

Amanda Carbajal, PhD, MS (she/her/ella)

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Summary: Versatile, non-traditional microbiologist and college educator with over a decade of experience addressing biomedically relevant challenges through a creative and interdisciplinary toolkit. Experienced educator/ mentor training students at all levels, serving as instructor of record at both public and private universities in virtual and in-person settings. Research experience and interests in molecular and microbiology-infectious disease pathology, bacterial genomics, antibiotic resistance and public health interventions to curb infection and resistant infection prevalence and spread, particularly in urban dense areas, and among high-risk individuals and other vulnerable populations.

SCIENTIFIC RESEARCH WORK EXPERIENCE

SUNY Downstate Health Sciences University - Epidemiology and Biostatistics, NYC - Remote Postdoctoral Research Scientist, January 2025 - present

Projects: 1) *Designing a free, accessible, tool for improved grant outcomes among Community Based Organizations*
2) *Designing and implementing evidence-based interventions of mentorship for improved postdoctoral training and success* (3) *Developing and implementing interventions to study and mitigate antibiotic resistance, multi-drug infections, modes of infections in rural vs. urban settings* (4) *Scan electronic health record data to understand physician networks*

- Designed an unbiased, user-friendly, online set of surveys aimed at Community Based Organization's and postdoctoral scholars to learn more about their respective needs, challenges and limitations on a personal and professional level. Analysis of responses done with SASS.
- Executed a pilot intervention aimed at supporting NYC postdoctoral scholars to improve their mentor networks, and tested scalability at other institutions outside of NYC.

Duke University - School of Medicine, Durham, NC Postdoctoral Research Scientist, June 2024 - January 2025

Project: *Elucidating mechanisms gut microbes utilize to sense nutrients, communicate with the brain and influence feeding behavior in organoids, mammalian cell culture and the murine mouse model.*

- Designed and implemented a customized workflow to assess TLR5 levels from transgenic mouse stool, modifying an Invitrogen protocol as the sole cell culture and microbiology specialist in the lab.
- Cultured primary and secondary gut cell lines, optimizing media with custom amino acid cocktails to identify stimulatory effects on STC-1 cell metabolism.

1 publication in *Nature*.

University of California, Santa Cruz-Microbiology & Environmental Toxicology, Santa Cruz, CA PhD Candidate - Graduate Student Researcher, February 2021 - June 2024

Project: *Genetic mechanisms of target mediated resistance against fluoroquinolones in uropathogenic E.coli.*

- Led investigation of antibiotic resistance mechanisms in uropathogenic E. coli (target mediated changes in the chromosome - DNA Gyrase and Topoisomerase IV) from UTI and sepsis patients by engineering isogenic strains with defined QRDR mutations and performing phylogenetic analysis on whole-genome sequencing data from clinical isolates.
- Developed and executed a high-throughput MIC assay for over 20 fluoroquinolones across 15 engineered strains; streamlined IC₅₀ analysis pipeline for survival curves, enhancing data processing efficiency and reproducibility.

National Aeronautics and Space Administration (NASA), Moffett Field, CA

PhD Candidate - Graduate Student Researcher, December 2018 - February 2021

Project: *Investigating aberrant prion amyloids, non-disease phenotypes and roles in the emergence of life.*

- Led an investigation to rank novel proteins among Archaeal methanogens and cyanobacteria depending on their match to known prion domains and their gene ontology (GO Enrichment).
- Utilized Archaeal methanogens, bacteria (*E.coli*), cyanobacteria, yeast (*S. cerevisiae*), for testing unique proteins that withstand conditions of early Earth, e.g., increased UV radiation, increased thermal environments.
- Bioengineered *E.coli* to test protein sequences for their capacity to form amyloids, manipulated [SUP] protein to insert candidate prion domains to test prion capacity in prion positive yeast models.

1 publication in *Molecular Biology and Evolution*.

University of California, San Francisco, San Francisco, CA

Master of Science Graduate Student Researcher, June 2016 - June 2018

Project: *Behavior based phenotypic, high throughput, novel neuroactive drug discovery in Danio rerio.*

- Developed high-throughput behavioral based assays in zebrafish (*Danio rerio*), including analysis pipeline to identify different known (to establish anchors) and unknown small neuroactive molecules
- Curated phenotypic screens and profiles of excitation, sedation, psychedelic, anti/habituation.
- Highly involved in the husbandry of zebrafish colony, including transgenic lines, matings and overall maintenance and monitoring of water quality and pathogens.

