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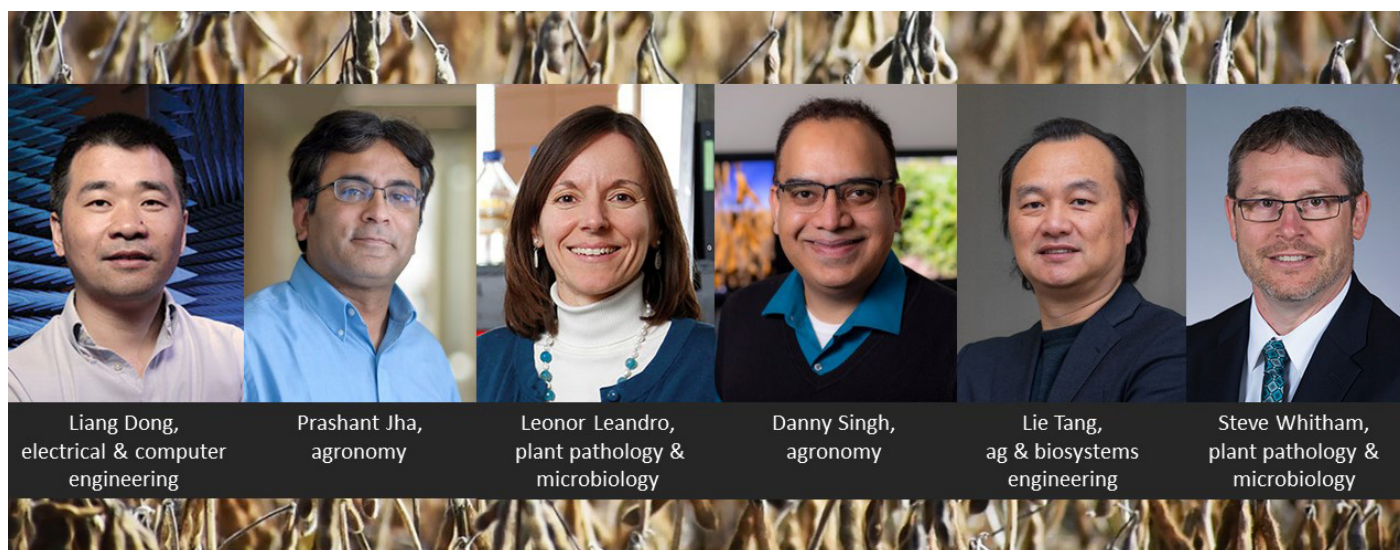
Iowa Soybean Research Center

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ISRC Funds Four Research Projects



The Iowa Soybean Research Center recently awarded funding for soybean research at Iowa State University. The center's Industry Advisory Council met in September to consider several research ideas and offer their guidance on how to invest the funds that were available. Due to the high quality and innovativeness of the proposed research and thanks to increased financial support provided by the Iowa Soybean Association, the ISRC granted a total of \$320,000 to four projects. This was the largest amount of funding ever invested by the center in a single year. The funded projects are described below.

Liang Dong, professor of electrical and computer engineering, and **Steve Whitham**, professor of plant pathology and microbiology, will receive two years of funding for a project titled "Low-cost Multimodal Sensor Arrays for Early Detection of Soybean Diseases." The research will aim to develop a diagnostic device for economical, rapid testing of soybean pathogens in order to better detect diseases at an early stage to reduce their spread and minimize damage. The technology will facilitate rapid monitoring of soybean crops during the growing season to help with making management decisions to protect yield potential. Also, the technology will be used by researchers to better understand pathogen-induced stress in soybean at different stages and under diverse conditions.

