

YAN ZHANG, Ph.D.

Incoming Assistant Professor (Starting January 2027)
Department of Chemical & Biomolecular Engineering, Rice University
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Research Interests

The Zhang Lab at [Rice ChBE](#) uses cell-free synthetic biology to expand our ability to engineer biological systems beyond the constraints set by living cells. Our research integrates innovations in cell-free expression platforms with application-driven biotechnology development, where advances in each continually inform the other. Our initial research program includes the platforms, diagnostics, and therapeutics developments for human health.

Education

Ph.D. in Chemical & Biomolecular Engineering (2022), Georgia Institute of Technology
B.S. in Chemical & Biomolecular Engineering (2017), Cornell University

Professional Appointments

Incoming Assistant Professor, Chemical & Biomolecular Engineering, Rice University (2027-)
NIH K99/R00 Postdoctoral Fellow, California Institute of Technology (2024-2026)
Presidential Postdoctoral Fellow, California Institute of Technology (2022-2024)

Honors and Awards

2026 CPRIT Scholar, Cancer Prevention and Research Institute of Texas
2025 Chemical Abstracts Service (CAS) Future Leader, American Chemical Society
2023 Best Ph.D. Thesis, Georgia Tech Chapter of Sigma Xi
2022 Best Poster Award, Georgia Tech Office of the Executive Vice President for Research
2022 First Place in F. L. Suddath Fellowship Award, Georgia Institute of Technology
2021 Most Dedicated Mentor Award, iGEM Mentorship Program
2021 Garry Betty Chair Fellowship in Chemical Engineering, Georgia Institute of Technology
2018 Honorable Mention in NSF Graduate Research Fellowship
2015 Ronald E. McNair Post-Baccalaureate Scholar, Cornell University

Publications

* = corresponding author

1. **Zhang, Y***, Deveikis, M., Qiu, Y., Björn, L., Martinez, Z. A., Chou, T., Freemont, P. S., Murray, R. M. (2025). Optimizing Protein Production in One-Pot PURE Systems: Insights into Reaction Composition and Expression Efficiency. *ACS Synthetic Biology*. DOI: 10.1021/acssynbio.4c00779
2. McSweeney, M. A., **Zhang, Y.**, Styczynski, M. P. (2023). Short Activators and Repressors of RNA Toehold Switches. *ACS Synthetic Biology*. DOI: 10.1021/acssynbio.2c00641.

3. Ahmed, T., **Zhang, Y.**, Lee, J.-H., Styczynski, M. P., & Takayama, S. (2022). Nucleic Acid Partitioning in PEG-Ficoll Protocells. ***Journal of Chemical & Engineering Data***. DOI: 10.1021/acs.jced.2c00042.
4. Miguez, A. M., **Zhang, Y.**, Styczynski, M. P. (2022). Metabolomics Analysis of Cell-Free Expression Systems Using Gas Chromatography-Mass Spectrometry. In: Karim, A. S., Jewett, M. C. (eds) **Cell-Free Gene Expression: Methods and Protocols**, vol 2433. Humana, New York, NY. DOI: 10.1007/978-1-0716-1998-8_13
5. **Zhang, Y.**, Steppe, P. L., Kazman, M. W., & Styczynski, M. P. (2021). Point-of-Care Analyte Quantification and Digital Readout via Lysate-Based Cell-Free Biosensors Interfaced with Personal Glucose Monitors. ***ACS Synthetic Biology***. DOI: 10.1021/acssynbio.1c00282.
6. **Zhang, Y.**, Kojima, T., Kim, G. A., McNerney, M. P., Takayama, S., & Styczynski, M. P. (2021). Protocell Arrays for Simultaneous Detection of Diverse Analytes. ***Nature Communications***. DOI: 10.1038/s41467-021-25989-3
7. Miguez, A. M., **Zhang, Y.**, Piorino, F. & Styczynski, M. P. (2021). Metabolic Dynamics in *Escherichia coli*-Based Cell-Free Systems. ***ACS Synthetic Biology***. DOI: 10.1021/acssynbio.1c00167.
8. Byagathvalli, G., Sinha, S., **Zhang, Y.**, Styczynski, M. P., Standeven, J., & Bhamla, M. S. (2020). Electropen: an Ultra-Low-Cost, Electricity-Free, Portable Electroporator. ***PLOS Biology***. DOI: 10.1371/journal.pbio.3000589
9. McNerney, M. P., **Zhang, Y.**, Steppe, P., Silverman, A. D., Jewett, M. C., & Styczynski, M. P. (2019). Point-of-Care Biomarker Quantification Enabled by Sample-Specific Calibration. ***Science Advances***. DOI: 10.1126/sciadv.aax4473
10. Hu, C. Y., Takahashi, M. K., **Zhang, Y.**, & Lucks, J. B. (2018). Engineering a Functional Small RNA Negative Autoregulation Network with Model-Guided Design. ***ACS Synthetic Biology***. DOI: 10.1021/acssynbio.7b00440

Presentations

- “*Designing the Cell-Free Gene Expression Environment*” Selected abstract. **American Chemical Society (ACS) Fall Meeting**, Washington, D.C., August 2025.
- “*Optimizing Protein Production in One-Pot PURE Systems: Insights into Reaction Composition and Expression Efficiency*” Selected abstract. **Build-A-Cell Seminar Series**, Virtual, April 2025.
- “*Optimizing Protein Production in One-Pot PURE Systems: Insights into Reaction Composition and Expression Efficiency*” Selected abstract. **13th International Conference on Biomolecular Engineering**, Houston, TX, January 2025.

- “*Protocell Arrays for Simultaneous Detection of Diverse Analytes*” Young speaker. **Synthetic Biology Young Speaker Series (SynBYSS)**, Virtual, March 2023.
- “*New Interfaces for Cell-free Biosensors to Enable Multiplexed Analyte Detection and Quantification at the Point of Care*” Award Winner Presentation. **Suddath Symposium**, Virtual. January 2022.
- “*The Sweet Solution to Sensing: Repurposing Glucose Monitors to Detect Micronutrient Deficiency and Pathogenic Bacteria*” Selected abstract. **Georgia Tech School of Chemical & Biomolecular Engineering 33rd Annual Graduate Research Symposium**, Virtual. February 2021.
- “*Multiplexing Cell-Free Diagnostics via Aqueous Two-Phase System*” Selected abstract. **Engineering Biology Research Consortium (EBRC) Annual Meeting**, Virtual. April 2020.

Professional Service

Engineering Biology Research Consortium (EBRC)

Policy and International Engagements Working Group, Liaison (2024-2026)
 Graduate Student & Postdoc Association (SPA) Board, Vice President (2022-2023)
 Government and Industry Mentorship Program, Co-chair (2021-2022)

International Genetically Engineered Machine (iGEM) Community

iGEM Giant Jamboree, Judge (2020-2024)