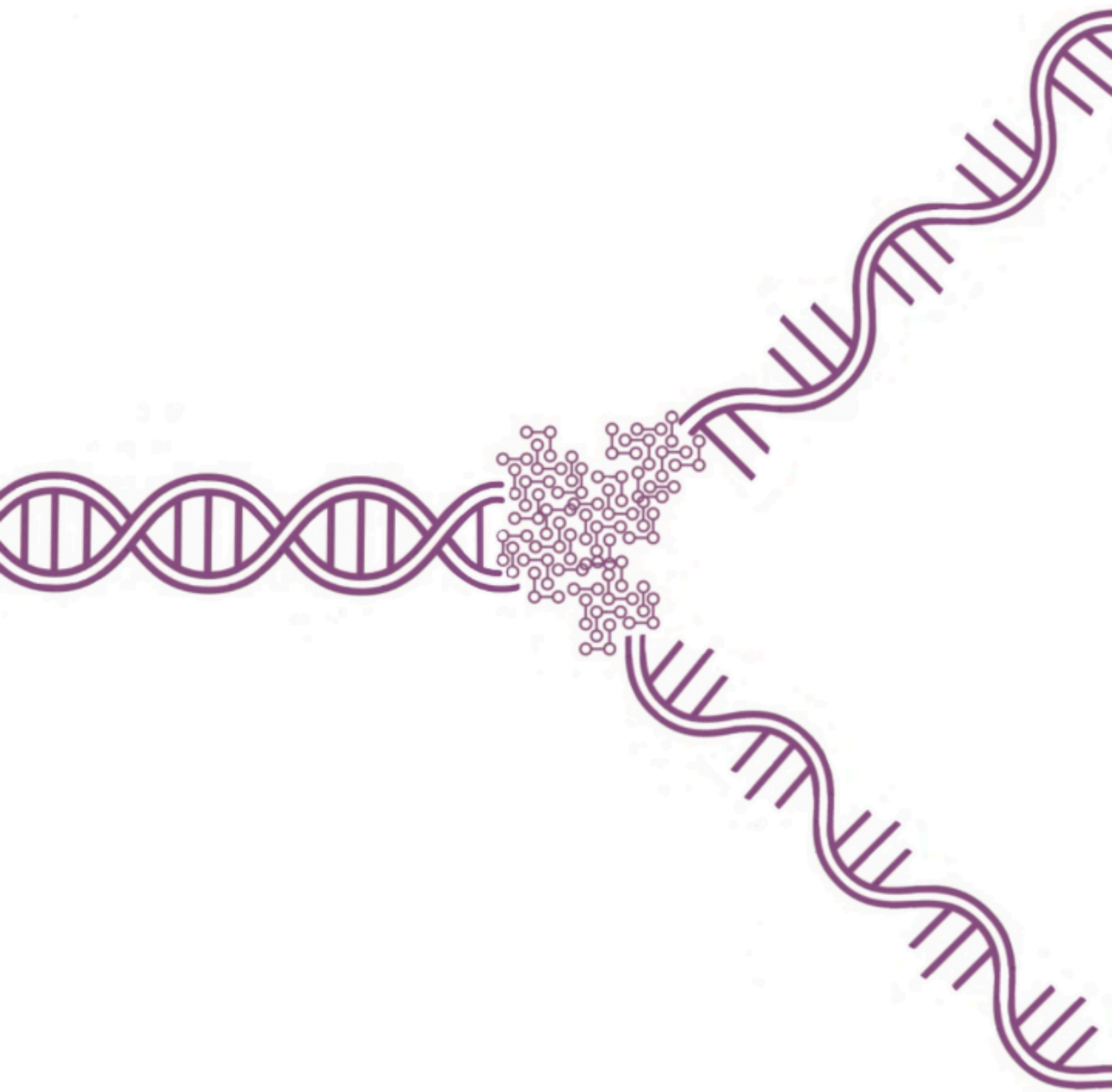
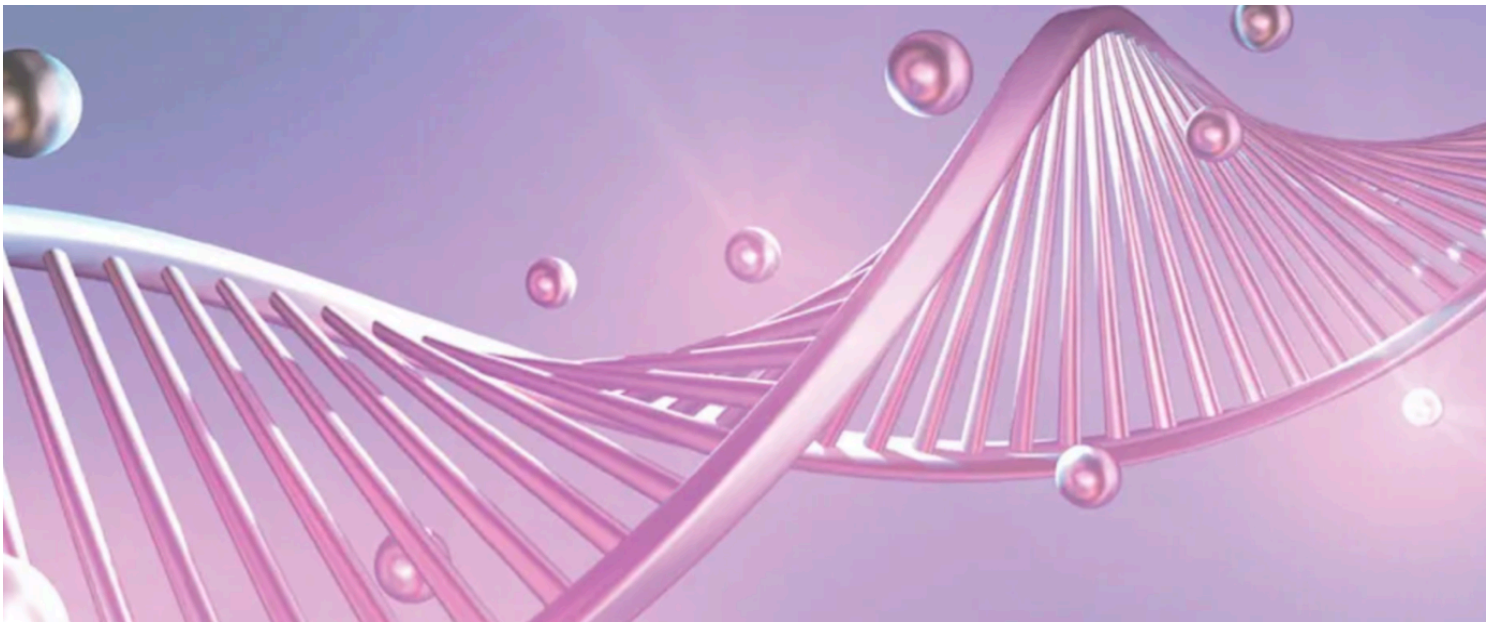


