

Q&A

with **Marjan Zare,**

Assistant Professor,
Mechanical Engineering



What brought you to Cal Poly College of Engineering?

I believe undergraduate education forms the foundation for future academic and professional success. I enjoy interacting with interested, curious and responsible students. In addition, I am strongly committed to undergraduate research and Cal Poly's Learn by Doing philosophy.

Tell me about your research interests and why you are passionate about this topic.

My research focuses on fluid mechanics and rheology, particularly the behavior of complex fluids in advanced manufacturing and sustainable energy systems. I combine experimental techniques and computational modeling to better understand how fluids flow, deform and interact in challenging environments.

I am especially passionate about research that connects fundamental science with real-world impact. Whether it is improving precision manufacturing processes, reducing greenhouse gas emissions or developing more sustainable technologies, I enjoy working on problems where fluid mechanics can contribute to meaningful solutions for society.

What do you want others to know about your research? Why is your topic important?

Fluid mechanics influences many aspects of our daily lives, from energy production and environmental systems to biotechnology and advanced manufacturing. My research aims to improve our understanding of complex fluid behavior so we can design more efficient, reliable and sustainable technologies. One aspect I find particularly

exciting is that fluid micro structure and rheological properties can have large-scale consequences. For example, the yield stress of a material can trap bubbles within a fluid, and in some cases, the accumulation of trapped gases may contribute to natural hazards such as the Lake Nyos disaster. Similarly, challenges in the transport and displacement of complex fluids can lead to failures in industrial processes and major environmental impacts, as seen in the Deepwater Horizon oil spill. In advanced manufacturing, elastic effects can cause the generation of satellite droplets during inkjet printing and spray coating, compromising print quality and coating uniformity. These challenges motivate us to develop more precise and overspray-free deposition technologies.

I want students and the broader community to see how engineering research can directly address important global challenges.

What are some of the upcoming projects or publications you're working on?

I am currently working on projects related to inkjet printing of paints, fluid-flow stability in advanced manufacturing and waste management in industrial ponds such as tailings ponds and dairy lagoons. I am particularly interested in using rheological characterization and computational methods to better predict complex flow behavior.

As I begin building my research program at Cal Poly, I look forward to collaborating with students on hands-on experimental and computational projects that connect fundamental fluid mechanics with practical engineering applications.

What is your favorite part of your job?

My favorite part of my job is working with students and seeing their confidence grow over time. I enjoy helping students realize that engineering is not just about solving equations; it is about curiosity, intuition and problem-solving, and equations are simply tools for formulating these ideas in a quantitative way.

I also love the moment when students connect theory to real physical phenomena, especially during demonstrations or laboratory activities. Watching students become excited about learning is incredibly rewarding.

What is your favorite place in San Luis Obispo County and why?

One of my favorite things about San Luis Obispo County is Morro Strand State Beach. It is a peaceful place where I can recharge and enjoy the natural beauty of the Central Coast.



I enjoy helping students realize that engineering is not just about solving equations; it is about curiosity, intuition and problem-solving, and equations are simply tools for formulating these ideas in a quantitative way.