

Sophia Liu

Education

Massachusetts Institute of Technology

Cambridge, MA

Candidate for B.S. in Chemical-Biological Engineering and minor in Biology

June 2017

Relevant Coursework: Computational Biology, Genetics, Cell Biology, Biochemistry, Experimental Biology and Communication, Thermodynamics and Kinetics, Differential Equations

GPA: 4.7/5.0; GRE: 338/340

West Windsor–Plainsboro High School South

Princeton Junction, NJ

GPA: 4.00/4.00; SAT: 2380/2400

June 2013

Experience

Broad Institute

Cambridge, MA

Amgen Scholar, Undergraduate Researcher, Shalek Laboratory

Sep 2015– Present

Uncovering nuances of cell heterogeneity in the piriform cortex as a measure of learning

- Collaborating with the Choi Lab to perform single-cell RNA-seq analyses on neurons in the piriform cortex
- Computationally analyzing Illumina sequenced cells to isolate differential receptors

SQZ Biotech

Boston, MA

Consultant

Jan 2015 – Jun 2015; Jan 2016

Identifying and pursuing novel markets for applications of the CellSqueeze microfluidic delivery chip

- Researching the projects of academic professionals and co-developing experimental designs using CellSqueeze
- Exploring alternative antigen presenting cells for immunotherapy
- Outlining future experimental directions of the company, with regard to shifts in scientific demand and research

Genentech

South San Francisco, CA

Intern, Immunology, Tissue Growth, and Repair Diagnostic Discovery Department

Jun 2015 – Aug 2015

Discovering human biomarkers for enhancing the detection and characterization of Alzheimer's Disease to improve disease sub-classification and enable personalized treatment strategies for patients

- Designed a **human *in vitro* induced stem cell neuronal model** for Alzheimer's Disease pathology
- Coded image analyses on immunostained samples and performed qPCR to evaluate the effects of recombinant tau and anti-tau antibodies
- Computationally uncovered differentially expressed genes from large RNA-Seq and qPCR datasets

David H. Koch Institute for Integrative Cancer Research

Cambridge, MA

Undergraduate Researcher, Langer Laboratory

Oct 2013 - May 2015

Developing the potential for immunotherapeutic cancer vaccines on the priming and proliferation of CD8 T-cells

- Proposed and executed a protocol for *in vivo* mouse tumor trials involving the injection of various types of antigen presenting cells post-modification by microfluidic delivery
- Optimized cell yield from bone marrow derived dendritic cell culture by 562% and viability to 99%
- Collaborated on a **publication in PLoS ONE** and a **patent on intracellular delivery**

Teaching

Neuro-Immunology in Splash 2016

This is How We Do It: Methods and Technologies behind Modern Biological Questions in HSSP Spring 2016

Immunology 101 - New Technologies for Finding Out How Your Body Naturally Fights Off Bad Things in Splash 2015

Healthcare and Global Health in HSSP Spring 2015

Obamacare and Global Health in Splash 2014

Leadership

MIT Undergraduate Association

Cambridge, MA

President (former Vice President, Secretary, former Vice President for the class of 2017)

May 2015 - Present

- Improving the undergraduate experience of 4500+ students, including developing an undergraduate conference grant, redesigning the website, establishing an academic advisory board, creating a weekly newsletter for campus events, and successfully advocating for a 15% increase in campus wages.
- Leading and guiding over twenty committees involved in various campus activities, from student support and wellness to sustainability, and managing a \$300,000+ organizational budget

- Educating middle school, high school, and college students on global health systems, national health policies, innovative technologies for the developing world, and GlobeMed's partner in Togo, Hope Through Health
- Facilitated a healthcare blog discussing topics such as Neglected Tropical Diseases and **healthcare inequities**
- Creating a global health conference of 200+ people located at MIT to spark community involvement and interest

