LERAN MAO

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EDUCATION

Carnegie Mellon University, Pittsburgh, PA　　　　　　　　　　　　　　　December 2023
Ph.D. in Chemical Engineering　　　　　　　　　　　　　　　　　　　　　GPA: 3.96/4.0
Selected Coursework: Data Science in Chemical Engineering, Introduction to Machine Learning for Biomedical Engineers, Molecular Simulation of Materials, Physical Chemistry of Macromolecules

University of California, Berkeley, Berkeley, CA　　　　　　　　　　　　　　May 2019
M.S. in Chemical Engineering (Product Development Program)　　　　　　　　　GPA: 3.90/4.0
Selected Coursework: Biochemical Engineering, Fundamentals of Business, Introduction to New Product Development

University of Virginia, Charlottesville, VA　　　　　　　　　　　　　　　　May 2018
B.S. in Chemical Engineering with distinction　　　　　　　　　　　　　　　GPA: 3.60/4.0
Selected Coursework: Bioprocess and Bioproduct Engineering, Bioseparations Engineering, Transport Processes

SKILLS

Software: Advanced – ImageJ, Matlab, Microsoft Excel & Word; Intermediate – AutoDock Vina, UCSF Chimera, GROMACS
Programming Language: Advanced – Python; Intermediate – C++, HTML
Experimental: Biochemical Assay, CE/PAGE, Cell Culture, Flow Cytometry, H/UPLC (Affinity/SEC/HILIC), Immunoassay
Analytics: Data analysis and visualization, Design of Experiments (DOE), Machine learning, Modeling and simulation

PHD THESIS RESEARCH

Carnegie Mellon University, Pittsburgh, PA　　　　　　　　　　　　　Fall 2020 – Fall 2023
Experimental and Computational Approaches to Control Mammalian Cell Proliferation, Protein Production, and Post-translational Modifications

- Improved antibody yield by three fold in a CHO cell line with media supplementation with mechanistic insight
- Identified differential effects of ER and oxidative stress on cell culture performance and protein quality attributes through design of experiments and multivariate analysis
- Designed high-throughput assays for multi-attribute analysis of antibody glycosylation
- Modulated antibody glycosylation using empirical and mechanistic models with metabolic regulation
- Led externally sponsored projects on antibody vector construction, expression, and characterization
- Cloned molecular vectors to study intracellular quality control for an aggregation-prone protein, tau
- Pioneered in the design, experimentation, and validation of multiple assays, such as DNA damage and ITC in the lab
- Trained graduate students on techniques such as protein purification and protein charge variant analysis

ADDITIONAL RESEARCH EXPERIENCE

Russell Lab, Graduate Student Researcher, Carnegie Mellon University　　　Fall 2019 – Summer 2020
- Designed a microfluidic, continuous flow reactor for atom transfer radical polymerization (ATRP) with lower polydispersity compared with batch reactions
- Constructed Monte Carlo and statistical simulation models for ATRP
- Developed a predictive, informational PEGylation model for site-specific protein-polymer conjugation

Conboy Lab, Graduate Student Researcher, University of California, Berkeley　　Fall 2018 – Summer 2019
- Led care of animals for research, including harvesting and genotyping of tissues
- Performed and optimized the workflow of antibody array experiments to characterize the aging proteome
- Established a stable cancer cell line with bio-orthogonal labels
- Acknowledged for primary technical assistance (Mehdipour et al. Aging. 2019, Liu et al. Rejuvenation Res. 2022)

Laurie Lab, Undergraduate Student Researcher, University of Virginia　　　Summer 2017 – Summer 2018
- Computationally mapped a protein-protein interactome of a tear protein, lacritin, to unveil novel interaction targets
- Analyzed and visualized data for CRISPR death screen proteomics to identify lacritin-regulated targets
- Presented key research findings in the Lacritin Research Consortium in Fall 2017

ADDITIONAL EXPERIENCE

Alternative Meat Program Student Collaborator, University of California, Berkeley　　Spring 2019 – Summer 2019
- Explored the market opportunities of the emerging field of plant-based meat through collaboration with a cutting-edge biotechnology company (key information not disclosed)
- Individually reviewed and communicated technical challenges such as production and texture of clean meat

ACADEMIC PROJECTS

Product Development Field Project, Degree Requirement, University of California, Berkeley　　Spring 2019
- Participated in a client-defined project with an international biotechnology company focusing on technical and market analysis for an emerging technology (key information not disclosed)

