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Fall 2007

### Food Science & Technology Alumni News, Fall 2007

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## A message from the Department Head...

Fall 2007

Greetings from the Department of Food Science and Technology and The Food Processing Center! We have many exciting developments to report and several new faces to introduce here at Food Science. This is looking to be a very intriguing academic year.

We begin the 2007/2008 school year with promising signs. We have an increase in the number of students enrolled in graduate programs at Food Science and Technology: 46 as opposed to 34 last year. I am also happy to note that 5 promising baccalaureates from our department have chosen to continue on with us, and, in addition, one of our Masters graduates is pursuing her doctorate at UNL.

We are also happy to report that Food Technology for Animal Companions is now a major offered by UNL. This is a joint effort by the Department of Food Science and Technology and the Department of Animal Science. As much interest as this has stirred up in our faculty there is even more enthusiasm outside our walls. Several companies specializing in food for companion animals are offering their support for this new major. It appears this interest will soon develop into tours of their production facilities and generous scholarships for students choosing this new program.

At The Food Processing Center (FPC), we have a few new faces. Dr. Dave Rickert, formerly of ConAgra, has joined us as a Research Food Product Developer. Julie Reiling has also joined our staff and will be working with small to mid sized company projects. Erika Martinez, who is finishing her Masters Degree in Agricultural Economics from UNL, will be assisting The FPC on marketing and business projects. We are looking to expand even more. The FPC is accepting applications for the positions of Food Process Engineer and Dairy Operations/Research Manager.

We've had some other new additions to The FPC, which are less animated, but still nice to have around. This year, the FPC invested over \$700,000 in different units of equipment to optimize our performance and opportunities. Among these are a vibrating fluidized bed drier, a reverse-osmosis/ultra-filtration unit, a single-screw extruder, and several other enhancements to augment operations of our Pilot Plants. Additionally, dry grain fractionation equipment has been generously loaned to us from the USDA Agricultural

Research Service. Supplementary to the processing equipment, \$130,000 has been invested in new equipment for laboratory services.

We've created exciting new conditions for research in Food Science and Technology. We have established an operational food engineering laboratory led by Dr. Jeyamkondan Subbiah. Additionally, Dr. Jens Walter has been facilitating the G.I. Tract Laboratory. We have

also ordered a high hydrostatic pressure processing lab unit which will be dedicated to food functionality studies and microbiology studies. This unit will arrive and be put into operation by the end of the year.

The Dairy Store has kept up the exciting pace this summer. In addition to meeting the usually high demand for our ice cream on hot days, the Dairy Store is using the occasion of its 90th anniversary to expand in all directions. We have been hard at work to establish a new store in the City Campus Union to sell our ice cream there directly. We are also expanding catering and football game services as well as our ice-cream repertoire, which now includes a new flavor, Scarlet and Cream.

We continue working to place all of our students. Our students, as always, show us a tremendous record of achievement and have earned numerous scholarships. We have intensified recruitment effort for our department, which means we'll have even more good things to say in years to come.

I am proud to relate that Drs. Harshavardhan Thipareddi and Vicki Schlegel attained tenure status and were promoted to the rank of Associate Professor. Additionally, Dr. Andrew Benson is now a Full Professor with our department. Congratulations to all three!

In this dynamic atmosphere of progress, the efforts and achievements of our students, faculty, and staff keep us proud and hopeful.

Rolando A. Flores, Ph.D.  
Professor, Head, & Director



**Rolando A. Flores**

## Graduates

### Graduates of the B.S. Program

**Timothy William Anderson** (May 2007)

**Gregory Andrew Knudsen** (May 2007)

**Rebekah Jo Lowe** (May 2007)

**Morgan Jean McGowan** (May 2007)

**Ashley Lynn Mueller** (May 2007)

**Jessica Ruth Peterson** (May 2007)

**Emily Diane Sitorius** (May 2007)

**Ryan Joseph Talley** (May 2007)

**Thahn Tuyen Thi Le** (May 2007)

**Tim Anderson, Morgan McGowan, Emily Sitorious,** and **Ryan Talley** will continue in the Food Science Masters Program at UNL

### Graduates of the M.S. Program

**Poi-Wah Lee** (August 2007) – Thesis: Development of an ELISA for the detection of mustard seed residues in processed foods – Dr. Steve Taylor, Advisor. Lee will continue in the Food Science Doctoral Program

**Richard Zbasnik** (August 2007) – Thesis: Characterization of Dried Distillers Grains of Sorghum Lipids and their Antiproliferative Properties Against Caco-2 Cells – Dr. Vicki Schlegel, Advisor

## New Students

The Department of Food Science and Technology was honored to have 10 new graduate students join the graduate program Summer and Fall semesters of 2007. These students include:

### New M.S. Graduate Students

**Tim Anderson** (Advisor - Dr. Thippareddi)

**Ryan Legge** (Advisor - Dr. Benson)

**Ines Martinez** (Advisors - Dr. Flores/Dr. Stratton)

**Morgan McGowan** (Advisor - Dr. Hutkins)

**Phaik Lyn Oh** (Advisor - Dr. Walter)

**Rakhi Panda** (Advisor - Dr. Goodman)

**Jalal Salahi** (Advisor - Dr. Hanna)

**Atkansh Singh** (Advisor - Dr. Thippareddi)

**Emily Sitorious** (Advisor - Dr. Schlegel)

**Ryan Talley** (Advisors - Thippareddi/Wehling)

### New Ph.D. Graduate Students

**Poi-Wah Lee** (Advisor - Dr. Taylor)

## Graduate Follow-up

Ryan Talley completed his Bachelor's of Science with the Department of Food Science and Technology this May. He has chosen our department to continue with his Masters Degree.

