

Winter 2012

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INSIDE:

Ricke Honored – 2

Arkansas Joins STEC Project – 5

AMIF Features UA Researchers – 7

Ricke Co-Edits Book – 8

Survey Reviews Consumer WTP – 8

FDSC Teams Win Awards – 10

Ground Beef Challenges – 11

New Food Safety Law Origins – 12

Richard Forsythe Honored – 14

AAES Researchers and ABI – 15

Istanbul Professor Visits – 16

SARE Project Team Meets – 17

Science Café' and Food Safety – 17

Michael Johnson Fund – 19

Position Announcement – 20

Workshops at UA – 21

Publications and Presentations – 22

Winter 2012

Vol. 3, No. 1

Owens Provides Extra Dimension of Support for Food Safety



Casey Owens

Not a food microbiologist herself, Casey Owens sees her role with the Center for Food Safety as helping the food scientists consider the other aspects of meat processing when they explore research issues. Owens, an associate professor of poultry science who joined the faculty in 2000, has an adjunct faculty appointment in food science where she collaborates on projects.

"My area is processing and products," Owens said. "So when it comes to food safety as it applies in the processing plant, then I can be there to help with the application."

Her general research focus in poultry science evaluates pre-slaughter environmental conditions and processing techniques on muscle metabolism and meat quality of poultry. It also includes an emphasis on evaluating the production and processing factors affecting the tenderness of poultry meat, such as the water-holding capacity, color and sensory attributes.

"We've done quite a bit of work with marination and looked at different concentrations of ingredients, timing and when to do marination, specifically looking at tenderness and the end eating quality of that product," she said. For example, researchers may seek to optimize a product's tenderness, which may be possible if it's allowed to age for 24 hours. But there may also be a need to get it out the plant door sooner than that. Owens brings her expertise with marination to find the right balance for improving tenderness and keeping a production schedule.

(Continued on page 2)

Center for Food Safety

Winter 2012 Vol. 3, No. 1

Owens Provides Extra Dimension of Support for Food Safety (Continued from page 1)

Owens has recently participated in research on a condition in poultry known as white striping, which creates striations in breast meat and affects its appearance. "We have not seen that it really affects the meat quality, but it could affect consumer perception of that product," she said.

Owens hopes to collaborate on food safety projects by helping microbiologists with the meat quality. An effective antimicrobial might have adverse effects on meat quality, which would diminish its overall cost effectiveness.

"As our scientists develop and research other antimicrobials either through feeding or direct application, some of them need to be evaluated in terms of yield, meat quality, tenderness, water-holding capacity and so forth," she said.

Owens teaches two courses in poultry science: Egg and Meat Technology, an upper-level undergraduate course, and Value Added Muscle Foods, a graduate course that advanced undergraduates may also take. The Egg and Meat Technology course is required for poultry science majors but also attracts students from animal science and food science. The Value Added Muscle Foods course is an advanced processing course for students who have already taken Egg and Meat Technology or for graduate students and is suited for students with an interest in meat science.

"It is potentially good for them in their career path," she said. "A knowledge about the science of meat and how meat proteins and ingredients function in further processed products would help them in the area of research and development, for example."

Ricke Honored with John W. White Outstanding Research Award

The University of Arkansas System Division of Agriculture presented its annual John W. White Outstanding Research Award to Steven Ricke, director of the Center for Food Safety. Ricke received the honor during the Division's awards luncheon Jan. 6 in Little Rock.

Jean-Francois Meullenet, Department of Food Science head, said in a letter of nomination that Ricke's "scholarly outputs have been simply phenomenal." He also noted Ricke's leadership of the Center and credited him with expanding its interdisciplinary nature and national visibility while enhancing collaborations among the university's food safety scientists.

Center for Food Safety

Winter 2012 Vol. 3, No. 1



Steven C. Ricke (center) accepts the John W. White Outstanding Research Award from Mark Cochran (left), University of Arkansas System vice president for agriculture, and Richard Roeder (right), interim director of the Arkansas Agricultural Experiment Station.

Suresh Pillai, Ricke's former colleague at Texas A&M University where he is currently director of the National Center for Electron Beam Research, said Ricke was deserving of the award for developing a flourishing program at Arkansas. "Since joining Arkansas, he has collaborated with a large number of faculty (both junior and senior) from a variety of departments, catalyzed the formation of large project teams and provided leadership as the director of the Center for Food Safety in organizing local and national scientific programs," Pillai said. "Importantly, it is clear that he continues to serve as a very effective mentor to a number of graduate students and senior scientists. Steve's ability to maintain a research program at this pace for almost two decades is by itself a great accomplishment."

Center for Food Safety

Winter 2012 Vol. 3, No. 1

Michael Johnson, emeritus professor of food science, preceded Ricke as research director for the tri-state Food Safety Consortium. He worked closely with Ricke during his final two years of active faculty service.

"The overall key to Dr. Ricke's success is that he makes those who work around him, including me, better in every way, able to accomplish more in a shorter time with fewer resources," Johnson said. "This kind of research catalytic personality is rare to find today." He called Ricke a scientist of the first rank who excels at providing critical and strategic thinking that steers others to devise more focused research efforts.

"Truly, Dr. Ricke has been very effective and had a high impact on the productivity of his advisees and fellow faculty team members in sharing his research skills in producing a very large yearly publication record averaging over 18 refereed research publications a year," Johnson said. "He also has an excellent amount of total research funding in an era in which there is an ever-increasing competition for a shrinking pot of available research funds."

