



DOE OF ENERGY STORAGE PEER REVIEW

2018 PEER REVIEWERS & OBSERVERS

EVENT FACILITATOR

Name

Biography

James Greenberger

*Executive Director,
National Alliance for Advanced
Technology Batteries*

Jim Greenberger is the Executive Director of the National Alliance for Advanced Technology Batteries (NAATBatt), a not-for-profit trade association of companies involved in the manufacture of large format advanced batteries for automotive and grid-connected energy storage applications. Mr. Greenberger co-founded the predecessor of NAATBatt in 2008.

Prior to leading NAATBatt, Mr. Greenberger practiced law for more than 25 years, most recently as a partner at Reed Smith LLP in Chicago, where he led its cleantech practice group. Mr. Greenberger's law practice focused on mergers and acquisitions, private equity and venture capital transactions. He has represented some of the leading private equity and venture capital firms in the country and published several articles on private equity transactions and structures. He also writes a weekly column entitled "Executive Director's Notes" in the NAATBatt Advanced Battery Weekly.

In addition to his duties at NAATBatt, Mr. Greenberger serves on the Board of Directors of the Association for Corporate Growth-Chicago, on the governing board of the Kentucky-Argonne Battery Manufacturing Center, and is the principal of Private Equity Law Advisors, a private law practice in Chicago. He is a past chair of the Commercial Finance & Transactions Committee of the Chicago Bar Association and a member of the American Bar Association. He is a graduate of Haverford College and the University of Michigan Law School.

PEER REVIEWERS

Name

Biography

Curtis Ashton

*Event Facilitator
Executive Director,
National Alliance for Advanced
Technology Batteries*

Curtis has 26 years of experience in telecommunications backup power and grounding, following 4 years working at an electric utility generation station. He has been published and has presented numerous times around the world. He is the vice-chair of IEEE PES ESSB (Energy Storage & Stationary Battery) technical committee, and the vice-president of IEEE PELS TC7 (annual Intelec conference). He served a term on IEEE RevCom (standards Review Committee). And, he is also the chair of the technical committee for the annual Battcon conference.

Erik Brandon

Jet Propulsion Laboratory

Dr. Erik Brandon received the Ph.D. degree in Inorganic Chemistry from the University of Utah in 1997, followed by a post-doctoral fellowship at the California Institute of Technology. Dr. Brandon joined the staff of the Jet Propulsion Laboratory (JPL) in 1999, and is a Research Technologist focused on a wide range of development efforts in the areas of materials and devices for power generation, energy storage and sensors for space exploration. He is currently the Technical Group Supervisor for the Electrochemical Technologies Group at JPL, which is comprised of 20 staff members including 10 Ph.D. level researchers. Dr. Brandon initiated a new research thrust at JPL in the area of supercapacitor technologies in 2005, to support wide temperature and high power applications. Specific efforts he has led as principal investigator include the development of integrated passive components and micro-batteries for miniaturized small spacecraft power sources, flexible electronics and multi-functional materials for deployable space structures, advanced thermoelectric couples for power generation, primary batteries for deep space missions and supercapacitors and supercapacitor/hybrid battery technologies for extreme environment applications. He is currently the battery lead for the Europa Lander pre-project.



Stephen Bukowski

*Director of New Technology Integration,
El Paso Electric Company*

As an electrical engineer of 26 years, Steve has worked with a diverse background of various companies in several different fields of electrical engineering, including Power and Energy systems, telecommunication, data networking, and the communication industry as director of research, chief architect, senior managing engineer, lead engineer, systems engineer, senior consultant, technical sales, and integration and test engineer. His current focus at EPE is developing a technology vision and roadmap in support of EPE corporate goals and implementing the road map with strategic objectives. Steve's goals at EPE include shifting EPE to a technology position preparing it for external and internal pressures from rapid advances of technology, increased regulation, changing legislation, changing workforce, and climate change.

Joe Eto

Lawrence Berkeley National Laboratory

Joe Eto is a staff scientist at the Lawrence Berkeley National Laboratory where he serves as the strategic advisor for the Electricity Markets and Policy Group and for the Energy Storage and Demand Resources Division. He supports the U.S. Department of Energy's Office of Electricity by coordinating and conducting grid research supported by the Advanced Grid R&D program, notably in the area of synchrophasors and microgrids. He also supports OE's Transmission Permitting and Technical Assistance program by conducting research and analysis on electricity reliability and resilience topics and on transmission planning and policies. He has authored over 250 publications on frequency response, transmission planning, electricity reliability metrics, trends and reliability value based planning, power quality, distributed generation, energy efficiency, and demand response.

