Research Programs

DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY

IMPACTING THE WORLD THREE TIMES A DAY

DIETARY BIOACTIVE AGENTS & FUNCTIONAL FOODS	RESEARCH ACTIVITIES
DR. DEVIN ROSE *foodsci.unl.edu/drose*	Evaluation of quality and chemical composition of whole grains. Impact of whole grain and dietary fiber containing foods on diet related disease prevention. Determine how differences in chemical and physical properties of whole grains influence end-use quality.
DR. VICKI SCHLEGEL *foodsci.unl.edu/schlegel*	Characterize natural bioactive agents and synergistic interactions within their natural matrix and other delivery matrices to promote a healthy cellular phenotype, (e.g., be it a non-virulent to virulent state in pathogens, or inflammatory state or anti-inflammatory state in macrophages.) This information is used to add value to an existing product or develop new functional foods.
DR. CURTIS WELLER *foodsci.unl.edu/weller*	Bioproducts engineering including the processing of agricultural commodities and physical properties determination. Concentration of research effort has been on refining of grain sorghum to recover high-value lipids. Enhancing food safety through control of foodborne disease agents.
DR. MICHAEL ZEECE *foodsci.unl.edu/zeece*	Development of conventional and emerging proteomic technologies such as protein and peptide microarrays. Research has been conducted on the use of high hydrostatic pressure treatment of food systems and proteins to enhance digestibility and increase the yield of bioactive peptides.
DR. JEYAM SUBBIAH *foodsci.unl.edu/subbiah*	Hyperspectral imaging and near-infrared spectroscopy systems for food safety applications. Non-thermal preservation technologies such as pulsed electric field pasteurization. Dr. Subbiah is also working on predictive microbiology and risk assessment models.
DR. OZAN CIFTCI *foodsci.unl.edu/ciftci*	The Ciftci lab investigates particle formation using supercritical fluid technology to produce novel “natural” lipid-based micro and nanoparticles as controlled delivery systems of bioactives and functional food ingredients. Enzymatic production of structured lipids in supercritical fluids and the evaluation of functional properties and product applications of the developed products.

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FOOD PROCESSING AND TRANSFORMATION	RESEARCH ACTIVITIES
DR. ROLANDO FLORES *foodsci.unl.edu/rflores*	Fractionation and grain processing modeling operations. New uses for grains and agricultural products and by-products. Utilization, optimization and development of foods.
DR. DAVID JACKSON *foodsci.unl.edu/djackson*	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]. Tortilla/chip process chemistry (wheat and maize tortillas).
DR. RANDY WEHLING *foodsci.unl.edu/wehling*	Chemistry and analysis of cereal grains. Rapid analytical methods for measuring food quality of grains and other commodities.
DR. CURTIS WELLER *foodsci.unl.edu/weller*	Research responsibilities are in the broad area of food and bioproducts engineering focusing on value-added processing of agricultural commodities and physical properties determination. Concentration of research effort has been on refining of grain sorghum to recover high-value lipids. Enhancing food safety through control of foodborne disease agents.
DR. JEYAM SUBBIAH *foodsci.unl.edu/subbiah*	Hyperspectral imaging and near-infrared spectroscopy systems for food safety applications. Non-thermal preservation technologies such as pulsed electric field pasteurization. Dr. Subbiah is also working on predictive microbiology and risk assessment models.
DR. DEVIN ROSE *foodsci.unl.edu/drose*	Evaluation of quality and chemical composition of whole grains. Impact of whole grain and dietary fiber containing foods on diet related disease prevention. Determine how differences in chemical and physical properties of whole grains influence end-use quality.
DR. ANDRÉIA BIANCHINI *foodsci.unl.edu/bianchini*	Dr. Bianchini studies the impact of processing on the quality and safety of foods. She has a particular interest on the effect of thermal and non-thermal processing on mycotoxins, pathogenic and sporeforming bacteria.
DR. OZAN CIFTCI *foodsci.unl.edu/ciftci*	The Ciftci lab studies the development of a green biorefinery based on supercritical fluid technology for value-added processing of renewable feedstocks to develop integrated extraction, fractionation, reaction and particle formation of lipids and nutraceuticals as well as understanding the fundamentals associated with such process development.
DR. BING WANG *foodsci.unl.edu/wang*	Dr. Bing Wang researches the application of quantitative risk assessment in evaluating the risk of adverse human health effects due to the exposure of biological and chemical hazards via food and other sources if relevant, to improve the use of scientific information in regulatory decisions about food safety and human health.
DR. GEORGE CAVENDER *foodsci.unl.edu/gcavender*	Dr. Cavender studies the impact of processing on the quality and safety of foods. He has a particular interest on the effect of non-thermal and other novel processing technologies on the physicochemical and sensory properties of foods.

