

# Zida Li, Ph.D.

Assistant Professor  
Biomedical Engineering, Shenzhen University  
zidali@szu.edu.cn | (+86) 17841138287  
<https://zidalab.github.io/>

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## Education

### University of Michigan, Ann Arbor (UM)

Ann Arbor, MI, US

Ph.D., Mechanical Engineering

Aug. 2013 – Apr. 2018

Dissertation: *Micro-Engineered Devices for Point-of-Care Blood Clot Retraction Testing*

Advisor: Prof. Jianping Fu

### University of Science and Technology of China (USTC)

Hefei, Anhui, China

B.Eng., Mechanical Engineering

Aug. 2008 – June 2012

Advisor: Prof. Liquan He

### Tsinghua University

Beijing, China

Exchange Program – C9 University League

Sept. 2010 – Feb. 2011

## Positions and Employment

### Shenzhen University (SZU)

Shenzhen, China

Assistant Professor, Biomedical Engineering

June 2018 – present

### University of Michigan, Ann Arbor

Ann Arbor, MI, US

Graduate Student Research Assistant, Mechanical Engineering

Sept. 2013 – Apr. 2018

Graduate Student Teaching Assistant, Mechanical Engineering

Sept. 2014 – Apr. 2018

### University of Hong Kong

Hong Kong

Research Assistant, Mechanical Engineering

Aug. 2012 – June 2013

Advisor: Prof. Anderson Ho Cheung Shum

## Honors and Awards

- Outstanding Undergrad Mentor Award, SZU (2022)
- Outstanding Undergrad Instructor Award, SZU (2022)
- Tier Three Award in Equipment Design for Laboratory Classes, 6th National Competition of Teaching Innovation, Chinese Association of Higher Education, Ministry of Education, China (2021)
- Advisor Award for Distinguished Undergrad Thesis (advisee: Meichi Jin), SZU (2021)
- University Teaching Award, SZU (2021)
- Excellence in Faculty Performance Evaluation, SZU (2020)
- Baxter Young Investigator Award First-Tier, Baxter Healthcare Inc. (2016)
- Provincial Honored Graduate, Department of Education, Anhui Province, China (2012)
- National Scholarship, Ministry of Education, China (2011)

- National Encouragement Scholarship, Ministry of Education, China (2010)
- Qian Jun Scholarship, USTC (2009)

## Research Grants

- Industrial collaboration grant for the research in single-cell RNA sequencing (2022)
- Grant for Interdisciplinary Innovation and Collaboration, Health Science Center, SZU (2020)
- Research Startup Grant for Overseas Talents, Department of Human Resource and Social Security, Shenzhen (2020-2022)
- Junior Faculty Development Award, Department of Biomedical Engineering, SZU (2019, 2020, 2021)
- Mianshang Grant, Science and Technology Agency, Guangdong (2019-2021)
- Grant for Research in Medical Science, Committee of Hygiene and Health, Guangdong (2019-2021)
- Faculty Startup Grant, SZU (2019-2022)

## Teaching Grants

- Student Innovation and Entrepreneurship Grant (advisee: Donghao Li), SZU (2022)
- Undergrad Innovation and Entrepreneurship Grant (advisee: Yihan Xie), SZU (2021)
- Graduate Innovation and Development Grant (advisee: Linzhe Chen), SZU (2021)
- Undergrad Innovation and Entrepreneurship Grant (advisee: Meichi Jin), SZU (2020)
- Undergrad Lab Equipment Development Grant, SZU (2020)

## Journal Publications

#first authors; \*corresponding author(s); underscore: student advisees.

