

International Programs in Agriculture



IPIA

Annual Highlights
2013–2014

Message from the Director

Purdue Agriculture is looking for partners. International research, education, and Extension require collaborators. We seek partners that share our goal of improving the lives of millions of people with skills and innovation. **If you share this goal, please contact us.**

In particular, we wish to replicate the widespread adoption and commercial success of the Purdue Improved Crop Storage (PICS) bags developed by Larry Murdock, Purdue professor of entomology, and colleagues in northern Cameroon. The bags were originally developed for on-farm storage of cowpeas, and now almost 20% of farm-stored cowpeas in West and Central Africa are in PICS bags. Almost 5 million PICS bags have been sold in that region. New manufacturers and distributors are being licensed in Eastern and Southern Africa and in South Asia.

In agricultural development, it is impossible to pick winners. One of the keys to the PICS success is that the bags were only one of a portfolio of nonchemical grain storage technologies developed with Purdue assistance. African farmers, grain traders, and manufacturers identified the bags as the

technology most practical for their conditions. We seek partners to develop a portfolio of alternatives for other food security challenges in the hope that from each portfolio at least one innovation benefits millions.

The PICS experience also shows the importance of commercialization in bringing innovations to people. In the developing world it is not possible to license technology and hope others will handle commercialization. Innovators must follow their technologies through the supply chain to identify bottlenecks and barriers. Partners are as important in technology commercialization as in technology development.

The 2013–2014 Highlights is a record of Purdue international programs' agriculture activity over the past year. We look forward to hearing from you.

Jess Lowenberg-DeBoer
Associate Dean and Director of
International Programs in Agriculture

Message from the Director of Study Abroad

In 2013–2014, 293 agriculture students traveled to all parts of the world, participating in a study-abroad experience. Over 28% of our graduating undergraduates studied abroad prior to graduation. This continues to be the highest percentage of any college or school at Purdue.

We welcomed 13 international exchange students for a semester or year. These students from our partner universities enable our students to study at their home universities. Students studying at Purdue are from Sweden, Ireland, Austria, England, Wales, Australia, and Germany.

Thanks to the generosity of our supporters, scholarships and grants totaling \$226,400 were awarded through International Programs in Agriculture (IPIA) to agriculture students who participated in long-term programs (eight weeks or longer) in 2013–2014.



International Agriculture Ambassadors: Row 1, left to right: Kelly Beeker, Alexis Zobel; Row 2 left to right: Brittany Sievers, Colleen Hartel, Melissa Galizio, Kimberly Lutz; Row 3, left to right: Andrew Sokolchik, Rachael James, Annie Li. Not pictured: Xun Zhou

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OFFICE CONTACTS

Another successful College of Agriculture Study Abroad Fair was held in September. Faculty who led courses and students who had previously participated in programs were on hand to promote the various courses and programs offered to our students. This was an excellent opportunity for students to discuss all the options available to them.

A student exchange agreement was completed with the Norwegian University of Life Sciences (UMB) in Aas, Norway, south of Oslo. This provides an opportunity for our students to study for a semester or year.

Our International Agriculture Ambassadors were again busy this year. In addition to talking with students at fairs, at meetings, in the classroom, and as they visited IPIA, they again hosted a booth at the annual Spring Fest and Agriculture Fish Fry. The ambassadors for 2013–2014 were:

Kelly Beeker—Agricultural Economics

Melissa Galizio—Food Science

Colleen Hartel—Wildlife

Rachael James—Animal Science

Annie Li—Food Science

Kimberly Lutz—Animal Science

Brittany Sievers—Natural Resources & Environmental Science

Andrew Sokolchik—Agricultural Economics

Xun (Anna) Zhou—Agricultural & Biological Engineering

Alexis Zobel—Biochemistry

INTERNATIONAL EXTENSION

IPIA sent the first teams to Guinea, Africa, through the Agricultural Education and Market Improvement Program. Through a three-year sub-award with Winrock International, the initiative builds the institutional capacity of the Institute for Agricultural and Veterinary Sciences (ISAV) by developing new curricula and improving research and Extension capacity. Richard Grant and Cliff Johnston taught ISAV faculty climate and soil science methods. Unfortunately, because of the outbreak of Ebola in Guinea, further assignments were put on hold until February 2015. IPIA and the Colombian University of Los Llanos developed a three-year Farmer-to-Farmer proposal that was granted and focuses on support for small farmers. The Catholic Relief Services (CRS) granted more opportunities to engage Purdue educators and Indiana agricultural experts in East African countries of Tanzania, Uganda, Ethiopia, and Kenya.

Regional International Partnership Efforts

Asia

During fall of 2013, Bernie Engle, head of Agricultural and Biological Engineering (ABE), and K.G. Raghothama, associate director of International Programs in Agriculture, were invited by China Agricultural University (CAU) to develop an undergraduate transfer student program with ABE. They spent four days at CAU working on the curriculum.

Raghothama served as session chair for the 10th National Symposium on Soil Biology and Ecology held at the University of Agriculture Sciences in Bangalore, India. He also reviewed the progress of the Afghan student training program in India that is managed by Purdue University.

Latin America

Intercollege activities, fostered by the Colombian-Purdue Initiative <https://engineering.purdue.edu/CPIASR>, included a visit by Purdue President Mitch Daniels and the establishment of the first Purdue office outside of the United States in Medellin, Colombia. The College of Agriculture led two major activities following these events. The Farmer-to-Farmer project developed by Jess Lowenberg-DeBoer and Andrea Burniske was developed to respond to the needs of smallholder farmers by bringing technical assistance and support to local farmers in the Department of Meta, which is located in Colombia. The Farmer-to-Farmer project is funded by Volunteers for Economic Growth Alliance (VEGA) in collaboration with USAID <https://ag.purdue.edu/ipia/Pages/Colombia.aspx>. The second activity, driven by Tamara Benjamin, is The Undergraduate Research Experience Purdue-Colombia (UREP-C) Program that brought 25 undergraduate students from Colombia's highest-ranking university (Universidad Nacional) to Purdue. The students performed research in Purdue laboratories and improved their technical knowledge and English language skills. The College of Agriculture had 13 professors participating in UREP-C in 2014.

Purdue Day at Universidade Federal de Viçosa (UFV), Brazil, held in October 2013, celebrated a historical relationship between Purdue and UFV. Dean Jay Akridge led the Purdue delegation at the event, where the highlight was a symposium on bioenergy and sustainability. Mauricio Lopes, President of EMBRAPA and a Purdue alumnus, was the distinguished speaker. The highlight of the event was a celebration of the large group of Purdue alumni who excelled in various positions at UFV.



Abby Amos, an agribusiness management major, visits Cleland Wildlife Park in Adelaide, South Australia, spring 2014.

Interdisciplinary International Efforts

Afghanistan Agricultural Extension Project

The Afghanistan Agricultural Extension Project (AAEP) was awarded the U.S. Department of Agriculture Secretary's Honor Award in the global food security category—the highest award given by the USDA. This award recognizes exceptional leadership contributions or public service in support of USDA's mission and goals. Kevin McNamara attended the award ceremony in November along with other university partners. Due to the success of the AAEP project, funding will continue through USAID for an additional three years. During the initial three years of the project, Purdue faculty trained over 1,500 Afghans in food science, animal health, and plant protection.

The expatriate staff members Joseph Stangl and Sevanne Calsoyas in Herat, Afghanistan, continued to work with the Afghan Ministry of Agriculture to provide short agricultural capacity-building. Hajji Basir is the Herat Extension Director.

The Sanitary/Phytosanitary (SPS) project included Purdue faculty members Haley Oliver (Food Science), Amanda Deering (Food Science), Paul Ebner (Animal Sciences), Rick Foster (Entomology), Tom Creswell (Botany), Dan Egel (Botany), and Ramesh Vemulapalli (Comparative Pathobiology), who were heavily involved in the success of the SPS project over the past year. Faculty developed training materials in food science, plant protection, and animal health, then traveled to Afghanistan to provide the trainings in-country.

Foster, Creswell, and Egel worked with three Afghan nationals to develop a train-the-trainer program in plant protection. They provided trainings to Afghan Extension staff throughout Afghanistan.

The Agricultural Data Collection and Utilization System (ADCUS) program worked with the Afghanistan Ministry of Agriculture to build skills within the ministry relevant to survey creation, data collection and analysis, and synthesis. The ADCUS team worked with ministry employees to conduct two agricultural surveys, turning over more responsibility to the ministry with each survey.

The Strengthening Afghan Agricultural Faculties (SAAF) Program builds capacity in faculties of Agriculture and Veterinary Science through continued support of Afghan master's and PhD students in the United States (Purdue University, North Carolina State University, and Washington State University) and in India (University of Horticultural Sciences and University of Agricultural Sciences). The year 2014 marked the first graduations of these students. Eight students completed master's degrees in India and North Carolina. Three students graduated from Purdue University with master's degrees in entomology, agronomy, and animal science. These graduates will build the capacity of their home institutions and improve the educational opportunities of Afghan students.

IPIA hosted 14 junior faculty members from five Afghan provinces during spring 2014 under the Afghan Junior Faculty Development Program (AJFDP). The AJFDP provides a nine-week intensive training for recently appointed Afghan faculty. With the goals of enhancing participants' professional skill sets and broadening their understanding of U.S. higher education, the visiting faculty members receive English-language and pedagogical instruction, observe multiple Purdue classes, and attend a professional conference. Faculty and staff from most of the colleges at Purdue are involved in this cross-discipline program. In addition to academic activities, the junior faculty members participate in numerous cultural and extracurricular activities.

Purdue Improved Cowpea Storage (PICS1), Purdue Improved Crop Storage (PICS2), and PICS3

Purdue received a five-year grant of \$10 million titled Commercializing Hermetic Technologies for Grain Storage in Sub-Saharan Africa (PICS3) from the Gates Foundation. The goal of this project is to reduce storage losses in economically and nutritionally important commodities and thereby increase incomes and improve food security of smallholder farmers across the continent through commercializing hermetic technology. The PICS technology is in seven countries in Africa and is expected to reach farmers in more than 15,000 villages. The principal investigator (PI) for this grant is research assistant professor Dieudonné Baributsa (Entomology). The Co-PIs are Larry Murdock (Entomology); Jess Lowenberg-DeBoer (IPIA); Jacob Ricker-Gilbert (Agricultural Economics); Charles Woloschuk (Botany and Plant Pathology); and Corinne Alexander (Agricultural Economics).

