Designing Catalysts and Chemical Processes for Global Sustainability

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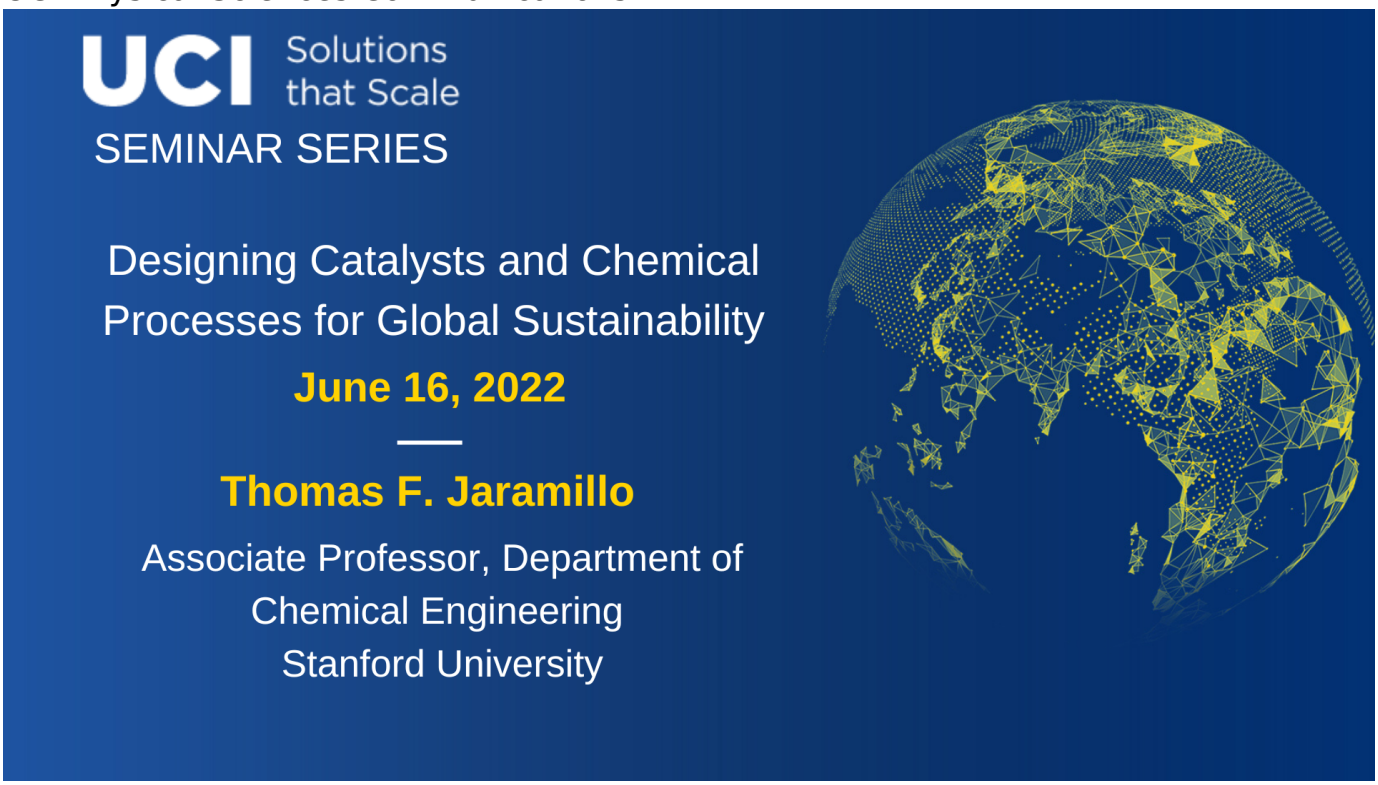
UCI Physical Sciences Communications



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Yesenia Garcia

Solutions that Scale Seminar Series: Designing Catalysts and Chemical Processes for Global Sustainability

A talk given by **Thomas F. Jaramillo,** Associate Professor, Department of Chemical Engineering, Stanford University; Associate Professor, Photon Science, SLAC National Accelerator Laboratory; Director, SUNCAT Center for Interface Science and Catalysis, and moderated by **Jenny Yang**, UCI Chancellor's Professor, Chemistry.

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 (H2) production from water, CO2 conversion to carbon-based fuels and chemicals, and renewable pathways to NH3 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.

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