Ricke, who holds the Donald "Buddy" Wray Endowed Chair for Food Safety, joined the Department of Food Science in 2005. He is an international authority on food safety with a focus on preventing *Salmonella* contamination during food production and processing. He has produced numerous scholarly publications just in the past six years, including five books edited or co-edited, 109 peer-reviewed journal articles (an average of 18 a year), 30 review articles and 19 book chapters. He is a co-founder and a former president of the Arkansas Association for Food Protection. Ricke has been either the lead-PI or a part of research teams that have obtained nearly \$6 million in grants and contracts for Division programs and external collaborators. He has served on USDA and National Research Council panels on food safety as well as influential positions with the Poultry Science Association and American Dairy Science Association. He has been a member of USDA and National Research Council food safety panels and serves on the food safety advisory committee for the United Egg Producers Scientific Advisory Council. He has held editorial positions with *Poultry Science* and other professional journals. He came to Arkansas from the Texas A&M Poultry Science Department, which he joined in 1992. He has B.S. and M.S. degrees from the University of Illinois and a Ph.D. degree from the University of Wisconsin.

The John W. White awards for outstanding teaching, research and extension service are named for the U of A System's first vice president for agriculture when the Division of Agriculture was made a statewide unit of the U of A System in 1959. White, a 1935 graduate of the university, served as an Extension agent and specialist, an agricultural economics instructor, assistant director of the Rice Branch Experiment Station, head of the Department of Agricultural Economics and Rural Sociology and associate director of the Experiment Station before his appointment as vice president.

Center for Food Safety
Winter 2012 Vol. 3, No. 1

To Be Led by University of Nebraska

Arkansas Researchers Part of USDA-AFRI STEC Nationwide Funded Project



Two UA Center for Food Safety researchers are leading a significant component of a federal research grant in which several universities seek to reduce the occurrence and public health risks from Shiga toxin-producing *E. coli* (STEC) along the entire beef production pathway.

Steven Ricke, director of the Center for Food Safety, and Fred Pohlman, professor of animal science and member of the Center, will lead the research into one of the grant's five objectives. The objective being investigated by Arkansas will explore interventions for seven STEC serotypes.



Steven Ricke

Fred Pohlman

The Arkansas work is part of a \$25 million multidisciplinary grant awarded Jan. 23 by the U.S. Department of Agriculture-

National Institute of Food and Agriculture through its Agriculture and Food Research Initiative. The University of Nebraska is the lead institution. The overall project aims to improve risk management and assessment of eight strains of STEC in beef, including the O104 strain that caused a recent outbreak in Germany. The project will focus on identifying hazards and assessing exposure that lead to STEC infections in cattle and on developing strategies to detect, characterize and control the pathogens along the beef chain.

Research teams in addition to those from Arkansas and Nebraska are from Kansas State University, the University of California-Davis, University of California-Tulare, University of Delaware, New Mexico State University, North Carolina State University, Texas A&M University, Virginia Tech University, the USDA Agricultural Research Service and a research

Center for Food Safety

Winter 2012 Vol. 3, No. 1

consortium of government, academic and industry scientists and food safety professionals.

"I am very excited to see the UofA Division of Agriculture be a part of this high profile NIFA project and glad to see collaborations develop across departmental lines. STEC is a big food safety issue and I am sure Drs. Pohlman and Ricke will make great contributions to the overall project," said Jean-Francois Meullenet, head of the Department of Food Science.

Michael Looper, head of the Department of Animal Science, said, "This integrated research project will continue to ensure the U.S. has the safest beef supply in the world. I am pleased that faculty in the Division of Agriculture are recognized as experts in the food safety area and their work will ultimately impact people's daily lives."

At Arkansas, Pohlman and Ricke will serve as co-principal investigators and will collaborate on all aspects of microbial testing on the effectiveness of antimicrobials.

"This project, for the first time, will take a comprehensive look at the beef processing chain and identify risks associated with the major STECs and develop technologies to best deal with and alleviate those risks," Pohlman said. "Never before has such a group of researchers, industry partners, affiliated industries, trade associations and regulatory agencies been assembled to tackle such an issue."

"Our research group is excited about the opportunity to work with pathogenic *E. coli* and apply what we have learned from other foodborne pathogens," Ricke added.

Ricke brings expertise in several areas to the project, including rumen microbiology and ecology, multiple hurdle intervention design for post-harvest and post-harvest microbial ecology and genetics. Pohlman's areas of expertise are meat processing and handling techniques, food safety, animal finishing, lean meat quality and yield and meat palatability.

"As non-O157 STEC bacteria have emerged and evolved, so too must our regulatory policies to protect the public health and ensure the safety of our food supply," said Chavonda Jacobs-Young, acting NIFA director. "This research will help us to understand how these pathogens travel throughout the beef production process and how outbreaks occur, enabling us to find ways to prevent illness and improve the safety of our nation's food supply."

Center for Food Safety

Winter 2012 Vol. 3, No. 1

Research Team Pursuit of *E. coli* O157:H7, *Salmonella* Project Is Featured in AMIF Publication

A team of researchers from the Center for Food Safety is exploring ways of reducing *E. coli* O157:H7 and *Salmonella* in beef trimming and ground beef with the support of a grant from the American Meat Institute Foundation. The project also aims to maintain quality and shelf-life attributes of ground beef.

The AMI Foundation highlighted the project on the opening text page of its *2011 Year in Review* annual report. The Foundation is a non-profit research, education and information organization that studies ways the meat and poultry industry can operate more efficiently and produce better and safer products. The UA project is part of AMIF's food safety program aimed at reducing and ultimately eliminating Shiga toxin-producing *E. coli* in fresh beef. AMIF has sponsored 90 food safety research projects at leading universities and research labs since 1999.

