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

USDA Chief Scientist and Under Secretary for Research, Education, & Economics Catherine Woteki (left) and Consul General of India Mukta Tomar (right) were featured speakers at the 2012 Seed Science Center and BIGMAP Symposium.

NINTH SEED SCIENCE CENTER AND BIGMAP SYMPOSIUM FOCUSES ON TECHNOLOGY, CO-EXISTENCE

The Ninth Seed Science Center and BIGMAP Symposium titled "Agricultural Biotechnology Regulation, Trade, and Co-existence" was held April 18 at the Gateway Hotel in Ames, Iowa.

More than 110 scientists, policymakers, and individuals from agricultural industry shared current research and perspectives on the role of regulation in biotechnology and genetically modified agricultural production during the one-day event. Speakers offered diverse perspectives on how innovation is shaping approaches, not only to regulation, but also to far-ranging broad social issues.

In her keynote address titled "Global Platforms for Sustainable Intensification of Agriculture" Catherine Woteki, USDA chief scientist and under secretary for Research, Education, & Economics, focused on policy innovation. "I believe that a forward-thinking agricultural science policy can get us to where we need to be to sustainably intensify agriculture over the next few decades—and to keep pace with a more crowded planet," she said.

Woteki outlined six strategic platforms to achieve a sustainable food supply. She also noted that topics of food availability and food policy are often in the public eye. "This interest is a great opportunity, one that we in the food and the agricultural research community really can't afford to pass up," she said. "We need to nurture this interest with a clear and focused vision of where we need to get to—how we can get there. With a plan for open, coordinated science, I believe we can turn this interest into the action the world desperately needs," she said.

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"By the year 2050 our population will rise to more than 9 billion. As scientists and policymakers, we will be responsible for feeding this future generation. I believe that to feed the future, we must first seed the future."
—Manjit K. Misra

To Feed the Future, We Must First *Seed* the Future

IOWA STATE UNIVERSITY

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SEED SCIENCE CENTER AND BIGMAP SYMPOSIUM

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Other speakers during the morning session included Gregory Jaffe, director for the project on biotechnology at the Center for Science in the Public Interest, who spoke on "The Changing Domestic and International Landscape for Biotechnology and Biosafety;" Alison Van Eenennaam, extension specialist for animal genomics and biotechnology at the University of California, Davis, who discussed "Genetically Engineered Animals Tangled in Regulatory and Political Deadlock;" Thomas Redick, Global Environmental Ethics Counsel, who presented "Litigation Surrounding Ag-Biotech Regulatory Approvals;" and Jack Bobo, senior advisor for biotechnology at the State Department, who addressed "Trade Wreck? When Ag Policy Meets Reality."

The Consul General of India, Mukta D. Tomar, delivered the luncheon address. Introduced by Seed Science Center Director Manjit Misra, Tomar offered insights into the opportunities and challenges that agricultural stakeholders in India face during her presentation "Promoting Trade Between the United States and India through Science and Technology."

The second session of the day, devoted to co-existence, was a continuation of the discussion initiated at the 2011 Seed Science Center and BIGMAP Symposium. Seed Science Center advisory council chair Bruce Maunder opened the session by introducing Sano Shimoda of BioScience Securities, Inc. Shimoda's presentation was titled "Science and Technology Has Opened up Pandora's Box in Agriculture—Are You Ready for Surprises?"

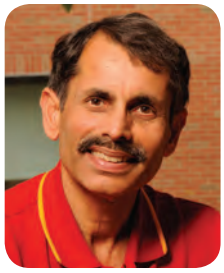
Also speaking during the afternoon session were Adrianne Massey, managing director of science and regulatory affairs, food and agriculture, for the Biotechnology Industry Organization, who spoke on "Industry Perspectives on Stewardship for Genetically Modified Agricultural Products;" Nicholas Kalaitzandonakes, director of economics and management for the Agrobiotechnology Center at the University of Missouri, Columbia, who presented "Unintended Trait Presence from Genetically Modified Crop Production;" and Wallace Huffman, Iowa State University Charles F. Curtiss distinguished professor of Agriculture and Life Sciences, who discussed "Managing for Co-existence."

"This year's symposium theme was really about alleviating world hunger," said Misra. "By the year 2050 our population will rise to more than 9 billion. As scientists and policymakers, we will be responsible for feeding this future generation. I believe that to feed the future, we must first *seed* the future."

The 2012 Seed Science Center and BIGMAP symposium was made possible with funds from the Food and Fuel Initiative: Iowa and the United States Department of Agriculture.

Audio recordings of the 2012 symposium are available at: www.extension.iastate.edu/broadcasts/bigmap/2012/.

MISRA APPOINTED TO NATIONAL GENETIC RESOURCES ADVISORY COUNCIL


Manjit Misra

In April, U.S. Secretary of Agriculture Thomas Vilsack announced the appointment of Manjit Misra as Chair of the National Genetic Resources Advisory Council (NGRAC). Misra is the Director of the Seed Science Center and one of nine individuals (including six scientific members and three general public members) to be appointed to the council.

"I am honored to be given the opportunity to serve on this council," said Misra. "The impact that it can have on the future of agriculture is significant. I believe that we need all types of agriculture—conventional, biotech, and organic—for the total improvement of the world's food supply."

Originally established by the Food, Agriculture, Conservation, and Trade Act of 1990, the NGRAC has been re-established to make recommendations on actions and policies for the collection, maintenance, and utilization of genetic resources; to make recommendations for coordination of genetic resources plans of several domestic and international organizations; and to advise the Secretary of Agriculture and the National Genetic Resources Program (NGRP) Director of new and innovative approaches to genetic resources conservation.

In addition, the NGRAC offers guidance on methods to ensure that the NGRP serves the needs of all farmers for high-quality and diverse seed (both genetically engineered and non-genetically engineered). It also offers strategies for maintaining plant biodiversity and strengthening public sector plant breeding capacities. *USDA*

FORMER IICA DEPUTY DIRECTOR JOINS SEED SCIENCE CENTER


Christopher Hansen

Christopher Hansen, former Deputy Director of the Inter-American Institute for Cooperation on Agriculture (IICA), joined the Seed Science Center in August as a visiting scientist. In his new capacity, Hansen will work with the center's Global Seed Program to build public-private partnerships and establish seed development centers in countries around the world.

"Our goal is to ensure that programs supporting the production and use of quality seeds become basic to national and international food security programs—especially for small stakeholders," said Hansen. "We want decisionmakers to better understand the importance of forming local seed companies that can attend the needs of local farmers who often are isolated from markets and information."