Purdue also received a \$386,201, one-year grant, for Purdue Improved Crop Storage Market Development in Kenya, from USAID Fintrac Partnering for Innovation. This grant is to commercialize PICS technology among smallholder farmers in Kenya. The project already trained more than 60,000 Kenyan farmers in the proper use of PICS technology. Baributsa is the PI. The PICS USAID Fintrac in Rwanda was successfully completed in April 2014 with the expansion of PICS bag sales into neighboring countries.

Research results under PICS2 confirmed that PICS bags are effective in storing dry grain, including cereal and legumes, and preventing attack by a variety of insects. The project was granted supplemental funding by the Bill & Melinda Gates Foundation to facilitate manufacturing of PICS bags in several countries. In one spinoff, PICS bags are used by Indian farmers to store groundnuts.

USDA/FAS Borlaug Fellowships

IPIA assisted in matching international Borlaug Fellowship opportunities with Purdue faculty expertise. Purdue faculty were selected to train two Borlaug Fellows: Emmanuel Kyereh from Ghana trained at Purdue from October to December 2013; and Antoine Sanon from Burkina Faso followed from January to March 2014. Both Fellows worked with co-mentors

Dieudonné Baributsa (Entomology) and Larry Murdock (Entomology) on post-harvest storage research, specifically the PICS bag technology. Emmanuel Kyereh and mentor Baributsa were able to attend the World Food Prize Symposium in Des Moines, Iowa, as a part of his fellowship. IPIA staff member Lonni Kucik served as Training Coordinator for the Fellows.

Innovation Laboratories

The Feed the Future Innovation Lab for Aquaculture & Fisheries (AquaFish Innovation Lab)

Kwamena Quagrainie continues to lead this project in Africa. The project in the past year involved a study to assess the impact of fish farming on the socioeconomic status, household food security, dietary intake and diversity, maternal and child health, and maternal and child anthropometrics in selected farming households in Ghana and Tanzania. The project involves graduate students from Purdue University as well as Kwame Nkrumah University of Science and Technology in Ghana, and Sokoine University of Agriculture in Tanzania. They will compare the above measures between fish-farming and non-fish-farming households in selected farming communities in Ghana and Tanzania.

Horticultural Innovation Lab

Stephen Weller (Horticulture) and Co-PIs Maria Marshall (Ag Economics); Steve Yaninek (Entomology); Gary Burniske (Global Sustainability Initiative); and Darrell Schulze (Agronomy) directed activities in Sub-Saharan Africa and Central America. The activities in Africa concentrated on surveys to determine barriers for smallholder farmer access to land, equality, production inputs, and market access. The survey established the basis for research and training programs in Kenya, Tanzania, and Zambia. The emphasis is on training and research to improve all aspects of the value chain, improve access to highly nutritious food, and provide income opportunities to disadvantaged clients, especially female farmers and families suffering from HIV/AIDS. Private AIV companies analyzed the nutrition of dried products for product labeling. New recipes for fresh consumption were created. The project had collaborators from Rutgers and several African institutions and in Kenya involved in AMPATH. The project has been ongoing for five years and has helped more than 3,000 smallholder farmers.

Global Nutrition Innovation Lab

Jerry Shively (Agricultural Economics) completed his fourth year as a PI for the Feed the Future Nutrition Innovation Lab. The goal is to understand and measure the connections between agricultural capacity, technology adoption, nutrition outcomes, and conditioning factors at levels of aggregation ranging from household to district levels. Research activities focus on using several nationally representative datasets on child health outcomes to better understand patterns and drivers of nutrition outcomes in Nepal and Uganda. Several graduate students in agricultural economics conduct research in Nepal and Uganda and are supported by the project.

Integrated Pest Management (IPM) Innovation Lab

This project in Honduras led by Stephen Weller (Horticulture) and Rick Foster (Entomology) was funded under the USAID Integrated Pest Management Innovation Laboratory at Virginia Tech and included collaborators in Honduras at FHIA (Fundación Hondureña de Investigación Agrícola Investigación y Proyectos Productivos) and at Zamorano. Research involved developing and implementing improved and sustainable pest management practices for smallholder vegetable farmers and included development of seven production manuals and over 50 training sessions for farmer stakeholders. The project also supported the master's program in nematology for David Perla from Honduras that was completed in 2014 under the direction of Virginia Ferris and Rick Foster in entomology. The program continued to host two Honduran students from the Universidad Nacional de Agricultura (UNA). This was the concluding year of the 20-year program at Purdue.



Emelia Kratz, senior in agricultural education, studied abroad through a service-learning course in Cap-Haitien, Haiti, 2014 by contributing to sustain community projects. This day was spent learning about how they grow different crops, especially cocoa.

News of Departments

Agricultural and Biological Engineering

During fall 2013, Bernie Engle, head of Agricultural and Biological Engineering, and Kashchandra G. Raghothama, associate director of International Programs in Agriculture, were invited by China Agricultural University to develop a special undergraduate transfer student program with ABE. They spent four days at CAU, visiting facilities and working on the curriculum. Raghothama served as session chair at the 10th National Symposium on Soil Biology and Ecology held at the University of Agricultural Sciences in Bangalore, India. He also reviewed the progress of the Afghan student training program in India that is managed by Purdue University.

John Lumkes and his son, Matthew Lumkes, two graduate students and two undergraduate students spent three weeks of May 2014 in Cameroon. The team worked on construction of a new Basic Utility Vehicle (BUV) with the African Centre for Renewable Energy and Sustainable Technology (ACREST), a local NGO. The BUV is meant to be a form of affordable transportation in rural settings. This marks the fifth year of Purdue ABE's involvement in BUV construction for the community and partnership with ACREST.

Lumkes, and four graduate students and three undergraduate students spent an additional two weeks in Kenya and Tanzania. Three students were part of an ABE Senior Design Team that worked with the Purdue Global Engineering Program (GEP), the Nelson Mandela African Institute of Science and Technology (NM-AIST) and Catholic Relief Services to design a water harvesting and treatment system for the rural village of Endallah, Tanzania. The team presented their design to community members and toured the site. The students and professor also toured multiple facilities and locations engaged in projects promoting sustainability, agricultural mechanization, renewable energies, water treatment, and education, including the UN-Habitat headquarters in Nairobi, Kenya, NM-AIST in Arusha, Tanzania, and the Kibera slum outside of Nairobi.

Keith Cherkauer and **Bernie Engel** traveled to the University Federal Vicosa in Brazil and participated in Purdue Day on Oct. 4, 2013. Bernie and Keith spent a day with colleagues in Agricultural Engineering, discussing opportunities for student exchanges and joint research, and also spoke with numerous Purdue ABE alumni. Our alumni recounted many stories of their positive experiences at Purdue.

Bernie also traveled from Brazil to Argentina to visit with ABE alumni to discuss opportunities for joint research.

Bernie Engel traveled to Beijing for meetings with faculty, staff and students at China Agricultural University (CAU) in October. The primary focus was to discuss a special 2+2 undergraduate program and streamlining of CAU courses with Purdue ABE requirements. CAU, which has China's top-ranked Agricultural Engineering program, will recruit a class of freshmen that will pursue coursework that aligns with the requirements of the first two years within ABE. These students will then

transfer to Purdue ABE and graduate with degrees from both Purdue ABE and CAU. Faculty in this program are also interested in growing collaborative research efforts with Purdue ABE. Additional discussions will be held at upcoming faculty meetings.

Bernie then visited Tianjin Agricultural University to discuss opportunities for joint research.

An ABE graduate student worked as an intern with the United Nations in Nairobi, Kenya. He was on a three-month internship with UN-Habitat in the Urban Energy Unit, working on a project to develop biogas resources and programs for the urban poor. Such projects address problems regarding energy access, improved sanitation, and income generation. While living abroad, he took several opportunities to explore Kenya's countryside and urban life

Another graduate student went to Arusha, Tanzania, to study at the Nelson Mandela African Institute of Science and Technology. He collaborated with researchers and collected data on water quality throughout the region. This data will be important in designing constructed wetlands to help store and clean runoff water for drinking purposes in rural villages. Along with collecting river water for sand filter tests, he went on a safari to Ngorongoro Conservation Area and visited rural villages.

Agricultural Economics

Philip Abbott has been working with the Food and Agriculture Organization of the UN (FAO), and with the Agricultural Marketing Information System (AMIS), a collaboration among several international organizations to examine improving grain stocks estimation methodologies for national and global markets. His research and recommendations have been presented at FAO Experts meetings in Rome and Bangkok and an AMIS Experts meeting in London.

Corinne Alexander traveled to Kenya for the PICS2 workshop on hermetic storage and the PICS3 launch meeting in April 2014. During the PICS2 workshop, she co-presented with Larry Murdoch on the overview of the PICS project.

In June and July, Alexander traveled to Malawi, Tanzania, and Uganda. In Kasungu, Malawi, she conducted a PICS training of trainers (ToT) for field agents who are training farmers in 200 villages. In Tanzania, she conducted two ToTs, one in Mtwara and the other in Mwanza, for field agents who are training farmers in at least 200 villages. In Uganda, she attended the Alliance for a Green Revolution in Africa (AGRA) conference titled "10K Seed Convening," where she made a presentation on the value of PICS for small seed companies.

Janet Ayres conducted three, two-hour interactive workshops with Afghanistan Junior Faculty Development Program participants on topics that included leadership development, interpersonal communication, and conflict management.

Freddie Barnard taught a one-week course on Agribusiness Management in Accra, Ghana, in May. He used the Purdue Agribusiness Management Simulation that he uses to teach undergraduates in his AGE330 course at Purdue and that is used by a number of university instructors across the country. He was asked to return in the summer of 2015 to teach the same course in Kenya, Tanzania, and Uganda. Plus, the Association of African Business Schools has asked to participate and fund a modification of the simulation that would enable the software to convert currencies.

