

Xu Zhou, Ph.D.

Research Scientist/Engineer, Department of Industrial & Systems Engineering
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Education

2020-2023

Ph.D., Food Engineering, Washington State University, USA

Dissertation title: Microwave heating of oils and oil-rich foods

Advisor: [Dr. Juming Tang](#)

2016-2019

M.S., Agricultural Engineering, Northwest Agriculture & Forestry University, China

Thesis title: Radio frequency drying system design for nuts and fruits

Advisor: [Dr. Shaojin Wang](#)

2011-2015

B.S., Mechanical Engineering, Zhejiang University of Technology, China

Employment

2024.12 –

Research Scientist, Department of Industrial & Systems Engineering, University of Washington

- Initiate and lead new research projects; develop grant proposals to secure funding for AI and digital twin applications in food processing and supply chains
- Collaborate with UW faculty and external partners, including University of Tsukuba (Japan), Hebrew University of Jerusalem (Israel), Seafood Products Association, and Amazon
- Manage labs and mentor post-docs & students

2023.12 – 2024.11:

Post-Doc Scholar, Department of Biological Systems Engineering, Washington State University

- Led research on microwave sterilization and pasteurization funded by USDA grants and other industry contracts with Pfizer, Kraft, Lamb Weston, Tree Top, and US Army
- Contributed to the PI's grant proposals to USDA, DOE, and NSF on advanced thermal processing, drying, and biomass pyrolysis
- Mentored PhD students (2) and supervised a visiting scholar (1)

Teaching Experience

2023 **Instructor**, FS 432 Food Engineering (WSU undergraduate course in Food Science)

2023 **Teaching Assistant**, BSysE 581 Advanced Physical Properties of Foods (WSU graduate course in Food Engineering)

2024 **Guest Lecturer & Teaching Assistant**, BSysE 584 Thermal and Non-thermal Food Processing (WSU graduate course in Food Engineering)

Professional Services

2024- USDA-NIFA Grant Review Panelist for Program A1521

2020- Reviewer for 100+ manuscripts in several journals, including

- 1) Food Control (26)
- 2) Journal of Food Measurement and Characterization (15)
- 3) Journal of Food Science (14)

- 4) Journal of Food Engineering (10)
 - 5) Food and Bioprocess Technology (10)
 - 6) Food Research International (8)
 - 7) Journal of the ASABE (4)
 - 8) LWT (4)
 - 9) Comprehensive Reviews in Food Science and Food Safety (4)
 - 10) Trends in Food Science & Technology (3)
- 2024 Panning Committee member of [2024 Conference of Food Engineering](#): Led Book of Abstracts and student volunteers; assisted with Conference Technical Program
- 2023 Seminar Coordinator, [Overseas Chinese Agricultural, Biological, and Food Engineers, affiliated with ASABE](#): Invited speakers and organized five seminars, each with 30-80 participants from U.S., Canada, and China
- 2022 President of Food Engineering Club at Washington State University

Awards & Scholarships

- 2024 **Graduate Student Academic & Leadership Achievement Award**, AOCABFE (Association of Overseas Chinese Agricultural, Biological, and Food Engineers)
- 2023 **AIM Student Oral Presentation Competition Awards** (1st place), ASABE (American Society of Agricultural and Biological Engineers), Omaha, Nebraska
- 2023 **AIM Presentation Excellence Award**, ASABE, Omaha, Nebraska
- 2023 **Robert F. Schiffmann Memorial Scholarship**, IMPI (International Microwave Power Institute), Denver, Colorado
- 2023 **Student Research Paper Competition** (1st place), AOCABFE
- 2023 **Graduate Student Seminar Competition Award** (1st place), Department of Biological Systems Engineering, Washington State University
- 2022 **Outstanding Graduate Student Award**, Washington State University
- 2020 **CSC Fellowship** for four-year PhD study at Washington State University, China Scholarship Council (CSC)
- 2019 **BaoGang Excellent Student Award** (1 out of 1000 grad students), Chinese government and BaoGang Iron & Steel Co., Ltd.

Grants Writing Experience

Roles: 1) Initiate ideas, 2) Design research, 3) Write proposal, 4) Develop budgets, 5) Write annual reports

Project title	Supporting agency	Total \$ amount	Status	My roles
AI-driven dynamic managing supply chains for perishable goods	Amazon & NVIDIA	\$800,000 (two yrs)	Pending (Submitted December 2024)	1, 2, 3, 4
Digital twin for efficient supply chain management of horticultural produce	USDA-NIFA	\$600,000	Pending (Submitted November 2024)	1, 2, 3, 4