Flora Flygt

DOE Electricity Advisory Committee

Flora Flygt was in the electric utility industry for approximately 35 years in a variety of planning and leadership positions. She has worked for Madison Gas & Electric Company, Alliant Energy, and American Transmission Company LLC (ATC). She was involved in many innovative electric planning approaches including leading the development of integrated resource planning and participating in demand-side planning at Madison Gas & Electric Company. She implemented a leading-edge strategic flexibility approach to investment decisions at Alliant Energy, where she was Director of Corporate Research and Market Planning. As Director of Transmission Planning at ATC, Flora led the development of the first economically justified transmission project in MISO and of ATC's first Multi-Value Projects approved by MISO in 2011. She has been an expert witness on transmission planning, long-term electric forecasting, demand-side planning, and integrated resource planning. She has presented at and chaired many industry conferences and was very actively involved in the Eastern Interconnection Planning Collaborative. Flora holds an M.S. degree in Land Resources with a Master's certificate in Energy Analysis & Policy from the University of Wisconsin-Madison and a B.A. degree in Economics from the University of Michigan-Ann Arbor. Currently, Flora is an industry representative on the U.S. Department of Energy's Electricity Advisory Committee.

Jonathan Hawkins

*Manager of Advanced Technology and Strategy,
PNM Resources*

Jonathan Hawkins is the Manager of Advanced Technology and Strategy at PNM Resources, an energy holding company based in Albuquerque New Mexico. Jonathan's team is responsible providing research and development of new technologies and the proposal of possible business applications of emerging technologies in support of PNM Resources strategic objectives. Areas of responsibility include "smart grid" technologies and strategy, integration of distributed energy resources; plug in hybrid electric vehicles, and storage technologies. Jonathan Hawkins received his Bachelor of Science degree in Electrical Engineering from the University of New Mexico in 1994. After graduation, he went to work for Sumitomo Sitix Silicon, Inc. as an engineer responsible for semiconductor pre and post production material characterization. Jonathan joined PNM Resources in 2002 where he managed PNM's Distribution Standards organization, which provides material specifications and model standards for design and construction of utility infrastructure. In 2010 he became the Manager of the Advanced Technology group. Jonathan is a member of the Institute of Electrical and Electronics Engineers (IEEE), a member of the Research Advisory Committee to EPRI as well as an advisor to multiple individual research programs, and an invited reviewer for proposals to the Department of Energy.

Michael Hoff

*CTO and VP of Research and Technology,
NEC Energy Solutions, Inc.*

Michael Hoff has over 30 years of experience in electric utilities, uninterruptible power supplies, advanced energy storage, battery systems, communications, manufacturing and construction. He is currently CTO and VP of Research and Technology and directs the research and modeling of advanced energy storage technologies at NEC.

Mr. Hoff was the first member of A123's Energy Solutions Group, where he helped build the core systems engineering capability for the company before it was acquired by NEC. Before that, Mr. Hoff served 18 years in various roles developing UPS products for American Power Conversion. This experience gave him broad exposure in energy storage technologies, power control, electronic controls and communications, manufacturing processes and the power market. Michael holds a BS in Electrical Engineering and Power from Drexel University, and a MS in Electrical Engineering and Power from Northeastern University.



Jeremy Lewis

State of New Mexico,
EM&NR Department

Jeremy Lewis has a B.S. degree in Natural Resource Studies from the University of Massachusetts and a Masters of Community and Regional Planning degree from the University of New Mexico. His current role with the New Mexico Energy Office includes developing and managing programs in renewable energy, energy efficiency and alternative transportation. He currently serves as a board member for the Clean Energy States Alliance, chairs the New Mexico Renewable Energy Storage Working Group and is former chair of Albuquerque Public Schools' Water & Energy Conservation Committee. Jeremy has served as a Transmission Policy Analyst with Western Resource Advocates, as a Peace Corps Volunteer expanding sustainable agriculture in Central Africa, and as an AmeriCorps Volunteer for literacy and conservation programs in Northern New Mexico.

