

# DISTINGUISHED SPEAKER SERIES

## *Design Principles for Catalysts, Transport Processes, and the Reaction Microenvironment for Improved Electrolyzers and Related Technologies*

**By Prof Thomas F. Jaramillo**

Electrified processes have rapidly gained attention in the energy sector as a means to utilize low-cost renewable electricity (e.g. wind and solar) for the sustainable production of fuels and chemicals. This includes water electrolysis for H<sub>2</sub> production, CO<sub>2</sub> electrolyzers for the production of carbon-based fuels and chemicals, and the electrochemical conversion of nitrate and N<sub>2</sub> to ammonia. Technologies that make use of those energy carriers through direct electrochemical conversion are also of interest, e.g. fuel cells and flow batteries. Innovation is needed in these technologies in order to reach cost-targets that are competitive with conventional chemical processes. Key to such innovation is establishing a deeper understanding of catalysts, transport processes, and the reaction environment, and then further utilizing that knowledge to design and develop improved systems. This will be the theme of the presentation, aiming to build a fundamental understanding and set of design principles in electrochemical technologies for the sustainable production and use of fuels and chemicals.



Tuesday, 11 July 2023



13:30 to 15:30pm



Hybrid Session

**In Person:**

LT1 -- 5 Engineering Drive 2, Singapore  
117579

**Via Zoom:**

<https://nus-sg.zoom.us/j/89829292343?pwd=a3crLzhVTmVXVHQweHpGZUhwWVBYZz09>

**Meeting ID:** 898 2929 2343

**Passcode:** 635749



*Prof. Jaramillo earned a BS in chemical engineering at Stanford University, his MS and PhD degrees in chemical engineering at the University of California, Santa Barbara. He pursued post-doctoral research as the Hans Christian Ørsted Postdoctoral Fellow at the Technical University of Denmark, Dept of Physics, prior to joining the Stanford faculty. His research efforts are aimed at developing catalyst materials and new processes to improve sustainability in the energy and chemical sectors. A key emphasis is engineering catalyst materials at the nano- and atomic-scale to induce desired properties, and on designing and developing new technologies that employ them. He's authored over 200 publications in the peer-reviewed literature, and earned a number of honors and awards for his efforts. To name a few, 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 and the Presidential Early Career Award for Scientists & Engineers (2011). Prof. Jaramillo is on the annual list of Highly Cited Researchers by Clarivate Analytics, ranking in the top 1% by citations (2018-present).*