



**Unraveling Reaction Mechanisms in
Electrocatalysis: Pathways Toward
Selectivity and Efficiency**

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Thursday, March 26, 2026, 2:30 pm
Dupuis Hall, Room 217

Understanding reaction mechanisms is central to designing next-generation electrocatalysts with superior selectivity and activity. In this talk, I will discuss recent advances from my group that combine in situ spectroscopy, electrochemical analysis, and density functional theory (DFT) to reveal how surface structure, adsorbate interactions, and reaction environment govern product distribution in complex electrochemical systems. Case studies will include the selective electroreduction of CO₂, nitrate, and acetonitrile, as well as the low-potential electrooxidation of aldehydes to carboxylic acids with concurrent hydrogen generation. These mechanistic insights not only elucidate fundamental pathways but also guide the rational design of catalysts capable of achieving higher energy efficiency and stability, advancing electrocatalytic technologies for sustainable fuel and chemical production.