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Greetings
from the Department of Food Science and Human Nutrition
at the University of Illinois

Our Areas of Excellence

In our mission to implement research, education, and outreach programs designed to promote a safe, nutritious, accessible, and affordable food supply that enhances human health, the Department of Food Science and Human Nutrition (FSHN) has organized itself into four thematic areas of excellence. These core areas allow us the ability to pursue collaborative and independent scholarly interests in Integrated Food, Nutrition and Health; Food Materials Science and Engineering; Biochemical and Molecular Nutrition; and Food Safety and Security. Discoveries in knowledge, applications to teaching and learning, and transfer of technologies to external groups are represented in the stories, accolades, and notable items included in this issue of the FSHN Newsletter. Our faculty, staff, students, alumni, and friends of FSHN are outstanding and work together for excellence as FSHN reaches its vision of being a global leader at transforming lives through distinguished scholarship in food, nutrition, and hospitality sciences.

We invite you to visit the FSHN Department and campus, if you have not been here recently. In talking with alumni and friends of the Department, they express excitement about the accomplishments of our faculty, staff, students, and alumni. We welcome your involvement, expertise, and excellence. We hope that you will join us in our efforts and look forward to your engagement with the Department!

Sharon M. (Shelly) Nickols-Richardson, Ph.D., R.D.
Department Head

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- Department of Food Science and Human Nutrition
- Bevier Café
- Spice Box
- College of ACES

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NEWSLETTER STAFF
David Brandon, Editor
Sharon M. (Shelly) Nickols-Richardson, FSHN Head

CONTRIBUTING WRITERS
Sharita Forrest
Mike Helenthal
Stephanie Henry
Elyssa Kaufman

CONTRIBUTING PHOTOGRAPHERS
Ryan Fang
Nathan Pratt
L. Brian Stauffer

CONTACT INFORMATION
Department of Food Science and Human Nutrition
260 Bevier Hall
905 S. Goodwin Avenue
Urbana, IL 61801
Phone: 217-244-4498
Fax: 217-265-0925
Email: fshn-general@illinois.edu
Website: www.fshn.illinois.edu
cancer-related outcomes and biomarkers. Her research program involves: 1) conducting epidemiological studies to determine how diet and nutritional status are associated with cancer outcomes (e.g., recurrence, survival, quality of life) and biomarkers of cancer progression and prognosis; and 2) translating epidemiological study results into clinical intervention trials with the potential to help develop new clinical nutrition recommendations for cancer patients and survivors. Before joining the department, Arthur earned a PhD and Master of Public Health from the University of Michigan School of Public Health, and then went on to complete a Postdoctoral Fellowship with the University of Alabama at Birmingham’s Cancer Prevention and Control Training Program, with funding from the National Cancer Institute. She arrived in January with her spouse and two children.

Retirements and Transitions

MR. JOHN P. JERRELL retired as a Senior Research Specialist in Agriculture in the FSHN Department in December 2015. John’s position with the university began in 1986, and in 30 years of service he met and worked with a variety of faculty members (inside and outside of FSHN) and a sizable number of students as they pursued their academic goals. John helped to host many visiting scholars, scientists, and friends of FHSN from around the world, and welcomed them into the laboratories and facilities of our institution. In the latter years of his position, John worked primarily with the research group of Dr. Keith Cadwallader, providing extensive practical knowledge in high performance liquid chromatography, gas chromatography, and mass spectrometry to the Cadwallader group and others, often working nights and weekends to facilitate an urgent request from a faculty member or student. Dr. Cadwallader, who referred to John as “one of the best kept secrets in the College of ACES,” came to appreciate John not only for his scientific expertise, but also his remarkable patience in dealing with students and faculty alike on painstaking, technical research issues. In 2015, John received the George H. Lanter Outstanding Staff Award from FSHN.

MS. REBECCA “BECKY” ROACH, MS, RD, LDN, retired from FSHN in July 2016. Becky joined the department in 2004, and was assigned to further develop and instruct FSHN 120, the very large Contemporary Nutrition course offered across campus as a general education course. She also provided exceptional orientation and guidance to incoming students in the Human Nutrition concentration through the FSHN 199/125 Introduction to Human Nutrition class. An active member of a number of departmental and campus committees, Becky was particularly dedicated to the student conflict resolution process with engagement on the campus Subcommittee on Student Discipline in the Office of the Dean of Students. She also combined her passion for community service and sustainable food systems through serving on the Champaign County Board’s Local Foods Policy Council, where she connected students to local foods and farmers, enriched student learning experiences, and increased the awareness of origins of foods. Prior to joining FSHN, Becky was a Health Educator, Nutrition Education Coordinator with McKinley Health Center for six years.

DR. LINDA GARROW transitioned out of her position in the department in August 2016. Dr. Garrow began her tenure with FSHN in 1994, as a Research Specialist. While earning the MS degree in Human Nutrition from FSHN, she became a Visiting Teaching Associate with the Department. This was followed by her 16-year tenure as a Teaching Associate, with primary responsibilities for instruction of the Science of Food Preparation and Science of Food Systems courses. Linda used her incredible talents to deliver rigorous and creative lectures and hands-on laboratories for students in all concentrations within the Department. She was a devoted advisor.
for students in the Human Nutrition concentration. She worked toward the Doctorate of Philosophy degree in Food Science, and achieved this academic credential in 2015, from the University. She was named on the List of Teachers Ranked as Excellent by their Students on 17 different occasions. In spring 2015, Linda was named the Outstanding Advisor, Mentor, and Educator for the FSHN Department. Linda served on many Departmental committees and was a constant presence for Department, College, and University activities, advocating for and promoting our students and areas of study. Last summer, Linda travelled to Beauvais, France, and completed a 6-week program in Culinary Science and Molecular Gastronomy to round out her joy of food chemistry and molecular sciences, which she in turn used to develop laboratory sessions for students.

