Curriculum Vitae

Shuhao Liu, Ph.D.

Assistant Professor, Department of Chemical Engineering

The University of Texas at Tyler, RBN 2041, 3900 University Blvd., Tyler, TX 75799

Email: sliu@uttyler.edu | Phone: 903-566-6332 | ORCID: [0000-0002-8024-4069] |
https://www.uttyler.edu/directory/chemical-engineering/shuhao-liu.php

https://scholar.google.com/citations?user=RTVsGi0AAAAJ&hl=en

Summary Statement:

Assistant Professor of Chemical Engineering at the University of Texas at Tyler, specializing in interfacial phenomena, functional surfaces, and nanomaterials. Research focuses on advanced material surface modification and colloid/nanoparticle engineering to develop antifouling and antimicrobial coatings, drug delivery systems, and composite materials. Has a strong record of peer-reviewed publications, conference presentations, and collaborative projects across academia and industry. Committed to mentoring students and advancing interdisciplinary research to provide innovative solutions for food safety, biomedical applications, and energy systems.

Education:

2019-2022	**Doctor of Philosophy** Department of Chemical Engineering, Texas A&M University, Texas, United States Advisor: Dr. Mustafa Akbulut Dissertation Title: "Development and Characterization of Functional Surfaces and Coatings with Microorganism Repellent and Inactivity Properties for Enhanced Hygiene and Safety"
2016-2018	**Master of Science** Department of Materials Science and Engineering, Texas A&M University, Texas, United States Advisor: Dr. Mustafa Akbulut Thesis Title: "Investigation into the Bacterial Repelling Behavior of Superhydrophobic Modified Metal Surfaces for Food Safety and Hygiene"
2012-2016	**Bachelor** Material Chemistry, Department of Chemical Engineering, Nanjing University of Science and Technology, Nanjing, China

Research Interests:

- **Interfacial Phenomena:** adsorption and desorption at solid–liquid and liquid–liquid interfaces.
- **Functional Surfaces and Materials:** Antifouling and antimicrobial coatings; self-cleaning and hygienic surfaces; food packaging materials with active protection.
- **Colloids and Nanomaterials:** Nanoencapsulation systems for controlled drug delivery; carrier design for targeted and sustained release.
- **Composite Materials:** Antimicrobial polymer composites; thermal interface materials combining metals and soft matter.
- **Industrial Applications:** Surfactants and emulsions for formulation science; enhanced oil recovery; stimuli-responsive supramolecular fluids for energy and environmental processes.

Experience:

2024-Recent	Assistant Professor
	The University of Texas at Tyler
2022-2024	Postdoc fellow, supervisor: Dr.Keith Johnston & Dr. Guihua Yu
	The University of Texas at Austin
2016-2022	Research Assistant, supervisor: Dr. Mustafa Akbulut
	Texas A&M University
2021 Sept-Dec.	Teaching Assistant, Applications of Thermodynamics to Chemical Engineering

Awards:

2025	Rising STARs Award (The University of Texas System)
2021	Phillips 66 Technical Fellowship

Grant Awards:

2023	"Asphaltene Inhibitor Delivery Systems to Increase the Lifetime of Squeeze Treatments" by Shell and AEC from July 2023 to July 2024 (PI: Keith Johnston)

Publications:

1 Chang, T.; **Liu, S.;** Huang, P.-W.; Lei, C.; Klevan, C.; LaValley, D.; Mahambare, A.; Park, T.; Ahmadian, M.; Pennell, K. D.; Abriola, L. M.; Yu, G.; Johnston, K. P. Ultra Long-Term Release of Oligomeric Surfactants from Mesoporous Silica Nanoparticles into Organic Solvents. Colloids Surf., A, under revision.

2 Bae, M.; Lewis, A.; **Liu, S.;** Arcot, Y.; Lin, Y.-T.; Viswanadha, L. S.; Bernal, J. S.; Akbulut, M.; Cisneros-Zevallos, L. Tailoring Biopesticides: Amphiphile-Assisted Nanoprecipitation of Azadirachtin within a Glycine Matrix for Sustainable Agriculture, Enhanced Stability, and Larvicidal Efficacy against Fall Armyworm. ACS Omega 2025, accepted Aug 2025

3 Zhou, W.; **Liu, S.**; DeFlorio, W.; Song, S. H.; Choi, H.; Cisneros-Zevallos, L.; Oh, J. K.; Akbulut, M. E. Nanostructured Antifouling Coatings for Galvanized Steel Food Storage and Container Surfaces to Enhance Hygiene and Corrosion Resistance against Bacterial, Fungal, and Mud Contamination. *J. Food Eng.* **2024**, *363*, 111784.

