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THE NEWSLETTER OF THE SEED SCIENCE CENTER AND BIOSAFETY INSTITUTE FOR GENETICALLY MODIFIED AGRICULTURAL PRODUCTS



MEMORIAL FUNDRAISING INITIATIVE HONORS SEED PATHOLOGIST LISA SHEPHERD JENKINS

The Iowa State University Seed Science Center, the American Phytopathological Society (APS), and the American Seed Trade Association (ASTA) have partnered to establish a fundraising initiative to honor the memory of former Iowa State University seed pathologist Lisa Shepherd Jenkins.

Shepherd Jenkins, director of the administrative unit of the National Seed Health System and seed health testing coordinator for the Seed Science Center, died July 1 at the age of 43, following a brief battle with amyloidosis and multiple myeloma.

“Lisa was an incredibly talented and driven individual who impacted the lives of countless individuals,” said Seed Science Center Director Manjit Misra. “Not only was she an internationally respected expert in seed health, heading the most active phytosanitary seed-testing program in the country, but she was also a strong advocate for the seed industry and for Iowa State.”

The goal of the fundraising initiative has been set at a minimum of \$50,000. It offers contributors two options for giving. One option is to contribute to the Lisa Shepherd Jenkins Memorial Scholarship which will provide scholarships to undergraduate students who are engaged in seed science and technology at Iowa State University. The other option is to contribute to the Lisa Shepherd Jenkins Memorial Fund which will provide awards to seed professionals who wish to enhance their career by attending the American Phytopathological Society annual meeting.

Misra says the fundraising initiative is a fitting way to honor Shepherd Jenkins’ memory. “The advances that Lisa made in seed pathology and seed health during her career were her legacy to the next generation of the seed industry. What better way to continue her legacy of giving forward than to do our part to help educate the next generation of seed industry professionals,” he said.

Individuals wishing to contribute to the Lisa Shepherd Jenkins Memorial Fundraising Initiative can do so by visiting the secure online giving link at: www.foundation.iastate.edu/shepherdjenkins or by contacting the Iowa State Seed Science Center at seedsci@iastate.edu.

For more information about the Lisa Shepherd Jenkins Memorial Fundraising Initiative see page 15.



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—Manjit Misra



To feed the future,
we must first *seed* the future.

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REMEMBERING LISA SHEPHERD JENKINS

Lisa Shepherd Jenkins, director of the Administrative Unit of the National Seed Health System (NSHS) and seed health testing coordinator for the Iowa State University Seed Science Center, had a great love for seed science and the seed industry. She possessed a natural leadership ability and an infectious enthusiasm for helping others. Lisa was a tireless champion for phytosanitary issues relating to seed health, and was highly regarded by seed industry colleagues from around the world.

As Administrative Director for the NSHS, Lisa facilitated the accreditation of private companies to conduct phytosanitary testing and worked to standardize laboratory and field inspection methods across the U.S. She collaborated with the USDA-APHIS and the American Seed Trade Association on international trade issues dealing with seed, and focused her efforts on science-based solutions to remove unnecessary phytosanitary restrictions.

As Seed Health Testing Coordinator for the Seed Science Center, Lisa headed the most active phytosanitary seed-testing program in the country, conducting tests on more than 350 different host-pathogen combinations. More than 95 percent of all seed samples certified for export in the United States were processed in Lisa's lab.

Lisa also served as Chair of the American Seed Trade Association Emerging Diseases Committee; Chair and member of the American Phytopathological Society Seed Pathology Committee; and as a member of the National Seed Health System/Plant Protection and Quarantine/ National Plant Advisory Group.

On a personal note, Lisa (BS '95 agronomy and seed science; MS '99 plant pathology) devoted 23 years of her life, in one capacity or another, to Iowa State University. A dedicated student and member of the Cyclone Marching Band, Lisa joined the Seed Science Center as a student seed analyst in 1991. Throughout her career, Lisa enjoyed life to the fullest and excelled at helping others. She was in constant motion whether at the Seed Science Center, on the RAGBRAI route, or cheering loudly at a Cyclone game. Lisa and her husband Andy loved to travel, and frequently arranged group trips for family and friends. Ever adaptable, Lisa was comfortable in any environment, whether it was inspecting a muggy cornfield, reading a book on a beach, blazing a trail down Chicago's Michigan Avenue, or quietly working in the background at a meeting. Lisa helped everyone around her to be a better person. But perhaps her greatest gift was her ability to bring and keep people together. Lisa was fiercely loyal to Iowa State, to her family and friends, and was *very much* loved.



Contributed photos.

IOWA STATE PART OF GRANT TO IMPROVE AG POLICY IN GHANA

Ed Adcock, Iowa State University News Service



John Beghin

Iowa State University has joined a partnership to improve agricultural policy making, policy analysis, and implementation in the African country of Ghana.

The work is funded by the U.S. Agency for International Development (USAID) through its Feed the Future Agriculture Policy Support Project. Iowa State joins Chemonics, an international development company; the Center for Policy Analysis, a non-governmental think tank in Ghana; and the Ghana Institute of Management and Public Administration on the four-year, \$15 million grant.

The ISU component of the project is led by John Beghin, professor of economics and a researcher in the Center for Agricultural and Rural Development, and Manjit Misra, director of the Seed Science Center who leads the Global Food Security Consortium. Iowa State's subcontract in the grant is worth \$1.145 million.

This project is called the Ghana Feed the Future Agricultural Policy Support Project. It is a capacity building project that will focus on policies affecting seeds and fertilizer use, and smallholder subsistence farming.

Ghana's agriculture sector represents 30 percent of its gross domestic product and 50 percent of its employment, but is not growing at a pace needed to eliminate food insecurity. The project is designed to complement other USAID efforts by supporting measures where the political will for reform connects with the constraints facing agribusinesses.



Seed Science Center Director Manjit Misra (front row, sixth from left) traveled to Washington, D.C., in June to take part in the Presidents United to Solve Hunger forum.

MISRA PARTICIPATES IN PUSH INTERNATIONAL FORUM

Excerpts from "The PUSH to End Hunger" by Shalom Khokhar.

Seed Science Center Director Manjit Misra attended the Presidents United to Solve Hunger (PUSH) international forum held at the National Press Club in Washington, D.C., in June.

