

Sarah M. Coleman, PhD

Austin, TX | [Email](#) | [GitHub](#) | [LinkedIn](#) | [Website](#) | [Google Scholar](#)

Summary

Experimental biologist with experience in mammalian and microbial systems, bioprocess development, and fermentation-based workflows. Strong computational background in statistical modeling and multi-omics analysis, enabling data-driven optimization of biological systems. Interested in scaling biological processes through integrated experimental and computational approaches.

Education

The University of Texas at Austin, Austin, TX

Ph.D. in Chemical Engineering, Aug 2024

The University of Texas at Austin, Austin, TX

M.S. in Statistics, May 2024

Massachusetts Institute of Technology, Cambridge, MA

S.B. in Chemical-Biological Engineering, Jun 2019

Technical Skills

- **Molecular & Cellular Biology:** Mammalian and microbial cell culture, CRISPR genome editing, Golden Gate assembly, bacterial and yeast strain engineering, adaptive laboratory evolution, qPCR, flow cytometry, protein expression & purification, Western blotting
- **Bioprocessing & High-Throughput Experimentation:** Batch and fed-batch fermentation, 3 L bioreactors, 96-well plate screening, assay development, high-throughput screening workflows, experimental optimization
- **Computational Biology & Data Science:** Python (pandas, NumPy, scikit-learn), R (tidyverse), SQL, statistical modeling, machine learning, mixed-effects models, experimental design (DoE), reproducible data analysis, multi-omics analysis (RNA-seq, metabolomics, variant analysis), pathway & enrichment analysis
- **Bioinformatics & HPC Workflow Engineering:** RNA-seq processing (QC, alignment, differential expression), omics data workflows, high-performance computing (TACC), containerized bioinformatics pipelines (BioContainers, Docker), version-controlled workflows (Git/GitHub)
- **Analytical Chemistry & Instrumentation:** HPLC, LC-MS, GC-MS, UV-Vis, microscopy, rheology
- **Software, Engineering & Reproducibility Tools:** Linux/Unix, Bash, Git/GitHub, Jupyter, Quarto, LaTeX, workflow automation, computational reproducibility practices

Work Experience

The University of Texas at Austin — Austin, TX

Postdoctoral Research Fellow, Statistics and Data Sciences | Oct 2024 – Present

- Developed epidemiological and statistical models quantifying the impact of industrial air pollution mixtures on excess mortality, identifying key sector-level risk drivers
- Modeled behavioral responses to air quality alerts to quantify pedestrian exposure-avoidance behavior under pollution events
- Advised medical faculty on statistical methodology and experimental design in recurring data science workshops

Lecturer, Statistics and Data Sciences | Jan 2026 – Apr 2026

- Instructed 100-student upper-division data science course
- Built GitHub-based course infrastructure enabling reproducible assignments and scalable grading workflows
- Managed 3 TAs to execute instructional, grading, and student support pipelines

Graduate Student Fellow, Chemical Engineering | Aug 2019 – Aug 2024

- Engineered *Yarrowia lipolytica* for enhanced conversion of waste cooking oil, improving lipid hydrolysis and reducing industrial waste buildup
- Integrated CFD modeling with fermentation experiments to characterize and optimize bioreactor performance in 3L systems
- Developed CRISPR-based genome editing system using Golden Gate assembly for targeted engineering of *Y. lipolytica*
- Engineered non-conventional yeast to convert industrial biomass waste into high-value polyketides (triacetic acid lactone)

MathWorks — Remote (Natick, MA)

MATLAB Student Ambassador | Mar 2020 – Jul 2021

- Delivered technical workshops translating research and engineering workflows into MATLAB-based computational pipelines for academic users
- Demonstrated applied modeling and data analysis workflows, accelerating adoption of reproducible computational methods in research environments

Bristol Myers Squibb — Devens, MA

Intern, Upstream Process Development (Biologics) | Jun 2018 – Aug 2018

- Designed and executed metabolite-controlled fed-batch fermentation experiments to systematically evaluate monoclonal antibody production performance
- Analyzed upstream bioprocess data to identify conditions that improved yield stability and process robustness in biologics production
- Supported experimental iteration cycles for process optimization in a regulated biomanufacturing environment

Takeda Pharmaceuticals — Cambridge, MA

Intern, Process Development (Vaccines) | May 2017 – Aug 2017

- Optimized mammalian cell culture conditions to improve vaccine production performance within a next-generation manufacturing system
- Contributed to experimental design and process optimization workflows focused on improving scalability and production efficiency of biologics

Girl's Angle Math Club — Cambridge, MA

Math Mentor | Sep 2016 – Apr 2018

- Mentored students in advanced mathematical reasoning with emphasis on structured problem-solving and analytical rigor
- Led weekly sessions focused on developing independent reasoning skills and quantitative problem solving

Select Honors and Awards

- **First Place, Professional Division — Data Challenge Expo, JSM (Joint Statistical Meetings)**, 2025
Recognized for data-driven problem solving in a competitive national data science setting
- **National Science Foundation Graduate Research Fellowship (NSF GRFP)**, 2021
Prestigious national fellowship awarded for demonstrated research excellence in science
- **Provost's Graduate Excellence Fellowship, UT Austin**, 2019
Competitive institutional fellowship awarded for outstanding incoming graduate students

Peer-Reviewed Publications

In reverse chronological order. An asterisk (*) indicates co-first authorship.