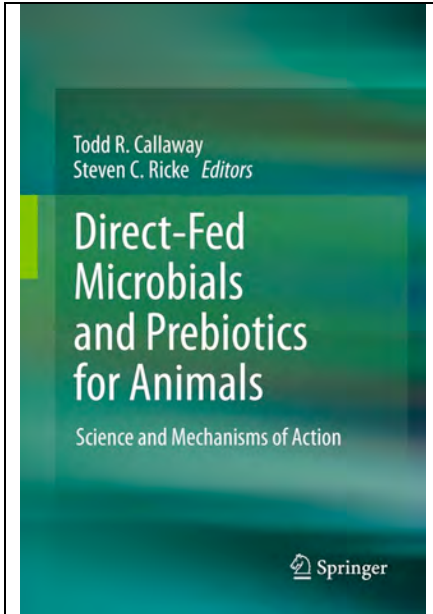
The project covers antimicrobial interventions and application methods for reducing the pathogens. Researchers are Fred Pohlman, Steven Ricke, Palika Dias-Morse, Anand Mohan, Sara Milillo, Peggy Cook and Karen Beers.

"This research will provide a practical and cost-effective, novel decontamination technology for beef processors that can be immediately implemented for commercial application of antimicrobial interventions during the ground beef production chain," the team reported. "The main focus of this research is to utilize and validate antimicrobial properties of peroxyacetic acid, novel organic acids alone or in combination with a non-ionic surfactant on beef trimmings against *E. coli* O157:H7, O26, O103, O111, O45 and O145 and *Salmonella* Typhimurium DT 104, Newport MDR-AmpC."

Center for Food Safety

Winter 2012 Vol. 3, No. 1

Ricke Co-Editor of Book on Microbials and Prebiotics



Steven Ricke, director of the Center for Food Safety, and Todd Callaway, a research microbiologist with the U.S. Department of Agriculture Agricultural Research Service in College Station, Texas, are the editors of *Direct-Fed Microbials and Prebiotics for Animals*, a book recently published by Springer.

The 12-chapter book with numerous contributing authors provides an in-depth analysis of the effectiveness of microbials and prebiotics in animals, discusses the key processes during establishment of microflora in the gastrointestinal system and serves as a resource on direct-fed microbials and prebiotics for animals.

"An understanding of the key processes during establishment of microflora in the gastrointestinal system that lead to the subsequent fermentation

characteristics and ecological balance exhibited by the highly protective microflora is needed," the publisher's summary said. "Several additional areas of future research directions are also suggested for further development and implementation of these biological approaches as new molecular and drug delivery technologies become available. Continued research on direct fed microbials and prebiotics in general should markedly expand their commercial applications."

The book is available in hardcover for \$189 from Springer at <http://www.springer.com/food+science/book/978-1-4614-1310-3>. It is also available for reading online at <http://www.springerlink.com/content/978-1-4614-1311-0#section=1006552&page=1>.

Consumers Willing to Pay Extra for Organic Meat, Survey Finds

Consumers, particularly those who occasionally or habitually buy organic chicken, are willing to pay a premium price for organic meat, according to a study conducted by Center for Food Safety personnel. The extent of their willingness to pay the premium, however, depends on the type of organic label.

Center for Food Safety

Winter 2012 Vol. 3, No. 1



Ellen Van Loo

The published results of the study were among the 15 most downloaded at the SciVerse ScienceDirect.com website. The results were published in the journal *Food Quality and Preference* in an article by lead author Ellen Van Loo, a former UA food science graduate student who is now a doctoral researcher in the food consumer science unit at the Department of Agricultural Economics at Ghent University. The co-authors are Jean-Francois Meullenet, head of the UA Department of Food Science; Steven C. Ricke, director of the Center for Food Safety; Rodolfo Nayga, UA professor of agricultural economics and agribusiness, and Vincenzina Caputo of Alma Mater Studiorum University of Bologna, Italy.

"Considering that consumers think of high price premiums as the strongest limiting factor when purchasing organic meat, it is then important to know consumers' willingness to pay for these products," Van Loo said. "Willingness-to-pay estimates can also provide insights on how consumers value the organic attribute in meat products and can be used as input in analyzing the marketability of the products."

Surveys of consumers asked them to make choices in hypothetical situations regarding purchases of chicken. The surveys found that consumers would be willing to spend a 35 percent premium for a general organic labeled chicken breast and would pay a 104 percent premium for a USDA-certified organic labeled chicken breast. (To receive the USDA organic certification, a product must meet the agency's organic requirements for production, handling and processing and accredited agents must have certified the farm and the handling and processing companies.)

When broken down further, the survey results showed that consumers who do not generally buy organic products would be unwilling to pay a premium, occasional buyers of organic products would pay a 35.7 percent premium for a general organic labeled chicken breast and a 97.3 percent premium for USDA-certified chicken breast, and habitual buyers of organic products would pay a 146 percent premium for a general organic labeled chicken breast and 244.3 percent premium for USDA-certified chicken breast.

Van Loo noted that more research is needed that would include real market data reporting actual consumer purchases.

Center for Food Safety

Winter 2012 Vol. 3, No. 1

Food Science Teams Win Product Development Awards

Several Food Science Department students coached and advised by Food Science Professor Navam Hettiarachchy, a member of the UA Center for Food Safety, received awards in recent months for food product development projects.



Navam Hettiarachchy

The Institute of Food Technologists awarded first place and a \$3,500 prize to one of Hettiarachchy's student teams at its annual meeting last June in New Orleans for Fenomenal Funchies, a fruit-rich, low fat, low sodium, zero trans fat, fiber-rich baked snack made for Disney product development. The student team members were Quyen Nguyen, Amara Venkata Perumalla, Leo Altenberg, Monica Ramos and Madison Weskamp. The competition called for a team to develop a market-relevant, delicious and nutritious food or beverage snack that integrates at least one of the following – a fruit, a vegetable, low-fat dairy product or whole grains – into a product targeted to children 10 and younger for a retail outlet.

Another team won third place and a \$2,000 prize plus \$4,286 in travel expenses in the Danisco Knowledge Award product development competition at its annual new products conference in Naples, Fla. The team's entry was TV Tots, a gluten-free, corn and trans-fats free, total vegetable combo snack. Team members were Monica Ramos, Amara Venkata Perumalla, Leo Altenberg, Tadjudini Lassissi, Amanda Mishler, Leighanna Massey and Quyen Nguyen. The competition required entrants to utilize Danisco's ingredients for product preparation.