PUSH is an initiative that unites universities in the fight against hunger and malnutrition. Nearly 80 universities spanning six continents are now members of PUSH, having signed the Presidents' Commitment to Food and Nutrition Security. Among them are Iowa State University, The Ohio State University, Texas A&M University, and Cornell University. By signing PUSH, university leaders are agreeing to make food and nutrition security a priority on their campus.

"The purpose of the forum was to develop an action plan to be undertaken by PUSH member universities," said Misra. The action plan introduced during the event involved four core areas: teaching, research, outreach, and student engagement. As part of the introduction and mapping plan, member universities were encouraged to share information with other PUSH campuses in an effort to stimulate cross-university collaborations and as a means to highlight the wealth of knowledge available at the respective universities.

International Food Policy Research Institute (IFPRI) Director General Shenggen Fan summed up the forum message in his address. "Ending hunger will not be achieved unless there is a strategy supported by knowledge and research. Research institutes and universities play a key role in this endeavor," he said.

MAIER NAMED GFSC ASSOCIATE DIRECTOR



Dirk Maier

Dirk Maier, professor of Agricultural and Biosystems Engineering at Iowa State University, was named Associate Director of the Global Food Security Consortium in August.

Maier, a specialist in grain quality and stored product protection engineering, mathematical modeling of stored grain ecosystems, and feed technology and process operations, is the former administrative director and lead PI of the USAID-funded Feed the Future Innovation Lab for the Reduction of Post-Harvest Loss at Kansas State University.

"Dirk is an excellent choice for Associate Director of the consortium," said GFSC Director Manjit Misra. "He has leadership experience with international food security projects, and brings with him a vast background of knowledge in post-harvest technology and in training business leaders, industry professionals, and government officials around the globe on all aspects of grains and oilseeds."

Prior to coming to Iowa State, Maier—a registered professional engineer—also served as Head of the Kansas State University Department of Grain Science and Industry where he was responsible for leading the teaching, research, and outreach programs. He also directed the International Grains Program Institute.



Agronomy Associate Professor Susana Goggi is interviewed by journalists in Ghana during an ATT training workshop.

GOGGI, RODRIGUEZ FACILITATE GHANA ATT WORKSHOP

Agronomy Associate Professor Susana Goggi traveled to Ghana in August with University of Illinois Associate Professor Lulu Rodriguez. Both served as trainers for a workshop sponsored by the Feed the Future U.S. Agency for International Development (USAID) Agricultural Technology Transfer Project and the International Fertilizer Development Corporation.

The purpose of the workshop, titled “Mind, Media, and Messages,” was to improve understanding about agricultural biotechnology and biosafety in Northern Ghana. Information provided will prepare participants to confidently answer tough questions about the safety and benefits of biotechnology.

Forty-five individuals attended the workshop, including 25 journalists, 13 scientists, and others.

“The workshop provided an opportunity for individuals from the scientific community and the media to meet and form long-lasting relationships,” said Goggi. “They now have access to quality information that will enhance their understanding of the complexity of biotech and biosafety issues, and will help to dispel any fear or misconceptions they might have previously held on the topic. This will have an impact on the quality of biotech and biosafety media coverage in the area.”



SEMI's Project Manager Yuh Yuan Shyy calibrated equipment and conducted a six-day workshop in Kenya this summer.

SHYY CALIBRATES EQUIPMENT, CONDUCTS SEMIS WORKSHOPS

Seed Science Center Scientist and Senior Engineer Yuh-Yuan Shyy traveled to the University of Nairobi in Kenya in June and August this year as part of the Seed Enterprise Management Institute (SEMI's) project.

Shyy, who serves as project manager, tested and calibrated newly installed equipment at the SEMI's conditioning plant in June. While there, he trained faculty and staff in the operation of the machines.

Shyy returned to Kenya August 17-22 to facilitate a six-day workshop that was attended by thirty-two individuals. Workshop attendees were from small, privately owned seed companies and government state-owned seed companies from 12 countries located throughout Eastern and Western Africa. Shyy discussed seed testing, seed conditioning and storage, and seed policies and regulations with the participants.

SEMI's was established in 2009 to eradicate food insecurity through capacity building in sub-Saharan Africa. Since the project's inception, Iowa State has provided assistance for the physical design and acquisition of equipment for the SEMI's conditioning plant and seed testing laboratory. The Institute includes seed conditioning, storage, and drying facilities; training facilities; and a seed laboratory.

Quality Management for Seed Enterprises in Developing Countries: A Reference Manual authored by Joe Cortes and Adelaida Harries is now available in the Iowa State University Extension Online Store.



NEW MANUAL INTRODUCES PROCESS MANAGEMENT CONCEPTS

Former Seed Science Center Global Program Leader Joe Cortes and Co-leader Adelaida Harries (retired) have developed a reference manual for seed entrepreneurs from developing countries. The 154-page manual titled *Quality Management for Seed Enterprises in Developing Countries: A Reference Manual* was designed to aid seed business owners and others obtain the skills necessary to build a strong seed industry based on high-quality varieties.

The manual introduces process management concepts in a comprehensive step-by-step format that is easy for readers to follow and implement.

“Joe and Adelaida devoted their careers to enhancing the lives of smallholders and entrepreneurs around the world,” said Seed Science Center Director Manjit Misra. “We are extremely proud of the work that they have conducted for our Global Seed Program, and of this new excellent resource they have authored. We are offering it online, so that we can make it available globally to benefit those who need it most.”

TO PURCHASE A COPY:

Copies of the *Quality Management for Seed Enterprises in Developing Countries* can be purchased online by visiting the Iowa State University Extension Online Store at: <http://store.extension.iastate.edu/Product/Quality-Management-for-Seed-Enterprises-in-Developing-Countries>.

A PDF is also available for download.

To view a video of Goggi's interview visit:

www.youtube.com/watch?v=OW_aZrS4UM0&feature=youtu.be

GUNTUKU JOINS GLOBAL SEED PROGRAM



Dileepkumar Guntuku

Dileepkumar Guntuku, former global leader for the Knowledge Sharing and Innovation (KSI) Program of the International Crops Research Institute for the Semi Arid Tropics (ICRISAT), joined the Seed Science Center in September. He will serve as Program Leader for the center's Global Seed Program.

"I am very excited to welcome Dileep to our center," said Director Manjit Misra. "His experience and expertise in information and communication technologies is considerable. He is an excellent leader, trainer, and researcher, and has led a number of outstanding initiatives that have made a significant impact on farmers, scientists, and students around the world. This makes him an excellent fit for our Global Seed Program."

