SPOTLIGHT: THE UNDERGRADUATE RESEARCH EXPERIENCE

What is your current position and how did you get to where you are?

I am **Rachel Shubella**, a PhD researcher and graduate teaching assistant in Mechanical Engineering at Portland State University, developing a fully biocompatible, biodegradable 3D-printed fish robot for ocean monitoring. My path to PhD, however, hasn't been completely linear. After earning undergraduate degrees in both Chemical Engineering and Chemistry from Rose-Hulman Institute of Technology in 2020, I joined Hitachi High-Technologies America, where I spent five years in R&D evaluating complex etching processes for semiconductor manufacturing. While was working full time, I completed a Masters' degree in Materials Science and Engineering from Portland State University in 2024. I've always wanted to pursue a PhD, and when the opportunity arose, I knew I had to take it!.

What made you decide to do research as an undergraduate student?

I have always been a hands-on learner, and research gave me a way to tackle big, real-world problems I didn't encounter in a regular classroom. Once I knew I wanted to pursue research, I was incredibly lucky to work with two outstanding female research advisors, Dr. Heather Chenette and Dr. Rebecca DeVasher. Their mentorship and guidance kept me engaged and inspired me to keep exploring and learning.

As an undergraduate researcher, were there particular incidents that stand out?

Long before the days of AI, my lab spent months trying to identify the second byproduct in a 1H-NMR spectrum. At 8pm the night before a lab meeting, I came across a literature source from 1966 where all the peaks lined up perfectly. I was so excited that I stayed up all night revamping a presentation to include this finding. The next day, despite being exhausted, I loved sharing with everyone that I had solved this mystery.

How did undergraduate research affect your career direction or play a role in your career choice?

Undergraduate research played a pivotal role in shaping my career direction because from the moment I started, I knew that research was what I wanted to do for the rest of my life. Working on undergraduate research projects in both plastics through Chemical Engineering and organic synthesis through Chemistry helped guide me towards materials science. From there, my path has been a cross-disciplinary adventure, exploring how different fields intersect and learning how to apply those insights to both industry and academia.

Did you publish your research as an undergraduate, and if so how did that experience serve to encourage you?

Yes, I had the opportunity to publish my research as an undergraduate, both through abstracts that allowed me to travel to conferences and journal articles. It was and still is incredibly exciting to see research I conducted being shared with the world. The experience of publishing and attending conferences as an undergraduate was also invaluable, giving me a strong foundation and confidence in navigating research, that has benefitted me in both industry and academia.developing.

Any final thoughts?

I cannot recommend getting involved with undergraduate research enough! As an undergraduate, learning how to navigate equipment, report data, collaborate with others, and think like a scientist is invaluable. Now, as a mentor to two female undergraduate students, I've learned that being on the other side is different and arguably even more challenging. That said, it is incredibly rewarding to celebrate the little victories with them and watch their curiosity and love for research grow.