Hansen's involvement with the Global Seed Program began several years ago after a visit to the Seed Science Center. "By coincidence, while I was visiting the Seed Science Center in Iowa, Joe Cortes was visiting IICA in Costa Rica looking for ways to establish a hemispheric partnership to promote seed trade and start seed companies," he said. Iowa State and IICA later signed a memorandum of agreement in 2009 to promote joint actions for the sustainable development of the agricultural sector and rural communities in the Americas.

During his career, Hansen has developed programs that assist small businesses in finding and accessing markets for their products. "Over the years I have learned to appreciate the importance of certified seed to competitive agriculture, especially the impact on small, traditional farmers who suffer from low propagation rates and yields," he said. "Now, I hope that my efforts with the Global Seed Program will aid in the establishment of seed companies that will help local farmers benefit from high quality and certified seed. I look forward to combining my experience with the expertise and leadership of the Seed Science Center in developing initiatives that will help to establish new seed companies in Latin America and Africa and to promote the use of quality seed."

"I look forward to combining my experience with the expertise and leadership of the Seed Science Center in developing initiatives that will help to establish new seed companies in Latin America and Africa and to promote the use of quality seed."—Christopher Hansen

CENTER ADVISORY COUNCIL MEETS

The Seed Science Center and BIGMAP advisory council met at the Seed Science Center in Ames in April. The group reviewed center activities, offered guidance on future projects, and attended the Ninth Seed Science Center and BIGMAP Symposium.

THE GLOBAL CHALLENGE BEFORE US:
How do we feed the hungry of the world?

by Jeffrey Wolt

World food production will have to increase by 70 to 100 percent in order to feed an estimated world population of nine billion people by 2050[1]. The magnitude of this challenge is shown in the world food crisis of 2007-2008 and in lingering higher food prices. Current structural problems in the global food system are being heightened by global climate change and decreased availability of arable land and clean water. Along with the need to increase food production to avoid scarcity, there is a parallel need to enhance food quality in regions of the world where improved incomes and living conditions have increased consumer demands for meats and other high protein foods and to meet the demands from consumers everywhere for more nutritionally balanced foods. This task must be done in a manner that improves and sustains our agricultural lands and the environment.

The need to improve the quality and productivity of food is part of a second green revolution, which seeks to address the issue of persistent food insecurity. The focus is on small landholders in parts of Africa, Asia, and elsewhere who have not been able to benefit from the mix of technologies which improved food production systems in many parts of the world as part of the original green revolution of the 1960s. Enabling this second green revolution will require a mix of social and technological approaches. These approaches start with food crops that have improved resistance to pests and extreme weather, increased nutritional value, and reduced food contamination. The goal of these initiatives is to meet the needs of small scale farmers in an environmentally sustainable manner.

Included in the toolbox of enabling technologies that will help secure bountiful and nutritious food for the future are the tools of modern biotechnology. These tools include genomics, marker assisted selection, and a variety of gene insertion and transformation techniques. Plant genomics considers the entire array of genes within an organism and seeks comparisons among populations and across species to determine those gene complements that direct metabolic pathways and determine their function. Marker assisted selection combines classical genetics with molecular biology and uses genetic signposts for morphological and biochemical variation within the plant to facilitate more rapid and precise selection of genes that control traits of interest. A rapidly expanding variety of techniques to design and insert genes enables targeted changes in genomes. Together with traditional breeding methods, these modern biotechnology tools allow a faster pace of development of targeted solutions that can meet special needs throughout the world. The increasing efficiency of these and other biotechnology tools lowers costs and reduces the time for development of improved plant varieties. Modern biotechnology applications to date have targeted major crops such as corn and soybeans. However, with the wider availability of these tools, considerable inroads are being made for crops such as cassava, bananas, and cowpea, which are critical staples for those in malnourished regions of the world. For example, the East African Highland banana, a fruit so important to Ugandans that its name, "matooke,"is synonymous with "food," has been genetically-transformed so that it is resistant to bacterial blight and is now undergoing experimental trials.[2] Breakthroughs such as this one speak to the benefits of biotechnology which have interested plant biologists for decades. These advances were accomplished through the efforts of scientists and funding agencies throughout the world.

Incomplete and sometimes misleading information regarding biotechnology crops, which are commonly referred to as GMOs, has raised concerns over the acceptability of biotechnology tools for food production. However, this technology has been employed for nearly two decades with almost 400 million acres planted worldwide in 2011[3]. The benefits of biotechnology-derived foods are well-recognized by health professionals. For instance, the Academy of Nutrition and Dietetics has a long-standing position that "biotechnology techniques have the potential to be useful in enhancing the quality, nutritional value, and variety of food available for human consumption an in increasing the efficiency of food production."[4] Coupled with benefits that can decrease the environmental footprint of agriculture through reduced land use, lowered rates of soil degradation and reduced chemical use, biotechnology applications are an important component for addressing food needs in an environmentally responsible manner.

Some consumers continue to resist biotechnology-derived foods due to social, cultural, or ethnical reasons, and these choices must be respected. However, concerns surrounding the safety

Table 1. Food Safety Testing and Analysis for Biotechnology Crops and Derived Foods

Expressed product	Whole plant and derived foods
• Host and donor familiarity • Molecular characteristics • Stability over generations and across environments • Toxicity —Bioinformatics and acute mammalian toxicity • Allergenicity —Bioinformatics and digestibility • Expression levels • Processing fate • Dietary exposure	• Equivalency • Plant composition —Nutrients —Antinutrients —Toxicants • Food toxicity and long-term feeding —Sub-chronic feeding and animal performance

Food safety risk assessment asks:
Does the GM food differ from the comparable non-GM food as encountered in the diet?

of these foods to human health and the environment remain unconfirmed. Since the emergence of the first products of modern biotechnology in the 1990s, there have been strong regulatory systems in place in regions of the world where these foods are produced and consumed. Regulatory oversight has been very dynamic in order to keep pace with rapid changes in the technologies that are being brought forward. Before biotechnology-derived foods are available to the public, regulators throughout the world consider reams of data that establish the likelihood of no harm to arise from these products. Internationally recognized principles underlying the safety risk assessment of foods derived from biotechnology crops are well established.[5] In order for these foods to be in the marketplace, they have been evaluated in terms of their food toxicity and potential to be allergenic, as well as their concentrations of nutrients, anti-nutrients, toxicants, and overall comparability with foods normally consumed in the diet (see Table 1). Because these products have been judged to be compositionally equivalent to foods already common to our diets, U.S. regulators have found no safety-based reason to label these foods as being biotechnology-derived. In fact, biotechnology crops entering the marketplace such as soybeans rich in omega-3 fatty acids are designed to have superior nutrient composition.