Madhav Manjrekar

University of North Carolina,
Charlotte

Dr. Madhav Manjrekar, Senior Member of IEEE, is an Associate Professor at the University of North Carolina in Charlotte and also serves as an Assistant Director of the Energy Production & Infrastructure Center (EPIC). Named as an e4 Carolinas Emerging Leader in Energy in 2015, Dr. Manjrekar has led technology and innovation teams in the areas of energy and power systems for more than 15 years. Prior to joining academia in 2012, he worked as the Vice President of Global Research and Innovation at Vestas (the wind turbine company), and previously has held various leadership and management positions at Siemens, Eaton and ABB. Dr. Manjrekar holds 10 US and international patents, has published over 55 journal and conference papers and has received multiple IEEE prize paper awards. He has also served on various task forces, including High Mega-Watt Leadership Team of National Institute of Standards and Technology, the Smart Grid Task Force of North American Electric Reliability Corporation, IEEE Standard P2030, and on review panels for ARPA-E, and the National Science Foundation. Dr. Manjrekar's research interests are in applications of power electronics in utility power systems and variable speed motor drives, interfaces for renewable power generation and energy storage, smart grids, and cyber vulnerability of electric infrastructure. Dr. Madhav Manjrekar received his B.E. degree from Government College of Engineering, Pune, India, his M.Tech. from Indian Institute of Science, Bangalore, India, M.S. from Montana State University, Bozeman, Montana, and Ph.D. from University of Wisconsin, Madison, Wisconsin, in 1993, 1995, 1997, and 1999 respectively.

Michael Mazzola

University of North Carolina,
Charlotte

Dr. Michael Mazzola is the Director of the Energy Production and Infrastructure Center (EPIC) and the Duke Energy Distinguished Chair in Power Engineering Systems at UNC Charlotte.

Dr. Mazzola holds a Ph.D. in electrical engineering from Old Dominion University. After three years in government service at the Naval Surface Warfare Center in Dahlgren, Virginia, in 1993 he joined the faculty at Mississippi State University where he became known for his research in the areas of silicon carbide power semiconductor device prototyping and semiconductor materials growth and characterization. For the past 10 years he served at the Mississippi State University Center for Advanced Vehicular Systems as the associate director for advanced vehicle systems, where he leads research in high-voltage engineering, power systems modeling and simulation, the application of silicon carbide semiconductor devices in power electronics, and the control of hybrid electric vehicle power trains. In addition, he served two years as the chief technology officer of SemiSouth Laboratories, a company he co-founded.

Neville Moody

Retired, Sandia National
Laboratories

Neville Moody obtained his PhD degree in Materials Science from the University of Minnesota in 1981. After joining Sandia National Laboratories, his research focused on the determination of hydrogen effects on deformation and fracture in titanium, stainless steels, and superalloys, employing experimental testing, modeling, and simulation techniques. For the past 20 years his research has included the study of deformation and fracture on the submicron scale in thin films and small volumes. He has given more than 100 invited presentations and authored or co-authored more than 170 publications, including invited reviews and chapters in the encyclopedia on Comprehensive Structural Integrity and the encyclopedia of Gaseous Hydrogen Embrittlement of High Performance Metals in Energy Systems. Dr. Moody has co-organized three International Conferences on Hydrogen Effects in Materials, three International Conferences on Environmental Damage in Structural Materials, three regional materials and welding technology conferences, and 23 symposia for materials societies and topical conferences. He co-chaired the 2005 MRS Spring Meeting in San Francisco and was vice chair 2012 and chair 2014 of the Gordon Conferences on Thin Film and Small Volume Mechanical Behavior. He served as the Director of Programming on the TMS Board of Directors from 2012 until 2015. He also managed the Sandia National Laboratories Energy Nanomechanics Department from 2011 until 2015. Dr. Moody is an active member of several TMS and MRS committees and is a Fellow of ASM International and MRS.



**Rangachary (Mukund)
Mukundan**
*Los Alamos National
Laboratory*

Mukundan's research focuses on fuel cells, electrochemical gas sensors and energy storage devices. He is a steering committee member for the Department of Energy's Fuel Cell Consortium for Performance and Durability (FC-PAD), where he coordinates the thrust area Operando Evaluation (i.e. evaluation of working fuel cells to determine how to improve the performance and durability). The thrust area includes benchmarking, accelerated stress testing, and contaminants. He is the co-inventor of six U.S. patents, has authored more than 125 papers, and is the principal investigator of a 2017 Los Alamos Laboratory Directed Research and Development (LDRD) project titled "Flow Cells for Scalable Energy Conversion and Storage."

