support for the ISRC comes from Iowa State University's College of Agriculture and Life Sciences, the Iowa Soybean Association and industry partners. Our goal is to seek widespread input and support from individuals representing key segments of the soybean production and protection system.

New Co-Directors

On January 1, 2026, Associate Professor of Agronomy Mark Licht and Professor of Plant Pathology, Entomology and Microbiology Steve Whitham became the new co-directors of the ISRC. Both are long-time faculty research affiliates of the ISRC and are well known and respected in their areas of expertise.

ISRC Staff



Mark Licht, co-director
Steve Whitham, co-director
Kara Berg, communications specialist
Jill Cornelis, center administrator
Steve May, industry partner recruiter
Clarke McGrath, on-farm research & extension coordinator

Industry Advisory Council

Iowa soybean farmers, industry partners and the Iowa Soybean Association have representation on the center's Industry Advisory Council. The council provides input on research needs, which includes identifying new areas of research, gaps in research and opportunities to expand and build upon existing research.

Industry partners currently represented on the council include Advanced Agrilytics, AMVAC, BASF, Bayer, Beck's, BioConnect Iowa, Corteva Agriscience, GDM, Inari, Indigo Ag, Meristem, Nutrien, Peterson Genetics, Spraytec, Syngenta, TerraMax, Tidal Grow and Valent.



The 2025 ISRC Industry Advisory Council meeting was held at Iowa State University's Alumni Center in Ames, Iowa.

ISRC Management Team

Funding decisions are made by the center's management team based on guidance from the Industry Advisory Council. The management team consists of:

- Iowa State University's College of Agriculture and Life Sciences Interim Dean Ruth MacDonald and Department Chairs Steve Harris (plant pathology, entomology and microbiology), Amy Kaleita (agricultural and biosystems engineering) and Glen Ritchie (agronomy)
- Iowa Soybean Association Chief Officer, Research Center for Farming Innovation Joe McClure
- ISRC Co-directors Mark Licht and Steve Whitham

Iowa Soybean Center Funded Research Projects

Award Period	Project Title	PI	Award Amount
2015-2016	IA Pesticide Resistance Mgmt. Plan	Bradbury	$ 60,000
2015-2016	RNA-based Approaches for Resistance to SCN	Baum	$ 63,922
2015-2016	Use of Remote Sensing & UAVs for Soybean Production	Darr	$ 36,893
2015-2016	Cropping Systems Modeling Tools to Improve Soybean Mgmt. & Yield in IA	Archontoulis	$ 79,914
2015-2016	Soybean Planter	Mark Licht	$ 95,000
2016-2019	Root & Microbiome Traits to Tailor the Next-Gen Soybean Cultivars	Beattie & Singh	$ 390,145
2018-2020	ISO-FAST - Interactive Online Summaries of On-farm Replicated Strip Trials	Miguez	$ 46,131
2018-2020	Machine Learning to Identify & Quantify Biotic & Abiotic Stresses in Soybean	Singh	$ 80,000
2019-2021	Hyperspectral Imaging for Early Detection of Herbicide-Resistant Weeds in Soybean	Jha	$ 120,000
2019-2021	Virus-mediated Gene Editing in Soybean	Whitham	$ 100,000
2020-2022	In-field Soybean Seed Pod Analysis Using 3D Imaging & Machine Learning	Tang	$ 100,000
2020-2022	Mechanisms of Defense Suppression by Cyst Nematode Effectors	Baum	$ 116,000
2020-2022	Time of Disease Onset as an Early Indicator of Soybean Resistance to SDS	Leandro	$ 40,000
2021-2023	Low-cost Multimodal Sensor Arrays for Early Detection of Soybean Diseases	Dong	$ 60,000
2021-2023	Enhancing Implementation & Adoption of Nonchemical Tactics for IWM in Soybean	Jha	$ 100,000
2021 - 2023	Time of Disease Onset as an Early Indicator of Soybean Resistance to SDS (expanded)	Leandro	$ 60,000
2021 - 2023	Effects of Increased CO2 & Abiotic Stress on Soybean in the Enviratron	Whitham, Singh & Tang	$ 200,000
2022-2024	Optimizing Continuous Soybean Production	Archontoulis	$ 156,500
2022-2025	Seed Treatment Effects on the Seed & Soil Microbiome	Munkvold	$ 156,500
2023-2024	Characterization of Iron Deficiency & *Fusarium graminearum* Interactive Responses in Soybean	Arias	$ 28,000