Prashant Jha, associate professor of agronomy and extension weed specialist, will receive two-year funding for a project on "Enhancing Implementation and Adoption of Non-Chemical Tactics for Integrated Weed Management in Soybean." Waterhemp is one of the most problematic and economically damaging weed species in soybean and its resistance to several herbicides has increased the need for management solutions. Jha received initial funding for this project from the USDA National Institute of Food and Agriculture Crop Protection and Pest Management Program in September 2021 with collaborators from Arkansas and Kansas. The funding from the ISRC will help Jha expand the

scope of the project through additional farm trials. His team will evaluate the effectiveness of two non-chemical weed management tactics (cover crops and harvest weed seed control) in conjunction with herbicides while also quantifying the economic benefits and risks of adopting a diversified integrated weed management program.

Leonor Leandro, professor of plant pathology and microbiology, will receive two years of funding to continue and expand a project the ISRC initially funded in 2020 titled “Time of Disease Onset as an Early Indicator of Soybean Resistance to SDS.” Leandro’s research team previously found that timing of the initial appearance of SDS foliar symptoms during the growing season was strongly correlated with late-season SDS severity and soybean yield. Leandro is exploring whether the timing of SDS symptom onset could be used as a more reliable measure of soybean resistance to SDS than late-season evaluations of disease that currently are used. The research could greatly benefit soybean breeding programs by improving screening methods used to identify soybean lines that are resistant to SDS.

Steve Whitham, professor of plant pathology and microbiology, **Lie Tang**, professor of agricultural and biosystems engineering, and **Danny Singh**, professor of agronomy, will receive funding to study “Effects of Increased Atmospheric CO₂ and Abiotic Stress on Soybean Performance in the Enviratron.” The team of researchers will investigate the performance of soybean with respect to disease development and abiotic stress tolerance under future climate scenarios. More specifically, the effects of CO₂ on soybean responses to pathogens as well as the effects of elevated ambient temperatures on soybean phenotype and gene expression will be studied. Experiments will be conducted in the Enviratron, a controlled-environment plant growth facility developed at Iowa State, to enable multiple environmental variables to be controlled to study effects on plant performance. The Enviratron is unique in that data collection is automated by the use of a robotic rover that visits the plants in growth chambers and collects data using an array of cameras and sensors that includes RGB, 3D, hyperspectral and thermal imaging and a fluorescence probe that measures photosynthetic activity. The long-term goal of this research is to generate scientific insights and inform forward-looking breeding approaches to develop soybean germplasm lines that are well suited for future crop production environments.

Greg Tylka, director of the ISRC, said, “We are very grateful for the thoughtful discussion and guidance of the farmers and industry representatives on the center’s Industry Advisory Council along with the increased financial support provided by the Iowa Soybean Association. We would like to thank the Iowa State researchers who submitted ideas, several of which were research concepts that were revised and improved based on feedback and guidance from the advisory council. The breadth of the research ideas considered for funding this year was notable and included collaborations of researchers combining talents and knowledge in different areas of expertise making the research multidisciplinary in ways we had not seen before.”

“Membership on the ISRC Industry Advisory Council continues to grow, as do company contributions and commitment from insightful council members. This year’s council discussion was enhanced by several innovative and potentially high-impact research proposals coming from small interdisciplinary teams of Iowa State University researchers. In the end, farmers representing the checkoff and company representatives provided funding and recommendations to support several important projects,” said Ed Anderson, senior director of research for the Iowa Soybean Association and chair of the ISRC advisory council.



Industry Advisory Council Chair Ed Anderson, second from bottom, gives opening comments during the group’s annual meeting.

Iowa Soybean Association Increases Its Financial Support of ISRC Research

At its board meeting on September 9, the Iowa Soybean Association doubled its financial commitment to the ISRC for fiscal year 2022. The ISA was able to increase the

amount of support provided to the center for the upcoming year from \$100,000 to \$200,000 due to higher soybean prices directly impacting checkoff dollars and the strong recommendation by farmers that research project proposals to the ISRC were innovative, aligned with the goals of ISA and important to Iowa soybean farmers. The increased support came following the ISRC's annual Industry Advisory Council meeting on September 3, in which council members wanted to fund more research projects than the budget would allow. The additional funding provided by the ISA and the funds from the center's 11 industry partners made this the largest amount of funding ever invested by the center in a single year.