- Led the conversation in weekly updates, and the final presentation. Presented market status, industrial relevance of the emerging technology, with a focus on key areas of improvement and investment plan

Senior Capstone, Thesis Project, University of Virginia   Fall 2017 – Fall 2018
- Conceptualized and designed key processes for a sustainable brewery with renewable energy
- Consulted on-site with Starr Hill Brewery and Old Bust Head Brewing Company for infrastructure improvement

PUBLICATIONS
- **L Mao** et al. Biotechnol. J. 2023; 2300397
- **L Mao** et al. Biotechnol. Prog. 2023; e3365.
- **L Mao** et al. Curr. Opin. Biotechnol. 2022; 78: 102788.
- **L Mao** et al. Bioconjug. Chem. 2022; 33(9): 1643-1653
- PN Smith, **L Mao** et al. Acta Biomaterialia. 2021;124:270-281.
- KLD Teixeira, **L Mao** et al. The FASEB Journal. 2018;32:533.47.
- GW Laurie, J Romano, **L Mao** et al. Ophthalmol. Vis. Sci. 2018;59(9):3828.

CONFERENCES & PRESENTATIONS
- **L Mao** et al., *"Understanding Oxidative and ER Stress in CHO Cell Culture and Product Quality with Multivariate Analysis"*, Cell Culture Engineering XVIII Conference, Carnegie Mellon University, Cancun, Mexico, April 2023, Poster Presentation
- **L Mao** et al., *"Controlling CHO cell proliferation and productivity to optimize antibody production"*, CHEGSA Symposium, Carnegie Mellon University, Pittsburgh, PA, October 2022, Conference Presentation
- **L Mao** et al., *"Lacritin Interactome Project"*, Lacritin Consortium, University of Virginia, Fort Belvoir, VA, December 2017, Conference Presentation
- **L Mao** et al., *"Construction of the First Tear Interactome"*, nanoSTAR Summer Research Symposium, University of Virginia, Charlottesville, VA, August 2017, Conference Presentation

AWARDS & HONORS
- **H. Robert Sharbaugh Presidential Fellowship in Chemical Engineering**, Carnegie Mellon University   Summer 2023
- **Mahmood I. Bhutta Fellowship in Chemical Engineering,** Carnegie Mellon University   Spring 2021
- **Phillips and Huang Family Fellowship in Energy,** Carnegie Mellon University   Spring 2021
- **nanoSTAR Summer Research Award,** University of Virginia   Summer 2017

TEACHING ASSISTANT EXPERIENCE

Carnegie Mellon University, Pittsburgh, PA   Spring 2020 – Spring 2021
Unit Operations of Chemical Engineering
- Assisted the professor with teaching and grading, improved students' Matlab programming familiarity in a class of 50+ students

Physical Chemistry of Macromolecules
- Managed classroom and teaching logistics in a class of 10+ students. Assisted the professor in selecting course and examination contents.

Transport Processes Laboratory
- Led and trained 2-4 teams of 4-6 students on experimentation and data analysis for heat transfer from a cylindrical tube, pipe flow, and membrane permeation experiments, and improved report-writing skills in mentored teams

University of Virginia, Charlottesville, VA   Fall 2015 – Spring 2016
Introduction to Chemistry
- Assisted teaching activities, including holding weekly office hours and discussion sessions and facilitating the usage of an online teaching platform ALEKS in a class of 1,000+ students
- Served as peer leader in discussion sections in groups of 10+ students to facilitate interactive teaching

EXTRACURICCULAR & LEADERSHIP EXPERIENCE

Reviewer, Carnegie Mellon University, Pittsburgh, PA   Summer 2023
- Served as glycosylation subject matter expert and reviewed manuscripts for publication in high-impact journals.

Website Manager, Carnegie Mellon University, Pittsburgh, PA   Spring 2023 – Spring 2024
- Managed and updated research group website

Mentor, Carnegie Mellon University, Pittsburgh, PA   Fall 2020 – Fall 2022
- Mentored first-year PhD students in academics and community involvement
- Mentored prospective students in essay-writing and PhD program application in the CMU PhD Mentorship Program
- Served as a CMU ChemE Open House mentor in-person and virtually to assist departmental recruitment

Graduate Student Panelist, Carnegie Mellon University, Pittsburgh, PA   Spring 2020 – Fall 2022
- Participated as PhD student panelist for both high school and undergraduate student panels to share academic and research experience as an outreach program and for departmental recruitment