Ryan gave the following appraisal to his undergraduate experience: "I feel the education provided to me through courses, laboratory work, and many other means opened doors for me to pursue my academic and professional goals in any way that I ever wanted. The classes were very comprehensive and provide pertinent information to make it in both the industry or further academia. In no way do I feel disadvantaged by the education I received from our department."

Why did Ryan choose to stay? He said. "The students, faculty, and staff have all been amazing in my years at UNL. I love that I can stop any professor in the hall or in their office and ask for help regarding any problem. Student



*Ryan Talley*

involvement in the Food Science Club has also come full circle. The club is doing very well and has a strong backing from all undergraduate classes, graduate students, PhD students, and faculty alike. Some of the fondest memories I have are of the Food Science Club activities and from this past summer's departmental softball team."

Indeed, there must be no place like Nebraska! Or, for sure, no other place like our Food Science and Technology department. "My advice to future students," Ryan added, "is to get involved around the department and around campus. Balancing class work with extracurricular activities is critical to both educational and personal development. The opportunities available to students from inside the department, our college, and the University as a whole are fantastic. The friendships made through involvement will last a lifetime." And last, but not least, "Also, going to class is a pretty good idea."

On his own career goals, Talley looked far to the future. "After my years as a Master's student are complete, I plan to find a job in product development, preferably here in the Midwest."

# Food Science Club

The Food Science Club (FSC) made the best of the 2006-2007. With a high percentage of students, faculty and staff active in club events, it is amazing how much can be accomplished. Here are updates on favorite long-time events and a few successful experiments from this year.

- **Ice Cream at the State Fair** - In addition to the red trailer ice cream booth serving Dairy Store Ice Cream, the FSC launched a new venture with the Nebraska Beekeepers Association. Club members took over the labor end of the NBA's ice cream booth (located in Ag Hall with their educational exhibit and judged entries) famous for its honey-sweetened ice cream. This proved to be a success, adding some revenue for the upcoming year.

- **Fall Break Food Industry Tour** - Fourteen students ventured east to St. Louis, Missouri via Denison, Iowa, to tour many food companies including Farmland Foods, Bissinger's Chocolates, Solae, Ralston Foods, the National Corn to Ethanol Research Center and Stone Hill Winery. These experiences help students see diverse career paths for food scientists and network in the field. If you are interested in hosting a Food Science Club industry Tour, please do not hesitate to contact the department as new sites are always being sought.

- **Industry Speakers** - This year, representatives from Wells' Dairy, Hormel and Danisco were featured

speakers at FSC meetings. Again, volunteers are always welcomed.

- **Red Card Green Card** - The FSC volunteered to perform compliance checks on behalf of the Nebraska Grocers Association with Red Card Green Card. For this program, of age students attempted to purchase alcohol at local retailers and evaluated the procedures followed by the sales clerk. This monthly program was a new addition to spring semester.



*Food Science Club at the Stone Hill Winery*

- **IFTSA Regional Meeting** - Again this year, the FSC sponsored a team for the IFTSA North Central Regional Meeting College Bowl Competition. This year's event was hosted by the University of Minnesota, and though Nebraska did not win, the team was competitive and eager for a shot at nationals next year.

- **Pre-seminar Reception** - The FSC hosted receptions prior

to each weekly seminar during the academic year with an average attendance of 65. This was a terrific opportunity for students to interact with the guest speakers, faculty, staff, and fellow students.

- **IFT Annual Meeting in Chicago** - This year the club worked hard to encourage members to attend the IFT meeting in Chicago. For members not receiving funding from another source, the club assisted with airfare and lodging expenses. Over 30 Nebraska Food Science and Technology students were able to participate in the event!

## FSC Roster

### Officers

*President*

*Vice President*

*Secretary*

*Treasurer*

*Undergraduate Liaison*

*Graduate Liaison*

*PR Chair*

*Ice Cream Managers*

*Junior Advisor*

*Senior Advisor*

### 2006-2007

Thanh Tuyen Le

Greg Knudsen

Melanie Downs

Richard Zbasnik , Rob Lacy

Ryan Talley

Andreia Bianchini, Richard Zbasnik

Tim Anderson

Steve Beckman, Tim Anderson , Richard Zbasnik, Rob Lacy

Dr. Jeyam Subbiah

Megan Patent-Nygren

### 2007-2008

Melanie Downs

Olivia Kunzman

Tessa Porter

Rob Lacy

Steven Kaiser

Kenzi Clark, Rachel Reuss

Daniela Bautista

Steve Beckman, Tim Anderson, Rob Lacy

Dr. Bob Hutkins

Dr. Jeyam Subbiah

# Student Achievements

## Sophomore Food Science Major Wins Candy Scholarship

In June, second year Food Science major Tessa Porter was awarded a \$5000 scholarship from the American Association of Candy Technologists.

The highly competitive AACT scholarship is awarded annually to one undergraduate in food science, biology, or chemistry at an American university. Candidates are expected to have a 3.0 GPA and a proven talent and dedication to confectionery technology.

After Porter discovered this scholarship through her own research and submitted



Tessa Porter

Porter has been honing her skills through internships with both The Food

her application well ahead of deadline, she was shortly made a finalist. At that stage, Tessa was required to make a DVD to showcase her talents. She chose to base it on some of her bakery projects and sugar experiments.

Processing Center and Beatrice Bakery, a client of The FPC. Tessa is actually that Bakery's first intern. A cake formula that she submitted was placed into production by Beatrice Bakery, and she was on hand when the first 1500 cakes were produced by the company's facilities.

Porter is originally from Albion, Nebraska, a town of under 2000. She says that she found her interest is confections there. Her grandmother owned a café and Tessa enjoyed making desserts with her.

