

## Ziwen He

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University of Minnesota Twin Cities ([Zasadzinski's lab](#))  
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**PRINCIPAL INTERESTS** Interfacial science, multiphase flows, thin film dynamics, interfacial 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](#), Minneapolis, MN  
Advisor: [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

*Grauate Assistant* Aug 2019 - May 2020  
Department of Mechanical Engineering  
[Baylor University](#), Waco, TX

**REFEREED JOURNAL PUBLICATIONS** See also [my google scholar](#) page.

10. Pirdavari, P., Tran, H., **He, Z.**, & Pack, M. Y. (2024). Drainage-induced spontaneous film climbing in capillaries. *Physics of Fluids*. (Under Review)

9. **He, Z.**, Tran, H., & Pack, M. Y. (2024). Capillary wave-assisted collapse of non-Newtonian droplets. *Physical Review Letter*. (Under Review)

8. Tran, H., **He, Z.**, & Pack, M. Y. (2024). Microbubble entrainment on thin liquid films under drop impacts. *Journal of Fluid Mechanics*. (Under Review)
7. Upoma, M. A., **He, Z.**, Tran, H., & Pack, M. Y. (2024). Extensional Rheological Effects of Dye-Polymer Solutions. *Physics of Fluids*. (Under Review)
6. 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. *Journal of Micromechanics and Microengineering*. (Under Review)
5. **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.
4. Tran, H., **He, Z.**, Pirdavari, P., & Pack, M. Y. (2023). [Interplay of Drop Shedding Mechanisms on High Wettability Contrast Bipilic Stripe-Patterned Surfaces](#). *Langmuir*.
3. **He, Z.**, Tran, H., & Pack, M. Y. (2022). [Air entrainment dynamics of aqueous polymeric droplets from dilute to semidilute unentangled regimes](#). *Physics of Fluids*.
2. 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.
1. **He, Z.**, Tran, H., & Pack, M. Y. (2021). [Drop Bouncing Dynamics on Ultrathin Films](#). *Langmuir*, 37(33), 10135-10142.

#### 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 bipilic 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 bipilic 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

## FUNDED RESEARCH PROPOSALS

“ERI: Incipient contact dynamics of viscoelastic drops,” M. Y. Pack (PI) and Z. He (Co-PI), National Science Foundation (#2137341), 2022, \$200,000.00.

## SKILLS & TECHNIQUES

### *Data Analysis*

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

### *Equipment*

- Photron NOVA S9 High-speed Camera
- Phantom V211 High-speed Camera,
- Olympus IX83 Microscope
- Atomic Force Microscope (AFM)
- Scanned Electron Microscope (SEM)
- FLIR Blackfly S USB3 Camera 1.6MP, 226 fps NIKON D2300
- Laurell Spin Coater
- Syringe Pumps (Harvard Apparatus, New Era)
- Anton Paar MCR302e,
- Bohlin Gemini II Rheometer
- OceanOptics spectrometer
- Probe Ultrasonicator
- Corona treator
- Lasers (ThorLabs)
- Kruss K20 tensiometer

### *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)

**JOURNAL  
REFEREES**

- Physics of Fluids
- Physical Review Fluids
- Journal of Applied Physics
- APL photonics
- Journal of Fluids Mechanics
- Biophysical Journal