Jacob Shapiro

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Education

Harvard University, Cambridge, MA – *PhD Candidate, Biophysics Program* *September 2023 - Present*
- Advisor: Professor Fei Chen

Massachusetts Institute of Technology, Cambridge, MA *August 2019 – June 2023*
- Major in *Computer Science and Molecular Biology*, Minor in *Literature*, GPA: 5.0/5.0

Technical Skills

- Selected Coursework: Machine Learning*, Inference*, Control Theory*, Algorithms, Software Engineering, Optics (*Grad)
- Computational Skills: Python, TypeScript, C (learning), Assembly (learning), single-cell RNA-seq analysis, protein design
- Laboratory Skills: Single-cell RNA seq, next-generation sequencing, confocal microscopy, cell culture
- Other: FPV drone assembly and flight, laser cutting, 3D printing

Research Experience

Chen Lab, Broad Institute of Harvard and MIT, Cambridge, MA – *PhD Candidate* *September 2023 – Present*

Project: Develop technology to map immune cell clones in tumor tissue with single-cell transcriptomic resolution.
- Adapted spatial transcriptomics technology to study clonal expansion of T and B cells in melanoma sample
- Contributing author: Maurer, K., […] **Shapiro, J.,** *et al.* A clonally expanded nodal T-cell population diagnosed as T-cell lymphoma after CAR-T therapy. *Nat Commun* **16**, 7462 (2025)

Project: Develop technology to measure the entire human proteome and transcriptome with single-cell resolution.
- Designing a single-cell proteomics technology with enhanced specificity.
- Using the method to study mRNA translation and identify therapeutic opportunities.

Weissman Lab, MIT, Cambridge, MA – *Undergraduate Researcher* *October 2022 – May 2023*

Project: Investigate how putative viral proteins affect human cells.
- Used ESMFold on MIT's computing cluster to predict the structure of putative viral proteins.

Baker Lab, University of Washington, Seattle, WA – *Undergraduate Summer Research Fellow* *June – August 2022*

Project: Design an agonist for cell-surface receptors using deep-learning.
- Used protein hallucination to design *de novo* protein sequences that bind to cell surface receptors.
- Analyzed designs *in silico* with AlphaFold2 and experimentally characterized binding affinity *in vitro.*

Langer Lab, MIT, Cambridge, MA – *Philips Undergraduate Research and Innovation Scholar* *January 2020 – May 2022*

Project: Model urea and ammonia metabolism in humans to assess feasibility of a treatment for kidney disease.
- Developed a system of differential equations to model urea and ammonia metabolism and implemented the model in Python.
- Simulations suggested treatment was not feasible, saving development time in the lab.

Lyndra Therapeutics, Watertown, MA – *Engineering and Product Design Intern* *August – December 2020*
- Used XGBoost and Shapley values to guide optimal design of a long-acting oral drug delivery platform.

Aerospace Controls Laboratory, MIT, Cambridge – *Undergraduate Researcher* *September – December 2019*
- Helped design a drone to collect airflow data behind ship for improved design; gain exposure to ROS and drone components

Leadership Experience

MIT Glass Lab – *Instructor* *January 2020 - Present*
- Help teach beginner glassblowing classes and make pumpkins for the annual MIT Glass Pumpkin Patch.

Amphibious Achievement at MIT – *Director of External Relations* *September 2022 – May 2023*
- Mentor under-privileged Boston youth in STEM and water safety, secured grant funding.

Camp Boston-Sderot, Herzliya, Israel – *Counselor* *August 2021*
- The camp is organized by volunteers from Boston for children who live in Sderot, a town on Israel's border with the Gaza Strip that is under frequent rocket fire. I helped organized camp-wide activities for 70 children, many of whom have PTSD.

Russian School of Mathematics Summer Camp, Sunapee, NH – *Head Counselor* *June – July 2021*
- Managed hiring and training of 36 counselors, led overnight camp activities for over 250 staff members and campers.

Honors and Awards

- **2022 Burchard Scholar** - Selected to participate in dinner seminars with faculty in the Humanities (1 of 30 selected).
- **2022 Bruce Mazlish History Prize** – Award for essay on European religious authority from 1500-1800 (1 of 3 awarded).
- **2020 Sinai Scholars Symposium National Finalist** – Awarded for essay on the modern history of Israel (1 of 10 awarded)

Personal

- **Music:** Classical piano (9 yrs.), Jazz piano (5 yrs.), Clarinetist in Klezmer band (8 yrs.)
- **Swimming:** MIT varsity swim team 2019 – 2021, 2019 Illinois Senior State Championships – 1st place in 100 fly
- **Languages:** Russian (fluent), French (proficient)