### UNL AWARDS

#### 2007 Graduate Student Poster

##### Competition - UNL Research

##### Fair

Chiew Hui Kaw

#### Claybaugh Graduate Student

##### Fellowship

Joseph Baumert

Viviana Bermudez Lopez

Bhima Geera

#### Cooper/Sharpless Fellowship

Kenzi Clark

#### Frank E. Mussehl and Inez L.

##### Mussehl Scholarship

Pradeep Krisnan

#### Larrick Student Travel Fund

David Monsalve

Audrey Wesseling

#### Milton E. Mohr Scholarship

##### Program

Andrew Lim

#### Wideman Trust Distinguished

##### Graduate Assistant Award

Joseph Baumert

Viviana Bermudez Lopez

### DEPARTMENTAL

#### Cornish Fund Scholarship

Susan Hammons

Laura Hargarten

Crystal Pribyl

### Henningsen Graduate Student

#### Fellowship

Pradeep Krishnan

#### Oak B. Smith Scholarship

Emily Ang Pei Tze

Elizabeth Baier

Daniela Bautista

Kristen Cochran

Jamie Eggerss

Lauren Gemar

Bailey Harris

Cody Hartman

Nuttawut Jiewchaloemmit

Nicole Johnson

Olivia Kuzerman

Robert Lacy

Andrew Lim

Pei Wen Lim

Wee Chin Low

Tessa Porter

Crystal Pribyl

David Splonskowski

Rachelle Struebing

Amanda Walls

### NATIONAL AND LOCAL

#### American Association of Candy

##### Technologists

Tessa Porter

#### National Dairy Promotion and

##### Research

Jeffrey Schroeder

#### Nebraska City Science Fair

Cody Hartman

### INTERNATIONAL FOOD

#### TECHNOLOGISTS

##### Scholarships

Melanie Downs

Lauren Gemar

Susan Hammons

Andrew Lim

Tessa Porter

##### IFT Alternates

Joe Baumert

Bailey Harris

Jeffrey Schroeder

#### Will Forbes Travel Award

Matt Dickey

Bhima Geera

Tammy Gries

Manjusha Kasakunhundi

Audrey Wesseling

Richard Zbasnik

### UCARE (AND SPONSORS)

Pei Tze Ang - Randy Wehling

Daniela Bautista - Robert Hutkins

Kristen Cochran - Richard Goodman

Mathew Crotty - Stephen Taylor

Jamie Eggerss - David Jackson

Bailey Harris - Andrew Benson

Olivia Kunzman - Rolando Flores

Robert Lacy - Susan Cuppett

Shy Shi Lee - Vicki Schlegel

Andrew Lim - Durward Smith

Sheu Lih Lim - Lloyd Bullerman

Tessa Porter - Michael Zeece

Grant Wallace - Jens Walter



## Faculty/Staff

### New Faces

**Kristina Goings** started in the FARRP Laboratory on August 6, 2007 as a Research Technologist. Kristina came to FARRP from UNL's Plant Pathology department

**Jana Hafer** began with Food Science in July 2006 as The FPC Events Coordinator. In March, Jana was promoted to the position of Research Outreach Specialist.

**Roberto Jimenez** has joined the FST's computer support staff. Roberto is an MS student in statistics and plans to proceed to his Ph.D. next Spring.

**Erika Martinez** began with The Food Processing Center in late July. She is currently finishing her Masters Degree in Agricultural Economics from UNL.

**Julie Reiling** began as a Food Product Developer with The FPC on July 23. She assists with nutritional labeling, shelf life projects, and is working on industry product development projects.

**Dr. Dave Rickert** joined The FPC on June 18 as a Research Food Product Developer. He previously worked with ConAgra Foods. Dave appreciates that The FPC gives him "unique exposure to variety of clients and research projects."

**Matthew Standley** began on July 2 in the main office of Food Science and Technology. He received a Bachelors Degree in English from UNL in 2003.

### Departures

**Daisy Brayton** took a position with the Department of Veterinary and Biomedical Sciences. She had previously worked in the Food Science administrative office.

**Shaowei Liu** resigned from his position as Food Processing Engineer in early July. He returned home to China.

**Nirav Pandya** accepted a position as a Research Product Developer with Nestle's research and development department in Bakersfield, California. Nirav has worked as Dairy Plant Manager for three years.

### Visiting Faculty

**Lutfiye Yilmaz** is a research scholar from Uludag University in Bursa, Turkey. Yilmaz is currently in Dr. Hutkins laboratory. She is here with her husband Gokhan Ersan, an industrial engineer, for one year. Her area of specialty is Dairy and Dairy Products.

**Soo-Hyun Chung** is a professor in the Department of Food and Nutrition at Korea University in Seoul, Korea. His specialty is the detection of mycotoxins by HPLC. He is using our facilities to develop quantification methods for mycotoxins in dried distillers grains produced by the ethanol industry. Dr. Chung is currently working with Drs. Stratton and Bullerman.

## Alumni Updates

### Let us Know how you're doing!

We are continually updating our alumni database. Please help us by sending your current contact information to insure you receive future Alumni Newsletters and other exciting Food Science and Technology Alumni News. Tell us about your career changes, progress, or any news. Please send your information to the address listed at right, or visit our website.

<http://foodsci.unl.edu/alumni/contact.shtml>

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## Hyperspectral Imaging to Predict Beef Tenderness



**Jeyamkondan Subbiah,  
Ph.D.  
Assistant Professor  
UNL Department of  
Food Science and  
Technology**

Beef tenderness is an important quality attribute for consumer satisfaction. Currently, the USDA grading system does not incorporate a direct measure of tenderness, because there is no accurate, rapid, nondestructive method for predicting tenderness available to the beef industry. Several studies have shown that most consumers can discern tenderness and a considerable portion of those consumers are willing to pay a premium anywhere from \$1.10 to \$2.72/kg for steaks that are "guaranteed tender."