The first commercial biotechnology crops with herbicide and insect resistance had direct benefits mainly to the farmer due to decreased exposure of farmers and their families to pesticide applications, improved land stewardship (through the ability to more widely adopt reduced tillage techniques) and simplified management decisions to free up time. Less widely recognized are the indirect benefits that these crops provide to the consumer through reduced pesticide residues and mycotoxins in foods, improved water quality, and overall improved quality and affordability. For example, corn modified for insect resistance through insertion of certain genes from the bacteria *Bacillus thuringensis* (Bt corn) can substantially reduce fungal infestation of grain to reduce concentrations of the mycotoxin fumonisin. In regions of Latin America and Africa where corn is a dietary staple, this indirect benefit can greatly reduce exposure to a toxin which is suspected of having both carcinogenic and teratogenic effects.

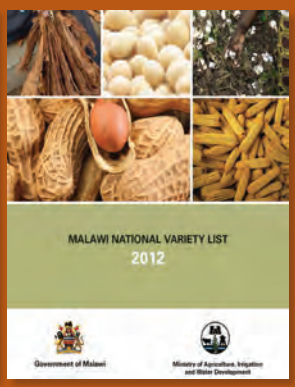
A large shift is now underway in the development of biotechnology crops for the design of plants which are resistant to abiotic stresses—such as drought, salt, heat, cold, and soil infertility—and which provide nutritionally enhanced foods with healthier oils and improved vitamin and mineral content. For example, the Gates Foundation is leading efforts to develop drought tolerant corn for Africa to alleviate food insecurity in those countries where corn is a staple food.[6] This effort exemplifies the recognition that global health improvement necessitates agricultural development, which in turn is facilitated through modern biotechnology. Golden rice and other crops with enhanced levels of vitamin A and iron, which are limited in malnourished populations in many regions of the world, are other examples of the benefits of biotechnology. With these developments, biotechnology can be an effective tool in the food developer's toolbox for facilitating the transformation of agriculture in poor regions with low productive capacity under current technology. This area includes regions of Africa, Central America, and Asia where natural resources are degraded, access to fertilizers is limited, and where locally used foods are in need of nutritional improvement.

There is no one answer to meeting the food security needs of millions of malnourished people throughout the world who are lacking in both the quantity and quality of food needed to lead healthy lives. Addressing these needs for now and the future necessitates a diverse set of social and technological tools that are specifically targeted to those regions of the world where persistent malnutrition is a day-to-day reality. Biotechnology affords substantial opportunity for breakthroughs in the ways in which we develop and deploy foods, and can provide key tools for feeding a hungry world.

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

Originally published in the Summer 2012 issue of *The Soy Connection*. Complete references for this article can be found at www.soyconnection.com/newsletters/soy-connection/health-nutrition/view.php/Summer+2012+Biotechnology?id=86

Global Program Specialist Adelaida Harries (front row, second from left) facilitated a PBS workshop in Kenya.



Iowa State faculty members collaborated with local and national seed authorities in Zambia, Nigeria, and Malawi to produce national variety lists for the SPEAR project.

BIGMAP FACULTY FACILITATE PBS WORKSHOPS IN VIETNAM, AFRICA

BIGMAP staff members Adelaida Harries and Jeff Wolt both facilitated workshops for the Program for Biosafety Systems (PBS) in 2012. The three-year project, funded by the United States Agency for International Development (USAID), was designed to benefit partner countries in Africa (Kenya, Malawi, Nigeria, Tanzania, and Uganda) and Asia (Vietnam and Indonesia) where science-based, functional biosafety systems are badly needed.

In February, Harries held a 1 1/2 day workshop for the National Biosafety Authority of Kenya on process mapping/management as a first step in developing guidelines for the commercialization of GM crops in Kenya. The workshop focused on developing a description of the process involved from the time an application for a GM crop is submitted in Kenya to the time that a decision is made, based upon guidelines set in place by the Kenya Biosafety Act and Regulations for Environmental Release.

"The exercises that we put the attendees of this workshop through were very engaging," said Harries. "They generated meaningful discussions about the interpretation of biosafety laws and regulations regarding the commercialization of GM crops."

Wolt, an Iowa State agronomy professor specializing in risk analysis, traveled to Vietnam in April to present a one-day workshop on "Food Safety Guidelines" to members of the Ministry of Agriculture and Rural Development (MARD). In June Wolt again returned to Vietnam to facilitate a two-day workshop on "The Environmental Risk Assessment Process" to members of the Ministry of Natural Resources and the Environment (MONRE). Together MARD and MONRE will be responsible for the first regulatory approvals for GM crop cultivation in Vietnam.

The workshops are just a few of the activities that Iowa State has facilitated as part of the PBS project. "In Malawi we have been working very hard to get final approval of confined field trails of GM cotton," said Harries. Harries has also facilitated development of Malawi GM seed import procedures and has provided training for the Malawi National Biosafety Authority.

Managed by the International Food Policy Research Institute (IFPRI), PBS supports partner countries in the responsible development and use of biotechnology.

ISU/AFSTA COMESA PROJECT DRAWS TO CLOSE

The Iowa State Global Seed Program recently culminated its efforts with the African Seed Trade Association (AFSTA) to harmonize seed policies and regulations in the Common Market for Eastern and Southern Africa (COMESA) region. Final program outcomes included technical agreements being reached in: (a) seed certification, (b) variety release systems, and (c) phytosanitary/seed import export procedures. Final approval by the region's Council of Ministers is still being sought. Once approval is complete, smallholders from 19 countries in the region will benefit from an enhanced availability of high-quality seed.

IOWA STATE PRODUCES NATIONAL VARIETY LISTS FOR SPEAR PROJECT

Iowa State's Global Seed Program has produced three national variety lists that serve as reference guides for plant breeders, research institutions, and private sector organizations as part of the Seed Policy Enhancement of Africa Regions (SPEAR) project. The project is part of a $1.49 million three-year grant funded by the Bill & Melinda Gates Foundation to improve genetic access and transfer of seed and to implement regional variety release policies at the national level in the countries of Zambia, Nigeria, and Malawi.

To facilitate the project and gather information for the variety lists, Global Seed Program Specialist Adelaida Harries, IT Specialist/Scientist Yuh-Yuan Shyy, and Communications Specialist Regina Hendrickson collaborated with local and national seed authorities of the countries to complete the following publications:

1. The *Seed Control and Certification Institute Zambia 2011 Official Variety Register*—A list of all crop varieties available in Zambia;
2. The *Catalogue of Crop Varieties Released and Registered in Nigeria, Volume 3*—A compilation of all crop varieties currently or retroactively released and registered in Nigeria; and
3. The *2012 Malawi National Variety List*—A catalog of all crop varieties released or registered in Malawi.