**MS. NIKKI L. BAKER** transitioned out of her position as Home Economics Staff Assistant I with the department in August 2016. Nikki began her position with FSHN in 2008, and was responsible for supporting the operations of the foods-based laboratories for our department and students. She assisted in the training of graduate teaching assistants and in organizing the flow and function of the procurement process, as well as acquiring and maintaining equipment and supplies. Nikki worked closely with faculty and teaching assistants to create a classroom experience that was welcoming, challenging, accessible, and innovative for our students. Nikki received the College of ACES Staff Award for Excellence in April 2016. One of her nominators wrote that Nikki “thinks outside the box to discover helpful ways to better organize the labs and to make ingredient procurement more efficient.” Prior to joining FSHN, Nikki spent three years in the Department of Veterinary Pathobiology as a Clerk III, providing support services for departmental activities. Before this, Nikki worked in FSHN in an Extra Help role that was critical to providing support to the business office.

**MS. LYNN A. MULLENHAUPT** transitioned out of her position as Test Kitchen Cook with the department in September 2016. Lynn joined the FSHN Department in 2009, and provided leadership in our food service operations and hands-on training of students in the Bevier Café and Bevier Catering. She worked with many of the Hospitality Management Learning Assistants, undergraduate and graduate students and dietetic interns, part-time employees, and others to deliver delicious and safe meals to our faculty, staff, and customers. She continually worked to create trendy and innovative menu items and was dedicated to ensuring that students understood the critical importance of standardized recipes. Lynn taught by example, using best practices in food service sanitation and safety. She was always willing to assist FSHN students with learning a new technique, testing a tasty recipe, building their confidence, and keeping them safe in a fast-paced environment. Lynn made Bevier Café a wonderful eating destination for our customers.

**DR. TIMOTHY A. GARROW** retired from the department in September 2016, to take positions as Professor of Biochemistry in the Department of Biomedical Sciences and Director of the Foundations of Medicine Curriculum at Western Michigan University’s Homer Stryker School of Medicine in Kalamazoo, Michigan. Dr. Garrow is highly regarded as one of the world’s leading scholars in one-carbon metabolism. More specifically, he has characterized the structure, kinetics, and regulation of betaine-homocysteine S-methyltransferase (BHMT), one of the key enzymes in the methyltransferase family. He has contributed to the understanding of how BHMT irregularities result in one-carbon metabolism defects that contribute to fatty liver, hepatic cancer, and genetic mutations of developmental diseases. Spanning a 20+-year career, Dr. Garrow’s research has been supported by the National Institutes of Health (NIH), the American Heart Association, the Illinois Council of Food and Agricultural Research (CFAR), and other funding agencies. His stature as a leading scientist in cellular and molecular biology and nutritional biochemistry led to his service as a grants reviewer for the CFAR, NIH Nutrition Study Section, and USDA National Research Initiative Competitive Grants Program during several funding cycles. Dr. Garrow has been an invited lecturer, keynote speaker, and/or session chair for the Federation of American Societies for Experimental Biology Summer Conference on Folic Acid, Vitamin B12, and One-Carbon Metabolism on six different occasions. He holds two patents for his work with BHMT, has published five book chapters, and has published over 70 original research papers and conference proceedings in peer-reviewed publications, the majority of which have been in the most rigorous nutrition-related scientific journals, including the Proceedings of the National Academy of Sciences (USA), Journal of Nutrition, and Journal of Nutritional Biochemistry. Dr. Garrow has been the recipient of several prestigious research awards, including the Future Leader Award from the International Life Sciences Institute, the Mead-Johnson Award from the American Society for Nutrition, and the Faculty Award for Excellence in Research from the College of ACES, UIUC. As a scholar of teaching and learning, Dr. Garrow developed roughly 15 new courses for undergraduate and graduate students at UIUC. Tim has been consistently on the List of Teachers Ranked as Excellent by Their Students during his tenure. He has continually engaged in teaching enhancement programs and grants. He has been an active faculty mentor for several extramurally funded training grants in human nutrition and cell and structural biology. Dr. Garrow’s teaching has been recognized via the Faculty Award for Excellence in Teaching from the College of ACES and with the Teacher Fellow Award from the North American Colleges and Teachers of Agriculture national association. He served as the Associate Head for Graduate Programs (2007-2011) and as the Associate Head for Undergraduate Programs (2014-2016) for FSHN. Dr. Garrow successfully graduated five MS and six PhD students as well as six postdoctoral associates during his FSHN tenure.
DR. KAREN CHAPMAN-NOVAKOFSKI, Professor, was presented with the Paul A. Funk Recognition Award, an award limited to full-time faculty with ten consecutive years of service prior to being nominated. The award recognizes outstanding achievement and major contributions to the betterment of agriculture, natural resources, and human systems.

DR. KEITH CADWALLADER, Professor, was awarded the Senior Faculty Award for Excellence in Research. A Faculty Award for Excellence recognizes outstanding professional achievement and demonstrated excellence in the areas of teaching, research, and extension.

Awards from the Campus Research Board (2015–2016)

DR. HONG CHEN, Associate Professor, received a grant to support her project titled, “Characterization of epigenome and secretome in high-fat induced obese mice undergoing optimized exercise.” In her proposal, Dr. Chen noted the high number of cancer diagnoses in 2015, and that just over half of cancer mortalities result from lifestyle risk factors, including poor diet and physical inactivity. The study proposes to characterize inflammatory markers by high-fat feeding and exercise intervention in mice with radiation treatment, and to examine epigenome changes in mice related to the effects of intervention.

DR. SCOTT MORRIS, Associate Professor, received funding for his project “Detection and characterization of material structure, properties, variation and defects using dynamic scanning tomographic infrared imaging.” The project involves using infrared laser as an energy source and analyzing high frame rate, high-resolution images of the thermal and material properties of a structure. This gives information about material and structural changes or failures in packaging. Using this method may lead to a new method of detecting material defects, structure analysis, and computational tomography of otherwise invisible features.

