Ziwen He

University of Minnesota Twin Cities (Zasadzinski's lab)
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PRINCIPAL INTERESTS

Interfacial science, multiphase flows, thin film dynamics, fluids rheology, lung surfactants, drop wetting

ACADEMIC BACKGROUND

Ph.D. Mechanical Engineering — Dec 2023
Baylor University, Waco, TX

- Ph.D. research in fluid mechanics under direction of Dr. Min Y. Pack. Dissertation title: Air entrainment dynamics under droplets from Newtonian to non-Newtonian fluids and their applications.

M.S. Mechanical Engineering — Aug 2023
Baylor University, Waco, TX

B.S. Mechanical and Civil Engineering — May 2019
Florida Institute of Technology, Melbourne, FL

B.S. Mechanical Engineering — May 2017
Shijiazhuang TieDao University, Shijiazhuang, Hebei

EMPLOYMENT HISTORY

Post-doctoral Associate — Jan 2024 - Present
Department of Chemical Engineering and Materials Science
University of Minnesota Twin Cities, Minneapolish, MN
Advisor: Prof. Joseph Zasadzinski

Research Assistant/Lab Manager — Jan 2021 - Dec 2023
Department of Mechanical Engineering
Baylor University, Waco, TX

Teaching Assistant — May 2020 - Jan 2021
Department of Mechanical Engineering
Baylor University, Waco, TX

Graudate Assistant — Aug 2019 - May 2020
Department of Mechanical Engineering
Baylor University, Waco, TX

REFEREED JOURNAL PUBLICATIONS

See also my google scholar page.

13. Upoma, M. A., **He, Z.**, Tran, H., Sivells, T., Cyran, J. D., & Pack, M. Y. (2024). Effects of Dye Addition on the Rheological Properties of Aqueous Polymer Solutions. Effects of Dye Addition on the Rheological Properties of Aqueous Polymer Solutions. *Langmuir*.

12. Pirdavari, P., Tran, H., **He, Z.**, & Pack, M. Y. (2024). Drainage-induced spontaneous film climbing in capillaries. Drainage-induced spontaneous film climbing in capillaries. *Physical Review Fluids*, 9(9), 094005.
11. Pirdavari, P., Pourfattah, F., Tran, H., Wang, L., **He, Z.**, & Pack, M. Y. (2024). Experimental and numerical study on the performance index of mixing for low aspect ratio serpentine microchannels. Experimental and numerical study on the performance index of mixing for low aspect ratio serpentine microchannels. *Engineering Research Express*, 6(3), 035009.
10. Huang, B., Iasella, S., Rathi, M., Hassler, J., Ciutara, C., **He, Z.**, Morse, D., & Zasadzinski, J. A. (2024) New experiments and models to describe soluble surfactant adsorption above and below the critical micelle concentration. *Journal of Colloid and Interface Science*.
9. **He, Z.**, Upoma, M. A., & Pack, M. Y. (2023). Dual nature of volatility on drop wetting dynamics of acetone–isopropanol mixtures on ultrathin smooth oil films. *Physics of Fluids*, 35(1), 012115.
8. Tran, H., **He, Z.**, Pirdavari, P., & Pack, M. Y. (2023). Interplay of Drop Shedding Mechanisms on High Wettability Contrast Biphilic Stripe-Patterned Surfaces. *Langmuir*.
7. **He, Z.**, Tran, H., & Pack, M. Y. (2022). Air entrainment dynamics of aqueous polymeric droplets from dilute to semidilute unentangled regimes. *Physics of Fluids*.
6. Tran, H., **He, Z.**, Sakakeeny, J., Ling, Y., & Pack, M. Y. (2022). Oscillation Dynamics of Drops on Immiscible Thin Liquid Films. *Langmuir*, 38(3), 1243-1251.
5. **He, Z.**, Tran, H., & Pack, M. Y. (2021). Drop Bouncing Dynamics on Ultrathin Films. *Langmuir*, 37(33), 10135-10142.
4. **He, Z.**, Tran, H., & Pack, M. Y. (2024). Capillary wave-assisted collapse of non-Newtonian droplets. *Physics of Fluids*. (In Press)
3. Tran, H., **He, Z.**, & Pack, M. Y. (2024). Microbubble entrainment on thin liquid films under drop impacts. *Nature Communication*. (Under Review)
2. **He,Z.**, & Pack, M. Y. Drop imact of immiscible fluids. *Annual Review of Fluid Mechanics*. (Under Preparation)
1. Haider, O. **He, Z.**, Zasadzinski, J. A., & Walker, M. L., Interfacial processing and characterization for control of interfacially-dominated soft materials using Microtensiometer platform. *Advances in Colloid and Interface Science*. (Under Preparation)

CONFERENCE PRESENTATIONS

19. **He Z.**, Tran H., & Pack M.Y., "The Determination of the Critical Concentrations of Aqueous Polymeric Solutions Using the Fingerprint of Impacting Drops", AIChE Annual Meeting, San Diego, CA, 2024
18. Pirdavari, P., Tran H., **He Z.**, & Pack M.Y., "Spontaneous Climbing of Thin Films Due to Drainage-Induced Surfactant Marangoni Effect", AIChE Annual Meeting, San Diego, CA, 2024
17. **He Z.**, Tran H., & Pack M.Y., "Central Collapse of non-Newtonian Droplets", American Physical Society, DFD, Washington, DC, 2023
16. **He Z.**, Tran H., & Pack M.Y., "Collapse of non-Newtonian droplets", Bluebonnet Symposium. SMU, Dallas, TX, 2023