4 **Liu, S.**; Iepure, M.; Zhou, W.; DeFlorio, W.; Akbulut, M. E.; Min, Y. Electrospun Superhydrophobic Polyvinyl Chloride/Polydimethylsiloxane-Nanodiamond Nanocomposite with Enhanced Antifouling and Mechanical Properties for Fresh Produce Packaging. *Appl. Food Res.* **2024**, *4* (1), 100417.

5 Lin, Y.-T.; Zhou, W.; **Liu, S.**; Bhat, B.; Kuan, K.-Y.; Pahari, S.; Kwon, J.; Akbulut, M. E. Influence of Chain Length of Amido Betaines and Amine Degree of Diamines on the Binary Supramolecular Assembly and Viscosity Dynamics of Amido Betaine/Diamine Coacervates. *JCIS Open* **2024**, *14*, 100112.

6 Pahari, S.; Lin, Y.-T.; **Liu, S.**; Lee, C. H.; Akbulut, M.; Kwon, J. S.-I. Stochastic Optimal Control of Mesostructure of Supramolecular Assemblies Using Dissipative Particle Dynamics and Dynamic Programming with Experimental Validation. *Chem. Eng. J.* **2023**, *475*, 145087.

7 Mu, M.; **Liu, S.**; DeFlorio, W.; Hao, L.; Wang, X.; Salazar, K. S.; Taylor, M.; Castillo, A.; Cisneros-Zevallos, L.; Oh, J. K. Influence of Surface Roughness, Nanostructure, and Wetting on Bacterial Adhesion. *Langmuir* **2023**, *39* (15), 5426–5439.

8 Mu, M.; Lin, Y.-T.; DeFlorio, W.; Arcot, Y.; **Liu, S.**; Zhou, W.; Wang, X.; Min, Y.; Cisneros-Zevallos, L.; Akbulut, M. Multifunctional Antifouling Coatings Involving Mesoporous Nanosilica and Essential Oil with Superhydrophobic, Antibacterial, and Bacterial Antiadhesion Characteristics. *Appl. Surf. Sci.* **2023**, *634*, 157656.

9 **Liu, S.**; Lin, Y.-T.; Bhat, B.; Pahari, S.; Kuan, K.-Y.; De, A.; Kwon, J. S.-I.; Akbulut, M. E. Dynamic, Hollow Nanotubular Networks with Superadjustable pH-Responsive and Temperature Resistant Rheological Characteristics. *Chem. Eng. J.* **2023**, *452*, 139364.

10 Lin, Y.-T.; **Liu, S.**; Bhat, B.; Kuan, K.-Y.; Zhou, W.; Cobos, I. J.; Kwon, J. S.-I.; Akbulut, M. E. pH-and Temperature-Responsive Supramolecular Assemblies with Highly Adjustable Viscoelasticity: A Multi-Stimuli Binary System. *Soft Matter* **2023**, *19* (29), 5609–5621.

11 DeFlorio, W.; **Liu, S.**; Arcot, Y.; Ulugun, B.; Wang, X.; Min, Y.; Cisneros-Zevallos, L.; Akbulut, M. Durable Superhydrophobic Coatings for Stainless-Steel: An Effective Defense against Escherichia Coli and Listeria Fouling in the Post-Harvest Environment. *Food Res. Int.* **2023**, *173*, 113227.

12 Pahari, S.; **Liu, S.**; Lee, C. H.; Akbulut, M.; Kwon, J. S.-I. SAXS-Guided Unbiased Coarse-Grained Monte Carlo Simulation for Identification of Self-Assembly Nanostructures and Dimensions. *Soft Matter* **2022**, *18* (28), 5282–5292.

