IOWA STATE UNIVERSITY

Iowa Soybean Research Center

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ISRC Researchers Visit Ag Leader and Blomgren Seed

At left, ISU graduate students, staff and faculty at Ag Leader's facility in Ames. Above right, Ag Leader employee Sam Worley (in blue shirt facing the group) begins the tour by giving an overview of Ag Leader's precision farming facilities in Ames.

On November 5, 2024, 25 Iowa State graduate students, staff and faculty visited Ag Leader Technology and Blomgren Seed on a tour organized by the ISRC. The center provides opportunities such as this to foster awareness and understanding among the researchers of businesses and organizations supporting soybean production in Iowa.

Founded in 1992, Ag Leader is a pioneer in the precision agriculture industry and offers a full line of precision farming technology for crop production. According to company founder and President Al Myers, Ag Leader produces high-quality, innovative precision agriculture tools and provides farmers technology to plan, plant, apply, and harvest more efficiently and accurately. Sam Worley, a sales specialist with Ag Leader, described Ag Leader's operations and led the ISRC group through their facilities, which are located near ISU's Research Park in Ames.

The ISU group traveled to Boone to tour Blomgren Seed after visiting Ag Leader. Blomgren Seed owner Sean Blomgren hosted the group and answered many questions about numerous agronomy-related issues and provided a tour of the company's warehouse. Blomgren Seed started in the late 1980s as a DEKALB Seed

dealership, but today the company offers specialty seed treatments, warehousing and habitat-management services in addition to selling seeds.

The ISRC tour visited Blomgren Seed near Boone, IA. Sean Blomgren, far right, answered many questions posed by the group.

Singh Named Associate Dean for Research at Iowa State

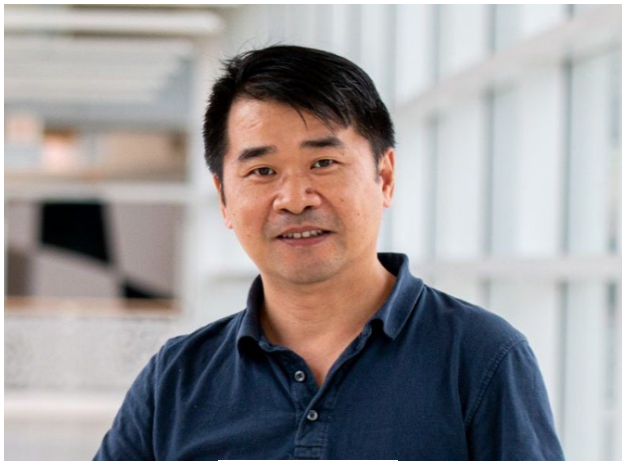
ISRC Co-director and Iowa State Professor of Agronomy Asheesh "Danny" Singh was appointed Iowa State University College of Agriculture and Life Sciences (CALS) associate dean for research and discovery and associate director of the Iowa Agriculture and Home Economics Experiment Station, effective January 1, 2025.

In his new role, Singh will provide strategic guidance on opportunities and challenges related to the college's research enterprise and further enable the college's graduate student programs. He will work with CALS Dean Dan Robison and the college's other associate deans to ensure operations advance and integrate across the college's missions and that resources are deployed wisely. Singh will engage with department chairs, center directors and individual faculty and programs to identify ways to amplify the resources, the impact and the scope of research activities across the college. Full article

Asheesh "Danny" Singh

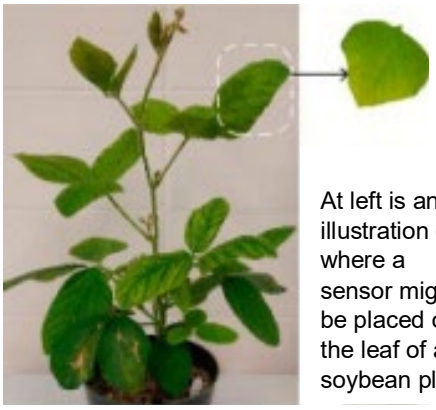
Iowa State Professor Creates Plant Sensors for the Early Detection of Soybean Diseases Through ISRC-funded Project

In 2021, the Iowa Soybean Research Center (ISRC) at Iowa State University funded research led by Professor of Electrical and Computer Engineering Liang Dong titled “Low-cost multimodal sensor arrays for early detection of soybean diseases.” The project included collaboration with Professor of Plant Pathology, Entomology and Microbiology Steve Whitham. The goal of the research was to develop sensors for low-cost monitoring and early detection of plant diseases. The following outcomes were described in a final project report to the ISRC in October 2024.



