

Department of Food Science Purdue University

MISSION STATEMENT

Our mission is to positively impact the world food system and the quality of human life through our efforts to educate students and to expand and transfer knowledge for continuous improvement of the safety, quality, and value of food.

Food Chemistry, Structure and Function

BeMiller, J.N., Food Science Professor Emeritus, Ph.D., Purdue University (1959)

Starch granule structure, reactivity, and behavior. Chemical and genetic modification of starch. Structure-functional property relationships of polysaccharides. Modifications of polysaccharides. Mono- and disaccharide chemistry and modification. Light, confocal, and electron microscopy. Uses of carbohydrates in food and other industries.

Chandrasekaran, R., Food Science Professor, Ph.D., University of Madras, India (1966)

Molecular architecture of biopolymers; structure-function relationships in proteins, carbohydrates and nucleic acids; implementation of modern techniques to X-ray diffraction.

Daniel, J.R., F & N Associate Professor, Ph.D., Texas A & M University (1977)

Small sugar chemistry and modification; starch granule structure, behavior and reactivity; starch retrogradation and baked good staling; modified starches; polysaccharide structure and modification; structure-function relationships of polysaccharides; novel plant and microbial polysaccharides; carbohydrate use in food; sweetness theory and alteration of carbohydrates to enhance sweetness.

Hamaker, B.R., Food Science Professor, Ph.D., Purdue University (1986)

Carbohydrates and health - manipulation of starch and other glyceric carbohydrates for slowly digestible/low glyceric response or resistant character, and collaborative studies to understand human enzyme digestion and physiological response; dietary fiber and colon health - modifications in fiber functionality and fermentability, and collaborative studies on colon health; cereal starch and protein structure-function relationships; cereal chemistry and processing.

Liceaga, A., Food Science Assistant Professor, Ph.D., University of British Columbia, Canada (2006)

Protein chemistry. Major interest is structure-function relationships and interactions of food proteins and peptides, cryopreservation and shelf-life extension of fresh and frozen fish and fish products. Fish processing and formulation of value-added products from under-utilized fish. Protein interactions using vibrational (Raman) spectroscopy. Also interested in formulation of functional food products, using omega-3 fatty acids.

- Mauer, L.J., Food Science Associate Professor, Ph.D., University of Minnesota (1999)*
Water-solid interactions. Shelf-life. FT-IR spectroscopy. Dairy protein chemistry. NASA space foods. Effects of processing on: functional, physical, and structural properties and safety of foods, food ingredients, and edible films.
- Nielsen, S.S., Food Science Department Head, Ph.D., University of Minnesota (1982)*
Food proteins; digestibility of legume proteins; enzyme inhibitors in legumes; plasmin enzymes system in milk, and its effects on dairy product quality.
- Nivens, D.E., Food Science Assistant Professor, Ph.D., University of Tennessee (1993)*
Development of living biosensors to detect hazardous chemical, a multi-technique imaging test bed for food and agriculture systems, analytical tools for food nanotechnology, and environmental containment/analytical detection systems for studying the interactions between living cells and surfaces (e.g., foods and food contact surfaces). Fundamental studies of microbial biofilms containing foodborne pathogens and use of scanning probe microscopy to study biological systems.
- Reuhs, B.L., Food Science Associate Professor, Ph.D., University of Georgia (1994)*
Research areas include food systems analyses (Pectin and Fiber) via the extraction and purification of acidic polysaccharides from the cell walls and middle lamella of plants. Bacterial capsule, gum, and lipopolysaccharide purification and analysis for plant-microbe interaction and food safety studies. The application of HPLC, GC-MS, and NMR in structural studies of carbohydrates and polysaccharides in food processing/food chemistry and the role of polysaccharides in bacteria-legume symbiosis and vegetable-human pathogen interactions.
- Santerre, C.R., F & N Professor, Ph.D., Michigan State University (1989)*
Analytical measurement (incl. analytical and immunological methods) of organic and inorganic contaminants to support risk assessment/communication efforts: influence of food processing upon food contaminants; pesticide toxicology; and food safety education.
- Yao, Y., Food Science Assistant Professor, Ph.D., Southern Yangtze University (2000)*
Rational design of starch, genetic starch modifications, and study of starch biosynthesis. Physico-enzymatic starch modifications. Carbohydrate metabolism of switchgrass. Specialty corn syrups and maltodextrins with improved nutrition value. Amylase-activated release for nutrients delivery. Self-assembling of carbohydrate nanoshell. Polysaccharide hybrids.

