Advanced Energy Storage

scialog 2019®

The Third Annual Scialog Conference
November 14-17, 2019
Westward Look Resort, Tucson, Arizona

Alfred P. Sloan
FOUNDATION

RESEARCH CORPORATION
for SCIENCE ADVANCEMENT

Objectives

Engage in dialogue with the goal of accelerating high-risk/high-reward research.

Identify and analyze bottlenecks to advance fundamental understanding of energy storage and develop approaches for breakthroughs.

Build a creative, better-networked community that is more likely to produce breakthroughs.

Form teams to write proposals to seed novel projects based on highly innovative ideas that emerge at the conference.

Process

Brainstorming is welcome; don't be afraid to say what comes to mind.

Consider the possibility of unorthodox or unusual ideas without immediately dismissing them.

Discuss, build upon and constructively criticize each other's ideas – in a spirit of cooperative give and take.

Make comments concise to avoid monopolizing the dialogue.

Diversity, Inclusion and No Harassment

Research Corporation for Science Advancement fosters an environment for listening and considering new ideas from a diverse group, with respect for all participants without regard to gender, race, ethnicity, sexual orientation, age or any other aspect of how we identify ourselves other than as fellow scientists.

RCSA does not tolerate any form of harassment, which could include verbal or physical conduct that has the purpose or effect of substantially interfering with anyone else's participation or performance at this conference, or of creating an intimidating, hostile, or offensive environment; any such harassment may result in dismissal from the conference.

From the President

Welcome to Research Corporation's 2019 *Scialog: Advanced Energy Storage* meeting. This is the third of three Scialog meetings on this theme. We are delighted to have the Alfred P. Sloan Foundation join Research Corporation as a cosponsor of Scialog this year.

The goal of this Scialog is to catalyze theorists, computational scientists, and experimentalists across multiple disciplines to collaborate on developing new and innovative projects to accelerate fundamental science to drive advances in energy storage.

Scialog's over-arching purpose is to help solve real-world problems of global significance by catalyzing innovative, basic research leading to fundamental discoveries. Our focus is on scientists in the early years of their independent careers. Through the unique Scialog process, we seek to lay the foundation for an ongoing, highly creative, cross-disciplinary community of energy scientists that will prove adept at identifying exciting areas for research advances.

To that end, under the guidance of Program Directors **Richard Wiener**, **Silvia Ronco**, and **Andrew Feig** (Research Corporation) and **Evan Michelson** (Sloan Foundation), we hope you will be engaged in passionate discussions with colleagues, many of whom you will have met for the first time at Scialog. The process may even push you out of your comfort zone with the goal of stimulating new and better ideas. The result, we expect, will be a meeting unlike others that you attend. We are confident that you will find the next few days to be extremely worthwhile.

This is your opportunity to air that wild idea you have been reluctant to share with others, or to discuss a nagging hunch that does not yet have sufficient supporting data, or to take a leap on a high-impact/high-risk project instead of concentrating all your effort on somewhat more "incremental" studies. This is the time to come up with, and be open to, completely new ideas that may truly change the world.

We hope this third meeting on this topic yields a crop of outstanding team proposals, which will make our job of determining who receives funding very challenging. I wish you every success in exploring new and compelling ideas over the next few days.

Have a terrific meeting!

Daniel Linzer
President
Research Corporation for Science Advancement

From the Program Director

This year Research Corporation and the Alfred P. Sloan Foundation are cosponsoring the third annual meeting of *Scialog: Advanced Energy Storage*. Research Corporation's highly interactive Scialog meetings have the goal of catalyzing new collaborations based on blue-sky ideas among Scialog Fellows who constitute a highly select group of exemplary early career U.S. scientists. The emphasis is on dialogue, networking, and building new collaborations to pursue novel, high-risk discovery research. The third meeting is an exciting opportunity for returning Fellows to once again experience the unique aspects of Scialog and for new Fellows to add their ideas to discussions.

Research Corporation and the Sloan Foundation chose to focus on advanced energy storage because we believe this critical area of science requires major breakthroughs in fundamental understanding of electrochemical and physical processes that will lead to a new era of technological advance. Just as firmly, we believe these breakthroughs can be accelerated by chemists, engineers, material scientists and physicists working collaboratively on novel, high-risk projects, particularly with theorists and experimentalists combining efforts.