Guntuku holds a BS in agriculture; MS degrees in agricultural entomology and in agricultural information technology; a PhD in information and communication technology (ICT); and a graduate certificate in human computer interaction.

While at ICRISAT, Guntuku led the KSI program, directed the Center of Excellence ICT Innovations for Agriculture, was a Coordinator for the South-South Initiative, and served as a member on the Institute's Research Committee and Risk Management Team. Under his leadership, ICRISAT opened a Center of Excellence in ICT Innovations for Agriculture to bring strategic partnerships from diversified areas to work on novel initiatives including open data and knowledge solutions, Big Data in Agriculture, Massive Open Online Courses, and ICT for Development. He received the 2013 Flame Award for showcasing innovative use of technology for the decade, and the 2014 Director General's Global Medal of Honor for his outstanding contributions to the ICRISAT.

"Projects that I have designed in the past have integrated science, technology, and value-chain approaches to develop affordable innovative technologies for smallholders," said Guntuku. "They have incorporated ICTs and knowledge transfers, extension, and capacity-building activities to address pressing global issues ranging from seed security and climate change to global food security. I look forward to developing new strategies for Iowa State that will impact the farmers of Africa and other countries who depend on information for their livelihoods."

An Indian national, Guntuku has extensive international experience. He has worked at several national and international agencies in various capacities and has contributed to various projects including the M.S. Swaminathan Research Foundation, Dhirubhai Ambani Institute of ICT, the World Bank, the USAID, the German Development Corporation, the Commonwealth of Learning, and the Agricultural Model Intercomparison and Improvement Project (AgMIP).

Zorrilla Seminar Focuses on Uruguayan Rice Market



Gonzalo Zorrilla

Gonzalo Zorrilla, director of the National Rice Research Program for the Instituto Nacional de Investigación Agropecuaria (INIA) in Uruguay, presented a seminar on "The Seed System, a Key Factor for Uruguayan Rice Competitiveness" at the Seed Science Center in September. Zorrilla received his master's degree from Iowa State where he conducted his graduate research with Drs. Allen Knapp and Denis McGee.



ASTA SCHOLARSHIP RECIPIENTS TRAVEL TO WASHINGTON, D.C.

Four recipients of the Undergraduate American Seed Trade Association (ASTA) Convention Scholarship had an opportunity to attend the 132nd Annual ASTA Convention in June.

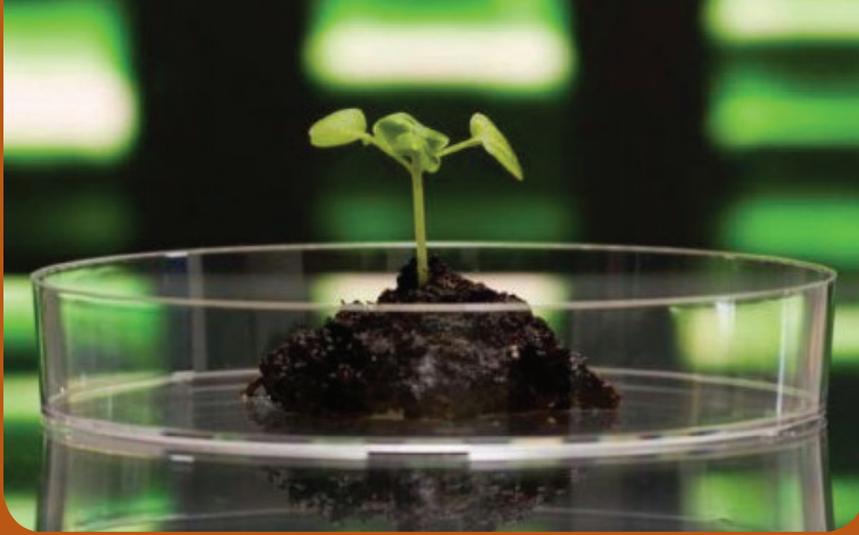
Iowa State students Elizabeth Wlezien, Gabe Sweers, Hiago Antonio Oliveira da Silva, and Jordan Summers (pictured above) earned an all-expenses paid trip to Washington, D.C., to attend the convention. During their trip they "stormed" Capitol Hill and had an opportunity to meet with Senator Joni Ernst and an aid for Senator Chuck Grassley. They also attended sessions and networked with seed industry professionals.

"This opportunity was incredible," said Wlezien. "The information and knowledge I gathered from my experiences will only be the beginning of my journey in this field."

The Undergraduate ASTA Convention Scholarship is awarded to Iowa State University undergraduates with a desire to enhance their interest in seed science and the seed industry.

Below: Hiago Antonio Oliveira da Silva, Gabe Sweers, and Elizabeth Wlezien had an opportunity to discuss seed industry topics with U.S. Senator Joni Ernst during their visit to Capitol Hill.





Jeff Wolt is a Professor of Agronomy and Toxicology and a risk analyst for the Biosafety Institute for Genetically Modified Agricultural Products (BIGMAP) at Iowa State University.

RESEARCH HIGHLIGHT—

GENOME EDITING: A NEW OPPORTUNITY FOR CROP IMPROVEMENT?

J.D. Wolt, K. Wang, and B. Yang. (2015). The Regulatory Status of Genome-edited Crops. *Plant Biotechnol. J.* doi: 10.1111/pbi.12444.

With nearly 450 million acres planted worldwide in 2014, it is difficult to call genetically modified crops a failure, but nearly two decades after their first commercial introduction GM crops continue to elicit considerable public controversy. Increased regulatory burdens and delays brought about by public questioning of the technology have led to development costs and timelines that are so great that relatively few crops and traits are commercially available. And these costs and times to market mean there are very few opportunities for public sector scientists to develop small market GM crops as a public good.

New breeding technologies, especially those based on the emerging tools of genome editing, may offer renewed opportunities for biotechnology crop development. A wide array of tools have emerged that afford a way to specifically edit any location within a plant's genome by targeting editing machinery to cause changes ranging

from single point mutations to whole gene additions or deletions (see box 1). The initial excitement among scientists has been to use these tools to investigate gene function by mutation or knockouts of specific genes. But this excitement has rapidly shifted to using gene editing to generate useful plant traits, some of which are well along the development pipeline (see box 2). Because the tools involved are readily accessible to the individual researcher and are proving quite simple to use, there are tremendous opportunities emerging for using genome editing to improve crops that are too expensive to develop using transgenic techniques.