DR. YOUNGSOO LEE, Assistant Professor, SHARON DONOVAN, Professor, and SOO-YEUN LEE, Professor, received funding for a project titled, “Improvement of gastrointestinal health by the incorporation of gamma-cyclodextrin/tributyrin complex in foods.” Over 60 million American suffer from gastrointestinal tract issues, and while butyrate can improve such conditions, its unpleasant taste and odor make it undesirable. A complex of gammacyclodextrin ($\gamma$-CD)/tributyrin (TB) effectively eliminated the bitter taste of TB, had a controlled release in the intestinal tract, and acted as a probiotic. The researchers hypothesize that the efficiency and stability of $\gamma$-CD/TB will be enhanced by ultra-high pressure homogenization, that foods containing $\gamma$-CD/TB will be acceptable to consumers, and that $\gamma$-CD/TB will promote GI health and reduce inflammation, which will be examined via a piglet model.

Vision 20/20 Awards
(from the College of ACES Division of Nutritional Sciences)

DR. ZEYNEP MADAK-ERDOGAN, Assistant Professor, received funding for a collaboration with Dr. Elif Tunc (Izmir Military Hospital, Turkey) to pursue a study titled, “A mouse model to study impact of botanical estrogens and diet on microvascular heart disease.” The goal of the study is to address a critical clinical need for novel ways to diagnose, treat, and prevent microvascular disease in post-menopausal women.

Dr. Naiman Khan, DR. HANNAH HOLSCHER, Assistant Professor, Dr. Michael De Lisio, and Dr. John Biggan received funding for their proposed study on “The effects of probiotics and prebiotics on behavioral and biological markers of cognition and stress.” The investigators will assess the impact of dietary probiotics and prebiotics on the gut-microbiota-brain axis in obese adults, with a long term goal of mitigating the detrimental effects of obesity on physical and mental health by modulation of the gastrointestinal microbiota.
DR. SHARON DONOVAN was awarded funding for a study titled, “Longitudinal assessment of the gut microbiota composition in children with Autism Spectrum Disorder (ASD): impact of dietary intake, supplements, and medications.” The goal of the study is to analyze the microbial changes in the stool of children with ASD over time and to identify and correlate the influences of dietary intake, nutritional status, and medications on observed microbial and behavioral changes.

Other Awards and Recognitions

DRS. MICHAEL MILLER, Associate Professor and ELIZABETH JEFFERY, Professor Emerita, were awarded a $500,000 grant by the USDA’s National Institute of Food and Agriculture for a study titled, “Improving gut health with broccoli.” The central hypothesis of the study is that frequent broccoli ingestion alters the gut microbiome, reduces gut inflammation, and improves the bioavailability and bioactivity of sulforaphane. Aims of the study include: 1) examining the impact of feeding broccoli on the composition and metabolism of gut microbiota and inflammation; 2) researching broccoli’s impact on sulforaphane absorption and bioactivity, and determining if quercetin improves sulforaphane absorption; and 3) identifying and characterizing gut microbes with myrosinase activity.

DR. HANNAH HOLSCHER and colleagues were awarded a three-year, $800,000 grant from the Hass Avocado Board to investigate the effects of twelve weeks of avocado intake on abdominal obesity, glycemic control, gastrointestinal microbiota, and cognitive function in adults with overweight and obesity.

DR. HAO FENG, Professor, in collaboration with colleagues from the College of Engineering and Worcester Polytechnic Institute in Massachusetts, was awarded a $750,000 grant by the National Science Foundation in support of a Center for Advanced Research in Drying, which will study efficiency in drying, one of the most energy-intensive stages across a variety of manufacturing industries, including food.

DR. SHARON NICKOLS-RICHARDSON, Professor, was awarded $450,000 by USDA’s National Institute of Food and Agriculture to continue a study on childhood obesity prevention. The PAWS Club intervention is a 12-week, school-based program that tests a peer-led versus an adult-led approach to implementing US dietary guidelines in middle-school-aged children.

DR. KAREN CHAPMAN-NOVAKOFSKI has been selected for the 2016 Excellence in Practice—Community Dietetics Award from the Academy of Nutrition and Dietetics Board of Directors. Karen was selected based on an outstanding career in assessing the nutritional needs of communities, developing and delivering impactful programs, and evaluating outcomes related to her award-winning community nutrition programs.

DR. ZEYNEP MADAK-ERDOGAN was presented with the 2016 Mary Swartz Rose Young Investigator Award, presented jointly by the American Society of Nutrition and the Council for Responsible Nutrition. The Mary Swartz Rose award recognizes outstanding research in the field of bioactive compounds for human health. Dr. Madak-Erdogan also received a “Future Interdisciplinary Research Explorations” seed grant in April 2016, from the College of ACES Office of Research to support her proposal titled, “Understanding cancer disparities using integrative -omics approaches.” The proposed research will seek a fundamental understanding of the biology of breast cancer in African-American and Caucasian women and will identify targetable biomarkers specific to breast cancer disparities.

MS. BARB VANDEVENTER received recognition as a 2016 Nominee for the Office Professional of the Year Award from The Secretariat, an organization for University of Illinois employees in Civil Service classifications. Barb was one of 13 nominees from across campus to be recognized for her exceptional achievements in office support activities and leadership.

MS. JUSTINE KARDUCK, Clinical Assistant Professor, has been selected by the Research Dietetic Practice Group of the Academy of Nutrition and Dietetics for the outstanding abstract award. Her full research proposal, “Mobile Apps in Diabetes Care” was featured during the Research Dietetic Practice Group breakfast in October 2016 in Boston, Massachusetts, during the annual conference and exhibition.
What happens to food and its microstructure when it is fried is a complicated process, both scientifically and mathematically speaking. While consumers want a product that is crispy and tasty, food scientists seek to get a closer glimpse into what exactly is going on inside the food during frying in order to improve products.