Liang Dong

Dong successfully developed a series of attachable plant sensors designed to monitor critical plant health indicators, which included reactive oxygen species, viruses, and pesticides. Creating sensors that detect disease before symptoms occur can alert farmers to potential problems and allow for the implementation of management practices to reduce disease spread.



At left is an illustration of where a sensor might be placed on the leaf of a soybean plant.

- The reactive oxygen species sensor utilizes a sensitive biohydrogel material to measure hydrogen peroxide, which is a key marker of stress in soybean plants. Producing results in less than three minutes, the sensor enables rapid and efficient stress assessment.
- The virus sensor identifies the presence of bean pod mottle virus in soybeans using specialized nanocavities that selectively bind virus particles. This sensor delivers accurate results in under two minutes, facilitating rapid detection of the plant virus.
- The pesticide sensor monitors dicamba herbicide absorption by soybean plants and herbicide residue on leaf surfaces. This technology provides real-time insights into herbicide uptake and waste, aiding in optimized herbicide use.

Together, the sensors offer a suite of portable, fast and efficient tools for tracking plant health, enabling better stress management and integrated pest management strategies for soybeans.

According to Dong, the project involved discovering how nanomaterials, microsystems and transducer technologies can be combined to create sensitive and selective sensors capable of detecting chemical and biological changes in plants. “The research demonstrates the ability to monitor plant responses under biotic stress, virus infection and herbicide absorption, providing insights into plant physiology beyond traditional measurements,” said Dong. “Practical applications of this research include the ability for farmers and agricultural industries to use these sensors for on-site, rapid and cost-effective monitoring of plant status.”

Dong added that the new knowledge and technology created in the project “have the potential to significantly impact the agricultural industry and farmers by improving crop management, reducing chemical inputs and promoting more sustainable farming practices.”

This project recently was selected to receive additional funding from USDA-NIFA. The final report of work accomplished with ISRC funds is available on the ISRC website.

Iowa State's New Weed Scientist Wesley Everman

Wesley Everman

Wesley Everman joined Iowa State University on November 1, 2024 as an assistant professor and extension weed specialist in the Department of Agronomy. The ISRC is excited to have Everman as a faculty affiliate.

Originally from northeast Iowa, Everman grew up on a farm near Decorah. He graduated with his BS in Agronomic Business and Marketing and an MS in Weed Science from Purdue University after which he earned his PhD in Weed Science from North Carolina State University. Following graduation, he accepted a position as assistant professor in weed science at Michigan State University. Everman subsequently returned to NC State and spent the last 13 years as a professor and extension weed specialist.

In addition to his extension appointment at Iowa State, Everman will conduct research and teach an upper level, weed management course in the fall of 2025. He anticipates initially having a heavy travel schedule, planning a "get-to-know-me" tour of Iowa that visits all corners of the state and having roundtable discussions with farmers and industry. He hopes the meetings will provide him a clearer directive on how to structure his research and what issues should be top priorities.

"I really want to be accessible, and I want to directly address challenges across the state," Everman said. "Helping growers implement tools that I know work here or find how best to adapt those tools, so that farmers in Iowa don't have to make drastic changes, moving that needle a bit on integrated management practices and control measures that keep resistance at bay. The challenge is to come in and hopefully get those things adopted: it's a big ask, and it's a big task."

Everman said he takes a direct, applied approach to managing weeds with extension and research going hand in hand. Precision weed mapping and spraying, weed biology and cultural weed management practices including cover crops are just some of the tools Everman intends to deploy to tackle herbicide resistant weeds.

"It's a big thing for me to return and have an opportunity to make an impact in my home state – herbicide resistance is here and it's a major concern. I have a lot of experience with herbicide resistant weeds, trying to manage them, and identify tactics and tools that growers can adopt," Everman said.