15. **He Z.**, Tran H., & Pack M.Y., "Air entrainment dynamics under bouncing Boger droplets", American Physical Society, DFD, Indianapolis, IN, 2022.
14. Tran H., **He Z.**, & Pack M.Y., "The interplay of dropwise condensation and drop shedding mechanism on biphilic patterned surfaces", American Physical Society, DFD, Indianapolis, IN, 2022.
13. **He Z.**, Tran H., & Pack M.Y., "Air entrainment dynamics under xanthan gum droplets from dilute to semi-dilute regimes", American Chemical Society, Colloid & Surface Science Symposium, Golden, CO, 2022.
12. Tran H., **He Z.**, & Pack M.Y., "Dropwise condensation on biphilic patterned surfaces with multiple thermal conductivities", American Chemical Society, Colloid & Surface Science Symposium, Golden, CO, 2022.
11. **He Z.**, Tran H., & Pack M.Y., " Air entrainment dynamics under xanthan gum droplets". Bluebonnet Symposium. University of Texas at Dallas, Dallas, TX, 2022.
10. Li J., **He Z.**, & Pack M., "Mesler entrainment-like microbubble entrainment on immiscible thin liquid films", American Physical Society, DFD, Phoenix, AZ, 2021.
9. Tran H., **He Z.**, & Pack M., "Drop oscillation dynamics on viscous thin immiscible liquid films: slip to pin transitions", American Physical Society, DFD, Phoenix, AZ, 2021.
8. Felton O., **He Z.**, & Pack M., "How does relative humidity affect the way water droplets interact with a surface?", American Physical Society, DFD, Phoenix, AZ, 2021.
7. **He Z.**, Tran H., & Pack M., "Entanglement attenuates the entrained air film underneath polymeric droplets", American Physical Society, DFD, Phoenix, AZ, 2021.
6. **He Z.**, Tran H., & Pack M., "Drop bouncing dynamics on ultra-thin films", American Physical Society, DFD, Phoenix, AZ, 2021.
5. **He. Z.**, Tran H., & Pack M., "The influence of polymer entanglement on air entrainment dynamics under droplet impacts", Society of Rheology 92nd Annual Meeting, Bangor, ME, 2021.
4. **He Z.**, Tran H., & Pack M., "Effect of polymer concentrations on air entrainment dynamics", American Chemical Society, Colloid & Surface Science Symposium, University Park, PA, 2021.
3. Tran H., **He Z.**, Sakakeeny J., Ling S., & Pack M., "Drop oscillation dynamics on thin immiscible liquid films", American Chemical Society, Colloid & Surface Science Symposium, University Park, PA, 2021.
2. **He Z.**, Tran H., & Pack M., "Drop bouncing dynamics on draining films: the influence of the entrained air layer", American Physical Society, DFD, Chicago, IL, 2020.
1. **He. Z.**, Tran H., & Pack M., "Drop bouncing dynamics on draining films: the influence of the entrained air layer", American Chemical Society, Colloid & Surface Science Symposium, Houston, TX, 2020.

Poster Presentations

3. Suzuki B., Park A., **He Z.**, & Pack M., "Dye, polymer and light interactions using the air entrainment dynamics of droplets", American Physical Society, DFD, Indianapolis, IN, 2022.

2. Park A., **He Z.**, & Pack M., "Dye & light effects on droplet pinch-off dynamics", American Physical Society, DFD, Indianapolis, IN, 2022.
1. **He Z.**, Tran H., & Pack M., "Air entrainment dynamics under shear-thinning droplets", Society of Rheology, Chicago, IL, 2022.

SEMINARS & INVITED TALKS

4. **He, Z.**, Tran, H., & Pack, M. Y. (2023). Capillary wave-assisted Central Collapse of non-Newtonian Droplets. University of Minnesota Twin Cities.
3. **He, Z.**, Tran, H., & Pack, M. (2022). Air entrainment dynamics under shear thinning droplets. Bear Seminar. Baylor University.
2. **He, Z.**, Tran, H., & Pack, M. (2021). Entanglement attenuates the entrained air film underneath polymeric droplets. Bear Seminar. Baylor University.
1. **He, Z.**, Tran, H., & Pack, M. Y. (2021). Drop bouncing dynamics on ultrathin films. Bear Seminar. Baylor University.

HONORS AND AWARDS

- *The Graduate Travel Award*, Department of Mechanical Engineering, Baylor University, Waco, TX, Nov 2019 - Oct 2023
- *APS DFD Travel Grant*, American Physical Society, Phoenix, AZ, Oct 2021
- *Presidential English Proficiency Scholarship*, Department of Mechanical and Civil Engineering, Florida Institute of Technology, Melbourne, FL, Nov 2017
- *Florida Tech Transfer Scholarship*, Department of Mechanical Engineering, Florida Institute of Technology, Melbourne, FL, Aug 2017
- *National Encouragement Scholarship*, Department of Mechanical Engineering, Shijiazhuang TieDao University, Shijiazhuang, Hebei, May 2016
- *Academic Outstanding Student Scholarship*, Department of Mechanical Engineering, Shijiazhuang TieDao University, Shijiazhuang, Hebei, Nov 2015

SKILLS & TECHNIQUES

Data Analysis
Image analysis and visualization by ImageJ and MATLAB; Data analysis by Excel and JMP.

Equipment

Languages
English (Fluent), Mandarin Chinese (Native)

PROFESSIONAL AFFILIATIONS

- American Physical Society (APS)
- American Chemical Society (ACS)
- Society of Rheology (SOR)
- American Society of Mechanical Engineers (ASME)
- Society of Plastic Engineering (SPE)
- Biophysical Society

JOURNAL REFEREES

- Physics of Fluids
- Physical Review Journals
- Journal of Applied Physics
- APL photonics
- Journal of Fluids Engineering