

International Programs in Agriculture



IPIA

Annual Highlights
2009–2010

Message from the Director

At Purdue, globalization started in the College of Agriculture (CoA) when International Programs in Agriculture (IPIA) was founded in 1962 to manage Purdue's efforts in Brazil. Study abroad was added to the portfolio in the 1980s and grew into a major IPIA activity. Over the years, the geographic focus of capacity building programs has shifted to sub-Saharan Africa and Central Asia—and, at home, globalization has spread throughout the university. Collaborative research, education, and engagement activities continue in over 60 countries.

Over the years, CoA faculty members have often worked on international efforts with colleagues from other Purdue colleges such as the School of Veterinary Medicine and the Department of Foods and Nutrition in the new College of Health and Human Sciences. Newer collaborations are growing with colleagues in Engineering and Technology around water management (remember, water is an essential nutrient) and food logistics, with Management focused on food supply chain development, and with Science on harnessing basic biology in service of humanity.



On February 8, 2010, Purdue held its first Global Food Security Summit to address a societal challenge that involves all disciplines at Purdue. Sixty-three Purdue faculty members from all 10 major colleges and schools attended. The consensus was that piecemeal solutions would not work. Instead, we need to work together to find sustainable solutions. While many details remain to be worked out, we are developing a Purdue Global Food Security Initiative that would harness the pent-up desire on campus to address this issue in a systematic way.

The *2009-2010 Highlights* is a brief summary of international programs in agriculture activity over the past year. Please contact us or the departments if you have any questions or comments.

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

Study Abroad

In 2009–10, agriculture students traveled to all parts of the world and studied on every continent except Antarctica. During a new summer program introduced with the National Taiwan University, Purdue students participated in a four-week research project and a four-week course. A service-learning course in Romania was also offered for the first time through the Department of Animal Sciences in cooperation with Heifer International.



Fifteen semester programs were approved by the College of Agriculture. These programs are coordinated through the campus-wide Office of Study Abroad. In addition to giving our students more choices in Australia and the United Kingdom, new opportunities are now available in Turkey, Egypt, and China.

IPIA and the College of Agriculture welcomed 23 international exchange students for a semester or a year.

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These students are from our partner universities and enable our students to study at their home universities. Students came from Sweden, Ireland, Austria, England, Wales, Australia, and Germany to study at Purdue. IPIA also hosted seven students from Japan for one month, which included a two-week stay with host farm families. While at Purdue they visited agribusinesses, cultural sites, and a few academic classes.

Thanks to the generosity of our supporters, IPIA awarded scholarships and grants totaling \$19,500 to agriculture students who participated in a long-term program (eight weeks or longer) in 2009–10.

It was a very successful first year for the International Agriculture Ambassadors program. In addition to talking with students in the classroom and helping with visitors to IPIA, they placed second in the Purdue Homecoming float contest, hosted an international food festival during International Week, and hosted a booth at the annual Spring Fest weekend. We said goodbye to some of the ambassadors and welcomed others.

The ambassadors for 2010–11 are:

- Ashtin Balzer, Agricultural Education
- Jessica Gilson, Agricultural Economics
- Carolyn Hanrahan, Animal Science, Preveterinary Medicine
- Keith Hoeing, Agribusiness Management
- Carissa McCay, Agribusiness Management
- Courtney McWaine, Biological and Food Process Engineering
- Jiangyi Qian, Agricultural Economics
- Chelsea Scheidler, Preveterinary Medicine
- James Sibray, Preveterinary Medicine
- Shalyse Tindell, Animal Science



International Extension

PICS Nigeria Extension

Purdue Extension educators Adrienne Held, Maria Restrepo, Bill Horan, Jeremy Weber, and International Extension Program Coordinator Jim Murren traveled to Nigeria from August 5–21, 2009, to assist in a Train-the-Trainer program with the International Institute of Tropical Agriculture (IITA), Kano Station. This program is part of the Purdue Improved Cowpea Storage (PICS) project facilitated by IPIA.

For two weeks, they traveled in separate teams with IITA staff throughout northern and central Nigeria to carry out more than 23 training workshops in state capitals and surrounding villages of 14 states and the Federal Capital Territory. A typical workshop involved a day or a day and a half of working with Nigerian Extension agents (EAs) and officials from each state's Agricultural Development Program, getting started around 9 a.m. and ending around 5 p.m. A follow-up session occurred the next morning with the final components of the training, if needed.

The purpose of the workshops was to train the EAs on the use of the PICS hermetic, triple-bag storage technology, providing instruction on how to properly use the plastic bags. It also covered socioeconomic implications, entomological aspects/pest problems, surveying, and ethical research processes. At the end of the trainings, the EAs traveled back to their communities where they met with village chiefs and sought permission to hold demonstration programs for farmers living in the villages. Some 650 Nigerian EAs were trained by Purdue Extension, and those EAs trained an estimated 10,000 villages on the PICS bagging technology.

Extension Professional Development

Understanding and Serving Latino-Hoosiers

The purpose of this workshop was to provide Purdue Extension educators with a better understanding of the Latino people that live among us, and how to serve them via the county Extension office. Social, economic, and political underpinnings of Latinos' decisions to come to the United States from their homelands were considered. The workshop focused on Latinos living in Indiana, and cultural considerations, especially in educational settings, were shared with the workshop participants. Additionally, a panel of Extension educators and Latinos already carrying out programming in county Extension offices shared their experiences. Thirteen Purdue Extension educators participated in the workshop.

The Role of Universities in Supporting Agriculture in Rural Communities of Indiana and Afghanistan: An Exchange of Models, Ideas, and Perspectives

Purdue had 18 Afghan faculty and junior faculty on campus this past year pursuing various long and short term training programs. The Afghan guests at Purdue had an opportunity to see how universities in the United States support agriculture outside of the classroom through Purdue Extension. At the same time, the Afghans had an opportunity to educate Purdue CoA faculty and staff about agricultural universities and farming practices in Afghanistan, broadening Purdue's understandings of global agriculture.

A one-day workshop held at Purdue on April 15 opened with general overviews of agriculture in Indiana and Afghanistan.



Presentations by the Afghans, Purdue CoA faculty, and Extension educators detailed the roles of their respective universities in supporting agriculture in rural communities, and the day ended with a discussion and exchange of ideas. Fifteen Purdue Extension educators participated.

Purdue Extension Global Awareness Team (PEGAT)

Purdue Extension's Global Awareness Team (PEGAT) made up of Purdue specialists and educators seeks to increase understanding of globalization and its impact on Indiana communities. Formed in the summer of 2009, the team consists of Purdue campus-based experts and field-based educators from around the state. PEGAT partners with state and local agencies that share its mission.

PEGAT aims to unite Purdue University's mission to be a global university with its Extension mission to provide research-based information and education to the residents of Indiana. Its goal is to assist in building globally aware communities that have the knowledge, skills, and attitude to adapt to cultural and economic changes associated with globalization.