1 publication in *Nature Communications*.

San Francisco State University - Biological Science Department, San Francisco, CA

Undergraduate Student Researcher, January 2013 - June 2016

Project: *Elucidating adult neurogenesis aging in insect brains and the effects of caloric restriction, stress, social isolation on neurogenesis through a cricket animal model.*

- Developed BrdU staining assay to track cell proliferation in calorically restricted animals and socially isolated animals, versus control animals eating *ad libitum* and in social housing.
- Conducted immunohistochemistry on insect brain tissue, fixed with Carnoy's and/or PFA, sliced on vibratome and/or cryostat.
- Organized a schedule and workflow for animal husbandry of insects, including *Manduca sexta* and *Acheta domesticus*.

Presented a poster at Society for Neuroscience, Chicago, 2015.

SELECTED TECHNICAL SKILLS

- **Tissue Culture:** Experience with 2D tumor and gut organoids, tissue culture - human cell culture (e.g HEK-293, STC-1, kidney podocytes), proliferation tracking (BrdU, EdU), cell viability assays (acridine orange, LDH assay), protein quantification (BCA).
- **Molecular and Immuno-Biology:** qPCR, PCR, ELISA (sandwich), co-immunoprecipitation (co-IP), gel electrophoresis, PAGE gel, Western Blot, reporter assays (e.g. BCA protein levels, TLR5 in HEK-293 cells), isolating, purifying and quantifying DNA and RNA (column-based DNA extraction), experience using the NCBI genome browser.
- **Microbiology:** Experience working in BSL – 1 and 2 labs, inoculation, liquid culture, OD readings to determine growth, aseptic technique, use of selective and non-selective medias, operation of autoclave and incubators, using stock cultures, competent cells preparation (electric, chemically), Gram staining, primer design (SnapGene, Benchling) for site directed mutagenesis, standard workflow tasks (making media, cryostocking).
- **Imaging:** microscopy (brightfield, confocal, electron -TEM, SEM), immunostaining (IHC), FISH.
- **Data Analysis / Statistics:** Biostatistics for qualitative data analysis derived from JMP, GraphPad

Prism, basic Python, basic R, Jupyter notebook, SAS.

- **Animal Models / In Vivo Techniques:** Murine models (rearing and basic husbandry), murine surgery and tissue dissection (Swiss roll, vagal nodose dissection, euthanizing, IACUC protocols), insect models (*Manduca sexta*, *Acheta domesticus*), proper practices handling pathogenic bacterial species and prions (*Bacillus subtilis*, *Escherichia coli*).

STUDENT ENGAGEMENT & PROJECT MANAGEMENT WORK EXPERIENCE

Ciencia Puerto Rico, Remote

Program Specialist, January 2024 - Current

- Contributed to the development of programs to train PhD scientists and science communicators in equitable mentorship and communication by serving on the selection committee of trainees and providing back end designing and support.
- Analyzed the effectiveness of our programming through interviews, surveys and pre and post assessments, follow up meetings and other evaluations.
- Utilized feedback and suggestions to change programming in real time to achieve desired impact.
- Worked with funders like Chan Zuckerberg Initiative, Yale University, and Ciencia PR teams to balance budget, goals, deliverables and timeline.
- Balanced the needs and desires of our instructors, our fellows, and administrative personnel to achieve goals and find compromises.

Foothill College - Science Learning Institute Internship Program, Los Altos, CA & Remote STEMM Internship Program Development & Management - Supervisor Role, February 2024 - July 2024

- Program Development: Developed an application for a hands-on STEM internship program through the lens of education equity to allow for more students of varied backgrounds to qualify for positions.
- Program Development: Designed and implemented an equity-focused application and evaluation system to expand access for diverse students.
- Collaboration and Outreach: Built partnerships with biotech companies and universities to increase student placements and resources.
- Training & Mentorship: Trained mentors from Stanford, UCSF, and local biotech to deliver inclusive, holistic training, stepped in to support trainees that needed more support.
- Outreach and communication: Led outreach and recruitment through flyers, social media, presentations, and, supporting application competitiveness by meeting 1:1 to improve access for low-income, first-generation college students.