Read the full announcement from ISU Extension and Outreach

ISRC Affiliates Offer Expertise at ICM Conference

Above left: a panel consisting of (from left) Mark Licht, agronomy, farmers Matt Bormann and AJ Blair, Ryan Reimers, E4 Crop Intelligence agronomist and Joe McClure of the Iowa Soybean Association, discuss conservation practices at ISU's Integrated Crop Management Conference in December 2024. Above right, entomologist Erin Hodgson discusses soybean aphid insecticide resistance.

More than 500 farmers, agronomists and researchers attended the 35th ISU Extension and Outreach Integrated Crop Management Conference held December 11 and 12 at the Meadows Event Center in Altoona, IA. The ISRC was a supporting sponsor of the conference.

Several ISRC faculty affiliates, including Sotirios Archontoulis, Wesley Everman, Mark Licht and Richard Roth, agronomy; Erin Hodgson, Daren Mueller, Matt O'Neal, Alison Robertson and Greg Tylka, plant pathology, entomology and microbiology; Rabail Chandio and Chad Hart, economics; and Matt Helmers, agricultural and biosystems engineering, presented their latest research information and crop management recommendations.

Specific to soybean, Mark Licht and Joe McClure (Iowa Soybean Association) led a panel discussion on successful soybean and corn production while using conservation practices with Iowa farmers Matt Bormann and AJ Blair and E4 Crop Intelligence agronomist Ryan Reimers. Mueller spoke on soybean disease challenges and fungicide strategies. Tylka provided an update on soybean cyst nematode (SCN) management strategies with an emphasis on resistance management. Hodgson provided information on soybean aphid insecticide resistance. Everman spoke on herbicide-resistant weed challenges. Licht also spoke in a session on soybean seeding rates and row spacing.

Guest speakers presenting on soybean-related issues included Horacio Lopez-Nicora from The Ohio State University who provided an overview of present and future challenges of SCN, Seth Naeve from the University of Minnesota who attempted to help answer the age-old question, "How early should you plant soybeans?" and Anibal Cerrudo, a visiting professor at University of Minnesota from the Argentinian National Institute for Agriculture, who offered insight on optimizing soybean management.

Above left, Greg Tylka takes questions on SCN. Above right, Daren Mueller quizzes the audience about soybean diseases.

Alliant Energy Digital Agriculture Innovation Lab Opens

Above left, attendees visit different research displays at the new Alliant Energy Agriculture Innovation Lab following a ribbon cutting ceremony for the facility in December 2025. Above right, outside view of the front of the facility located just south of the ISU Research Park.

Over 400 people attended the ribbon cutting ceremony on December 5, to celebrate the opening of the Alliant Energy Digital Agriculture Innovation Laboratory located on the south side of the ISU Research Park in Ames. The new facility will work to enhance agronomic technology development in Iowa. Agricultural and Biosystems Engineering Professor and ISRC faculty affiliate Matt Darr serves as the lab's director.

Speakers at the ribbon cutting ceremony included Iowa State President Wendy Wintersteen, ISU Research Park President Rick Sanders, Iowa Department of Agriculture and Land Stewardship Secretary Mike Naig, Alliant Energy President Mayuri Farlinger and Director Matt Darr.

The 85,000 square foot facility will house the Digital Ag Innovation Team and agriculture-focused business tenants to utilize technology, research and development resources. The lab features designated spaces for students to engage in hands-on experiences. Activities will focus on developing technologies and products aimed at making agriculture more productive, efficient and profitable, such as smart sensors and control systems, precision agriculture, machinery electronics and Controller Area Network bus technology and biomass logistics.

Above, tours were provided of the Digital Ag Innovation Lab.

The Digital Ag team currently has 59 products being sold and distributed worldwide, including crop-yield sensors and AI technology to identify empty spaces in crop storage containers.

ISRC Sponsors Variety of Speakers for ISU in 2024

Above left, Kaiyu Guan, University of Illinois professor, discusses his research in precision agriculture. Above right, Iowa Secretary of Agriculture Mike Naig discusses conservation practices.