A third team was a finalist and the winner of a \$300 travel award at the American Association of Cereal Chemists annual meeting in October in Palm Springs, Calif., for Bran Knew muffins, a gluten-free, low sodium, low calorie, fiber and protein-rich snack with rice bran and soy meal. Team members were Srinivas Rayaprolu, Irene Pagana, Emily Arijaje, Patrick Rodgers, Jack Teague and Martha Hunt. They were required to develop a novel food product containing at least one major cereal/legume ingredient.

Center for Food Safety

Winter 2012 Vol. 3, No. 1

Ground Beef Presents Challenges to Red Meat Researchers



Fred Pohlman lectures at Food Science seminar.

Students in the UA Department of Food Science got a look into the world of red meat processing issues during its seminar series in November when Fred Pohlman, professor of animal science, discussed beef value enhancements.

The animal science labs examine meat safety and health issues such as *E. coli*, *Salmonella* and BSE. The lab personnel research decontamination procedures including carcass cleaning, chemical de-hairing, knife trimming, steam pasteurization, spraying and other sanitizing solutions.

"The industry has looked at the above technologies with mixed success," Pohlman said. "We have evaluated and developed chemical, spraying and other sanitizing technologies on intact beef cuts, beef trimmings and in ground beef systems."

Carcasses must be fabricated and go through a system with many people handling them. Pohlman said. "This system of fabrication where the carcasses are being broken down is a source for a whole series of contaminations."

Ground beef – which accounts for 44 percent of all beef consumed annually in the United States – has its own set of potential challenges. It's comingled, ground and mixed together, which opens new possibilities for contamination.

Irradiation is a technology that can eliminate or at least greatly reduce the hazards of ground beef contamination, but the procedure isn't popular with the public and isn't used much by processors. "Irradiation is a severe oxidation environment," Pohlman said. "To get it to levels that will sterilize the product will put it at levels that you won't want to consume it."

Oxidation can cause discoloring of a product, which makes it less attractive to consumers. Oxidation can also create off flavors. Pohlman's research group has experimented with reducing agents in combination with antioxidants. "We can take the irradiated products that normally have a really detrimental effect on redness and we were able to keep the same degree of redness as in non-irradiated products," he said.

Center for Food Safety

Winter 2012 Vol. 3, No. 1

If ground beef is sterilized and sanitized, it still must remain palatable so consumers will buy it. Tests by sensory panels have shown that sometimes the sterilization treatments actually help the product's attractiveness.

"The treated samples generally tend to look like, smell like and taste like ground beef and the sensory panel couldn't detect that we'd done anything to it," Pohlman said. "But if they found something from a sensory standpoint, the antimicrobial-treated samples were more juicy. That tends to be a good thing, so why were those samples more juicy? We may have increased the moisture just enough."

The research on sensory properties is done either instrumentally or visually with follow-up tests to determine if the value-added qualities provide the product something the consumer will want to buy. The sensory attributes are also important because of ground beef's short shelf life. "If you don't sell it in two or three days you're going to have to discard it," Pohlman said.

Food Safety Attorney Marler Explains Origins of New Law



Bill Marler speaks at UA School of Law.

Corporate investments in food safety picked up when government responded to a 1993 foodborne illness outbreak in the Pacific Northwest which sickened more than 600 people from *E. coli* O157:H7 that was traced back to hamburgers served at Jack in the Box restaurants. Bill Marler, a lawyer who represented clients in lawsuits stemming from the outbreak, said the incident put food safety issues on a path that

ultimately led to passage of the federal Food Safety Modernization Act that became law in January 2011.

"Lawsuits change corporate behavior," Marler said in remarks in November at the University of Arkansas School of Law, where he serves in an adjunct faculty position teaching food

Center for Food Safety

Winter 2012 Vol. 3, No. 1

safety law in the school's master of laws degree agricultural law curriculum. He noted that after the Jack in the Box episode, the U.S. Department of Agriculture declared *E. coli* O157:H7 to be an adulterant.

"If industry finds it in their product they need to recall it," Marler said "The reality is it changed behavior. Investments were made."

The Marler Clark law firm in Seattle has gone on to represent thousands of clients in legal action prompted by foodborne illnesses and has won more than \$600 million in awards to the clients. In addition to pursuing cases through the judicial system, Marler has also become a prominent lobbyist in Washington on behalf of consumers in food safety issues.

Most of the first decade of this century was devoid of any significant legislative activity regarding food safety, Marler said. Food safety awareness picked up in 2006 following an outbreak of illnesses that was traced back to *E. coli* O157:H7 found in spinach that sickened at least 200 people, followed by an outbreak of *Salmonella* infections in 2007 from peanut butter that caused hundreds more to become ill. Later in 2007, *The New York Times* published a front-page article about food safety featuring a dancer who had become paralyzed from *E. coli* poisoning. Congressional committees began holding hearings on food safety.

By 2009, Marler said, consumer groups and industry began looking for common ground on food safety legislation. By July of that year, the house passed the Food Safety Modernization Act (FSMA) that gave the Food and Drug Administration inspection authority at the non-meat food processors similar to the authority that USDA has long held over meat and poultry processors. The legislation then went to the Senate where it stalled for more than a year before passage during in late 2010.

But by 2011, funding for the activity prescribed in the new law "was being pushed to the side," Marler said, and isn't expected to be approved anytime soon. "The FSMA, if implemented, would make some significant changes. But you can't expect it to work if it's not funded."

Center for Food Safety

Winter 2012 Vol. 3, No. 1

Forsythe Honored at 90th Birthday Event



Richard Forsythe and his wife, Ruth, at birthday celebration.

