

Mohamed Soufi

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Asimov Press Researcher and Freelance Writer applying to opportunities that align with my research interests. Dedicated to rebuilding biology for forward and reverse-engineering. More specifically, interested in cell-free ribosome biogenesis, synthetic cells, cell-free systems, and ribosome engineering. As a technician at the Mayalu Lab at Stanford, I set up the new wet lab and the first project. Former Bioengineering Ph.D. student at Rice University, but voluntarily withdrew after science funding cuts. Graduated from Caltech in 2022 with a B.S. in Bioengineering and Computer Science minor, conducted research on the directed evolution of acoustic reporter genes in the Shapiro Lab, published in *ACS Synthetic Biology*.

EDUCATION

B.S. in Bioengineering and Computer Science minor

California Institute of Technology • Pasadena, CA • August 2018 - December 2022 • 3.6 GPA

Ph.D. in Bioengineering (voluntary withdrawal)

Rice University • Houston, TX • August 2024 - February 2025 • 4.0 GPA

EXPERIENCE

Researcher/Freelance Writer

Asimov Press, Boston

April 2025 - Present

- Part-time 3-month contract to help build Asimov Press publishing initiative
- Contributing to Asimov Press' long-form and technical coverage
- Investigate, scrape, and curate interesting datasets and developing interactive data exploration and visualization tools for Data Briefs series
- Freelance writing with Addgene and Synbiobeta

Research Technician

Mayalu Lab, Stanford

June 2023 - June 2024

- Spearheaded the development of a quorum-sensing circuit with paradoxical feedback to robustly control bacterial populations (publication in preparation)
- Established a BSL-2 laboratory from scratch, including setup of equipment, procurement of samples, supplies, reagents, protocols, and safety
- Trained lab members on established and new protocols and techniques, enabling a postdoc and graduate student to independently manage the lab and advance the quorum-sensing project
- Designed molecular biology protocols, carried out experiments, and managed daily lab operations
- Served as Lab Safety Coordinator, maintaining compliance with institution and county guidelines for a safe working environment
- Presented my work during lab meetings

Undergraduate Researcher

Shapiro Lab, Caltech

February 2021 - April 2023

- Developed and automated data acquisition and processing pipeline of ultrasound images for screening bacteria expressing gas vesicles, resulting in up to 12 hour per scan time savings
- Created Graphical User Interfaces (GUIs) using MATLAB App Designer to make the pipeline accessible to lab members with no coding background
- Co-authored *ACS Synthetic Biology* publication on the Directed evolution of acoustic reporter genes.
- Performed molecular biology wet lab work, including the assembly, transformation, and expression of DNA constructs in *E. coli* in high-throughput
- Presented work to the lab and larger Caltech community.
- Demonstrated reliability and troubleshooting ability with over 1000 hours of lab experience.
- Provided training to lab members on established protocols and techniques.

Research Technician

Shapiro Lab, Caltech

December 2023 - April 2023

- Continued post-graduation to complete my undergraduate research project, now published in *ACS Synthetic Biology*

Summer Undergraduate Research Fellow

Stathopoulos Lab, Caltech

June 2019 - October 2019

- Worked with Prof. Stathopoulos and Dr. Susie Newcomb on a project whose goal was to determine how transcription factors regulate the *brinker* promoter proximal element in *Drosophila Melanogaster*
- Used RNAi to knockdown the transcription of *brk*, which we observed with in situ hybridization

CHORI Summer Student Research Program, Lucas Memorial Intern

Fung Lab, CHORI

June 2018 - August 2018

- Worked with Dr. Ellen Fung on a project whose goal was to find the best predictors of vertebral fracture in Thalassemia patients

PAPERS

- Soufi, M. Fracassi, A. Hoxie, N., Abdo, Noireaux, V. & Jewett, M.J. (2025) Cell-Free Ribosome Biogenesis for Synthetic Cells. [Manuscript in preparation]
- Roy, R. Soufi, M., Perez-Medina V., & Mayalu, M. (2025) Paradoxical Signaling-Based Synthetic Population Control Circuit in *E. coli* [Manuscript in preparation]