Regional International Partnership Efforts

Asia/Middle East Partnerships

Middle East: A group of Purdue faculty including Jess Lowenberg DeBoer, Associate Dean/Director of IPIA, participated in a water and plant meeting in Jordan jointly supported by grants from ISE (International and Science Education) and MARD (Multinational Agriculture Research and Development). The team also visited Israel to discuss a Jordan-Palestine-Israel Joint Research Center Initiative at Bet Shean and attended a symposium organized by Bethlehem University to discuss Purdue CoA interactions with higher education institutions in Palestine (March 2010). Lastly, the Purdue team visited Jordanian and Palestinian

greenhouses to help understand the intensive production of high-value horticulture crops destined for export to Europe and the Middle East.

Asia: Over a year in the planning, Purdue Day at China Agricultural University (CAU) took place May 21, 2010, at CAU in Beijing, China. Purdue President France Córdova and a delegation of faculty and students participated in the celebration of the decade-long partnership with CAU. Initiated by CoA/IPIA, some 16 CoA representatives were in attendance, including Dean Jay Akridge and 2007 World Food Prize winner Phil Nelson. The event included a Global Food Security Forum and Exhibition, Purdue-CAU agreement-signing ceremony, and a Gala Night Party. Facility tours and meetings between Purdue and CAU colleagues helped explore current and potential research collaboration and student exchanges. For more information see: <https://www.purdue.edu/global2010/100521PurdueDayCAU.html>; <http://www.ag.purdue.edu/Pages/china.aspx>

Latin America

The IPIA Initiative on Latin America and the Caribbean (ILACI) is charged with reengaging the College of Agriculture with this region. It started with a call for the formation of a network of faculty and students interested in the region, and has grown to include faculty from several universities in Latin America. Some of the activities organized by ILACI during this period were:

- January 27, 2010—Brown bag seminar presented at Purdue by Dr. Tamara Benjamin, joint researcher for Purdue and Costa Rica-based CATIE (Tropical Agricultural Research and Higher Education Center). A room packed with a college-wide audience gave testimony to the interest that the region evokes among our researchers.
- March 3, 2010—Four agriculture graduate students from Central America presented a compelling case for joint efforts between our faculty and their counterparts in Latin America. Three of the students come from Zamorano in Honduras, a program greatly enriched by the tireless work of a member of our college, the late Robert James O'Neil.
- Also in March 2010—Adriela Fernandez visited the campus of the Federal University of Vicosa (UFV) in Minas Gerais, Brazil, to initiate the reconnection with our sister institution.
- April 2010—IPIA-ILACI hosted Rector Luiz Claudio Costa and Director International Programs Luiz Claudio Barbosa of the UFV. Located in the state of Minas Gerais, Brazil, the UFV has been a sister institution of Purdue since 1952. Purdue's College of Agriculture, together with Brazilian educators, led one of the most successful international university-to-university cooperation efforts. That work culminated with the world-class

institution of higher education that UFV is today. Through this visit Purdue and the UFV renewed their commitment to joint collaboration and cooperation. Jess Lowenberg-DeBoer and Adriela Fernandez have planned a follow-up visit to the Vicosá campus in October 2010. Another follow-up activity, proposed by Rector Costa, is a joint UFV-PU Symposium on Agro-Energy Sustainability. IPIA has teamed-up with faculty from various colleges on campus and centers at the Discovery Park to coordinate this event for May 2011.

- April 26, 2010—Professor Ursula Oswald Spring, professor at the Regional Centre of Multidisciplinary Research at the National Autonomous University of Mexico (CRIM-UNAM), came to Purdue at the invitation of IPIA-ILACI and partner programs across campus. She shared her world expertise on “Climate Change and Water Security” in a lecture at Pfendler Hall. The main objective of her visit was to initiate a formal connection with the UNAM at their research facilities in Cuernavaca in the state of Morelos. An exchange of researchers and graduate students around the issue of water security was proposed as the first step of collaboration. IPIA and the Women’s Resource Office have proposed to bring Dr. Oswald Spring back for a workshop to discuss women, food and water security and sustainability. This would be a two-week workshop for faculty and upper classmen across campus and will be offered by the Office of the Provost for Special Initiatives during the spring semester of 2011.

Interdisciplinary International Efforts

Advancing Afghan Agriculture Alliance (A-4) and Related Activities

www.agecon.purdue.edu/extension/programs/afghanistan.asp

Purdue continued capacity-building efforts in Afghanistan. The USAID A4 Program saw two Afghan master’s students finish their degrees at Purdue. The other 10 Afghan students are expected to complete their studies by early 2011.

Sophia Wilcox, University Development Specialist-Afghanistan, worked with Animal Science faculty at Kabul University this past spring to establish a poultry program and to integrate laboratory activities into their curriculum. A poultry barn was built to house chickens for student farm activities, and animal science laboratory activities are now a part of the department curriculum.

During the summer of 2009, six junior Afghan faculty members came to Purdue for a six-week short-course on pest diagnostics, presented by faculty from the Departments of Botany and Plant Pathology, Entomology, Horticulture and Landscape Architecture,

and from the Southwest Purdue Agriculture Center. The program centered on intensive insect, disease, and weed pest identification and control. The Afghan faculty also participated in field days, extension visits/training programs, and pest identification in the Purdue Plant Diagnostics Laboratory. In June 2010, Chris Oseto and Rick Foster traveled to Afghanistan to lead an entomology teaching workshop for Afghan agriculture faculty from 10 universities.

Purdue continued the Agriculture Development Team (ADT) training program for National Guard ADT members deployed to Afghanistan. Guard units from Indiana, Iowa, and South Carolina came to Purdue for the weeklong workshops this past year.

Kenya – AMPATH

Pamela Obura, Associate Director of Agriculture Programs with AMPATH (Academic Model Providing Access to Healthcare), is based and working in Eldoret with local and international partners to jointly identify, develop, and disseminate best practices to promote appropriate technologies and environmentally sound agricultural production. Obura has been engaged in capacity building with agricultural Extension staff and farmers in the following areas: (a) appropriate cereal legume intercropping, (b) soil fertility improvement and conservation practices, and (c) African Leafy Vegetable (ALV) farming, identified as one of the potential micro-enterprise for smallholder farmers with limited resources.

About 60 farmers in selected AMPATH sites participated in the cereal-legume intercropping and fertilizer trials and approximately 400 soil samples have been taken from farmers’ fields and submitted to Moi University’s soil lab for analysis. With knowledge of the fertility status of these soils, local Extension staff will be in a better position to provide appropriate crop and soil management recommendations.

Purdue Improved Cowpea Storage (PICS)

www.ag.purdue.edu/ipia/pics

PICS entered its fourth year with the launch of training and village activities in Ghana, Cameroon, Senegal, and Chad. For the past three years, milestones reached by the PICS project are: more than 100,000 households tested the PICS technology and more than 1,200,000 PICS bags were sold in Nigeria, Niger, Burkina Faso, Mali, Togo, and Benin.

Partners in the new countries include International Tropical Agriculture (IITA), World Vision International, the Institute of Agricultural Research for Development (IRAD) of Cameroon, the Association of Support to Local Development Initiatives (ASSAILD), the Christian Centre for Support of Community Development (CECADEC) in Chad, and the Council of Associations of Community Development (CADEC) in Senegal.