Ken Foster was a member of a group of Purdue University students and faculty members who completed work on a system that makes safe drinking water available to a community sickened by poor water in the Dominican Republic. Purdue launched a service-learning class in fall 2012. The class has operated as a hybrid learning setting involving conventional classroom lectures, laboratory-based experiments, field measurements and surveys, and construction and implementation of the system. The six students and faculty members returned from their fourth and final trip to Las Canas this summer. "When properly operated, the system we developed and installed in Las Canas will yield water that will consistently meet the World Health Organization's standard for *E. coli* and other potable water indicators." The School of Civil Engineering, Departments of Agricultural Economics and Food Science in the College of Agriculture, and the School of Nursing collaborated in the initiative.

Michael Gunderson is collaborating with researchers from Argentina on a Large Commercial Producer Survey across countries.

Gunderson also coached a team of five AgEcon graduate students who won the international case study competition at the International Food and Agribusiness Management Association conference in South Africa in June, beating out 20 teams from all over the world. One student also won the award for best graduate student poster.

Paul Preckel traveled twice to Jordan to work with staff on a research project at the International Center for Agricultural Research in the Dry Areas. He also hosted a visiting scholar from Hohhot, Inner Mongolia, China.

The Feed the Future Innovation Lab for Aquaculture & Fisheries (AquaFish Innovation Lab)

Kwamena Quagrainie continues to lead this project in Africa. The project in the past year involved a study to assess the impact of fish farming on the socioeconomic status, household food security, dietary intake and diversity, maternal and child health, and maternal and child anthropometrics in selected farming households in Ghana and Tanzania. The project involves graduate students from Purdue University as well as Kwame Nkrumah University of Science and Technology in Ghana, and Sokoine University of Agriculture in Tanzania. They will compare the above measures between fish farming households and non-fish farming households in selected farming communities in Ghana and Tanzania.

Jacob Ricker-Gilbert continued building his international research program in 2013 and 2014. In September 2013, he traveled to Malawi to launch a new project called Guiding Investments in Sustainable Agricultural Intensification in Africa (GISAIA). The project is a collaboration between Purdue University, Michigan State University, and Lilongwe University of Agriculture and Natural Resources. In July 2014, Ricker-Gilbert again traveled to Malawi to present his findings on the costs and benefits of agricultural input subsidy policy in that country to an audience of policy makers, donors and ministry of agriculture staff.

Ricker-Gilbert has been involved with the Purdue Improved Crop Storage (PICS3) project in East Africa funded by the Bill and Melinda Gates Foundation, along with the Feed the Future Innovation Lab for Food Processing and Post-Harvest Handling in Senegal, funded by USAID.

Gerald Shively continued to maintain a very active schedule of international activities. His research projects on food security in Uganda and Nepal funded by the USAID Nutrition Innovation Lab are discussed on page 4. He continued to partner with colleagues on agricultural development research in other locations, including China, Ethiopia, the Philippines, and Malawi. He currently serves on a C-FARE Blue Ribbon Panel formed to study frontier issues in agricultural development. He also serves as editor-in-chief of *Agricultural Economics*, the flagship journal of the International Association of Agricultural Economists.

Wally Tyner participated in a celebration of the long-term relationship between Vicos, Brazil, and Purdue in October 2013. In June 2014, he presented a paper at the annual Global Trade Analysis Project conference in Dakar, Senegal.

Nelson Villoria presented "An introduction to GEOSHARE's cyber infrastructure: Exchange and Analysis of Geo-Spatial Data through HUBZero" in the second Open Science Meetings of the Global Land Project at Humboldt University, Berlin, in March. He also presented his work on "Global Food Security in a Teleconnected World: The Role of Variable Trade Policy and Early Warnings in Mitigating the Global Effects of El Niño Southern Oscillation" at the 16th annual Conference on Global Economic Analysis held in Shanghai, China, during June. Villoria led the 21st Short Course in Global Trade Analysis, a 12-week program that combines online and on-site instruction on computable general equilibrium, hosted by the Ministry of Economy of the Republic of Turkey and Bahçeşehir University in Istanbul, Turkey, during August. This course introduced the Global Trade Analysis Project (GTAP) model to 21 individuals working in places ranging from consulting companies in Australia, the top government research institute of Ukraine, and policy analysts in Turkey.

Elizabeth Yeager led a study abroad course for nine students from the College of Agriculture at Purdue University to experience food production, processing, marketing, and preparation in the Emilia-Romagna and Tuscany regions of Italy. The objective of this study abroad was for students to gain a better understanding of marketing by experiencing agritourism among smallholding and micro food producers in Italy. The program was designed to provide students with examples of all facets of marketing of these products, from the segments served by the producers (consumer,

trade, and distribution) or local processors, to product development, pricing, distribution in various channels, and promotion activities at these small facilities. Yeager presented “Syngenta: Changing a Global Company” during the Harvard-Style Case Study Workshop at the International Food and Agribusiness Management Association’s Scientific Research Symposium in Cape Town, South Africa.

Agronomy

Richard Grant continued collaborations with colleagues in Germany (multiple universities and institutes) for a project designed to provide understanding in how to “upscale” soil chamber GHG measurements to plot and field scale emissions, involving ongoing proposal development, and intended for joint NSF (USA)-DFG (German) funding in 2016.

Grant collaborated with 1) Institute for Meteorology and Climate Research, Atmospheric Environmental Research Division, Karlsruhe Institute of Technology, Garmisch-Partenkirchen, Germany (IMK-FSU) and 2) Princeton University, NJ, USA in the development of unmanned aerial vehicle CH₄ measurement systems to determine emissions of CH₄ in complex terrain. This will include a cross-laboratory experience of a German Ph.D. student in his laboratory in 2015.

Grant is involved in international climate change education that provides undergraduate and graduate students of developing countries a framework to assist in the adaptation to the changing climate. He collaborated on the initiation of the education in Mauritania, Germany, and Guinea.

Grant consulted on the purchase and installation of a climate station at the Advanced Institute for Agronomy and Veterinary Science, Faranah, Guinea, as part of the IPIA collaboration with Winrock International in a USAID-funded project.

He also was an external dissertation examiner for University of Southern Queensland.

He participated in nonprofit management to facilitate and coordinate educational projects of Global Involvement through Education; he is president of that nonprofit. He traveled to Mauritania, Kyrgyzstan, and Turkey for that group, and to Colorado as well for board and executive meetings.

He is the director of the George Washington Academy (an ~800-student Moroccan K2-12 school in Casablanca, Morocco). He traveled to Morocco to attend board meetings, oversee programs in finance, teaching and student assessment, and manage evaluations of the school board and the head of the school.

John Graveel gave a presentation at Purdue to the participants of the Herat Partnership Student Exchange Program – Afghanistan on higher education in the United States. He organized, promoted, and led 20 students from Purdue University on a spring break trip to Earth and CATIE universities in Costa Rica. He also gave presentations at Purdue to international groups from Massey University, New Zealand, and Ecole d’Ingenieurs, France, PURPAN.

Yiwei Jiang was an invited lecturer abroad and gave four lectures. The first two were given in Lanzhou, China, “Recent Advances in Turfgrass Stress Physiology” and “Integrated Physiology and Genomics Approaches for Dissecting Drought Tolerance in Perennial Ryegrass.” “Physiological Responses of Perennial Grasses to Flooding Stress” was given in Taigu, China. “Physiological and Genetic Mechanisms of Salinity Tolerance in Perennial Ryegrass” was delivered in Tianjin, China.

Yiwei Jiang was also a guest professor at Lanzhou University, a top-30 university in China.

Brad Joern gave three invited lectures abroad in 2014: “The Future of Nutrient Management in the USA: Coming to Grips with Regulations and Embracing New Ideas and Technologies,” Chengdu, China, October; “Nutrient Management and Soil Health-Related Projects in the USA and Canada,” Hefei, China, October; and “History, Current Status and Future Needs of Nutrient Management in the USA,” Barcelona, Spain, December.

Cliff Johnston gave an invited lecture on “Influence of Mineral-Surface Interactions on Enhanced Oil Recovery in the Illinois Basin” at the Saskatchewan Research Council in Canada in June. In February, he taught an intensive short course in Guinea titled “Introduction to Climate Change and Soil Properties of West Africa.” This was supported by USAID. Johnston was named the Andrew Main Lecturer for 2015 at the University of Alberta.

Jianxin Ma was an invited lecturer at six institutions in China. The lectures were “Evolutionary Novelty of Duplicated Genes in Soybean,” presented at three institutions in Wuhan in December; and “Molecular Basis and Evolutionary Novelty of Soybean Stem Growth Habit in Soybean,” presented in Shijiazhuang, Hangzhou, Beijing, and Changchun, all in May.

Cindy Nakatsu attended a four-day workshop on “Introduction to Basics of Biotechnology” at the Institute d’Economie Rurale a research group within the Mali Ministry of Agriculture.

Devdutta Niyogi is involved with the Department of Electronics and Telecommunication and the launch of the Information Technology Research Academy (ITRA) of India. Niyogi has been involved in the ITRA-WATER initiative from its inception. One grant was awarded in which he is the co-principal investigator. There is no salary support, but the initiative has consulting and travel components as well as provisions for postdoctoral researchers, scientists and students to be fully supported by ITRA.

A virtual center award was given through the Indo-US Science and Technology Forum on tropical cyclones. This involves IIT Bhuvaneshwar (India), India Met Department, NOAA Hurricane Research Division, the National Centers for Environmental Predictions, and Purdue University, where Niyogi is the sole PI.

George Van Scoyoc served as mentor and instructor to 16 Afghanistan Junior Faculty who were on the Purdue campus for 10 weeks during spring 2014. Van Scoyoc met with them regularly to discuss teaching pedagogy and on three occasions to present programs on teaching practices that engage students in active learning.

Animal Sciences

John Patterson went on a spring break trip to Ireland in spring 2014 with 32 students.

Todd Applegate presented an invited talk on “Western Perspective to Challenges to Food Production” in Bangkok, Thailand. Additionally, for 12 months Applegate hosted a visiting faculty member from Sichuan Agricultural University who was studying duck nutrition.

