# Audrey Shih

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## EDUCATION

**Stanford University** — **Stanford, CA**
**Ph.D.**, Chemical Engineering, GPA 3.95 — Expected June 2025
**M.S.**, Chemical Engineering — 2020-2023

**Princeton University** — **Princeton, NJ**
**B.S.E.**, Chemical and Biological Engineering, *cum laude* — 2016 – 2020
Minor, Materials Science and Engineering

## EXPERIENCE

**Stanford University**, Stanford, CA — 2021 - Present
*Doctoral Researcher* | PI: Gerald G. Fuller

- Developed a portable magnetic stress rheometer for hospital use, reducing device costs from ~$50k to $160 and enabling predictions of flow during abscess drainage procedures, allowing customized treatment plans
- Engineered 3D bioprinting systems for rheological analysis, elucidating crosslinking kinetics and optimizing mechanical properties in biomanufactured complex biological tissue structures
- Instructed and mentored undergrad/grad students in *Mechanics of Soft Matter: Rheology (CHEMENG 470)*
- Managed lab safety as the designated lab safety officer, attending quarterly meetings with Environmental Health and Safety (EH&S), performing quarterly inspections, and updating annual lab inventory

**Stanford University**, Stanford, CA — 2021
*Doctoral Researcher* | PI: Joseph M. DeSimone

- Developed and optimized high-resolution 3D Continuous Liquid Interface Production (CLIP) printing through experiments and simulations of optics and photopolymerization transport/kinetics, enhancing precision in additive manufacturing

**Princeton University**, Princeton, NJ — 2018 – 2020
*Undergraduate Researcher* | PI: Sujit S. Datta

- Investigated elastic instabilities in polymer flow through stereolithographic model porous media
- Featured in ACEE's first ever spotlight article on undergraduate contributions to environmental studies
- Thesis featured in profile article by the School of Engineering and Applied Science

**Princeton University**, Princeton, NJ — 2017 – 2018
*Undergraduate Researcher* | PI: Celeste M. Nelson

- Analyzed role of tissue mechanics in epithelial-mesenchymal transition (EMT) using immunostaining

## SKILLS

*Technical/Laboratory:* CAD; 3D printing; laser cutting; hardware/embedded systems (PCB assembly, Raspberry Pi); SEM; PCR; tissue/cell culture; immunostaining; confocal microscopy imaging
*Software:* programming in Java, MATLAB, Python; ImageJ; TRIOS; PIV; Adobe Illustrator/Photoshop; LaTeX

## PUBLICATIONS & PATENTS

- **Shih, A.**, Chung, S. J., Shende, O. B., Herwald, S. E., Vezeridis, A. M., Fuller, G. G., Viscoelastic measurements of abscess fluids using a magnetic stress rheometer. *Physics of Fluids* (in review).
- Cai, P. C., Braunreuther, M., **Shih, A.**, Spakowitz, A. J., Fuller, G. G., Heilshorn, S. C., Air-liquid intestinal cell culture allows *in situ* rheological characterization of intestinal mucus. *APL Bioengineering* (2024).
- DeSimone, J. M., Jacobson, G. B., Dulay, M. T., Lee, B. J., Hsiao, K., Rajesh, N., Driskill, M. M., **Shih, A.**, et. al., *Polymeric microstructures and systems and methods for making same.* Patent number WO2023049267A1.
- Hsiao, K., Lee, B. J., Samuelsen, T., Lipkowitz, G., Kronenfeld, J. M., Ilyn, D., **Shih, A.**, et al., Single-digit-micrometer-resolution continuous liquid interface production. *Science Advances* (2022).
- Browne, C. A., **Shih, A.**, Datta, S. S., Bistability in the Unstable Flow of Polymer Solutions in Porous Media. *Journal of Fluid Mechanics* (2020).
- Browne, C. A., **Shih, A.**, Datta, S. S., Pore-Scale Flow Characterization of Polymer Solutions in Microfluidic Porous Media. *Small* (2019).

## SELECTED AWARDS

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|---|---|
| 2023 | Chemical Engineering Department Service Leadership Award |
| 2021 | Judges' Vote and Audience Choice poster awards, Stanford MIPS Retreat, Stanford, CA |
| 2020 | National Science Foundation (NSF) Graduate Research Fellowship |
| 2020 | Lore von Jaskowsky Memorial Prize, Princeton School of Engineering and Applied Sciences |
| 2020 | Materials Science and Engineering Department Outstanding Senior Thesis Award |
| 2020 | Sigma Xi Scientific Research Honor Society Nominee |
| 2019 | PSEG Best Poster Award, ACEE Annual Meeting, Princeton, NJ |

## CONFERENCE PRESENTATIONS

- **Shih, A.**, Chung, S. J., Shende, O. B., Herwald, S. E., Vezeridis, A. M., Fuller, G. G., *Viscoelastic measurements of abscess fluids using a magnetic stress rheometer*. American Society of Chemical Engineers Annual Meeting (AIChE 2024), San Diego, CA, Oct. 2024.
- **Shih, A.**, Chung, S. J., Shende, O. B., Herwald, S. E., Vezeridis, A. M., Fuller, G. G., *Rheological Characterization of Biological Fluids*. NETZSCH Introduction to Rheology and Thermal Analysis Workshop, Palo Alto, CA, Oct. 2024.
- **Shih, A.**, Chung, S. J., Herwald, S. E., Vezeridis, A. M., Fuller, G. G., *Magnetic stress rheometer for biological fluid characterization*. American Society of Chemical Engineers Annual Meeting (AIChE 2023), Orlando, Fl, Nov. 2023.
- **Shih, A.**, Chung, S. J., Herwald, S. E., Vezeridis, A. M., Fuller, G. G., *Magnetic stress rheometer for biological fluid characterization*. XIXth International Congress on Rheology (ICR2023), Athens, Greece, Aug. 2023.
- **Shih, A.**, Chung, S. J., Herwald, S. E., Vezeridis, A. M., Fuller, G. G., *Magnetic stress rheometer for abscess fluid characterization*. Society of Rheology Annual Meeting (SOR2022), Chicago, IL, Oct. 2022.

## LEADERSHIP & MENTORSHIP

**Stanford University**, Stanford, CA 2021 - Present

*Community Associate* | Graduate Life Office

- Coordinated 12 events annually to foster community among graduate student body, managing a $3,600 budget for diverse and inclusive programs, including welcome, orientation, and multicultural initiatives
- Advised graduate residents on support services and professional development, utilizing annual training on suicide prevention, servant leadership, bias intervention, and sexual harassment prevention

**Stanford University**, Stanford, CA 2022 - 2023

*Social Events Chair* | Chemical Engineering Graduate Student Action Committee

- Served as liaison between ChemE student community and administration
- Spearheaded multi-departmental events to expand the department's community, promoting social and collaborative connections across various department programs

**Stanford University**, Stanford, CA 2022 - 2023

*First-Year Mentor* | Department of Chemical Engineering

- Guided first-year students in selecting labs, managing classes, and adjusting to graduate school, sharing resources and support through three meetings per quarter to ease their transition

## PROFESSIONAL AFFILIATIONS

Society of Rheology, American Institute of Chemical Engineers