Richard Forsythe, the founding coordinator of the Food Safety Consortium, was recognized by friends and family during a 90th birthday celebration on Dec. 10 at the Butterfield Trail Village retirement community in Fayetteville. Forsythe served as coordinator of the FSC from 1989 until he retired from the University of Arkansas poultry science faculty in 1995.

Forsythe was an executive at Campbell Soup in Fayetteville when he joined the university.

While at Campbell Soup, he was among the poultry industry leaders who met with then-Sen. Dale Bumpers of Arkansas to promote the establishment of a food safety research organization that would explore scientific solutions to problems in animal meats. Congress established the FSC in 1988 with the UA System Division of Agriculture, Iowa State University and Kansas State University as members that would conduct research respectively in issues concerning poultry, pork and beef. Funding from a U.S. Department of Agriculture special grant to support research projects began flowing in 1991. Forsythe led the partnership of the three universities in determining research priorities for the campuses.

The FSC ceased operations in 2011 when federal funding for the annual grant ended.

Forsythe, who earned a Ph.D. in biophysical chemistry at Iowa State, joined the UA as a Distinguished Professor and was the first to hold the Arkansas Poultry Federation Endowed Chair. He was named Man of the Year by the American Poultry Federation in 1987 and was elected to the American Poultry Historical Society Hall of Fame in 1989. He was named a Fellow in the Institute of Food Technologists in 1982.

Center for Food Safety

Winter 2012 Vol. 3, No. 1

AAES Researchers Recognize ABI Project Support



AAES research personnel recently gathered to recognize their support from the Arkansas Biosciences Institute.

The Arkansas Biosciences Institute (ABI) recently observed its 10th anniversary supporting health and agriculture research activity dedicated to improving the health of Arkansans. The University of Arkansas System Division of

Agriculture serves as one of five research partners. The Arkansas General Assembly established the ABI in 2001 with proceeds from the state's share of the 1998 nationwide tobacco settlement. A photo of several Arkansas Agricultural Experiment Station scientists was recently commissioned in observance of the 10th anniversary.

ABI funds have been used for leveraging extramural funding, recruiting scientists to member institutions and provide knowledge-based jobs in Arkansas. Division scientists have received over \$15 million in research awards from the ABI, and ABI is currently funding 12 Division research projects.

The Arkansas Agricultural Experiment Station currently has several faculty researchers who are pursuing projects with ABI support. Among them are several current and former researchers from the Center for Food Safety: Philip G. Crandall, Food Science; Billy M. Hargis, Poultry Science; Young Min Kwon, Poultry Science; Jody M. Lingbeck, Food Science; Fred W. Pohlman, Animal Science; Steven C. Ricke, Food Science, and Guillermo Tellez-Isaias, Poultry Science.

Center for Food Safety

Winter 2012 Vol. 3, No. 1

UA Food Science Department Hosts Istanbul Technical University Official



CFS director Steven Ricke (left) and Dilek Boyacioglu of Istanbul Technical University.

The UA Department of Food Science spent most of the day on Jan. 30 hosting Dilek Boyacioglu, professor and chair of the Food Engineering Department at Istanbul Technical University in Turkey. Boyacioglu visited the university to discuss potential collaborations, meet faculty and deliver a seminar lecture.

"We are trying to understand the research capacities that the two universities have," Boyacioglu said. "I'm trying to match with our research interests and the research interests already here at Arkansas. The main idea is to collaborate on a research project in which we are both interested on topics like antioxidative

compounds. We might exchange our students or professors. New research projects might be a possibility as well."

Boyacioglu met with staff members from the Center for Food Safety and explained her department's academic program at Istanbul. She described it as having a strong emphasis in food chemistry and food microbiology with an engineering component in the processing studies.

Boyacioglu's seminar presentation reviewed the results of two projects her university pursued with support of the European Union. One project from 2004 to 2009 covered the antioxidant properties of phenolic compounds. The other project explored the effects of food processing on anthocyanins in foods such as Turkish variety sour cherry, pomegranates, black carrots and their juices and nectars as well as dark chocolates.

"It is very interesting to understand the interactions between food components and antioxidants because we observe some changes in the antioxidant capacities of foods during processing," she said. "We are trying to get more detailed information about the interactions of compounds."

Boyacioglu said her university's researchers are setting up experiments to review the changes in bioavailability of the antioxidant compounds by using both *in vitro* and *in vivo* studies. "We are trying to measure the bioavailability using tests with enzymes or cells to understand the changes," she said.

Center for Food Safety

Winter 2012 Vol. 3, No. 1

USDA-SARE Project Team Meets to Plan Strategy



SARE project principal investigators meeting at the UA Center for Food Safety included, from left, Genti Kostadini of the University of Georgia, Kristen Gibson of the UA, Walid Alali of Georgia, Steven Ricke of the UA and Divya Jaroni of Oklahoma State University.

Members of the multiuniversity team investigating the food safety risk of small on-farm processing systems – pasture poultry production – met at the UA Center for Food Safety in February to review their assignments. Grant funds were recently released for the project funded by the federally-supported Sustainable Agriculture Research and Education agency (USDA-SARE).