Jeff Wolt, professor of agronomy and member of BIGMAP, has been evaluating the current state of public and regulatory opinion regarding gene-edited crops as a member of ISU's Crop Bioengineering Consortium. Wolt and fellow consortium members Bing Yang and Kan Wang have reported their assessment of the state of scientific and regulatory opinions on the subject in a recently published review

in the *Plant Biotechnology Journal*. The authors note that when the potential for gene editing for novel trait development was first recognized, regulators and scientists saw opportunities for crop improvement that avoided the controversies of GM crops. This is especially true for those applications that caused simple point mutations at specifically targeted sites on genes, since these 'site-directed mutations' are not considered as regulated throughout most of the world. Early interest in Europe; however, has started to cool because of emerging questioning by civil society groups. Thus far both U.S. and Canadian regulators have found ways to accommodate the technology, but the regulatory status of crops being developed by genome editing remains uncertain.

The full article of this research "The Regulatory Status of Genome-Edited Crops" can be found at: <http://onlinelibrary.wiley.com/doi/10.1111/pbi.12444/epdf>.

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Box 1. Current gene-editing techniques used for trait discovery and development.

CRISPR	Clustered Regularly-Interspaced Short Palindromic Repeats	Programmable nucleases comprised of bacterially derived endonuclease (Cas9) and a single-guide RNA (sgRNA).
EMN	Engineered Mega Nuclease	Microbially- derived meganucleases that are modified, fused, or rationally designed to cause site-directed double strand breaks. Also referred to as LAGLIDADG endonucleases or homing nucleases.
OMM	Oligonucleotide Mediated Mutagenesis	Site-specific mutation with chemically-synthesized oligonucleotide with homology to the target site (other than for the intended nucleotide modification).
TALEN	Transcriptional Activator-Like Effector Nuclease	Programmable nucleases comprised of the DNA binding domain of Xanthomonas-derived TAL effectors fused with FokI restriction endonuclease.
ZFN	Zinc Finger Nuclease	Programmable nucleases comprised of the DNA binding domain of a zinc-finger protein and the DNA-cleaving nuclease domain of the FokI restriction endonuclease.

Box 2. Early examples of genome editing for development of useful traits in important crops.

Crop	Trait	Technique	Citation
Barley	Phytase reduction	TALEN	Wendt et al., 2013, <i>Plant Mol. Biol.</i> 83, 279–285.
Cotton	Herbicide tolerance and insect resistance stacking	EMN	D’Halluin et al., 2013, <i>Plant Biotechnol. J.</i> 11, 933–941.
Maize	Herbicide tolerance	OMM	Zhu et al., 1999, <i>Proc. Nat. Acad. Sci. USA</i> , 96, 8768–8773.
Maize	Herbicide tolerance and phytase reduction	ZFN	Shukla et al., 2009, <i>Nature</i> , 459, 437–441.
Maize	Male sterility	EMN	Djukanovic et al., 2013, <i>Plant J.</i> 76, 888–899.
Rice	Herbicide tolerance	OMM	Okuzaki and Toriyama, 2003.
Rice	Bacterial blight resistance	TALEN	Li et al., 2012, <i>Nat. Biotechnol.</i> 30, 390–392.
Rice	Bacterial blight resistance	sgRNA/Cas9	Jiang et al., 2013, <i>Nucleic Acids Res.</i> 41, e188. doi:10.1093/nar/gkt780.





Above: Arlene Mitchell, executive director of the Global Child Nutrition Foundation; John Bowman, senior agriculture adviser with the USAID Bureau for Food Security; and Sara Lilygren, executive vice president of corporate affairs for Tyson Foods Inc.; were featured speakers at the 2015 Global Food Security Consortium and Leroy & Barbara Everson Seed and Biosafety Symposium.

SYMPOSIUM FOCUSES ON WHOLE SYSTEMS APPROACH TO GLOBAL FOOD SECURITY

The Global Food Security Consortium (GFSC) and the Seed Science Center at Iowa State University welcomed experts from around the world to discuss the components necessary for addressing global food security at their 2015 symposium titled “Interlocking the Pieces for Global Food Security.”

More than 180 scientists, seed industry professionals, and others attended the Global Food Security Consortium and the Leroy & Barbara Everson Seed and Biosafety Symposium, which focused on using a whole systems approach to global food security.

The symposium offered sessions on nutrition; capacity building, education, entrepreneurship and public/private partnerships; and the production environment — seed, soil, livestock, and water. It was held April 14-15 at the Gateway Hotel and Conference Center in Ames, Iowa.

“Meeting the challenge of global food security involves examining every step of the food value chain,” said Manjit Misra, director of the Global Food Security Consortium and Seed Science Center. “Much like the pieces of a puzzle, several key components need to come together to ensure a safe and nutritious food supply.”

During the symposium speakers discussed ways to use innovative research and climate-resilient crop and livestock science, education, and technology transfer to more efficiently and sustainably feed our growing population.

Featured speakers included Arlene Mitchell, executive director of the Global Child Nutrition Foundation; John Bowman, senior agriculture adviser with the United States Agency for International Development Bureau for Food Security; Sara Lilygren, executive vice president of corporate affairs for Tyson Foods Inc.; and Linda Logan, professor in the Department of Veterinary Pathobiology at Texas A&M University.

Mitchell, who spoke on “The Ag-Nutrition Nexus: Unmet Potential,” discussed ways to link agricultural development goals to school meal programs to improve the return on investments in nutrition, health, education, and agriculture. “Every person in this room is affected by the ag-nutrition nexus,” she said. “The economics of ag and nutrition are astoundingly important.”

Other speakers included: Joe Cortes, Iowa State University (Retired); Lora Iannotti, Washington University/St. Louis; Helen Raikes, University of Nebraska; Yuan Zhou, Syngenta Foundation; Elcio Guimaraes, International Center for Tropical Agriculture (CIAT); Lorna Butler, Former Wallace Chair at Iowa State University; Paula Bramel, Global Crop Diversity Trust; Venkat Reddy, Feed the Future Innovation Lab for the Reduction of Post-Harvest Loss, Kansas State University; and Suat Irmak, University of Nebraska/Lincoln.



Top: Joe Colletti, ISU senior associate dean (far right); and Bottom: Jitendra Srivastava, World Bank, retired (far right); moderated panel discussions during the symposium.

