

GAELEN D. GUZMAN, PhD

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EDUCATION AND PROFESSIONAL EXPERIENCE

Tafesse Lab, Oregon Health and Science University

Portland, OR

Post-doctoral Researcher

May 2024 - Present

Led the design and deployment of a data repository and visualization platform for proteomics experiments, enhancing data accessibility and collaboration. Our repository, the [Lipid Interactome](#) is open access during development.

Directed the lab's contribution to Phase I of the Gates Foundation M72 clinical study. We performed coordinated lipidomics, proteomics, and metabolomics analyses on serum samples collected from vaccine-recipient and control volunteers. In this collaborative experience, I worked with the Multi-Omics core at the Pacific Northwest National Labs to prepare a data package; our research group is under consideration for Round 2 of the consortium.

Mentored a graduate student and advised lab members on experimental design and procedures. Supported grant renewal efforts by assisting in preparation and writing.

PhD in Molecular Microbiology and Immunology

Sept 2017 - Feb 2024

Investigated how host sphingolipids influence Mycobacterium tuberculosis infection, employing BSL3 techniques alongside lipidomics, proteomics, and molecular biology (e.g., CRISPR, fluorescence microscopy, phagocytosis, and cell death assays). Published as co-first author in mBio, with additional contributions to two literature reviews on the role of lipids in immunology and virology, a methods paper, and several co-authored research publications. Presented findings at nine domestic and international meetings. Mentored five lab members, including graduate students and research assistants, while independently managing my research project.

Proteomics Platform, Broad Institute

Cambridge, MA

Research Associate II

Mar 2014 - June 2017

Performed interactome experiments in collaboration with academic and pharmaceutical teams (Broad, MIT, Harvard, Cambridge UK/MA). Leveraged quantitative proteomics and data-dependent mass spectrometry to identify interaction partners of target proteins and small molecules, contributing to insights into diseases like Alzheimer's, Inflammatory Bowel Disease, Colitis, Type 2 Diabetes, and myocardial infarction. Independently managed 85+ experiments from sample preparation to data analysis.

Massachusetts Institute of Technology

Cambridge, MA

Bachelor of Science in Biology

Sept 2010 - June 2014

My senior project was an investigation into the activation of the NF- κ B regulator NEMO following N-linked ubiquitination during inflammatory cell activation. I additionally worked for 3 semesters in the laboratory of Dr. Hidde Ploegh, where I helped establish a column-based flow-through method of Sortase mediated fluorophore-protein conjugation.

COMPUTATIONAL AND DATA ANALYSIS SKILLS

Programming: Proficiency in R: Applied Tidyverse for data wrangling and transformation of multi-omics datasets; developed Shiny apps for interactive explorations of proteomics and lipidomics data. Familiarity with Python: Undergraduate coursework, hobbyist Advent of Code (Pandas, NumPy, Matplotlib). Learning C++: microcontroller programming for ESP32-based hobbyist projects. Git: wide use for version control and collaborative data repository development.

Data Visualization: Expertise in creating publication-ready graphics and interactive dashboards using Shiny, Plotly, and Quarto Markdown. Extensive experience in figure preparation in Adobe Illustrator.

Bioinformatics and data pipelines: Expertise in automating workflows to analyze proteomics and lipidomics datasets via R and Python. Extensive experience in quantitative fluorescence microscopy and high-content imaging; building data pipelines in image analysis software such as FIJI, CellProfiler, and Keyence Analysis Software.

Repository Development: Lead the design and deployment of a centralized data repository and presentation tool for affinity proteomics to enhance storage, access, and collaborative capabilities of studies utilizing functionalized lipid probes. Ongoing work seeks to improve site functionality, including multi-user data upload, scalability, and efficiency.

LABORATORY TECHNIQUES

Bio Safety Level 3 (BSL3): Expertise in high-containment laboratory protocols, requiring meticulous planning, precise execution, and strict adherence to safety standards for infectious disease research.

Fluorescence Microscopy: Skilled in advanced imaging techniques for studying cellular processes, including live-cell imaging, high-content imaging, super-resolution imaging, and quantitative analysis.

Affinity Proteomics: Extensive experience in designing and executing workflows for proteomic profiling, including mass spectrometry-based methods.

Flow Cytometry: Proficient in multi-parameter flow cytometry for cell population analysis, data acquisition, and interpretation.

Experimental Design: Demonstrated expertise in planning and optimizing complex experiments to ensure reproducible, high-quality data, including integration of computational analysis pipelines for downstream insights.

AWARDS, HONORS, AND FELLOWSHIPS

- 2023: Award for Best Question – Sphingolipid Biology FEBS Special Meeting; Funchal, Portugal
- 2023: Rittenberg Meritorious Travel Award; OHSU, Portland, OR, USA
- 2023: Award for Excellent Talk by a Trainee – International Ceramide Conference; Charleston, NC, USA
- 2023: Sears Microbiology Fellowship Award; OHSU, Portland, OR, USA
- 2022: T32 Graduate Fellow – Pulmonary and Critical Care Medicine; OHSU, Portland, OR, USA
- 2021: T32 Graduate Fellow – Program in Enhanced Research Training; OHSU, Portland, OR, USA
- 2018: Henry Collins Foundational Fellowship; OHSU, Portland, OR, USA
- 2017-2020: Graduate Fellow – Early Independence Fellowship Award; OHSU, Portland, OR, USA
- 2017: Promising Scholars Award; OHSU, Portland, OR, USA

ABOUT ME

Endurance sports enthusiast (cycling, running, triathlons) and rock climber with a passion for hobby electronics and creative problem-solving using Raspberry Pi and ESP32. Committed to open science, collaboration, and scientific communication. New parent who enjoys balancing family life with ongoing personal and professional growth.