IOWA STATE UNIVERSITY
Agricultural and Biosystems Engineering

Lingling Liu

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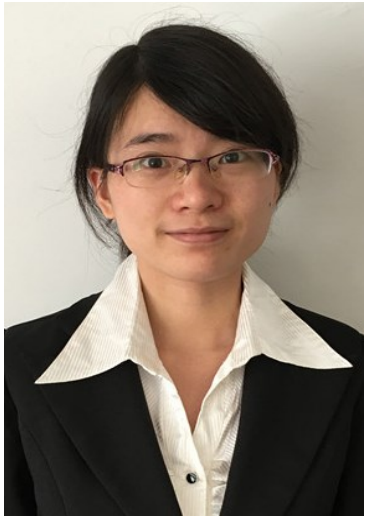
Education
Ph.D. Food Science, 2018, University of Georgia
M.S. Food Science, 2013, China Agricultural University, China
B.S. Food science and Engineering, 2011, Southwest University, China

Honors and Awards
ILSI North America Food Packaging Conference Travel award (2019)
IFT Food Chemistry Division Graduate Student Oral Competition Finalist (2019)
IFT Nutrition Division Graduate Research Paper Competition Finalist (2018)
Romeo Toledo Graduate Support Award (2018)
Young Scholars Research Apprenticeship Program Award (2014, 2018)
IFT Marketing and Management Division Graduate Research Paper Competition Finalist (2014)
IFTSA College Bowl Competition Regional Champion (team member) (2014)

Recent Publications
Liu, L., Moore, M. D. (2020) A Survey of Analytical Techniques for Noroviruses. *Foods*, 9(3), 318.
Liu, L., Kong, F. (2020) Chapter 14. Measuring Chemical Deterioration of Foods. In: Rodriguez-Amaya, D. B., Amaya-Farfan, J. (1st Ed.) *Chemical Changes During Processing and Storage of Foods: Implications for Food Quality and Human Health*. Elsevier Science & Technology. In-print.
Liu, L., Kerr, W. L., Kong, F. (2019) Characterization of Lipid Emulsions During *In Vitro* Digestion in the Presence of Three Types of Nanocellulose. *Journal of Colloid and Interface Science*, 545: 317-329.
Liu, L., Kong, F. (2019) Influence of Nano-cellulose on *In Vitro* Digestion of Whey Protein Isolate. *Carbohydrate Polymers*, 210: 399-411.
Liu, L., Kong, F. (2019). *In Vitro* Investigation of the Influence of Nano-cellulose on Starch and Milk Digestion and Mineral Adsorption. *International Journal of Biological Macromolecules*, 137: 1278-1285.
Liu, L., Kong, F. (2019). *In Vitro* Investigation of the Influence of Nano-fibrillated Cellulose on Lipid Digestion and Absorption. *International Journal of Biological Macromolecules*, 139: 361-366.
Liu, L., Kerr, W. L., Kong, F., Dee, D. R., Lin, M. (2018) Influence of Nanocellulose on Starch Digestion and Glucose Absorption. *Carbohydrate Polymers*, 196: 146-153.



Teaching
Dr. Liu will co-teach several courses with other faculty in the department, including ABE 451/551 Food and Bioprocess Engineering and others. She will also serve as faculty mentor to student teams.

Research
Currently Dr. Liu's research interests focus on:
(1) Reduction of agricultural wastes/byproducts via transformation into value-added nano-biomaterials (e.g., nanocellulose)
Agricultural and food waste/byproducts (e.g., soybean residue and corn stover) contain high percentage of fiber (e.g., cellulose), which can be further processed to prepare nano-biomaterials (e.g., nanocellulose). Physicochemical properties of the nano-biomaterials will be determined. The goal is to develop value-added use of agricultural and food byproducts and determine the new functionalities.

(2) Physicochemical and nutritional changes of agricultural products during processing and storage
Agricultural and food products can go through physicochemical, nutritional and microbiological changes during their storage and processing. Our goal is to gain better understanding of the changes occurred and develop mathematical modelling for prediction.

(3) Using simulated *in vitro* digestion models for the study of bio-accessibility of functional foods and fate of nano-biomaterials
Simulated in vitro digestion models which include salivary, gastric and intestinal digestion phases can mimic the food digestion and nutrient absorption process in human body. These models are cheaper, simpler and easier to perform than animal studies but provides valuable information on how the foods get digested and absorbed. Physicochemical properties of the food studied will include viscosity, particle size, microstructure and surface charge.

(4) Development of novel biobased food packaging materials
Nano-biomaterials are excellent candidates for developing biobased food packaging or coating materials. Our goal is to utilize the functionalities of nano-biomaterials and develop biobased food packaging or coating materials.

(5) Detection and disinfection of foodborne viruses (e.g., hepatitis A virus and norovirus)
Viruses of primary concerns that are associated with foodborne illnesses are hepatitis A virus and human norovirus. Due to the challenges of culturing human noroviruses, surrogates like murine norovirus will be studied via cell culture and plaque assays. Our lab is interested in applying new techniques for the detection and disinfection of these viruses.

Professional Activities
Dr. Liu is a member of several societies, including Institute of Food Technologists (IFT), International Association for Food Protection (IAFP), International Life Sciences Institute (ILSI), Chinese American Food Society and American Society for Agricultural and Biological Engineers (ASABE). Dr. Liu is also actively engaged in international collaborations.