"Seed varieties from each country are listed in these lists along with their characteristics, breeders, etc." said Harries. "They are excellent decision-making tools."

by Mike Ferlazzo
Iowa State University
News Service

Photo by Bob Elbert Iowa State University News Service

Above: Bobby Martens (left), an assistant professor of supply chain management; and Kevin Scheibe (right), an associate professor of management information systems, developed a decision support system to help African seed entrepreneurs make informed decisions about starting small-scale seed chain businesses.

IOWA STATE RESEARCHERS BUILD TOOL TO AID SUB-SAHARAN AFRICAN SEED COMPANIES

The United Nations humanitarian office reports that there's been a more than 20 percent increase in the number of people needing international aid since the start of the year, fueled mainly by hunger in sub-Saharan Africa. But thanks to Iowa State University researchers, in the future there may be more small-scale commercial seed companies to assist in crop production to better feed those starving nations.

Working in harmony with the Iowa State Seed Science Center, Bobby Martens, an assistant professor of supply chain management; and Kevin Scheibe, an associate professor of management information systems, developed a decision support system (DSS) to help African seed entrepreneurs make informed decisions about starting small-scale seed chain businesses. The decision tool has been used to evaluate the economic viability in at least 17 small seed companies that are now introducing improved seed varieties in villages and farms in Mozambique, Malawi, Kenya, and Tanzania.

The ISU College of Business professors detailed their tool and its use in a paper titled, "Supply Chains in Sub-Saharan Africa: A Decision Support System for Small-Scale Seed Entrepreneurs," which will be published in a future issue of the *Decision Sciences Journal*.

"We really looked at a supply chain perspective on what transportation infrastructure means to the development of seed entrepreneurs and seed businesses," Martens said. "So we looked at the traditional supply chain nodes and links such as transportation because of infrastructure, storage because of infrastructure, storage because of pest contamination and theft, and those kinds of things that are big issues that come to the forefront."

Sub-Saharan Africa needs improved seed varieties

In the paper, ISU researchers report that it is necessary to infuse a consistent supply of improved seed varieties into local sub-Saharan African crop production in order to improve low crop yields. The best distribution channel for the improved seed varieties may be small-scale commercial seed companies, but local entrepreneurs struggled to determine whether such businesses are viable.

"It's a tool to enable people who live in these areas to make decisions on starting seed companies," Martens said.

"As we developed the tool, we varied levels of population density, which translates to greater transportation distances for the same level of demand," Scheibe said. "We also varied spoilage, pilferage, and other causes of seed loss."

Martens visited the region four years ago to conduct a weeklong training session in Ghana for people from six sub-Saharan nations on the use of the tool to potential seed entrepreneurs. He says Ghana's Minister of Agriculture visited the training session.

"It was a collaborative work that originated through the Seed Science Center in a relationship they had with the International Crops Research Institute for the Semi-Arid Tropics," Martens said.

The tool applies decision science research

The DSS applies decision science research in a humanitarian application and offers important managerial implications about supply chain infrastructure for anyone interested in starting one of these companies.

In many cases, it found surprising results when it came to potential seed entrepreneurs who already owned their own storage facilities.

"Often, these seed entrepreneurs may already have a large shed or older building," Scheibe added. "One interesting discovery was that it actually was more profitable to pay rental on storage rather than to use an existing owned storage building. This appears counterintuitive. You'd say, 'I own this building, why pay to use someone else's instead?' The rental facilities had better security and better containment capabilities resulting in reduced spoilage, theft, and rodent infestation, and this would yield greater profitability over using owned, less secure storage."

Martens and Scheibe hope to extend their work by creating additional decision tools for seed entrepreneurs in South America and other parts of the world.

Above: Bobby Martens (first row, third from right) conducted a weeklong training session for potential seed entrepreneurs in Ghana.

Andrew Lauver (third from right) visited with Congressman Tom Latham (center) while taking part in the Undergraduate ASTA Convention Scholarship trip to Washington D.C.

NEW SCHOLARSHIP DESIGNED FOR UNDERGRADUATES WITH AN INTEREST IN THE SEED INDUSTRY

A new scholarship program for Iowa State College of Agriculture and Life Sciences students with an interest in the seed industry was launched in May 2012 by the Seed Science Center. Established with funds from an anonymous donor and from center advisory council member and Pioneer Vice President of Production Mike Gumina and his wife Julie, the Undergraduate American Seed Trade Association (ASTA) Convention Scholarship is designed for undergraduate students with a desire to enhance their interest in seed science and industry.

Funding from the scholarship offered an all-expenses-paid opportunity this summer for four Iowa State students to attend the 129th Annual Convention of the American Seed Trade Association meeting held June 20-23, in Washington, D.C. Scholarship recipients included: Andrew Lauver, Lauren Brown, Madison Vangorp, and Avril Carter.

As part of their scholarship trip to Washington D.C., the students listened to talks and networked with seed industry professionals at the ASTA convention. They also visited Capitol Hill where they met with staff members from the offices of Senators Chuck Grassley and Tom Harkin. They later had an opportunity to discuss seed industry issues with Congressman Tom Latham and meet with Collin Peterson of the House Agriculture Committee. Peterson briefed the students on the farm bill, GMO labeling and research, and national germplasm funding before offering them an opportunity to sit in on a Senate session that included a discussion of the farm bill.

Lauver, a senior in agricultural studies from Rockwell City, Iowa, who took part in the scholarship trip, said the opportunity to network with legislators and seed industry professionals was invaluable. "As a young agriculturalist, I realize the importance of learning from current leaders in the industry to meet the growing demand [for agricultural products] that we are going to see as we approach 2050," he said. Lauver says he believes it is important to create a bond between industry and universities. Upon graduation he plans to join associations that promote a positive future for the seed industry. "I look forward to the opportunities that lobbying for these organizations will bring," he said.

Scholarship recipient Lauren Brown also found the interaction with seed industry professionals worthwhile. "Ultimately, the best part of the whole experience was the different connections that I made throughout the week," she said. "I met many very influential people throughout the trip that helped open my eyes to the many opportunities that await me once I graduate and am ready to step out into the seed industry."

Undergraduate ASTA Convention Scholarship funds are available for students to attend the 130th Annual Convention June 2013, in Nashville, Tennessee. Contact seedsci@iastate.edu for information.

SEED SCIENCE CENTER WORK CITED IN MATZ ARTICLE

Marshall Matz

Marshall Matz cited the Seed Science Center recently in an article celebrating the 150th anniversary of the Morrill Act. Matz is an attorney with OFW Law in Washington, D.C. and a board member of the World Food Program-U.S., the Global Child Nutrition Foundation, and the Congressional Hunger Center.

