



Jennifer Garcia PEER Spotlight, July 2023

PEER Spotlights highlight the accomplishments and visions of PEER (People Excluded by Ethnicity and Race) members within the SABER community.

Jennifer Garcia is the current chair of SABER's PEER Network's Advocacy Group and a graduate student in the Chemistry Department at Purdue University. She's recently been accepted into several Future Faculty Programs, won the Boiler Changemaker Award, and won the Gordon Research Conference Carl Storm Underrepresented Minority Fellowship. We recently interviewed her to learn more about her work and visions in STEM education.

Laurel Lorenz: Can you tell me about yourself? What program are you in?

Jennifer Garcia: I am currently a grad student at Purdue University, specifically within the Chemistry Department. I'm working towards earning my PhD in Chemistry and I'm specializing in Chemistry Education. It's my last year, so I'll be graduating in August.

LL: Congratulations! What's the scope of your research?

JG: Thanks! I have three different projects right now - all related to STEM education in some way, shape, or form. First, in my dissertation work I study how students interpret different visualizations of glycosidic bonds and sugars. As part of this work, I am looking at how students interpret Fischer and Haworth projections. These projections are used to represent sugars in their open-chain and cyclic forms. While these projections seem straightforward to biochemists and chemists, it's completely different for students. Students may be able to complete a task, such as numbering the carbons correctly, but aren't able to explain their reasoning. The work emphasizes that for these projections to be fully understood, it's important to take some time to explain both their benefits and limitations.

My second project, which I call my COVID project, looks at how the pandemic impacted incoming undergraduates' readiness for a freshman General Chemistry course. During the pandemic, students experienced high-school Chemistry labs in a variety of formats including in-person, online, hybrid, and an absence of labs. From my work, it's important to understand the variety of these background experiences so that instructors can make changes to help students succeed.

The results of this research were recently published in The Journal of Chemical Education and can be found on PubMed.

My final project is a new one that I developed as the inaugural fellow researcher within Purdue's Graduate School Mentoring Project. The goal of this project was to examine the current mentoring climate within Purdue's College of Science as a means to improve mentoring throughout the entire university. I hope this work makes a change so that both instructors and students recognize cultural differences in mentorship expectations.

LL: How did you become interested in Chemistry?

JG: I feel like it was destiny, but not the destiny I had planned. From the time I was three years old until my senior year of undergrad, I always thought that I wanted to be a physician. I took my first chemistry class in high school. I absolutely fell in love with chemistry; everything that it encompasses. That's when I told myself, "Okay I'm still going to be a physician, but at least I know what my degree will be." In undergrad, I declared myself as a Chemistry major and stayed with the mentality of wanting to become a physician.

Throughout undergrad, I had a great experience working at a campus health and counseling clinic. I met amazing people and loved my time there. At some point, though, I became disheartened by the nature of systemic injustices in the healthcare field when I did two medical school internships. At that point, I wanted to do something else and not partake in that environment.

One of my first insights into a non-physician career was through my research when I presented my conductometric titrations project as an undergraduate student at the American Chemical Society Conference. As I stood in front of my poster, a man with a 10-gallon hat approached. He was one of the first few people that came by, so I gave him my pitch. Afterwards, he asked me what I wanted to do when I graduated, so that's when I told him I wanted to be a physician. Surprisingly, he told me, "No, you're wrong. You're supposed to stay in chemistry because clearly, you have a gift for it, and you can do it and this is just interesting work."

I just shook my head and said "Oh, thank you, but I don't think so." Sure enough, the man basically told my future because here I am completing my Chemistry PhD.

LL: Within Chemistry, what prompted you to focus on Chemistry Education?

JG: My focus on Chemistry Education came from a mix of two main factors – where I published my undergraduate research and my experiences in grad school. In undergrad, my first two articles were both published in the Journal of Chemistry Education.