UC Santa - Cruz Title IX - Educational Opportunities Program, Santa Cruz, CA

PhD Candidate - Education and Social Media Intern, May 2021 - June 2023

- Conflict Resolution: Managed mentor/mentee dynamics and personnel issues.
- Communication: Designed impactful social media content, flyers, clear and engaging presentations.
- Training & Mentorship: Guided, trained new staff and students on Title IX procedures.
- Project Management: Led initiatives from concept to completion, meeting all deadlines.
- Collaboration: Partnered across disciplines to integrate media, art, and marketing into outreach on available resources to all.

UC Santa Cruz - Matriculating, Influencing, Networking, Triumphant (MINT) Program, Santa Cruz, CA Outreach Program Coordinator - Supervisor Role, June 2021 - October 2022

- Program Development & Mentorship: Designed and implemented workshops, panels, and mixers; created an equitable mentorship system pairing first-generation undergraduates with graduate students; trained and supported mentors.

- Fundraising, Outreach & Stakeholder Relations: Secured donations from local vendors and private funders through presentations and community outreach, communicated how funds were used and provided updates on our successes and events.
- Research & Data Analysis: Developed needs assessment surveys and data workflows to improve our methods or keep what was working best.

Women's Community Clinic (Now: Lyon Martin), San Francisco, CA
Outreach Program Manager - Supervisor Role, June 2016 - December 2017

- Community Engagement & Public Health: Led initiatives supporting marginalized and homeless populations; organized teams to distribute food, hygiene, and harm reduction supplies; trained in and taught safe Naloxone (Narcan) administration.
- Fundraising, Outreach & Stakeholder Relations: Secured donations from local vendors and private funders through presentations and community outreach, communicated how funds were used and provided updates on our successes and events.
- Research & Data Analysis: Developed needs assessment surveys and data workflows to inform grants, public health strategies, and policy recommendations.
- Communication & Advocacy: Presented data to diverse audiences to influence public policy on women's health and harm reduction.

ADJUNCT PROFESSOR ROLES AT FOUR YEAR UNIVERSITIES

San Francisco State University - undergraduate courses, August 2021- August 2024
Instructor of Record BIOL 231 - (30-45 students per semester) Biological Sciences Advising & BIOL 337 - Evolution (virtual, in-person)

Santa Clara University - undergraduate courses, March 2022 - June 2022
Instructor of Record BIOL 115 and 116 - (30 students per quarter) Medical Microbiology Lecture and Lab (virtual, in-person)

University of San Francisco - undergraduate courses, December 2020 - January 2024
Instructor of Record BIOL 115 - (25-30 students per semester) Human Physiology Lecture & Lab, BIOL 114 - Human Anatomy

UC Santa Cruz - Teaching Assistant - undergraduate courses in Molecular Biology, Cell Biology, Microbiology, Lecture and Lab, January 2021- Spring 2024, (30-35 students per quarter)

In my teaching roles, I developed course materials including lectures, quizzes, exams, evaluations, and syllabi. I provided constructive feedback, held flexible office hours, provided extra-credit opportunities, and exam review sessions, while also integrating tools such as recorded lectures and collaborative Google Doc "Lab Notebooks" for group work. Assessments were designed to be open note, encouraging critical engagement with scientific literature. Feedback was provided in a timely manner. I collaborated regularly with faculty and chair and pursued professional development through STEMM education workshops and seminars. Additionally, I incorporated career readiness content, including resume and cover letter writing, navigating job postings, graduate school applications, and LinkedIn strategies.

BIOTECH RESEARCH EXPERIENCE

Infinite Elements - Research and Development, San Francisco, CA
Research Associate, August 2022 - February 2023

Project: *Leveraging microbes for safe and cost-efficient e-waste/ EV battery recycling and retention of rare earth elements.*

- Executed field work to collect unknown microbial samples from hot springs to leverage surface adsorption capabilities.
- Bioengineered extremophile microbes (Bacteria and Archaea) using chromosomal CRISPR editing to enhance rare earth element extraction from e-waste and aqueous solutions, incorporating metal-binding peptide tags onto bacterial surface proteins and using phage display to identify selective peptides for targeted metal sequestration.

Codexis, Inc. - Chemical and Molecular Engineering, Redwood City, CA

Doctoral Student Research Intern, May 2022 - September 2022

Project: *Validating AI guided evolution of synthetic T7 RNA polymerase for in vitro mRNA therapeutics.*

- Optimized T7 RNA polymerase variants to withstand pH, temperature changes, and avoiding triggering adjacent 3'-O methylation residues that contribute to self-RNA recognition (antiviral response) that degrades the synthetic mRNA.
- Designed workflows for testing high number of variants informed by AI, leveraging data from results to continue training the algorithm, and to improve candidates that could be utilized across therapeutic modalities.