In recognition of the ISRC's 10th anniversary in 2024, the center provided funding to the Iowa State University Department of Agricultural and Biosystems Engineering, Department of Agronomy and Department of Plant Pathology, Entomology and Microbiology to host experts from outside the university as speakers for departmental seminars. Seminars were held during the spring and fall semesters to share information on timely topics with ISU faculty, students and staff.

In April, the Department of Plant Pathology, Entomology and Microbiology hosted University of Nebraska's Justin McMechan who provided an update on soybean gall midge research. More detail about Dr. McMechan's visit to ISU can be found in the April ISRC newsletter. In September, the Department of Agronomy hosted a panel featuring Northeast Iowa farmer Tim Burrack, Heartland Coop Conservation Manager Ruth McCabe and Syngenta Crop Protection Field Development Regional Head Brett Miller who provided a lively discussion on the benefits and challenges of integrating conservation methods into farming practices. Additional information about this panel discussion can be found in the October ISRC newsletter.

In November, the Department of Agricultural and Biosystems Engineering hosted University of Illinois Professor Kaiyu Guan, who is well known for his work in agroecosystem sensing and modeling. Much of Guan's research focuses on developing new modeling tools to improve accuracy and scaling (using scalable sensing) to predict agricultural outcomes on productivity and environmental impacts. He continues to revolutionize field-level modeling using satellite data and leveraging AI technology. Guan also spoke on the impacts of tile drainage. He developed a process-based agroecosystem called Ecosys that focuses on interactions between hydrology, biogeochemistry and plant growth to measure the impact on tile drainage and soil oxygen. His goal is to transform agricultural hydrology for use in sustainable agriculture production and healthy watersheds, thus improving water quality and quantity.

And in December, the Department of Agronomy hosted a visit with Iowa Secretary of Agriculture and Land Stewardship Mike Naig who discussed the tradeoffs of implementing conservation practices and how legislative policies may affect decisions by Iowa farmers.

Naig farms in Palo Alto County and is a proponent of no-till and traditional conservation practices such as cover crops, bioreactors, saturated buffers and preserving wetlands. He recommended, "Start small, try, get experience and then go bigger." When considering new conservation practices, he pointed out that incentives can also go a long way toward increasing conservation adoption by reducing risk through traditional cost-share programs. Naig told the audience that Iowa was the first state to allocate funds toward conservation efforts back in 1972 and how proud he is that Iowa continues to try to do even more by working with different ag commodity groups in leveraging state and federal resources.

Get to Know IAC Rep: Mike Rupert, Innvictis/Simplot

Mike Rupert, second from left, asks a question during a small group discussion at the ISRC's IAC meeting in September.

Mike Rupert is the director of agronomic sciences for the J.R. Simplot Company, an ISRC industry partner. He serves as a representative on the ISRC's Industry Advisory Council (IAC) for Innvictis/Simplot.

Based out of Sacramento, CA, Rupert leads the national agronomic sciences team for Simplot Grower Solutions. He oversees trials in crop protection, crop nutrition and seed product lines.

Simplot is an international food and agriculture company based in Boise, Idaho that distributes Innvictis agriculture products. Simplot is an innovator in plant nutrition and food processing and in researching new ways to feed animals, sustain ecosystems and feed a growing global population.

Of his time on the ISRC's Industry Advisory Council, Rupert said, "Working with the ISRC is a professional and innovation highlight of my year. The Council has expertise in the latest technologies, and we get to dialogue with some of the top researchers in agriculture. The knowledge and energy in the room to solve problems is invigorating. This past year we were also able to talk to some of Iowa State's top graduate students in a poster session, which was truly impressive. These young scientists showed me that the agricultural legacy in Iowa is thriving and our agriculture future is in good hands with the talent ISU is developing."

Rupert earned his MS in agronomy with a specialization in genetics and plant breeding from the University of California, Davis.

The SCN Coalition and BASF Hold SCN Workshop at ISU

Above left, Chelsea Harbach (far right) of the Plant & Insect Diagnostic Clinic and Professor Greg Tylka (in black, left of Harbach) answer questions about SCN following a laboratory session in which workshop participants viewed various SCN life stages under microscopes. Above right, ISU Research Scientist Chris Marett (in red) demonstrates how soil samples are tested for SCN.