Matz's article titled "Right On, Abe!" published in the July issue of *Agri-Pulse® Newsletter* discusses the impact of the Morrill Act on U.S. agriculture.

In the article Matz traces Lincoln's signing of the Morrill Act in 1862 to the many ways that land-grant institutions have paved the way for the cutting-edge research that is being conducted today in areas such as seed science, biofuels, and renewable energy.

Matz highlighted one of the nation's most prominent land-grant university graduates, Norman Borlaug, and his contributions to mitigate world hunger. He then cited the Seed Science Center's efforts to promote seed technology both nationally and internationally. "At Iowa State University, the Seed Testing Laboratory is a national center for seed science," he said. "For over 100 years, the program has provided accurate, professional seed testing services to the seed industry. Iowa State has the only graduate program in Seed Technology and Business in the world. In the past 12 years, scientists from the center have facilitated projects on seed policy and regulations in over 70 countries around the world."

Article excerpt and photo courtesy of Agri-Pulse® Newsletter.

For a full version of Matz's article, visit: www.agri-pulse.com/Matz-July2012-Abe.asp

RESEARCH BRIEF—

Stewart's Wilt

Stewart's wilt is a disease of major phytosanitary importance, affecting the international movement of maize seed to over 100 countries as a result of concerns about seed transmission. In their research project **"Comparison of Nine PCR Primer Sets Designed to Detect *Pantoea stewartii* subsp. *stewartii* in Maize," Charles Block, Lisa Shepherd, and Gary Munkvold** have isolated and are currently characterizing new *Pantoea* strains from tropical maize seed lots that interfere or cross-react with both the ELISA test and with PCR assays developed for *P. stewartii.* Several PCR primer sets have been developed as possible replacements for the NSHS-standard ELISA test. Unfortunately, none of the primer sets was specific. They detected DNA from additional isolates, including *P. ananatis* and non-pathogenic unknown *Pantoea* spp. from maize seed. The unknowns are particularly troublesome because they were part of the resident bacterial population of tropical maize seed lots. The scientists do not believe that any of the PCR protocols tested offer an improvement over the ELISA for seed health testing as a result of the frequency of false-positive reactions. Phytosanitary testing schemes that rely on any of these PCR-based assays are likely to result in unnecessary obstruction to the international movement of maize seed.

To view the abstract for this research, visit: http://www.ars.usda.gov/research/publications/Publications.htm?seq_no_115=266266

MUNKVOLD RESEARCHES MYCOTOXINS IN ITALY

Gary Munkvold, Seed Science endowed chair and Plant Pathology & Microbiology professor, spent six months during the past fall and winter on a Faculty Professional Development Assignment (FPDA) in Bari, Italy. As part of the assignment, Munkvold worked with mycotoxin researchers at the Institute for Food Production Science (ISPA).

ISPA is part of Italy's National Research Council, a system of more than 100 research centers covering a broad range of subject areas in science and technology. The project also involved collaboration with researchers at the University of Turin and the Catholic University of Piacenza in northern Italy. These groups are working together on a project related to the origin of fumonisins, a toxic natural compound, in corn seed and grain.

Fumonisins are produced by fungi that infect corn kernels in the field. They are harmful or even fatal to livestock consuming contaminated grain. In seed, fumonisins are believed to interfere with germination and emergence. Fumonisins originate from fungi in the genus *Fusarium*, but recent genomics research has revealed that some species of *Aspergillus* (which can be common in corn kernels) also produce fumonisins. The objectives of the project include learning the importance of *Aspergillus* fungi in the development of fumonisins in corn, and the ways that fumonisins from *Aspergillus* affect corn seeds. The group collected hundreds of corn samples from throughout the corn-growing regions of Italy, and recovered strains of *Aspergillus*, which are being analyzed for gene sequences characteristic of fumonisin production. These sequences will be compared against those of strains from the U.S., along with their fumonisin production and effects on seed germination.

In addition to his research activities, Munkvold worked with colleagues at ISPA to co-edit a special issue of the journal *Phytopathologia Mediterranea,* an international plant pathology journal focusing on diseases of crops in Mediterranean climates, and to develop a proposal for publishing a book on the role of mycotoxins in plant disease development.

During his FPDA, Munkvold also traveled to Mendoza, Argentina, where he was an invited speaker at the 2011 Conference for the International Society for Mycotoxicology. Munkvold also finalized plans for a 2012 Conference in Ottawa, Canada, that he is co-organizing and met with university colleagues in Rome, Naples, and Florence. Exchange programs were discussed, which should lead to enhanced interchange of students and faculty between Italian universities and Iowa State.

Seed Science Endowed Chair Gary Munkvold spoke at the 2011 Conference for the International Society for Mycotoxicology in Argentina during a faculty development assignment.

NEWSLETTER DISTRIBUTION

If you would like to receive your copy of *Iowa Seed & Biosafety* electronically, remove your name from the mailing list, or change the way that your copy of the newsletter is addressed, please send us an email at seedsci@iastate.edu.

USAID Photo

Above from left: Judy Chambers, International Food Policy Research Institute (IFPRI), and Joe Cortes, Iowa State Seed Science Center, are pictured with USAID Bureau for Food Security staff members Mark Huisenga and Paul Weisenfeld following a panel discussion and webinar that focused on the Policy Brief "Building an Enabling Environment for Seed Sector Growth."

SEED SCIENCE CENTER, USAID PARTNER TO PUBLISH SEED POLICY BRIEF

Cortes participates in panel discussion, webinar

In the fall of 2011, the United States Agency for International Development (USAID) Enabling Agricultural Trade (EAT) project partnered with the Iowa State Seed Science Center to research and publish a Policy Brief to inform policymakers and donors interested in seed sector reform. The brief titled "Building an Enabling Environment for Seed Sector Growth" was the first in a series of briefing papers on key agribusiness enabling environment topics designed to achieve USAID's goal of generating and sharing knowledge about how policies and governments can enable agribusinesses.

Following the publishing of the brief, the EAT project, in partnership with the USAID's Bureau for Food Security, held an Agriculture Sector Council Seminar panel discussion and worldwide webinar on December 14 to discuss the findings of the paper with the public. At the event, Iowa State Seed Science Center global program leader Joe Cortes, who served as a technical contributor for the brief, highlighted the main points outlined in the report. Mark Huisenga, USAID Bureau for Food Security, and Judy Chambers, International Food Policy Research Institute (IFPRI), joined in the panel discussion that was moderated by Nate Kline of the EAT project. The panelists answered questions from the audience on institutional roles, biotechnology, and regional harmonization of seed regulation.