DR. PAWAN TAKHAR, an associate professor of food engineering, is particularly interested in the food’s uptake of oil during frying and how that oil gets distributed throughout the food. “Through conventional lab techniques we can already see how much oil content is in food material, but we didn’t know how it gets distributed,” he says.

To understand the distribution of oil better, Takhar and his lab conducted a study using X-ray micro-computed tomography (micro-CT) to gain 3D images of the microstructure of fried potato disks after they had been fried for various lengths of time.

During deep frying, as food is immersed in hot oil, water in that food quickly evaporates and steam pressure builds. This pressure affects the microstructure, including the porosity—the number and size of pores in the food—as well as the twistiness of the pathways between those pores (tortuosity). This determines how and how much oil gets taken up into the food.

For the study, russet potatoes cut into disks that were 45-mm in diameter and 1.65 mm thick were fried at 190 degrees Celsius for 20, 40, 60, or 80 seconds, freeze dried, and scanned.

Takhar says about 986 2D images of the potato samples were collected and then combined to produce 3D images. Using the 3D images, they were able to gain more information about the pores and pore networks in the material.

The researchers observed that as frying time increased, pore size increased, allowing for greater uptake of oil. They also saw a correlation between oil content and how the network of pathways between the pores changed throughout the frying time. These pathways act like channels for water and vapor flow and oil penetration in the food.

“We found that in the beginning of frying, the pore network is very complicated. The waviness in the pathway, the tortuosity, is very complex in the beginning so the material resists oil penetration. But as the frying progresses, those pathways become simpler. Pores open up and are easily accessible from the outside and oil can be taken up,” Takhar explains.

Oil was also observed distributed across the full thickness of the potato disks. In thicker materials with lots of moisture (like chicken nuggets and French fries), they have observed the oil to remain near the surface as continuous evaporation helps to resist oil penetration.

“It is not easy to make a product that has no oil and still provides taste, flavor and texture that consumers enjoy,” he says. “At the same time you want to reduce the oil content to make the food healthier. It’s a combination of the oil content and air pockets in the pore structure that provide the desired crispy texture.

“Our aim is to make these products healthier, so that they have the same taste and texture but, at the same time, have lower fat content. That is our long-term goal with our research,” he adds.

The findings from the potato disks in the study can also be applied to other fried foods, Takhar says. His lab has done previous research on frying using chicken nuggets and French fries.

While Takhar and his lab have done mathematical modeling of what happens during frying—just one previous paper outlines over 100 mathematical equations involved in the process—he says this study provides some experimental validation as to what is happening inside the food material.

The study was published in the Journal of Food Science. Funding for the study was provided by the United States Department of Agriculture’s National Institute of Food and Agriculture.
Diseases such as obesity, diabetes, and heart disease can often be prevented or treated by managing the intake of certain nutrients. However, in a time-constrained situation, such as standing in line at a cafeteria or restaurant, it can be difficult for consumers to quickly calculate and use numerical nutrition information—beyond the amount of calories—provided for menu items.

A study from Dr. Manabu T. Nakamura, an associate professor of nutrition found that when consumers are shown a graphical display of select nutrients on a 2-dimensional plot when ordering in a café setting, they purchase healthier, not just lower-calorie, menu items as a meal.

Understanding how to best present nutrition information is an important, new area of research for Nakamura and his lab. “We have researched how fats or carbs metabolize and are regulated, for example. Based on this kind of research, the message of what nutrients we should eat is pretty set. The important thing is learning how you select the right foods. We need to provide a way to communicate what foods to select for certain health problems.”

“Current nutrition labels provide comprehensive nutrient information, but unfortunately they’re not working for consumers to help them make decisions in restaurants and grocery stores,” he says.

In order to see if presenting the nutrition information graphically would change diners’ purchasing behavior, Nakamura, along with doctoral student, Nathan Pratt, and a team of other researchers set up two experiments using a visual, 2-dimensional plot showing the values of fiber and protein per calorie for each menu item. The graph also includes a target box that represents the recommended dietary amounts of those nutrients per calorie of food.

The researchers chose to plot fiber and protein per calorie values because these two nutrients are closely tied to weight management. Fiber has been linked to greater satiety and lean protein has been linked to improving body fat loss. “Promoting fiber intake is important. It could help in preventing overeating. Only 10 percent of the U.S. population meets the fiber recommendation,” Nakamura explains.

The team began with an experiment to see how well participants could recall nutrition information when shown the information for foods either using the 2-dimensional graph or numerical information. The participants were then asked to recall the information. Recall accuracy improved by up to 43 percent when they were shown the information graphically versus numerically.

The second experiment was a 12-week study of purchasing behavior in U of I’s Bevier Café.

During some weeks, menu items were plotted either on the 2-dimensional graph according to their fiber, protein, saturated fat, and sodium per calorie values with the information signposted where customers could see before ordering, or other weeks, nutrition information was displayed numerically.

Ultimately, when nutrition information was provided on the 2-dimensional graph, consumers purchased fewer calories, but purchased more protein per calorie and more items that were rated high as healthy on the plot. Nakamura calls this a “clear success.”

“This may be the first study that shows unambiguous purchasing changes from displaying the nutrition information,” he says.

Protein per calorie increased by nearly 24 percent when the graph was present compared to when no nutrition label was provided, and 20 percent from the numerical stage.

“If you are looking at just calories when choosing food, that’s not enough. If you stop eating something, you can certainly reduce calorie intake. But the important thing is that to make your meal healthy, you have to think about other nutrients, too,” Nakamura says.

In the future, the researchers hope the graph can be used to present nutrition information in restaurants, grocery stores, and dining halls, as well as in households for recipe analysis.

“We are hoping this system can be quickly understood and can provide the information needed to make a decision,” Nakamura says.