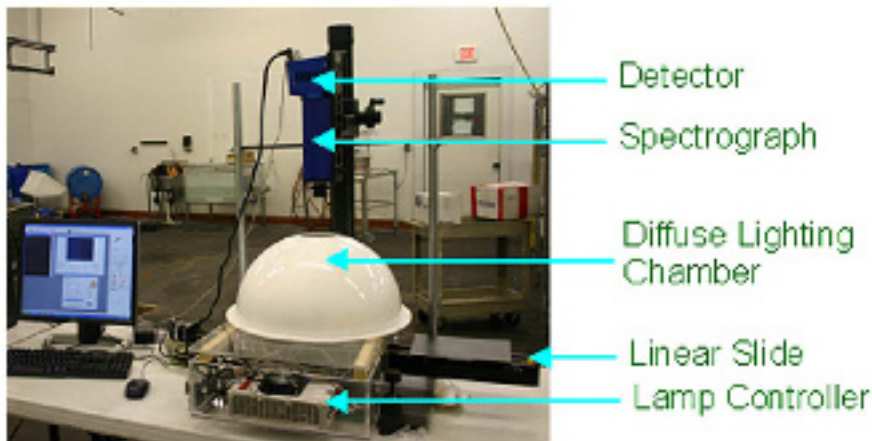
Tenderness is related to two major components: muscle structure (myofibers and connective tissues) and biochemical activity (proteolysis). Several researchers have developed methods such as tenderness probes and video image analysis (VIA) to extract muscle structure information. They have achieved only limited success in predicting tenderness because biochemical information such as protein degradation related to aging was not considered. Similarly researchers have used near-infrared (NIR) spectroscopy to extract biochemical information. As expected, they also have achieved only limited success, because muscle structural information was ignored. We have developed a hyperspectral imaging technique, which is a combination of VIA and NIR spectroscopy, to predict

beef tenderness.

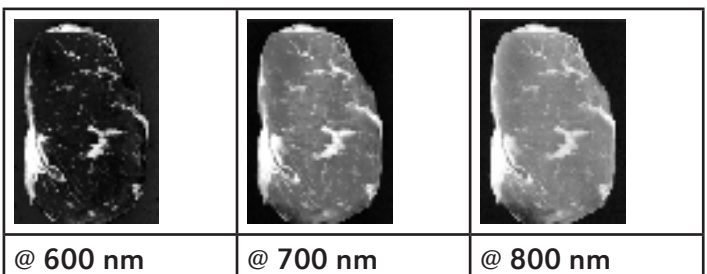
Hyperspectral imaging is a cutting-edge technology and has a great potential in the food quality, safety, and biomedical applications. It combines two technologies, computer vision and near-infrared spectroscopy. Near-infrared spectroscopy works by measuring the relative intensity of light reflectance from an object. In contrast, hyperspectral imaging provides much more detail by providing the same information on each and every pixel. Thus, a spectrum can be obtained from each and every pixel of a hyperspectral image.

Hyperspectral imaging can also be considered as an extension of RGB (red-green-blue) camera, which gives only three broader spectral bands, with hundreds of narrow spectral bands. Thus, for each narrow spectral wavelength band, a gray scale image can be obtained. Figure 2 shows the gray scale images of three selected bands

of a 300 band hyperspectral image. This technique will collect both textural (muscle structure) and spectral (biochemical activity) information simultaneously. So the likelihood of success is much greater with



**Figure 1. Near-infrared hyperspectral imaging system.**



**Figure 2. Images of beef steak at different wavelengths**

(Continued on next page)

hyperspectral imaging than VIA and NIR.

A visible/near-infrared (VNIR) hyperspectral imaging system (wavelength 400 - 1000 nm) was developed to predict current status of tenderness. Hyperspectral images of fresh ribeye steaks at 14-day postmortem were acquired and analyzed to predict 14-day aged, cooked beef tenderness. Principal component analysis (PCA) was conducted to reduce dimension along the spectral axis. Gray-level co-occurrence matrix analysis was conducted on PCA images to extract textural features. A canonical discriminant model was developed to classify carcasses into three tenderness categories based on textural features. With a leave-one-out cross validation procedure, the model predicted three tenderness categories with an accuracy of 96.4%. All the tough samples were correctly identified.

A NIR hyperspectral imaging system (wavelength 900 - 1700 nm) was tested for its ability to forecast 14-day aged, cooked beef tenderness from the hyperspectral images of fresh ribeye steaks acquired at 3 to 5 day postmortem. The NIR hyperspectral imaging system consists of an NIR camera and a spectrograph (Figure 1). The system scans a line of a target object, and the spectrograph disperses light from each line image pixel to spectrum. Thus, each spectral image contains line

pixels in one axis and spectral pixels in the other axis. To obtain the 3-D hyperspectral data cube, the object has to be scanned. A linear slide was used to move the sample using a stepper motor, which is controlled by the computer via serial port so that camera scanning and slide motion can be synchronized. The scanning rate is selected to achieve a square pixel. The model forecasted three tenderness categories (tender, medium, and tough) with an accuracy of 79%. The beef industry is interested in identifying the tough carcasses, so that it can guarantee tenderness on remaining carcasses. For classifying carcasses into 2 categories (tender and tough), the accuracy was 96%.

### **Jeyamkondan Subbiah, Ph.D.**

**Dr. Subbiah began his studies at Tamil Nadu Agricultural University in India where he received his B.S. in Agricultural Engineering. He continued his education at the University of Manitoba in Winnipeg, Canada, receiving a Masters Degree in Biosystems Engineering. He received his doctorate in that field from Oklahoma State University.**

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## **Food Technology for Companion Animals New Major From Food Science and Animal Science**

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At their May 17, 2007 meeting, the Nebraska Coordinating Commission for Post-Secondary Education unanimously approved the new Food Technology for Companion Animals (FTCA) undergraduate major. This was the final step in the approval process of the new major which is a joint program between the Department of Food Science & Technology and the Department of Animal Science in the UNL College of Agricultural Sciences and Natural Resources. The major is available for student enrollment in the Fall 2007 semester.

