

# Dr Bruce Applegate/ Food Microbiology

## Research Interests

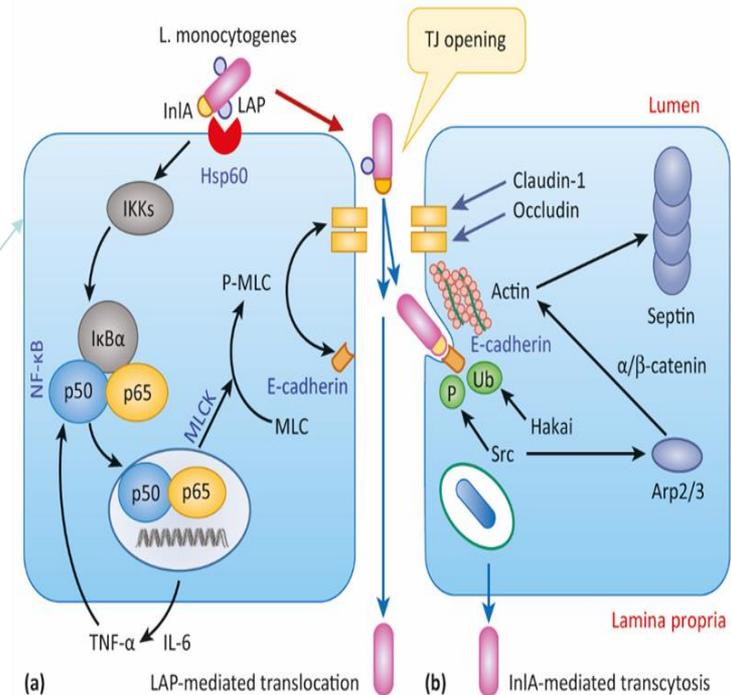
- Detection of viable foodborne pathogens using bacteriophage
- Use of bioreporters in bioelectronics for remote sensing and teaching
- Use of synthetic biology to construct reporter bacteriophage
- Detection of problematic microorganisms in industrial environments
- Construction of recombinant luminescent bacterial strains to rapidly evaluate antimicrobial products and effectiveness of control measures
- Microbial ecology related to food spoilage and safety
- Alternative food processing technologies for increasing shelf life of food products
- Microbial transformation for production of value added food products



**INSTRUCTOR OF COMMERCIAL FOOD  
AND BEVERAGE FERMENTATION,  
FOOD MICROBIOLOGY**

## Pathogenesis, Probiotics, Gut Health, and Pathogen Detection

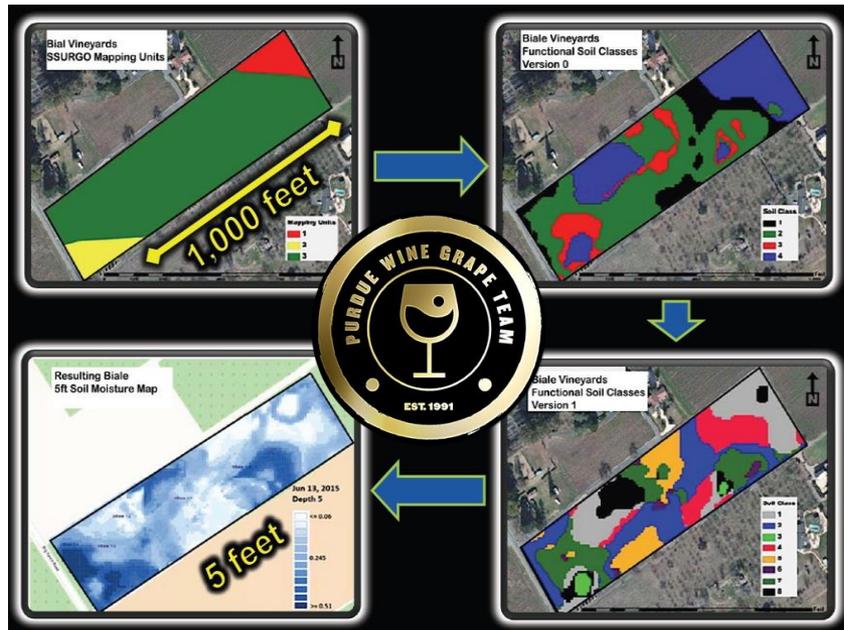
- Molecular Mechanism of *Listeria monocytogenes* Pathogenesis and Host Immune Response during Gastrointestinal Phase of Infection
- Bioengineered Probiotics in Prevention and Control of Infectious Disease, and Inflammatory Bowel Disease
- Development of Novel Detection (3-D cell culture system) and Diagnostic Tool for Pathogens and Toxins