13 DeFlorio, W.; Crawford, K.; **Liu, S.**; Hua, Y.; Cisneros-Zevallos, L.; Akbulut, M. Facile, Fluorine-Free Fabrication of Bacterial Antifouling Titanium Alloy Ti6Al4V Surfaces for Surgically Implanted Devices. *Surf. Coat. Technol.* **2022**, *443*, 128580.

14 Bhat, B.; Pahari, S.; **Liu, S.**; Lin, Y.-T.; Kwon, J. S.-I.; Akbulut, M. Nanostructural and Rheological Transitions of pH-Responsive Supramolecular Systems Involving a Zwitterionic Amphiphile and a Triamine. *Colloids Surf. Physicochem. Eng. Asp.* **2022**, *654*, 130067.

15 Bae, M.; Lewis, A.; **Liu, S.**; Arcot, Y.; Lin, Y.-T.; Bernal, J. S.; Cisneros-Zevallos, L.; Akbulut, M. Novel Biopesticides Based on Nanoencapsulation of Azadirachtin with Whey Protein to Control Fall Armyworm. *J. Agric. Food Chem.* **2022**, *70* (26), 7900–7910.

16 Yegin, Y.; Perez-Lewis, K. L.; **Liu, S.**; Kerth, C. R.; Cisneros-Zevallos, L.; Castillo, A.; Akbulut, M.; Taylor, T. M. Antimicrobial-Loaded Polymeric Micelles Inhibit Enteric Bacterial Pathogens on Spinach Leaf Surfaces during Multiple Simulated Pathogen Contamination Events. *Front. Sustain. Food Syst.* **2021**, *5*, 646980.

17 **Liu, S.**; Ulugun, B.; DeFlorio, W.; Arcot, Y.; Yegin, Y.; Salazar, K. S.; Castillo, A.; Taylor, T. M.; Cisneros-Zevallos, L.; Akbulut, M. Development of Durable and Superhydrophobic Nanodiamond Coating on Aluminum Surfaces for Improved Hygiene of Food Contact Surfaces. *J. Food Eng.* **2021**, 110487.

18 **Liu, S.**; Lin, Y.-T.; Bhat, B.; Kuan, K.-Y.; Kwon, J. S.-I.; Akbulut, M. pH-Responsive Viscoelastic Supramolecular Viscosifiers Based on Dynamic Complexation of Zwitterionic Octadecylamidopropyl Betaine and Triamine for Hydraulic Fracturing Applications. *RSC Adv.* **2021**, *11* (37), 22517–22529.

19 **Liu, S.**; Bae, M.; Hao, L.; Oh, J. K.; White, A. R.; Min, Y.; Cisneros-Zevallos, L.; Akbulut, M. Bacterial Antifouling Characteristics of Helicene—Graphene Films. *Nanomaterials* **2021**, *11* (1), 89.

20 Lei, S.; Huang, D.; **Liu, S.**; Chen, M.; Ma, R.; Zeng, M.; Li, D.; Ma, W.; Wang, L.; Cheng, Z. Templating Synthesis of Natural Cotton-Based Hierarchically Structured Carbon Hollow Microfibers for High-Performance Solar Vapor Generation. *J. Mater. Chem. A* **2021**, *9* (27), 15346–15354.

21 DeFlorio, W.; **Liu, S.**; White, A. R.; Taylor, T. M.; Cisneros-Zevallos, L.; Min, Y.; Scholar, E. M. Recent Developments in Antimicrobial and Antifouling Coatings to Reduce or Prevent Contamination and Cross-contamination of Food Contact Surfaces by Bacteria. *Compr. Rev. Food Sci. Food Saf.* **2021**, *20* (3), 3093–3134.

22 Bhat, B.; **Liu, S.**; Lin, Y.-T.; Sentmanat, M. L.; Kwon, J.; Akbulut, M. Supramolecular Dynamic Binary Complexes with pH and Salt-Responsive Properties for Use in Unconventional Reservoirs. *PloS One* **2021**, *16* (12), e0260786.

23 Bae, M.; Oh, J. K.; **Liu, S.**; Nagabandi, N.; Yegin, Y.; DeFlorio, W.; Cisneros-Zevallos, L.; Scholar, E. M. Nanotoxicity of 2D Molybdenum Disulfide, MoS2, Nanosheets on Beneficial Soil Bacteria, Bacillus Cereus and Pseudomonas Aeruginosa. *Nanomaterials* **2021**, *11* (6), 1453.