From July to August 2010, more than 300 field technicians were trained in Ghana, Cameroon, Senegal, and Chad to conduct activities in 4,251 villages. By June 2010, PICS technology was demonstrated in 9,263 villages in Nigeria, 5,829 villages in Niger, 4,321 villages in Burkina Faso, 2,111 villages in Mali, 906 villages in Togo and 488 villages in Benin. Nigeria, Mali, Togo, and Benin are entering the second or “reinforcement year,” with a focus on marketing the PICS technology through media and market demonstrations. In addition, some countries are conducting activities in villages that were not reached during the 2009 cowpea season.



PICS received buy-in from various organizations to extend the technology to villages that were not targeted by the project. These partners received PICS training and provided funding to implement demonstration activities in 1,400 additional villages. These institutions include the Research In Use (RIU) Nigeria, State Agricultural Development Programs of Bauchi and Gombe in Nigeria, Community Based Agricultural and Rural Development Program (CBARDP), and the Sub-Saharan African Challenge Program Kano-Katsina-Maradi Pilot Learning Site (KKM PLS).

From March 2010 to July 2010 open-the-bag events were completed in all villages where demonstrations had occurred in 2009, with an estimate of more than 950,000 people participating. PICS technology continues to perform well. It eliminates insecticide use in storage and enables farmers to hold their grain after harvest instead of selling it when the price is the lowest of the year. Some farmers are reporting price premium for the cowpeas stored in PICS bags when compared to alternative methods.

Media (radio, TV, cell phone videos, and print) continue to play an important role in building awareness regarding the PICS technology. Radio has been effective in reinforcing the PICS technology message in rural villages. Video images for TV or cell phones are proving to be useful, because hermetic sealing is difficult to describe in words on the radio or in print. PICS is taking advantage of the use of cell phones with Bluetooth by rural communities in Africa to disseminate video clips on the use of hermetic storage. PICS project developed cell phone videos in

Hausa (Niger and Nigeria), French (Niger) and English (Nigeria), and a TV sketch in Bambara. Culturally and linguistically appropriate cell phone videos present potential as a new tool for conveying visual and oral messages on cowpea storage technology in rural Africa.

PICS stepped up its efforts to increase the participation of women in village activities. In areas of Nigeria where mixed-gender gatherings are rare, PICS-trained women field technicians to conduct demonstrations for women. In Mali, Togo, and Benin, women community workers were recruited to conduct village demonstrations for fellow women. In Burkina Faso, the project organized a cowpea storage contest in collaboration with the women’s association in the Province of Sourou.

The PICS research team continues to work on improving the quality and performance of the triple-layer sacks technology at the farm level. The PICS project has learned that farmers are trying the PICS technology on different crops, including maize, Bambara groundnut, and hibiscus seed. Efforts are being put in place to develop activities for the use of PICS bags for storing crops other than cowpea. These efforts will identify African commodities or other stored products, which the PICS technology, in its current or in modified form, might prevent storage losses.

The PICS project is currently working with several African based plastic manufacturers to produce the triple-layer bags. To date, the project has worked with five manufacturers based in Nigeria, Ghana, Mali, Senegal, and Burkina Faso. African entrepreneurs are finding new business opportunities in purchasing the PICS bags from manufacturers and selling them to farmers through their retail networks. Farmers and cowpea consumers are enjoying the benefits of Purdue and partners’ research and development efforts.

Research to Support Linking Livestock Markets to Wildlife Conservation

This was the final year of the GLOBE Foundation-funded project in Kenya, which involved students and faculty from Purdue University, Egerton University (Eldoret, Kenya), and the University of Nairobi (Nairobi, Kenya) in addressing topics related to better management of range lands, earning more income from livestock, and finding alternative enterprises to supplement the local peoples’ incomes. In April, Kyle Culp, the final Purdue student on the project, completed his thesis and a cattle body-condition-scoring guide to benefit Kenya cattle herders and owners. Over the project’s four-year period, three Purdue and four Kenyan Master of Science students focused their theses research on various aspects related to Kenya’s livestock and wildlife conservation relationship. In addition, three fourth-year Purdue veterinary medicine students spent six to ten weeks in Kenya conducting Abattoir surveys of ranch and community (Il Nwgesi) cattle.

Collaborative Research Support Programs (CRSPs)

Aquafish CRSP

Kwamena Quagrainie (Agricultural Economics) led a project to study consumer preferences and trends in the demand for tilapia (*Oreochromis niloticus*) and African catfish (*Clarias gariepinus*) products in Kenya, Tanzania and Ghana. Francis Darko, a master's student who is working on the consumer preferences study, travelled to Ghana to conduct a survey of consumers to assess their preference for farmed tilapia versus wild-capture tilapia.

Quagrainie travelled to Kenya to train students and fisheries officers who will conduct the survey of fish consumers in Kenya and Tanzania.

Quagrainie also led a second study to assess the state of women's participation in the fish value chain in Kenya. Identifying opportunities and constraints to improving women's welfare and training in fish value participation may reveal possible points of intervention. Master's student Leah Ndanga began her program at Purdue and will be working on this project.



Assets and Market Access (AMA) BASIS CRSP

Purdue's AMA BASIS CRSP project is led by Jerry Shively (Agricultural Economics) in cooperation with colleagues at the University of North Carolina, the University of Malawi, Makerere University (Uganda), and the Norwegian University of Life Sciences. Consultative Group on International Agriculture Research (CGIAR) partners include International Food Policy Research Institute (IFPRI) and the Center for International Forestry Research (CIFOR). During the past year, students at Purdue conducted thesis research aimed at measuring the impacts of Malawi's Farm Input Subsidy Program, which aims to lift maize production in that country. In May, at Makerere University in Uganda, we conducted a three-day workshop entitled Policy-Oriented Research for Improved Policy Making in Uganda. The workshop involved more than 45 participants from university, government, and NGO communities, and included more than a dozen paper presentations and intensive training in data analysis.

Horticultural CRSP

Stephen Weller (Horticulture and Landscape Architecture) and Maria Marshall (Agricultural Economics) are leading an Immediate Impact Project titled "Indigenous African Leafy Vegetables

(ALV) for Enhancing Livelihood Security of Smallholder Farmers in Kenya," in collaboration with Michigan State University, Tennessee State University, AMPATH/Indiana University, Moi University, Kenyan Agriculture Research Institute (KARI), and The World Vegetable Center (AVRDC). ALVs are highly nutritious and provide an excellent source of essential vitamins, nutrients, and minerals in the diets of rural and urban residents of Kenya. Project goals are to improve cultural practices and market opportunities

for small-holder HIV AIDS farmers who are clients of the AMPATH program. Collaborators will work with farmers in the Eldoret region on the introduction and evaluation of new germplasm, outreach on cultural practices through workshops and farmer field days, surveys of farmer practices and needs, and market surveys relating to market demand. First-year activities included testing ALVs for performance at research plots at Moi University/Eldoret and Kenya

Agriculture Research Center/Kakamega and village training for farmers on agronomic basics, social networks, and business/micro-finance.