Alan Schinckel made two trips to Brazil in 2014. The first, in February, was to serve on the Ph.D. committee of a visiting scholar at Purdue and to present an invited talk at the University of Lavras. The second trip, in April, consisted of teaching a one-credit course on mathematical modeling of pig growth (26 graduate students and faculty from University of Lavras and University of San Paolo) and to present two invited talks at a Pork Congress. Brian Richert also made the trip.

Jon Schoonmaker went to Universidade Federal de Vicosa with Alan Mathew and Kola Ajuwon in October to build on the historical relationship that Purdue and Vicosa have. Schoonmaker also went to Universidade Federal de Lavras in October, to speak at Simposio Internacional de Pecuaria de Corte – the third International Symposium of Beef Cattle Production. The title of his talk was “Effects of Lifetime Nutrition on Beef Quality.” He also toured beef farms in the area.

Kola Ajuwon, Shawn Donkin, and Jon Schoonmaker traveled to Universidade Federal de Lavras in October. Ajuwon guest lectured while Donkin and Schoonmaker worked to establish a partnership.

Alan Mathew, who heads the Department of Animal Sciences, traveled to Brazil, Taiwan, and China. In October, he visited the Universidade Federal de Vicosa to establish a working relationship for a student/faculty research exchange and to attend Purdue Day. A trip to Taipei, Taiwan, in September afforded a chance to visit National Taiwan University to meet faculty, present a talk outlining research in Animal Sciences and extend the graduate student exchange and undergraduate summer research program. Also in September, Mathew and Shihuan Kuang visited the Institute of Medicinal Plant Development at the Chinese Academy of Medical Sciences in Beijing to discuss joint research efforts.

Biochemistry

Barbara Golden in July traveled to Davos, Switzerland, to attend the 18th annual International Meeting of the RNA Society and to help plan the 2014 meeting. In June, she traveled to Quebec City, Canada, for the organizers’ meeting for the 2014 annual meeting.

Elizabeth Tran and a graduate student traveled to Davos, Switzerland, to attend the 18th annual International Meeting of the RNA Society. Beth organized the ~400-person mentoring luncheon at the event. Elizabeth

also traveled to Ludwig-Maximilian University Gene Center in Munich, Germany, where she presented a seminar on “The Dynamic Roles of RNA Helicases and Long Non-Coding RNAs in Eukaryotic Gene Regulation.” In July, a graduate student presented a poster titled “The DEAD-box Protein Dbp2 Functions with the RNA-binding Protein Yra1 to Promote mRNP Assembly.” Tran traveled in September to the UK, visiting Newcastle University for collaboration and Oxford to attend the EMBO Conference (RNA 3’ ends: Mechanism and biological function in eukaryotic genomes). She presented a talk titled “Long Non-coding RNAs Poise Inducible Genes for Rapid Regulation of Gene Expression.”

Tran and a graduate student traveled to Quebec City, Quebec, Canada, to attend the 19th annual meeting of the RNA Society. In June, she organized a 525-person mentoring workshop, and the graduate student gave an oral presentation on “Enzymatic Regulation of a DEAD-box Helicase Promote Efficient mRNP Assembly During Transcription.”

Andy Tao traveled to Nantong, China, to give a seminar at Nantong University titled “Chemoproteomics to Study Drug Targets and Molecular Signaling.” He also was the keynote speaker at the Beijing Conference and Exhibition on Instrumental Analysis. His talk was titled “Chemical Proteomics to Study Molecule Signaling.” In November, in Dalian, at the Dalian Institute of Chemical Physics Proteomics Symposium on Quantitative Proteomics, he gave a talk titled “Label-free and Isotope Labeling to Study Plant Signaling.” In April, Tao traveled to Jiangsu, China, to collaborate with researchers and visit the Jiangsu Wujin Hi-Tech Industrial Zone.

Two visiting scholars joined Tao’s lab. Ning Bao, who joined in August, is a professor at Nantong University, School of Public Health, in Nantong, China. Yan Lin, who joined Tao’s lab in September, is a lecturer at China Agricultural University in the Department of Science, Central Laboratory of Mass Spectrometry.

Two graduate students joined Andy Tao’s lab in June. One is from Taipei, and the other is from Taiwan.

Humaira Gowher joined the department as assistant professor of biochemistry in August. She was raised in Srinagar and Zakoora of the Kashmir Valley in the northwest region of India. She received her Ph.D. in 2002 from Justus Liebig University Giessen, in Germany, followed by a postdoc assignment at Jacobs University Bremen, also in Germany. Most recently she was a research fellow at the National Institute of Diabetes and Digestive and Kidney Diseases

Mark Hall: A visiting graduate student from China joined Mark Hall’s lab in September.

Clint Chapple: A graduate student from India joined Clint Chapple’s lab in September as a visiting scholar. A postdoctoral student from India, who was a grad student in Chapple’s lab, returned in June as a postdoctoral research associate.

Natalia Dudareva traveled to Les Diablerets, Switzerland, to teach “Plant Volatiles: From Lab Bench to Application” to graduate students and postdocs at EuroVol summer school. She also attended the 13th

World Petunia Days in Nijmegen, Netherlands, where she presented a talk titled “Phenylalanine Biosynthesis, Regulation and Transport in Petunia Flowers” and visited the University of Amsterdam, Swammerdam Institute for Life Sciences, where she gave a Green Life Sciences seminar titled “Phenylalanine Biosynthesis in Plants: What’s Left to Know?”

A graduate student from Nanjing University joined Dudareva’s lab in October as a visiting scholar until December. He received three months of support from the university to collaborate with the Dudareva lab.

Xiaoqi Liu: Ying Lu joined Liu’s lab in October as a visiting scholar, supported by a fellowship from the China Scholarship Council. She is an associate professor in the Department of Occupational and Environmental Health at Xinjiang Medical University, with a focus on the relationship between the environment and human health. Ying Lu will be visiting until September. Professor Xiaqui will be visiting the lab of Tianhua Zhou (Department of Basic Science, School of Medicine, Zhejiang University) in China, as well as the lab of Zhimin Yuan (Harvard School of Public Health) in Boston, Massachusetts.

Jim Clemens traveled to Leuven, Belgium, where at Katholieke Universiteit Leuven he presented a talk titled “Activated cdc42 Kinase Signaling Downstream of Axon Guidance Receptors Regulates Mitochondria Function and May Serve as a New Therapeutic Target for Neurodegenerative Disease”.

Joe Kappock: A graduate student from Wuhan University joined Joe Kappock’s lab in March as a research assistant.

A graduate student traveled to India to give a talk titled “Modulators of DNA Methylation and Their Role in Gene Expression” at the International Conference on Cellular and Molecular Mechanisms of Disease Processes meeting at the University of Kashmir as well as to the Department of Biochemistry at Kashmir. The student also presented this talk for the Department of Biochemistry at the Indian Institute of Sciences in Bangalore.

Jim Forney and his graduate students traveled to Shanghai, China, to attend the 7th International Conference of SUMO, Ubiquitin, UBL Proteins: Implications for Human Diseases. One student presented a poster titled “Developmental Regulation of SUMOylation during Conjugation in Tetrahymena.” Another student presented a poster titled “Depletion of UBC9 Causes Defects in Somatic and Germline Nuclei in Tetrahymena Thermophile.” The group then traveled to Yingling, Shaanxi, China, to visit Northwest Agriculture and Forestry University. Jim presented a seminar titled “Multiple Roles for SUMOylation in Ciliated Protozoa.”

Clint Chapple and **Natalia Dudareva** traveled to Russia and presented talks at the Institute of Plant Physiology in Moscow and at the University of St. Petersburg. Clint’s talk was titled “Evidence for Metabolite-driven Transcriptional Feedback Mechanisms in Arabidopsis” and Natalia’s was “Aromatic Amino Acid Network: Biosynthesis, Regulation and Transport.”

Botany and Plant Pathology

Cathie Aime gave an invited plenary talk in February at the inaugural ASEAN Microbial Biotechnology Conference in Bangkok, Thailand. She spoke on “Biodiversity of Macrofungi From Remote Rainforests of the Guiana Shield.”

In November, she gave two invited seminars at Universidad Nacional de Colombia, Facultad de Agronomía, Bogotá, Colombia: “Introduction to Fungi and What Biodiversity Studies in the Guiana Shield are Teaching Us About Their Importance” and “Phylogenetics of Phytopathogens: Case Studies in Moniliasis of Cacao and the Fungi that Cause Rust Diseases.”

In September, she was the invited guest speaker for the Foray Newfoundland and Labrador on Fogo Island, Newfoundland. Her speech was titled “Gomphidii of Newfoundland and Labrador.”

In July, she gave an invited seminar — “New Species of Fungi From the Guiana Shield” — at Universidade Federal do Recôncavo da Bahia, School of Agronomy, Cruz das Almas, Bahia, Brazil.

Aime also presented at two workshops overseas. She presented “Estudios de Diversidad de Hongos con Enfoque en Hongos Fitopatógenos (moniliasis y roya) y con Capacidad Lignocelulolítica,” at Universidad Nacional de Colombia, Bogotá, Colombia, in November. The workshops were hosted and co-organized by Dr. Esperanza Torres, Facultad de Agronomía.

At the other workshop she presented “Taxonomía e Filogenia de Fungos Causadores de Ferrugens—Curso Teórico e Prático” at Universidade Federal do Recôncavo da Bahia (UFRB), Cruz das Almas, Bahia, Brazil, in July. It was hosted by Dr. Jorge Teodoro (UFRB); she co-lectured with Dr. Anibal Alves de Carvalho (Rio Botanical Gardens), and Dr. Jose Carmine Dianese (Brasília).

Aime hosted visiting scientist Dr. Esperanza Torres, Associate Professor, Facultad de Agronomía, Universidad Nacional de Colombia, for one year (2013–2014) to collaborate on aspects of fungal biodiversity and fungal-derived lignocellulolytic enzymes.