Walid Alali, faculty member of the University of Georgia Center for Food Safety, came to Fayetteville to visit members of the team focusing on the food safety and environmental components of the project. The UA

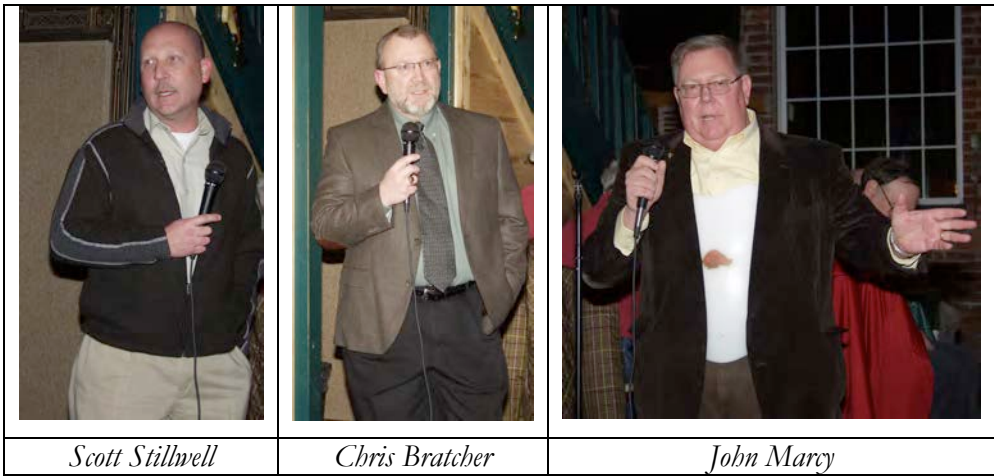
System Division of Agriculture is researching that aspect of the project. Georgia is the lead institution for the project. Alali said the group met to coordinate individual roles in the two-year project.

Science Café Hosts Food Safety Experts

Three perspectives on food safety – academic, industry and government – prompted a spirited discussion at the University of Arkansas Science Café, a forum on current issues that met Feb. 7 in Fayetteville.

"From farm to consumer, we collaborate with partners on food safety," said Scott Stillwell, Tyson Foods vice president for food safety. "Food safety is a non-competitive knowledge base. We share that information with our competitors." He noted that the company's food safety staff works outside of Tyson's production operation so the food safety efforts don't become involved in other business concerns.

Center for Food Safety
 Winter 2012 Vol. 3, No. 1



Chris Bratcher, the Springdale frontline supervisor from the U.S. Department of Agriculture Food Safety and Inspection

Service, explained his agency's role as the regulator of meat and poultry plants. He supervises 10 veterinarians and 78 food inspectors at plants in Springdale and Fayetteville. He described his job as "to make sure the plants are doing what they should to support their HACCP plans." Federal law requires plants to prepare HACCP (Hazard Analysis and Critical Control Points) plans that detail their strategy for intervening at points in the food processing system to guard against potential contamination.

Advising that "food is not zero risk," John Marcy, Extension food scientist at the UA Center of Excellence for Poultry Science and a member of the Center for Food Safety, noted that the best way to guard against pathogens is at the final cooking step in the consumer's or restaurant's kitchen. "We still haven't found a way to improve on fire," he said.

Asked why irradiation hasn't been adopted by food processors as a way of decontaminating food products, Marcy said it's not widely used because there isn't a wide demand from consumers for it, so only a few small companies sell irradiated meat products. Stillwell added that irradiation adds to the price of a product and consumers will likely choose to buy the less expensive non-irradiated version.

Recalls of contaminated food products happen occasionally, but usually the recalls aren't the result of reported illnesses, Stillwell said. The recalls happen because of routine surveillance of product quality by USDA aimed at finding problems before outbreaks of illness have a chance to occur.

Center for Food Safety

Winter 2012 Vol. 3, No. 1

Contribute to the Michael G. Johnson Endowed Fund in Food Science

The Arkansas Association for Food Protection has established the Michael G. Johnson Endowed Fund in Food Science at the University of Arkansas in honor of Dr. Michael G. Johnson, emeritus professor of food science. Johnson, who retired in 2009, joined the food science faculty in 1984. He served as research coordinator for the Arkansas component of the Food Safety Consortium.

When establishment of the scholarship was announced at an AAFP meeting, Johnson was honored by testimonials from colleagues and former graduate students. In his remarks to the audience, Johnson said mentors should direct their time to people who are working their way up. This "spirit of investing" prepares the next generation of researchers to pass their skills along to future students, he said. He advised researchers to be proactive in food protection issues and to "take what works for you and pass it on."

Donors may give to fund online by following these steps:



1. Go to the UA Office of Development online donor site at <https://payments.bankofamerica.com/otp/StartAction.do?UAR> and enter your phone number.

2. Complete the online donation form. At the drop-down menu for "Designate Gift 1," select the line for "Other--type in description below."

3. At the line for "Other Specific Department or Program," type in "Michael Johnson Endowed Fund in Food Science."

4. At the line for "Is this an honor/memorial gift?" select "Honor."

5. At the line for "Honor/Memorial Designee," type in "Michael Johnson."

6. Leave blank the line for "Designee Address (for notification purposes)." The UA Office of Development will notify Dr. Johnson of donations to the fund.

7. Proceed with the credit card donation procedures.

Center for Food Safety

Winter 2012 Vol. 3, No. 1

To discuss major contributions, contact Blake Bard, director of development for the UA Dale Bumpers College of Agricultural, Food and Life Sciences, at bsbard@uark.edu or 479-575-2270.

Position Announcement

University of Arkansas
Fayetteville, Arkansas
Department of Food Science (<http://foodscience.uark.edu/>)

FOOD SCIENCE FACULTY POSITION in MOLECULAR FOOD SAFETY MICROBIOLOGY

Position: Assistant Professor of Food Science in Molecular Food Safety Microbiology, 12-month, tenure-track position; 75% Research; 15% Teaching; 10% Service. Position with appointment in the Department of Food Science at the University of Arkansas.

Required Qualifications: An earned doctorate in Microbiology, Cellular and Molecular Biology, Food Microbiology or Food Science with a focus on general food microbiology and/or molecular biology related to food microbiology and its application in foods and/or food components. The applicant must have demonstrated excellence in effective oral and written communication skills as well as documented teaching experience.

Desired Qualifications: Experience in successful grant-writing and food safety/food microbiology experiences such as working in the food industry and/or regulatory/governmental agencies are highly desirable. Post doctorate experience in a Microbiology, Cellular and Molecular Biology, Food Microbiology or Food Safety laboratory will be considered a plus.