Today, a majority of US households have at least one companion animal. In 2004, there were 60 million dogs and 75 million cats in USA households. These animals are more than just creatures sharing our homes; they

are members of the family. Companion animal food processing in the USA is a major industry, with annual sales reaching \$13.97 billion in 2003. By 2008, the market is expected to grow to \$16.70 billion/year. In the state of Nebraska alone, there are at least six facilities that produce foods for cats, dogs, and other companion animals. These facilities provide employment for over 500 Nebraskans, and serve as an essential outlet for agricultural commodities and by-products from Nebraska's meat and grain processing industries. Many of the processes and products of the companion animal food industry more closely resemble human foods and processes than they do traditional livestock feed manufacturing. Graduates from food science

(Continued on page 8)



# ***Food Technology for Animal Companions***

(Continued from page 7)

programs frequently find employment in the companion animal food industry, but then need to learn important aspects of animal nutrition and management, as well as ration formulation. Graduates of animal science programs have backgrounds in feed formulation and production, but little experience with the processes or safety issues involved in the manufacturing of canned, semi-moist and specialty pet products. Prior to creation of our new FTCA major, there were no undergraduate academic programs in the United States that focused exclusively on companion animal food processing. Consequently, there is a definite need for this new major that is specifically designed to prepare students for positions of responsibility in the companion animal food industry. Our goal is to have fifty students enrolled in the major within five years; this will be a sustainable number of students that will meet the industry needs.

Graduates of the FTCA program will be prepared for positions of responsibility in research, process technology and plant operations, product development, marketing, and quality control/quality assurance in the pet food industry. In preparation for these positions, students will first establish a strong background in the basic sciences, followed by extensive coursework in the areas of food chemistry, food microbiology and safety, food processing and engineering. Students in the FTCA major will take many of the same courses as our Food Science students, and the technical rigor of the two programs will be equivalent. In addition, students in the FTCA major will take coursework in companion animal management and nutrition through the Department of Animal Science. Students may choose to be advised through either the Department of Food Science & Technology or the Department of Animal Science. The major will be appropriate for both rural and urban students with strong science backgrounds, and may also appeal to pre-veterinary and other pre-

professional students, who desire an undergraduate major that will both lead to a degree and provide alternative career opportunities.

As we implement this new major, the University of Nebraska-Lincoln will also be establishing partnerships with the companion animal food manufacturing industry in the state of Nebraska and nationwide, in several ways. On November 8, we are scheduling a one-day symposium addressing areas of technical interest for representatives of the companion animal food industry. The symposium will be held on the UNL East Campus. We are also expanding our pilot plant capabilities to allow us to better work with various companion animal foods and products. Representatives of Nebraska-based companion animal product manufacturers will be serving as guest speakers in our courses, and

hosting field trips for our students. We will also be arranging a more extensive multi-day industry tour of manufacturing and research facilities during spring break or the summer pre-session. Another cooperative effort with the companion animal food industry will be an internship program that will give students formalized summer work experiences, and may serve as an avenue to future employment following graduation. Short-term job shadowing experiences for interested high-school students and university students are also being arranged with local companies. Finally, we are working with companion animal food manufacturers to develop scholarships for students enrolling in the new major.

If you would like to receive additional information about the Food Technology for Companion Animals major, you may do so by contacting either Dr. Randy Wehling (rwehling1@unl.edu; 402-472-2857) or Ms. Megan Patent-Nygren (mpatentnygren2@unl.edu; 402-472-5783). Additional information about the upcoming symposium can be obtained from Ms. Jana Hafer (jhafer2@unl.edu; 402-472-2817). This is an exciting new venture for us at UNL as we seek to better serve all facets of the food industry!



## YES! I want to support the Food Science and Technology Development Fund

Private support is essential to recruiting outstanding undergraduate and graduate students, providing timely and applicable research, and expanding our outreach to small businesses and entrepreneurs across the state. As alumni and friends of the Department of Food Science and Technology, we hope you will consider making a gift to assist us in these efforts. Please complete the contribution form to the right and accept our appreciation for your generosity.

### FOOD SCIENCE & TECHNOLOGY DEVELOPMENT FUND #4312

This fund provides general support to the department and is specifically used to enhance undergraduate student recruitment efforts.

☐ Enclosed is my check for ☐ \$250 ☐ \$175 ☐ \$100 ☐ \$ Other\_\_\_\_\_

Make payable to University of Nebraska Foundation

☐ Charge my ☐ Visa ☐ Mastercard ☐ Discover ☐ American Express

Credit Card Number\_\_\_\_\_ Expiration Date\_\_\_\_\_

Signature\_\_\_\_\_ Date\_\_\_\_\_

If you have questions regarding other giving opportunities, please contact Rolando Flores, Head, Department of Food Science & Technology, (402) 472-2831 or Ann Bruntz, Director of Development at the University of Nebraska Foundation, (402) 458-1176 or email [abruntz@unfoundation.org](mailto:abruntz@unfoundation.org)

Name\_\_\_\_\_ Phone number\_\_\_\_\_

City/State/Zip\_\_\_\_\_

E-mail\_\_\_\_\_

University of Nebraska Affiliation

☐ Alumnus ☐ Current Student ☐ Parent of a Student ☐ Friend

If Alumnus, please indicate campus(es): ☐ UNL ☐ UNO ☐ UNK ☐ UNMC

Class Year(s)\_\_\_\_\_ Degree(s)\_\_\_\_\_

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LFST06

## Research Grants

**ARD Advisory Council:** Vicki Schlegel, "Isolation and Characterization of Novel Cellulose Digesting Enzymes" \$20,000

**Dionex:** Vicki Schlegel, "Dionex Research/Technology Grants for Academic Research Program" \$72,000

**INTSORMIL:** David Jackson, "Building a Sustainable Infrastructure for Product Development and Food Entrepreneur/Industry Technical Support: A Strategy to Promote Increased Use of Sorghum and Millet in East Africa" \$348,500 (4 years)

