

***UNIVERSITY OF RHODE ISLAND***  
***Department of Chemistry***

***SEMINAR***

***Room 234 Pastore Hall***  
***3:00 p.m, Monday, Sept. 21, 2015***

***Prof. Andrew Peterson***

***School of Engineering***  
***Brown University***  
***Providence, RI***

***“Engineering Surface Reactions for the  
Design of Energy Technologies”***

***HOST***

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# *Engineering Surface Reactions for the Design of Energy Technologies*

Andrew Peterson  
School of Engineering  
Brown University

## *Abstract*

Many new and important technologies for the advancement of the energy sector --- such as fuel cells, batteries, and solar fuels --- at their core involve chemical reactions at surfaces. In this talk, I will describe how we combine quantum mechanics-based calculations with laboratory experimentation in order to engineer such interactions at the atomic scale. In particular, we will focus on the understanding and development of active site expression in the context of the electrochemical reduction of carbon dioxide to produce fuels (e.g., solar fuels), in which we use electronic structure calculations to identify active sites and precise synthetic methods to express them. Also discussed will be key reactions at battery electrodes that lead to the development of the solid-electrolyte interphase, which can be understood in the context of methods developed in the electrocatalysis community.