24 Arcot, Y.; **Liu, S.**; Ulugun, B.; DeFlorio, W.; Bae, M.; Salazar, K. S.; Taylor, T. M.; Castillo, A.; Cisneros-Zevallos, L.; Scholar, E. M. Fabrication of Robust Superhydrophobic Coatings onto High-Density Polyethylene Food Contact Surfaces for Enhanced Microbiological Food Safety. *ACS Food Sci. Technol.* **2021**, *1* (7), 1180–1189.

25 Zhao, X.; Vashisth, A.; Blivin, J. W.; Tan, Z.; Holta, D. E.; Kotasthane, V.; Shah, S. A.; Habib, T.; **Liu, S.**; Lutkenhaus, J. L. pH, Nanosheet Concentration, and Antioxidant Affect the Oxidation of Ti3C2Tx and Ti2CTx MXene Dispersions. *Adv. Mater. Interfaces* **2020**, *7* (20), 2000845.

26 **Liu, S.**; Zheng, J.; Hao, L.; Yegin, Y.; Bae, M.; Ulugun, B.; Taylor, T. M.; Scholar, E. A.; Cisneros-Zevallos, L.; Oh, J. K. Dual-Functional, Superhydrophobic Coatings with Bacterial Anticontact and Antimicrobial Characteristics. *ACS Appl. Mater. Interfaces* **2020**, *12* (19), 21311–21321.

27 Baticados, E. J. N.; Capareda, S. C.; **Liu, S.**; Akbulut, M. Advanced Solar Still Development: Improving Distilled Water Recovery and Purity via Graphene-Enhanced Surface Modifiers. *Front. Environ. Sci.* **2020**, *8*, 531049.

28 Oh, J. K.; **Liu, S.**; Jones, M.; Yegin, Y.; Hao, L.; Tolen, T. N.; Nagabandi, N.; Scholar, E. A.; Castillo, A.; Taylor, T. M. Modification of Aluminum Surfaces with Superhydrophobic Nanotextures for Enhanced Food Safety and Hygiene. *Food Control* **2019**, *96*, 463–469.

29 Hao, L.; Yegin, C.; Chen, I.-C.; Oh, J. K.; **Liu, S.**; Scholar, E.; Zhang, L.; Akbulut, M.; Jiang, B. pH-Responsive Emulsions with Supramolecularly Assembled Shells. *Ind. Eng. Chem. Res.* **2018**, *57* (28), 9231–9239.

30 Hao, L.; Chen, I.-C.; Oh, J. K.; Nagabandi, N.; Bassan, F.; **Liu, S.**; Scholar, E.; Zhang, L.; Akbulut, M.; Jiang, B. Nanocomposite Foam Involving Boron Nitride Nanoplatelets and Polycaprolactone: Porous Structures with Multiple Length Scales for Oil Spill Cleanup. *Ind. Eng. Chem. Res.* **2017**, *56* (49), 14670–14677.

PRESENTATION & CONFERENCE:

1 Chang, T.; Liu, S.; Huang, P.-W.; Lei, C.; Klevan, C.; Pai, A.; Jesurum, G.; Pencarinha, C.; Kosieja, S.; Pennell, K.; Abriola, L.; Yu, G.; Johnston, K. P. Extended Release of Asphaltene Inhibitor Polymers from Mesoporous Nanoparticles into Organic Solvents; AIChE, 2025.

2 Liu, S. Improved Antifouling Characteristics of Material Surfaces by Applying Nanomaterials and Surface Modifications. 41st Southern Biomedical Engineering Conference, 2025.

3 Chang, T.; Liu, S.; Lei, C.; Park, T.; Huang, P.-W.; Klevan, C.; Pennell, K.; Abriola, L.; Yu, G.; Johnston, K. P. Controlled Release of Asphaltene Inhibitors from Nanomaterials in Oil and Gas Production; AIChE, 2024.

4 Mu, M.; Liu, S.; DeFlorio, W.; Hao, L.; Wang, X.; Salazar, K. S.; Taylor, M.; Castillo, A.; Cisneros-Zevallos, L.; Oh, J. K. Correlations between Bacterial Adhesion and Surface Roughness and Topography; AIChE, 2023.