The brief was organized around three key principles necessary to develop the seed industry as a successful business: 1) the elements necessary to set up a legal and regulatory framework and remove unnecessary barriers to private seed sector growth, 2) the policy interventions governments need to make to build market capacity for the private seed industry, and 3) the interventions required by governments to implement regional policy harmonization agreements.

The central finding of the brief was that for a vibrant and healthy seed industry to develop, rather than advancing government control and supervision, policies should focus on offering initial support to the private sector while enabling it to adapt to the market and develop independently through a transparent, rules-based legal and regulatory system.

"We hope that this paper will move forward the possibility of lifting some of the burdensome regulations that are restricting agricultural growth in areas of the world that can least afford the delay," said Manjit Misra, director of the Seed Science Center. "The more people who understand the problems, the quicker we can adapt lasting solutions."

Cortes agreed. "This report encompasses the knowledge that Adelaida Harries and I have gleaned over many years of working with the global seed industry. We all have the same goal in mind. We want farmers to be able to feed their families—to make a living—no matter where they are located in the world. But how do we make easy access to quality-seed a reality in places like Africa? What kind of environment is the most conducive for that to happen? Three key principles need to be in place. This brief spells out both the barriers and the opportunities. It is an excellent resource for offering insights into the international seed industry."

Excerpts from: USAID-Enabling Agriculture Trade Project News, Iowa State University News Service

Iowa State Global Program Leader Joe Cortes and Specialist Adelaida Harries were key technical contributors for the USAID Policy Brief "Building an Enabling Environment for Seed Sector Growth." The brief was produced by USAID's Enabling Agricultural Trade (EAT) project, and implemented by Fintrac Inc. and the Seed Science Center. David Quinn, policy specialist for the EAT project, authored the report.

A copy of the ISU/USAID Policy Brief can be found at: *http://agrilinks.kdid.org/sites/agrilinks/files/resource/files/EAT_PolicyBrief_Seed_07Dec2011.pdf*

To view a screencast of the presentation, visit: *http://agrilinks.kdid.org/library/enabling-private-sector-led-seed-industry-policy-perspectives-presentation-and-screencast*

CENTER DEVELOPS WHITE PAPER ON CO-EXISTENCE

Wallace Huffman

The Seed Science Center signed a cooperative agreement with the USDA in 2010 to develop a white paper on key issues related to the development of Environmental Impact Statements (EIS) conducted under the National Environmental Protection Act (NEPA).

The white paper is designed to be a science-based authoritative review and analysis of current biotech issues. Written and edited by experts, it will be cited in APHIS documents to aid the USDA in decision making and will help policy makers achieve a consensus as to the impacts of GE crops.

To carry out the project, Seed Science Center Director Manjit Misra formed a panel of scientists to define the topic and scope of the paper. Misra then identified Wallace Huffman, a Charles F. Curtiss distinguished professor in economics at Iowa State, to lead the group in developing the document.

The panel identified co-existence as the topic of the white paper, discussed sub-topics to be researched, and then assigned experts from various institutions and disciplines to author the sub-topics.

Huffman and Economics graduate student Jesse Strzok researched the project throughout 2011 and into 2012. They authored a preliminary version of the paper titled "The Economics of Organic and GMO Farming Systems: Interactions and How They Might Co-exist," which Huffman presented at the April 2012 Seed Science Center and BIGMAP Symposium.

The paper is currently being submitted to critical stakeholders and center advisory council members for external review and recommendations. After final revisions are made, the white paper will be submitted to APHIS for review.

TEN STUDENTS AWARDED ISA SCHOLARSHIPS

Ten Iowa State students were awarded Iowa Seed Association (ISA) scholarships at the association's 109th Annual Convention awards ceremony held in conjunction with the Agribusiness Showcase and Conference in Des Moines in February.

Recipients of $1,000 ISA scholarships included: Megan Bierschenk, Andrew Chamra, Austin Dobbels, Lance Goettsch, Raymond Kruse, Andrew Lauver, Jay McCoskey, Stephen Prather, Matthew Riessen, and Matt McLaughlin.

Also honored at the ceremony was Jordan Uthoff of Solon, Iowa, who was named the 2011-12 Manjit K. Misra Outstanding Senior Seed Scholar. Uthoff was also awarded the American Seed Trade Association Scholarship. An Agronomy major with a secondary minor in Seed Science, Uthoff held internships with Crop Tech Services, New Century FS, Inc., and GrowMark during his college career.

This is the sixth year that the Manjit K. Misra Scholarship has been awarded to Iowa State students. Bruce and Kathy Maunder provided 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 the seed industry or in seed science.

Ten Iowa Seed Association Scholarships were awarded at the association's 109th Annual Convention in February. Jordan Uthoff (third from right) was named the 2011-12 Manjit K. Misra Scholar.

RESEARCH BRIEF—

Keaton Krueger

Seed Science Center graduate student Keaton Krueger's research was highlighted in the May-June 2012 issue of *Crop & Soils* magazine. Krueger was a Graduate Research Associate with Susana Goggi, associate professor of Agronomy and Seed Science Center. Krueger was also a former Iowa Seed Association and Manjit K. Misra Scholarship recipient. A brief highlight of his paper follows:

Phosphorus and Potassium Fertilization Do Not Affect Soybean Storability

Keaton Krueger, A. Susana Goggi, Russell E. Mullen, and Antonio P. Mallarino.

The soybean seed industry faces a pressing concern. How to prolong seed viability and vigor of fungicide-treated soybean seeds in storage to reduce disposal of treated-seed? This research article explores the effect of levels of phosphorus (P) and potassium (K) fertilization in the production field and seed storage environments on soybean seed physiological quality and seed carry-over potential. The unique aspect of this work is that, for the first time, investigators explore the effects of excessive P and K fertilization on soybean seed longevity and storability. Phosphorus and K fertilization did not improve seed survival under optimal storage conditions beyond 13 months, although higher rates of K fertilization increased seed survival in poor storage environments for up to 6 months.

To access a full copy of this article, visit: https://www.agronomy.org/publications/aj/tocs/104/2

IOWA STATE UNIVERSITY SEED LAB EXPANDS SERVICES

COMMENTARY

by Iowa State Seed Lab Manager Mike Stahr

It has been a busy summer preparing for the after-effects of this year's drought—along with continued efforts to enhance our staff of certified analysts, increase testing capabilities, update our customer web locker system, and conduct well-attended workshops on seed testing and conditioning for professionals in the seed industry.