On November 21, ISRC Co-director and Iowa State Professor of Plant Pathology, Entomology and Microbiology Greg Tylka led a hands-on educational workshop for farmers and agriculture media on soybean cyst nematode (SCN). The event was organized for and sponsored by BASF as part of the SCN Coalition.

Tylka opened the workshop with a review of SCN biology, and ISU Research Scientist Chris Marett demonstrated how SCN cysts are extracted from soil samples and how eggs then are extracted and recovered from the SCN cysts to be counted. Also, ISU Plant and Insect Diagnostic Clinic Diagnostician Chelsea Harbach took the group to a teaching lab where participants were able to look at SCN eggs, juveniles that hatch from the eggs and cysts under microscopes. Tylka and BASF Seed Treatment Product Manager Jeremiah Mullock concluded the workshop by answering questions after a presentation on SCN management.

ISU Researchers Funded by USB

The United Soybean Board (USB) approved $4.8 million in research funding to support 16 projects involving ISU researchers for fiscal year 2025. Following are projects that involve eight ISRC faculty affiliates serving as PI (principal investigator) or co-PI and five additional ISU researchers who are not affiliates of the ISRC.

Madan Bhattacharyya, agronomy, will serve as PI on a project titled "Introgression of Drought and Flood Tolerance Genes into Four Elite Soybean Cultivars through Backcrossing."

Michael Castellano, agronomy, will serve as PI on a project titled “Reducing Nitrous Oxide Emissions from Soybean through Early Planting and Cover Crops.”

Leonor Leandro, plant pathology, entomology and microbiology (PPEM), will serve as PI with **Daren Mueller**, PPEM, and **Danny Singh**, agronomy, as co-PIs on a project titled "Biology and Management of Soybean Stem Diseases."

Mark Licht, agronomy, will serve as co-PI on a project titled “Multi-State Validation of Management Methods for Sustainable Soy” led by Joe McClure, Iowa Soybean Association.

Daren Mueller and **Leonor Leandro**, PPEM, will serve as co-PIs on a project titled “Seedling Pathogens in Soybean: Disease Management and Farmer Education” led by Febina Mathew, North Dakota State University.

Daren Mueller, PPEM, will serve as PI on a project titled "Crop Protection Network: Delivering Soybean Research Results to Farmers through National Partnerships."

Daren Mueller, PPEM, will serve as co-PI on projects titled “Better Together: Bridging Soybean Disciplines to Collaboratively Deliver Soybean Best Management Practices” led by Rachel Vann, North Carolina State University and “Breeding and Screening Soybean for Resistance to Mature Seed Damage” led by Tessie Wilkerson, Mississippi State University.

Jamie O'Rourke, USDA-ARS, will serve as co-PI on a project titled “Increasing Resistance to Iron Deficiency Chlorosis through Gene Discovery and Multi-regional Coordinated Breeding” led by Robert Stupar, University of Minnesota.

Alison Robertson, PPEM, will serve as co-PI on a project titled “Developing Perfect Molecular Markers and New Germplasm for Rapid Incorporation of Resistance to Soilborne Pathogens of Soybean” led by Leah McHale, The Ohio State University.

Danny Singh, agronomy, will serve as co-PI on projects titled “Discovering and Deploying Genetic Solutions Across Maturity Groups for Durable Resistance to Multiple Nematodes” led by Zenglu Li, University of Georgia, “Yield Limitations of Soybean Varieties Under Drought: Identifying and Overcoming Weaknesses by Team Drought via Breeding, Genomics, Phenomics and Physiology” led by Ben Fallen, USDA-ARS and

“Understanding the Role of Root System Architectural Traits in Nutrition Acquisition and Carbon Sequestration in Soybean” led by Aaron Lorenz, University of Minnesota.

Additional Iowa State researchers involved in USB-funded projects for 2025 include the following:

Nicholas Gabler, animal science, will serve as PI with **Laura Greiner** and **David Rosero**, animal science, as co-PIs on a project titled “Evaluation of Feeding Conventional and High Oleic Full Fat Soybean in Grow-finish Pig Production.”

David Rosero, animal science, will serve as PI with **Laura Greiner** as co-PI on a project titled “High Soyhulls Inclusion in Gestational Sow Diets: A Comparative Analysis to Improve Sow Survivability.”

