

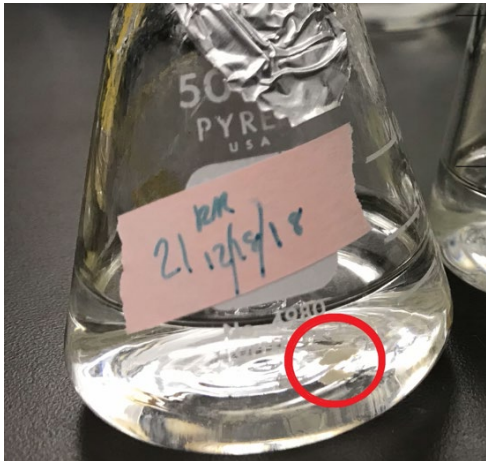
The functional genomics of pesticide-remediating bacteria

During rainy seasons, the build-up of pesticides on agricultural farmland runs off the land and is introduced into the drinking water supplies and aquatic ecosystems. These pesticide-contaminated waters in the environment are costly to treat and detrimental to public health. Naturally occurring pesticide-bioremediating bacteria have already been found at the Molera Treatment Wetland in Castroville by the lab of Dr. Arlene Haffa at CSU Monterey Bay. These bacteria are currently being introduced into woodchip bioreactors, trenches filled with woodchips along the edge of farmland. Although well-established for removing nitrogenous waste, woodchip bioreactors' applicability to agricultural pesticides is still an active area of development.



Molera Treatment Wetland in Castroville, CA

Genomic sequencing of pesticide-degrading bacteria can provide insight to using the bacteria as an inexpensive solution for targeted pesticide water treatment. Understanding these bacteria may lead to optimization of the woodchip bioreactors and target pesticide contamination in groundwater.



Diazinon-degrading bacteria (red outline) growing in media with pesticide as the only carbon source

The bacterial strains in this study will degrade three types of pesticides: organophosphates, neonicotinoids, and pyrethroids. After bacterial growth on pesticide minimal media, DNA isolations will be performed followed by sequencing, assembling, and annotating the genomes. Outcomes will provide the necessary data to then study the molecular mechanism involved in the remediation process, create freely available novel genetic resources, and ultimately assist farmers to better comply with the strict regulations of pesticide use at minimal cost.

As an undergraduate student assistant for this project, you will get to assist with:

- Culturing bacteria and streaking for single colonies
- Bacterial DNA isolations and purifying the DNA
- Growth assays of the bacteria

Things you will learn/be exposed to:

- Aseptic technique
- Bacteria characteristics and culturing
- Growth assays and using a Tecan
- DNA handling
- Laboratory procedures and maintenance
- Data organization

You need to be willing and able to:

- Work up to 4 hours in a laboratory setting
- Pipette for long periods of time
- Responsibly work with hazardous and biohazardous material
- Adhere to safety rules
- Work independently and as a team member

Looking for someone who is:

- Detail oriented
- Honest
- Focused
- Communicative
- Enthusiastic
- Hard working