Responsibilities: Develop a nationally competitive and independent research program in molecular food safety, food microbiology and gastrointestinal microbiology. Focus areas may include microbiome analysis and characterization, microbial physiology and pathogenesis, microbial ecology in food systems, intervention technologies and risk assessment of bacterial pathogens of foods. Conduct collaborative research as part of faculty multidisciplinary team for implementing farm to fork solutions to reduce foodborne pathogens in a wide range of food production systems. The candidate will provide expertise and interface with industry partners and other stakeholders including retailers, consumers and various government agencies. The candidate will also be expected to contribute to the department's food safety outreach programs, recruit and advise graduate students, supervise undergraduate research, and secure extramural funding from a variety of sources including

Center for Food Safety

Winter 2012 Vol. 3, No. 1

Federal, State, private and industry sources.

Salary and Benefits: Salary will depend upon qualifications and will be nationally competitive. Benefits available include group medical insurance, dental insurance, group and individual life insurance, long-term disability insurance, workers' compensation, non-contributory retirement (UofA makes all contributions), voluntary retirement programs, sick leave, annual leave, paid holidays and administrative leave days, unemployment compensation, educational waivers, and use of University Services.

Application Deadline: Review of applications will begin on March 1st, 2012 and will continue until a qualified candidate is identified.

Application: The Fayetteville campus of the University of Arkansas is seeking candidates who have the ability to contribute in meaningful ways to the diversity and intercultural goals of the University. Applicants should submit: 1) a letter of application, 2) a curriculum vitae detailing education background qualifications, experience, and publications, 3) a one-page statement of research plans and goals, 4) a one-page statement of teaching plans plus a proposed course syllabus with course objectives and deliverables, 4) transcripts of all college course work, and 5) names and contact information (including e-mail addresses) of three individuals who will serve as references. Send all materials to:

Dr. Steven Ricke, Chair, C/O Dianne Saffire

Department of Food Science • 2650 N Young Ave. • University of Arkansas • Fayetteville, AR 72704 Phone: (479) 575-4455 • FAX: (479) 575-6936

Inquiries should be addressed to the search committee chair, Steven Ricke, sricke@uark.edu or Jean-Francois Meullenet, Professor and Head, Department of Food Science, jfmeull@uark.edu

Workshops at the UA Institute of Food Science and Engineering

Microbiological Laboratory Logistics and Fundamentals - This workshop will be held on several dates (March 13-15, April 10-12, May 15-17, June 12-14, July 10-12, August 14-16, September 11-13 and October 9-11, 2012). See

http://www.uark.edu/ua/foodpro/Workshops/Micro_Lab.html

Better Process Control School

-- A special "Acidified" Better Process Control School will be conducted at the University of Missouri in March 26-27, 2012. See <http://foodscience.missouri.edu/afw/>

-- There will be a regular Better Process Control School at Oklahoma State University May 21-24, 2012.

Center for Food Safety

Winter 2012 Vol. 3, No. 1

-- This 3.5-day workshop will be held the first week of November (Nov. 6-9, 2012) at the University of Arkansas. For more information and registration form, go to <http://www.uark.edu/depts/ifse/bpcsrev1.html>

Sensory Evaluation of Foods – This workshop will be held June 2012. For details and registration information, see http://www.uark.edu/ua/foodpro/Workshops/Sensory_Evaluation_Workshop.html

CFS Publications and Presentations

Publications

Callaway, T.R. and S.C. Ricke (Eds.), 2012. Direct Fed Microbials/Prebiotics for Animals: Science and Mechanisms of Action, Springer Science, New York, NY, 206 pp.

Sirsat, S.A., A. Muthaiyan and S.C. Ricke. 2011. Optimization of RNA extraction method for transcriptome studies of *Salmonella* inoculated on commercial raw chicken breast samples. BMC Research Notes 4:60:1-7.

Pittman, C.I., S. Pendleton, B. Bisha, C. O'Bryan, L. Goodridge, P.G. Crandall, and S.C. Ricke. 2011. Validation of the use of citrus essential oils as a post-harvest intervention against *Escherichia coli* O157:H7 and *Salmonella* spp. on beef primal cuts. J. Food Sci. 76: M433-M438.

Park, S.H., R. Jarquin, I. Hanning, G. Almeida, and S.C. Ricke. 2011. Detection of *Salmonella* spp. survival and virulence by targeting the *hilA* gene. J. Appl. Microbiol. 111: 426-432.

Shannon, E., S.R. Milillo, M.G. Johnson, and S.C. Ricke. 2011. Inhibition of *Listeria monocytogenes* by exposure to a combination of nisin and cold-pressed terpeneless valencia oil. J. Food Sci. 76: 600-604.

Callaway, T. R., J. A. Carroll, J. D. Arthington, T. S. Edrington, M. L. Rossman, M. A. Carr, N. A. Krueger, S. C. Ricke, P. Crandall, and D. J. Nisbet. 2011. *Escherichia coli* O157:H7 populations in ruminants can be reduced by orange peel product feeding. J. Food Prot. 74: 1917-1921.

Kim, W.K., S.A. Bloomfield, and S.C. Ricke. 2011. Effects of age, vitamin D₃, and fructooligosaccharides on bone growth and skeletal integrity of fast-growing broiler chicks (*Gallus gallus*). Poultry Sci. 90: 2425-2432.

Ravichandran, M., N.S. Hettiarachchy, V. Gansch, S.C. Ricke and S. Singh. 2011. The enhancement of antimicrobial activities of naturally occurring phenolic compounds by

Center for Food Safety

Winter 2012 Vol. 3, No. 1

nanoaparticle mediated delivery against *Listeria monocytogenes*, *Escherichia coli* O157:H7 and *Salmonella* Typhimurium in broth and chicken meat system. J. Food Safety 31: 462-471.

