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Sabbatical Report for Fall 2022  
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My intention with my Fall 2022 sabbatical was to work towards having my teaching, research (scholarship), and service drive each other in order to sustain passion about the work I get to do at Sonoma State University. In order to work towards this, I shifted my research focus to a culturally relevant project investigating the plant *Opuntia ficus-indica* (nopales in Spanish) and its putative role in stabilizing blood glucose levels in diabetics. With the dedicated time to focus on this goal, I was able to experiment with two different assays to detect glucose in order to determine which assay would serve our research purposes best with the resources available at Sonoma State. I was also able to spend time and volunteer with a community partner that consists of health equity activists committed to anti-racist, trauma informed care. Spending time with this potential community partner allowed us to see how I could incorporate a Service Learning Project around their work and/or service work with a campus club. Additionally, there were some unexpected benefits of being able to contribute to other areas on campus without a heavy teaching load.

Including research on nopales (*Opuntia ficus-indica*) in my scholarly activities was one of the main objectives of my sabbatical and this has now become the main focus of my research group. Coming back from COVID definitely provided challenges in getting in person research momentum started again. Before COVID, I had a nice rotation of senior students training incoming research students. Getting this rotation started again and moving past the initial input of activation energy was part of my sabbatical. During my sabbatical, I had five undergraduate students working with me at various levels of dedication.

With my undergraduate students, we worked on developing an appropriate assay for detecting glucose in our lab setting. I had a very dedicated student the previous school year- who was the first student to come and work in person on this project- that really wanted to try an assay (Glucose Glo Assay) they had identified. Unfortunately, that student left the university unexpectedly. Though they had run the assay a couple of times, I didn't think we could draw any conclusions from those experiments. One of the first experiments I ran during my sabbatical was to rerun the experiments with the Glucose Glo assay. This assay was a good way for students to learn about light detection using a luminometer, but there was much variability in the results and it was decided that trying the industry standard assay would be a good idea.

My next set of students and I worked on the standard glucose detection assay using the two enzymes, glucose oxidase and horseradish peroxidase. This assay involves the two

mentioned enzymes and measures absorbance values on a UV-Vis spectrometer. We decided to use a 96 well plate. No one in our lab had ever used the 96-well plate UV-Vis and there were no current users in our department, so learning to use that machine was also part of this process. The first time we ran this assay, it was to see if it worked with our system. The assay worked and we realized we could be more efficient with our resources and streamline the process to make the assay conducive to a successful undergraduate research lab environment. My students worked on calculating and then making aliquots of all the assay components. We have a protocol now, but it still needs to be written in a way to minimize errors and to support an incoming research student to understand the assay. We are still working on writing up a protocol that would be straightforward to follow while providing useful information.

The 96-well plate UV-Vis is connected to an outdated computer that has presented some other challenges we have worked through during my sabbatical. The UV-Vis does not have the ports compatible with an updated computer so getting data off the machine is cumbersome. So far, we have decided to transfer the data as a text file (CSV file is not an option) to a USB drive. Then we can process the data in a Google Sheet or Excel. My students have been getting familiar with how to generate a standard curve in a spreadsheet and we have been thinking about how we want to handle the *O. ficus-indica* data. This is another process that could be better streamlined so that incoming students can understand the data processing piece better.

There are many immediate objects that my lab is still working on such as narrowing our research question, deciding what is the best way to process this cactus for these types of experiments, identifying compounds found in nopales, identifying an assay we can use in lab to monitor the uptake of glucose into plasma (in vivo assay), understanding the structures and mechanisms of anti-diabetic drugs, identifying what is in the mucilage. We have established that this is the main project for the Lares Lab at Sonoma State and we look forward to the science we get to explore with this project.

During my sabbatical, I was able to volunteer time and build a relationship with a potential community partner, The Botanical Bus. This was a very rewarding experience and I happily gave up Saturday mornings to spend time with them. From their website, the Botanical Bus embodies “the proven success of the self-healing community model in which holistic health is empowered by the people, for the people.” The founder is very intentional in using traditional knowledge to provide health services to Latine and Indigenous clients. The fact that I come from the university creates a bit of a challenge because we are an institution that may not traditionally align with the values of the Botanical Bus. At a university, it may be thought that knowledge can only be obtained through a formal education and those without a formal education may be underestimated and undervalued. Also, those without a formal education

may feel less than, and renounce their power to someone with a degree. The Botanical Bus truly values traditional knowledge and other ways of knowing that may not come with a degree. They work to value and empower their promotoras (healers) in the work they do. An objective is to explore how the university can compliment traditional knowledge without displacing it. We are working towards existing in the same place without overshadowing one another.

During their Wellness Workshops, the Botanical Bus has a session called, “*¡Presente para Nutrirnos! (Present to Nourish Us).*” This is a spanish language wellness workshops that centers whole, accessible Indigenous foods and traditional recipes in type 2 diabetes prevention and care. They focus on different foods, but one food that is always included is *O. ficus-indica*, nopales. There has to be a way we can partner and use the power I hold as a representative of the university to uplift this great source of knowledge by providing evidence of this ancestral knowledge. However, right now I continue to focus on building this relationship and observing to see how I can compliment their mission either with our lab’s research or through a Service Learning Project.

As stated in my Statement of Purpose, every spring semester since I arrived at Sonoma State University, I have taught CHEM 446 (Metabolic Biochemistry). In this class, we cover how metabolic pathways (glycolysis, gluconeogenesis, fatty acid oxidation, fatty acid synthesis, and amino acid oxidation) are used to build or extract fuel from carbohydrates (glucose), fats, and proteins. It is often useful to discuss how these pathways operate under ideal conditions as well as conditions that cause disruptions in these pathways. Diabetes is often used as an example. I continue to work towards developing a Service Learning Project around students performing community outreach around how our bodies process carbohydrates, fats, and proteins. This would allow me to include course objectives that focus on students learning about issues relevant to their own cultural communities in my syllabus. This would also provide opportunities for diverse students to connect with people from their own cultural communities.

An unexpected outcome from being on Sabbatical, was being able to participate in other endeavors without a heavy teaching load. I was able to submit a book chapter as part of the Teagle grant, I was able to work as a facilitator for the NSF-funded project, Transformative Inclusion in Postsecondary STEM: Towards Justice (TIPS), where we got to work on redesigning a chemistry lab experiment to better connect with students, I attended the National Diversity in STEM conference (SACNAS), and I was a member of Sonoma State’s Middle Leadership Academy.

Working to blend teaching, scholarly activities, and service helps to balance the responsibilities of a teacher-scholar at a public institution, but it also helps me sustain passion

about the work I get to do at Sonoma State University. In addition, I believe there are several potential benefits to the University. Creating this new learning opportunity would allow me to assign projects that allow students to analyze problems that are relevant to while giving back to their own cultural communities. We would also be doing research that would contribute to advancing knowledge about diverse cultural communities. It would also show that we are engaging in service to advocate for the well-being of diverse cultural communities. Students would also learn to communicate effectively with people from diverse backgrounds.