

Ziwen He

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 *Postdoctoral Research 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
Advisor: Min Y. Pack

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 See also my google scholar page.

JOURNAL

PUBLICATIONS 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

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.

CONFERENCE *Invited Talks*

- PRESENTATIONS**
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.

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.

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

- 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