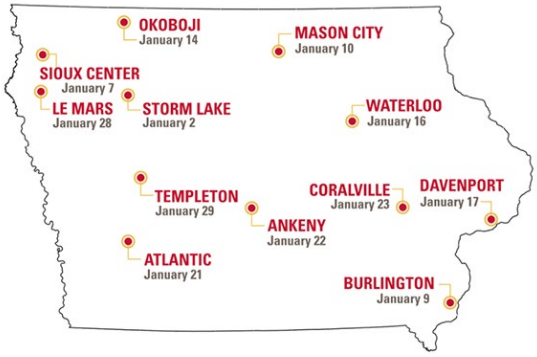
Laura Greiner, animal science, will serve as PI with **Dalton Humphrey**, **Nicholas Gabler**, **Kayla Miller** and **David Rosero**, animal science, as co-PIs on a project titled “Effects of Increasing SBM Inclusion With or Without Adjusted Essential Amino Acid Supply on the Growth Performance of Health Challenged Nursery Pigs.”

CropsTV Season 5 Now Available

ISU Extension and Outreach’s CropsTV has returned for a fifth season. New episodes are released weekly running from January 7 through February 18, 2025, and will remain open until April 15th. Viewers also have the option of earning CCA credits after viewing episodes.

ISRC affiliates featured in the episodes include Chad Hart, economics; Erin Hodgson, plant pathology, entomology and microbiology; Mark Licht, agronomy; Daren Mueller, plant pathology, entomology and microbiology; Wesley Everman, agronomy; Marshall McDaniel, agronomy; Alison Robertson, plant pathology, entomology and microbiology; Richard Roth, agronomy and Michelle Soupir, agricultural and biosystems engineering. A wide range of topics will be covered. For more information and to register, visit https://www.aep.iastate.edu/cropstv. The ISRC is a supporting sponsor.

Crop Advantage Series Meetings Being Held in January



ISU Extension and Outreach is hosting 12 meetings across the state during the month of January. For locations, topics and to register, visit https://www.regcytes.extension.iastate.edu/cas. These meetings are approved for continuing education credits for certified crop advisers and a private pesticide applicator continuing instruction course is also offered for an additional fee. The ISRC is a supporting sponsor.

SoyFest 2025! Save the Date: August 27

The ISRC will host SoyFest 2025 on Wednesday, August 27. This free, fun, outdoor, educational event is held biennially on ISU's central campus near Parks Library during the first week of fall semester classes in August, which also happens to be Soybean Month in Iowa. The event strives to inform ISU students, especially non-agriculture students, about the importance of soy in everyday living and to showcase the new and emerging uses of soy through interactive displays from a variety of exhibitors, ISU research labs and student clubs. The highlight of the event is a free cookout featuring grilled pork burgers ("processed soy") and soy-veggie Impossible Burgers.

Past participants of SoyFest have included the Iowa Soybean Association, the Food and Family Project, Corteva Agriscience, Chevron-REG, Okabashi Shoes, Old Capitol Food Company, Laura Soybeans, Iowa Smokehouse, the ISU Creamery, ISU's Bee Program and ISRC affiliates from the Iowa Pest Management group and faculty labs. SoyFest offers a wide variety of soy-related foods, games and giveaways.

Individuals who would like to participate in SoyFest 2025 as an exhibitor, providing giveaway items or treats or providing sponsorship or by volunteering, should contact Jill Cornelis at cornelis@iastate.edu or 515-294-7318. More information

Upcoming Events

January-April15: CropsTV Season 5

January 2-29: Crop Advantage Series

February 18-27: ISA Innovation to Profit Series Meetings

March 1-5: Commodity Classic, Denver, CO

July 23-26: Soy 2025: 19th Biennial Conference on Molecular & Cellular Biology of the Soybean, Madison, WI

August 27: SoyFest 2025, Iowa State University, Ames, IA

Each Wednesday at Noon - Iowa Learning Farms Webinars

Keep up with what's new at the ISRC on **LinkedIn** and **X** (formerly Twitter).

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for providing funding to make this newsletter possible.

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Have a newsletter idea or wish to subscribe? Email us at
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