Tamara Benjamin: 25 undergraduate Colombian students from Universidad Nacional-Bogotá were part of the inaugural Undergraduate Research Experience Purdue-Colombia (UREP-C) program in West Lafayette, Indiana. The students were from the top 10% of their programs and were interviewed in English as to their aspirations of participating in the program and becoming instruments of change in advancing Colombia’s economic, social, and political ambitions. Universidad Nacional-Bogotá (QS university ranking of 14, according to the 2014 rankings for Latin America) is perhaps the most competitive university in Colombia for accepting students, and its student body is one of the most diverse.

Covering six different colleges on campus, the 25 students were paired with faculty members and their graduate students to conduct research in a multitude of disciplines, including chemical engineering, agronomy, horticulture, aviation technology, plant science, mechanical engineering, entomology, statistics, pharmacy, physics, health and human sciences,

and civil engineering. Students were given professional development training and participated in a seminar series; each student presented their experimental design, results or conclusions during the Fall 2014 semester. In September, the students presented the results of their studies at a poster session attended by more than 100 people. In December, each student presented in English the results of their studies at a symposium.

Dan Egel conducted IPM trainings for two days in four cities in Afghanistan: Kabul, Mazar-i-Sharif, Jalalabad, and Herat. Personnel involved with the training included: Daniel S. Egel, Extension Plant Pathologist, Purdue University; Sayed Wahidullah Aqil, Extension Horticulturalist, Afghan Agriculture Extension Project; and Raymond Clark, Deputy Chief of Party, Afghan Agriculture Extension Project. The hands-on exercise for these sessions was how to use a hand lens to identify insects and diseases; 25 hand lenses were given out in each location, and they and the accompanying instruction were well received.

In September, pest management training sessions were conducted in Herat, Kabul and Mazar. The lists of pests to be covered were generated by Sayed Aqil, with input from the DAILE Extension and Plant Protection Staff. Of particular interest was the sprayer calibration exercise. Afterward, participants came inside and a volunteer wrote the calculations on the blackboard. There was a lively discussion about different methods to do the calculations.

Additional tasks were to increase the technical knowledge of the Plant Protection Department in Herat; assess the capacity of the Plant Protection Laboratory in Mazar and the Food Quality Laboratory in Herat; and to meet with the faculty of Herat University to plan implementation of the Purdue/Herat University partnership.

In March, Egel evaluated a pilot training in front of an audience of Extension staff from Kabul province. Once the training methods have been finalized, three Afghan plant protection staff will use the materials developed to make presentations in several Afghan provinces

Tom Creswell traveled to Bangladesh in November and again in March to join a team from the USDA-Foreign Agricultural Service to visit major agricultural universities and agricultural research institutes to evaluate strengths and seek opportunities for collaboration across traditional boundaries of research, plant problem diagnostics and Extension. A consensus report from the team found significant opportunity for collaboration between the US plant health program and Bangladesh phytosanitary laboratories. The US team proposed holding annual conferences to discuss synergies and, ideally, construct a laboratory network to benefit Bangladesh agriculture and trade. The first conference was held in August, with representatives from major agriculture research institutions and universities in attendance. Tom presented talks on the National Plant Diagnostic Network (NPDN) model of collaboration among diagnostic labs in the United States. The conference culminated in a unanimous vote by attendees to pursue development of a national network of research laboratories modeled after the NPDN.

Creswell traveled to Istanbul, Turkey, in March in support of the USDA-sponsored Afghanistan Agricultural Sanitary and Phytosanitary Project

(AASPS). While there, he collaborated with Rick Foster from Entomology and two members of the Afghanistan Ministry of Agriculture, Irrigation and Livestock (MAIL) staff to develop plans for ongoing plant pest diagnostic training for MAIL specialists and inspectors. They developed Extension fact sheets for major crop pests and diseases and edited training materials and modules that were translated into Dari and used in a pilot training program in Kabul and other locations for regional MAIL staffers.

Stephen Goodwin traveled to Seville, Spain, in March to attend the 12th European Conference on Fungal Genetics. He presented a poster. Also in Seville, he attended the Dothideomycetes Workshop and presented the talk "The Compact Mitochondrial Genomes of the Ethanol-Metabolizing Fungi *Baudoinia compniacensis* and *Zasmidium cellare*."

Ray Martyn participated in the 10th International Congress of Plant Pathology in Beijing, China, in August. He organized a special symposium session on fungal vascular wilt diseases and presented an invited lecture titled "The Global Impact of Fungal Vascular Wilt Diseases." This congress occurs once every five years and was attended by more than 1,700 delegates. Martyn also participated in the 10th International Mycological Congress in Bangkok, Thailand, in August. It, too, occurs every five years.

Entomology

Dieudonne Baributsa was the principal investigator for "Purdue Improved Crop Storage Market Development in Kenya," a one-year, \$386,201 grant. The USAID-FinTrac- Partnering for Innovation project hopes to commercialize PICS technology among smallholder farmers in Kenya. Collaborators included Bell Industries, Caritas Eldoret, Caritas Meru and Sorghum Value Chain Development Consortium (SVCDC).

Baributsa traveled in August/September to Kenya, Malawi, Rwanda, and Uganda to follow up on PICS2 activities. He interacted with staff members of the International Center for Insect Physiology and Ecology (ICIPE) and staff members of Caritas Meru in Kenya, N2 Africa, One Acre Fund, Post-Harvest Task Force of Ministry of Agriculture, and Eco Plastic Ltd. (manufacturer of PICS bags) in Rwanda; Entomology faculty members of Makerere University and Cooperative League of USA (CLUSA), National Cooperative Business Association (NCBA) in Uganda; and lecturers from Bunda College in Malawi. These partners were implementing trials to assess the efficacy of the PICS bags in storing maize, common bean, pigeon pea, and mungbean.

In the fall, he was an invited speaker to the third annual Global Design Team Exposition student callout at Purdue. He gave a presentation, "Improving Rural Livelihood through Sustainable Development," to students interested in study abroad through the Global Engineering Program. He attended the World Food Prize ceremony as a Borlaug fellow from Ghana. He hosted a Borlaug Fellow from Ghana for six weeks in the United States and two weeks in Niger. Baributsa will have a reciprocal visit in early 2015. Baributsa traveled to Kenya, Tanzania, Uganda and Niger for follow-up activities on the PICS2, Catholic Relief Services (CRS), strengthening millet, sorghum and cowpea value chains (MISOCO), and USAID-FinTrac-Partnering for Innovation projects.

Also in fall, Baributsa implemented a train-the-trainers (ToT) in Kenya under the USAID-Fintrac grant for the Caritas Eldoret, Kenya Agriculture Value Chain Enterprises (KAVES) project, Academic Model for Providing Access to Healthcare Program (AMPATH), and interacted with Bell Industries. In Tanzania and Uganda, under the PICS2 project, he interacted with a PICS bag manufacturer, PPTL, implemented a ToT for CLUSA and NCBA, and interacted with PICS bags manufacturer Luuka Plastic. In Niger, he made field visits for the Alliance for a Green Revolution in Africa (AGRA), the CRS MISOCO project, met with a PICS bag distributor, and interacted with National Agricultural Research Institute of Niger (INRAN) researchers on the PICS2 project activities.

In late fall, under the USAID-Fintrac project in Kenya, Baributsa implemented three training of trainers for service providers, including Caritas Eldoret and media representatives and 13 staff members of KAVES and AMPATH. He trained 43 participants (Extension agents and media representatives.) He trained Extension agents on activities to demonstrate implements to a thousand farmers groups and traders in markets in west, central, and eastern Kenya.

Under the PICS2 project, Baributsa implemented a ToT in Kampala for CLUSA NCBA staff members. Seven participants attended the ToT; CLUSA planned to reach 1,000 farmers with the PICS technology by June.

In early 2014, Baributsa participated in the Global Knowledge Initiative workshop supported by the Rockefeller Foundation. The strategies were to reduce food waste and spoilage in Sub-Saharan Africa. He also hosted a Borlaug Fellow from Burkina Faso at Purdue for six weeks. Baributsa will have a reciprocal visit.

In the spring, Baributsa attended a demonstration in Central Kenya organized by SCDC under USAID-Fintrac Kenya. In Zambia, he visited CRS, World Food Program, IITA and Polyethylene Products Zambia (manufacturers of PICS bags). In Tanzania, he visited PPTL and attended the Gates Foundation Tanzania Collaboration Convening. In Lusaka he organized a half-day PICS Roadshow, "Reducing Grain Storage Losses: Purdue Improved Crop Storage." There were 12 participants interested in reducing grain storage losses, including the World Food Program Purchase for Progress, CRS, IITA, Polyethylene Product Zambia, Zasaka, the Ministry of Agriculture, RCZ-Diacona, COMACO, and the Zambia Agriculture Research Institute (ZARI). In Tanzania, Baributsa attended the Tanzania Collaboration Convening in Dar Es Salam, organized by the Gates Foundation. In Nairobi, Baributsa organized a two-day Hermetic Storage Technologies workshop that was sponsored by the PICS2 project, which is funded by the Bill and Melinda Gates Foundation. A total of 56 participants from 15 different countries attended.

In late spring, Baributsa collaborated with the PICS3 team to organize a two-day meeting in Nairobi, Kenya, to launch the PICS3 project. Purdue attendees were from Entomology, IPIA, Ag Economics, and Botany and Plant Pathology. Partners included IITA, INERA, University of Maradi and ICIPE. Participants were from Burkina Faso, Nigeria, Niger, Kenya, Uganda, Malawi and USA.

In May, Purdue was awarded a \$10 million, five-year grant from the Gates Foundation — "Commercializing Hermetic Technologies for Grain Storage in Sub-Saharan Africa (PICS3)." Baributsa is the PI. Partners include NGOs, government agencies, and the private sector. Also in May, Baributsa served on a panel discussion — "Food Security, Post-Harvest Loss and Hermetic Storage" — during a half-day workshop organized by the Alliance to End Hunger and GrainPro.

Baributsa met with PICS bags manufacturers in Ethiopia (SePCo) and in Zambia (Polyethylene Products); interacted with ICIPE regarding the hiring of the supply chain network manager under the PICS3 project; implemented a training of trainers (ToT) for the World Food Program P4P in Zambia; and interacted with Bell Industries and SVCDC regarding the implementation of the USAID-Fintrac-Partnering for Innovation grant in Kenya.