The study was published in Nutrition Research.
Recognition for International Research Efforts

College of ACES—Office of International Programs—Joint Research Grant Awardees—2015

Note: these grants support faculty working jointly with researchers at peer institutions abroad.

**DR. MATTHEW STA-SIEWICZ**, Assistant Professor, received grant support for joint work with the University of Nairobi, Kenya, on a project titled, “Developing optical sorting system to manage mycotoxin contamination of locally hammer-milled maize in eastern Kenya.”

**DRS. YONG-SU JIN,** Associate Professor, and **MICHAEL MILLER** received grant support for a joint project with Nanyang Technological University, Singapore, titled, “Impact of edible polysaccharide gels and capsules containing SCFAS on gut microbiota.”

**DR. ELVIRA DE MEJIA**, Professor, received recognition in March 2016, via the “Sheth Distinguished Faculty Award for International Achievement,” as organized by Illinois International Programs. The Sheth award recognizes “a current University of Illinois at Urbana-Champaign faculty member for his/her exemplary accomplishments in teaching, research, and public service in the international arena; the award highlights the importance of the international dimensions of the awardees’ contributions to his/her discipline or subject matter.” Selection criteria included a significant record of achievement and recognition for international work, and contributions to humanity, science, art, or human welfare that have made a positive impact internationally.

**DR. PAWAN S. TAKHAR**, Associate Professor, received grant support for joint efforts with the International Rice Research Institute, The Philippines, on a project titled, “A multiscale approach for predicting quality changes in rice during cooking.”

**DR. MICHAEL J. MILLER** was selected by the College of ACES Office of International Programs to participate in the 2015 College of ACES Academy for Global Engagement, in the tenth year of the program. Also known as the Global Academy, the goal of the program is to promote internationalization of the College by familiarizing participants with national resources that support global efforts, by facilitating discussion of the impact of globalization on the College, by team building, and by providing an international immersion experience. Dr. Miller joined seven other faculty for a trip to Mexico, the location of the first Global Academy immersion experience.

College of ACES Office of International Programs—Seed Grants

**Note**: funded by the Arlys Conrad Endowment Fund, the Seed Grants support development and expansion of international relationships and collaborations.

**DR. HONG CHEN** received funding for a project titled, “Molecular mechanisms of anti-inflammation and apoptosis-induction by herbal extracts from Toona sinensis (Chinese Toon leaf).” This work will be conducted with a collaborator from Xi’An Jiaotong University in China.

**DR. ZEYNEP MADAK-ERDOGAN** was awarded seed money in support of a project titled, “Reengineering of a material-based biosensor for early cancer detection” which will involve a collaboration with Bogazici University in Turkey.

**DR. YONG-SU JIN** advised the “UIUC_Illini” team which entered the International Genetically Engineered Machine (iGEM) competition, earning a silver medal at the September 2015 iGEM Giant Jamboree Competition. The team, comprised of ten undergraduates from six departments, worked in the Biosystems Design Laboratory at the Institute for Genomic Biology under Dr. Jin, who has an interest in synthetic biology. The team project was titled SCRIBE (Synthetic Cellular Recorders Integrating Biological Events), and represented a novel genetic system that allowed bacteria to record its environment. This is not the first time Dr. Jin’s iGEM team has won awards; they won a regional bronze medal in 2011 and an international gold medal in 2010.

College of ACES—Office of International Programs—ACES Education Abroad Grant Awardees

**Note**: the ACES Offices of International Programs joined with ACES Education Abroad to provide the grants listed below.

Elizabeth Sloffer received a Graduate Student International Research Grant to support her project on “Gender, nutrition, and agricultural linkages in rural Honduras.” Sloffer is a student of **DR. JUAN ANDRADE**, Assistant Professor.

In Iok Kong was awarded a Graduate Student International Research Grant to fund the proposal “Genetic engineering of yeasts isolated from nature and characterization of their feasibility for value-added product production elucidation of the function of an unknown protein.” Kong is advised by **DR. YONG-SU JIN**.

Emely Lopez Barrera has received a Graduate Student International Research Grant to facilitate her work on “Development and evaluation of spiced-vinegar ‘Saw-sawan’ as a vehicle for iron fortification in Negros Island, Philippines.” Barrera is mentored by **DR. BILL HELFERICH**.
Walking down Green Street, the smell of Sausage Egg McMuffins, juicy burgers and bacon bits consumes the air. Between that tempting hot dog stand across from Joe’s and a Cracked sandwich, processed meat lurks at every corner.

On Oct. 26, the World Health Organization issued a statement regarding an 18 percent cancer risk in consuming processed meats. This shocking statement caused confusion in the true danger of meat and the risk of developing colon and other cancers.

John Erdman, University professor in food science and human nutrition responded to this report and stated, “The WHO report presented their findings in a way that was alarmist by describing an 18 percent increase. In reality, 18 percent is a very small risk.”

Processed meats are defined as salted, cured and grilled meats, according to Erdman. While he acknowledges the cancer risk, the professor recommends limiting the consumption of processed meats every day in order to avoid the risk.

“For someone consuming cured meats, for example hot dogs, every day there may be a small increase of risk for colon or rectal cancer. It’s a real risk, but it is very small.” Erdman said.

Bill Helferich, University professor of nutrition, also responded to the report.

Helferich also explained that this risk report is limiting because of what he defines as a “hazard assessment,” or a statement only involving the dangers and not the benefits of a food. For example, looking at a hazard assessment of consuming red meat leaves out the important benefits of the meat. The professor said red meat is one of the most “available iron and protein sources.”

DINING HALLS

University dining halls remain a major food source to students living on campus. With the WHO’s statement, new light has been placed on the processed meat served in campus dining halls.

Assistant Director and Dietitian of Dining Services Erica Nehrling Meador responded to this concern by stating that the dining halls will not be making alterations to the menus.

“We don’t plan to change our offering, most of the meat we offer is not processed meat,” Meador said. “It is up to students themselves. Most of our students are 18 and older, so they are able to choose what they want to eat.”