ISRC's SoyFest a Huge Hit on ISU Campus



The ISRC's SoyFest event was well attended by students during the first week of classes at ISU.

The Iowa Soybean Research Center hosted its inaugural SoyFest on August 25, 2021. This fun and educational event was held on ISU's central campus to coincide with August as "Soybean Month" in Iowa and the start of fall semester. Activities included a free cookout featuring soy veggie and pork burgers, soy-related snacks, robotic demonstrations, giveaways, games and a photo booth. The ISU Creamery created a tasty new ice cream flavor that was a hit with students called "SoyFest" that featured chocolate custard ice cream with soy beverage and dark-chocolate-covered roasted soybeans. Iowa State University President Wendy Wintersteen, Dean of Agriculture and Life Sciences Dan Robison and CY all made appearances at the event.

Thanks to the following businesses and student groups that contributed to SoyFest: Cargill, Syngenta, REG, Iowa Soybean Association, Iowa Food & Family Project, Okabashi Shoes, Iowa Smokehouse, Iowa Turkey Federation, Morning Bell Coffee, ISU Creamery, Center for Crops Utilization Research, Agricultural Research Service - U.S. Department of Agriculture; and ISU Clubs: Agronomy, Culinary, Dietetics, Food Science, Block & Bridle Grill Team and the research labs of Eric Cochran, Danny Singh and Lie Tang. And, very special thanks to the Tylka Lab staff who helped in a variety of ways!



Clockwise from top left: Cy pilots one of Professor Danny Singh's drones, CALS Dean Dan Robison tries the ISU Creamery's "SoyFest" ice cream made specially for the event, the ISRC's Jill Cornelis and Greg Tylka pose with ISU President Wendy Wintersteen and Cy, students stop by the Agronomy Club booth that displayed commonly used products containing soy and students stand in line for pork and soy veggie burgers.

SoyFest Kicks Off with Meals from the Heartland



At left, Cy gives a thumbs up for Tylka Lab members packaging meals. At right, Iowa State volunteers help package meals.

In a kick-off event to SoyFest, the ISRC hosted Meals from the Heartland. ISU students, faculty and staff packaged 30,000 meals in which the main ingredient was soy protein. Meals from the Heartland is a nonprofit organization that helps feed food-insecure populations in over 37 countries. Some of the meals packaged were sent to Haiti. Joel O'Dell with Meals from the Heartland said, "Soy protein is the most life-saving ingredient in our formula." Special thanks to Cargill and Syngenta for providing funding to make this very special SoyFest-related event possible.



Close to 40 volunteers helped package 30,000 meals in just over two hours.

Enjoy the Sights and Sounds of SoyFest!

Our thanks to Brandon Kleinke, Integrated Pest Management at Iowa State, for creating the following videos from our SoyFest events.



Innvictis/Simplot Partners with the ISRC

Innvictis Seed Solutions distributed by Simplot Grower Solutions has joined the ISRC as an industry partner. In this role, Innvictis/Simplot provides financial support to the center and will have a representative serving on the ISRC's industry advisory council, which provides guidance on research funding priorities for the center.



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“It is wonderful to have Innvictis/Simplot join our center as an industry partner and we greatly appreciate their support,” said Greg Tylka, director of the Iowa Soybean Research Center and professor of plant pathology and microbiology at Iowa State. “They will provide a unique perspective to our advisory council as a manufacturer and retailer,” he said.

“Innvictis/Simplot is an exciting addition to the center’s forward-thinking group of industry partners, which will help us in advancing the needs of Iowa’s soybean farmers through innovative research,” said Ed Anderson, senior director

of research for the Iowa Soybean Association and chair of the ISRC's Industry Advisory Council.