In June, under the PICS2 project, Baributsa implemented a ToT for the World Food Program Purchase for Progress (P4P) staff and partners, in Lusaka. The goal of the training was to reduce post-harvest losses of grain stored for school feeding programs under the WFP P4P.

Grzegorz Buczkowski gave a lecture titled "The Effect of Urbanization on Ant Abundance and Diversity" at the 17 Congress of the International Union for the Study of Social Insects in Cairns, Australia.

Rick Foster is a major professor for graduate students from Herat and Kabul, Afghanistan, and Honduras. He hosted and mentored two summer interns from the National Agricultural University in Honduras. Foster co-organized, with Peter Hirst, a tour of fruit production farms in New Zealand and Australia for fruit growers from four states in the USA. He developed training materials for Afghan nationals to use in training Ministry of Agriculture personnel in identification and management of major pests of a variety of crop groups, and he conducted a three-day training workshop in Istanbul, Turkey, with the trainers to help them prepare for sessions, including development of evaluation tools.

Cliff Sadof received a Fulbright research scholarship for "Senior Research Scholar Developing and Testing a Conceptual Framework for Assessing Risks of Pesticides to Beneficial Arthropods." He and colleague Elisa Viñuela worked in the Instituto de Agronomos at the Universidad Politecnica de Madrid, an established leader in Europe in the field of non-target effects of pesticides. To gain familiarity with her approaches, Sadof worked with her students to help collect field data in experiments conducted on vegetables grown in the field and the greenhouse.

Sadof presented two papers, one in Namur, Belgium, at a meeting of the International Organization of Biological Control, on the effects of insecticide applications against soft-scale insects on spider mite outbreaks in urban landscapes regarding evaluating non-target effects of pesticides applied on urban street trees. The other paper, presented in Rechovot, Israel, regarded multitrophic factors influencing outbreaks of spider mites on trees in peri-urban landscapes. This seminar was on research in his laboratory being conducted on host plant resistance, fertilization, and pesticide use as it relates to spider mite outbreaks in maple trees.

Sadof was an invited speaker at the Spanish National Research Council in Madrid, and his talk was on the same topic he discussed in Israel.

Steve Yaninek is a co-author and collaborator with Steve Weller, Maria Marshal, Jim Simon (Rutgers) and African collaborators in three countries on a African indigenous vegetable project — USAID Horticulture CRSP Indigenous African Leafy Vegetables for Enhancing Livelihood Security of Smallholder Farmers in Kenya, Tanzania and Zambia — funded by the USAID Horticulture Innovation Lab. Yaninek also co-authored a brief narrative for the IPIA Highlights publication, “Promoting African Indigenous Vegetables Production and Marketing in Eastern Africa.”

In January, Steve Yaninek was part of a delegation from the College of Agriculture at Purdue University that participated in a 50-year anniversary celebration of the cooperation with the Federal University of Viçosa. Yaninek was invited to the University of São Paulo in Piracicaba for similar discussions. The visit to Brazil was from October 1-9. He presented twice on “Developing Sustainable Plant Protection for Smallholder Farmers in Africa: Cassava and Indigenous Leafy Vegetable Case Studies.”

In January, Yaninek traveled to Colombia to visit Jeff Stuart, a Purdue Entomology faculty member on sabbatical leave at Centro Internacional de Agricultura Tropical (CIAT) in Cali, meet with counterparts at the National University of Colombia in Bogota and Palmira, and work with an entomology colleague and make a presentation at CIAT about the department and current research. He also visited the College of Agricultural Sciences and entomology faculty at the University of Caldas in Manizales and visited an alum working at Cenicafe in Manizales. He attended the Purdue Alumni Association reception in Bogota.

In March, Yaninek co-authored a brief narrative regarding promoting African indigenous vegetable production and marketing in eastern Africa, and presented it in Honduras. It is titled “Sustainable African Indigenous Vegetable Production and Market-Chain Development for Improved Health and Nutrition and Income Generation by Smallholder Farmers in Kenya, Tanzania and Zambia,” Horticulture CRSP Innovation Lab Annual Meeting, Tegucigalpa, Honduras

In July, Yaninek helped local Zamoranos coordinate the second Symposium of Zamoranos in the U.S. “The Building Bricks for the Future of Agriculture” was held on July 20 at the Kurz Purdue Technology Center in Purdue Research Park. Zamorano alumni and collaborators from across the US attended the symposium. Special guests included the director of Zamorano, the dean of the College of Agriculture, and a selection of invited speakers with insights on the unique experience offered by interns from Zamorano.

Food Science

Arun Bhunia was invited to deliver talks on biosensor-based technologies on foodborne pathogen detection and probiotics to control pathogens at conferences in The Netherlands, Mexico, Serbia (virtual speaker) and South Korea. In addition, he delivered invited talks in universities and institutions in India, South Korea, and China, and taught short courses on Foodborne Pathogen and Pathogenesis to sophomore and junior Food Science and Technology major students at Southwest University for Nationalities in

Chengdu, China, where he is appointed as a guest professor for three years. The titles of his presentations: “Pathogenesis and Nanotechnology — Complementary Approaches to Disease Prevention,” University of Hyderabad, India, and CFTRI, Mysore, India; “Global Food Safety and Food Security Issues,” Central Institute of Fisheries Education, Salt Lake City and India; “Forthcoming New Technologies for Microbial Detection,” annual International Food Safety Congress, Mexico; “Bacterial Pathogenesis and Nano/Biosensor Tools: A Complementary Approach in Improving Food Safety,” Korea; “Bioengineered Probiotic: A Novel Approach in Preventing Microbial Disease,” keynote lecturer, Korea; “Laser Optical Sensor, a Label-free Rapid On-Plate Pathogen Screening Tool,” The Netherlands. He also presented two seminars on “Novel Biosensor Technologies for High Throughput Screening of Pathogens and Toxins” and “Bioengineered Probiotic: A Novel Approach in Preventing Microbial Disease,” China. Buhnia also taught short courses on FM201: Fundamental Food Microbiology and FM301: Foodborne Pathogen and Pathogenesis to sophomore and junior Food Science and Technology major students at Southwest University for Nationalities, China.

Christian Butzke and **Bruce Bordelon** led a group of wine growers from Indiana, Illinois, California, Florida, and Iowa on a two-week exploration of the wine industry in New Zealand. Strategically planned during Purdue’s spring break and the southern hemisphere’s grape harvest, the Extension class visited the wine regions of Waiheke Island, Hawke’s Bay, and Martinborough on the North Island, as well as Marlborough, Nelson and Waipara on the South Island. After a visit with viticulturists and enologists at Lincoln University in Canterbury, the adventure ended after 1,600 miles in central Otago with a delicious glass of cool-climate Pinot Noir.



Twenty winemakers and winegrowers from Indiana, Illinois, California, Florida, and Iowa explored New Zealand’s wine industry for two weeks, led by professors Christian Butzke and Bruce Bordelon of the Purdue Wine Grape Team.

Mario Ferruzzi and **Christian Butzke** took 20 Purdue undergraduates on yet another European Maymester adventure, appropriately themed the Food, Wine and Culture of Italy and Switzerland. Arriving in Switzerland, the class studied chocolate, cheese and wine production along Lake Geneva before traveling east across the Alps into Bella Italia. On their way to Padua and Venice, the students visited one of Italy's leading academic institutions in agriculture, the Consiglio Centro di Ricerca per la Viticoltura in Conegliano, to learn firsthand about Italian winegrape research and commercial agricultural practices. In their travels through the world's largest wine-producing country, the class visited vineyards and wineries in the cool-climate regions of Piedmont, Alto-Adige and Veneto and later descended into the warm Mediterranean climate of Sardinia, all representative of Italian diversity in fine wine production and value-added agriculture. They further explored the agropastoral production of gourmet foods on the island and visited some of the world's most extraordinary archeological sites, such as the Phoenician-Roman ruins in Tharros and the 3,500-year-old nuragic ruins in Barumini.



Food Science Professors Mario Ferruzzi and Christian Butzke took 20 Purdue undergraduates on a European Maymester adventure, appropriately themed the "Food, Wine and Culture of Italy and Switzerland."

Forestry and Natural Resources

Paul Brown gave a talk on "Expanding the Utilization of Sustainable Plant Products in Aquafeeds" at the Brazilian Society of Animal Science's 50th annual meeting in Campinas, Brazil. Brown also gave three other talks, all in Wuhan, China: "Nutritional Needs of Bass and Perch" at the China-US Forum on the Innovation in Perch and Bass Production at Huazhong Agricultural University; "Application of Metabolomics and Proteomics in Aquaculture Nutrition" at the Yangtze River Fisheries Research Institute, Chinese Academy of Fisheries Science; and "Nutrigenomics: A Theoretical Framework for Studying Nutrition, Reproduction and Health of Wild and Cultured Fish" at the Institute of Hydrobiology, Chinese Academy of Science.

Jeff Dukes presented "Warming Affects the Climate Sensitivity of Plant and Microbial Processes in an Old-field Climate Change Experiment" at the INTECOL/BES 100th annual meeting in London, England; and "The Importance of Temperature Responses of Respiration and Thermal Acclimation for ESM predictions" at the 8th New Phytologist Workshop:

Improving Representation of Leaf Respiration in Large-scale Predictive Climate-Vegetation Models, in Kioloa, Australia. Lastly, Dukes gave a talk on "Results and Experience from INTERFACE Experiments" at the INCREASE/INTER-ACT Symposium in Copenhagen, Denmark

Barney Dunning, **Doug Jacobs** and **Tomas Hook** led a class, FNR 460 International Natural Resources Issues, in a summer study abroad course to Sweden, Germany, and Poland. Eight Purdue students enrolled in the class of 14.

Barney Dunning and **Reuben Goforth** led a Tropical Biology Study Abroad course to Costa Rica during spring break. Fourteen Purdue students enrolled.