This is the third symposium to be held as part of the Leroy & Barbara Everson Seed and Biosafety Symposium series launched in 2013. It was sponsored jointly by funding from the Iowa State University Presidential Initiative supporting the Global Food Security Consortium and by a generous contribution from the family of Leroy Everson, former director of the Iowa State University Seed Laboratory.

Videos of the 2015 GFSC and Leroy & Barbara Everson Seed and Biosafety Symposium can be found at: www.globalfoodsecurity.iastate.edu/videos/2015.



MAUNDER EARNS SEED SCIENCE OUTSTANDING ACHIEVEMENT AWARD

Bruce Maunder, retired senior vice president of sorghum research at DEKALB Genetics, was awarded the Outstanding Achievement Award in Seed Science, Technology, and Systems during the 2015 Global Food Security Consortium and Leroy & Barbara Everson Seed and Biosafety Symposium.

College of Agriculture and Life Sciences Endowed Dean Wendy Wintersteen presented the award, that recognized Maunder for his exemplary leadership, commitment to excellence, and years of service as Chair of the Seed Science Center Advisory Council. "We honor Bruce today for his contributions to the Seed Science Center and to agriculture, as a scientist, an industry leader, and for increasing the world food supply through research on a crop that he is passionate about—sorghum," said Wintersteen.

Maunder earned a BS in agriculture from the University of Nebraska and an MS and PhD in agriculture from Purdue University. As a sorghum researcher and breeder, he helped to develop more than 150 commercial sorghum hybrids grown on as many as 10 million acres annually in more than 35 countries.

In his retirement, Maunder combines his education with an interest in international agriculture and food security as he works to increase agricultural production worldwide. He volunteers his expertise with organizations such as the National Sorghum Producers, contributes to academic reviews, lectures, and advisory committees, and provides support for grants and scholarships.

Maunder resides with his wife Kathy in Lubbock, Texas.



BRUMM NAMED SUKUP GLOBAL PROFESSOR IN FOOD SECURITY

College of Agriculture and Life Sciences Endowed Dean Wendy Wintersteen announced Thomas Brumm as the new Mary & Charles Sukup Global Professor in Food Security on April 14 during the 2015 GFSC/Leroy & Barbara Everson Seed and Biosafety Symposium.

Brumm, an associate professor in agricultural and biosystems engineering, is Associate Director of ISU's Center for Sustainable Rural Livelihoods, where he has been working with post-harvest storage loss in Uganda, one of the poorest countries in the world.

To view a video of the announcement visit: vimeo.com/125154965.

GFSC CO-SPONSORS HEAT STRESS SYMPOSIUM

More than 80 people from the U.S. and abroad attended the "Climate Change: Biological Consequences of Heat Stress" symposium held in Kildee Hall on the Iowa State University campus April 16-17. The symposium, which was co-sponsored by the Global Food Security Consortium (GFSC) at Iowa State, focused on climate change effects on the nation's food supply.

"Iowa State University is fast becoming a leading center in addressing the critical issue of livestock adaptation to climate," said Max Rothschild Charles F. Curtiss Distinguished Professor of Agriculture and Life Sciences and co-director of the consortium. "This event was an important opportunity for key stakeholders to gather to exchange information and collaborate on research efforts to mitigate climate-change effects and ensure the sustainability of our food supply."



Pictured at the Iowa Seed Association awards ceremony are Agribusiness Association of Iowa Chairman Max Smith, ISU Seed Science Center Director Manjit Misra, Kathryn Hoemann, Katharina Wigg, Thomas Sobota, Morgan Shrader, Madison Schulte, Lucas Roberts, Catherine Leafstedt, Hillary Kletscher, Jeffrey Barnes, Brandon Miller, and ISU Associate Professor Susana Goggi.

HOEMANN NAMED MISRA SCHOLAR

Kathryn Hoemann from Clive, Iowa, was named the Manjit K. Misra Outstanding Senior Seed Scholar at the Iowa Seed Association (ISA) Annual Convention and awards ceremony in February.

Hoemann also received an ISA scholarship at the event, which was held in conjunction with the Agribusiness Showcase and Conference in Des Moines.

An agronomy major with a secondary major in genetics, Hoemann is passionate about plant breeding. She has interned at Monsanto and DuPont Pioneer, and has participated in the ISU Honors Program where she researched high-throughput PCR and electrophoresis methods.

Eight other Iowa State students were also awarded \$1,000 ISA scholarships for the 2014-2015 school year at the event. They included Jeffrey Barnes, Hillary Kletscher, Lucas Roberts, Catherine Leafstedt, Madison Schulte, Morgan Shrader, Thomas Sobota, and Katharina Wigg. Brandon Miller was named the American Seed Trade Association Scholarship recipient.

This is the ninth year that the Misra Scholarship has been awarded to Iowa State students. Bruce and Kathy Maunder provide funding for the scholarship that is awarded on the basis of academic excellence, leadership, and interpersonal skills, along with a demonstrated interest in a career in seed science or in the seed industry.



COMMENTARY: WET CONDITIONS MAY GIVE RISE TO PHOMOPSIS IN SOYBEAN CROPS

by Iowa State Seed Laboratory Manager Mike Stahr

Photo by Barb McBreen

In central Iowa this year weather conditions progressed from a mild drought in March to precipitation every few days throughout the spring and summer. As a result of the continuous wet weather, Northern Corn Leaf Blight has been reported to be rearing its ugly head in corn fields across the state, and cereal seeds are exhibiting disease problems. *Phomopsis* sp. on soybean seed is an unfortunate possibility. Therefore, quality seed and grain may be in shorter supply than thought.

Wet conditions have been here and they have to be dealt with. Weather conditions in August and September will be critical in determining whether *Phomopsis* sp. and other fungi will be an issue. If the overwintering bodies of *Phomopsis* sp. (pycnidia) are present on soybean pods, rainy and foggy weather in these months may cause the *Phomopsis* sp. to move to seeds from pods. At the Seed Lab, we have already seen the effects of the wet weather on wheat, rye, and other cereals. *Fusarium* spp. on dry seeds can be indicated by a white or pink coating on the seeds, or from the presence of shrunken seeds, but its absence doesn't guarantee quality seed. That is why seed testing is necessary. In the lab, fluffy mycelium can cover areas of rolled paper towels, and can even be found growing on the outside of the towels. Seed treatments can be effective in controlling fungi, but their effectiveness depends in part on the severity of the infection. Seed treatment can benefit living seeds. However, it is not effective on dead or nearly dead seeds. A standard (warm) germination test can provide clients with useful information on the types of fungi present in a seed lot. However, if you wish to quantify the

amount of each fungi present in a seed lot, you will receive the most accurate results by requesting a blotter or plate health test.

