

Jinxiong Cheng

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Education

University of Pittsburgh

Ph.D. in Bioengineering

Pittsburgh, Pennsylvania, United States

Aug 2023 - Present

Southern University of Science and Technology

B.Eng. in Biomedical Engineering

Shenzhen, Guangdong, China

Sep 2019 - Jun 2023

Technical Skills

Microfluidics & Device Engineering

Microfluidic chip design, photolithography, soft lithography, SolidWorks, COMSOL Multiphysics, 3D printing

Cellular & Molecular Assays

High-throughput screening (HTS), single-cell analysis, mammalian cell culture, immunofluorescence staining

Computational Analysis

MATLAB, ImageJ, deep learning, quantitative data visualization (OriginLab, GraphPad Prism)

Animal Models

Tumor model establishment, primary cell isolation, in vivo imaging system (IVIS)

Research Projects

1. Blocking cancer metastasis by targeting cell migration

Pittsburgh, Pennsylvania, United States

Graduate Student Researcher, Chen Lab, University of Pittsburgh

Aug 2023 - Present

- Designed microfluidic platforms enabling high-throughput screening of **~3,000 compounds** at **single-cell** resolution.
- Quantified migration behavior across **>10,000 single cells** per experiment.
- Integrated **machine learning** with high-throughput screening to predict drug efficacy, enabling virtual screening of **>6,000 compounds**.

2. Suspension cell culture on digital microfluidics platform

Toronto, Ontario, Canada

Visiting Research Student, Wheeler Lab, University of Toronto

Sep 2022 - Dec 2022

- Investigated suspension cell culture on **digital microfluidic platforms** using CHO cells.
- Optimized droplet manipulation workflows achieving **>90% cell viability** and high reproducibility across experiments.

3. dECM-based tumor-on-chip for drug screening

Shenzhen, Guangdong, China

Undergraduate Researcher, Jiang Group, SUSTech

Feb 2022 - Jun 2023

- Designed a high-throughput microfluidic platform integrating a **concentration gradient generator** and 3D tumor microenvironment.
- Generated stable linear drug gradients (**1–10 $\mu\text{L}/\text{min}$, 7 outlets**) with maintained nanoparticle dispersion **over 7 days**.
- Established **vascularized co-culture systems** ($\sim 10^6$ cells/mL) for physiologically relevant drug screening.

4. Effects of nanoplastics on neuronal systems

Shenzhen, Guangdong, China

Undergraduate Researcher, Jiang Group, SUSTech

Sep 2021 - Jan 2022

- Designed a microfluidic **gradient chip** for controlled nanoparticle exposure and high-throughput screening.
- Quantified size- and ligand-dependent neuronal uptake of nanoplastics (80–200 nm).
- Demonstrated brain deposition and behavioral alterations **in vivo** following 7-day exposure.

5. Microfluidic system for multiplexed biomarker detection

Shenzhen, Guangdong, China

Undergraduate Researcher, Jiang Group, SUSTech

Mar 2021 - Apr 2022

- Characterized the intrinsic properties of PDMS films and evaluated their effects on the vitamin detection assays.
- Achieved high sensitivity (**LOD: 6.15 ng/mL**) and high SNR (**33.49 dB**).
- Enabled multiplexed detection with strong clinical correlation ($R^2 > 0.9$) at low cost ($\sim \$0.04/\text{test}$).

Selected Publications

- [1] Chen, H. C., Wang, L. J., Shih, C. H., Ye, H., Lai, Y. J., **Cheng, J.**, ... & Chen, Y. C. (2026). High-Throughput Drug Screening for Targeting Polyploid Cancer Cells with an Interactive Web Portal. *Cancer Letters*, 218289.
- [2] **Cheng, J.**, Anne, R., & Chen, Y. C. (2025). Transforming microfluidics for single-cell analysis with robotics and artificial intelligence. *Lab on a Chip*, 25(23), 6100-6125.
- [3] **Cheng, J.**, Rock, E. C., Rao, M., Chen, H. C., Ma, Y., Chang, K. C., & Chen, Y. C. (2025). 3D-printed plugs enhance cell usage efficiency for single-cell migration and neuron axon guidance assays. *Cell Reports Methods*, 5(8).
- [4] Ma, Y., Shih, C. H., **Cheng, J.**, Chen, H. C., Wang, L. J., Tan, Y., ... & Chen, Y. C. (2025). High-Throughput Empirical and Virtual Screening to Discover Novel Inhibitors of Polyploid Giant Cancer Cells in Breast Cancer. *Analytical Chemistry*, 97(10), 5498-5506.
- [5] Liu, X., **Cheng, J.**, & Zhao, Y. (2024). Tumor Microenvironment Based on Extracellular Matrix Hydrogels for On-Chip Drug Screening. *Biosensors*, 14(9), 429.
- [6] Chen, H. C., Ma, Y., **Cheng, J.**, & Chen, Y. C. (2024). Advances in single-cell techniques for linking phenotypes to genotypes. *Cancer heterogeneity and plasticity*, 1(1), 0004.
- [7] Liu, C., **Cheng, J.**, Liu, Y., Mou, L., Xia, Y., Wang, P., & Jiang, X. (2024). The nature of PDMS affects the results of the immunoassays carried out in microfluidic channels. *Biomedical Analysis*, 1(1), 54-63.
- [8] Liu, X., Zhao, Y., Dou, J., Hou, Q., **Cheng, J.**, & Jiang, X. (2022). Bioeffects of inhaled nanoplastics on neurons and alteration of animal behaviors through deposition in the brain. *Nano Letters*, 22(3), 1091-1099.