Rado Gazo presented "Computed Tomography Log Scanning: An Industrial Application" at ISCHP 2013 – 4th International Scientific Conference on Hardwood Processing in Florence, Italy, and "An Efficient Pith Detection for Computer Tomography Scanned Logs Using CUDA" at the International IUFRO In Proceedings of MeMo Wood — Measurement Methods and Modeling Approaches for Predicting Desirable Future Wood Properties, in Nancy, France. Gazo was invited by University of Bio, Concepcion, Chile, to present a paper, "Computed Tomography Log Scanning: An Industrial Application." Gazo was also invited to speak at the Forestry Commission workshop for International Forestry Day in Zapote, Costa Rica. He presented "Innovations in Wood Processing: Sustainability and Innovation in the Wood Products Industry."

Eva Haviarova, with J. Bois and H.P. Quesada, presented a paper, "Development of Optimal Forest Products Supported by LCA," at the International Scientific Conference of Hardwood Processing in Florence Italy. Professor Haviarova also presented a paper, "An Efficient Pith Detection for Computer Tomography Scanned Logs Using CUDA," at the International IUFRO Conference: MeMo Wood – Measurement Methods and Modeling Approaches for Predicting Desirable Future Wood Properties in Nancy, France. Haviarova was invited to speak in Zapote, Costa Rica, on "Wood, Sustainable Biomaterial, Innovations in Wood Processing. Sustainability and Innovation in the Wood Products Industry." She was also invited to conduct research at the Wood Research Laboratory, Department of Forestry and Natural Resources, Purdue University; Costa Rica Institute of Technology, Cartago, Costa Rica; and present a paper, "Sustainable Forest Products Supported by Life Cycle Analysis," at Colegio Federado de Ingenieros y de Arquitectos in San Jose, Costa Rica.

Douglass Jacobs was invited to speak on "Nutrient Dynamics of Planted Forests: Advances in Techniques and Theory," at Zhejiang A&F University in Lin An, China, at the International Forum on Sustainable Development of Subtropical Forests, Tree Physiology and Environmental Stress. He gave two presentations, "Optimizing Seedling Quality for Restoration After Surface Mining," and "A Conceptual Framework for Restoration of Threatened Plants: The Effective Model of American Chestnut (*Castanea dentata*) Reintroduction," at the Society for Ecological Restoration's fifth world conference in 2013 in Madison, Wisconsin.

Charles Michler was invited to present a paper, "Fine Hardwood Tree Improvement in the Central Hardwoods Region of the United States," at Northeast Forestry University in Harbin, China.

Bryan C. Pijanowski presented a paper, "Soundscape Ecology as a Paradigm for Monitoring Biodiversity and Ecosystem Dynamics," at the Zoological Society of London in London, England. He also presented "Soundscape Ecology as a Means to Monitor Biodiversity Patterns in the Tropics" at the University of Sao Paulo, Brazil; "Soundscapes as Coupled Natural Human Systems" in Nanjin, China, at the joint US-China Workshop on Coupled Natural Human Systems; and a plenary talk in Budapest, Hungary, "Soundscape Science: Advances in the Terrestrial Ecosystems."

Paula Pijut gave a talk on "Rapid In Vitro Shoot Proliferation and Anatomical Investigation of Adventitious Root Formation in Black Walnut (*Juglans nigra*) Microshoots" at the VII International Walnut Symposium in Fenyang city, Shanxi, China. Pijut gave a research presentation and lab tour to visiting scientists from Yunnan Academy of Forestry, Yunnan, China, and Tengchong Forestry Bureau, Tengyue Town, Tengchong County, Yunnan.

Linda Prokopy presented "Socio-Economic Barriers and Opportunities for Change in Agriculture" at Sustainable Intensification: The Pathway to Low Carbon Farming, a conference in Edinburgh, Scotland.

Maria Soledad Sepulveda presented "Oxygen Consumption in *Daphnia Magna* as a Rapid Bioindicator of Changes in Water Quality" at the 23rd Society of Environmental Toxicology and Chemistry SETAC Europe Annual Meeting, in Glasgow, Scotland.

Guofan Shao presented a paper, "Forest Conservation Under the Pressure from Timber Shortage and Heavy Human Population," at the Proceedings of Changbai Mountain International Eco-Forum, Changbai Mountain, China.

Shao also presented a paper, "Remote Sensing of Forest Disturbance: Resolution Matters," at the International Workshop on UAV Remote Sensing in Sao Carlos, Brazil. He was invited to present "Seeking a Technical and Political Convergence to Diminish the Barriers of Cross-Border Conservation on Changbai Mountain" at International Workshop on East Asian and European Regional Environmental Governance (EE-REG) in Kyoto, Japan.

The Department of Forestry and Natural Resources also had 19 international graduate students and 22 international postdoctoral or visiting scientists/speakers who were supervised or hosted. Haviarova and Gazo led a Study Abroad class on Global Sustainability Issues in Central America in Costa Rica during spring break.

Horticulture and Landscape Architecture

David Barbarash was invited to present a paper at the 2014 Digital Landscape Architecture conference in Zurich, Switzerland. The research focused on student use and acceptance of a mobile (cellphone-based) learning platform, using the Purdue Arboretum as a tool for plant identification and character.

Mike Dana, along with **Rosie Lerner**, Extension Consumer Horticulture Specialist, led a 10-day Master Gardener study tour of the Gardens of France in July. Twenty-five Master Gardeners from Indiana and six other states received advanced training by studying and experiencing 15 historic and contemporary landscapes in the Loire Valley, Normandy, and the Paris region.

Peter Hirst, along with Kola Ajuwon (Animal Sciences), led four students to Zambia to work with the Kafakumba Training Center to provide expertise to their development work. This was a pilot program that will likely lead to an ongoing collaboration. He also hosted a visiting scientist and a visiting graduate student from Northwest Agricultural and Forestry University (NWAUFU) in Shaanxi, China, where he also holds guest professor status. Hirst visited NWAUFU in September and provided advice to faculty and graduate students. He also toured research and Extension centers in Shaanxi and Shandong provinces. He supervised a graduate student and visiting scientist from Afghanistan. They studied field and lab research methods and became familiar with American agricultural production techniques.

Hirst and Rick Foster (Entomology) led a tour to New Zealand and Australia in February. The participating 20 growers were from Indiana, Ohio, Kentucky, New York and Connecticut.

Hirst and Cale Bigelow presented to the Slovenian Greenkeepers Association in November.

Jennifer Dennis went to Beijing, China, from Aug. 24-30 with the American Distance Education Consortium (ADEC) to form collaborations with the Central Agriculture Broadcasting and Television School (CABTS).

Dennis began working on distance education initiatives in 2013, chairing a taskforce of eight people to examine the status of distance education in Agriculture. This effort focused on undergraduate, graduate, Extension, professional, and executive programming within the College of Agriculture. This work resulted in an 86-page white paper that outlined distance education efforts and opportunities and included the evaluation of Extension and outreach distance education programs and a survey assessment of distance education needs for Extension specialists and educators. More in-depth work from January to July examined the feasibility of a distance resource center for the College of Agriculture. This exploration included a different task force of nine faculty/staff in the college to create an action plan for creating a support unit for distance education efforts. As a result, one white paper, one action plan, one invited talk to China and one conference proceeding paper has been written on exploring distance programs for land grant institutions. Upcoming plans include launching an assessment program for expanding the flipped classroom approach in Extension workshop programming. Dennis also participated in the ADEC/CABTS 2014 International Conference on Open Distance Education as an invited speaker: "Evaluating Support for Distance Programs," Conference Proceeding and Invited Talk, Aug. 26-29.

Stephen Weller: Activities continued at Purdue under the direction of Stephen Weller and co-PIs Maria Marshall, Steve Yaninek, Gary Burniske and Darrell Schultz on activities in Sub-Saharan Africa and Central America. The activities in Africa were concentrated on surveys to determine barriers for smallholder farmer access to land, equality, production inputs and market access. The survey established the basis for research and training programs aimed at value chain interventions for smallholder farmers to become more involved in production, access to affordable inputs, postharvest handling, and market access for African indigenous vegetables in Kenya, Tanzania and Zambia. The emphasis is on training and research to improve all aspects of the value chain, improve access to highly nutritious food, providing income opportunities to disadvantaged clients, especially female farmers and families suffering from HIV/AIDS, and practices for value addition, including improved and efficient solar drying technology. Collaborations with private AIV companies have included nutritional analysis of dried products for product labeling and analysis, development of new recipes for fresh consumption, and the determination of nutritional composition of such foods. The project had collaborators from Rutgers and several African institutions, and in Kenya involved AMPATH, a medical program providing access to medical interventions and improved agriculture practices for their farmer clients. The USAID-supported Horticulture Innovation Laboratory at the University of California, Davis funded the project. The project has been ongoing for five years and has impacted more than 3,000 smallholder farmers in our target countries.

A second project in Honduras led by Weller and Rick Foster was funded under the USAID Integrated Pest Management Innovation Laboratory at Virginia Tech. The project included collaborators in Honduras at FHIA (Fundación Hondureña de Investigación Agrícola Investigación y Proyectos Productivos) and also at Zamorano. Research involved developing and implementing improved and sustainable pest management practices for smallholder vegetable farmers in Honduras and included development of seven production manuals and more than 50 training sessions for farmer stakeholders. The project also supported the Master of Science program in nematology for David Perla from Honduras that was completed in 2014 under the direction of Virginia Ferris and Rick Foster in Entomology. The program continued to host two Honduran students from the Universidad Nacional de Agricultura during the summer of 2014 to work on an insect and weed management project under Weller and Foster. This was the concluding year of the program that has been ongoing for 20 years at Purdue.

Weller is also involved in a Gates Foundation-funded project in Nigeria on weed management in cassava; it is directed by IITA (International Institute of Tropical Agriculture) in Ibadan. This project is determining both chemical and cultural interventions in cassava production that will reduce labor inputs for weed removal, effectively and sustainably manage weeds, increase yields, improve income for smallholder farmers and improve cassava availability for diets of nutritionally deficient populations. The project was initiated in 2014 and will be conducted over a five-year period.

