HAJIM SCHOOL OF ENGINEERING AND APPLIED SCIENCES
UNIVERSITY of ROCHESTER

Department of Chemical Engineering presents

The 18th G.J. & S.T. Su Distinguished Lectureship

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Zoom Link: https://rochester.zoom.us/j/98875611576?pwd=d2llTzFjWEo0ak5lRzhBM3QrZW9hdz09

"Electrochemical Reduction of CO_2: Factors Affecting the Choice of Catalyst, Electrolyte, and Reactor"

Societies in different parts of the world are becoming increasingly aware that the continuing dependence on fossil energy for the production of electricity and transportation fuels as well as domestic heating is unstainable because of the effects of CO_2 emission on the global climate. While electricity generated from renewable energy resources (wind and solar) can be used for electrification of transportation and domestic heating, there continues to be a need for carbon-based fuels for aircraft, marine transport, and long distance, heavy-duty trucks. The electrochemical reduction of CO_2 offers a means for storing electrical energy produced by renewable energy sources for use when it is not available and for the production of carbon-containing chemicals and transportation fuels. A great deal of information has been gained during the past decade about the factors affecting the performance of electrochemical systems for CO_2 reduction. This talk will review this information with particular emphasis on work done in the speaker's laboratory. We will focus on understanding how catalyst composition and structure, electrolyte composition, and surface modifiers together with the effects of mass transfer at the catalyst-electrolyte interface influence the activity and electivity of Cu electrocatalysts. We will also explore the advantages of using solid vs aqueous electrolytes to achieve faradaic as well as overall energy efficiency for electrochemical reactors. The presentation will end with an outline of ongoing technical challenges, which include both product and CO_2 crossover, and a comment on how these challenges might be addressed through future research.