She explained that there are other protein options served at each meal in the dining halls, giving students an alternative protein choice rather than processed meat.

Meador also highlighted the WHO’s lack of specificity in releasing its statement.

“The WHO did not release the mechanisms by which they believe processed meat could be carcinogenic,” she said. “We are not sure if it is preservatives or the way the meat is processed.”

Ultimately, the dietician concluded that everything is okay in moderation. She said individuals have to look at relative risk versus absolute risk when deciding their daily meals.

Erdman also responded to the dining hall concern.

“University dining halls and programs should limit the amount of processed meat served and encourage students to eat vegetables or whole grains,” he said.

He discussed the importance of students establishing good dietary patterns early on, so they can continue as them as they get older.

However, Helferich discussed that rather than limiting the food served, the real issue is within the options available.

“In dining halls, I would push for more healthy choices, and if people choose to eat unhealthy, then that is their choice,” Helferich said. “Regulating food should be a personal choice.”

There is also an importance of cured meats in safety within dining halls. Helferich focused on the fact that cured meats are prepared to be preserved. If the meats are not preserved, there are potential bacterial dangers, like Botulinum toxins.

Botulinum toxin is a potent neurotoxin that is often found in foods that have not been preserved correctly. Cured meat is preserved and bacterial growth is prevented, especially when meat sits in a dining hall for a prolonged time period.

Helferich said he would rather consume cured meat in moderation then take the risk of potentially getting botulinum.

“I think we have to be careful in confusing the public with contradictorily nutrition information,” Helferich said. “The WHO
recommendation about red and cured meats sent confusing signals to the public. I think the message is to consume a balanced, healthy diet.”

EATING IN MODERATION

Both University professors agreed on the importance of eating processed meats in moderation to establish a healthy diet.

Erdman recommended that an individual consuming bacon, sausage or other types of processed meat should add a vegetable and fiber to the meal to reduce the risk.

His research at the University includes testing on prostate cancer and finding ways to reduce the risk of cancer. He stressed the importance of eating a high fiber diet when consuming processed meats.

“It has shown in a number of studies that if you add tomato and broccoli to diets, animals have shown to have a reduced risk of cancer,” he said.

To Helferich, this 18 percent risk of cancer is really about moderation.

“I would never recommend consuming red meat three times a day, six days a week. I would also not want an individual eating bacon two meals a day and ham at the other two,” Helferich said. “I don’t see a real negative if you consume these foods in a well-balanced diet.”

On the Job: Brian Jacobson

Brian Jacobson’s kitchen is bigger than most. His kitchen is the U. of I.’s Food Science and Human Nutrition pilot processing plant, which works alongside the Integrated Bioprocessing Research Laboratory (IBRL) in the College of Agricultural, Consumer and Environmental Sciences.

“Between the two facilities, we can process a number of agricultural commodities into food, biofuels, biochemicals and other co-products,” he said. “We take raw ingredients from the field and make them into consumer or industrial products. The eventual goal is to bring things to the commercialization stage, while providing a valuable teaching resource to students. This type of research and teaching activity isn’t being emulated elsewhere.”

Jacobson, an academic professional, has managed the college’s pilot plant facilities since 2010, when he was an undergraduate student in the ACES Technical Systems Management program and then took a full-time job at the plant after graduation. He is quick to admit that running the plant is far from a one-man job—students, faculty and staff all work together to reach research, teaching and outreach goals.
“I guess you’d call me somewhere between a facility manager and a teaching associate,” he said, noting his varied supervisory duties. “None of this could happen if we didn’t have a team approach. It seems like there’s always something going on around here.”

The FSHN pilot plant focuses on consumable foods like cereals, beverages and sauces, and IBRL’s research is more heavily in bio-based fuels and chemicals, food ingredients and co-products. Both utilize the variety of specialized, industrial-scale equipment onsite.

Right now, the facilities are well-used and adequate space is difficult to find. But that is expected to change once the $24 million IBRL facility—being constructed next door—and a $3 million renovation to the pilot plant are finished.

The renovations will bring both facilities into the 21st century. “We’re going to end up with two state-of-the-art pilot plant facilities,” says Jacobsen.

When construction work is finally finished and everyone has a little more elbowroom, Jacobson foresees big things on the horizon for the pilot processing plant.

A project funded by the Student Sustainability Committee (SSC) allows the facility to produce 25 percent of the pizza sauce used at Ikenberry Hall this year. The goal is 100 percent by 2017. Another project funded by the SSC will fund flour milling in the pilot plant, which can be used to produce a number of products on campus (breads, pastries, cakes, pasta, biscuits, etc.).

“When we’re done with both projects, we could move closer to 100 percent U. of I. grown and processed pizza,” says Jacobson. “It’s such a fun and fulfilling thing to make a product from start to finish. I’d like to do it more and more.”

Having grown up on a farm north of Kankakee, Illinois, and having raised animals with his family, instilled both a sense of self-reliance, and an interest in technical issues in Jacobson.

“I always knew I would do something technical, but this has really tied into my background,” he said. “This place certainly keeps me from getting bored.”

Maternal Protein Deficiency During Pregnancy ‘Memorized’ by Fetal Muscle Cells

A new study has uncovered the genetic processes that link insufficient protein consumption during pregnancy with the development of muscle problems in mothers and their male offspring.

Huan Wang served as principal investigator on the study, published in the British Journal of Nutrition. In Wang’s study, pregnant rats in the low-protein group consumed food that contained 8 or 9 percent protein, while those in the control group consumed about twice as much.

New research by, from left, nutritional sciences professor Stéphane Lezmi, doctoral researcher Huan Wang and Yuan-Xiang Pan, a professor of nutritional sciences and food science and human nutrition, found the long-sought link between maternal protein deficiency during pregnancy and problems such as stunted growth and metabolic diseases in offspring.
much—18 to 20 percent protein. After giving birth, all of the rats consumed the control diet during lactation, as did all of their pups after weaning. The rats’ body weights and food intake were recorded every other day.