We have one outstanding keynote speaker:
Yiying Wu, The Ohio State University

Along with **Yiying**, we have a team of terrific discussion facilitators: **Sarbajit Banerjee**, Texas A&M University, **George Crabtree**, Argonne National Laboratory, **Nancy Haegel**, the National Renewable Energy Laboratory, **Prashant Kamat**, University of Notre Dame, **Karl Mueller**, Pacific Northwest National Laboratory, **Kyusung Park**, the National Renewable Energy Laboratory, **Amy Prieto**, Colorado State University, and **Stan Whittingham**, Binghamton University.

We are delighted **Stan**, who shared the 2019 Nobel Prize in Chemistry for his work on Li-ion batteries, also will give a talk.

Evan Michelson, a Program Director at the Sloan Foundation, is looking forward to interacting with Fellows and Facilitators.

Scialog meetings focus on dialogue and team building with the goal of creating novel strategies and collaborative approaches. An important feature is the opportunity for Scialog Fellows to form teams and write proposals to pursue particularly creative ideas that emerge through the dialogue. We hope this competition is exciting, but regardless of which proposals are funded, the primary purpose is to catalyze a deeper and more meaningful exchange of ideas than ordinarily occurs at scientific conferences. Our intent is for this process to help participants gain new insights and connections that significantly advance efforts to understand fundamental science to enable major advances in energy storage.

We hope each participant finds the Scialog experience of great value. Please do not hesitate to provide feedback on how to make the conference better. My fellow Program Directors, **Andrew Feig** and **Silvia Ronco**, the RCSA staff, and I are here to help make the meeting a great experience!

Richard Wiener
Senior Program Director
Research Corporation for Science Advancement

Conference Agenda
Westward Look Resort
November 14-17, 2019

Thursday, November 14

2:00 pm	**Registration Opens**	Lobby
1:00 - 5:00 pm	**Snacks & Informal Discussions**	Palm Room & Terrace
5:00 - 6:30 pm	**Poster Session & Reception**	Sonoran Ballroom
6:00 - 6:30 pm	**Meeting for Discussion Facilitators**	Saguaro Ballroom
6:30 - 8:30 pm	**Dinner**	Ocotillo & Cholla
	Welcome Dan Linzer, *President, RCSA* Evan Michaelson, *Sloan Foundation*	
	Conference Overview, Desired Outcomes & Guidelines for Collaborative Proposals Richard Wiener, *RCSA*	
	Introductions	
8:30 - 11:00 pm	**AES Starlight Café** Snacks, conversations, beverages, etc.	Palm Room & Terrace

Friday, November 15

7:00 - 8:00 am	**Breakfast**	Palm Room & Terrace
8:00 - 8:45 am	**Keynote Presentation** How Super is "Superoxide" Battery? Yiying Wu, *The Ohio State University*	Ocotillo & Cholla
8:45 - 9:00 am	**Breakout Sessions Overview**	Ocotillo & Cholla
9:00 - 10:15 am	**Breakout Session I**	Ocotillo & Cholla*
10:15 - 10:35 am	**Report Out**	Ocotillo & Cholla
10:35 - 11:15 am	**Conference Photo & Morning Break**	Ocotillo & Cholla
11:15 - 11:45 am	**Mini Breakout Session I**	Ocotillo & Cholla
	Facilitators Debrief	
11:45 am - 1:00 pm	**Lunch**	Palm Room & Terrace
1:00 - 1:45 pm	**2018 Team Presentations**	Ocotillo & Cholla
1:45 - 3:00 pm	**Breakout Session II**	Ocotillo & Cholla*
3:00 - 3:20 pm	**Report Out**	Ocotillo & Cholla
3:20 - 3:50 pm	**Mini Breakout Session II**	Ocotillo & Cholla
3:50 - 5:15 pm	**Afternoon Break**	Ocotillo & Cholla
5:15 - 6:45 pm	**Poster Session & Reception**	Sonoran Ballroom
6:45 - 8:30 pm	**Dinner**	Ocotillo & Cholla
	After-Dinner Talk Stan Whittingham, *Binghamton University*	
8:30 - 11:00 pm	**AES Starlight Café** Snacks, conversations, beverages, etc.	Palm Room & Terrace

