

Mohamed Soufi

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Paris-Saclay M2 Synthetic Biology Student 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 projects. 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

M.S. in Systems and Synthetic Biology

Université Paris-Saclay • Evry, France • September 2025 - July 2026

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

Freelance Writer

Remote

April 2025 - Present

- Developed interactive data tools and curated datasets during a part-time contract with Asimov Press to support long-form and Data Briefs content.
- Published articles with Addgene and SynBioBeta covering synthetic biology industry trends, scientific advances, and practical laboratory protocol guides
- Co-authored policy essay with an international, interdisciplinary team for the NTI Next Generation for Biosecurity Competition, providing recommendations on updating bioweapons governance.

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 (manuscript in preparation)
- Established a BSL-2 laboratory from scratch, including setup of equipment, procurement of samples, supplies, reagents, protocols, and safety
- Trained postdoc and graduate students in new and established lab protocols, enabling them 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.

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/>

CONFERENCES AND PRESENTATIONS

- Soufi, Mohamed (2025, August 21). *Cell-Free Ribosome Biogenesis for Synthetic Cells*. AICHE 3rd Cell Free Systems Conference 2025, Evanston, IL, United States.
- Soufi, Mohamed (2025, June 8). *Cell-Free Ribosome Biogenesis for Synthetic Cells*. RiboWest, Lethbridge, Canada. [Accepted but not presented]
- Soufi, Mohamed (2025, June 26). *Cell-Free Ribosome Biogenesis for Synthetic Cells*. SEED 2025, Houston, TX, United States.
- Soufi, Mohamed (2025, May 10). *Cell-Free Ribosome Biogenesis for Synthetic Cells*. Build a Cell 14, Stanford, CA, United States.
- Soufi, Mohamed (2025, May 7). *Cell-Free Ribosome Biogenesis for Synthetic Cells*. Synthetic Biology for Sustainability Symposium, Stanford, CA, United States.
- Soufi, Mohamed (2024, September 20). *Cell-Free Ribosome Biogenesis for Synthetic Cells*. Build a Cell 13, Cambridge, MA, United States.
- Soufi, Mohamed (2024, March 29). *Cell-Free Ribosome Biogenesis for Synthetic Cells*. Build a Cell 12, San Diego, CA, United States.
- 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.
- Conferences Attended but did not present: SEED 2023, SEED 2024, Synbiobeta 2023, Synbiobeta 2024, Synbiobeta 2025, Build a Cell Workshop 11, ISBUS 2023

AWARDS

Paris-Saclay IDEX International Master's Scholarship

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 a full academic 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 review paper on cell-free ribosome biogenesis with international collaborators, Build-a-Cell, and Profs. Jewett and Noireaux.
- Led manuscript development by coordinating literature review, writing, meetings, task delegation, and expert feedback
- Presented our work at SEED 2025, the Stanford Synthetic Biology for Sustainability Symposium, AICHE 3rd Cell Free Systems Conference, and Build-a-Cell Workshops 12, 13, and 14
- This project enables me to critically evaluate the field, connect with 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