ISRC Assists with Ag Media Meet & Greet



At left, ISU Agronomist Mark Licht answers questions during the meet and greet. At right, extension field crop pathologist Alison Robertson talks about crop conditions and diseases.

In August, the ISRC assisted in hosting an ag media/ISU Extension meet and greet at the ISU Field Extension Education Lab (FEEL) near Boone, IA. ISRC affiliate and assistant professor of agronomy Mark Licht came up with the idea due to some personnel turnover during the pandemic in the ag media ranks as well as at ISU. The event brought ISU researchers and subject matter experts together with ISU and external agricultural communicators.

Associate Dean for ISU Extension and Outreach and Director of Agriculture and Natural Resources Extension Jay Harmon welcomed attendees while extension experts gave brief overviews on their areas of expertise and answered questions on a variety of topics. FEEL served as a good backdrop for interviews as several researchers have test plots at the location. Materials were provided that gave contact information for each ISU researcher/subject matter expert by topic, including a special set of fact cards closely resembling baseball cards.

Thank you to the following ISU experts who made this event possible: entomologist Erin Hodgson, weed scientist Prashant Jha, agronomists Mark Licht and Antonio Mallarino, economist Chad Hart, agricultural engineer and Iowa Nutrient Research Center Director Matt Helmers, field crop pathologists Daren Mueller and Alison Robertson, and nematologist and ISRC Director Greg Tylka.

Iowa State Hosts NC-1197 Meeting



From left, South Dakota State's Emmanuel Byamukama, Kansas State's Marty Draper and University of Missouri's Kaitlyn Bissonnette engage in discussion during the NC-1197 meeting.

In July, ISRC staff assisted in hosting the NC-1197 meeting at Iowa State University, which was sponsored by the North Central Soybean Research Program (NCSRP). Scientists from several states attended in person and virtually. NC-1197 is a multi-state research project on the Practical Management of Nematodes on Corn, Soybeans and Other Crops of Regional Importance, established in 1998 by the Agricultural Research, Extension, and Education Reform Act to encourage and enhance multistate, multidisciplinary research on critical national or regional issues. Today, the group is led by the Crop Protection and Pest Management Program under the U.S. Department of Agriculture's National Institute of Food

and Agriculture. The group meets annually at locations throughout the north central U.S. to provide updates on conditions and ongoing research in each state.

NCSRP Senior Director of Research Ed Anderson gave an update announcing the addition of Pennsylvania to the states belonging to the NCSRP as well as funding priorities for yield enhancement, soybean productivity, and yield preservation. He encouraged the NC-1197 group to consider pursuing collaborative and coordinated projects to propose to NCSRP, as they tend to have a better chance of receiving funding. ISRC Director and SCN Coalition Co-lead Greg Tylka reported on SCN Coalition activities, which included discussion on the success of the [“Let’s Talk Todes” video series](#) that focuses on soybean cyst nematode (SCN) management practices. The coalition is currently working on a 6th edition of the SCN Management Guide.

Researchers gave updates on studies being conducted in each state. Much of the research continues to focus on SCN with studies taking a closer look at the increase in SCN reproduction on resistant varieties, soil testing that shows a dramatic jump in SCN population numbers (when comparing data from the late 1990s to 2020) and determining what soybean varieties are still somewhat resistant to SCN that should be used in crop rotations.

Participating institutions included the University of Illinois, Iowa State University, Kansas State University, Michigan State University, University of Minnesota, University of Missouri, University of Nebraska, North Dakota State University, The Ohio State University, Purdue University, South Dakota State University, University of Wisconsin, and the USDA’s Agricultural Research Service, Crop Protection and Pest Management Program and National Institute of Food and Agriculture.

Get to Know IAC Rep: Will Cornelius, Cornelius Seed

Will Cornelius is Vice President of [Cornelius Seed](#) and serves as Cornelius Seed’s representative on the ISRC’s Industry Advisory Council. Cornelius Seed is one of the ISRC’s original industry partners from its inception in 2014.