- [1] Donghao Li,# Jingyi Ding,# Xinyu Liu, Yong Liang, and **Zida Li**\* (2023). Digital microfluidics for point-of-care *in vitro* diagnostics. #, under review
- [2] Jingyi Ding,# Kai Wu,# and **Zida Li**\* (2023). Emerging digital nuclei acid amplification tests: a materials perspective. #, under review
- [3] Meichi Jin, Kai Wu, Mengzhen Wang, Yang Zhang, Chengbin Yang, and **Zida Li**\* (2023). High resolution, multiplex antibody patterning using micropillar-focused droplet printing and microcontact printing. **Advanced Materials Technologies**, under review
- [4] Kai Wu,# Qi Fang,# Zhantao Zhao, and **Zida Li**\* (2023). CoLD-LAMP: Color-encoded, intelligent digital LAMP for multiplexed nucleic acid quantification. **Analytical Chemistry**, in press
- [5] Run Xie,# Yang Liu,# Xuyang Shi, Shiyu Wang, Zhantao Zhao, Longqi Liu, Ya Liu,\* and **Zida Li**\* (2023). Combinatorial perturbation sequencing on single cells using microwell-based droplet random pairing. **Biosensors & Bioelectronics**, 220, 114913
- [6] Yang Liu,# Shiyu Wang,# Menghua Lyu,# Run Xie, Weijin Guo, Ying He, Xuyang Shi, Yang Wang, Jingyu Qi, Qianqian Zhu, Hui Zhang, Tao Luo, Huaying Chen, Yonggang Zhu, Xuan Dong, **Zida Li**, Ying Gu, Feng Mu, Longqi Liu,\* Xun Xu,\* and Ya Liu\* (2022). Droplet microfluidics forward for tracing target cells at single-cell transcriptome resolution. **Bioengineering**, 9(11), 674
- [7] Yang Zhang, Tao Zhao Yu, Jingyi Ding, and **Zida Li**\* (2023). Bone-on-a-chip platforms and integrated biosensors: towards advanced *in vitro* bone models with real-time biosensing. **Biosensors & Bioelectronics**, 219, 114798

- [8] Menghua Lyu,<sup>#</sup> Xuyang Shi,<sup>#</sup> Xiaopan Liu,<sup>#</sup> Xijun Zhu, Yang Liu, Lijuan Liao, Shiyu Wang, Na Sun, Hongyan Zhao, Linzhe Chen, Linyuan Fan, Qumiao Xu, Qianqian Zhu, Kai Gao, Huaying Chen, Yonggang Zhu, **Zida Li**, Weijin Guo, Yue Zheng, Ying Gu, Longqi Liu,<sup>\*</sup> Meiniang Wang,<sup>\*</sup> and Ya Liu<sup>\*</sup> (2022). Generation and screening of antigen-specific nanobodies from mammalian cells expressing BCR repertoire library using droplet-based microfluidics. **Analytical Chemistry**, 94(22), 7970–7980, 2022
- [9] Linzhe Chen, Donghao Li, Xinyu Liu, Yihan Xie, Jieying Shan, Haofan Huang, Xiaxia Yu, Yudan Chen, Weidong Zheng, and **Zida Li**<sup>\*</sup> (2022). Point-of-care blood coagulation assay based on dynamic monitoring of blood viscosity using droplet microfluidics. **ACS Sensors**, 7(8), 2170–2177
- Selected as Front Cover story by ACS Sensors
- [10] Linzhe Chen,<sup>#</sup> Jingyi Ding,<sup>#</sup> Hao Yuan, Chi Chen<sup>\*</sup>, and **Zida Li**<sup>\*</sup> (2022). deep-dLAMP: deep learning-enabled polydisperse emulsion-based digital loop-mediated isothermal amplification. **Advanced Science**, 9(9), 2105450