Later, I had to declare my grad school division. Because I always enjoyed classes in Analytical and Biochemistry, I declared as Analytical/Biochemistry. However, in the third year of my program, I faced a turning point when I faced a lot of negative attitudes and actions towards my identity as a PEER, a woman, a first-generation student, and coming from a low socioeconomic class. Then the pandemic happened. I recentered, committed to persisting in the program, and changed my division to Chemistry Education. I feel like I'm in the best of both worlds because my dissertation work is within the Biochemistry aspect of education.

LL: You mentioned that one of your goals is to make an impact. What kind of impact do you want to make?

JG: Honestly, any and all that I can make! I feel like that's just a part of who I am. A while ago, I did the Myers Briggs Assessment and found out that I'm an ISTJ (introversion, sensing, thinking, judgment). It fits. I'm competitive; I'm an achiever; I'm deliberative; I value individualization; and I'm a maximizer. I feel like the combination of that and knowing myself has helped me a lot in grad school. I want to be the best that I can be and right now that's being the best that I can be in chemistry, education, research, and just having an impact in the field.

I want to make higher education and general education experiences better for other students, especially other students who have similar identities as me. I'm a woman, an underrepresented minority, Latina specifically, coming from a low socioeconomic background, and I'm first-generation.

LL: In what ways have you been able to make an impact with your research?

JG: The greatest impacts have been in my mentoring project and in my dissertation research. In my mentoring research, I've been able to help Purdue's College of Science develop a mentoring plan. My research shows that students identifying as Hispanic or Latino have the highest rate of dissatisfaction with their advisor. These students also have the highest rate of mental health concerns. From these results, I've been able to help create a mentoring plan that specifically targets Latinos to make them more feel more welcome and more comfortable.

In my dissertation project, I have been able to suggest ways to improve teaching practices within Biochemistry. While I never had issues understanding visualizations of bonds and carbohydrates, I noticed that a lot of my peers did. That was the inspiration behind that project. While writing the manuscript for these results, I shared the results with my undergrad Biochemistry professor. He told me that he's going to implement my recommendations of restructuring learning objectives and breaking down the process of visualizing molecules. The curriculum remains the same, but the objectives become more explicit for students. Having him tell me that he believes my work is impactful to the point where he himself will address his teaching approach means the world to me.

LL: What are your future career goals?

JG: My future career goals are to become a tenure-track faculty member in General Chemistry and Biochemistry with the opportunity to create my own courses. I want to work within a STEM education program and if such a program does not yet exist at my institution, I would like to create one. I want to create one because many institutions do not yet have STEM education programs. The power of a STEM education program is that the program can help future educators ensure that Chemistry and STEM students succeed and understand course concepts.

I also want to help students better understand the resources available at a particular institution through establishing and expanding an Upward Bound TRIO program, which is a federally funded program to help students prepare for college. My motivation for creating this program is from my

own experience as a high school Upward Bound TRIO participant. While the program provided financial support for standardized testing and application programs, I feel like there is an opportunity through these programs to help students learn about the resources available on college campuses. Doing so can help students succeed in college courses.

LL: Before we finish up, can you tell me more about your role as the Chair of the Advocacy Committee within the SABER PEER network? What motivated you to take on this role?

JG: I joined the committee as a co-chair and was quickly promoted to chair. I'm grateful for the opportunity to chair the committee because I feel like this is my first opportunity to demonstrate my leadership skills and to have a commanding role in a committee. I feel particularly grateful because my experiences in high school, undergrad, and grad school show that nomination or promotion to a certain position is basically a popularity contest. I've never been the popular individual, so it's fantastic to have this organization, the members of the SABER Executive Board, and the executive members within the PEER network see my leadership skills and provide an opportunity to execute them.

As chair, my vision is to make impactful changes. I want more people talking about issues impacting PEERs. I want to reduce the adversity faced by minoritized individuals such as underrepresented, first-generation, low socioeconomic status, and women in STEM.

LL: You inspire me, Jennifer. Thanks for taking the time to share your visions and I wish you all the best on your upcoming defense.

JG: Thank you!