Integrated Pest Management (IPM) CRSP

Stephen Weller (Horticulture and Landscape Architecture) and Rick Foster (Entomology), working with partners in Honduras, report several significant new activities and accomplishments. Research continued in developing diagnostic keys for major viruses that affect Solanaceous crops and for nematode management in sweet potatoes with cover crops. Research and preparation of a diagnostics manual for zebra chip and other viral diseases of potato neared completion. The manual will assist growers and Extension personnel in determining viruses that are present in the field and will provide suggestions to minimize virus potential. Nematode research involved use of cowpea cultivars as a rotation crop to reduce nematode numbers in subsequent sweet potato culture. The annual IPM CRSP Latin America region meeting was held in La Lima, Honduras, in May (17-19) and was attended by scientists from Guatemala, Honduras, Ecuador, Dominican Republic, and the United States.

Sorghum, Millet, and Other Grain CRSP (INTSORMIL)

Purdue faculty members Gebisa Ejeta, Bruce Hamaker, John Sanders, and Mitch Tuinstra are INTSORMIL investigators in sub-Saharan Africa. Highlights of research and capacity building activities follow.

Bruce Hamaker (Food Science) had ongoing projects on processing and expanding markets for sorghum and millet in the Sahelian countries of West Africa that took him four times to the countries of Mali, Senegal, Burkina Faso, and Nigeria. He co-coordinates the INTSORMIL West Africa Regional Program, and they had their biennial all-PI meeting in Ouagadougou in May 2010.

John Sanders (Agricultural Economics) continued his work in West Africa and Mali. In 2009–10 USAID-Mali asked IICEM (Integrated Initiatives for Economic Growth in Mali Project) and Sanders (Production and Marketing component) to expand the pilot project. USAID gave a goal of 10,000 ha for this scaling-up effort and asked IICEM to get involved in providing financing, and for INTSORMIL/Sanders to remain as the technical advisers for the scaled-up sorghum-millet activities.

Normal pilot project implementation starts with 50 farmers in the village with one ha or less and increases to 150 farmers. Reaching this quantity, it is on to the next village site. The project provides the initial input credits, which are then repaid to the farmers' association and become a rotating fund. Besides the production technologies, a series of marketing strategies to increase the prices received by farmers and the development of village level marketing cooperatives are implemented. As the scaling-up process goes on, there is a shift to bank financing and substantial area expansion.

Only 3,000 ha were added in the scaling-up process, but researchers anticipate improvement in 2011. Various implementation problems were experienced as we moved to bank financing and training rather than our intensive orientation. In Koutiala, where the goal was 5,000 ha, only 1,800 ha of sorghum were added plus 500 ha of millet in the Segou region. Researchers identified how to work better with the banks and how to improve training in 2011. The regular pilot project had approximately 500 ha in 2010 with a focus on millet in the Mopti region (360 ha).

Baquedano and Sanders published their research results in *Agricultural Systems* on the choices for Malian cotton producers between Bt and other cotton innovations and the introduction of these new sorghum technologies.

Mitch Tuinstra (Agronomy) is the PI for an INTSORMIL project entitled, Developing Sorghum with Improved Grain Quality, Agronomic Performance and Resistance to Biotic and Abiotic

Stresses. The overarching objective of this project is to develop and deploy genetic technologies that improve sorghum production, performance, and value through plant breeding. The germplasm sources needed to create new breeding populations were identified or developed through evaluations of elite U.S. and tropical germplasm in the target region. The populations are advanced and selected in summer and winter nurseries and then transferred to the target region for evaluation with collaborating plant breeders.



One major outcome of this project involved development of a new *Striga* management technology based on use of herbicide tolerance traits for managing this weed. Low-dose herbicide seed coatings applied to herbicide tolerant varieties have been highly effective in controlling *Striga* infestation in trials conducted in Nigeria, Niger, Burkina Faso, Ghana, and Mali.

Current research efforts

focused on technology transfer (a collaboration with DuPont Crop Protection researchers) aim to commercialize both new hybrid sorghum cultivars and supporting seed treatment technologies for managing *Striga* in West Africa. Another major success involves development of high-yielding hybrids with new technologies to manage grassy weeds. Parent lines used in hybrid seed production are being converted to ALS and ACCase herbicide tolerance to facilitate commercialization of these technologies in the United States and around the world.

Collaborative research efforts in West Africa are supported through short and long-term training programs, germplasm exchange and evaluation, and basic research. Graduate students and visiting scientists with interest in crop improvement and molecular biology are hosted for short-term and graduate training at Purdue University.

The Mali Training Component, managed by IPIA, welcomed the last long-term academic training participant, Sory Diallo. Diallo started his English Language training at Kansas State University (KSU) in January, and will begin his master of science in agronomy at KSU in January 2011. Also in January, Fatimata Cisse was admitted to Purdue's Graduate School for a master of science in food science. Bandiougou Diawara was admitted to KSU's Graduate School in June to pursue his master of science in agronomy. Two students (Aly Ahamadou and Mamadou Dembele) continued working on their English skills.

News of the Departments

Agricultural Economics (AGEC)

Phil Abbott and graduate student, Ce Wu, worked with the Central Institute for Economic Management (CIEM) in Vietnam on a project funded by the University of Copenhagen and Danida (the Danish aid agency). That research is focused on the linkages between international trade and economic development that have contributed to rapid growth and significant poverty reduction in Vietnam.

Otto Doering served as rapporteur and facilitator for a session with USDA and the Canadian Department of Agriculture towards cooperation on climate change issue response and program criteria for encouraging activities that might mitigate climate change.

Scott Downey and **Allan Gray**, of the Center for Food and Agricultural Business (CAB), travelled to Argentina in March 2010 with 38 American managers from Land O'Lakes member cooperatives. Downey also visited Singapore with Sugato Chakravarty (CSR), Paul Wang (Northwestern University), Stacey Schetzle (Ball State University), and CAB staff to lead a week long sales management workshop for an international group of 39 sales managers in the oil and gas industry.

Purdue's Space, Health and Population Economics (SHaPE) group, led by **Raymond Florax**, organized the IVth World Conference of the Spatial Econometrics Association in Chicago, which attracted scholars from across the world. Florax also delivered a keynote speech on spatial heterogeneity and spatial dependence at a Polish conference organized by the Institute of Spatial Economy of the University of Lodz.

Gerald Shively continues to serve as co-Editor-in-Chief (with Will Masters, Tufts University) of the journal *Agricultural Economics*, the flagship journal of the International Association of Agricultural Economists. His research during the past year has focused on studying Malawi's Food Input Subsidy Program for maize, in cooperation with Monica Fisher (Purdue PhD, 2002) who heads the Malawi office of the International Food Policy Research Institute (IFPRI).

Holly Wang organized an international conference, A Forum: The Relevance of Chinese Economic Development, held at Purdue University on March 3–4, 2010 www.agecon.purdue.edu/conference/index.html. Over one hundred scholars and government officials from China, the state of Indiana, other states in the United States, and other countries participated in the conference focusing on the Chinese economy and its interaction with the U.S. economy, teaching experiences from Study Abroad in China programs, and a business and policy roundtable.

In May, **Wang** and **Ken Foster** participated in the Purdue Day

events at China Agricultural University in Beijing. Wang conducted Chinese market research and also spoke at Renmin University, Inner Mongolia Agriculture University, Shanghai Jiaotong University, Xiamen University, and Southwest University of Finance and Economics.