**Nebraska Beef Council:** Harshavardhan Thippareddi, "Minimizing the Risk of Listeria Monocytogenes on Ready-to-Eat Meat Products by Combination 'Lethality-Bacteriostic' Approach" \$48,120 (1 year)

**Nebraska Beef Council:** Michael Zeece, "Enhancing Healthiness and Nutritional Quality of Beef by High Pressure Treatment: An Investigation of Bioactive Peptides" \$56,871 (1 year)

**Nebraska Beef Council:** Michael Zeece, "Use of High Pressure-Treatment to Develop Value-Added Beef Entries" \$52,021 (1 year)

**Nebraska Grain Sorghum Board:** Jens Walter, "Investigation of Potential 'Prebiotic' Properties of Grain Sorghum Lipid Extract" \$2500 (1 year)

**UNL Layman Fund:** Vicki Schlegel, "Development of Fourier Transform Mid-Infrared Spectroscopy as a Metabolic Method for Characterizing Natural Antioxidants" \$9000 (10 months)

**UNL Layman Fund:** Jens Walter. "The Genetic Basis of Host-Bacterial Symbiosis in the Gut" \$10,000 (1 year)

**UNL - Mussehl Poultry Research Endowment:** Jens Walter, "Identification of Novel Enzymes for the Supplementation of Poultry Feed Using a Metagenomic Approach" \$25,000 (1 year)

# Dairy Store

## 2007: The 90th Anniversary of the Dairy Store

On April 20th, the UNL Dairy Store held a grand re-opening to celebrate its 90th anniversary. The staff provided anniversary cake as well as free ice cream to the first 250 visitors. This occasion also celebrated the release of a new flavor of ice cream: Scarlet and Cream.

Scarlet and Cream ice cream is a tasty mix of vanilla and strawberry preserves. Also available for a limited time is a special Husker Sundae: Scarlet and Cream ice cream with toppings of strawberry cream, whipped cream, peanuts, and a cherry, all served in a complimentary Dairy Store mug.

This year the Dairy Store is expanding ice cream sales at home football games. The Dairy Store staff are establishing a new site outside the stadium from where they will be selling their 10 oz ice cream cups. Another new service is selling the cups directly in the stands.

The opening of a new store in City Union was timed to the first week of classes. This location is the final product of months of concerted effort. With this new venture, the Dairy Store more than doubled its number of student workers and is preparing for an increase in production of ice cream. The new Dairy



*Lil Green at the Dairy Store's 90th Anniversary with Courteney Wilson, Dairy Store Manager (left).*

Store will offer traditional ice cream and gift gourmet cheese boxes.

In addition to its cheeses, for a limited time only, the Dairy Store sells Nebraska product gift boxes that include sausage, honey, and cheese. Dairy Store t-shirts, polo shirts, and baseball caps are now available. Another exciting innovation is the ½ gallon carton of ice cream; this size will be available this fall.

**Visit us at:**

**<http://dairystore.unl.edu>**

### **Products Available at the Dairy Store**

- |             |              |                        |
|-------------|--------------|------------------------|
| • Ice Cream | • Quail Eggs | • Daily Lunch specials |
| • Milk      | • Sandwiches | • Fruit                |
| • Cheese    | • Salads     | • Muffins              |
| • Sausage   | • Soups      | • Candy                |
| • Eggs      | • Beverages  | • And MUCH MORE!       |



### IICA Visits UNL

On August 2nd and 3rd, Department of Food Science and Technology and The Food Processing Center hosted representatives from the Inter-American Institute for Cooperation on Agriculture (IICA). IICA is headquartered in San José, Costa Rica and is dedicated to guiding its member states towards agricultural development, rural prosperity, and a sustainable future.

The IICA representatives who joined us were Dr. James Butler, former undersecretary of the United States Department of Agriculture and currently the Deputy Director of IICA (the second highest ranking position in IICA); Dr. James French, the Director of Technical Leadership and Knowledge Management for IICA; and Dr. Ricardo Mollins, the Director of Technical Leadership and Knowledge Management for IICA. Several Food Science faculty members presented on their areas of research for these representatives. These included Drs. Benson, Cuppett, Goodman, Jones, Hutkins, Schlegel, and Subbiah. Also in attendance were Vice Chancellors Paul and Owens as well as several other representatives of UNL.

Dr. Owens related from Dr. Butler "that the visit to UNL was the best organized university trip he and his colleagues from IICA had experienced and he went on to say he was highly impressed with the capabilities, professionalism, and enthusiasm of our faculty and staff."

The original intention of the visit was to make IICA aware of the programs, research, and capabilities of the Food Science Department and the FPC. The visit went much better than expected. A memorandum of understanding was signed between the two organizations. IICA and UNL will be able to work in partnership on several selective programs. In fact, before the representatives left, a project had already been initiated.

The visit was a great success and should have a positive influence on the department. Shortly before the trip, Dr. Butler had received word from the United Nations Food and Agriculture Organization (FAO) announcing his appointment as Deputy Director General of the organization. In this role, Dr. Butler will be responsible for the day to day operation of FAO. We offer our best wishes to Dr. Butler in his new position.



*Dr. French and Dr. Butler experience Dairy Store ice cream while on a break from meetings*

### Fortenberry Holds Educational Conference on Local Foods

In early August, Congressman Jeff Fortenberry sponsored an educational conference on local foods systems in conjunction with the University of Nebraska-Lincoln. The event focused on the benefits of locally grown foods to producers, consumers, and economies.

