



Advances, Challenges, and Long-Term Opportunities of Electrochemistry: Addressing Societal Needs

DAY 1
November 18, 2019
National Academy of Sciences Building

- 8:30 AM **Welcome and Opening Remarks**
- Ellen Mantus
Director, Chemical Sciences Roundtable
- 8:40 AM **Electrochemistry: Past, Present, and Future**
- Larry Faulkner
University of Texas, Austin

Session 1: Applications of Electrochemistry

Energy Storage

Moderator: Héctor Abruña, Cornell University

- 9:10 AM Multivalent Systems: The New Frontier in Battery Research
Stanley Whittingham
Binghamton University
- 9:40 AM Peering into Batteries: Electrochemical Insight through Operando Methods
Esther Takeuchi
Stony Brook University
- 10:10 AM Applications and Fundamentals of Electrochemical Capacitors
Veronica Augustyn
NC State University
- 10:40 *Break/Mingle*



Energy Conversion

Moderator: Anne Co, The Ohio State University

- 11:00 AM Electrocatalysis for Sustainable Energy Conversion: Transferring Protons and Electrons at Solid-Liquid Interfaces
Marc Koper via Videoconference
Leiden University
- 11:30 AM Simulating Materials for Energy Conversion and Storage from First Principles
Ismaila Dabo
Penn State University
- 12:00 PM Designing New Catalysts and Processes for the Sustainable Production of Fuels and Chemicals
Thomas Jaramillo
Stanford University
- 12:30 PM **LUNCH BREAK**

Electrosynthesis

Moderator: Phil Baran, The Scripps Research Institute

- 1:30 PM Making Synthetic Organic Electrochemistry Mainstream
Phil Baran
The Scripps Research Institute
- 2:00 PM New Catalytic Strategies for Selective Organic Electrosynthesis
Song Lin
Cornell University
- 2:30 PM From Molecules to Molecular Surfaces: Exploiting the Synergy Between Organic Synthesis and Electrochemistry
Kevin Moeller
Washington University in St. Louis
- 3:00 PM *Break/Mingle*
- 3:30- 5:00 **Session II – Educational, Resource, and Other Needs to Advance Electrochemical Applications**

Moderators: Phil Baran, The Scripps Research Institute; Yet-Ming Chiang, MIT



Panelists – Jeffrey Dick (University of North Carolina), Thomas Jaramillo (Stanford University), Shelley Minteer (University of Utah), Andrew Rappe (University of Pennsylvania), Esther Takeuchi (Stony Brook University), Bill Tumas (National Renewable Energy Laboratory)

5:00 PM **Adjourn Day 1**

DAY 2
November 19, 2019
National Academy of Sciences Building

8:30 Introduction to Day 2

Ellen Mantus
Director, Chemical Sciences Roundtable

Session III: Electrochemical Applications on the Horizon

Moderators: Raul Miranda, DOE; Carol Bessel, NSF

8:40 AM Next Generation Applications of Bioelectrochemistry
Shelley Minteer
University of Utah

9:10 AM Seeing Electrochemistry Live at the Atomic Scale
David Muller
Cornell University

9:40 AM Engineering Electrochemical Manufacturing: From high-performing reactors to separation processes
Miguel Modestino
New York University

10:10 AM Integrating Data Science Tools into Molecular Design in Electrocatalysis and Energy Applications
Matt Sigman
University of Utah

10:40 AM *Break/Mingle*



- 11:00 AM Single Entity Electrochemistry: Reaching the Ultimate Sensitivity in Measurement Science
Jeffrey Dick
University of North Carolina, Chapel Hill
- 11:30 AM Electrification and Decarbonization of Chemical Synthesis
Karthish Manthiram
MIT
- 12:00 PM **Closing Remarks**

Carol Bessel
NSF
- 12:15 PM **Workshop Concludes**