- [11] Donghao Li,<sup>#</sup> Xinyu Liu,<sup>#</sup> Yujuan Chai,<sup>#</sup> Jieying Shan, Yihan Xie, Yong Liang, Susu Huang, Weidong Zheng, and **Zida Li**<sup>\*</sup> (2022). Point-of-care blood coagulation assay enabled by printed circuit board-based digital microfluidics. **Lab on a Chip**, 22(4), 1473-0197
- [12] **Zida Li**<sup>#,\*</sup>, Feng Lin<sup>#</sup>, Shue Wang, Xufeng Xue, and Yue Shao<sup>\*</sup> (2022). Single-cell sequencing to unveil the mystery of embryonic development. **Advanced Biology**, 6(2), 2701-0198
- [13] Shiyu Wang,<sup>#</sup> Yang Liu,<sup>#</sup> Yijian Li, Menghua Lv, Kai Gao, Ying He, Wenbo Wei, Yonggang Zhu, Xuan Dong, Xun Xu, **Zida Li**,<sup>\*</sup> Longqi Liu,<sup>\*</sup> and Ya Liu<sup>\*</sup> (2022). High-throughput functional screening of antigen-specific T-cells based on droplet microfluidics on single-cell level. **Analytical Chemistry**, 94(2), 918–926
- Selected as Front Cover story by *Analytical Chemistry*
- [14] Linzhe Chen, Guoliang Zhang, Longqi Liu,<sup>\*</sup> and **Zida Li**<sup>\*</sup> (2021). Emerging biosensing technologies for improved diagnostics of COVID-19 and future pandemics. **Talanta**, 225, 121986
- ESI Highly Cited Paper in the academic field of Chemistry as of July/August 2021
- [15] Lanzhu Huang,<sup>#</sup> Xinyu Liu,<sup>#</sup> Yuanbin Ou, Haofan Huang, Xia Zhang, Yize Wang, Yong Liang, Xiaxia Yu, Weidong Zheng, Huisheng Zhang, and **Zida Li**<sup>\*</sup> (2020). Micro-engineered flexural post rings for effective blood sample fencing and high throughput measurement of clot retraction force. **ACS Sensors**, 5(12), 3949-3955
- Selected as Front Cover story by ACS Sensors
  - Highlighted in Introducing Our Authors by ACS Sensors (2020, 5(12), 3653–3654)
- [16] Zhouhui Xu, **Zida Li**, Yihang Jiang, Gaixia Xu, Mingwei Zhu, Wing-Cheung Law, Ken-Tye Yong, Yanshuai Wang, Chengbin Yang, Biqin Dong, and Feng Xing<sup>\*</sup> (2020). Recent advances in solar-driven evaporation system. **Journal of Materials Chemistry A**, 8, 25571-25600
- [17] Xue Chen, Nicolo Simone Villa, Yanfeng Zhuang, Linzhe Chen, Tianfu Wang, **Zida Li**,<sup>\*</sup> and Tiantian Kong<sup>\*</sup> (2020). Stretchable supercapacitors as emergent energy storage units for health monitoring bioelectronics. **Advanced Energy Materials**, 10(4), 1902769
- [18] Yi Zheng, Xufeng Xue, Yue Shao, Sicong Wang, Sajedeh Nasr Esfahani, **Zida Li**, Jonathon M. Muncie, Johnathon N. Lakins, Valerie M. Weaver, Deborah L. Gumucio, and Jianping Fu<sup>\*</sup> (2019). Controlled modeling of human epiblast and amnion development using stem cells. **Nature**, 573(7774), 421-425