Fortenberry, a member of the House Agriculture Committee, spoke about efforts in federal farm policy to develop local foods markets, such as farmers' markets, and school lunch programs. Presentations featured Nebraskans' work to market local foods in Nebraska communities, an update on University of Nebraska efforts to promote local foods and assist Nebraska food entrepreneurs, and information from public policy experts about governmental assistance for value-added and specialty market ag projects.

Director Flores presented on the function and efficacy of The Food Processing Center. Flores emphasized two programs with particular relevance to the subject at hand. The Nebraska Food Cooperative is a coalition of local farmers and consumers seeking an equitable relationship. It is a marketing and distribution service designed to improve market access for Nebraska goods. The Nebraska Sustainable Food Project has been providing fresh, local foods for UNL Dining Halls. In addition, The FPC has coordinated a USDA funded trip to examine a local foods program operating at Yale and facilitating a relationship with the Nebraska Food Cooperative.



# The Food Processing Center

## Laboratory Services

Laboratory Services performs a wide variety of services for a diverse clientele, including large and small food companies, retail stores, and entrepreneurs. These services include testing for foodborne pathogens, general microbiological screening, shelf-life studies, and mycotoxin detection. Our lab prides itself on consistently reliable results and rapid turn-around time. The Laboratory participates in a proficiency testing program and follows FDA, USDA, or AOAC procedures for all analyses. Our professionals provide personalized service and will interpret results as needed.

In addition to its highly qualified personnel, the Laboratory utilizes the latest technology to continuously expand its capabilities. Our goal is to provide service to all levels of the food industry. Some of our newer acquisitions include:

**Qualicon BAX®:** The BAX® is used for the automated PCR detection of major foodborne pathogens: Salmonella, E. coli O157:H7, and Listeria. The principle behind the method involves the genetic detection of specific DNA sequences unique to each organism. Highly accurate, the BAX® is faster than traditional cultures methods. BAX® methods are USDA-approved.

**Roche Lightcycler®:** The Roche Lightcycler 2.0 performs rapid Polymerase Chain Reaction (PCR) with real-time detection and quantification of target nucleic acids; in addition it can perform melting curve analysis of the amplified nucleic acids. Detection of foodborne pathogens on the Lightcycler® can be completed within an hour of loading samples into the instrument, thus greatly reducing the waiting time for results. Gene expression analysis, mutation analysis, and microarray verification experiments can also be run on this machine.



*Dr. Jayne Stratton with the new spiral plater*

**Dionex UltiMate 3000 HPLC:** High-performance liquid chromatography (HPLC) is a form of column chromatography used in analytical chemistry, biochemistry, and toxicology applications. An HPLC is used to separate components of a mixture by using a variety of chemical interactions between the substance being analyzed and the chromatography column. Various mycotoxins (aflatoxins, fumonisins, ochratoxin, etc) are quantified using HPLC methods.

**Eddy Jet Spiral Plater and Automatic Counter:** The Spiral Plater is a microprocessor controlled automatic dispenser that allows for rapid bacterial counting while avoiding intermediate dilutions. The automatic counter “reads” plates instantly and provides accurate counts in a fraction of the time traditional hand-counting would take. Large projects can be conducted by fewer personnel while maintaining a high degree of accuracy.

In addition to our excellent facilities and friendly, service-oriented atmosphere, we are able to support a number of cutting-edge research and training opportunities for undergraduate and graduate-level students as well as visiting scientists.

## Visiting Scientist

Dr. Soo-Hyun Chung comes to us from Korea University in Seoul, Korea, where he is a Professor in the Dept. of Food and Nutrition in the College of Health Sciences. His expertise is in the detection of mycotoxins by HPLC. He is using our facility to work on quantification methods for mycotoxins in dried distillers grains produced by the ethanol industry.

## Graduate Students

Rachel Reuss, a graduate student from Grand Island, NE, is working on a Masters Degree in Food Science & Technology under the supervision of Dr. Durwood Smith. Her thesis work involves the optimization of apple wine fermentation and the study of different antimicrobials that inhibit pathogens in apple cider.

Inez Martinez is a graduate student from Montevideo, Uruguay, working on a Masters Degree in Food Science & Technology. Her undergraduate work was in food engineering at the Universidad de la República in Montevideo. In a unique new program being offered for the first time at The Food Processing Center, she will intern in the service laboratory, the pilot plants, and product development areas before choosing a topic for her thesis work.

Using both newer and traditional methods, The Food Processing Center Laboratory provides flexible, customer-oriented services. In addition, the Laboratory has access to faculty expertise when faced with difficult questions that often arise in the food industry.

# Meet the Faculty

As a courtesy of the Department of Food Science and Technology, we would like to give you a brief introduction to our current faculty. For those that haven't been to campus in some time, this should be a helpful guide to who currently leads the progress and education in our department.

## **Rolando A. Flores**

*Professor and Head, Department of Food Science and Technology and Director, The Food Processing Center*

Research is focused on the investigation of dry fractionation methods to develop food value-added ingredients from corn to ethanol process and other grains; procedure risk analysis and modeling of food processes and unit operations used in the processing of food, grain and grain products.



## **Andrew Benson**

*Professor*

Dr. Benson's research interests center on the use of comparative genomics, phylogenetics, and molecular genetic analysis to identify important events in the genome of foodborne pathogenic bacteria.



## **Lloyd Bullerman**

*Professor*

Dr. Bullerman's primary research interests include food safety, food microbiology, food toxicology, food mycology, mycotoxins, and the effects of processing on survival of molds and stability of mycotoxins in foods.



## **Susan Cuppett**

*Professor*

Dr. Cuppett's primary research interests focus on the in vitro and in vivo activity of natural antioxidants. Her program has been involved with evaluating alternate methods for measuring lipid oxidation in oil systems; testing antioxidant activity in food systems and evaluating new sources of lipids, including waxes.