Saturday, November 16

6:45 - 7:30 am	**Optional Guided Nature Walk**	WL Trails–Meet in Lobby
7:00 - 8:00 am	**Breakfast**	Palm Room & Terrace
8:00 - 8:45 am	**2018 Team Presentations**	Ocotillo & Cholla
8:45 - 9:15 am	**Mini Breakout Session III**	Ocotillo & Cholla*
9:15 - 9:45 am	**Morning Break**	
9:45 - 11:00 am	**Breakout Session III**	Ocotillo & Cholla*
11:00 - 11:20 am	**Report Out**	Ocotillo & Cholla
11:20 - 11:50 am	**Mini Breakout Session IV**	Ocotillo & Cholla*
11:50 am - 1:00 pm	**Lunch**	Palm Room & Terrace
1:00 - 6:00 pm	**Team Formation, Informal Discussion & Proposal Writing** Proposals due 6:30 am Sunday morning	
6:00 - 6:30 pm	**Reception**	Santa Catalina Ballroom
6:30 - 7:30 pm	**Dinner**	Ocotillo & Cholla
7:30 - 11:00 pm	**AES Starlight Café** Snacks, conversations, beverages, etc.	Palm Room & Terrace

Sunday, November 17

6:30 - 7:30 am	**Breakfast**	Palm Room & Terrace
7:30 - 11:00 am	**Presentations of Proposal Ideas**	Ocotillo & Cholla
	Assessment Survey & Wrap-up	
10:00 am - 12:00 pm	**Lunch** Available to go	Saguaro Room

*Breakout Sessions will be held in Ocotillo & Cholla, Desert, Canyon, Mesa, and Saguaro meeting rooms. Fellows will first meet in Ocotillo & Cholla and then disperse to their discussion groups.

Westward Look Resort

Keynote Speakers

How Super is "Superoxide" Battery?

Yiying Wu
The Ohio State University

Abstract: Due to the lack of adequate energy storage, the current electricity infrastructure faces the daunting task of continually balancing electrical supply with demand, and the electrical grid has to be designed to support peak load levels. Therefore, developing low-cost and high-performance batteries is vital for electrical grid levelling and regulating the energy output of intermittent solar and wind energy. In this talk, I will show how the basic chemistry that we have learned in high school was used to inspire the idea of the K-air battery and why this battery holds promise for the large-scale grid storage. The key step was the recognition of superoxide chemistry in addressing the sluggish kinetics of oxygen redox. The one-electron K-air battery has elegantly solved the kinetic challenge in oxygen reduction and evolution without using electrocatalysts. Moreover, potassium has advantages in abundance (1.5 wt % in Earth's crust vs. 0.0017 wt % for Li) and fast K^+ ion transport kinetics in electrolyte. Therefore, K-air Battery has the great potential of providing a more cost-effective, energy-efficient, non-toxic solution than other existing battery technologies. I will discuss the existing challenges and review our recent progresses that involve oxygen chemistry, electrolyte designs, interphase controls and solid state ionics.

Bio: Yiying Wu received his B.S. in chemical physics from the University of Science and Technology of China in 1998, and his Ph.D. in chemistry from the University of California at Berkeley in 2003 with Prof. Peidong Yang. He then did his postdoctoral research with Prof. Galen D. Stucky at the University of California, Santa Barbara, and joined the chemistry faculty at The Ohio State University in the summer of 2005. He was promoted to associate professor with tenure in 2011 and to full professor in 2014. Since 2017, he has been appointed as the Leet Endowed Chair. He has been serving as an associate editor for ACS Applied Materials and Interfaces since 2013. His group focuses on materials chemistry and interface synthesis for energy conversion and storage. He is the inventor of the one-electron K-O2 battery and pioneered solar batteries that integrate solar harvesting with energy storage. He received Cottrell Scholar Award in 2008, NSF CAREER Award in 2010, CAPA Biomatik Distinguished Faculty Award in 2014, Franklin County Commissioner's Award in 2014, *Midwest Energy News* "40 under 40" in 2015, *Nano Research* Top Paper Award in 2019, and ACS Akron Award in 2019. His invention of K-air battery received DOE Clean Energy Prize in 2014.

2018 Scialog AES Funded Teams

Water in Redox Active Ionic Liquid (WIL) Electrolytes for Energy Storage
Kah Chun Lau, physics, California State University, Northridge
Tianbiao (Leo) Liu, chemistry, Utah State University, UT
Yuan Yang, physics, Columbia University

Solid Electrolyte Interphase (SEI) "Skin Grafts"
Candace Chan, materials science, Arizona State University
Anne Co, chemistry, The Ohio State University
Hui (Claire) Xiong, materials science, Boise State University

e-COBRA: eutectic Co-deposition Based Rechargeable Anodes
Lauren Marbella, chemical engineering, Columbia University
Partha Mukherjee, mechanical engineering, Purdue University
Venkat Viswanathan, mechanical engineering, Carnegie Mellon University