2015 may be the type of year that compels farmers and seed producers to rely heavily on the expertise of seed and plant pathologists. As many of you may already be aware, Iowa State University and the seed industry recently lost an internationally respected expert in seed pathology. Lisa Shepherd Jenkins, seed health testing coordinator for the Seed Science Center and director of the administrative unit of the National Seed Health System (NSHS), passed away July 1 after a short, valiant battle with amyloidosis and multiple myeloma.

Lisa was instrumental in standardizing testing for various seed-borne pathogens and reducing the number of pathogens requiring testing for shipment of seeds to countries around the world. She had a hearty laugh and ready smile and worked tirelessly with countless individuals at all levels of the seed industry on seed health issues. Lisa was also well known by many at the American Seed Trade Association's conferences—events that won't be the same without her.

A scholarship fund is being established in Lisa's memory. (See page 15 for more details.) This is extremely appropriate as Lisa was a strong advocate for the Seed Science Center at Iowa State. She did an amazing job of sharing her knowledge with everyone that she came in contact with.

At Iowa State University the Plant and Insect Diagnostic Clinic (www.ent.iastate.edu/pidc) is an excellent resource for diagnosing plant and seed health problems. In addition, the Seed Science Center's Gary Munkvold (munkvold@iastate.edu) is an internationally renowned

DID YOU KNOW?

For more than 41 years, the Seed Science Center at Iowa State has provided training for seed industry professionals through short courses and workshops. Each April through August Seed Conditioning Specialist Alan Gaul and Seed Lab Manager Mike Stahr facilitate workshops covering topics from seed testing and cleaning, to gravity separation, color sorting, and seed treatment.

In 2015, 217 individuals traveled from 14 states in the U.S. and 8 countries including Canada, Belgium, Brazil, China, Germany, Nigeria, and the United Kingdom to attend Iowa conditioning workshops.

A highlight of the 2015 series was the additional coverage of the new Satake Evolution color sorting equipment.

For more information about Seed Science Center training opportunities, visit www.seeds.iastate.edu/seedtest/training.html.



expert in plant pathology research on *Fusarium* spp. and resulting mycotoxins in seed and grain.

As always, feel free to contact me at mgstahr@iastate.edu or Iowa State Seed Lab Customer Care at seedlab@iastate.edu with any of your seed testing questions or needs.



STB Graduate Student Emily Tobin (left) discusses program curriculum with Program Coordinator Lori Youngberg (right) during a recent campus visit. The STB program has experienced increasing enrollment for the past three semesters.

GRADUATE PROGRAM IN SEED TECHNOLOGY AND BUSINESS EXPANDS COURSE OFFERINGS

The online master's program in Seed Technology and Business (STB) at Iowa State is growing in numbers again. Online learning has been gaining popularity over the last ten years—and the online STB program is no exception.

“With the program’s increasing enrollment, it became clear that the students would benefit from courses being offered more often in order to allow additional participants into the program,” says Lori Youngberg, program coordinator for the STB program. Youngberg believes the curriculum change not only allows the program an opportunity to continue to grow and broaden in scope, but it also offers students already in the program more flexibility as they move forward.

Fifty-seven students are enrolled in the program this fall, with new applications continuing to climb each semester. In both the summer and fall semesters of 2014 the STB program experienced a record number of students enrolled into the program. The broad reach of the STB program currently encompasses students who are employed at more than 15 seed companies of varying sizes. Students originate from 11 countries worldwide and 21 states domestically.

Youngberg attributes the program growth to several key factors. “The STB program offers not only both seed science and MBA courses as part of its curriculum, but it also provides an opportunity for online learners to enhance their understanding of the seed industry in a very relevant way. Students tell us they use what they are learning in the program in their jobs on a daily basis.”

Another factor impacting enrollment in online programs like the STB program is an educational shift that is taking place around the world. “I think for our society as a whole, our ‘comfort level’ with online learning is progressing rapidly. More than ever before, students are viewing these new learning opportunities as significant, and they value them. It isn’t necessary to interact face to face with an instructor or classmates,” says Youngberg.

Advancements in online technology allow students and faculty to network and form relationships without ever meeting. “In some ways online learning encourages constituents to network more often because discussion boards and social media groups encourage frequent interaction,” she says.

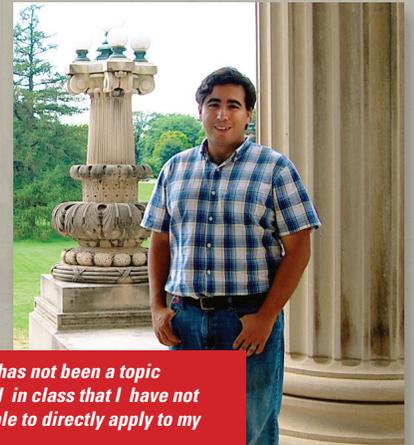
Initiated in 2008, the Graduate Program in Seed Technology and Business at Iowa State offers an interdisciplinary online Master of Science degree, which provides students with current seed science and technology instruction along with essential courses in business management in a rigorous, integrated curriculum. The program also offers graduate certificates focusing on seed science and technology and on seed business management. To date, approximately 30 seed industry professionals have graduated from the program.

YOUNGBERG NAMED STB PROGRAM COORDINATOR

Seed Technology and Business (STB) Program Assistant Lori Youngberg has recently been named Program Coordinator. Youngberg, who holds a master’s degree in educational leadership and policy studies from Iowa State University, brings with her more than seven years of experience working in online learning and with the STB program. She replaces Anoop Sindhu who served as STB Program Manager from August of 2013 - August 2015.

IOWA STATE UNIVERSITY

ONLINE GRADUATE PROGRAM IN SEED TECHNOLOGY AND BUSINESS



“There has not been a topic covered in class that I have not been able to directly apply to my work.”

*Cristobal Gonzalez,
STB Student*



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PROMOTING UNDERGRADUATE RESEARCH

Each year the Seed Science Center at Iowa State provides support for undergraduate research. From left: Undergraduate research assistants Ashley Dean and Katharina Wigg husk and extract seed embryos for their research project on defoliated seed corn. The project is supervised by Agronomy Lecturer Erik Christian and Agronomy Associate Professor Susana Goggi.