Genentech (Roche) - Research and Development, South San Francisco, CA

Master of Science Graduate Intern, June 2018 - September 2018

Project: *Investigating APOL1 variant interactions as a novel therapeutic target for chronic kidney disease.*

- Validated candidate APOL1 binding partners (including wildtype G0 and variants G1 and G2) from single-clone expression screens using co-immunoprecipitation and Western blot analysis.
- Characterized TIM1-mediated regulation of APOL1 expression and demonstrated toxicity of APOL1 risk variants in iPSC- derived kidney podocytes.

ACADEMIC HONORS & AWARDS

- NIH Funded Early Career Scientist - Program in One Health (MSDT- One Health) 2025
- California State University Pre-Professor Program (PREPP) Fellow 2023
- Achievement Rewards for College Scientists (ARCS) Foundation Fellowship 2023 - 2024
- Yale University Ciencia Initiative (YCA) Scholar and Fellow 2023 - 2024
- UC - HIS - Doctoral Diversity Initiative Fellowship - IBSC at UC Santa Cruz 2023 - 2024
- Nucleate Fellow 2022
- Rx One Health Field Institute Fellow, UC Davis 2022
- Center for Innovations In Teaching and Learning (CITL) Instructional Support Fellow 2021
- STARS Scholarship Recipient 2021
- California Doctoral Incentive Program (CDIP) Graduate Student Fellow 2020
- IMSD Fellowship Recipient at UC Santa Cruz, September 2018 - December 2019
- WISE (Women in Science and Engineering) Scholarship recipient, San Francisco State University 2017
- Sally Casanova Pre-Doctoral Scholarship Recipient 2017-2018
- Irene and Eric Simon Brain Summer Research Fellowship Foundation Recipient, UCSF 2015

TRAINING & EXPERIENCE in MENTORSHIP. DIVERSITY. EQUITY & INCLUSION

- Center for the Improvement of Mentored Experiences In Research (CIMER) Culturally Aware Mentorship Workshop, University of Wisconsin, Madison, 2025
- Summer Program in Translational Disparities and Community Engaged Research (SPRINTER) Mentor, Summer 2025
- Intercollegiate Psychedelics Network Talk Coach and Mentor, 2025
- Mentor via RePresented, to incarcerated or orphaned undergraduates, 2025
- Latino Cientifico - Mentor to graduate students, 2024, 2025
- Mentor for the Science Learning Institute, community college students, 2022, 2024
- Science Support Network Graduate Student Mentor 2020, 2021, 2022, 2023

- Lead Graduate Student Mentor for the Graduate Program of UC Santa Cruz, 2022 – 2022
- Mentor, Science Learning Institute, Foothill Community College 2021 – 2022
- Title IX Graduate Student Intern 2021, 2022, UCSC
- Center for Innovations In Teaching and Learning (CITL) Instructional Support Fellow 2021
- Center for Innovations In Teaching and Learning (CITL) Teaching for Equity, 2021
- Title IX Graduate Student Advisory Board Member Representing UCSC 2021, 2022
- Anti-Racist Pedagogy Working Group Member, PBSE, UCSC 2020 – 2021
- Graduate student policy, advocacy, liaison to Dean Paul Koch of PBSE, UCSC 2020 – 2021
- Science Internship Program (SIP) Grad Mentor, through UCSC 2020, 2021, 2022, 2023
- Tutor & Grad Mentor via *Cultivamos Excelencia* at San Jose City College 2019 – 2021
- Science Teacher (K-8th grade) at Celsius & Beyond, San Francisco 2018 - 2019
- YMCA After School Program Teacher at Aptos Middle School, San Francisco 2014 - 2016