Weller was a keynote speaker in the African Indigenous Vegetable (AIV) Symposium held at the 2014 International Horticulture Congress in Brisbane, Australia, in August and presented two additional talks on market access and nutrition of AIVs. He hosted an AIV conference for the Horticulture Innovation Laboratory AIV project in Kisumu, Kenya, in July 2014; more than 30 project collaborators from Kenya, Tanzania and Zambia attended. He presented a talk in Washington, D.C., on July 9, on "Sustainable African Indigenous Vegetable Production and Market-Chain Development for Improved Health and Nutrition and Income Generation by Smallholder Farmers in Kenya, Tanzania and Zambia and the nutritional aspects of AIVs for African Diets." The occasion was a UC Davis-hosted event, "Horticulture: Key Opportunities for Nutrition."

International Extension

PICS Improved Cowpea Storage (PICS1)

The PICS1 project was granted a no-cost extension through December 31, 2014, to complete reinforcement activities in PICS1 countries in West Africa.

PICS Improved Cowpea Storage (PICS2)

Research results confirmed that PICS bags are effective in storing dry grain, as well as cereals and legumes, attacked by a variety of insect pests. The PICS2 project was granted supplemental funding by the Bill and Melinda Gates Foundation to facilitate manufacturing of PICS bags in several countries to improve availability. PICS bags are currently being produced by 15 manufacturers in West, East and Southern Africa and in Asia. New PICS manufacturing capacity was established in Tanzania, Rwanda, Kenya, Zambia, Uganda, Malawi, Ethiopia, Afghanistan, and Nepal. Under the same grant supplement, Purdue and partners organized a two-day Hermetic Storage Technologies Workshop in Nairobi, Kenya, on April 28–29, 2014. The workshop brought together development, government and private-sector partners who have developed, and/or are disseminating, hermetic storage technologies around the world. A total of 56 participants from 15 different countries attended this workshop. A PICS special issue — "Hermetic Storage of Grain in Developing Nations," highlighting research on the use of PICS bags in storing several commodities — was published in the Journal of Stored Product Research: <https://www.sciencedirect.com/science/journal/0022474X/58>

PICS Improved Cowpea Storage (PICS3)

In May 2014, the Bill and Melinda Gates Foundation awarded \$10.1 million to Purdue University as the third phase of the PICS project (PICS3). Dieudonne Baributsa is serving as Principle Investigator, with Jess Lowenberg-DeBoer and Larry Murdock as Co-PIs. The project goal is to commercialize hermetic technology in Sub-Saharan Africa to reduce storage losses in a variety of economically and nutritionally important commodities, and thereby increase incomes and improve food security of smallholder farmers across the continent. The project will work with the private sector (manufacturers, distributors, and vendors) to commercialize

the PICS technology. PICS3 is primarily focused in seven countries — Ethiopia, Tanzania, Uganda, Nigeria, Ghana, Burkina Faso and Malawi — and plans to reach farmers in more than 15,000 villages. Extension partners include the International Institute of Tropical Agriculture (IITA) in Nigeria, Catholic Relief Services (CRS) in Ethiopia and Malawi, INERA in Burkina Faso, CLUSA NCBA in Uganda, and NARI Naliendele and LAZARDI in Tanzania. Pilot activities have been launched in Uganda, Malawi, Ethiopia and Tanzania, and full-scale activities are being implemented in Nigeria and Burkina Faso.

Other PICS-Related Activities

Purdue University and several partners, including Bell Industries in Kenya and Eco Plastic in Rwanda, successfully commercialized the PICS technology in both countries. The PICS USAID Fintrac in Rwanda was successfully completed in April 2014 with the expansion of the PICS bag market into neighboring countries, including D.R. Congo. In Kenya, the project trained more than 60,000 farmers in the proper use of the PICS technology in the Rift Valley and Central and Eastern Kenya. Purdue continues to strengthen its partnership with CRS in promoting the PICS bags in several countries, including Niger, Malawi, Ethiopia, Tanzania, and D.R. Congo. One recent spinoff of the project at ICRISAT, and backstopped by Purdue, focuses on the use by Indian farmers of PICS bags for safely storing ground nuts.

Youth Development and Ag Education

Neil Knobloch conducted a research study of rural youth motivation in a post-guerrilla conflict community in rural Colombia with Professor Carlos Parra at the Universidad de Caldas in Manizales, Colombia. This research study was presented at the annual conference of the Association of International Agricultural and Extension Education in Miami, Florida. Moreover, he presented an abstract on learner-centered teaching and a current educational gaming project at the inaugural International Congress of Innovation in Higher Education for Teaching and Learning Agriculture and Natural Resources, Universidad Nacional Agraria LaMolina, Lima, Peru. He co-advises a doctoral fellow and Fulbright scholar from Chile.

Jerry Peters traveled to the University of Faisalabad, Pakistan, to present a seminar titled “Strategies for Working With Adult Learners/Farmers.” This was part of a funded project, “Af-Pak Initiative Strengthening Extension Skills of Young Professionals In Afghanistan and Pakistan.” During this time period he also worked with Dr. Khalid Mahmood Choudhary, Associate Professor, Institute of Agricultural Extension & Rural Development, Faculty of Social Sciences, University of Agriculture, Faisalabad, Pakistan, and his research team on an additional funded project, “A Follow-up Study of the AF-Pack Workshops on Strengthening Extension Skills of Young Pakistan Professionals.” He visited several Extension educators and trainees as they provided assistance to farmers in districts around Faisalabad.

Peters also traveled with Jess Lowenberg-DeBoer to Faranah, Guinea, for the launch workshop for the Assessment of the Institute of Agricultural and Veterinary Science (ISAV). The general objective was to work with ISAV administrators, faculty, and students to develop an assessment of their

institution to use as a starting point for the Agricultural Education and Market Improvement Project (AEMIP) being led by Winrock International. He presented a workshop with an overview of different approaches to institutional assessment.

Peters traveled with Allen Talbert and several agricultural education students to Jamaica for the study abroad courses EDCI 20500 and EDCI 28500. The base of operations for the Study Aboard program is the College of Agriculture, Science, and Education (CASE) in Port Antonio, Jamaica.

Pamala V. Morris traveled with the Purdue DiversiKey over the 2013 spring break to take 15 students to the Netherlands for an examination of diversity and social justice issues. These students were from a variety of disciplines from across campus, including four agriculture students. In 2014, she partnered with Thelma Snuggs, professor in HHS, to travel to Cartagena, Colombia, for a spring break study abroad. They took 30 (HHS and Agriculture) students for eight days to study the culture. The course title was “Multifaceted and Cultural Dimensions of Cartagena, Colombia.” In summer of 2014, she attended the 14th International Diversity in Organizations, Communities and Nations Conference Institute for Gender and Diversity in Organizations held at the Vienna University of Economics and Business, Vienna, Austria, July 9-11.

Roger Tormoehlen and several youth educators in Extension Areas II (south central Indiana) and XI (northeast Indiana) organized, in partnership with our 4-H and governmental colleagues in Poland, a two-week cultural exchange of 25 American youths and adults to Poland. The Area II county youth educators arranged for six youths and three adults associated with the Indiana Extension system and Indiana 4-H program to spend 2 ½ weeks in the Opolskie voivodship (province) of Poland. Ten 4-H youths and six adults from the northern part of Indiana spent 2 ½ weeks in the Swietokrzyskie voivodship of Poland. All members of the Indiana delegations were provided the opportunity to learn about the Polish culture as part of their home stay with a Polish family.

Jerry Peters, Allen Talbert, and Roger Tormoehlen served as the major professors for four Malawian graduate students during the 2013–14 academic year. During the academic year, three students returned to Malawi to conduct their research. The fourth began his studies at Purdue University during spring 2014.

International Food Technology Center International Activities

USAID Feed the Future Innovation Lab Program

The International Food Technology Center (IFTC), in collaboration with International Programs in Agriculture, in May received a US Agency for International Development (USAID) project award funded at \$5 million USD over five years. The award is for the Feed the Future Innovation Lab for Food Processing and Post-harvest Handling, shortened as Food Processing Lab, FPL. The goal of the project is to increase access to safe and nutritious

foods along the value chains by improving the drying and storage capacity of smallholder farmers and expanding market opportunities through diversified processed products that address quality in the market and nutritional needs. The program will focus on cereal grain value chains in Kenya and Senegal. Locally available nutrient-rich value chains will also be targeted for enhancing the nutrition of products. The project has two core research components: 1) Grain drying and storage involving development and dissemination of affordable and efficient drying and storage technologies for use by smallholder farmers, and 2) Food processing and nutrition involving development of high-quality, market-competitive food products, including products with improved nutrition and dissemination through incubation training centers. Building of local capacities (human and institutional) and partnerships among public and private sectors are other components of the project. Gender and environment will be taken into account at all stages of the project cycle. The project partners include: North Carolina A&T State University; University of Pretoria, South Africa; Institut de Technologie Alimentaire, Senegal; L'Institut Sénégalais de Recherches Agricoles, Senegal; the Cooperative College of Kenya; University of Eldoret, Kenya; CIMMYT-Kenya; and A to Z Textiles, Tanzania. The project was officially launched in August in Dakar, Senegal. Details about the project can be found at: <https://ag.purdue.edu/ipia/fpl>.

The IFTC also received a grant of USD \$179,824 from USAID Education and Research Agriculture (USAID-ERA) for a project to develop and assess fortified instant cereal products for the Senegalese market. This three-year project (2013-2015) led by Mario Ferruzzi also focuses on capacity building by training a Senegalese student.

The IFTC also received USD \$28,545 for a Cochran Fellowship training on food security policy for South African Fellows from the U.S. Department of Agriculture, Foreign Agriculture Service. Two senior government officials from South Africa were trained under this project.

Invited talks, activities, and presentations

The IFTC was invited to participate in the Rockefeller Foundation's Leaders' Quest in India to explore solutions to post-harvest food loss that may be applicable to Africa (May 18-23, 2014). The quest was part of the process employed by the Foundation toward developing a post-harvest initiative in Africa.

Suzanne Nielsen and Betty Bugusu participated in the International Symposium on Agriculture Development in East Africa, organized and hosted by Kilimo Trust in Kampala, Uganda, in November. Bugusu was an invited speaker for the conference themed "Value Addition and Post-harvest Processing in East Africa over Past Fifty Years and Prospects for the Future."

Betty Bugusu was the keynote speaker at the annual Hunger Banquet organized by the Global Health Student Group at Indiana University School of Medicine in Indianapolis, Indiana, in March.