Awards

MIT Amgen Scholar	2016
Kelly Essay Prize for Excellence in Humanistic Scholarship – ‘Almond Shaped Eyes’	2016
Burchard Scholar	2016
MSNBC Women in Politics: College Edition – MIT	2016
Business Insider – Most Impressive Students at MIT	2015
GenenTank – <i>Winner</i> : DiaDem, Diagnostics for Dementia, a proposed quantum dot microfluidic device	2015
Chemical Engineering Department Special Service – 2017 AICHE board Class Representative	2015
BP Ultimate Field Trip – Houston, TX – <i>National Finalist</i> : Self Sustaining Methane-Gel Fracturing	2015
Biomedical Engineering Society (BMES) Annual Meeting – San Antonio, TX – <i>Presenter</i> : Improving the Response Post-Adoptive Cell Transfer of Dendritic Cells Using Microfluidic Delivery	2014
Mediterranean Model United Nations Competition – Menton, France – <i>Best Delegate</i> : International Atomic Energy Agency (IAEA) Committee	2014
Alex's Lemonade Stand Fund Research Grant	2014
MIT Federal Credit Union Memorial Scholarship	2014
Science Olympiad – Madison, WI – <i>National first placement</i> : Materials Science	2012

Publications

1. Armon Sharei, Radiana Trifonova, Siddharth Jhunjhunwala, George C. Hartoularos, Alexandra T. Eyerman, Abigail Lytton-Jean, Mathieu Angin, Siddhartha Sharma, Roberta Pocevičute, Shirley Mao, Megan Heimann, **Sophia Liu**, Tanya Talkar, Omar F. Khan, Marylyn Addo, Ulrich H. von Andrian, Daniel G. Anderson, Robert Langer, Judy Lieberman, Klavs F. Jensen, *Ex Vivo Cytosolic Delivery of Functional Macromolecules to Immune Cells*. **PLoS ONE**, 2015.
2. 19SL1.11 WSSP *Wolffia australiana* cDNA library *Wolffia australiana* cDNA clone 19SL1.11 5-similar to defensin-like protein, mRNA sequence GenBank: JZ077809.1, 2012.
3. 19SL2.11 WSSP *Wolffia australiana* cDNA library *Wolffia australiana* cDNA clone 19SL2.11 5-similar to photosystem I reaction center subunit V, mRNA sequence GenBank: JZ077662.1, 2012.
4. 19SL3.11 WSSP *Wolffia australiana* cDNA library *Wolffia australiana* cDNA clone 19SL3.11 5-similar to MBOAT (membrane bound O-acyl transferase)-like protein, mRNA sequence GenBank: JZ077961.1, 2012.
5. 19SL4.11 WSSP *Wolffia australiana* cDNA library *Wolffia australiana* cDNA clone 19SL4.11 5-similar to catalase, mRNA sequence GenBank: JZ077962.1, 2012.
6. 19MA9.10 WSSP *Wolffia australiana* cDNA library *Wolffia australiana* cDNA clone 19MA9.10 5-similar to photosystem I reaction centre subunit VI, mRNA sequence GenBank: JK990499.1, 2012.

Patents

1. **Delivery of Biomolecules into Immune Cells**. United States U.S. Provisional Application No. 62/073,548. Filed October 31, 2014. No. PCT/US2015/058489, Filed October 31, 2015.

Presentations

1. **Amgen Scholars** – Cambridge, MA – *Presenter*: Decoding associative learning in the piriform cortex using single-cell RNA-seq 2016
2. **Genentech** – San Francisco, CA – *Presenter*: Biomarkers Derived from a Human Neuronal Model Characterizing Alzheimer's Disease Progression 2015
3. **Biomedical Engineering Society (BMES) Annual Meeting** – San Antonio, TX – *Presenter*: Improving the Response Post-Adoptive Cell Transfer of Dendritic Cells Using Microfluidic Delivery 2014

Skills and Interests

Languages: Fluency in English, Professional proficiency in Chinese-Mandarin and Spanish

Computer: Python, MATLAB, R, ImageJ Macro Language, Microsoft Office, Basic HTML and JavaScript

Activities: Running, Society of Women Engineers (SWE), American Institute of Chemical Engineers (AIChE), Sigma Kappa Sorority – Philanthropy Committee, Model United Nations – Chair of the World Health Organization