Foods for Health

- Ferruzzi, M.G., Food Science Associate Professor, Ph.D., The Ohio State University (2001)*
Phytochemical and botanical chemistry focused on natural pigments and flavonoids. Development of analytical methodologies for determination of phytochemicals in food systems, biological tissues and fluids. Investigate the influence of food matrix and processing on stability, bioavailability and bioactivity of phytochemicals.

Kim, K.-H., Food Science Assistant Professor, Ph.D., Rutgers University (1999)
Bioactive food components that affect the fat cell biology such as cell differentiation, inflammatory response and metabolism; Understanding the role of a selenium binding protein in endoplasmic reticulum stress signaling pathway and its associated protein degradation in adipose tissue.

Mattes, R.D., F & N Professor, Ph.D., Cornell University (1981); Registered Dietitian
Sensory evaluation; regulation of food intake in humans; dietary compliance; energy and macronutrient balance; human cephalic phase responses, hunger, satiety, cravings.

Watkins, B.A., Food Science Professor, Ph.D., University of California, Davis (1985)
Diet and medicine in the area of inflammation investigating the anti-inflammatory properties of omega-3 PUFA and flavonoids on muscle atrophy and osteopenia, dietary intervention for dialysis patients, and hepatic disease.

Weaver, C.M., F & N Professor, Ph.D., Florida State University (1978)
Chemical form and bioavailability of minerals; calcium metabolism.

Food Safety and Microbiology

Applegate, B.M., Food Science Associate Professor, Ph.D., University of Tennessee (1997)
Detection of viable foodborne pathogens using bacteriophage; automated extraction of nucleic acids from various matrices; enumeration of microorganisms (i.e. pathogens and other organisms) using quantitative PCR; the use of bioreporters in bioelectronics; metabolic engineering; detection of problematic microorganisms in industrial environments; construction of recombinant bacterial strains to rapidly evaluate antimicrobial products; microbial ecology.

Bhunja, A.K., Food Science Professor, Ph.D., University of Wyoming (1989)
Detection and identification of foodborne bacterial pathogens by biosensor, immunological, cell culture (cytotoxicity assay) and molecular biology-based techniques; monoclonal and polyclonal antibodies against bacterial proteins and toxins; molecular mechanism of interaction of enteric pathogens with gastrointestinal cells and prevention strategies.

Linton, R.H., Food Science Professor, Ph.D., Virginia Polytechnic Inst. and State Univ. (1994)
Environmental factors affecting growth and survival of microorganisms in foods; heat resistance of foodborne pathogens; predictive microbiology; HACCP and GMP programs; use of non-thermal means of preservation; food biosecurity and food defense.

Food Processing and Technology Development

Ballard, T.S., Food Science Assistant Professor, Ph.D., Virginia Polytechnic Institute and State University (2008)

Development of novel methods for the extraction of natural antioxidants from plant waste materials and investigating their efficacy in food and biological systems. Extraction methods of interest include microwave-assisted, ultrasound-assisted and supercritical fluid extraction. Evaluation of nondestructive methods to characterize product attributes related to food quality and safety.

Butzke, C.E., Food Science Associate Professor, Ph.D., Technische Universität Berlin, Germany (1992)

Biological and chemical parameters affecting wine and brandy production and quality: fermentation techniques and yeast nutrition, off-odor prevention, aging reactions, cork taint and bottle closures, distillation.