SCIENTIFIC PUBLICATIONS

- **Carbajal A**, Peng NY, Hernandez J, Camps M. Investigating the drug binding interactions of 4th generation fluoroquinolones in clinically relevant QRDR mutation profiles. **In preparation.**
- Peng, N., **Carbajal, A.**, Camps, M. Recombineering-Based Single-Step Method for Genomic Engineering of Selectable Mutations in *E.Coli*. **In preparation.**
- Liu, W. W., Reicher, N., Alway, E., Rupprecht, L. E., Weng, P., Schaefgen, C., Klein, M E., Villalobos, J. A., Puerto-Hernandez, C., Kiesling Altún, Y. G., **Carbajal, A.**, Aguayo- Guerrero J. A., Coss, A., Sahasrabudhe, A., Anikeeva, P., de Araujo, A., Bali, A., de Lartigue, G., Gil-Lievana, E., & Gutierrez, R. (2025). A gut sense for a microbial pattern regulates feeding. *Nature*. <https://doi.org/10.1038/s41586-025-09301-7>
- Zajkowski T, Lee MD, Mondal SS, **Carbajal A**, Dec R, Brennock PD, Piast RW, Snyder JE, Bense NB, Dzwolak W, Jarosz DF, Rothschild LJ. The Hunt for Ancient Prions: Archaeal Prion-Like Domains Form Amyloid-Based Epigenetic Elements. *Mol Biol Evol.* 2021 May 4;38(5):2088-2103. doi: 10.1093/molbev/msab010. PMID: 33480998; PMCID: PMC8480180.
- McCarroll, M.N., Gendele, L., Kinser, R.,... **Carbajal, A.** et al. Zebrafish behavioural profiling identifies GABA and serotonin receptor ligands related to sedation and paradoxical excitation. *Nature Communications*. 10, 4078 (2019). <https://doi.org/10.1038/s41467-019-11936-w>

NOTABLE SCIENTIFIC PRESENTATIONS

- SUNY Downstate Health and Sciences University, Epidemiology and Biostatistics Seminar, “From microbial pathology to health disparities and STEM Mentorship”, July 11, 2025 (Virtual)
- California State University, Long Beach, Biology Department Seminar “The Power of Bacteria: From Pathogenic Mechanisms of Antibiotic Resistance to Commensal Gut Microbiome Effects on Feeding Behaviors” November 21, 2024 (Virtual)
- Society for the Advancement of Chicanos/Hispanics and Native Americans (SACNAS) Scientific Conference, Portland, Oregon, October 15, 2023
- Seminar Speaker “Elucidating the Genetic Basis of Antibiotic Resistance in Uropathogenic *E.coli*”, Stanford School of Medicine, May 18, 2022
- Grad Slam Finalist “Leveraging biotechnology and basic science to stay one step ahead of the next Global Pandemic” - February 2022
- NASA Ames Research Center Seminar Speaker in Exobiology (SSX) “The arms race between natural selection and drug design: investigating fluoroquinolone effectiveness against ciprofloxacin-resistant *E. coli*”, August 18, 2021
- University of California, Santa Cruz, Molecular, Cellular, Developmental Biology Seminar Speaker “The arms race between natural selection and drug design: investigating fluoroquinolone effectiveness against ciprofloxacin-resistant *E. coli*” May 14, 2021
- City of Hope Biomedical Research Graduate Student Symposium, Genome Stability Panel, August 2020

- Grad Slam Finalist “Prion Proteins and the Origins of Life”, UC Santa Cruz, March 6, 2020
- Graduate Research Symposium at the University of California, Santa Cruz, April 2019, 2019
- SFSU College of Science and Engineering Graduate Research Showcase, title of talk: “Novel Neuroactive Drug Discovery” Carbajal, A., Kokel, D., San Francisco, CA, May 2017, April 2018
- CSU Research Competition, title of talk: “Behavior Based High Throughput Neuroactive Drug Discovery” Carbajal, A. San Francisco, CA, February 2017, February 2018
- Society for Neuroscience Poster “The Effects of Caloric Restriction on Adult Neurogenesis in *Acheta domesticus*” Carbajal, A., Moffatt, C., Chicago, IL, October 2015

EDUCATION

UNIVERSITY OF CALIFORNIA, SANTA CRUZ & NASA AMES RESEARCH CENTER

Santa Cruz, CA

Doctorate, Spring 2024

Molecular, Cell, Developmental Biology - Microbiology & Environmental Toxicology

UNIVERSITY OF CALIFORNIA, SAN DIEGO - RADY SCHOOL OF MANAGEMENT

San Diego, CA

Micro Master of Business Administration, Fall 2024

Innovation for Scientists with PhDs

SAN FRANCISCO STATE UNIVERSITY & UNIVERSITY OF CALIFORNIA, SAN FRANCISCO

San Francisco, CA

Master of Science, Spring 2018

Biology - Physiology & Human Behavior

SAN FRANCISCO STATE UNIVERSITY

San Francisco, CA

Bachelor of Science, Spring 2016

Biology - Zoology