5 Mu, M.; Lin, Y.-T.; DeFlorio, W.; Arcot, Y.; Liu, S.; Zhou, W.; Wang, X.; Min, Y.; Cisneros-Zevallos, L.; Akbulut, M. Essential Oil-Loaded Mesoporous Silica Nanoparticles for the Development of Multifunctional Nonfouling Coatings; AIChE, 2023.

6 Liu, S.; Zhou, W.; Mu, M.; DeFlorio, W.; Song, S. H.; Choi, H. Y.; Cisneros-Zevallos, L.; Oh, J. K.; Akbulut, M. Fungally and Bacterially Antifouling Coatings for Galvanized Steel Surfaces; AIChE, 2023.

7 Liu, S.; Mu, M.; DeFlorio, W.; Arcot, Y.; Akbulut, M. Multifunctional Surfaces for Antibacterial Properties: Investigating the Effect of Surface Topography and Characteristics on Preventing Bacterial Adhesion.; AIChE, 2023.

8 Liu, S.; Lin, Y.-T.; Bhat, B.; Akbulut, M. Exploring the Potential of Smart Supramolecular Materials for Energy and Beyond; AIChE, 2023.

9 Liu, S.; Lei, C.; Park, T.; Chang, T.; Klevan, C.; Pennell, K.; Abriola, L.; Yu, G.; Johnston, K. P. Development and Characterization of Adsorption and Desorption of Polymers from Mesoporous Materials with Application to Controlled Release of Inhibitors in Oil Production; AIChE, 2023.

10 Liu, S. Advancements in Nanoengineering: Colloidal Soft Materials & Advanced Coatings for Energy and Bio-Applications; AIChE, 2023.

11 Pahari, S.; Liu, S.; Akbulut, M.; Kwon, J. Unbiased Coarse-Grained Monte Carlo Simulation Using SAXS-Data for Identification of Self-Assembled Nanostructures; AIChE, 2022.

12 Pahari, S.; Liu, S.; Akbulut, M.; Kwon, J. Optimal Feedback Morphology Control of Amphiphile Self-Assembly Using Markov State Models: Numerical Studies and Experimental Validation; AIChE, 2022.

13 Liu, S.; DeFlorio, W.; Taylor, T. M.; Masabni, J. G.; Cisneros-Zevallos, L.; Akbulut, M. Multifunctional Antimicrobial and Antifouling Coating on Metal Surfaces for Enhanced Hygiene during Post-Harvest Process; ASHS, 2022.

14 DeFlorio, W.; Liu, S.; Taylor, T. M.; Cisneros-Zevallos, L.; Masabni, J. G.; Akbulut, M. Superhydrophobic Bacterial Antifouling Steel and Stainless-Steel Surfaces to Minimize Post-Harvest Escherichia Coli O157: H7 Cross Contamination; ASHS, 2022.

15 Bhat, B.; Pahari, S.; Liu, S.; Lin, Y.-T.; Kwon, J.; Akbulut, M. Morphological and Rheological Transitions of Zwitterionic Surfactant Based pH-Tunable Dynamic Binary Complex Coacervates; AIChE, 2022.

16 Bhat, B.; Liu, S.; Lin, Y.-T.; Kwon, J.; Akbulut, M. pH and Salt-Responsive Dynamic Binary Complexes Based on Supramolecular Complexation with Applications in Unconventional Reservoirs; AIChE, 2022.

17 Aydin, H.; Boppano, N.; Yurukcu, M.; Liu, S.; Yegin, C.; Temizel, C. A Comprehensive Review of RTA/DCA Methods in Unconventional Reservoirs; SPE, 2022; p D021S009R005.

18 Liu, S.; Lin, Y.-T.; Bhat, B.; Kwon, J.; Akbulut, M. Ph-Responsive Viscoelastic Gel Based on Dynamic Binary Complex As Viscosity Modifying Agent for Hydraulic Fracturing; AIChE, 2021.

19 Liu, S.; DeFlorio, W.; Taylor, T.; Cisneros-Zevallos, L.; Akbulut, M. Bacterial Anti-Adhesive and Antifouling Nanofiber for Enhance Food Safety and Hygiene; AIChE, 2021.