# Dr Christian Butzke / Innovation & Entrepreneurship Fellow

## Improving and sustaining grape and wine quality in a changing climate

- Providing winegrowing decision-support through real-time, high-resolution functional soil maps
- Understanding of soil, climate, and other environmental effects on grape composition and wine quality
- Quantifying biodiversity through vineyard soundscapes



PROTECTING THE WORLD'S MOST VALUABLE VALUE-ADDED AGRICULTURAL COMMODITY - WINE

## Research interests

- Food and Biological Engineering
- Physics of Foods
- Advanced Bioprocessing
- Rheology, and Interfacial Dynamics
- Data-driven Discovery
- Scientific Computing



INSTRUCTOR OF STATISTICAL  
PROCESS CONTROL, FOOD PROCESSING, FOOD  
KINETICS (GRAD), SCIENTIFIC COMPUTING  
(GRAD)

# *Dr Amanda Deering / Food Microbiology*

## Understanding internalization of human pathogenic bacteria in plants

- Determine the routes pathogenic bacteria use to contaminate fruits and vegetables
- Examine postharvest sanitizers to reduce pathogenic and spoilage microorganisms on plant surfaces
- Educate fruit and vegetable growers on food safety and Good Agricultural Practices (GAPs)



**UNDERSTANDING WAYS TO PREVENT CONTAMINATION OF FRUIT AND VEGETABLES WITH PATHOGENIC BACTERIA**

# Dr. Feng / Food Safety Human Factor Lab

Exploring the impact of human factors on food safety.

- Understanding consumers' perceptions of food systems and technology.
- Using new technologies to understand human perception of food safety in real-world situations.
- Applying social and behavioral change theories on food safety education and communication.
- Extending food safety knowledge to the public and stakeholders nationwide.



Conducting novel studies using multidisciplinary methods to understand the human factors of food safety for use in development of data-driven interventions designed to promote a change in knowledge and behavior.

# *Dr Bruce Hamaker / Food Chemistry, Foods for Health*

## Primary Research Areas

- Carbohydrates and health
- Starch, chemistry and function
- Dietary fiber, chemistry and function

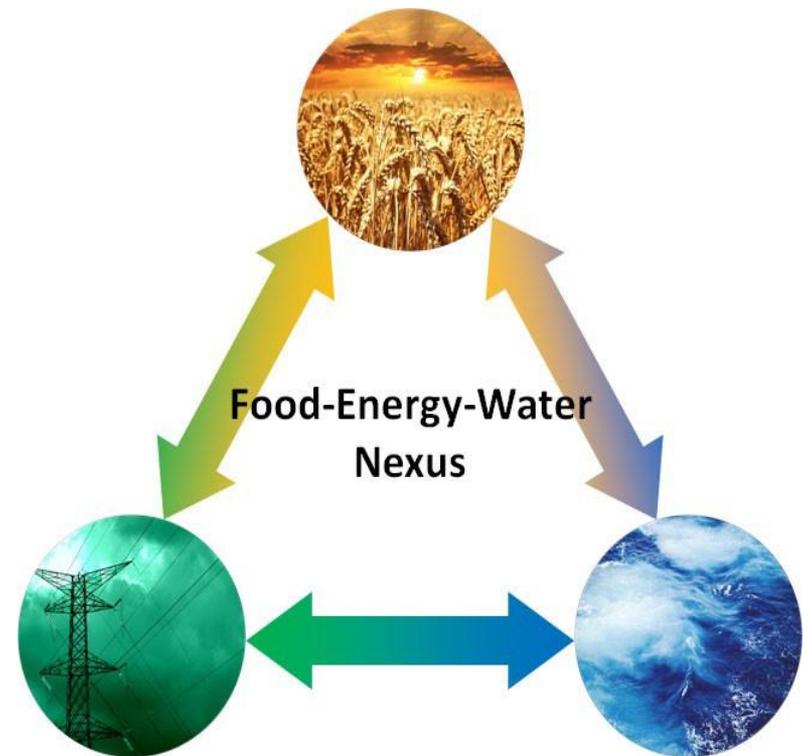


**DISTINGUISHED PROFESSOR, ROY L. WHISTLER CHAIR, DIRECTOR OF WHISTLER CENTER FOR CARBOHYDRATE RESEARCH**

# Dr Jen-Yi Huang / Food Processing

Dr. Huang's Food Process Sustainability Lab is to enable interdisciplinary research that leads to productive food supply chains for meeting the growing global demands for food, energy and water, while ensuring a safe and sustainable environment for human welfare. Current research includes:

- Physical methods for green cleaning
- Life cycle assessment of agri-food system sustainability
- Atmospheric cold plasma and plasma-activated water
- Fouling in food processing and its mitigation
- Electro-membrane processes for bioresource valorization



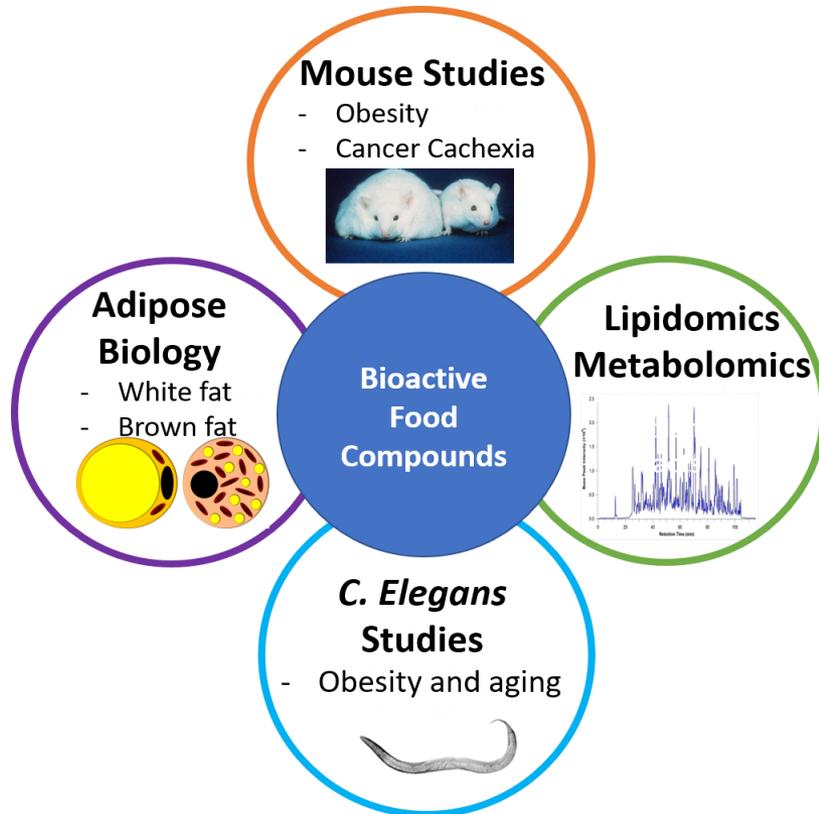
## Research Interests

- Investigation of physical interactions between food biopolymers, such as milk or vegetal proteins and polysaccharides
- Identifying techniques, preliminary processes, or components that guide assembly of biopolymers into useful colloidal structures
- Using physical structuring among and between colloidal materials to enhance stability or utility of liquid or solid suspensions
- Refinement of colloidal characterization techniques for food-relevant materials



**MEMBER OF WHISTLER CENTER FOR  
CARBOHYDRATE RESEARCH**

## UNDERSTANDING BIOLOGICAL ASPECTS of FOOD COMPOUND-REGULATED LIPID METABOLISM, OBESITY and AGING



- Discover anti-obesity food and nutritional active compounds
- Improve the delivery of bioactive food compounds to biological system
- Dietary control of the metabolic link between obesity and its related diseases (insulin resistance, aging and cancer-induced wasting)

# *Dr. Jozef Kokini / Food Processing*

## Research Interests

- Food materials science; food nanotechnology and fabrication of nano-biosensors
- Linear and non-linear rheology
- Computational fluid dynamics
- Phase behavior and compatibility of ingredients in food mixtures
- Food structure, phase behavior, texture, especially during extrusion, mixing processes
- Structural bioinformatics to develop structure function relationships in plant-based protein



**SCHOLLE ENDOWED CHAIR IN FOOD PROCESSING**

## Foods Chemistry & Foods for Health, Sensory Evaluation

- By the year 2050, agricultural production will need to increase by 60% in order to produce enough food to feed the world (FAO, 2015).
- We investigate the application of affordable, healthy, and eco-friendly resources (e.g. insects) to develop alternative protein sources.
- We study mechanisms for improving the techno-functional properties of these proteins to facilitate their incorporation into food and feed formulations.
- We evaluate the protein's health-promoting properties towards diseases such as hypertension and type-2 diabetes; protein allergenicity, sensory evaluation and consumer attitudes towards these alternative proteins.



