

SMS Spring 2022 Seminar Series

Wednesday Jan 19 | 2:30pm | Virtual*

Catalyzing chemical transformations for global sustainability

Our modern world relies upon chemical transformations that benefit the lives of billions. These transformations can be found across many sectors, including transportation, heating and cooling, electricity, food production, and manufacturing, among many others. To date, fossil resources have provided the majority of the energy demanded by the global economy, and thanks to human ingenuity over decades (and centuries) we have been able to develop large-scale chemical processes that can make use of the fossil resources to provide for many across the globe in a cost-effective manner. However, there are many challenges to the current paradigm, as (1) modern processes are generally not sustainable, and (2) while they provide for billions, there are billions of others who have minimal access to the modern energy system.

This talk will describe efforts envisioned for a future paradigm, particularly on the development of new catalysts and new processes that can make use of renewable resources in the production, storage, and utilization of important molecular products. Examples include hydrogen (H_2) production from water, CO_2 conversion to carbon-based fuels and chemicals, and renewable pathways to NH_3 fertilizer production, among others. A key focus will be on the fundamental design and development of catalyst systems that can execute desired chemical transformations with high activity, selectivity, and durability, plus the integration of such catalysts into devices that can achieve high-performance, paving the path ahead for new, sustainable technologies.

Thomas F. Jaramillo, PhD

Associate Professor, Stanford University

Director, SUNCAT Center for Interface Science & Catalysis

Prof. Jaramillo has authored over 200 publications in the peer-reviewed literature in these areas, and has earned a number of honors and awards for his efforts. Honors include the Paul H. Emmett Award in Fundamental Catalysis (2021) from the North American Catalysis Society, the Resonate Award (2014) from the Resnick Institute, the Presidential Early Career Award for Scientists & Engineers (PECASE, 2011), the U.S. Dept. of Energy Hydrogen and Fuel Cell Program Research & Development Award (2011), the National Science Foundation (NSF) CAREER Award (2011), and the Mohr-Davidow Ventures (MDV) Innovator Award (2009). Prof. Jaramillo is on the annual list of Highly Cited Researchers by Clarivate Analytics, ranking in the top 1% by citations (2018-present).

Professor Jaramillo is from San Juan, Puerto Rico, earning a BS in chemical engineering at Stanford University and MS and PhD degrees in chemical engineering at the University of California, Santa Barbara. He then pursued post-doctoral research as the Hans Christian Ørsted Postdoctoral Fellow at the Technical University of Denmark, Department of Physics, prior to joining the Stanford faculty.