Probing the Mechanistics of a Molecularly Tailored Solid/Solid Interface
Beth Guiton, chemistry, University of Kentucky
Partha Mukherjee, mechanical engineering, Purdue University
Luisa Whittaker-Brooks, chemistry, University of Utah

Scaling the Sensitivity Gap to Probe Interfaces of High-Voltage Cathodes
Bryan McCloskey, chemical and biomolecular engineering, University of California, Berkeley
Louis Piper, physics, Binghamton University

Solid Electrolytes with Entropy-Enhanced Ionic Conductivity and Stability for High-Energy-Density Lithium Batteries
Shyue Ping Ong, nanoengineering, University of California, San Diego
Yan-Yan Hu, chemistry, Florida State University
Yuan Yang, physics, Columbia University

2019 Proposal Guidelines & Collaborative Awards

Scialog: Advanced Energy Storage

1. Awards are intended to provide seed funding for teams of two to three Scialog Fellows formed at this conference for high-impact projects.
2. Two-page proposals should describe the project and the role of each team member. No budget is necessary. A third page may be used for references.
3. Awards will be in the amount of $50K direct funding, plus a small percentage for overhead, for one year.
4. No Scialog Fellow can be a member of more than two teams. If a Scialog Fellow is a member of two teams, other members of the two teams must be different. No team can submit more than one proposal.
5. No Scialog Fellow who previously has won a Scialog Collaborative Award can be a member of more than one team. The other team members must be different from the members of the previously awarded team.
6. Teams cannot include members who have previously collaborated with one another.
7. Teams are encouraged (but not required) to
   a) Include at least one theorist or computational scientist and one experimentalist.
   b) Include members from different disciplines.
8. Proposals must be submitted electronically by Sunday morning at 6:30 am. Instructions for electronic submission will be provided at the meeting.
9. Awards will start in early 2020.

Scialog Fellows

Nongnuch (Nong) Artrith na2782@columbia.edu
Columbia University
Materials simulations for energy applications and development of machine learning models for accelerated generation of materials insights.

Veronica Augustyn vaugust@ncsu.edu
North Carolina State University
Mechanistic understanding of electrochemical energy storage materials.

Fikile (Fik) Brushett brushett@mit.edu
Massachusetts Institute of Technology
We're interested in the science and engineering of electrochemical systems for energy storage and conversion.

Jordi Cabana jcabana@uic.edu
University of Illinois at Chicago
Redox chemistry and transport in inorganic solids across length scales.

Candace Chan candace.chan@asu.edu
Arizona State University
Developing materials solutions to challenges in lithium ion battery anodes, solid electrolyte interfaces, and all-solid-state batteries.

Zheng Chen zhengchen@eng.ucsd.edu
UC San Diego
Leveraging reversible chemistry to better design and understand materials for sustainable energy storage and conversion.

Anne Co co.5@osu.edu
The Ohio State University
Interested in understanding fundamental electrochemical processes in catalysis and energy storage and developing operando tools.

Neil Dasgupta ndasgupt@umich.edu
University of Michigan, Ann Arbor
1) Lithium-metal batteries (solid-state and liquid); 2) Design of 3-D electrode architectures; 3) Interfacial Engineering using ALD.

Jahan Dawlaty dawlaty@usc.edu
University of Southern California
Spectroscopic measurements of interfacial phenomena, with special attention to interfacial electric fields and ionic structure and dynamics.

Zhenxing Feng zhenxing.feng@oregonstate.edu
Oregon State University
Operando synchrotron X-ray characterizations; oxide thin film as model systems; interfacial processes in energy devices; aqueous battery.

Betar Gallant bgallant@mit.edu
Massachusetts Institute of Technology
Development of new chemistries, mechanisms and materials underlying solid-solid and gas-solid phase transitions for Li-ion and Li batteries.

Eleanor Gillette egillette@sandiego.edu
University of San Diego
In-situ infrared measurements at electrochemical interfaces.

Puja Goyal pgoyal@binghamton.edu
Binghamton University
Proton-coupled electron transfer; Quinones in batteries; Photoinduced processes in chemistry and biology.

Beth Guiton beth.guiton@uky.edu
University of Kentucky
Inorganic nanostructure synthesis and characterization, in particular using in situ transmission electron microscopy techniques.

Shoji Hall shoji@jhu.edu
Johns Hopkins University
Electrocatalysis, electrodeposition, energy conversion.

Kelsey Hatzell kelsey.b.hatzell@vanderbilt.edu
Vanderbilt University
Understanding solid|solid interfaces for all solid state batteries.

