

Student Spotlight | Alexandra Ramos, Ph.D. Candidate of Chemical Engineering ^[1]

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Alexandra Ramos, Ph.D. Candidate of Chemical Engineering

"Often perceived as a tropical paradise, Puerto Rico's reality tells a different story, one where its natural resources lack proper management and exploration. This has led to consistent power outages, compromised healthcare access, and critical infrastructure issues. Growing up amidst these challenges, I slowly came to realize the wide gap between the island's potential and its own scientific community. This realization sparked my initial interest towards Chemical Engineering and helped define my purpose – to provide reliable, accessible, and sustainable solutions for major ongoing energy and health problems in disadvantaged communities. My aspiration is to not only contribute but to be a catalyst for change, inspiring the Puerto Rican community to overcome these long standing hurdles.

I pursued my undergraduate degree in Chemical Engineering at the University of Puerto Rico, Mayaguez Campus. During my sophomore year, Hurricane María dramatically impacted my life, leaving me without electricity in my own home for 136 days, which highly challenged my motivation and sense of security. This time period became a defining moment for me. It fueled my commitment to inspire underrepresented students in STEM, showing them that resilience and innovation can emerge from adversity.

In 2019, I was excited to join the Stanford Undergraduate Research Fellowship (SURF) program. Under the guidance of Prof. Jian Qin, I worked in the development of a molecular dynamics model for self-healing polymers, aiming to enhance lithium anode-based batteries. I was really fascinated by the idea of self-healing polymers and its potential application towards energy and healthcare applications. This enriching experience not only deepened my interest in polymer science but also drew me towards Stanford's commitment to diversity, equity, and inclusion (DEI), along with the groundbreaking dynamic polymer research within the department.

At Stanford, I joined Prof. Zhenan Bao's lab, where the group explores the intersection between fundamental polymer science and development of soft electronic devices. My research aims to understand the self-healing and autonomous alignment capabilities of multilayered dynamic polymer networks, focusing on how different molecular designs influence their ability to heal and adhere. Moving forward, my research focus will be on refining experimental approaches and simulation models to predict and enhance material properties, with the goal of creating multifunctional, robust and aligned devices.

Beyond the lab, I serve as a coordinator in the Chemical Engineering DEI Committee, where we have launched new initiatives like the Food Extravaganza, DEI Conference-Graduate Recruitment program, and quarterly bagel events that celebrate Heritage Months. Our committee plays a crucial role in ensuring Lab Handbook best practices, increasing engagement in DEI forums, and serving as a point of contact for students seeking support from the Department. During my time at Stanford, most of my fond memories are really about getting to know my cohort peers, which have become my main support system on campus and my inspiration to keep going.

These opportunities at Stanford University will be pivotal towards achieving my long-term goal of leading a collaborative research group that addresses ongoing problems by making medical and energy devices more sustainable, reliable, and accessible for disadvantaged communities through the use of dynamic bioinspired polymers."

Tags:

- [stanford university](#) [3]
- [Chemical engineering](#) [4]
- [#PHD](#) [5]
- [#Representation](#) [6]

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