

Curriculum Vitae

Madison Leone

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Education:

Massachusetts Institute of Technology, 2018-present

B.S. in Brain and Cognitive Sciences (Course 9) & B.S. in Biology (Course 7)

Past Positions:

- **Biology Lab Technician at Droplette Inc. (Fall 2020):** Managed start of product manufacturing for Droplette's skincare capsules, worked closely with senior mechanical engineers to optimize production for product integrity, employee and consumer safety, and assembly efficiency. Following optimization, trained new employees on machine operation; produced capsule stock for October 2020 device release.
- **Undergraduate Researcher in Graybiel Lab, McGovern Institute for Brain Research (Summer 2019):** Performed fluorescent immunohistochemistry stains and analyzed resulting confocal microscopy images with ImageJ software, sectioned and fixed murine cerebral tissue, and ran behavioral studies with live mice, studying the stereotypes associated with amphetamine use.
- **Intern at Cosford Lab of Chemical Biology, Sanford Burnham Prebys Medical Discovery Institute (Summer 2017):** Carried out original research relating to autophagic inhibition in *Drosophila* models.

Current Work:

- Undergraduate researcher in Kim Lab of Immunotherapy at Korea Advanced Institute of Science and Technology, Daejeon, Korea: In-person Summer 2022. Investigating CAR microglia in phagocytosis of amyloid plaques.
- Undergraduate Researcher in Garcia-Beltran Lab, Ragon Institute (Feb. 2022-present): Designing and carrying out an independent project involving natural killer cell activation, engineering plasmids for expression of chimeric proteins in NK cells, assaying CAR-NK cell killing of target cells.

Awards and Honors:

MCAT: 522 (130 Chemistry/Physics, 129 CARS, 131 Biochem, 132 Psych/Sociology)

USA Biology Olympiad 2017 Semifinalist: Top 50 out of 5,488 competitors nationwide

Leadership and Extracurriculars:

- ❖ *Captain of the MIT Ballroom Dance Team (2019-2020; 2021-Present)*: Roles in recruiting new team members, inviting guest coaches to the team, coordinating team-hosted events, and restructuring team practices around remote learning for summer 2020 through spring 2021. As a member of the team, I competed in all four styles of dance (Standard, Latin, Smooth, and Rhythm) at the Gold and Silver levels, with training 20-25 hours per week and regular competitions prior to March 2020. Secretary of the team 2020-2021. Managed transition of team's lessons to Zoom format for 2020-2021AY.
- ❖ *MCAT and K-12 Math/Science/English Tutor (Fall 2020 - present)*: Taught various subjects via Zoom with electronic notepad interface to visually demonstrate concepts to various students. Tailored lessons to each individual's strengths, preferred modes of learning, and interests.
- ❖ *Founder and President of the La Jolla High School Science Olympiad Team (2016-2018)*: Raised funds to buy study resources, coordinated reestablishment of the team after 20 years of inactivity, organized team meetings and fundraising events, and made the USA Biology Olympiad Open Exam available for all students. Coordinated La Jolla High School Science Olympiad Invitational held on January 13th, 2018.
- ❖ *Assistant Stage Manager for J*Company Youth Theater (2013-2018)*: Ensured the safety of the cast and crew by communicating with the stage manager via headset and conveying cues; operating spotlight, running rehearsal music tracks, etc.
- ❖ *Production Assistant for the Broadway San Diego Awards (2014-2018)*: Aided the rehearsal process by guiding invited guests to the stage, collaborating with the competition judges to elect finalists and winners, preparing sheet music for accompanist, etc.

Fields of Knowledge:

DNA, RNA, and Protein Analysis: PCR, DNA gel electrophoresis, SDS-PAGE, Western blot, fluorescent immunohistochemistry, cell fractionation, protein purification, ELISA, and qtRNA-sequencing.

Cell-based Analysis: Fluorescent in-situ hybridization, confocal imaging and analysis, FRAP (fluorescence recovery after photobleaching), and FACS (fluorescence activated cell sorting).

Genetic Engineering for Experimental Modeling: Tamoxifen-inducible Cre-lox systems, chimeric protein design, CRISPR-Cas9, and plasmid/vector engineering via restriction enzymes.

Techniques in model systems:

Mice: Intraperitoneal injection, behavioral studies practices, brain sectioning, perfusion.

Drosophila: stock maintenance and propagation, cardiac filming and analysis.

Human cells: culture of various cell lines, lentivirus production from HEK-293T cells.

Certifications:

CITI Human Research: Biomedical Research Investigators (exp. 6/20/24)

CITI Human Research: Social & Behavioral Research Investigators (exp. 6/16/24)

Software Experience:

Python (programming and data visualization), MatLab (statistical modeling/simulation, data visualization), ImageJ, Prism, Snappgene, and Excel (functions on cells, graphing/visualization).

Language Skills:

Intermediate in Korean and Latin American Spanish. Elementary in French.

MIT Coursework:

7.012: Introductory Biology
8.01: Calculus-based Mechanics
5.112: Principles of Chemical Science
18.01: Single Variable Calculus
21H.130: The Ancient World: Greece
7.0002: Fundamentals of Experimental Molecular Biology
18.02: Multivariable Calculus
5.12: Organic Chemistry I
7.03: Genetics
9.00: Introduction to Psychology
9.01: Introduction to Neuroscience
9.85 Infant and Early Childhood Cognition
9.97: Introduction to Neuroanatomy
9.09: Cellular and Molecular Neurobiology
24.01: Classics of Western Philosophy
9.12: Experimental Molecular Neurobiology
21G.901: Korean I
6.0001: Introduction to Computer Science Programming in Python
6.0002: Introduction to Computational Thinking and Data Science
8.02: Calculus-based Electromagnetism
21G.902: Korean II
7.05: General Biochemistry
9.24: Disorders and Diseases of the Nervous System
21G.903: Korean III
7.06: Cell Biology
7.20: Human Physiology
7.45: The Hallmarks of Cancer
5.13: Organic Chemistry II
9.07: Statistics for Brain and Cognitive Sciences
9.40: Neural Computation
7.26 Molecular Basis of Infectious Disease
7.95 Cancer Biology
9.13 The Human Brain
5.310 Laboratory Chemistry
21G.904 Korean IV

Additional Coursework (College Courses not taken at MIT):

- *University of California, San Diego:*
Organismic and Evolutionary Biology, Human Nutrition
- *Bunker Hill Community College:*
French 101 and French 102
- *San Diego Mesa College:*
Linear Algebra and Discrete Mathematics, Calculus I and II, Political Science 101 and 102