Model prediction of microbial inactivation in drying and roasting processes using kinetic data and physics-informed neural network	USDA-NIFA	\$600,000	Pending (Submitted October 2024)	3
Development of next-generation microwave-assisted pyrolysis reactor for energy-efficient biochar production	National Science Foundation	\$1M	Pending (Submitted April 2024)	2, 3, 4
Energy efficient processing and packaging technologies for manufacturing of safe and extended shelf-life of food products for the US food service industry	Department of Energy	\$1M	Pending (Submitted March 2024)	3
Establishing a multiregional sustainable agriculture system: Biochar-centered climate-smart practices to boost low-carbon circular bioeconomy	USDA Sustainable Agricultural Systems		Not awarded (2024)	2, 3, 4
Advancing next-generation microwave heating systems for industrial applications: utilizing solid-state generators and artificial intelligence for improved heating performance and high-quality food	Post-Doc Fellowship, Washington Research Foundation		Not awarded (2023)	1, 2, 3, 4
Hybrid heating via hydrogen (“3h”): a composite approach to decarbonized and enhanced industrial-scale cooking/baking in food manufacturing	Department of Energy		Not awarded (2023)	2, 3
Exploring the application of solid-State 915-MHz microwave generators for commercial production of ready-to-eat meals	USDA-NIFA	\$594,000	Funded (2023-2027)	3, 5
Multiscale mathematical modeling-based design the next generation of microwave-assisted frying technology	USDA-NIFA	\$499,928	Funded (2020-2024)	5

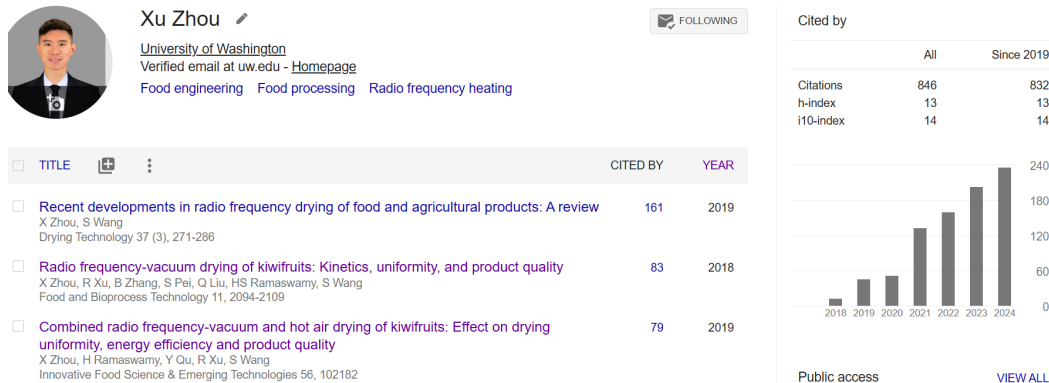
Peer-Reviewed Publications

1. **Zhou, X.,** Tang, J. (2024). Microwave-Assisted Thermal Sterilization and Pasteurization. In: Pratap Singh, A., Erdogdu, F., Wang, S., Ramaswamy, H.S. (eds) *Microwave Processing of Foods: Challenges, Advances and Prospects*. Food Engineering Series. Springer, Cham.

