

UC San Diego

JACOBS SCHOOL OF ENGINEERING
Aiiiso Yufeng Li Family Department of
Chemical and Nano Engineering

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DEPARTMENT SEMINAR

Wednesday, October 23rd, 2024

11:00 AM - 12:00 PM

SME 248

Dr. Sijin Li, PhD

*“An integrated synthetic biology pipeline to
understand and harness plant specialized
metabolism”*

Assistant Professor

Smith School of Chemical and Biomolecular Engineering

Cornell University



Abstract: Plants are a rich resource of small-molecule drugs and drug leads. Traditional methods that source valuable plant natural products (PNPs) from their native producers are often limited by cost and inefficiency. Leveraging recent advances in synthetic biology and plant multi-omics analysis, our work has demonstrated that yeast is a feasible platform to elucidate and reconstruct complicated PNP biosynthetic pathways. We have developed methods to identify these pathways by capturing the co-regulation patterns at the genomics, transcriptomics, and interactomics levels in rare medicinal plants. Deciphering these hidden correlations between genes within PNP biosynthetic pathways has led to the discovery of multiple pathways that produce non-opioid analgesics from the medicinal plant kratom. Furthermore, the versatile yeast platform enables the scalable biomanufacturing of complex PNPs with anticancer, antimicrobial, and antidepressant properties, highlighting the potential of synthetic biology to revolutionize PNP-based drug discovery and development.

Bio: Dr. Sijin Li is an Assistant Professor of Chemical and Biomolecular Engineering and a field faculty in the School of Integrative Plant Science at Cornell University. She received her B. S. degree in Chemical Biology from Tsinghua University in 2008, and her Ph.D. degree in Chemical and Biomolecular Engineering under the guidance of Prof. Huimin Zhao at the University of Illinois, Urbana-Champaign in 2014. Then she moved to Stanford University and worked with Prof. Christina D. Smolke as a postdoctoral scholar. Her lab's research focuses on using yeast to decipher and reconstruct the biosynthetic machinery in plant specialized metabolism, as well as accessing the hidden language of bio-communication within plants and their surrounding environment using synthetic biology approaches. Her research has been recognized by several awards, including an NSF CAREER award, an NIH R01 grant, and an NSF EDGE grant.

Seminar Host: Yanran Li