

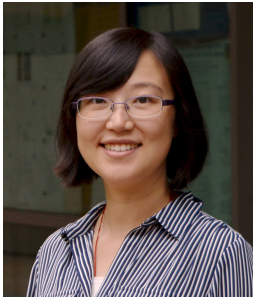
UCSD NANO & CHEMICAL ENGINEERING
SPECIAL SEMINAR

February 2nd 2023

Seminar Presentation: 1PM - 2PM

SME Room 248

“From Enzymes to Cell Factories: Towards Biomanufacturing of High-Value Plant Molecules”



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Abstract: Nature is the best synthetic chemist. Plant molecules exhibit a wide range of bioactivities and are of great pharmaceutical and agricultural importance (Osborn, 2009 #123). One major challenge in developing and using plant molecules for medicinal and agricultural purposes is their low abundance in nature. The low accessibility of these high-value plant molecules has resulted in limited supplies of these molecules that, in many cases, do not meet research and market demand. For example, phytohormones, vital to plant growth and development, have recently gained much attention for potential agricultural applications. However, they have not been commercially utilized due to the extremely low abundance in nature. The Li Laboratory is endeavored to address this challenge through developing microbial biomanufacturing of plant molecules of high importance and value as an economic approach. To achieve this goal, we engineered microbial system to mimic plant microenvironment for the functional reconstitution of plant enzymes, the biocatalyst. The biomanufacturing platform in turn also enabled us to investigate plant metabolism and to discover novel plant molecules for agricultural and pharmaceutical applications.

Educational Development and Training: This is a story-based talk about the journey my students and I have gone through, failure or success – well, surprisingly you’ll find that often, repeated failures, though frustrating, led to surprising breakthroughs and discoveries. The projects we are working on are also highly interdisciplinary, which serve as good examples to show how important fundamental investigations are if one wants to conduct better engineering, and how engineering shift the paradigm on how we investigate fundamental science.

Biosketch: Yanran Li is an Assistant Professor in the Department of Chemical and Environmental Engineering at UC Riverside. She obtained her Bachelor’s degrees in Chemistry from Nankai University and Chemical Engineering from Tianjin University. She then pursued her PhD degree with Dr. Yi Tang at UCLA, working on elucidating and engineering the biosynthesis of bacterial and fungal aromatic polyketides. She then spent one year in Dr. Rustem Ismagilov’s lab at Caltech, using microfluidic devices to investigate microbial interactions. From 2013 to 2016, she was a postdoctoral fellow in Dr. Christina Smolke’s lab at Stanford, working on the engineered biosynthesis of plant alkaloids in yeast. The Li Lab at UC Riverside work on harnessing microbial cell factory to investigate and engineer plant secondary metabolism and signaling complex. Yanran Li is recognized by NIH Director’s New Innovator Award and NSF CAREER Award.