Iowa Soybean Center Funded Research Projects *(cont.)*

Award Period	Project Title	PI	Award Amount
2023-2025	Soil Amendment with Biofuel Industry Co-products for Improving Soybean Disease Management & Soil Health	Leandro	$ 84,000
2023-2026	Application of Intercropping Practices to Increase Soybean Production in IA	Arias	$ 191,500
2024-2026	Using Soybean Microbes as Protectants from Stress	Beattie	$ 200,000
2024-2026	Cyst Nematode Single-Cell Omics	Baum	$ 128,795
2024-2026	The Role of Sterols in Soybean Growth & Development	Suza	$ 65,000
2025-2026	Soil Amendment with Biofuel Industry Co-products for Improving Soybean Disease Mgmt. (expanded)	Leandro	$ 51,499
2025-2026	Seed Treatment Effects on the Seed, Seedling & Soil Microbiome (expanded)	Munkvold	$ 62, 583
2025-2028	Using AI to Decode SCN Effector Functions to Engineer Durable Soybean Resistance	Baum	$ 117,583
2025-2028	Optimizing Cover Crop Termination Timing to Manage Waterhemp & Minimize Shade Avoidance in Soybean	Everman	$ 147,583
	TOTAL ALL PROJECTS		$3,137,548

ISRC-Funded Research That Received Additional Funding

Sotirios Archontoulis, *Optimizing Continuous Soybean Production with Rye Cover Crop Project* - Iowa Soybean Association $163,579

Thomas Baum, *An Integrated Approach to Enhance Durability of SCN Resistance for Long-term Strategic SCN Management (Phase III)* - NCSRP $150,000

Gwyn Beattie, *Mechanistic Drivers Shaping Root Microbiomes and Microbiome Drivers of Fitness Benefits in Drought-stressed Plants* - USDA NIFA Foundational and Applied Science Program: Agricultural Microbiomes in Plant Systems and Natural Resources $749,590

Steve Whitham & Liang Dong, *Low-cost Multimodal Sensor Arrays for Early Detection of Soybean Diseases* - DARPA $485,713, USDA NIFA $594,000

Lie Tang, *Effects of Increased Atmospheric CO2 and Abiotic Stress on Soybean Performance in the Enviratron* (Development of PhenoAgent AI-powered universal greenhouse robot) - Iowa Soybean Association $237,140

New Research Projects Fall 2025

Using AI to Decode SCN Effector Functions to Engineer Durable Soybean Resistance

Thomas Baum, plant pathology, entomology and microbiology



SCN feeding on a soybean root

This study investigates key effector functions of SCN and defines the structural and dynamic features of effector interaction interfaces. This research seeks to reveal critical points of vulnerability within the SCN pathosystem, prioritize host genes for resistance breeding or gene editing and provide a foundation for developing targeted interventions to disrupt nematode infection at its earliest stages. Most importantly, this work will set in motion the much-needed shift from wet-lab bench work to computational approaches to exploit the wealth of data generated at Iowa State with soybean checkoff support.

Optimizing Cover Crop Termination Timing to Manage Waterhemp and Minimize Shade Avoidance in Soybean

Wesley Everman, agronomy



Waterhemp in soybean

This project addresses the knowledge gap regarding how timing of cereal rye termination affects early season light competition, reduces waterhemp germination, induces shade avoidance response in soybean and ultimately affects soybean yield. This research will lead in providing clearer guidance on how long cereal rye can remain in the field to maximize soil health and weed suppression benefits without compromising soybean productivity.

Additional Funding Awarded in 2025 for Ongoing Research Projects

Seed Treatment Effects on the Seed and Soil Microbiome

Gary Munkvold and Larry Halverson, plant pathology, entomology and microbiology



Treated soybeans

Originally funded in 2022, this project received an additional year of funding in fall 2025 to continue the investigation of seed treatments commonly used to protect seeds and roots from damaging pathogens. The reaction of soil microflora, including pathogens, to the presence of different seed treatment products on soybean seeds will be studied. Results will provide new information about the efficacy of chemical and biological seed treatments used in soybean.

Seed treatments are known to improve crop performance, but there is little information about exactly how they affect microbial colonization in the zone in the soil surrounding a seed as it germinates and how long these effects last. The researchers will study the reaction of soil microflora, including pathogens, to the presence of different seed treatment products on soybean seeds.