Cornelius is an agronomist, certified crop adviser and soybean lead for his family’s seed company near Bellevue, Iowa, which started in 1935. They produce and market corn and soybeans primarily in Iowa, Illinois and Wisconsin. Their mission is to provide growers with the industry’s leading genetics, traits and service to maximize profits on every acre. He enjoys working with farmers and those involved in the agriculture sector to find solutions to the challenges that agriculture presents each year.

Cornelius said, “Organizations like the Iowa Soybean Research Center and the Iowa Soybean Association are critical to helping farmers be successful in growing a profitable and bountiful crop. The research being done and sponsored by these types of organizations is fundamental in helping mitigate risks and in finding the best practices for each farming operation.”

“Serving on the advisory committee is a very rewarding experience as I get to bring industry and farmer perspectives to the table to help influence the next generation of research and development. It is amazing to see the potential projects that are out there to help improve our understanding of how to be more productive and sustainable,” said Cornelius.

Cornelius is a graduate of Iowa State University with a BS in Agronomy and MS in Seed Technology and Business.



Will Cornelius

Researcher Spotlight: Thomas Baum

ISRC affiliate Thomas Baum is a Charles F. Curtiss Distinguished Professor of plant pathology and microbiology at Iowa State University. He has been a faculty member at Iowa State since 1995 and served as chair of the plant pathology and microbiology department from 2005-2020.

Baum studies one of the most damaging groups of plant-parasitic nematodes, which is responsible for billions of dollars in annual yield losses. His research focuses on the compatible interaction between sedentary nematodes and their host plants with particular emphasis on the soybean cyst nematode, the sugar beet cyst nematode and root-knot nematodes. His lab works to understand the molecular, genetic and biochemical events of successful plant parasitism with an increasing emphasis on cell biological and genomic approaches. These efforts include characterization of changes in plant and nematode gene expression during the different phases of parasitism, functional characterization of genes involved in the plant-nematode interaction, and most importantly, the study of nematode effector proteins, which are the molecules secreted by the nematodes into their host plants to enable parasitism.

Baum says understanding the compatible plant-nematode interaction will allow him and other scientists to interfere with parasitism through genetic engineering of host plants in order to solve major agricultural and horticultural problems. For example, by using gene silencing or genome editing approaches, Baum hopes to decrease plant susceptibility to nematodes.

The ISRC has funded two of Baum's research projects. In 2015, the ISRC funded his project, "RNA-based Approaches for Resistance to Nematode Pathogens of Soybean" and in October 2020, Baum's project "Mechanisms of Defense Suppression by Cyst Nematode Effectors," received two-year funding. In February 2020, Baum's lab published the genome of the soybean cyst nematode.

Baum received his BS equivalent in agricultural sciences from the University of Bonn, Germany, his MS equivalent from the Technical University of Munich, Germany and his PhD in plant pathology from Clemson University and completed his post-doctoral research at the University of Georgia before joining the faculty at Iowa State.



Thomas Baum

Schulte Moore Named 2021 MacArthur Fellow

Lisa Schulte Moore, ISRC affiliate and professor of natural resource ecology and management at Iowa State University, has been named a 2021 MacArthur Fellow. This prestigious award, sometimes called a "genius grant," identify scientists, artists, entrepreneurs and others who have demonstrated exceptional creativity and who show promise for important future advances. Schulte Moore is the first ISU faculty member to receive a MacArthur Fellowship. She's conducted groundbreaking research as a landscape ecologist working closely with farmers to build more sustainable and resilient agricultural systems. [Full article](#)



Lisa Schulte Moore, photo courtesy of the John D. and Catherine T. MacArthur Foundation

Upcoming Events

- Wednesdays at noon – [Weekly Iowa Learning Farms Webinars](#)
- Oct. 27 – [Iowa Soy for Plant-based Protein Convening](#)
- Dec. 1-2 - [2021 Integrated Crop Management Conference](#)



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