- Hurt, R. C., Jin, Z., **Soufi, M.**, Wong, K. K., Sawyer, D. P., Shen, H. K., Dutka, P., Deshpande, R., Zhang, R., Mittelstein, D. R., & Shapiro, M. G. (2024). Directed evolution of acoustic reporter genes using high-throughput acoustic screening. ACS Synthetic Biology. <https://doi.org/10.1021/acssynbio.4c00283>
- **Soufi, M.**, Wang, M., & Lin, E. Modeling Microtubule Time to Catastrophe, 2020, <https://meganwang08.github.io/microtubule-catastrophe/>

PRESENTATIONS

- Soufi, Mohamed (2022, August 18). *Development of an acoustic 96-well plate reader*. Caltech SURF Seminar 2022, Pasadena, CA, United States.
- Soufi, Mohamed (2021, October 16). *Development of an acoustic 96-well plate reader*. Caltech SURF Seminar 2021, Pasadena, CA, United States.
- Soufi, Mohamed (2019, October 20). *Determining how transcription factors regulate the brinker Promoter Proximal Element in Drosophila Melanogaster*. Caltech SURF Seminar 2019, Pasadena, CA, United States.

AWARDS

Caltech Summer Undergraduate Research Fellowship 2022

Caltech Summer Undergraduate Research Fellowship 2021

Caltech Summer Undergraduate Research Fellowship 2019

EXTRACURRICULARS

Tutoring • 2019 - Present (Pasadena Police Activities League, Young Legends Program, Ocean Tutor Program, Private Tutoring)

Stanford Synthetic Biology Planning Committee • 2023-24

NCAA Division III Men's Soccer • 2018-22

- Committed between 10 - 30 hours per week throughout the year for training, meetings, film study, travel, and games while maintaining full course and research load
- Led tours of facilities to prospective student-athletes and their families
- Organized group practices and individual workouts during the Covid pandemic

SKILLS

Languages: Arabic (native), French (working proficiency)

Tutoring

Wet Lab Molecular Biology

- Directed evolution High throughput molecular cloning, CIDAR MoClo and 3G Assembly, PCR, Gel Electrophoresis, Bacteria Culture, DNA purification/sequencing/analysis

Software Development

- Python (Data Analysis and Visualization, numpy, scipy, polars, pandas, bokeh, holoviews, panel), MATLAB, C++, C, JAVA, GIT

PROJECTS

Independent Research: Cell-Free Ribosome Biogenesis for Synthetic Cells

March 2024 - Present

- Leading a joint review and perspective paper on cell-free ribosome biogenesis with collaborators from the Build-a-Cell community, including Professors Jewett and Noireaux
- Leading the reading and writing, organize meetings, delegate tasks, and reach out to experts for interviews and feedback
- Leading this project allows me to critically evaluate the field, connect with labs and experts globally, lay the groundwork for future collaborations, and prepare for my Ph.D.

LV Caller 2.0

December 2024 - January 2025

- Developed software at Bao Lab at Rice to analyze and visualize microhomology alignments around large CRISPR/Cas9-induced deletions.
- Created interactive plots for k-mer and homology distribution analysis, deployable in both Jupyter Notebook and on a standalone server.

Brawlhouse

March 2022 - June 2022

- Designed a 2D Top-down shooter game following standard software engineering processes to document, review, test, inspect, and release code as part of CS 3 course at Caltech
- Implemented full game including physics engine (handles objects, forces, and collisions) and SDL for graphics in C
- Developed core backend and frontend components for visual and character design

Pulse Oximeter

May 2021 - June 2021

- Engineered functional pulse oximeter that displays your pulse trace, heart rate, and blood oxygen saturation from an LED sensor probe as part of BE189a course at Caltech
- Used hardware pieces (LEDs, resistors, transistors, amplifiers), an Arduino motherboard, and software using Python packages (bokeh, numpy)

Modeling Microtubule Time to Catastrophe

October 2020 - December 2020

- Wrote an online paper for Programming and Data Analysis in Biology class at Caltech with 2 other students
- Designed interactive graphics, wrote python package, mathematically derived unique Poisson model, and analyzed public dataset from Howard Lab
- Compared consecutive Poisson interactions model to Gamma distribution model