Soil amendment with biofuel industry co-products for improving soybean disease management

Leonor Leandro, plant pathology, entomology and microbiology



Biochar

Originally funded in 2023, this project received additional funding in fall 2025 to transition from studying the impact of biochar and digestate amendments on soybean disease development and plant health in pasteurized soil to natural field soil that more closely resembles conditions in farm fields. Understanding the root causes of soybean sudden death syndrome severity is crucial in developing recommendations to farmers on soil amendment application rates and managing soybean disease.

Initial research found the effectiveness of biochar in disease suppression depends on the source material, with yellow pine biochar having the greatest potential to reduce seedling root rot caused by *F. virguliforme*.

Ongoing Research Projects

Using Soybean Microbes as Protectants from Stress

Gwyn Beattie, plant pathology, entomology and microbiology



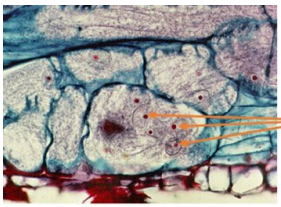
Interaction between soybean roots and soil microbiome. *By Victoria Cicha ©*

This project, funded in fall of 2024, uses multiple approaches to explore the potential for microbes to serve as protectants for plants under certain stressful conditions. Abiotic stresses including water deficit, salinity, low phosphate and acidity can negatively impact soybean growth and the number of flowers per plant, pods per plant, seeds per pod, and weight of pods. The study will reveal the effectiveness of approaches to enhance soybean stress tolerance that involve manipulating the microbial members and interactions within microbial communities on roots.

Ongoing Research Projects *(cont.)*

Cyst Nematode Single-Cell Omics

Thomas Baum, plant pathology, entomology and microbiology



Funded in 2024, this study investigates research ideas that are of primary scientific and academic interest but are directly relevant to future projects to target soybean cyst nematode. By way of new molecular approaches, key aspects of infection biology of the soybean cyst nematode will be uncovered. Successful completion of the work will reveal single-cell processes that govern nematode infection, which will lay the foundation for novel nematode control approaches.

Application of Innovative Intercropping Practices to Increase Soybean Production in Iowa

Silvina Arias, plant pathology, entomology and microbiology

Funded in the fall of 2023, this project explores expanding soybean production with the potential to increase economic returns to Iowa farmers and industry by the sustainable intensification of existing cropland. The strategy is to apply intercropping practices, which involve the harvest of our main cash crop, soybean, plus the harvest of a second crop in the same field in the same year, reducing negative environmental costs.



Intercropping soybean with small grains.

Planting soybean with winter crops, such as small grains, is a way to take advantage of Iowa's six-month fallow period. A winter crop can be planted immediately following soybean harvest and serves two purposes, functioning as a cash crop and a cover crop, protecting soil from erosion and nutrient runoff, which are major causes of water pollution. Another benefit of intercropping and crop biodiversification is potential pest control and disease suppression by breaking disease cycles.

Multiple advantages of intercropping soybean with winter small grains includes increased land use efficiency, improved soil fertility, better pest and weed control, and enhancement of overall crop productivity relative to conventional crop monocultures, allowing Iowa farmers to implement an "ecocontinuous soybean system" instead of corn-soybean rotations.

Ongoing Research Projects *(cont.)*

Investigating the Specific Role of Sterols in Soybean Growth and Development

Walter Suza, agronomy



Soybean plants growing in a lab.

Funded in 2024, the objective of this research is to seek to identify the genes responsible for making healthier phytosterols and explore their impact on soybean growth and development. Phytosterols are natural compounds found in plants that can help lower cholesterol levels in humans. The research will help identify soybean varieties with improved phytosterol content that are better adapted to stress conditions. Additionally, the research will be linked with the George Washington Carver Future Hunger Fighters Program, offering ISU students the chance to experience molecular biology research focused on a globally significant crop.

Concluding Research Project

Optimizing Continuous Soybean Production

Sotirios Archontoulis, agronomy



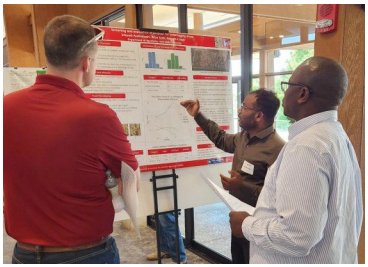
PhD student Carolina Freitas talks with ISA farmers and research staff in a field of continuous soybean near Boone, IA.