EXPANDED TESTING CAPABILITIES

Testing for mycotoxins, and the adventitious presence (AP) of biotech traits, is just part of the Iowa State Seed Lab's portfolio of tests. We are continually looking for ways to offer our customers more options. To this end, testing for aflatoxin has taken a step forward with the addition of a lateral flow strip reader, which enables generating qualitative (yes/no) as well as quantitative results. The strip reader will also provide additional Trait Lab capabilities—customers will have the option of requesting testing for AP using strips as well as by PCR. Strips not only detect the presence of biotech traits, but also identify which traits are present. PCR is a very sensitive option for AP detection, often being used to detect 35S and NOS, one or both of which are present in biotech traits.

IMPROVED WEB LOCKER SERVICES AVAILABLE SOON

The Seed Laboratory is in the process of implementing noteworthy changes to its web locker system, with an eye towards retaining those services that have been noted as successful or desirable in the past. Customers will continue to have 24-hour access to testing progress and results, while enjoying newly designed web locker pages.

SEED LAB NAMED FIRST TO HOST RST, CSA TRAINING

It was announced at the Association of Official Seed Analysts (AOSA)/Society of Commercial Seed Technologists (SCST) Annual Meeting in May that the Iowa State University Seed Lab will be the first to host the newly consolidated certification testing for Registered Seed Technologists (RSTs) and Certified Seed Analysts (CSAs). Iowa State has been a site for testing for the AOSA Certified Seed Analyst exam for many years. Two Iowa State Seed Lab analysts were recognized at the annual meeting: Jessica Blake earned certification as a Registered Seed Technologist, and John Ferrari earned accreditation in germination. Trait Lab Coordinator Trisha Scott has also passed written exams in all areas of testing for biotech traits. Successful completion of practical exams will earn her certification as a Registered Genetic Technologist (RGT).

Mike Stahr (center) is pictured with Jessica Blake (left) and John Ferrari (right) who received recognition at the AOSA/SCST Annual Meeting in May.

Even though almost every testing season brings something new, the ISU Seed Lab continually works to remain on the cutting edge of the seed testing industry, utilizing the knowledge and experience gained from more than 110 years of testing. We test for a wide variety of species, offering more than 60 different types of tests. In addition, personally tailored service, regardless of company size, is an integral part of the services the Seed Lab offers.

2012 SEED SCIENCE WORKSHOP UDPATE

Iowa State University has provided training to seed industry professionals for more than 38 years. Each April through August Iowa State Seed Conditioning Specialist Alan Gaul and Seed Lab Manager Mike Stahr facilitate workshops covering topics from seed testing and cleaning, to gravity separation and color sorting.

"The 2012 workshop series was very well attended," said Gaul. "There were waiting lists for both the corn and soybean conditioning workshops, and many other workshops were nearly full. Our seed treatment workshop also had record attendance again this year."

This year 14 Seed Science Center workshops were held at Iowa State. They were attended by 242 individuals from 62 companies located in 22 states across the U.S. and three Canadian provinces.

Gaul has already traveled to facilitate five on-site workshops this year and has several more pending for 2012. "We are actively involved with seed conditioning technical support for both the public and the private seed industry," he said.

In addition to standard workshop content, Gaul and representatives from several companies demonstrated new equipment this summer that included rotary and static laboratory spirals, an optical imaging counter, and an automatic batch treater.

For more information about center workshops, visit: www.seeds.iastate.edu/seedtest/training.html

Awards & Recognitions

Gaul Recognized by Syngenta

Seed Conditioning Specialist Alan Gaul (above left) recently received special recognition from the Syngenta Company for building train-the-trainer capacity across the Asia-Pacific (APAC) region where he created and piloted seed conditioning courses in Lop Buri, Thailand; and Secunderabad Andhra Pradesh, India. Senior Associate Dean for the College of Agriculture and Life Sciences Joe Colletti (right) presented the award to Gaul at the 2012 Seed Science Center/BIGMAP Symposium.

Christian, Rolling Receive ASTA Best Poster Awards

Former Seed Science Center graduate students Erik Christian and Ruth Rolling received recognition at the First American Seed Trade Association (ASTA) Best Poster Award competition held during the 2011 Seed Expo in Chicago. Christian received a second place award for his research "Alternative Temperatures Promote Seed Germination of Miscanthus Sinensis," and Rolling received third place for her research titled "Influence of Seed Priming on Agronomic Performance in Soybeans." Both Christian and Rolling were Agronomy graduate students working with Agronomy Associate Professor Susana Goggi.

ISU Photo

Bilsten, Bruns, and Christian Take Part in Leath Installation Ceremony

Seed Science Center Graduate Students (from left) Erin Bilsten and Tracy Bruns served as student delegates representing Toxicology and Plant Pathology respectively, at the installation ceremony for Iowa State's 15th President Steven Leath (second from left). Former Seed Science Center graduate student Erik Christian (right) also took part in the event. Christian is currently an instructor with the Department of Agronomy at Iowa State.

VEISHEA 2012

Visitors young and old got caught up in the zany world of Dr. Seuss at the Seed Science Center's 2012 VEISHEA display. Guests enjoyed free popcorn and learned about seed science, seed production, and seed identification while taking a break from the cool VEISHEA weather.

Heather Simmons

Postdoctoral Research Associate

Heather Simmons joined the Seed Science Center in January as a Postdoctoral Research Associate in Gary Munkvold's lab. Simmons also serves as the manager of the center's DNA Lab.

"One component of my position is to work on a National Seed Health System (NSHS) project which includes coordination and compiling information for technical review panels—a group of experts assigned to provide a peer review of the current test methods for phytosanitary testing used by the NSHS," says Simmons. She also validates tests that do not meet NSHS standards.

Simmons also manages the day-to-day operations of the DNA lab, assists students that conduct research in the lab, and develops and runs PCR-based pathogen tests for Seed Lab customers.

In addition, Simmons conducts research on topics such as the sequencing of fungal genomes; extraction protocols for RNA viruses from seed; and real-time PCR for bacterial pathogens. Research that she believes will lead to the development of phytosanitary tests that will promote food security by preventing pathogens from destroying vegetable crops.

"I enjoy how challenging my position is, and I am learning a tremendous amount," said Simmons. "Working on my dissertation I worked exclusively with RNA viruses, but now I am working with a much wider range of pathogens that includes fungi, bacteria, viroids, and viruses."

Simmons was born in Texas and later moved with her family to South Africa where she lived until age 21. She earned a BS at the University of Oregon and a PhD in Biology from Penn State. Simmons lives in Ames with her husband Aaron.