- [19] Yuanyuan Zheng,<sup>#</sup> Xufeng Xue,<sup>#</sup> Agnes M. Resto Irizarry, **Zida Li**, Yue Shao, Yi Zheng, Gang Zhao,\* and Jianping Fu\* (2019). A patterned model for neural tube development studies by human embryonic stem cells in a biomimetic niche. **Science Advances**, 5(12), eaax5993
- [20] Sajedeh Nasr Esfahani, Yue Shao, Agnes M Resto Irizarry, **Zida Li**, Xufeng Xue, Deborah L Gumucio, and Jianping Fu\* (2019). Microengineered human amniotic ectoderm tissue array for high-content developmental phenotyping. **Biomaterials**, 216, 119244
- [21] Luoquan Li<sup>#</sup>, Ping Wu<sup>#</sup>, Zhaofeng Luo, Lei Wang, Weiping Ding, Tao Wu, Jinyu Chen, Jinlong He, Ying Chen, Guibo Li, **Zida Li**,\* and Liquun He\* (2019). Dean flow assisted single cell and bead encapsulation for high performance single cell expression profiling. **ACS Sensors**, 4(5), 1299-1305
- [22] **Zida Li**,\* Luoquan Li, Meixiang Liao, Liquun He, and Ping Wu\* (2019). Multiple splitting of droplets using multi-furcating microfluidic channels. **Biomicrofluidics**, 13(2), 024112
- [23] Feng Lin, Yue Shao, Xufeng Xue, Yi Zheng, **Zida Li**, Chunyang Xiong, Jianping Fu\* (2019). Biophysical phenotypes and determinants of anterior vs. posterior primitive streak cells derived from human pluripotent stem cells. **Acta Biomaterialia**, 86, 125-134
- [24] **Zida Li**, Yize Wang, Xufeng Xue, Brendan McCracken, Kevin Ward, and Jianping Fu\* (2018). Carbon nanotube strain sensor based hemoretractometer for blood coagulation testing. **ACS Sensors**, 3(3), 670-676
- [25] **Zida Li**, Xufeng Xue, Feng Lin, Yize Wang, Kevin Ward, and Jianping Fu\* (2017). Capillary-assisted coating of carbon nanotube thin film as a strain gauge. **Applied Physics Letters**, 111(17), 173105
- [26] Koh Meng Aw Yong, **Zida Li**, Sofia D. Merajver, and Jianping Fu\* (2017). Analysis of tumor invasion front using long-term fluidic tumoroid culture. **Scientific Reports**, 7(1), 10784
- [27] Xufeng Xue, Xiaowei Hong, **Zida Li**, Cheri X. Deng, and Jianping Fu\* (2017). Acoustic tweezing cytometry enhances osteogenesis of human mesenchymal stem cells through cytoskeletal contractility and YAP activation. **Biomaterials**, 134, 22-30
- [28] Jianming Sang, Xiang Li, Yue Shao, **Zida Li**, and Jianping Fu\* (2016) Controlled tubular unit formation from collagen film for modular tissue engineering. **ACS Biomaterials Science & Engineering**, 3(11), 2860-2868
- [29] **Zida Li**, Xiang Li, Brendan McCracken, Yue Shao, Kevin Ward, and Jianping Fu\* (2016). A miniaturized hemoretractometer for blood clot retraction testing. **Small**, 12(29), 3926-3934.
  - Selected as Frontispiece story by *Small*
- [30] Ping Wu, Zhaofeng Luo, Zhifeng Liu, **Zida Li**, Chi Chen, Lili Feng, and Liquun He\* (2015). Drag-induced breakup mechanism for droplet generation in dripping within flow focusing microfluidics. **Chinese Journal of Chemical Engineering**, 23(1), 7-14
- [31] **Zida Li**, Sze Yi Mak, Alban Sauret, and Ho Cheung Shum\* (2014). Syringe-pump-induced fluctuation in all-aqueous microfluidic system implications for flow rate accuracy. **Lab on a Chip**, 14(4), 744-749
- [32] Sze Yi Mak, **Zida Li**, Arnaud Frere, Tat Chuen Chan, and Ho Cheung Shum\* (2014). Musical Interfaces: Visualization and Reconstruction of Music with a Microfluidic Two-Phase Flow. **Scientific Reports**, 4, 6675
- [33] Xiang Li, Weiqiang Chen, **Zida Li**, Ling Li, Hongchen Gu, and Jianping Fu\* (2014). Emerging microengineered tools for functional analysis and phenotyping of blood cells. **Trends in Biotechnology**, 32(11), 586-594