Hanning, I., D. Gilmore, S. Pendleton, S. Fleck, A. Clement, S. H. Park, E. Scott, and S.C. Ricke. 2012. Comparison of *Staphylococcus aureus* isolated from healthy humans and whole retail chicken carcasses in Northwest Arkansas. J. Food Prot. 75: 174-178.

Foley, S., R. Nayak, I.B. Hanning, T.L. Johnson, J. Han, and S.C. Ricke. 2011. Population dynamics of *Salmonella enterica* serotypes in commercial egg and poultry production. Appl. Environ. Microbiol. 77: 4273-4279.

Crandall, P.G., J.A. Neal Jr., C.A. O'Bryan, C.A. Murphy, B.P. Marks, and S.C. Ricke. 2011. Minimizing the risk of *Listeria monocytogenes* in retail delis by developing employee focused, cost effective training. Agric., Food, Anal. Bacteriol. 1:159-174.

Siragusa, G.R. and S.C. Ricke. 2012. Chapter 20. Probiotics as pathogen control agents for organic meat production. In: S.C. Ricke, E.J. Van Loo, M.G. Johnson and C.A. O'Bryan (Eds.), Organic Meat Production and Processing. Wiley Scientific/IFT, New York, NY pp, 331-349.

Ricke, S.C., P. Hererra, and D. Biswas. 2012. Bacteriophages for potential food safety applications in organic meat production. pp. 407-424 In: S.C. Ricke, E.J. Van Loo, M.G. Johnson and C.A. O'Bryan (Eds.), Organic Meat Production and Processing. Wiley Scientific/IFT, New York, NY.

Burr, J.J., A.R. Clement, E.J. Stellwag, G.S. Burr, and S. Ricke. 2012. Characteristics and modification of the intestinal tract microbiota of channel catfish *Ictalurus punctatus*. In Direct Fed Microbials/Prebiotics for Animals: Science and Mechanisms of Action, T.R. Callaway and S.C. Ricke (Eds.), Springer Science, New York, NY, pp. 163-188.

Perumalla, A.V.S., N.S. Hettiarachy, and S.C. Ricke. 2012. Current perspectives in poultry preharvest food safety. In Direct Fed Microbials/Prebiotics for Animals: Science and Mechanisms of Action, T.R. Callaway and S.C. Ricke (Eds.), Springer Science, New York, NY. pp. 89-120.

Nayak, R., C.A. O'Bryan, P.B. Kenney, P.G. Crandall, and S.C. Ricke. 2012. Pre-and post-harvest intervention strategies for controlling *Salmonella* contamination in broiler production. In *Salmonella: Classification, Genetics and Disease Outbreaks*, Adelaide S. Monte and Paulo Eduardo De Santos (Eds.), Nova Science Publishers, Inc., Hauppauge, NY. pp. 1-38.

Center for Food Safety

Winter 2012 Vol. 3, No. 1

Callaway, T.R., J.A. Carroll, J.D. Arthington, T.S. Edrington, R.C. Anderson, S.C. Ricke, P. Crandall, C. Collier, and D.J. Nisbet. 2011. Chapter 17. Citrus products and their use against bacteria: Potential health and cost benefits. In: Nutrients, Dietary Supplements, and Nutraceuticals: Cost analysis versus clinical benefits, eds. R. Watson, J.K. Gerald, and V.R. Preedy (Ed's). Humana Press, New York, NY. pp. 277-286.

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Neal Jr., J.A.* , Murphy, C.A., Crandall, P.G., O'Bryan, C.A., Keifer, E., Ricke, S.C. 2011. Development of an Evaluation Tool for Online Food Safety Training Programs. J Food Sci Ed 10: 9-12.

Hardin, A., Crandall, P.G., Stankus, T. 2011. The Zoonotic Tuberculosis Syndemic: A Literature Review & Analysis of the Scientific Journals Covering A Multidisciplinary Field That Includes Clinical Medicine, Animal Science, Wildlife Management, Bacterial Evolution & Food Safety WSTL: Science & Technology Libraries 30: 1, 20-57.

Over, K., Crandall, P.G., O'Bryan, C.A., Ricke, S.C.*. 2011. Current perspectives on *Mycobacterium avium* subsp. *paratuberculosis*, Johne's disease, and Crohn's disease: a Review. Crit Rev Microbiol 37: 141-156.

Lungu, B., O'Bryan C.A., Muthaiyan, A, Milillo, S.R., Johnson, M.G., Crandall, P.G., Ricke, S.C.*. 2011. *Listeria monocytogenes*: Antibiotic resistance in food production. Foodborne Path Dis 8: 569-578.

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Crandall, P.G., Friedly, E.C., Patton, M., O'Bryan, C.A., Gurubaramurugesan, A., Seideman, S., Ricke, S.C., Rainey, R. Consumer Awareness of and Concerns about Food Safety at Three Arkansas Farmers' Markets. Food Prot Trends 31: 156-165.

Li, M., Muthaiyan A., O'Bryan C.A., Gustafson, J.E., Li, Y., Crandall, P.G., Ricke, S.C.*. 2011. Natural antimicrobials for control of *Staphylococcus aureus*. Current Pharmaceutical Biotechnology 12: 1240-1254.

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Center for Food Safety

Winter 2012 Vol. 3, No. 1

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Pradhan A., Cooney, L., Mauromoustakos, A., Crandall, P.G., Slavik, M., Li, Y. 2011. A predictive model for the inactivation of *Listeria innocua* in cooked poultry products during postpackage pasteurization. J Food Prot 74: 1261-1267.

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Presentations

Ricke, S.C. "Salmonella as a Foodborne Pathogen" Dept. of Food Science, University of Arkansas, Fayetteville, AR, Oct. 3, 2011.

Ricke, S.C. "Salmonella and Antibiotic Resistance" Arkansas Poultry Processors Workshop, Holiday Inn, Springdale, AR, Oct. 5, 2011.