



RESEARCH PROGRAMS



DIETARY BIOACTIVE AGENTS & FUNCTIONAL FOODS

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.

DR. ROBERT HUTKINS

foodsci.unl.edu/hutkins

Studies 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). How prebiotics shift the intestinal microbiota in humans and animals and how such changes affect host health are also being studied.

DR. KAUSTAV MAJUMDER

foodsci.unl.edu/majumder

Explore the food proteins to produce protein-derived peptides with health beneficial biological properties. Assessing the potential therapeutic values of those peptides for the treatment and prevention of hypertension, diabetes, and associated metabolic disorders.

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. JEYAM SUBBIAH

foodsci.unl.edu/subbiah

Multiphysics modeling of food processes for improving food quality and safety. Improving safety of low moisture foods using radio frequency processing, extrusion, and gaseous technologies. Pulsed electric field for enhancing extraction of bioactives from fruits, vegetables and food processing waste for chemoprevention. Hyperspectral and multispectral imaging for predicting food quality.

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. CHANGMOU XU

foodsci.unl.edu/xu

Exploring functional ingredients (phytochemicals) in fruits, berries, and vegetables, and evaluating their bioactivities. Investigating the impact of factors (e.g. genetic variation, climates, processing technologies) on the composition of these phytochemicals. Developing fortified food products or innovational applications using phytochemicals in the laboratory bench scale.

DR. YUE ZHANG

foodsci.unl.edu/yue-zhang

Fabricating and characterizing protein-based delivery systems for bioactive food components including phytochemicals, enzymes, lipids, and probiotics, addressing the needs to produce functional foods.

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FOOD PROCESSING AND TRANSFORMATION

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. DENIZ CIFTCI
foodsci.unl.edu/dciftci

Research interests include value-added processing of food and agro-industrial by-products to obtain bionanomaterials and chemicals. Concentration of research effort has been on subcritical water treatment of lignocellulosic biomass to isolate high-value nanocelluloses and hemicellulose sugars, and applications of nanocelluloses in food industry.

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. MARY-GRACE DANAÓ
foodsci.unl.edu/danao

Research interests are in the broad area of food and bioprocess engineering focusing on value-added processing, storage and transportation of food and agricultural commodities, and developing novel methods, techniques, and procedures for evaluating and characterizing food products for quality control and safety assurance.

DR. TERRY HOWELL JR.
foodsci.unl.edu/howell

Dr. Howell's current focus is on R&D leadership, project leadership, portfolio management, and organizational efficiency enhancement.

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. JOOYEOUN JUNG
foodsci.unl.edu/jung

Multidisciplinary research approaches for value-added, sustainable food product development and packaging, active and smart food packaging, and optimization of processing conditions and application of the advanced food processing technology.

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. ROSANNA VILLA ROJAS
foodsci.unl.edu/villarojas

Areas of interest include improvement of product safety through traditional and novelty processing technologies. Modeling the effects of food properties and environmental factors on foodborne pathogen inactivation and resistance, with emphasis in low moisture foods.

DR. JEYAM SUBBIAH
foodsci.unl.edu/subbiah

Multiphysics modeling of food processes for improving food quality and safety. Improving safety of low moisture foods using radiofrequency processing, extrusion, and gaseous technologies. Pulsed electric field for enhancing extraction of bioactives from fruits, vegetables and food processing waste for chemoprevention. Hyperspectral and multispectral imaging for predicting food quality.

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. 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. YUE ZHANG
foodsci.unl.edu/yue-zhang

Dr. Zhang studies the molecular interactions of biopolymers with other food components and the correlations between molecular interactions, structures and functionalities of food systems. Thermal analytical and rheological methods are employed to evaluate the processing and storage of foods.

GASTROINTESTINAL BIOLOGY

DR. THOMAS AUCHTUNG
foodsci.unl.edu/tauchtung

Dr. Auchtung researches the contribution of the gastrointestinal microbiome to health and disease and the influence of under appreciated microbes, such as fungi and *Turicibacter*.