Funded in 2022, this study initiated research on the continuous soybean cropping system in Iowa. While soybean after soybean cropping has typically been discouraged, this may change in coming years as market demands influence farming decisions. Long-term plot experiments were established at two locations in central and northwest Iowa with seven cropping systems per experiment: 1) soy-soy (30” rows), 2) soy-soy (15” rows), 3) soy-corn, 4) corn-soy, 5) corn-corn, 6) soy-rye-soy, 7) soy-rye-soy with manure. Each system was replicated four times in large plots. In the first three years, the continuous plots were just as productive as rotated control plots.

Currently, the study (specific to Iowa) seems to be disproving the long-held theory that soybean should be rotated with corn to avoid yield penalties, especially from increased disease pressure, particularly from SCN, as well as potential nutrient and water loss in the soil. However, more time is needed to see how long continuous soybean can be grown without eventually seeing major yield penalties. For this reason, the project is continuing with funding from the Iowa Soybean Association.

ISRC Education and Outreach Activities for Fall 2025-Summer 2026

ISRC Research Day



Prior to the center's Industry Advisory Council meeting in September 2025, the ISRC hosted an ISU Research Day that provided updates on ISRC-funded projects and a poster session featuring the research of 19 ISU graduate students and research staff. Research topics included numerous soybean-related projects and soil and regenerative agricultural practices.

Soy Foods Month Student Omelet Breakfast



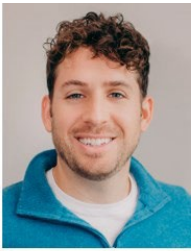
On April 6, 2026, the ISRC, Iowa Food & Family Project, Iowa Egg Council, North Central Poultry Assoc. and Vibe Nutrition hosted an omelet brunch for ISU students in celebration of Soy Foods Month. Students learned about the role of soy in poultry production.

GDM Awards ISU Students Travel Grants

The ISRC would like to thank GDM for continuing their student travel grant program, which the ISRC helps manage. GDM provides funding for one-two ISU graduate students to travel and present at the NAPB and CANVAS Conferences each year.



Victoria Moser



Joscif Raigne

Victoria Moser was selected for her presentation on "Evaluating UAV and Satellite Imagery to Connect LAI with Yield in Soybean" for the 2025 CANVAS Conference. Joscif Raigne was selected for his presentation on "Phenomic-assisted Selection in Soybean Variety Development" for the 2026 NAPB Conference.

ISRC Hosts Webinar on Continuous Soybean Project



The ISRC funded portion of the Continuous Soybean Project concluded with a final report provided in March of 2026. ISRC faculty research affiliate Sotirios Archontoulis, agronomy, and PhD student Carolina Freitas, provided an overview and findings of their project in a webinar hosted by the ISRC on May 12, 2026. This project will continue with funding from the Iowa Soybean Association.

Relay Intercropping Field Day



On June 5, 2026, the Seed Science Center at Iowa State University and the Iowa Soybean Research Center, hosted a field day highlighting Silvina Arias's ISRC-funded research on relay intercropping, which focused on the benefits of growing cereal and oilseed crops with soybean. The field day featured tours of large-scale research plots, demonstrations of precision agriculture technology, and discussions about emerging crops and market opportunities.

NCSRP Visit



The ISRC hosted members of the North Central Soybean Research Program at Iowa State University on August 4, 2026. The group visited research labs at the Advanced Teaching and Research Building, the Kent Feed Mill and Grain Science Complex and the Veterinary Diagnostic Laboratory. Department chairs and faculty from agronomy, agricultural and biosystems engineering and plant pathology, entomology and microbiology participated.

Meals from the Heartland



The ISRC hosted its sixth annual Meals from the Heartland event in celebration of Soybean Month in Iowa on August 6, 2026. More than 70 volunteers from ISU, Corteva Agriscience and John Deere packaged more than 42,000 meals in two hours. Cargill continues to sponsor this event through a generous monetary donation to cover the cost of the meal ingredients, which includes soy protein. The packaged meals were delivered to food insecure people in Iowa, across the U.S. and around the world with some of the meals delivered to food pantries in Ames.

On the Cover

The ISRC held a photo contest in early 2026 and on the cover are some of the photos sent in by ISU students and staff. At top: *Soy Storm* by Fernando Marcos, agronomy. Second row from left, *Soy Canopy* by Maria Luiza Schmidt, plant pathology, entomology and microbiology, *Soybean Pods* by Murilo Freitas, agronomy and *Harvest Sun* by Yanben Shen, agronomy.

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In collaboration with the Iowa Soybean Association

Thank you to our industry partners!

All ISRC-funded research project progress and final reports can be found on the ISRC's website under "Research" at **iowasoybeancenter.org**

August 2026