RESEARCH HIGHLIGHT—

PHYSICAL AND PHYSIOLOGICAL CHANGES IN PREMATURELY DEFOLIATED SEED CORN

Erik Christian and Susana Goggi, Iowa State University

Seed corn is harvested while still at high moisture content and dried artificially. This practice is implemented to avoid the threat of an early fall frost event which negatively affects seed quality. More recently, seed companies have implemented a seed corn production practice of early chemical defoliation. This practice accelerates seed maturation allowing earlier harvest, reduces seed size, and possibly, improves seed vigor. However, early defoliation may increase the amount of low density seed in a seed lot.

Iowa State seed science graduate and Agronomy Lecturer, Erik Christian, and Agronomy Associate Professor Susana Goggi teamed up with DuPont Pioneer to uncover the effects of early defoliation on seed characteristics. Two undergraduate students in agronomy, Katharina Wigg and Ashley Dean, are participating in this research. The research is partially supported by a public/private partnership. The students' research assistantships are partially supported by the Seed Science Center, the Department of Agronomy, and an undergraduate research assistantship program from Iowa State University's Office of Student Financial Aid.

For more information about this research:

Erik Christian and Susana Goggi. Ongoing. Plans are to submit the research findings from this project to *Crop Science* for publication in 2016.

SANDVE RETIRES AFTER 30 YEARS AT SEED SCIENCE CENTER

When Connie Sandve first joined the Seed Laboratory at Iowa State in 1985 things were vastly different from today. "When I started working at the Seed Lab, everything was handled manually. There was only one computer in the entire building," laughs Sandve. "In fact, at that time there was no Seed Science Center."

Seed Laboratory Director Allen Knapp originally hired Sandve to provide secretarial services for the Seed Lab. Sandve later went on to work for Seed Science Center Director Manjit Misra performing center administrative duties while continuing to assist with Seed Lab duties as necessary.

Sandve admits that during her career she has witnessed significant changes in the center. "I have watched the Seed Science Center grow from a small department governed by Plant Pathology to an internationally recognized seed center. And from a small building to what it is today," she says. "I have worked for two center directors and couldn't pick a favorite. Both were great to work for."

"It's hard to say goodbye to someone like Connie," said Seed Science Center Director Manjit Misra. "She has been the glue that has held this center together for so many years. She has always instinctively known what needs to be done to get things accomplished, and simply did it. Yet, she always made the Seed Science Center a welcoming place for everyone who came through our door."

Although Sandve and her husband Tom are "officially" retired, you may see her sitting behind a center computer screen or hear her voice on the Seed Lab customer service phone from time to time. "I plan to work part-time for awhile at the center," she says. "We also plan to do some traveling. And we want to spend more time with our two granddaughters. We have another grandchild due in December and that's exciting. The Seed Science Center has been my home for 30 years. It's a place that people come to work and many people stay until the end of their career. There is a real family atmosphere here."



Administrative Secretary Connie Sandve (front row second from left) is pictured with her family during her retirement party in February.

Nancy Gonzalez
*Postdoctoral
 Research Associate*



Postdoctoral Research Associate Nancy Gonzalez joined the Seed Science Center in June of 2015. A native of Puerto Rico, Gonzalez manages the center DNA Lab and conducts research for Plant Pathology and Microbiology Professor Gary Munkvold.

“My main responsibilities include the development and validation of molecular seed health testing methods for pathogens in maize and tomato,” says Gonzalez. As part of her job, Gonzalez manages technical review panels for the National Seed Health System (NSHS). She also organizes peer reviews of seed health testing methods—methods that must be approved before they can be used for phytosanitary testing of seed pathogens in the U.S.

As DNA Lab Manager, Gonzalez oversees the daily operations of the lab and provides support to center graduate students and staff. “I like working in Dr. Munkvold’s lab because I’m learning about a wide range of pathogens that I haven’t had the opportunity to work with before—specifically viruses and viroids,” Gonzalez said. “And, I enjoy my work because I know it makes a difference. The research that I conduct here will help to create additional seed health tests that will be used by the government as well as seed industry companies to obtain federal phytosanitary certificates that will allow for the international movement of seeds.”

The seed health tests that Gonzalez is working to develop will be used to test seeds for pathogens of phytosanitary importance for the U.S. They will help prevent the introduction of pathogens that could cause great harm to U.S. agriculture and will improve the quality of seed produced in the U.S. for exports.

(Continued)

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Tyler Tunning
*Interim Trait
 Lab Coordinator*



Interim Trait Lab Coordinator Tyler Tunning has a passion for agriculture research in both laboratory and field settings. Graduating from Iowa State in 2012 with a BS in horticulture and an emphasis in fruit and vegetable production, Tunning took a job in the Seed Science Center DNA Lab as a student and hasn’t looked back since.

In his current position as Interim Trait Lab Coordinator, Tunning tests commercial seed lots for the presence or absence of biotech traits. Testing that he oversees includes bioassays, immunoassays, and PCR-based testing for insect and herbicide resistance traits in both corn and soybean. He also assists the Seed Health Lab with PCR testing for screening of viral and bacterial pathogens. “These tests are important as a final, third-party check to pass the legal requirements for percentage of resistance in certain seed lots before they are released to our customers,” says Tunning. “Tests for adventitious GMO presence and for pathogen screening have been coming through our lab more frequently,” he said.

The tests that Tunning and his staff perform benefit smaller seed companies trying to release seed to customers by providing trait verification. They also aid organic companies that don’t want biotech traits in their material. In addition, they prevent undesired traits or pathogens from being introduced into countries that lack infrastructure to properly monitor the impact of a transgenic crop being introduced into their economy. “Obviously, countries without reports of



certain pathogens want to ensure harmful diseases do not cause a detrimental impact on their industry,” he says.

Research for Tunning involves optimizing tests for improved efficiency and developing tests for newly released traits. He assists others in the Seed Science Center by providing high-throughput testing for various seed pathogens.

Originally from Sioux City, Iowa, Tunning worked in the R&D Division in the Genetic Discovery and Double Haploid Wheat groups for DuPont Pioneer in Johnston, Iowa, for four years prior to coming to Iowa State.

