Mr.W

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SUSTech, Shenzhen, Guangdong, 518055, China

EDUCATION BACKGROUND

Southern University of Science and Technology (SUSTech) September 2022 - June 2026

- **Major:** Theoretical and Applied Mechanics
- **Degree:** Bachelor of Science *(expected)*
- **GPA: 3.xx**/4.0 **Rank: x**/xx
- **Advisor:** Prof. L.
- **Research interests:** Fluid mechanics; Microfluidics; Ferrofluid; Interfacial phenomenon; Multiphase flows
- **Major Courses:** Fluid Mechanics (A), Fluid Mechanics Lab (A+), Mechanics of Material (A+), Elasticity (A+), Interfacial Phenomena (A), Heat Transfer (A-), Computational Solid Mechanics (A), Calculus I&II (A)

PUBLICATION

- **W.**, Dr. S., & P. L. (2024). Integrating AI and writing. *Journal of Computational Linguistics and Creative Writing*, *15*(2), 123–145.

PROJECT EXPERIENCE

Projects of the 2025 "Climbing Program" Special Funds October 2024 - September 2025

- *"Research and development of Polydimethylsiloxane (PDMS) chips for detection of microspheres and study on their microscopic flow mechanism"* .
- Collected alginate microspheres generated by HFE-7500 shearing in cross-junction PDMS chips under varied flow-rate ratios, recorded the formation process, and harvested the droplets for downstream solidification.
- Optimized alginate-microsphere collection and curing protocols, introducing an innovative scheme that yields highly spherical, uniform spheres with sustained process stability.
- Quantified the impact of distinct flow-rate ratios on droplet formation and final microsphere size, achieving stable production of spheres as small as 30 μm, thereby offering a new route for biological microsphere fabrication.
- This tunable relationship between flow rates and droplet characteristics holds significant promise for advancing microfluidic applications in precision biology, advanced material fabrication.

RESEARCH EXPERIENCE

Passive droplet generation in T-junction PDMS Chip April 2023 - June 2024

- Designed a T-junction PDMS chip with 50 μm channel width to visualize HFE-7100 shearing deionized water under varied flow rates using a high-speed camera.
- Discovered a new two-phase flow regime inside microchannel, provided an updated classification of existing regimes.
- Designed and conducted extensive experiments to elucidate the physical mechanisms governing regime transitions.
- Proposed universal regime-discrimination criteria for four two-phase flow patterns—dripping, threading, parallel with breakup, and parallel without breakup—based on flow-rate ratios and relevant dimensionless groups.
- Finalized a scholarly manuscript titled "Passive droplet generation in T-junction microchannel: Experiments and lattice Boltzmann Simulations" as the second author, which was received by *Micromachines*.

Passive droplet generation in different cross-junction PDMS Chips June 2024 - July 2025

- Designed eight cross-junction PDMS chips with 100 μm channel width and varied constriction sizes for passive droplet generation using HFE-7500 shearing deionized water.

- Conducted experiments by tuning the two-phase flow-rate ratio to quantify how constriction geometry influences droplet size, generation frequency, and pinch-off location.
- Analyzed the droplet-formation mechanisms in microchannels under different flow-rate ratios and chip designs.
- Manuscript summarizing these findings will be submitted to ***Chemical Engineering Journal*** *(IF: 13.2)*.

Flow mechanism of ferrofluid under uniform magnetic field based on PDMS Chip January 2025 - Present

- Utilized active droplet generation to synthesize magnetic droplets via HFE-7500 shearing of a ferro-fluid inside a cross-junction PDMS chip while applying uniform magnetic fields of 0, 10, 20 and 30 mT oriented either vertically or horizontally.
- Identified three distinct flow regimes—dripping, threading, and parallel with breakup—within the microchannels.
- Quantified the characteristic geometric parameters (extrusion length, neck width, and breakup position) of the squeezing, necking, and rupture events that occur during magnetic-droplet formation under varying flow-rate ratios.
- Mapped droplet diameter, rupture position, and generation frequency under varying magnetic field strengths and orientations, providing a comprehensive parametric visualization for magnetic-droplet microfluidics.

HONORS & SCHOLARSHIPS

- The "Ruoshui" Scholarship of Zhiren College, SUSTech *(Top 1%)* April 2025
- First Class Outstanding Student Scholarship, SUSTech *(Top 2%)* October 2024
- Outstanding Student of 2023, SUSTech November 2024
- First Prize for Calligraphy Works in the Calligraphy and Painting Exhibition of SUSTech *(Top 1%)* June 2024
- Second Class Outstanding Student Scholarship, SUSTech *(Top 5%)* November 2023
- Outstanding Volunteer of the World Youth Development Forum November 2023
- Outstanding individual in Summer Social practice, SUSTech October 2023
- Second Class Outstanding Freshman Scholarship, SUSTech *(Top 10%)* December 2022

EXTRACURRICULAR ACTIVITIES

Teaching assistant for the course *Elasticity*, SUSTech February 2025 - June 2025

President of Calligraphy and Painting Society, SUSTech May 2024 - May 2025

Vice Secretary of the Communist Youth League Committee, SUSTech May 2024 - May 2025

Senior Mentor, Zhiren College, SUSTech July 2023 - June 2024

Digital Content Assistant, Department of Mechanics and Aerospace Engineering July 2023 - June 2024