Campanella, O.H., ABE Professor, Ph.D., University of Massachusetts (1987)

Food rheology, role of rheology in food processing. Food extrusion. Transport phenomena in food processing.

Chen, L.F., Food Science Professor, Ph.D., University of Wisconsin, Madison (1973)

Processing of biomaterials for food and other industrial applications: Structural and functional relationship, physical/chemical modification of carbohydrates, kinetic and dynamics of reactions during processing, minimal process designs.

Corvalan, C.M., Food Science Associate Professor, Ph.D., Unive. of Litoral, Argentina (1993)

Food and Biological Engineering. Coordinate experimental, theoretical and computational analysis of biomaterials, equipments and processes in the food industry. Physicochemistry and thermodynamics of biomaterials and kinetics of bioprocess. Rheology of biopolymers, micro-rheology, and rheology of interfaces.

Keener, K.M., Food Science Associate Professor, Ph.D., P.E., Purdue University (1996)

Current technologies under development include, cryogenic cooling, radiant frying, NMR/MRI quality systems and non-thermal plasma for food including eggs, poultry, red meat, fruit and vegetables. In addition, provide technical assistance to food processors in regulatory compliance (USDA-FSIS and FDA), sanitation, and process development.

Ladisch, M.R., ABE & BME Professor, Ph.D., Purdue University (1977)

Bioseparations (process-scale liquid chromatography, absorption, and fundamentals of multicomponent separations). Bio-nanotechnology (protein biochips, proteins at surfaces, biomimetics). Bioprocessing of renewable resources and biological materials to value-added products.

- Morgan, M.T., Food Science Professor, Ph.D., P.E., Ohio State University (1992)*
Food process engineering applied to the design of novel food processing methods, sensors for rapid detection of food safety and quality, hygienic design of equipment, development of bio-active packaging films, and non-thermal equipment sterilization using chlorine dioxide.
- Narsimhan, G., ABE Professor, Ph.D., Indian Institute of Technology, India (1979)*
Physical properties, functional properties of proteins; formation, stability, and rheology of food emulsions and foams, absorption of proteins at air-water and oil-water interfaces, separation of proteins in downstream bioprocessing - precipitation of proteins, foam fractionation of proteins, transport processes in particulate systems.
- Nelson, D.C., RHIT Associate Professor, Ph.D., Purdue University (1997)*
Design and operating characteristics of food service equipment and their effects on food quality; optimization of utility and facility utilization in food service; productivity and ergonomic issues associated with food service operations.
- Nelson, P.E., Food Science Professor, Ph.D., Purdue University (1967)*
Unit operations and packaging of aseptically processed products; effect of processing and packaging on product components; essence recovery studies; tomato products composition.
- Okos, M.R., ABE Professor, Ph.D., Ohio State University (1975)*
Fundamental and design aspects of biochemical and food process engineering. Fundamental mechanism for moisture migration as related to quality changes during the processing of food and biological materials, simulation and design of food processes, methodology to improve design and operation of food processes to minimize energy use and waste production of ethanol and flavor compounds from immobilized microbial and plant cell reactors.
- San Martin-Gonzalez, F., Assistant Professor, Ph.D., Washington State University (2002)*
Nonthermal technologies for food processing, including high pressure homogenization, high hydrostatic pressure and ultrasound. Develop applications for nano and microencapsulation of bioactive compounds and natural antimicrobials based on high pressure homogenization.
- Tao, B.Y., ABE Professor, Ph.D., Iowa State University (1988)*
Structural/functional relationships of carbohydrate enzymes: substrate binding, kinetics, recombinant genetic expression/mutation of amylases/cyclodextrin glycosyltransferases. Modification of biomaterials for industrial applications: synthesis and characterization of surface-active agents, molecular filters, molecular chelating agents; physical/chemical properties of lipids/carbohydrates.