

UCSD NANOENGINEERING/CHEMICAL ENGINEERING

SEMINAR SERIES

Wednesday, January 24th, 2024

Seminar Presentation: 11:00am - 12:00pm

SME room 248

“Nanotechnology approaches for engineering photosynthetic organisms”

Dr. Juan Pablo Giraldo, PhD

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Abstract: Advancing towards sustainable agriculture, energy, and biomanufacturing for a growing human population requires novel and convergent approaches to engineer photosynthetic organisms. My research group develops nanotechnology tools to engineer and study plants and algae. We have created optical nanosensors to establish communication between photosynthetic organisms and electronic devices for monitoring plant health and cell signaling in real time. My lab has elucidated chemical and engineering principles that guide the design of biocompatible targeted nanocarriers with agrochemical active ingredients and genetic elements in plants and algae. We have created antioxidant nanoparticles that enhance plant and algae stress tolerance for improving crop and biofuel production. Using nanotechnology and bioengineering approaches, my research group seeks to control photosynthetic organisms turning them into augmented environmental sensing and biomanufacturing technologies.

Biosketch: Juan Pablo Giraldo is an Associate Professor at the University of California, Riverside. Dr. Giraldo is also a Co-Investigator of the National Science Foundation (NSF) Center for Sustainable Nanotechnology. He received his Ph.D. in Biology from Harvard University (2011) and two Bachelor's degrees in Biology and Physics from University of Los Andes (Bogota, Colombia). As an NSF Postdoctoral Fellow, he developed nanotechnology approaches for engineering plants in the Department of Chemical Engineering at the Massachusetts Institute of Technology (2011-2015). His research group develops nanotechnology tools to study and engineer photosynthetic organisms. Dr. Giraldo has authored more than 50 peer reviewed journal articles, reviews, and patents (h-index 28). The Giraldo research group has been supported by multiple awards (\$4M) from NSF Biological Sciences, Engineering, and Chemistry divisions, the Department of Energy (DOE), and the United States Department of Agriculture (USDA). His research team is also funded by industry grants (BASF) to translate targeted nanocarrier research into commercial technologies.