Agricultural and Biological Engineering (ABE)

Vince Bralts participated in an International Forum on Global Science and Engineering Education held November in Almaty, Kazakhstan, as part of the 75th Anniversary celebration for the Kazakhstan National Technical University (KazNTU). His presentation was titled "Producing Graduates Effective in a Global Context," and he also met with faculty and students from KazNTU and discussed possible student and faculty exchange programs. In June 2010, he traveled to China to meet with potential graduate students and two former visiting scholars from the China Agricultural University (CAU). Dr. Tingwu Lei, a visiting scholar in the USDA Soil Erosion laboratory from 1995–99, is now the director of a similar lab in Yangling, China.

Dennis Buckmaster visited Costa Rica to help launch pasture compaction, yield, and quality research on the Herrera farm near Aguas Vargas in collaboration with Agronomy faculty member Lori Unruh Snyder and Anna Verseman. While in Costa Rica, they delivered a day-long workshop regarding ensiling to about 130 farmers and farm advisors on a farm near La Fortuna. He also hosted a visiting scholar, Mr. Wang Defu, from Northeast Agricultural University, Heilongjiang province, China, interested in machinery systems for forage handling, ensiling, and total mixed ration delivery.

Oswaldo Campanella spent a one semester sabbatical at the University of Grenoble in Grenoble, France.

In summer 2009, **Indrajeet Chaubey** hosted visiting scholar Prof. K.P. Sudheer from the Indian Institute of Technology-Madras, India. They have worked on several research proposals and scientific manuscripts for the last five years.

Chaubey and **Rabi Mohtar** traveled to Mexico City as members of Purdue's Global Engineering Program to attend a series of meetings with faculty from the Universidad Nacional Autonoma De Mexico and Universidad Autonoma Metropolitana. Chaubey led discussions related to research and student training opportunities in the areas of ecohydrology, water quality, ecosystem management, and modeling.

Keith Cherkauer was invited to attend the China-U.S. Workshop on Sustainable Management of Soil and Water Resources hosted by the Chinese Academy of Sciences (CAS) Institute of Applied Ecology in Shenyang, China, the first week of 2010. He presented his work on regional climate change impacts. Cherkauer also presented his climate work at China Agricultural University

and the CAS Institute of Geographic Sciences and Natural Resources Research in Beijing. Lastly he participated in development talks for the establishment of the China-U.S. Joint Laboratory of Soil and Water Research. This laboratory has explicit support from the CAS Institute of Applied Ecology in Shenyang, and meetings in the United States are planned for summer 2010 to complete the establishment of the laboratory on the U.S. side.

Dennis Flanagan hosted a visiting scholar from the Czech Republic for nine months. Ms. Klara Cechova was the recipient of a Fulbright Scholarship and conducted soil erosion research through May at the USDA-National Soil Erosion Research Laboratory.

Jane Frankenberger traveled to Kenya for two weeks in July 2009 as part of Purdue's Office of International Programs' initiative to develop a collaborative partnership related to water. After returning, she created an e-mail list of Kenyan and U.S. participants to continue discussions, and contribute to the strategic plan that resulted.

Klein Ileleji, working with the Foreign Agricultural Service (FAS) in collaboration with Nigeria's National Food Reserve Agency of the Federal Ministry of Agriculture and Water and Resources (NFRA), as well as Oklahoma State University and the University of Kentucky, conducted workshops aimed at reducing postharvest losses for grains in Nigeria. The workshops took place in Makurdi, Benue State, March 9-11, 2010, and Akure, Ondo State, March 15-17, 2010, and focused on stored-grain management, stored-product insect pest control, and workers' health and safety issues. These workshops were part of FAS activities in support of the U.S. Government's Global Hunger and Food Security Response for Nigeria funded by the United States Agency for International Development (USAID).

Joseph Irudayaraj pursued collaborations with the Tata Institute of Fundamental Research (TIFR), Bombay, India, through a Purdue VICS (international scholar-exchange support) grant. Outcomes included successful collaboration with Dr. Sudipta Maiti in TIFR to develop single molecule probe-based systems, student and faculty exchanges in 2009, one conference (Biophysical Society) presentation and one publication in review in the *Biophysical Journal*. Irudayaraj also taught 15 hours of lecture in the course Biosensors in Medicine at Peking University (hosted by Dr. Na Li, Department of Chemistry).

Monika Ivantysynova and several students attended the 7th International Fluid Power Conference held in Aachen, Germany, March 2010. Four students wrote and presented papers at the conference.

John Lumkes provided the keynote lecture at the 2nd Annual Workshop on Digital Fluid Power in Linz, Austria, in November 2009. He also co-led a study-abroad class to China with 19 students participating (eight from Agricultural and Biological Engineering).

Lumkes and **Rabi Mohtar** hosted Liu Yajun as a visiting scholar from the School of Mechanical and Automotive Engineering, South China University of Technology (SCUT), Guangzhou, China. Dr. Liu is working at Purdue for one year studying the effects of ethanol on cavitation in pumps for gasoline filling stations.

Nathan Mosier attended the international symposium at the inauguration of the P.K. Sinha Centre for Bio-Energy at IIT Kharagpur, India, January 5-7, 2010. Mosier gave an invited seminar "Biochemically Derived Liquid Fuels from Plant Biomass." His PhD student Elizabeth Casey presented a poster "Systems Biology Approach to Understanding the Effect of Acetic Acid on the Cofermentation of Glucose and Xylose by *S. cerevisiae* 424A (LNH-ST)."

Jiqin Ni and **Marshall Porterfield** were part of the Purdue team that visited China Agricultural University (CAU) in Beijing in May 2010. On May 20, they had group meetings and discussions with their Chinese counterparts in biological engineering on water conservancy for future collaboration in research and education.

Agronomy (AGRY)

Cale Bigelow was a presenter at a two-day symposium at Mendel University in Brno, Czech Republic, in December. The workshop was entitled New Advances in Sustainable Turfgrass Management.

Gebisa Ejeta, 2009 World Food Prize Recipient, was in high demand. He had extensive international travel and gave six international presentations in five different countries.

Richard Grant and **Cliff Johnston** are developing a Climate Change and Africa seminar to broaden students' perspectives on both the science and realities of climate change, and the people affected by the change. The seminar course will be a two-credit course offered in the fall with the overseas experience in Nouakchott and Rosso, Mauritania, during winter break. Johnston and Grant traveled to Mauritania in April 2010 to plan the overseas experience, and this trip was partly funded by the Purdue's Climate Change Research Center (PCCRC) and International Program's Study Abroad and International Learning (SAIL) program.

Scott Jackson was very active with international conferences, serving as a co-organizer the 5th International Congress on Legume Genetics and Genomics held in Pacific Grove, California, July 2-8, 2010, and giving 13 research presentations in six different countries (Brazil, China, France, India, Mexico, and The Philippines).

In September 2009, **Cliff Johnston** gave a series of lectures at three major universities in Taiwan (National Taiwan University, National Chung Hsing University, and National Cheng Kung University). He also hosted two visiting scholars from University of Bologna, Italy, and one from Granada, Spain.

Jianxin Ma was an invited speaker and co-chair of the Soybean Genetics session in the World Soybean Research Conference VIII, held in Beijing, China, August 10–15, 2009. While in China, he also presented invited seminars at in the Oil Crop Institute, Chinese Academy of Agricultural Sciences, Wuhan, China, and the Food and Oil Crop Institute, Hebei Academy of Agricultural Sciences, Shijiazhuang, China.