GASTROINTESTINAL BIOLOGY	RESEARCH ACTIVITIES
DR. ANDREW BENSON *foodsci.unl.edu/abenson*	Study of the evolution and development of gut microflora. Genome evolution in pathogenic bacteria. Identifying host genes that affect gut flora development.
DR. ROBERT HUTKINS *foodsci.unl.edu/hutkins*	Studies of bacteria important in fermented foods and in human health. Understanding the molecular basis for metabolism of prebiotic sugars by lactic acid bacteria and bifidobacteria (so-called probiotic bacteria). Study of the anti-adhesive properties of oligosaccharides and the molecular mechanisms involved in pathogen binding to the surface of host cells.
DR. VICKI SCHLEGEL *foodsci.unl.edu/schlegel*	Characterize natural bioactive agents and their interactions with various types of food matrices through the integration of metabolomic and physiochemical approaches. Facilitate the development of functional foods and/or nutraceuticals. Study the health promoting and/or toxic properties of these systems at the cellular level.
DR. HEATHER HALLEN-ADAMS *foodsci.unl.edu/hallenadams*	The role of fungi in the healthy human gut, including interactions between different species of gut fungi, interactions with bacteria, and interactions with the human host. The potential for fungal probiotics to limit fungal disease in humans.
DR. AMANDA RAMER-TAIT *foodsci.unl.edu/Ramer-Tait*	Research centers on the dynamic interactions between the mucosal immune system and intestinal microbial communities. Current research projects are aimed at understanding how host-microbial interactions in the gastrointestinal tract contribute to the pathogenesis of chronic, inflammatory diseases. To study these complex relationships in vivo, we employ conventional, germ-free, and defined microbial community mouse model systems.
DR. JENNIFER CLARKE *foodsci.unl.edu/jclarke*	Dr. Clakre researches the analysis of complex high-dimensional data; statistical model assessment, validation, and prediction; metagenomics; and inference from multitype data; 'big data' applications.

FOOD ALLERGENS	RESEARCH ACTIVITIES
DR. STEPHEN TAYLOR *foodsci.unl.edu/taylor*	Food allergies and allergy-like diseases, development of immunochemical methods for the detection of allergens, proteins, and toxins. Assessment of the allergenicity of food ingredients derived from commonly allergenic foods. Effect of food processing on food allergens.
DR. JOE BAUMERT *foodsci.unl.edu/jbaumert*	Determination of minimal eliciting doses for specific allergenic foods. Examination of the digestive stability of major food allergens and monitoring the in vivo distribution of digestion-resistant allergens in the human body. Development of immunochemical methods for detection of allergenic food proteins.
DR. RICHARD GOODMAN *foodsci.unl.edu/goodman*	Refining methods and evaluation criteria for regulatory assessments of the potential allergenicity of genetically modified crops. Development of allergenicity assessment tools. Identification of food allergens.

FOOD SAFETY	RESEARCH ACTIVITIES
DR. HARSHAVARDHAN THIPPAREDDI *foodsci.unl.edu/thippareddi*	Development and validation of antimicrobial intervention technologies to control foodborne pathogens in foods. Non thermal food processing to assure food safety. Predictive Microbiology, Quantitative Risk Assessments for food safety. Food industry training on Food Safety Management Systems including HACCP and Sanitation.
DR. JOHN RUPNOW *foodsci.unl.edu/rupnow*	Teaches Food Safety education and food handling protocols as well as food toxicology and Introduction to Food Science.
DR. JEYAM SUBBIAH *foodsci.unl.edu/schlegel*	Hyperspectral imaging and near-infrared spectroscopy systems for food safety applications. Non-thermal preservation technologies such as pulsed electric field pasteurization. Dr. Subbiah is also working on predictive microbiology and risk assessment models.
DR. JAYNE STRATTON *foodsci.unl.edu/stratton*	Food safety microbiology. Rapid detection methods for pathogens (Listeria, E. coli O157:H7, Salmonella). Evaluation of interventions for the reduction of pathogens in various food and pet food matrices.
DR. HEATHER HALLEN-ADAMS *foodsci.unl.edu/hallenadams*	The Hallen-Adams lab studies toxigenic fungi, including molds that produce toxins in food, and has expertise in poisonous mushrooms. Research includes toxin detection and quantification, and studies in toxin biosynthesis.
DR. ANDRÉIA BIANCHINI *foodsci.unl.edu/bianchini*	Applied research on the evaluation of ingredients, assessment of processes, and development of strategies to reduce/prevent contamination of final products with mycotoxins and bacterial pathogens. The development of quality control mechanisms, HACCP assistance focusing on food, dairy and feed products.
DR. JENNIFER CLARKE *foodsci.unl.edu/jclarke*	Dr. Clakre researches the analysis of complex high-dimensional data; statistical model assessment, validation, and prediction; metagenomics; and inference from multitype data; 'big data' applications.
DR. BING WANG *foodsci.unl.edu/wang*	Dr. Bing Wang's primary research interests center around human health risk assessment, epidemiology and research synthesis methodologies. Dr. Wang has applied the principles of those disciplines to a diverse of fields, including charactering the risks of sparsely tested chemicals, developing probabilistic evidence-synthesis method for dose-response assessment, and the risk-benefit analysis of nutrient fortification in grain food

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