Wang found that inadequate protein intake during pregnancy activates the amino acid response (AAR) pathway, triggering cell destruction—a process called autophagy—as well as atrophy, or wasting, of the mother’s skeletal muscles.

These genetic changes may be transferred through the placenta and “memorized” in the skeletal muscles of the fetus, causing low birth weight and stunted growth in male offspring, the research team reported in the study.

“This is the link we have been seeking for years, which shows transduction from the mom through the placenta to the child,” said Wang, who conducted the research while completing her doctorate in food science and human nutrition at Illinois. “However, the cell autophagy is activated in the skeletal muscles of the male offspring only, so there is gender specificity. Apparently, the female offspring have more resistance to low-protein exposure during gestation and cell autophagy.”

The findings underscore the importance of women consuming healthy diets with adequate amounts of protein during pregnancy to protect the health of their children, from birth through adulthood, said Wang, currently a postdoctoral researcher in human genetics at the University of California at Los Angeles. Detecting biomarkers of protein insufficiency during pregnancy could enable doctors to possibly avert serious health conditions in the next generation, says Wang.

Wang’s co-authors on the paper were U. of I. nutritional sciences professors Stéphane Lezmi and Yuan-Xiang Pan, also of food science and human nutrition; and Donald K. Layman, food science and human nutrition.

Illinois alumni Xiuwen Chen, Gabriel J. Wilson and Dan Zhou also were co-authors on the paper.

Pilot Processing Plant Renovations Proceed Towards Spring 2017 Opening

Renovations on the FSHN Pilot Processing Plant are underway, with a goal of making the facility available for classes by Spring 2017. When completed, the 10,000 square foot processing facility will feature multiple food-grade suites for instruction and research, an analytical laboratory, and a product development kitchen. The plant will provide students hands-on learning in an environment that resembles their future workplaces as food professionals.

Construction began in May 2016. The demolition and removal of old equipment has been completed, and work on infrastructure is well underway. A flexible and elaborate utility chase has been installed to provide the facility with clean steam, process chilled water, and compressed air as needed, along with five new electrical panels to manage the electrical load. Installation of a 33,000 pound HVAC system on the building roof is planned for September to ensure the facility temperature and humidity is maintained to provide a safe space for food production. A period of internal inspections and testing will follow completion of the renovations.

The Spring 2017 plant opening will provide students in a senior food processing class with access to a twin-screw extruder, deep fat frying equipment, and a spray dryer, among other equipment. A Sophomore level class on raw material processing will have access to steam kettles and an analytical lab in support of their learning. Other classes and student projects will benefit from use of the updated facility as well. In addition to the training benefits, the plant provides faculty and corporate collaborators with a state-of-the-art facility to benefit their research efforts.

For more information about renovation details and naming opportunities, visit www.pilotplant.aces.illinois.edu or contact the Pilot Plant Manager Brian Jacobson at 217-300-5404 or bjacobs3@illinois.edu.
While foodies may seek to win your heart through your stomach, Assistant Professor of Nutrition Hannah Holscher seeks to improve your health through your gut. Specifically, her research shows that interrelations between the gut microbiome, a community of microbes and their genes found in the gut, and diet impact human health. This gut microbiome-diet-health connection is the focus of work conducted in Dr. Holscher’s Nutrition and Human Microbiome Laboratory, which now includes a newly renovated Metabolic Kitchen facility. The overarching goal of research in her laboratory is to improve human health through dietary modulation of the gut microbiome.

As a registered dietitian and nutritionist, Dr. Holscher is particularly interested in translational or applied studies. Research in her lab has included projects such as the impact of almonds, walnuts, and whole grains on gut microbiota, how physical activity impacts the gut, and how calorie restriction impacts gut microbiota in obese individuals. Current efforts include collaborative research with three other labs on the relationship between diet, gut function, metabolism, and thinking ability, and a study of how the gut microbiota responds to probiotics (beneficial microorganisms in the gut) and prebiotics (fibers beneficial to gut microbes) and how these changes affect behavior, cognition, and stress.

As an Assistant Professor of Applied Food Safety, Dr. Matthew Stasiewicz is interested in researching the micro-world of bacterial foodborne pathogens and fungal toxins, such as Listeria monocytogenes and aflatoxin. However, to have the capability to better study those foodborne hazards, Dr. Stasiewicz has to manage laboratory renovations in the ‘macro’ or real world first.

In collaboration with Drs. Michael J. Miller and Yong-Su Jin, each an Associate Professor of Food Microbiology in the department, Dr. Stasiewicz has taken on the task of renovating all of the laboratory and office spaces on the first floor of the Agricultural Bioprocess Laboratory—and that is a task with several moving parts: infrastructure, equipment, and people. The vision is for these three faculty, and their students, to operate in a shared laboratory and office space, allowing everyone’s ideas and resources to build upon each other.

One moving part of the task that literally requires moving is moving equipment—some old equipment, some new equipment (e.g., from delayed campus projects)—out of the laboratory spaces to provide a clean pallet for a new design. Another moving part is designing a floor plan that matches the scale of the overall project, i.e., laboratory and collaborative spaces that meet the needs of three professors and their students. The largest laboratory space will utilize a “flexible bench system” to provide 200 feet of laboratory benches to support student work. Other laboratory...
spaces will have specific uses, including a mycotoxin room to control for cross-contamination concerns, an instrument room for highly specialized equipment, and a waste-processing/autoclave room for safe disposal of laboratory materials. Of course, another moving part is finding equipment, furniture, and other items to flesh out the laboratory design, which requires a mix of salvaging, purchasing, negotiating, and navigating university and other guidelines. Once all the parts of the renovation have come together, Dr. Stasiewicz envisions a modern, collaborative research facility tackling challenges in food safety, fermentation, and metabolic engineering.