Ellen Hicks (Matson) matson@chem.rochester.edu
University of Rochester
Transition metal-oxide clusters, Synthesis, Redox flow batteries.

Aaron Holder aaron.holder@colorado.edu
University of Colorado Boulder
Computationally- and data-driven design of novel mechanisms, chemistries, and materials for energy generation and *storage.*

Shu Hu shu.hu@yale.edu
Yale University
Selectivity control of electrocatalysis for flow battery applications; Polarization-modulated IR spectroscopy for liquid interfaces.

Yan (Yan-Yan) Hu yhu@fsu.edu
Florida State University
Development and Application of Advanced NMR/MRI for Materials Research.

Kah Chun Lau kahchun.lau@csun.edu
California State University Northridge
My research interests are related to atomistic simulation and theoretical study of energy related materials.

Zheng Li zhengli@vt.edu
Virginia Tech
My research interests center on designing advanced energy storage systems for transportation and electric grid.

Scialog Fellows Continued

Tianbiao (Leo) Liu leo.liu@usu.edu
Utah State University
Energy Storage (flow batteries, Li ion, and multivalent) and electrocatalysis.

Lauren Marbella lem2221@columbia.edu
Columbia University
NMR/MRI of energy materials.

Bryan McCloskey bmcclosk@berkeley.edu
UC Berkeley
Li-ion cathode interfaces, fast charging, low temperature battery operation, electrolyte design.

Matthew (Matt) McDowell mattmcdowell@gatech.edu
Georgia Tech
Materials transformations in batteries, interfaces, in situ characterization, chemo-mechanics.

James McKone jmckone@pitt.edu
University of Pittsburgh
Application-inspired basic research in electrochemical energy conversion and catalysis.

Brent Melot melot@usc.edu
University of Southern California
Our group is interested in creating new and improving existing functional materials through the development of materials design principles.

Partha Mukherjee pmukherjee@purdue.edu
Purdue University
Mesoscale physics and stochastics in energy storage.

James (Jamie) Neilson james.neilson@colostate.edu
Colorado State University
Prescriptive materials synthesis and structure-dynamics-properties relationships.

Susan Odom susan.odom@uky.edu
University of Kentucky
Organic compounds for electrochemical energy storage systems.

Julien Panetier panetier@binghamton.edu
Binghamton University
We use computational methods to study the electronic structure and reactivity of catalysts for energy storage and conversion.

James Pikul pikul@seas.upenn.edu
University of Pennsylvania
I study electrochemical kinetics and how they are applied to enable new battery architectures and high power batteries.

Louis Piper lpiper@binghamton.edu
Binghamton University
Electronic structure of electrochemical cathodes and interfaces.

Ekaterina Pomerantseva ep423@drexel.edu
Drexel University
Synthesis of new materials with advanced electrochemical properties for sustainable energy and clean environment.

Farshid Ramezanipour farshid.ramezanipour@louisville.edu
University of Louisville
Synthesis of new oxides, electronic and ionic charge transport in oxides, magnetism, electrocatalysis.

Chad Risko chad.risko@uky.edu
University of Kentucky
Create chemically robust models to enable synthetic control of electron and energy transport in semiconductors and energy storage materials.

Joaquin Rodriguez-Lopez joaquinr@illinois.edu
University of Illinois at Urbana-Champaign
The Rodriguez-Lopez group explores fundamental aspects of electron and ion transfer at interfaces using multimodal electrochemical tools.

Emily Ryan ryanem@bu.edu
Boston University
Mesoscale computational modeling; interfacial phenomena.

Justin Sambur jsambur@colostate.edu
Colorado State University
Probing charge storage mechanisms and establishing structure/property relationships using single nanoparticle electrochemistry.

Jennifer (Jen) Schaefer Jennifer.L.Schaefer.43@nd.edu
University of Notre Dame
Liquid, squishy, and solid polymer electrolytes–ionomers – metal anodes–sulfur cathodes; I love ions!

Kimberly (Kim) See ksee@caltech.edu
Caltech
Solid-state and solution phase inorganic chemistry of multivalent and multielectron battery systems beyond Li-ion.

Linsey Seitz linsey.seitz@northwestern.edu
Northwestern University
Controlled material synthesis and in situ spectroscopic investigation of materials and reaction mechanisms for production of renewable fuels.

V. Sara (Sara) Thoi sarathoi@jhu.edu
Johns Hopkins University
Framework materials for energy storage and conversion.

Emily Tsui etsui@nd.edu
University of Notre Dame
My research interests are in chalcogen redox chemistry in bioinorganic active sites and at nanomaterials surfaces.