Cindy Nakatsu was an invited speaker at an international meeting titled Bacterial Genetics and Ecology (BAGECO) 10: Coexisting on a Changing Planet, in Uppsala, Sweden. She also gave a presentation to the Indo–U.S. Secretary level workshop in New Delhi through the National Oceanic Atmospheric Administration (NOAA) and the Indian Ministry of Earth Sciences.

Dev Niyogi visited Tsinghua University and Beijing Normal University, in Beijing, China, to work on a cyberinfrastructure for climate studies project. He also hosted professor U.C. Mohanty from the Indian Institute of Technology Delhi as part of Niyogi's National Science Foundation CAREER award. They initiated a collaborative arrangement with National Oceanic and Atmospheric Association Hurricane Research Division to study tropical systems over the United States and India.

Herbert Ohm presented talks at the Northwest Agriculture and Forestry University, Yangling, China, and Shandong Agriculture University, Shandong, China, May 17–19, 2010. He then attended Purdue Day at the China Agricultural University, in Beijing May 20.

Suresh Rao participated in and taught for two weeks at the six-week long National Science Foundation Hydrologic Synthesis Summer Workshop, held at the University of British Columbia, Vancouver. He mentored 10 graduate students, selected from various universities, to conduct interdisciplinary research projects on multiscale hydrologic and biogeochemical processes in catchments. He also presented a seminar at the Hydrology Summer School, held in Venice, Italy, hosted by the Istituto Veneto and the University of Padua.

In September 2009, **Darrell Schulze** presented his paper entitled “Historical Milestones in Soil Chemistry and Mineralogy” at Bridging the Centuries: 1909– 2009, centennial meetings and a celebration of the legacy of agrogeology and 100 years of advances in soil sciences, held in Budapest, Hungary.

Lori Unruh Snyder co-led a Maymester Course: Agricultural Sustainability at EARTH University with the University of Florida.

Mitch Tuinstra's sorghum research was presented at three international meetings: “Health, Research, and Entrepreneurship: Sorghum Food for Celiac Patients,” Naples, Italy, October 19; “Sorghum: A Healthy and Gluten-Free Alternative for Celiac Patients,” EUCARPIA XXI Conference, Bergamo, Italy, June 21–24; and “Managing *Striga* Infestation with Herbicide Seed Treatment

in Acetolactate Synthase Resistant Grain Sorghum,” 10th World Congress on Parasitic Plants, Kusadasi, Turkey, June 8-12.

Jeffrey Volenec, **Sylvie Brouder**, and **Ron Turco** were invited participants at the XVI International Plant Nutrition Colloquium, Sacramento, California August 26–30. Volenec and Brouder were also invited to a China-US workshop at Oak Ridge National Lab (ONRL) focused on the Energy-Climate Nexus. Participants included scientists from ORNL, University of Tennessee, Purdue, and several institutions from China including the Chinese Academy of Science.

Cliff Weil was a co-organizer of the 2nd International Conference on Plant DNA Repair and Recombination, Pacific Grove, Calif., February 2010, and presented research at several international meetings: IUSSTF Genomics Workshop, Hisar, India, February 2010; Maize Genetics Conference, Lago del Garda, Italy, March 2010; and Genomics of Plant Genetic Resources 2 Conference, Bologna, Italy, March 2010.

Animal Sciences (ANSC)

Laji Adeola, at the invitation of the Sichuan Agricultural University (SAU), gave talks at SAU in Yaan, Sichuan, and spent time with the Total Quality Logistic Services (TQLS) group presenting seminars in Mianyang and Cheng Du, Sichuan, China. He also gave a keynote lecture at the annual conference of the Nigerian Society for Animal Production, which was held on the campus of the University of Ibadan, Ibadan, Oyo State, Nigeria.

Todd Applegate presented talks at AveExpo, Foz do Iguacu, Brazil; the Western Nutrition Conference, Winnipeg, Manitoba, Canada; Asociacion de Especialistas en Ciencias Avicolas del Centro de Mexico, Queretaro, Mexico; and the European Poultry Conference, Tours, France.

Paul Ebner and **Mark Russell**, in partnership with Banat University of Veterinary Medicine and Agricultural Sciences (Timisoara, Romania), Hunedoara County Livestock Production Association (Hunedoara, Romania), Heifer International Romania (Cluj-Napoca, Romania), and Reach 2 Romania (Indianapolis, Indiana; Paclisa, Romania), led a group of 24 Purdue CoA and Banat University undergraduates on a four-week service-learning course in Romania. Students worked with six individual families in a community of 13 villages to learn Romanian livestock production practices and jointly implement programs improving animal health and environmental stewardship. They also worked on a long-term care hospital's farm (produce, grain, livestock) that provides both therapy and food for its 200 patients. The students worked in teams alongside farm managers, patients and administrators to improve their livestock facility through the design and construction of a manure-handling system, a fenced pasture, and calf and poultry housing.

Dale Forsyth has an online course (ANSC 22100), which has attracted an international audience of students from 15 foreign countries.

Scotti Hester was involved in a collaborative effort with scientists from Great Britain and Germany on evaluating hen welfare in different housing systems (www.poultryscience.org/docs/PS_962.pdf). She gave two talks in Vancouver, British Columbia, on hen welfare guidelines and maintaining the sustainability of the egg industry.

John Patterson gave an invited talk at the 2nd TNO Beneficial Microbes Conference in Noordwijkerhout, the Netherlands, March 2010.

Scott Radcliffe served as the Animal Sciences representative on Purdue's Team visit to China Agricultural University (CAU), Beijing, China, in May 2010. He visited with scientists in the Animal Sciences Department at CAU and gave a lecture to their faculty and students.

Biochemistry (BCHM)

Clint Chapple traveled to Banff, Alberta, Canada, along with undergraduate Anna Hurlock, graduate students Nick Anderson and Yi Li, and postdoc Nick Bonawitz, to attend the Second Banff Conference on Plant Metabolism held in June 2010.

Ann Kirchmaier traveled to Guanacaste, Costa Rica, in November 2009 to attend the Chromatin: Structure & Function Conference 2009 and gave a presentation entitled, "Replication-coupled histone modifications modulate silencing in *S. cerevisiae*."

Xiaoqi Liu traveled to China in January 2010 to present two seminars. The first was at Zhejiang University and the second was at the Chinese Academy of Sciences, both entitled, "Plk1 in kinetochore function, chromosome dynamics and p53 regulation." While in China, he also interviewed students who have applied to our graduate program, interviewed a post-doc candidate for the Chapple lab, and had collaboration discussions with a colleague at Zhejiang University.

Botany and Plant Pathology (BTNY)

Janna Beckerman conducted a growers' workshop in Heredia, Costa Rica, July 2–3, 2009. This research is part of a broader, World Trade Organization (WTO) funded project to develop an integrated, multidisciplinary Extension program around the clean stock program approach with the long-term goal to improve grower production and reduce the risk of accidental introductions of plant pathogens.

Kevin Gibson co-developed a Costa Rica educational program for Purdue undergraduates. The program consists of a semester course

taught at Purdue and a two-week Maymester course taught in Costa Rica; approximately sixteen students attended this year. This was followed by an eight-week research program for four undergraduates.