Margaret Ellis

Postdoctoral Research Associate

Known by her friends as "Maggie," Margaret Ellis is a Postdoctoral Research Associate with the Seed Science Center. Ellis researches *Fusarium oxysporum* in soybean with Seed Science Center Endowed Chair Gary Munkvold and Plant Pathology and Microbiology Associate Professor Leonor Leandro.

Ellis studies the genetic diversity of *Fusarium oxysporum* collected from soybean in Iowa and surrounding states. Previous research has found variation in aggressiveness to soybean when inoculated with different isolates of *F. oxysporum*. Ellis states "Some isolates cause severe root rot, or damping-off, while others cause very little to no disease. My task is to describe the genetic diversity in this species and to distinguish unique subgroups and compare these findings with fungal characteristics such as isolate aggressiveness."

Ellis believes that her research will aid future farmers in caring for their crops. "I hope with this research we can find some of the key determinants as to why some isolates of this fungus are pathogenic to soybean while others are not," she said. "Eventually this research should lead to the development of better management strategies for Fusarium root rot and seedling diseases."

According to Ellis, conducting research with Munkvold and Leandro has been beneficial. "They are helping me to develop my professional research skills on a subject that I am very passionate about," she says. "In fact, I've even been given the opportunity to help teach mycology this semester. This is a very rewarding opportunity since teaching is something I definitely see in my future."

Simi Venkatagiri

STB Program Assistant

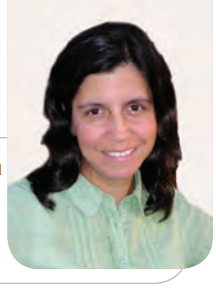
The Graduate Program in Seed Technology and Business (STB) welcomed Program Assistant Simi Venkatagiri, in February 2012. Venkatagiri came to the Seed Science Center from the Interdepartmental Microbiology Graduate Program at Iowa State where she served as a graduate program coordinator for 15 years.

Experienced at working with graduate students and graduate school policies, Venkatagiri facilitates the program by answering inquiries, corresponding with potential students, assisting faculty members with course logistics, and assisting students with their administrative requirements. "We have an excellent group of students that are very dedicated," she says. "Many of them have jobs and families, so they have full schedules. We all try to help them make the most of their time and resources."

However, Venkatagiri admits that not being able to talk face-to-face with a student can have its drawbacks. "It can be a challenge communicating by email with distance ed students," she said. "You don't get a chance to see them face-to-face—to get the same level of interaction that I am used to. So you have to make allowances."

Venkatagiri finds working with the students, professors, and others affiliated with the STB program rewarding. "I enjoy working at the Seed Science Center," she says. "So far it has been a wonderful experience for me. Working with the STB students I believe, is beneficial to both the program and to the University."

Originally from Talaguppa, India, Venkatagiri enjoys living in Ames with her husband Horabail, an ISU associate professor in Liberal Arts and Sciences. "I have lived in Iowa from more than 34 years, so I consider myself an Iowan," she says.



Katherine Espinosa

Graduate Student

Graduate student Katherine Espinosa began her PhD program at Iowa State University in May 2009. Espinosa's degree is in plant breeding with a minor in crop production and physiology.

A native of Cali, Colombia, South America, Espinosa earned her BS in Agronomy from the University of Colombia. She then studied genetic diversity at the Sugarcane Research Center Biotechnology Laboratory in the country for four years before coming to Iowa State.

Espinosa is currently exploring the genetic variability of soybean inbreed lines with Drs. Susana Goggi and Reid Palmer from the Agronomy Department. "Our approaches are to use seed stress treatment, plant stress treatment, and a planting design as possible factors involved in the generation of intrinsic genetic variation in soybean inbred lines," she said. "If the 'de novo variation' is present and heritable, then we will be able to demonstrate that it is possible to exploit endogenous sources of genetic variation for elite gene pools," she added.

Espinosa believes her research will benefit others by providing alternative methods of generating new sources of genetic variation in improved cultivars. "The newly created variation could play an important role in increasing the performance of agronomic traits in the cultivars," she said.

Previously working in Palmer's lab in the Agronomy Building, Espinosa came to work in Goggi's lab in the Seed Science Center in January of 2012. "I enjoy working with Dr. Goggi," she says. "She is a great advisor, very helpful, and she is always attentive toward the progress of my research. I have learned a great deal from her."

Trisha Scott

Trait Testing Coordinator

Iowa State University Seed Lab Trait Testing Coordinator Trisha Scott is no newcomer to the seed industry. Scott has coordinated labs and provided molecular marker support for the seed industry for the past 17 years as a former employee of companies such as Cargill Hybrid, Dow AgroSciences, Pioneer Hi-Bred International, and Syngenta.

In her current position, Scott tests commercial seed for the desired presence or absence of biotech traits using a variety of methods including bioassays, immunoassays, and PCR. Scott is currently developing PCR tests for native disease resistance traits for several crops and is examining ways to optimize existing trait testing methods to decrease costs. This includes researching ways to improve efficiency or throughput. "Because the Seed Lab is a service lab, our main focus is our customers," said Scott. "Each year there are new crop technologies released commercially and introduced into breeding programs. We need to make sure we develop and implement tests for these technologies to meet our customer's needs and so that we remain competitive," she said.

Scott says that she finds satisfaction from conducting research that benefits seed companies regardless of their of size. "The tests we perform in the trait lab allow our commercial customers to 'clear' their seed lots so that they can be sold under the desired biotech trait label—for herbicide resistance, insect resistance, or non-biotech/non-GMO presence," she said. "The tests we are developing will allow us to support breeding efforts in addition to commercial seed. Larger seed companies have internal market labs that provide these services, but mid- and small-size companies do not have those kinds of resources." Scott says that when the Seed Lab develops and implements tests like these, smaller- and mid-sized companies will have access to the same rapid market-assisted breeding capabilities that larger companies have. "They will be able to get their products out on the market years sooner than they previously could using conventional breeding," she said. "My goal is to not only get these tests implemented, but to make sure the costs of the tests are affordable for all companies."

Originally from Rockford, Illinois, Scott currently lives in Ankeny with her 15-year-old son Skylar. She admits that working at the Seed Lab is a nice change for her. "I feel like I have made a lot of friends here quickly," she said. "The lab and project coordinating roles that I've held in industry in the past have taken me away from the lab," she said. "But, I found I really missed lab work. Here I get the best of both worlds."

WORLD FOOD PRIZE IOWA YOUTH INSTITUTE PARTICIPANTS VISIT SEED SCIENCE CENTER

Seed Lab Trait Testing Coordinator Trisha Scott (right) explains methods of PCR testing to students from the World Food Prize's first Iowa Youth Institute. The event, held at Iowa State University in April, was attended by more than 130 Iowa high school students.

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