20 Lin, Y.-T.; Liu, S.; Bhat, B.; Kwon, J.; Akbulut, M. A Gemini-like Viscoelastic Surfactant System with pH Adjustable and High Salt Tolerance Properties Applied in the Area of Fracturing Fluid; AIChE, 2021.

21 DeFlorio, W.; Oh, J. K.; Liu, S.; Hao, L.; Kim, S. B.; Min, Y.; Taylor, M.; Castillo, A.; Cisneros-Zevallos, L.; Akbulut, M. Surface Wettability and Roughness Play a Key Role in Bacterial Adsorption Kinetics; AIChE, 2021.

22 Bhat, B.; Liu, S.; Lin, Y.-T.; Akbulut, M.; Kwon, J. Novel Zwitterionic Surfactant Based pH-Tunable Dynamic Binary Complex with Potential for Hydraulic Fracturing Applications; AIChE, 2021.

23 Liu, S.; Yegin, Y.; Oh, J. K.; Akbulut, M. Development of Dual Functional Superhydrophobic Coatings with Bacterial Antimicrobial and Anticontact Characteristics. In IAFP 2020; IAFP, 2020.

24 Liu, S.; Ulugunb, B.; DeFlorio, W.; Taylor, T.; Cisneros-Zevallos, L.; Akbulut, M. Development of Bacterial Anti-Adhesive and Antifouling Coatings for Metal Surfaces to Enhance Food Safety and Hygiene; IFT, 2020.

25 Liu, S.; Lin, Y.-T.; Bhat, B.; Kwon, J.; Akbulut, M. Dynamic Binary Complexes As Super-Adjustable Viscosity Modifiers for Hydraulic Fracturing Fluids; AIChE, 2020.

26 Liu, S.; Bhat, B.; Lin, Y.-T.; Kwon, J.; Akbulut, M. Interactions of Proppant with Dynamically Complexing, pH-Responsive Viscosity Modifying Agents for Hydraulic Fracture Fluids; AIChE, 2020.

27 Liu, S.; Arcot, Y.; DeFlorio, W.; Taylor, T.; Cisneros-Zevallos, L.; Akbulut, M. Durable Superhydrophobic Coatings on Polymer Surfaces With Bacterial Anti-Adhesion Characteristics; IFT, 2020.

28 Liu, S.; Akbulut, M. Modification of Metal Surfaces with Dual-Functional, Superhydrophobic Coating for Bacterial Antiadhesion and Antimicrobial; AIChE, 2020.

29 Lin, Y.-T.; Liu, S.; Bhat, B.; Kwon, J.; Akbulut, M. Proppant Transport with a Reversible and pH Adjustable Supramolecular Material Used As Viscous Fracturing Fluid; AIChE, 2020.

30 Bhat, B.; Liu, S.; Lin, Y.-T.; Kwon, J.; Akbulut, M. Novel pH-Switchable Viscosity Modifiers to Improve Rheology and Cost Efficiency of Hydraulic Fracturing Fluids; AIChE, 2020.

31 Liu, S.; Bae, M.; Yegin, Y.; Huang, S.; Oh, J. K.; Min, Y.; Akbulut, M. The Role of Intermolecular and Surface Forces on the Kinetics and Thermodynamics of Bacterial Adhesion; AIChE, 2019.

32 Liu, S.; Bae, M.; Oh, J. K.; Akbulut, M. Modification of Metal Surfaces with Superhydrophobic Nanotextures for Enhanced Food Safety and Hygiene; AIChE, 2019.

33 Liu, S.; Bae, M.; Oh, J. K.; Akbulut, M. Bacterially Super Anti-Adhesive, Optically Transparent Coatings Inspired from Rice Leaves; AIChE, 2019.

34 Liu, S.; Akbulut, M. Colloidal Stability and Interparticle Interactions of Proppant Dispersed in pH-Responsive, Supramolecular Hydraulic Fracturing Fluids; AIChE, 2019.

35 Bae, M.; Liu, S.; Oh, J. K.; Akbulut, M. Investigation of Mechanical Properties of Femur and Tibia Articulations of Insect Joints; AIChE, 2019.