Dear Faculty, Postdocs, Students, and Friends:

You are cordially invited to attend a special seminar presented by the Institute for Integrative Genome Biology

UC RIVERSIDE | UNIVERSITY OF CALIFORNIA Institute for Integrative Genome Biology

Dr. Jing-Ke Weng

Whitehead Institute

Massachusetts Institute of Technology

TITLE: "Harnessing plant metabolic evolution for new catalysts, medicines, and materials"

DATE: Friday, January 28, 2022
TIME: 12:00 pm PST

MEETING ID: 924 2795 4599 PASSCODE: 777538

Host: Dr. Yanran Li

Abstract: Plants contain a diverse tapestry of specialized metabolites, many of which are of significant pharmaceutical and industrial importance to humans. Nevertheless, exploration of specialized metabolic pathways underlying specific chemical traits in nonmodel plants has been technically challenging and historically lagged behind that of the bacterial systems. Recent advances in genomics, metabolomics, phylogenomics, and synthetic biology now enable a new workflow for interrogating unknown specialized metabolic systems in nonmodel plant hosts with greater efficiency and mechanistic depth. In this talk, I will discuss our current effort in elucidating a number of specialized metabolic pathways in various medicinal plants using such workflow. Facilitated by this newly learnt knowledge, we engineer chassis organisms to produce

valuable plant natural products and their new-to-nature analogs with broad industrial, agricultural, and pharmaceutical utilities. In addition to small-molecule specialized metabolites, plants also produce a wide range of macromolecular biopolymers which are key for plants' adaptation to the challenging terrestrial environments. I will also discuss our recent effort in studying the chemistry, biochemistry and evolution of sporopollenin, an extremely inert biopolymer that coats the outer wall of all land plant spores and pollen grains. Engineering sporopollenin-like synthetic polymers and sporopollenin biosynthesis in crop plants may open new avenues for new materials and scalable strategies for mitigating climate change.