**UNCOVERING WAYS TO USE ALTERNATIVE PROTEIN SOURCES TO FIGHT GLOBAL HUNGER**

# Dr Steve Lindemann | Foods for Health

## Identifying links between our food, our gut microbiota, and our health

- Influence of prebiotic and dietary fiber chemical structure on microbiome structure, function, and influence on health
- Impact of physical processing on microbiome responses to cereal fibers and influence on host health
- Division of labor in microbial consumption of polysaccharide structure
- Microbial systems biology and ecological theory to understand mechanisms of polysaccharide degradation in communities

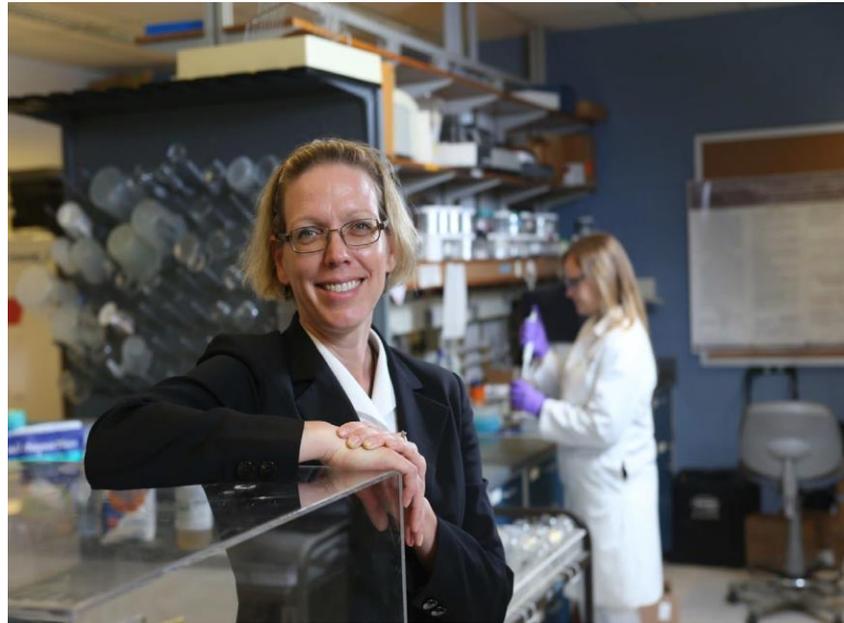


**UNCOVERING WAYS TO DESIGN FOODS  
FOR INCREASED GUT MICROBIOME -  
AND HUMAN - HEALTH**

# Dr Lisa Mauer/ Food Chemistry

## Research Interests

- Water-solid interactions, including deliquescence and glass transition
- Effects of processing on functional, physical, and structural properties of food ingredients
- Shelf-life
- Food safety
- Infrared spectroscopy techniques for rapid, non-destructive food analysis



**DIRECTOR, CENTER FOR FOOD SAFETY ENGINEERING  
ASSOCIATE VICE PROVOST FOR FACULTY AFFAIRS**

# *Dr. Dharmendra Mishra / Food Processing*

## OVERCOMING BARRIERS TO COMMERCIALIZATION OF NEW FOOD PROCESSING TECHNOLOGIES

Dr. Mishra's extension and applied research is focused on commercial food manufacturing to advance food safety and quality for existing and novel thermal and non-thermal manufacturing technologies.

Dr. Mishra is an internationally recognized process authority who helps food industry challenges by focusing on the following extension and applied research areas:

1. Commercial food manufacturing
2. Entrepreneurship program
3. Industry engagement
4. International extension program
5. Non-invasive sensors development
6. New food manufacturing technology development
7. Process modeling and inverse problems



PROCESSING AUTHORITY FOR ACID /  
ACIDIFIED AND LOW-ACID FOODS IN  
BOTH STILL AND CONTINUOUS FLOW  
SYSTEMS

# *Dr. Eun Joong Oh | Food Microbiology, Foods for Health*

## **Research Interests**

- Dr. Oh's research focuses on fermentation science and the biotechnological production of food ingredients and value-added chemicals using engineered microorganisms.
- His research aims to develop designer microorganisms by metabolic engineering and synthetic biology approaches.