## Book Chapters

- [1] **Zida Li\*** and Anderson Ho Cheung Shum\* (2019). Nanotechnology and microfluidics for biosensing and biophysical property assessment: implications for next generation in vitro diagnostics. *Nanotechnology and Microfluidics*, 83-107, John Wiley & Sons

## Patents

- [1] **Zida Li**, Xiaxia Yu, Xinyu Liu, Jieying Shan, and Yihan Xie. (2023) Simulation system and method of in vitro diagnostics. *China Patent Application* ZL202110750662.0
- [2] **Zida Li**, Lanzhu Huang, and Weidong Zheng. (2022). A fabrication method and application of soft post rings for clot retraction testing. *China Patent Application* ZL202010260648.8
- [3] Jianping Fu, Kevin Ward, **Zida Li**, and Xiang Li. (2017). A microscale device for blood coagulation assay. *U.S. Patent Application* 62/304,385
- [4] Ho Cheung Shum, Alban Sauret, **Zida Li**, and Yang Song. (2013). System and method for generation of emulsions with low interfacial tension and measuring frequency of vibrations in the system. *U.S. Patent Application* 13/839,072

## Conference Presentations

- [1] Single-cell chemical transcriptome profiling for drug screening. **Panel speech**. *15th IEEE International Conference on Nano/Molecular Medicine & Engineering*. Online, Nov. 2021
- [2] Micro-engineered devices for point-of-care blood clot retraction testing. **Panel Speech**. *3rd International Conference of Microfluidics, Nanofluidics, and Lab-on-a-Chip*, Shenzhen, China, July 2021
- [3] Micro-engineered devices for point-of-care blood clot retraction testing. **Panel Speech**. *8th Conference on Micro-Total Analysis*, Shenzhen, China, Apr. 2021
- [4] Micro-engineered devices for point-of-care blood clot retraction testing. **Panel Speech**. *4th Conference of Microfluidics Technology and Innovation*, Shenzhen, China, Dec. 2020
- [5] Dean flow assisted single cell and bead encapsulation for high performance single cell expression profiling. **Panel Speech**. *7th Forum on Lab-on-a-Chip Applications*, Dalian, China, Nov. 2019
- [6] Dean flow assisted single cell and bead encapsulation for high performance single cell expression profiling. **Panel Speech**. *9th International Multidisciplinary Conference on Optofluidics*, Hong Kong, China, June 2019
- [7] Capillary-facilitated coating of carbon nanotube thin film as a strain gauge for blood retraction testing. **Poster Presentation**. *Conference of Micro-Total Analysis System*, Savannah, GA, USA, Oct. 2017
- [8] Capillary-assisted coating of carbon nanotube thin film for blood retraction testing. **Panel Speech**. *Biomedical Engineering Society Annual Meeting 2017*, Phoenix, AZ, USA, Oct 2017
- [9] A miniaturized hemoretractometer for blood clot retraction testing. **Panel Speech**. *8th International Symposium on Microchemistry and Microsystems*, Hong Kong, May 2016

## Invited Talks

- [1] Droplet microfluidics-based nucleic acid quantification and single cell analysis. Department of Mechanical Engineering, **Northern Arizona University**, Online, Feb. 2022
- [2] Single-cell analysis using microfluidics. College of Engineering, **Peking University**, Online, Nov. 2021
- [3] Microfluidics-enabled point-of-care testing and single cell analysis. Department of Biomedical Engineering, **Shenzhen University**, Shenzhen, China, Dec. 2020

- [4] Droplet microfluidics and single cell analysis. Department of Thermal Science and Energy Engineering, **University of Science and Technology of China**, Hefei, China, Nov. 2019
- [5] Micro/Nano-engineered tools for mechanobiology. Department of Mechanical and Electrical Engineering, **Guilin University of Electronic Technology**, Guilin, China, Dec. 2018
- [6] Micro-engineered blood coagulation tests. Department of Thermal Science and Energy Engineering, **University of Science and Technology of China**, Hefei, China, Mar. 2018

## **Supervised students**

- Master's students

- [1] Donghao Li (2023). "Point-of-care blood coagulation assays using digital microfluidics."
- [2] Kai Wu (2023). "Multiplex digital LAMP using droplet color-coding and intelligent image analysis."
- [3] Run Xie (2023). "High throughput analysis of chemical transcriptomes using droplet pairing and single-cell RNA sequencing."
- [4] Linzhe Chen (2022). "Point-of-care testing based on droplet microfluidics."
- [5] Lanzhu Huang (2021). "Flexible Micropost Rings for High Throughput Testing of Clot Retraction Force."

- Bachelor's students

- [1] Yihan Xie (2023). "Single-cell RNA sequencing from sorted cells with low number."
- [2] Yunzhu Wan (2022). "Digital nucleic acid amplification tests using non-uniform compartments."
- [3] Jieying Shan (2022). "Digital microfluidics and its biomedical applications."
- [4] Jinying Cai (2021). "Digital microfluidics for reagent processing in *in vitro* diagnostics."
- [5] Meichi Jin (2021). "Antibody patterning using micropillar-focused droplet printing."

## **Teaching**

- [1] Calculus for medical students. 2018-19, 19-20, 20-21, 21-22, 22-23
- [2] Biomedical sensors and applications. 2018-19
- [3] Single cell sequencing. 2019-20, 20-21
- [4] Scientific reading and writing. 2018-19, 19-20, 20-21, 21-22