2. **Zhou, X.**, Czekala, P., Olszewska–Placha, M., Salski, B., Zhang, S., Pedrow, P.D., Sablani, S.S., Tang, J. (2024). Understanding microwave heating of oil. *Journal of Food Engineering* 375, 112039
3. **Zhou, X.**, Gezahegn, Y., Zhang, S., Tang, Z., Takhar, P.S., Pedrow, P.D., Sablani, S.S., & Tang, J. (2023). Theoretical reasons for rapid heating of vegetable oils by microwaves. *Current Research in Food Science* 7, 100641.
4. **Zhou, X.**, Pedrow, P.D., Tang, Z., Bohnet, S., Sablani, S.S., & Tang, J. (2023). Heating performance of microwave ovens powered by magnetron and solid-state generators. *Innovative Food Science & Emerging Technologies* 83, 103240.
5. **Zhou, X.**, Tang, Z., Pedrow, P.D., Sablani, S.S., & Tang, J. (2023). Microwave heating based on solid-state generators: New insights into heating pattern, uniformity, and energy absorption in foods. *Journal of Food Engineering* 357, 111650.
6. **Zhou, X.**, Zhang, S., Tang, Z., Tang, J., & Takhar, P.S. (2022). Microwave frying and post-frying of French fries. *Food Research International* 159, 111663.
7. **Zhou, X.**, & Wang, S. (2019). Recent developments in radio frequency drying of food and agricultural products: A review. *Drying Technology* 37(3), 271-286.
8. **Zhou, X.**, Ramaswamy, H., Qu, Y., Xu, R., & Wang, S. (2019). Combined radio frequency-vacuum and hot air drying of kiwifruits: Effect on drying uniformity, energy efficiency and product quality. *Innovative Food Science & Emerging Technologies* 56, 102182.
9. **Zhou, X.**, Gao, H., Mitcham, E., & Wang, S. (2018). Comparative analyses of three dehydration methods on drying characteristics and oil quality of in-shell walnuts. *Drying Technology* 36(4), 477-490.
10. **Zhou, X.**, Li, R., Lyng, J.G., & Wang, S. (2018). Dielectric properties of kiwifruit associated with a combined radio frequency vacuum and osmotic drying. *Journal of Food Engineering* 239, 72-82.
11. **Zhou, X.**, Xu, R., Zhang, B., Pei, S., Liu, Q., Ramaswamy, H.S., & Wang, S. (2018). Radio frequency-vacuum drying of kiwifruits: Kinetics, uniformity, and product quality. *Food and Bioprocess Technology* 11, 2094-2109.
12. Zhang, S., Yang, R., **Zhou, X.**, Feng, Y., Tang, J. (2024). Salmonella control for dried apple cubes. *Food Control* 162, 110428
13. Sun, S., Xie, Y., **Zhou, X.**, Zhu, M.-J., Sablani, S., & Tang, J. (2023). Survival and thermal resistance of Salmonella in chocolate products with different water activities. *Food Research International*, 113209.
14. Zou, R., **Zhou, X.**, Qian, M., Wang, C., Boldor, D., Lei, H., & Zhang, X. (2023). Advancements and applications of microwave-assisted deep eutectic solvent (MW-DES) lignin extraction: a comprehensive review. *Green Chemistry* 26, 1153-1169.
15. Hou, L., **Zhou, X.**, & Wang, S. (2020). Numerical analysis of heat and mass transfer in kiwifruit slices during combined radio frequency and vacuum drying. *International Journal of Heat and Mass Transfer* 154, 119704.
16. Jiang, H., Ling, B., **Zhou, X.**, & Wang, S. (2020). Effects of combined radio frequency with hot water blanching on enzyme inactivation, color and texture of sweet potato. *Innovative Food Science & Emerging Technologies* 66, 102513.
17. Kou, X., Li, R., Hou, L., Cheng, T., **Zhou, X.**, & Wang, S. (2018). Evaluation of a heating block system for accurate temperature-time controlled pasteurization treatments on various foods. *International Journal of Agricultural and Biological Engineering* 11(3), 220-228.

18. Wang, C., Kou, X., **Zhou, X.**, Li, R., & Wang, S. (2021). Effects of layer arrangement on heating uniformity and product quality after hot air assisted radio frequency drying of carrot. *Innovative Food Science & Emerging Technologies* 69, 102667.
19. Zhang, L., Lyng, J.G., Xu, R., Zhang, S., **Zhou, X.**, & Wang, S. (2019). Influence of radio frequency treatment on in-shell walnut quality and *Staphylococcus aureus* ATCC 25923 survival. *Food Control* 102, 197-205.
20. Zhang, S., Zhang, L., Lan, R., **Zhou, X.**, Kou, X., & Wang, S. (2018). Thermal inactivation of *Aspergillus flavus* in peanut kernels as influenced by temperature, water activity and heating rate. *Food Microbiology* 76, 237-244.

[Google Scholar](#) (accessed November 2024)



Conference Presentations

1. **Zhou, X & Tang, J.** (2024). Why solid-state microwave generators are the future of microwave heating? Oral presentation in 2024 Conference of Food Engineering, Seattle, WA, USA, August 25-28.
2. **Zhou, X.**, Zhang, S., Takhar, P., Pedrow, P., Sablani, S., & Tang, J. (2023). Why do microwaves heat oil faster than water? Oral presentation in 2023 ASABE AIM, Omaha, Nebraska, USA, July 2023 (*won the Student Oral Presentation Competition Award*)
3. **Zhou, X.**, Tang, Z., Pedrow, P., Sablani, S., & Tang, J. (2023). Can solid-state microwaves provide predictable and stable heating patterns of foods? Oral presentation in 2023 ASABE AIM, Omaha, Nebraska, USA, July 2023 (*won the Student Oral Presentation Competition Award*)
4. **Zhou, X.**, Zhang, S., Tang, Z., Takhar, P., Pedrow, P., Sablani, S., & Tang, J. (2023). Microwave heating of vegetable oils. Oral presentation in IMPI's 57th annual microwave power symposium, Denver, Colorado, USA, June 2023.
5. **Zhou, X.**, Zhang, S., Tang, Z., Takhar, P.S., Tang, J. (2022) Microwave frying and post-frying for oil reduction of French fries, Oral presentation in the 4th Global Congress on Microwave Energy Applications (4GCMEA), Virtual, August 2022.
6. **Zhou, X.**, Tang, Z., Takhar, P.S, Tang, J. (2022) Computer simulation of microwave frying. Poster presentation in IMPI's 56th annual microwave power symposium, Savannah, GA, USA, June 2022

Professional Affiliations

- Society of Food Engineering
- American Society of Agricultural and Biological Engineers
- Institute of Food Technologists
- International Microwave Power Institute