## Defining challenges and identifying solutions to food safety

- Partner with national retail grocery chains to improve food safety where most US consumers source their foods
- Developing better protocols and people management strategies to improve food safety and quality
- Build food safety systems in developing economies (e.g. Afghanistan, Nigeria, Peru) to reduce foodborne disease globally



**IMPROVING FOOD SAFETY & QUALITY SYSTEMS IN GOVERNMENT, ACADEMIA, AND INDUSTRY AROUND THE WORLD**

# *Dr Lavanya Reddivari | Food Chemistry, Foods for Health*

## Plant flavonoids, fiber and gut bacterial metabolism in health and low-grade inflammation-driven chronic diseases

- Anti-inflammatory bioactive compounds in plant foods
- Influence of flavonoids on gut bacterial composition and function
- Flavonoid, fiber and gut bacterial interactions in improving bioavailability and bioactivity
- Develop food-based strategies to counter diseases such as ulcerative colitis, Crohn's disease and colon cancer



**INTERACTION OF FOOD, GUT BACTERIA AND THE HOST IN HEALTH AND DISEASE**

# *Dr Brad Reuhs / Food Chemistry*

## Research Interests

- Polysaccharide structures
- Plant cell wall analysis
- Bacterial cell wall analysis
- Extraction and purification of acidic polysaccharides from cell walls of plants and bacteria
- Pectin analysis. Capsule, gum, and lipopolysaccharide analysis
- Application of HPLC, GC-MS, and NMR in structural studies of carbohydrates and polysaccharides
- Role of polysaccharides in bacteria- legume symbiosis. Detection of bacteria in plant roots.



**PART OF WHISTLER CENTER  
FOR CARBOHYDRATE  
RESEARCH**

# Dr. Fernanda San Martin | Food Processing

- Nano and microencapsulation of bioactive compounds and natural antimicrobials based on high pressure homogenization
- Plant-based proteins for nanoemulsion stabilization and color delivery
- New area: Processing of novel proteins sources (plants, insects, fungi) for food production by:
  - Extraction
  - Extrusion
  - Thermal processing



CONTINUOUS MICROWAVE PROCESSING OF  
FRUIT AND VEGETABLES PUREES

# Dr. Senay Simsek / Food Chemistry

## Research Interests

- Cereal/grain chemistry and quality
- Structure function relationships of cereal/grain and food polymers
- Utilization and value adding strategies for grain derived ingredients or byproducts to improve function or nutrition



PROFESSOR AND HEAD  
DEAN'S CHAIR IN FOOD SCIENCE



# Dr Deandrae Smith/ Food Processing

## PROduct and Process Engineering Laboratory (PROPEL)

- **PROPEL** is a **Research, Teaching, and Extension** program that aims to drive innovation in the food industry by developing novel technologies, processes, and products to address concerns of **Food Security, Safety, Nutrition, and Sustainability**.

### Main Research Objectives:

- To develop novel technologies and processes for:
  - a. Thermal Food Processing
  - b. Non-Thermal Food Processing
  - c. Inactivation of Foodborne Pathogens
  - d. Extended Food Shelf Life
  - e. Improved Food Physicochemical Characteristics
- To develop value-added food products for improved food nutrition, security, safety, and sustainability.

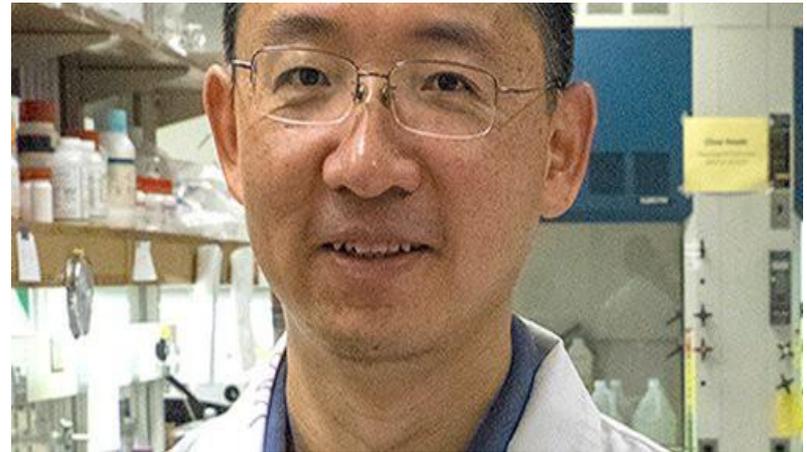


**Deandrae L. W. Smith, Ph. D.**  
Assistant Professor | Principal Investigator  
PROduct and Process Engineering Laboratory  
(PROPEL)

# *Dr Yuan Yao / Food Chemistry*

## **Carbohydrates & starch, food ingredients, functional biomaterials, and nanotechnology for food and non-food applications**

- Sustainable nanotechnology: nanomaterial platform built on plant-based, naturally occurring dendrimer-like biopolymers
- Enabling technologies for active food or pharmaceutical ingredients
- Novel applications of carbohydrate polymers
- Food ingredient technology.



Integrating fundamental research with technology development, focusing on creation, characterization, and application of carbohydrates, ingredients, and functional biomaterials

***THANK YOU***