## **Glenn Froning**

*Professor Emeritus*

Dr. Froning's past research emphasis included mechanical deboning of poultry meat; emulsification properties of poultry meat and eggs; chemistry of poultry heme pigments and color stability of poultry meat; surimi-like processing of poultry meat; supercritical fluid extraction of lipid components and cholesterol from eggs, beef and poultry meat; improved functionality of egg proteins; and ultrafiltration of egg white.



## **Richard Goodman**

*Research Professor*

Dr. Goodman's research focuses on refining methods and evaluation criteria for evaluating the potential allergenicity of proteins in new genetically engineered crops and novel food products.



## **Milford Hanna**

*Professor*

Dr. Hanna's research programs emphasize development of starch-based polymers for use in foam and other applications, use of vegetable oils and animal fats as diesel fuels, use of vegetable oils as lubricants, use of starch and protein in mulch films, production and use of levulinic acid, neural network and fuzzy logic modeling of the extrusion cooking process and contract research.



## Meet the Faculty



**Robert Hutkins**

*Professor*

Dr. Hutkins's research is focused on the role of probiotics and prebiotics on human and animal health. Specifically, his lab uses molecular and genomic approaches to study how lactic acid and probiotic bacteria metabolize prebiotic carbohydrates and how these agents affect gastrointestinal health.



**David Jackson**

*Professor*

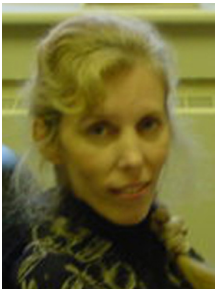
Research interests include determining functional/structural relationships in starch and other biopolymers, developing methods to improve starch analysis, characterization of corn/sorghum hybrids and their end-use functionality, improving corn processing technologies [dry-grind ethanol, wet milling (starch & ethanol), dry milling & alkaline / nixtamalization], and tortilla/chip process chemistry (wheat and maize tortillas).



**John Rupnow**

*Professor*

Dr. Rupnow's current research interests are in food safety microbiology, and he is conducting collaborative research projects in predictive microbiology with Dr. Thippareddi and lactic acid bacteria with Dr. Hutkins.



**Vicki Schlegel**

*Associate Professor*

Dr. Schlegel's long-term research objective is to characterize natural bioactive agents and their interactions with various types of food matrices through the integration of metabolomic and physiochemical approaches. This information will then be used to develop efficacious and safe functional foods and nutraceuticals (supplements).



**Durward Smith**

*Associate Professor*

Dr. Smith's research interests include improving the process efficiencies of smaller-scale food process systems and determining the effects of new process technologies on food quality and food safety.



**Jeyamkondan Subbiah**

*Assistant Professor*

Dr. Subbiah's research is in the area of improving food quality and safety. Agriculture continues to be Nebraska's dominant industry, contributing more than \$14 billion to the state's economy annually and accounting for 31% of all employment in the state. Improving food quality and safety is essential to enhance competitiveness of our agricultural and food industry in the global market. This newsletter highlights one of his research interests on page 6.



## Meet the Faculty



**Steve L. Taylor**

*Professor*

Research interests involve food allergies and allergy-like diseases, the development of immunochemical methods for the detection of allergens, proteins, and toxins; the assessment of the allergenicity of food ingredients derived from commonly allergenic foods; the determination of minimal eliciting doses for allergenic foods; and the effect of food processing on food allergens.



**Harshavardhan Thippareddi**

*Associate Professor*

Dr. Thippareddi's research areas are the development and validation of intervention technologies for the food industry to control foodborne pathogens; non-thermal process development and validation to improve safety of food products, development and evaluation of rapid detection and identification methods for foodborne pathogens; predictive microbiology, and development and evaluation of food safety systems.



**Jens Walter**

*Assistant Professor*

Dr. Walter's areas of interest involve the identification and investigation of genetic and phenotypic traits of lactobacilli essential for colonization of the gastrointestinal tract, cultivation independent genomic approaches for functional studies of the gut microbiota (metagenomics), and the characterization of dynamics within bacterial populations inhabiting the intestine using molecular methods.



**Randy L. Wehling**

*Professor*

Research interests are the chemistry and analysis of cereal grains and other foods, including evaluation of the effects of processing technologies on the composition and chemistry of foods. Also, he is interested in the development of rapid analytical methods for measuring food quality, and for predicting the end use characteristics of grains and other commodities.



**Curtis L. Weller**

*Professor*

Dr. Weller's research responsibilities are in the broad area of food and bioproducts engineering with particular attention on value-added processing of agricultural commodities and physical properties determination.



**Michael Zeece**

*Professor*

Dr. Zeece's research interest is focused on the development of proteomic applications for both conventional and emerging technologies (microarrays). Microarrays have been developed for the quantitative profiling proteins of interest in animal and plant materials. He has also initiated new research activity on the use of high hydrostatic pressure treatment, a novel processing technology that has been shown to induce desirable changes in food systems.



# ***Conferences and Workshops***

## ***Don't miss out!***

### **Food Entrepreneur Program Workshops**

**October 9, 2007 – Jamestown, ND**

**October 15, 2007 - Eustis, Nebraska**

**October 29, 2007 – Lincoln, NE**

**November 7, 2007 - Omaha, NE (presented in Spanish)**

### **Better Process Control School**

**October 2-5, 2007 – Lincoln, NE**

### **16th Annual Applied Extrusion Workshop**

**October 16-18, 2007 – Lincoln, NE**

### **Agriculture & Food Vulnerability Assessment Training Course**

**October 23-25, 2007, Lincoln, NE**

### **Food Technology for Companion Animals Symposium**

**November 8, 2007 - Lincoln, NE**

**Please watch for more workshops to come. The Food Processing Center continues to add workshops and short courses that will fill needs of our many industry partners as well as the workforce not only in Nebraska, but also across the world!**



DEPARTMENT OF FOOD SCIENCE  
AND TECHNOLOGY

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