Teaching and Sustainability Awards

College of ACES Teaching Enhancement Grant Program

Note: funded by the Karl E. Gardner Endowment, teaching grants are meant to improve and enhance teaching within the College of ACES

**DR. SHELLY J. SCHMIDT**, Professor, received funding for the class “Introduction to Food Science and Nutrition” to create and deliver exam wrappers to enhance examination performance in the large introductory course.

Dr. Schmidt also received a 2016 Campus Award for Excellence in Graduate and Professional Teaching from the University of Illinois.

**JILL CRAFT** and **ALANNA OLAH**, Clinical Assistant Professors, received funding for the class “Foundation in Beverage Management: Introduction to Beer, Wine and Spirits” to support purchase of aroma kits for student sensory development of specialty beverages.

**DR. PAWAN TAKHAR** received funding for the graduate class “Transport in Food Biopolymers” to support use of software to model heat transfer in food processing and product development. Takhar was also selected as the Outstanding Educator for 2016 by the FSHN Department.

**DR. ZEYNEP MADAK-ERDOGAN** received grant funds for her for her “Diet, Nutrition and Cancer” class.

**JUSTINE KARDUCK**, Clinical Assistant Professor and Director of the Didactic Program in Dietetics, received grant support from the Karl E. Gardner Endowment

**DR. ELIZABETH JEFFERY** received recognition for her teaching and mentoring via the 2016 Dannon Institute Mentorship Award from the American Society of Nutrition. Dr. Jeffery was noted in the award statement for encouraging ethics, confidence, excellence, curiosity, adaptability, and selflessness in those she mentors.

The **AGRICULTURAL BIOPROCESS LABORATORY** (ABL) received second place in the 2015 Energy Conservation Incentive Program. ABL showed a 25.2% increase in energy saved via conservation efforts as compared to fiscal 2014-2015. The funding will go towards future facility improvements, such as door replacements and new lighting.

Student Awards and Recognitions

United States Agency for International Development (USAID)—U.S. Borlaug Fellows in Global Food Security Program

Note: the Borlaug program is meant expand the pool of U.S. food security professionals who have the study sustainable food systems, and provides fellowships and summer institutes towards that goal

**EMELY LOPEZ BARRERA**, from the laboratory of **DR. BILL HELFERICH**, attended the 2016 summer institute at Purdue.

**SHASHANK GAUR**, from the laboratory of **DR. JUAN ANDRADE**, attended the 2016 Borlaug summer institute.

**ELIZABETH SLOFFER**, from **DR. JUAN ANDRADE’S** research lab, was selected as a 2016 honoree at the upcoming International Women’s Day Celebration in recognition of her invaluable work on behalf of women internationally. Sloffer also won a Purdue Center for Global Food Security research grant to fund her work in Honduras, where she will study the role of this center in training women farmers and its impact on food preparation and nutrition within the household.

**EYLEM KULKOYLUOGLU**, from **DR. ZEYNEP MADAK-ERDOGAN’S** research lab, has been granted a scholarship for the Nutrigenomics, Nutrigenetics and Precision Nutrition short course at UNC Charlotte.

Phi Tau Sigma and Institute of Food Technologists—2016 Division Competition Winners

International Division: **Sage Haggard**—Haggard is mentored by **DR. ELVIRA DE MEJIA**

Nutraceuticals & Functional Foods Division: **Candice Mazewski**—Mazewski is mentored by **DR. ELVIRA DE MEJIA**

FSHN 2016 Departmental Awards

Nishida Undergraduate Researcher | **ANDREW TAYLOR**

Outstanding MS Student | **KYLE OKADA**

Outstanding PhD student | **SINDY P. PALMA-SALGADO** and **TIM TURNER**

Outstanding Senior in Dietetics | **JENNIFER KACZMAREK**
Thank You To Our Generous Donors

The Department of Food Science and Human Nutrition expresses sincere appreciation to the following people and organizations for contributing to our program from July 1, 2015, to June 30, 2016. It is with the support of alumni and friends that FSHN is able to implement outstanding education, research and outreach programs.

Bronze Tablet

The following Food Science and Human Nutrition students have been recognized with the Bronze Tablet distinction (3.5 cumulative grade point-average through the academic term prior to graduation; rank in the top three percent of the students in their graduating class) for spring 2016.

ALEXANDRA R. BECRAFT | Food Science
YU-JU CHEN | Dietetics
JENNIFER L. KACZMAREK | Dietetics
LAUREN J. HALL | Human Nutrition
MEGAN J. KATES | Human Nutrition
XIAOYU WANG | Food Science
GUANYING XU | Food Science

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FSHN appreciates contributions in support of its programs and facilities. The generous donations of alumni and friends assist in maintaining an excellent educational experience for undergraduate and graduate students, supporting continued research and building outreach programs.

You are encouraged to make a general donation or to direct your contribution to a specific program or project of your choice (for example: pilot processing plant renovation, undergraduate scholarships, graduate fellowships, endowed professorships). You may also submit a gift online at www.giving.illinois.edu.

For more information on supporting the Department of Food Science and Human Nutrition, contact giving-fshn@illinois.edu.

We Want to Hear From You!

Please take a moment to send the information requested below to the Department of Food Science and Human Nutrition. This helps us stay in contact with you and to update our records. Any news that you would like to share may be included in next year’s letter.

• Name
• Year of Graduation
• Street Address
• City, State, Zip
• Email
• News to share (e.g., a move, job change, promotion, award or recognition, retirement, accomplishments)
• Please share if your company has internship or job opportunities for FSHN graduates.

Send to FSHN Alumni, 260 Bevier Hall, 905 S. Goodwin Ave., Urbana, IL, 61801, fax it to 217-265-0925, email alumni-fshn@illinois.edu, or use the alumni form at: go.illinois.edu/alumni_fshn