1. Partipilo, G.*, **Coleman, S. M.***, Holwerda, A. J., Gao, Y., Mahfoud, I. E. M., Wilke, C. O., Alper, H. S., & Keitz, B. K. (2026). A Linear Mixed Effects Model for Evaluating Synthetic Gene Circuits. *ACS Synthetic Biology*. <https://doi.org/10.1021/acssynbio.6c00171>
2. **Coleman, S. M.**, & Peng, R. D. (2026). Do ozone action day alerts modulate active transportation in Texas cities? *Environmental Research Communications*. <https://doi.org/10.1088/2515-7620/ae2e99>
3. Gordillo Sierra, A. R., Yook, S., **Coleman, S.**, Bansal, M., & Alper, H. S. (2025). Developing a *Yarrowia lipolytica* platform for conversion of mannitol-containing waste streams. *Bioresource Technology*, 133161. <https://doi.org/10.1016/j.biortech.2025.133161>
4. Qin, J., Liu, N., Abid, U., **Coleman, S. M.**, Wang, Y., Fu, Q., Yoon, S., Alper, H. S., & Xie, D. (2025). Metabolic Engineering of *Yarrowia lipolytica* for Conversion of Waste Cooking Oil into Omega-3 Eicosapentaenoic Acid. *ACS Engineering Au*, 5(2), 128–139. <https://doi.org/10.1021/acseengineeringau.4c00053>
5. **Coleman, S. M.***, Marx, R. J.*, Martinez, M. K., Silvera, A. J., Park, J., Ramanan, E., Kaown, G., Yoon, S., Xie, D., & Alper, H. S. (2024). Considerations Regarding High Oil Density Bioreactor-Scale Fermentations of *Yarrowia lipolytica* Using CFD Modeling and Experimental Validation. *Biotechnology Journal*, 19(12), e202400506. <https://doi.org/10.1002/biot.202400506>
6. Presnell, K. V., Melhem, O., **Coleman, S. M.**, Morse, N. J., & Alper, H. S. (2024). Design and synthesis of synthetic promoters for consistency of gene expression across growth phases and scale in *S. cerevisiae*. *Synthetic and Systems Biotechnology*. <https://doi.org/10.1016/j.synbio.2024.03.004>
7. Marsan, C. B., Lee, S. G., Nguyen, A., Sierra, A. R. G., **Coleman, S. M.**, Brooks, S. M., & Alper, H. S. (2024). Leveraging a *Y. lipolytica* naringenin chassis for biosynthesis of apigenin and associated glucoside. *Metabolic Engineering*, 83, 1–11. <https://doi.org/10.1016/j.ymben.2024.02.018>

8. Graham, A. J., Partipilo, G., Dundas, C. M., Miniel Mahfoud, I. E., Halwachs, K. N., Holwerda, A. J., Simmons, T. R., FitzSimons, T. M., **Coleman, S. M.**, Rinehart, R., Chiu, D., Tyndall, A. E., Sajbel, K. C., Rosales, A. M., & Keitz, B. K. (2024). Transcriptional regulation of living materials via extracellular electron transfer. *Nature Chemical Biology*, 1–12. <https://doi.org/10.1038/s41589-024-01628-y>
9. **Coleman, S. M.***, Cordova, L. T.*, Lad, B. C., Ali, S. A., Ramanan, E., Collett, J. R., & Alper, H. S. (2023). Evolving tolerance of *Yarrowia lipolytica* to hydrothermal liquefaction aqueous phase waste. *Applied Microbiology and Biotechnology*. <https://doi.org/10.1007/s00253-023-12393-8>
10. Soong, Y.-H. V.*, **Coleman, S. M.***, Liu, N., Qin, J., Lawton, C., Alper, H. S., & Xie, D. (2023). Using oils and fats to replace sugars as feedstocks for biomanufacturing: Challenges and opportunities for the yeast *Yarrowia lipolytica*. *Biotechnology Advances*, 108128. <https://doi.org/10.1016/j.biotechadv.2023.108128>
11. Yuan, S.-F., Nair, P. H., Borbon, D., **Coleman, S. M.**, Fan, P.-H., Lin, W.-L., & Alper, H. S. (2022). Metabolic engineering of *E. coli* for α -alanine production using a multi-biosensor enabled approach. *Metabolic Engineering*. <https://doi.org/10.1016/j.ymben.2022.08.012>
12. Lad, B. C.*, **Coleman, S. M.***, & Alper, H. S. (2021). Microbial valorization of underutilized and nonconventional waste streams. *Journal of Industrial Microbiology and Biotechnology*. <https://doi.org/10.1093/jimb/kuab056>
13. Gordiichuk, P., **Coleman, S.**, Zhang, G., Kuehne, M., Lew, T. T. S., Park, M., Cui, J., Brooks, A. M., Hudson, K., Graziano, A. M., Marshall, D. J. M., Karsan, Z., Kennedy, S., & Strano, M. S. (2021). Augmenting the living plant mesophyll into a photonic capacitor. *Science Advances*, 7(37), eabe9733. <https://doi.org/10.1126/sciadv.abe9733>

Preprints/In Preparation

1. **Coleman, S. M.**, Zhang, H. S., Lucchesi, L. R., & Roy, S. (2026). Exploring the periodicity of flight patterns. *arXiv*. <https://doi.org/10.48550/arXiv.2606.00128>
2. Martinez, M. K.*, **Coleman, S. M.***, Marter, C., Vinod, N., Subramanian, A., & Alper, H. S. Alkane metabolism of yeasts in the *Yarrowia* clade.