## FACULTY FEATURE







# DR. SHANNON SIRK: BUILDING USEFUL SCIENCE

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Magnets of all shapes and sizes dot the walls of Dr. Shannon Sirk's office while her bookshelf overflows with colorful anatomy models—complete with the ever-lingering smell of coffee, the room is nearly as welcoming as she is. By far the most eye-catching addition, however, is a small framed certificate, proudly proclaiming her the “best scientist ever” in scrawling red crayon.

The road to this title started in high school, where her first encounter with protein synthesis sparked what would become a lifelong passion. As she learned how ribosomes translate genetic code into functional proteins, she found herself captivated by the field of molecular and cellular biology. This growing

interest led her to Occidental College, where she immersed herself in undergraduate biology studies, eagerly absorbing everything from biochemistry to genetics.

Though Dr. Sirk planned on further fostering this interest in graduate school, she decided to first pursue hands-on experience in the field. Her first professional position at City of Hope's gene therapy program proved transformative. Here, she began to appreciate how fundamental biological principles could be harnessed to develop therapeutic solutions. Seeking even broader exposure, she then undertook a unique dual role, splitting her time between the Jet Propulsion Laboratory (JPL) and Children's Hospital Los Angeles.

Armed with hands-on experience from her time in gene therapy and interdisciplinary research, Dr. Sirk embarked on her doctoral studies at the University of California, Los Angeles (UCLA). Her graduate work not only deepened her technical skills but also sharpened her ability to frame scientific questions, laying the groundwork for her future as an independent investigator. At Scripps Research, she discovered the creative potential of protein engineering, a field that married her love of molecular mechanisms with tangible design applications.

Her subsequent position at Stanford University, however, presented an entirely different challenge. As the sole biologist in a chemistry-focused lab, she navigated unfamiliar methodologies and often worked in isolation. While the project yielded just one publication, the experience proved unexpectedly valuable. She credits this experience with teaching her to be self-sufficient in research. "You can be good at what other people tell you to do," she says, "but learning to plan a project yourself—that's the hard part."

Now leading the Sirk Group at the University of Illinois Urbana-Champaign, Dr. Sirk channels her hard-won independence into a singular goal. "I just want to do stuff that's useful," she says—and her lab does just that. Their research focuses on developing next-generation biotherapeutics by engineering both the therapeutic molecules and the living systems that deliver them. This includes designing microbial "living therapeutics" that can safely colonize the human body and produce treatment molecules on-site, as well as engineering the protein-based therapeutics themselves—often compact antibody fragments optimized for bacterial production, stability, and in vivo performance. By combining synthetic biology, protein engineering, and immunology, the Sirk Group is pushing toward therapies that are smarter, more adaptable, and more precise—solutions that could

reshape disease treatment in humans, animals, and even the environment.

Dr. Sirk stresses that there is no single solution to the kinds of problems her lab takes on, and emphasizes the importance of being deeply knowledgeable in the field—not only to recognize which problems are worth solving, but to design creative, effective solutions. This mindset is something she encourages in her students as well. Her advice to undergraduates is clear: be patient, and commit to the process. "You don't get to a place where you feel like you can do the job until you're already doing it," she says. Research isn't just about knowing the right answers—it's about learning to ask better questions, and embracing the slow, often nonlinear work of discovery. She encourages students to keep reading, keep showing up in the lab, and to treat research not just as coursework, but as a craft—something that improves with practice. "You don't always love it, and it's not always fun," she adds, "but you *can* always get better—at running a gel, reading a paper, giving a presentation."

Looking back, Dr. Sirk is the first to admit that her path wasn't linear—and certainly not conventional. Each turn in her journey added a new lens through which to view complex problems. Though trained as a molecular biologist, her work has intersected with optical engineers, cancer researchers, and immunologists, giving her the ability to speak across disciplines and think in many dimensions at once. That wide-ranging experience shapes not only how she does science, but how she mentors others to find their own paths through it. In that sense, the red crayon certificate in her office—the one proclaiming her the "best scientist ever"—feels like a reflection of the kind of scientist she's become: not just skilled, but open-minded, adaptable and endlessly curious.