Zachary (Zach) Ulissi zulissi@andrew.cmu.edu
Carnegie Mellon University
Developing the methods and datasets necessary to apply machine learning in surface science/catalysis.

Scialog Fellows Continued

Alexander (Alex) Urban-Artrith au2229@columbia.edu
Columbia University
Computational modeling of atomic and electronic scale processes in energy storage and conversion materials.

Fernando Uribe-Romo fernando@ucf.edu
University of Central Florida
Synthesis of functional metal-organic framework (MOFs) materials for energy storage and conversion.

Venkat Viswanathan venkvis@cmu.edu
Carnegie Mellon University
Batteries for electrification of transportation, electrocatalysis for renewable synthesis.

Hailiang Wang hailiang.wang@yale.edu
Yale University
Materials chemistry of batteries and electrocatalysis.

Haotian Wang htwang@rice.edu
Rice University
My group's research is focused on developing novel electrocatalysts for efficient renewable energy conversion and storage.

Luisa Whittaker-Brooks luisa.whittaker@utah.edu
University of Utah
Deep understanding of chemical processes and ion-migration in energy storage materials and devices via in situ and in operando techniques.

Hui (Claire) Xiong clairexiong@boisestate.edu
Boise State University
Fundamental understanding of defects, disorder, and interfacial properties of electrode materials.

Yang Yang Yang.Yang@ucf.edu
University of Central Florida
Nanostructured films, renewable energy generation and storage, solar energy harvesting.

Yuan Yang yy2664@columbia.edu
Columbia University
Solid state batteries, structural batteries and fundamental characterizations.

Yan Yao yyao4@uh.edu
University of Houston
Li-ion and non-Li-ion battery, solid-state battery, organic redox molecules.

Iryna Zenyuk iryna.zenyuk@uci.edu
University of California Irvine
We are working on energy conversion and storage devices, trying to understand interplay between morphology and transport properties.

Discussion Facilitators

Sarbajit Banerjee banerjee@chem.tamu.edu
Texas A&M University
Phase transitions, electronic structure, X-ray spectroscopy, chemistry-mechanics coupling, metastable materials.

George Crabtree crabtree@anl.gov
National Renewable Energy Laboratory
Materials and phenomena of energy storage, lithium-ion batteries and beyond, electricity grid of the future.

Nancy Haegel nancy.haegel@nrel.gov
National Renewable Energy Laboratory
Energy transport with near-field dual probe imaging, multiscale and multimodal characterization, materials science for renewable energy.

Prashant Kamat pkamat@nd.edu
University of Notre Dame
@kamatlab interested in exploring new material properties and designing light harvesting assemblies for energy conversion and storage.

Karl Mueller karl.mueller@pnnl.gov
Pacific Northwest National Laboratory
Design and probing of battery materials and interfaces using novel characterization methods such as multimodal imaging and spectroscopies.

Kyusung Park Kyusung.Park@nrel.gov
National Renewable Energy Laboratory
My research interests lie in solid-state electrochemistry and transition-metal chemistry for energy-storage applications.

Amy Prieto alprieto@colostat.edu
Colorado State University
3D architectures for batteries, high capacity electrodes.

M. Stanley (Stan) Whittingham stanwhit@mac.com
Binghamton University
Chemistry of Materials for Energy Applications, particularly energy storage.

Yiying Wu wu.531@osu.edu
Ohio State University
Materials Chemistry for Energy Conversation and Storage including metal-oxygen batteries and solar fuels.

Alfred P. Sloan Foundation

Evan Michelson michelson@sloan.org
Research on the economic, environmental, and policy tradeoffs on low/no carbon resources and technologies across the energy system.

Research Corporation

Dan Linzer dlinzer@rescorp.org
President

Silvia Ronco sronco@rescorp.org
Senior Program Director

Richard Wiener rwiener@rescorp.org
Senior Program Director

Andrew Feig afeig@rescorp.org
Program Director

Danny Gasch dgasch@rescorp.org
Chief Financial Officer

Kathleen Eckert keckert@rescorp.org
Senior Program Assistant

Laura Esham lesham@rescorp.org
Program Assistant

Barbara Shapiro bshapiro@rescorp.org
Program Assistant

4703 East Camp Lowell Dr.
Suite 201
Tucson, Arizona 85712
Phone 520.571.1111
www.rescorp.org

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for SCIENCE ADVANCEMENT