Peter Goldsbrough and **Zhixiang Chen** participated in the Purdue Day at China Agricultural University (CAU) in May 2010. They also visited Zhejiang University in Hangzhou to discuss graduate research training during this trip to China.

Ray Martyn was an invited keynote speaker at the XVIII Czech and Slovak Conference of Plant Protection in Brno, Czech Republic, Sep 1–4, 2009. His keynote address was "Where will the next Norman Borlaug come from? A U.S. perspective of plant pathology education and research."

Tesfaye Mengiste presented research on plant immunity at two international settings. In May 2010, he was an invited speaker at the International Botrytis Symposium in Cadiz, Spain, and in June he presented "Regulatory mechanisms in plant innate immunity" at the University of Bern, Switzerland.

Jin-Rong Xu became an adjunct professor at Shandong Agricultural University, Shandong, China, in May 2010 and participated in the Purdue Day at China Agriculture University activities. Xu also hosted Dr. Xi Hou, Vice President of Northwest Agricultural and Forestry University, Yangling, China, in June 2010. An agreement was signed by Dr. Hou and Dr. Dale Whittaker to establish a joint research center on biotic and abiotic stresses. Xu will serve as the director of this center to foster and coordinate collaboration.

Entomology (ENTM)

C. Richard Edwards was a collaborator and co-investigator on two international projects; one in Brescia, Italy, on field crop research and outreach, which included farmer training sessions for members of a 2,000+ member farmer consortium. The second activity was a Germany and USA/Indiana collaboration looking at the impacts of tillage systems. In May, Edwards served as a MS-Integrated Pest Management (IPM) lecturer at the University of Lleida, Catalonia, Spain.

Rick Foster has been active with Afghanistan capacity-building activities. He mentored several visiting Afghan faculty on agriculture and Extension March–May 2010. He helped organize and teach the July 2009 pest diagnostic workshop for Afghan visiting faculty here at Purdue, and in September 2009 taught an IPM workshop to students at Kabul and Herat Universities in Afghanistan. Last, he is part of the Purdue team of faculty training National Guard units from Indiana and other states in basic agriculture information before their deployment to Afghanistan. He also continues his research involvement in the IPM CRSP Latin America Region.

Linda Mason was a speaker and session moderator at the 10th International Working Conference on Stored Product Protection held June 2010 in Estoril, Portugal.

Chris Oseto was a faculty instructor for the Costa Rica Maymester study-abroad course, teaching about biodiversity/cultural impacts of sustainable development in Costa Rica. Summer of 2010, Oseto, along with Rick Foster, traveled to Kabul, Afghanistan to conduct an Entomology Workshop for 18 University Teaching Faculty from 10 universities.

Steve Yaninek was part of the Purdue delegation that traveled in May 2010 to China Agricultural University (CAU) in Beijing for Purdue Day at CAU. He also visited several other universities in China (Northwest Agriculture and Forestry University, Zhejiang University and Nanjing Agricultural University) to discuss student recruitment and potential faculty collaborations. Yaninek was an invited speaker at the Zoological Society of London's symposium, Foundations of Biodiversity: saving the world's non-vertebrates, held February 2010 in London. He also hosted two international visiting scholars. Dr. Linnet Gohole from Moi University, Eldoret, Kenya, came in June to work on plant protection strategies to improve rural livelihoods of smallholder farmers; and a PhD student from Portugal came for two months working on tomato host plant resistance to leafminer pest.

Food Science (FS)

Arun Bhunia gave seven invited talks on biosensor technologies on foodborne pathogen detection at international conferences and universities in South Korea, United Kingdom, India, and Canada. He also traveled to the University of Sharjah, Dubai, United Arab Emirates, to review their program on Food Safety and Environmental Health.

Bruce Hamaker was keynote speaker at several international meetings: the Gums & Stabilizers Conference in Wrexham, Wales, in July 2009; the BioAsia Starch Update conference in Bangkok, Thailand, in September 2009; and the International Hydrocolloids Conference in Shanghai, China, in June 2010.

Kee Hong Kim was invited by the Korean Society of Food Science & Technology in Korea as a guest speaker at the 2010 Annual Meeting on June 15. He also visited four universities and two companies in Korea to present seminars and discuss potential research collaborations.

Lisa Mauer was interviewed in 2010 on a radio talk show (Walo Radio) in Puerto Rico to discuss optimum storage and handling conditions for dietary supplements. Her related work was featured in thousands of news stories ranging from CBS News and the *LA Times*, *WebMD*, and the *Chicago Tribune* to international *Metro*, *Scotsman*, *Yorkshire Evening Post*, and *Top News New Zealand*. She also gave an invited talk on deliquescence at Nestle in Vevey, Switzerland and participated in the largest rapid-method-focused workshop in the world held each year (International

Workshop on Rapid Methods and Automation in Microbiology at Kansas State University, Manhattan, Kansas).

Phil Nelson participated in the Purdue Day at China Agricultural University events held in Beijing, China, on May 20–21. President France Córdova headed the Purdue delegation for this unique event. Nelson presented a talk entitled “Global Food Security” as a part of the presidential symposium.

Food Science faculty members participated in the training of five senior students from Zamorano University in Honduras. The students worked on projects in the laboratories of faculty members during the period January–April 2010.

Forestry and Natural Resources (FNR)

John Bickham presented at three international conferences, visited Morocco, and supervised one graduate student from Trinidad.

Paul Brown presented at an international conference and supervised one graduate student from China.

Andrew DeWoody conducted collaborative research in Costa Rica, visited prospective field sites in South Africa and Russia, and supervised one postdoc from Korea.

Jeff Dukes attended the European Union's INCREASE Advisory Board meeting in The Netherlands, was an invited speaker at the October 2009 Diversitas OSC2 Conference in Cape Town, South Africa, and supervised graduate students from Thailand and India.

Barry Dunning taught a study-abroad course in Canada and Turkey, and hosted a visiting scientist from Afghanistan.

Rado Gazo presented at the International Scientific Conference on Hardwood Processing in Paris, France.

Reuben Goforth presented at an international conference and conducted tropical stream field research in Costa Rica.

Eva Haviarova presented at the International Scientific Conference on Hardwood Processing in Paris, France, supervised one visiting scientist from China and two visiting graduate students from Turkey, and cooperated with one visiting scientist from Afghanistan.

Douglass Jacobs presented research seminars in Madrid, Spain; Berlin and Freiburg, Germany; and Sao Paulo, Brazil. He also published five journal articles with colleagues in Spain and Italy and completed a master's student who conducted his research in Ireland.

Rick Meilan presented at three international conferences, conducted collaborative research in Italy, and hosted a visiting scientist from Chile.

Paula M. Pijut gave an invited keynote presentation at the 12th World Congress of the International Association for Plant Biotechnology, and supervised one graduate student from China.

Mike Saunders presented at an international conference, taught a study-abroad course in Canada, and conducted collaborative research in Mexico.

Maria S. Sepúlveda presented at an international conference in Perú, hosted a visiting scientist from Chile, and supervised a PhD student from India and two exchange graduate students, one from Thailand and one from Egypt.