According to Tunning, working for the Iowa State Seed Lab has been a positive experience. “This position allows me to work with several different crops and pathogens, and allows me the freedom to use a variety of methods to achieve confident results,” he said. “In addition, working at a university gives me the reassurance of having experts to troubleshoot problems and share ideas for new test development.”

Tunning says he also enjoys the Seed Lab’s welcoming environment. “Everyone seems to want to do anything they can to provide me with the help and assistance I need. I have worked in several different environments where this was not always the case.”

An Ames resident, Tunning is looking forward to meeting other young professionals in the area and taking part in community activities such as sporting events, golf, and kayak fishing.

Gonzalez (Continued)

Gonzalez holds a BS and MS in plant breeding from the University of Puerto Rico and a PhD in plant pathology from the University of Nebraska-Lincoln. She and her husband Jose live in Ankeny with their daughters Adri and Ilianna.

Lisa Shen
Program
Coordinator



Working at the Seed Science Center is presenting a variety of new opportunities and experiences for Program Coordinator Lisa (Lin) Shen.

Shen joined the Seed Science Center in May from the Office of Budget and Finance in the College of Agriculture and Life Sciences (CALs) at Iowa State. A CALs employee for seven years, Shen specialized in accounting, budgeting, and grant management. That experience, along with a thorough knowledge of federal, state, and university policies and procedures, has made Shen's transition to the Seed Science Center a fairly easy one.

Shen holds a BS in accounting and an MBA from Iowa State. As Program Coordinator for the Seed Science Center, her duties include working with the center director, program leaders, external domestic and international partners, subcontractors, and consortium members. She performs such tasks as managing accounts and expenditures, making fiscal projections, developing and reviewing proposal budgets, human resource management, and many more.

Originally from Shanghai, China, Shen has lived in the U.S. since 2002. Although not raised on a farm, she says she finds working with others in agriculture rewarding. "I enjoy meeting and helping people from developing countries all over the world working in agriculture-related fields," she says. But Shen admits that some of the duties required of her new position at the Seed Science Center vary from those she has performed in the past. "This job is enhancing my human resources and leadership skills," she said. "I am enjoying working with, and learning from everyone." Shen lives in Ames with her husband and two children.

Fabricio Lanza
Visiting Scientist



Brazilian visiting scientist Fabricio Lanza came to the Seed Science Center to conduct research for two reasons. "In my opinion, Iowa State University is one of the best universities in agronomy science, and [Plant Pathology and Microbiology Professor] Gary Munkvold is one of the best phytopathologists in maize; specifically in *Fusarium*-maize pathosystems. My dream was to work here."

Lanza's visit was arranged as part of a scientific exchange program sponsored by CAPES, a foundation established within the Ministry of Education in Brazil. Lanza, a Scientist Assistant with the Brazilian Agricultural Research Corporation (EMBRAPA), is originally from Sete Lagoas in Minas Gerais, Brazil. He is an Agronomist Engineer with an MS and PhD in phytopathology from the Federal University of Viçosa.

As a graduate student, Lanza had the opportunity to read a number of articles authored by Munkvold on maize. As a result of his interest in scientific research and his desire to learn more about *Fusarium*, Lanza set out to find an opportunity to work with Munkvold.

Lanza conducted research at the Seed Science Center from February-September of 2015. While at Iowa State, he worked to better understand a new *Fusarium* species in maize called *Fusarium temperatum*. "It has high potential for mycotoxin production," he said. Lanza also studied the pathogenic behavior of the species. "We made the morphological and molecular identification using modern molecular tools," said Lanza. "As a result, we are doing work to determine a good control strategy, and we are testing the Bt and non-Bt maize hybrids in field



conditions against the damages caused by *Fusarium temperatum*."

"We have a big problem with mycotoxin contamination and *Fusarium* infection in corn around the world," said Lanza. "In Brazil, we have a lack of information concerning control strategies for *Fusarium* and mycotoxin contamination in maize. The research I conducted while at Iowa State can help provide information about strategies in maize breeding and control methods against this new *Fusarium* species and other *Fusarium* species in Brazil."

According to Lanza, agricultural practices differ greatly between Brazil and the U.S. "In Brazil we have two-season planting—sometimes three. Brazil is a tropical country, and we have some different maize hybrids. But, in general, we have the same problems involving maize diseases, so control methods can be applied to both countries."

Lanza has also been working to identify a fungal species in milkweed, which is causing problems with efforts to restore monarch butterfly habitats.

Lanza says that working with Munkvold and the faculty and staff at Iowa State has been the highlight of his career to date. "I have learned many things that I will never forget. This experience was all that I was hoping for," he said. "When I return to my country, I will continue my work at EMBRAPA and will create a project that includes the new scientific methods that I have learned here. Some conditions in Iowa are different, but I will adapt the methods for Brazil."

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Lisa Shepherd Jenkins Memorial Fundraising Initiative



HELPING EDUCATE THE NEXT GENERATION
OF SEED INDUSTRY PROFESSIONALS



THE LISA SHEPHERD JENKINS MEMORIAL FUNDRAISING INITIATIVE

The Iowa State University (ISU) Seed Science Center, the American Phytopathological Society (APS), and the American Seed Trade Association (ASTA) have partnered to establish a fundraising initiative to honor the memory of former Iowa State University seed pathologist Lisa Shepherd Jenkins.

The goal of the fundraising initiative has been set at a minimum of \$50,000. It offers contributors two options for giving: the Lisa Shepherd Jenkins Memorial Scholarship, and the Lisa Shepherd Jenkins Memorial Fund.

Individuals wishing to contribute to the Lisa Shepherd Jenkins Memorial Fundraising Initiative can do so by completing the back panel of this brochure and mailing it to the Iowa State University Foundation, or, by visiting the secure online giving link at:

[www.foundation.iastate.edu/
shepherdjenkins](http://www.foundation.iastate.edu/shepherdjenkins)

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TWO WAYS TO GIVE

The Lisa Shepherd Jenkins Memorial Scholarship

will provide scholarships to undergraduate students engaged in seed science and technology at Iowa State University.

The Lisa Shepherd Jenkins Memorial Fund

will provide awards to seed professionals who wish to enhance their career by attending an American Phytopathological Society annual meeting.

For more information, contact:

Dr. Manjit Misra
102A Seed Science Building
Iowa State University
Ames, Iowa 50011-3228
mkmisra@iastate.edu
515-294-6821

www.seeds.iastate.edu

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