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. 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. 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. ROBERT HUTKINS
foodsci.unl.edu/hutkins

Studies bacteria important in fermented foods and in human health. Understanding the molecular basis for metabolism of prebiotic sugars by lactic acid bacteria and bifidobacteria. How prebiotics shift the intestinal microbiota in humans and animals and how such changes affect host health are also being studied.

DR. JACQUES IZARD
foodsci.unl.edu/izard

Dr. Izard studies the biology of human microbiomes in context of their host, with a focus on the role of human digestive tract microbiota in health and disease, including its impact on host homeostasis. One aspect of this research is to understand the effect of diet on microbiome structure and cancer risk.

DR. KURT PIEPENBRINK
foodsci.unl.edu/piepenbrink

Investigates the mechanisms by which bacterial extracellular appendages mediate interactions with host cells and other bacteria, including the formation of microbial biofilms. Interest in the capacity of *Clostridium difficile* to form microcolonies in the gut and the impact of that self-association on competition with the commensal gut microbiome.

DR. AMANDA RAMER-TAIT
foodsci.unl.edu/ramer-tait

Current research projects are aimed at understanding how interactions between the mucosal immune system and intestinal microbes contribute to the pathogenesis of chronic, inflammatory diseases, including inflammatory bowel diseases, obesity, and metabolic syndrome.

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 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.

FOOD SANITATION

DR. ANGELA ANANDAPPA
foodsci.unl.edu/anandappa

Developing cross disciplinary research to address complex sanitary design and sanitation challenges including validation, methods and addressing manufacturing challenges in the food industry.

FOOD SAFETY

DR. JENNIFER AUCHTUNG
foodsci.unl.edu/auchtung

My lab studies how the human gastrointestinal microbiome contributes to health and provides protection from infection with antibiotic-resistant pathogens. Our studies provide a foundation to develop new treatments that restore microbiome function following disruption.

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. BYRON CHAVES
foodsci.unl.edu/chaves

Applied food safety microbiology focusing on the evaluation and validation of chemical, physical, and biological interventions for the post-harvest control of foodborne pathogens in foods of animal origin; detection and characterization of bacterial pathogens along the food production chain.

DR. JENNIFER CLARKE
foodsci.unl.edu/jclarke

Dr. Clarke researches the analysis of complex high-dimensional data; statistical model assessment, validation, and prediction; metagenomics; and inference from multitype data; 'big data' applications.

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. DONGJIN PARK
foodsci.unl.edu/park

Genomic diversity and pathogenicity of foodborne pathogens, with a specific focus on *Enterohemorrhagic Escherichia coli* (EHEC). My research aims to characterize heterogeneous virulence potentials of EHEC, which is largely determined by evolutionary lineages and differential expression of Shiga toxin subtypes.

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. JAYAM SUBBIAH
foodsci.unl.edu/subbiah

Multiphysics modeling of food processes for improving food quality and safety. Improving safety of low moisture foods using radiofrequency processing, extrusion, and gaseous technologies. Hyperspectral and multispectral imaging for predicting food quality.

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. and the risk-benefit analysis of nutrient fortification in grain foodment.

DR. CHANGMOU XU
foodsci.unl.edu/xu

Exploring natural antimicrobial and anti-biofilm agents from botany against foodborne pathogens in foods. Developing fast analytical methods to detect pesticides in foods.

FOOD ALLERGENS

DR. JOE BAUMERT
foodsci.unl.edu/jbaumert

Research focuses on the development of quantitative risk assessment models for food allergens, the identification and characterization of novel food allergens, the examination of the digestive stability of major food allergens, and analytical methods for detection of allergenic food proteins.

DR. MELANIE DOWNS
foodsci.unl.edu/mdowns

Dr. Downs's primary research interests are in food proteomics, with a specific focus on the proteomics of allergenic foods. Protein mass spectrometry methods are employed to examine several topics associated with allergenic foods.

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.

DR. PHILIP JOHNSON
foodsci.unl.edu/pjohnson

Application of protein mass spectrometry to the detection and study of food allergens. Use of allergens for clinical applications. Research to evaluate the safety of novel foods (particularly insects).

DR. MEI LU
foodsci.unl.edu/lu

Research interests include the identification and detection of food allergens, the allergenicity assessment of the genetically modified crops, and the effect of food processing on food allergens.

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.