Guofan Shao presented at an international conference, conducted collaborative research in China, hosted a visiting scientist from China, and supervised two graduate students from China.

Rob Swihart presented at the 10th International Mammalogical Congress in Mendoza, Argentina.

Keith Woeste conducted collaborative research in Japan, Canada, and Italy, and supervised a visiting PhD student from China.

Hao Zhang presented at two international conferences, supervised a visiting student from China, and conducted collaborative research in China.

Patrick Zollner presented at two international conferences, jointly published with scientists from England, Russia, and Japan, and supervised one international graduate student.

Horticulture and Landscape Architecture (HLA)

Bruce Bordelon and **Christian Butzke** (Food Science) of the Purdue Wine Grape Team visited wineries, vineyards, and fruit growers in Chile and Argentina in August, 2010, in preparation for a study abroad spring break 2011 course for students entitled “The International Wine Industry of Chile and Argentina.”

Mike Dana and **Rosie Lerner** organized a July 2011 Master Gardener Study Abroad program to expand Master Gardener’s knowledge in ornamental horticulture, landscape design, and garden design in a historical context. The program will focus on gardens of historical and modern significance near London, in The West Country, and in East Anglia. Participants share what they learn with others in their community upon their return. To view detailed information online, see www.hort.purdue.edu/ext/EaiG/Main2011.html.

Jennifer Dennis traveled with Kwamena Quagraine (Agricultural Economics) to assist with Extension workshops on best marketing practices for aquaculture farmers in Kenya and Ghana. She also attended the International Society for Horticultural Science Symposium for Marketing and Economics in Chaing Mai, Thailand, in June 2009, and gave three talks on consumer behavior horticultural issues.

Natalia Dudareva was an invited speaker at numerous international universities and scientific symposia during 2009–10 on topics related to the biosynthesis of plant volatile compounds.

Invited lectures were given at the Institute of the Plant Molecular Biology, Strasbourg, France and Banff, Canada; Barcelona University, Spain; Cartagena, Spain; the Australia National University, Canberra, Australia; Tokyo, Japan; RIKEN Plant Science Center, Yokohama, Japan; Les Diablerets, Switzerland; and Kibbutz Ein-Gedi, Israel. She also served as a member of the EuroVOL review panel at European Science Foundation, Strasbourg, France.

Avtar K. Handa was an invited speaker at the Sixth International Solanaceae Genome Workshop held in New Delhi from November 8–13, 2009. His talk was entitled “Molecular Breeding of Fruit Crops via Novel Genetic Interventions.”

Peter Hirst conducted both classroom and hands-on orchard management training for National Guard Agricultural Development Teams from Indiana, Texas, Kansas, Iowa, Nevada, and Tennessee being deployed to Afghanistan. Hirst hosted Mokhles El-Sysy, a visiting scientist from Assiut University in Egypt, and gave an invited presentation “Breeding large sized apples: First step is understanding genetic control” at an apple breeding conference in Baishui County, China. He also visited Northwest Agriculture and Forestry University and China Agriculture University to forge research and teaching collaborations.

Mike Mickelbart participated in a workshop on Horticultural Productivity in Palestine: Current Status and Future Challenges in Education, Research, and Applied Research in March 2010.

Wendy Peer’s research focuses on small molecules and post-transcriptional/post-translational events that regulate the cell cycle, cell signaling, and cell identity, as well as the roles of small molecules in human health. These basic research questions have real-world applications in molecular assisted breeding for food and biofuels. In 2009–10, she was invited to present her work at several academic institutions and conferences including Protein Complexes in Plant Signalling and Development, Glasgow, Scotland; Auxin and Cytokinins in Plant Development Prague, Czech Republic; IBT UNAM (Institute of Biotechnology at the National Autonomous University of Mexico), Cuernavaca, Mexico; Society for Experimental Biology, Prague, Czech Republic; and the American Society of Plant Biologists, Montreal, Canada.

Paula M. Pijut is a Research Advisor for Trees for Tanzania (www.treesfortanzania.com). Mary Schott (M.S. graduate student) is the founder and project director. High population pressure has caused widespread and severe deforestation in Kigoma, the poorest of 20 regions in Tanzania. Deforestation has led to serious detrimental impacts—most notably the lack of wood for construction and fuel, loss of modest incomes through the selling of sticks for firewood, and perhaps most devastating, the lack of fuel wood to boil un-potable water to remove bacteria and waterborne diseases. Trees for Tanzania is committed to help ease the burden caused by deforestation.

Kashchandra Raghothama was an invited speaker at the International Sorghum Research Planning Workshop organized by Moi University, Eldoret, Kenya, (March 29–April 1, 2010). This meeting was sponsored by the McKnight Foundation.

Paul Siciliano was an invited speaker at several universities throughout the United Kingdom on topics surrounding the role of audio podcast technology as an independent learning resource for historic garden study. Presentations were given at the University of Sheffield, Sheffield; Leeds Metropolitan University, Leeds; and Manchester Metropolitan University, Manchester.

Paul Siciliano, Matt Jenks, and Mike Dana led a group of 21 Purdue students on a four-week Maymester study program of historic garden design. The course, titled *In the English Landscape: Integrating History, Horticulture, and Landscape Architecture* (LA/HORT/HIST 450), is offered alternate years and is expressly interdisciplinary and intended to be equally accessible to students in agricultural sciences, humanities, and the design disciplines.

Youth Development and Agricultural Education (YDAE)

Jerry Peters presented three pedagogical workshops to Afghanistan university professors and secondary school teachers. The workshops were: Agriculture and Veterinary Science Faculty Teaching Workshop, Herat, July 12–16, 2009; Agriculture and Veterinary Science Faculty Teaching Workshop, Kabul, July 19–22, 2009; and Agriculture Student Leadership Workshop, Kabul, July 19–22, 2009.

Peters and master's student, Lee Stanish, presented a paper entitled "The Role of the 4-H Club Program in Poland" at two international meetings: the XIX European Seminar on Extension Education: Theory and practice of advisory work in a time of turbulences, September 2009, Assisi, Italy; and the Association for International Agriculture and Extension Education Conference, May 2010, Saskatoon, Canada. Peters also taught YDAE 642/SA 590 entitled Seminar on Wings to Costa Rica which focused on Agricultural Education in the Tropics. Ten students participated in the June 19–29, 2010, program.

Roger Tormoehlen spent two weeks in China in May 2010 to further explore potential collaborative student learning/exchange programs, joint research efforts, and cooperative Extension opportunities. He visited with officials at China Agricultural University, Shandong Agricultural University, and Northwest Agriculture and Forestry University.

Mark Tucker and **Colleen Brady** received a grant to fund two international graduate students from Malawi. Tucker will advise Ms. Fallys Masambuka pursuing research in agricultural communication and Extension audience analysis. The other student, Mr. Roy Kwelepeta, will work under the direction of Brady in the area of animal science/Extension education.

Two international 4-H programs exposed U.S., Japanese, and Polish youth to new cultures and experiences. Seventeen Japanese youth and four adults spent four weeks in Indiana as part the Purdue/Meiji Gakuin Summer 4-H International Program. Each Japanese participant stayed with an Indiana host family. In June 2010, 13 Indiana youth and six adults visited Poland as part of the annual Indiana/Poland 4-H youth exchange program.

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