Mukundan is a fellow of the Electrochemical Society has received the Electrochemical Society's J.B Wagner Award of the High Temperature Materials Division and the Sensor Division Outstanding Achievement Award, the highest recognition the division can bestow on an ECS member. He is also the technical editor for ECS journals in the area of sensors and measurement sciences, and previously served on the Board of Directors and as chair of the Sensor Division.

He earned a Ph.D. in materials science and engineering from the University of Pennsylvania, and joined Los Alamos in 1997 as a postdoctoral fellow. He became a staff scientist in 1999.

Vittal S. Rao
Texas Tech University

Dr. Vittal S. Rao is a professor and Electrical and Computer Engineering and Director at Smart Grid Energy Center (SGEC) at Texas Tech University. His research interests include Cyber Security of SCADA Control Systems, Smart Grid and Microgrid Systems, Smart Structural Systems, Control of Wind Turbines; Cyber Security of Smart Grid Systems; Robust Control Systems. He has supervised 198 publications, developed three multidisciplinary courses in smart structures and structural health monitoring, and developed a state-of-the-art research laboratory in Smart Grid using the Major Research grant of NSF. Dr. Rao received his Ph.D. at the Indian Institute of Technology in New Delhi.

Robert Reuss

Dr. Robert Reuss has consulted to government organizations since 2006. He was a DARPA Program Manager in the Microsystems Technology Office from 2001 to 2006. He was responsible for several research thrusts into fabrication of flexible, large area electronics including high mobility TFTs for digital and RF applications and organic photovoltaics, as well as conventional microelectronics efforts that included exploiting mainstream semiconductor processes for high performance analog, mixed signal RF and MMW applications, reconfigurable, multi-core processor design, asynchronous logic design methodology, and sub-threshold, ultra-low power operation. Since September 2006, he has been an independent consultant. Prior to joining DARPA, Dr. Reuss spent twenty years in various technology and research management positions with Motorola. Earlier, he worked for the U.S. government as a research and development manager for seven years and was a Research Faculty member at the University of Colorado for three years. Dr. Reuss received a Ph.D. in Chemistry from Drexel University in 1971. He has published over 50 papers and has been awarded 13 U.S. patents. His technology interests lie in the area of application of materials and electrochemistry technologies for advanced microelectronic applications and microsystems integration as well as large area electronics.

Most recently he was the recipient of the 2018 FLEXI Awards Innovation and Leadership in Flexible Hybrid Electronics Technology Champion – Robert Reuss, former program manager in the Microsystems Technology Office at DARPA, won a FLEXI for his extraordinary dedication to growing the flexible electronics industry, early recognition of the impact of large area electronics and strong contributions to helping build the FLEXI Conference.

Ramteen Sioshansi
The Ohio State University

Ramteen Sioshansi is a professor in and the associate chair of the Department of Integrated Systems Engineering and an associate fellow in the Center for Automotive Research at The Ohio State University. He holds a B.A. in economics and applied mathematics and an M.S. and Ph.D. in industrial engineering and operations research from the University of California, Berkeley and an M.Sc. in econometrics and mathematical economics from the London School of Economics and Political Science. Prior to joining OSU, he was a postdoctoral research fellow at the National Renewable Energy Laboratory.

His research focuses on the integration of advanced energy technologies, including renewables, energy storage, and electric transportation, into energy systems. He also works in energy policy and electricity market design, especially as they pertain to advanced energy technologies.

He has published numerous academic journal articles and serves on the editorial boards of the Foundations and Trends in Energy Markets and Policy, IEEE Transactions on Power Systems, Journal of Energy Engineering, IET Renewable Power Generation, and Journal of Modern Power Systems and Clean Energy. He received the 2010 Campbell Watkins Energy Journal Best Paper Award from the International Association for Energy Economics. He is currently serving a third term on the Electricity Advisory Committee of the U.S. Department of Energy and is chair of its Energy Storage Subcommittee. In addition to his academic research and teaching, Professor Sioshansi has been a consultant to numerous public and private organizations.



Reinaldo Tonkoski
South Dakota State University

Reinaldo Tonkoski received his B.A.Sc. degree in Control and Automation Engineering, in 2004, the M.Sc. in Electrical Engineering in 2006 from PUC-RS (Pontifícia Universidade Católica do RS), Brazil, and his Ph.D. in 2011 from Concordia University, Canada. He was with CanmetENERGY, Natural Resources Canada, from January 2009 to January 2010 where he worked on projects related to the grid integration of renewable energy sources.

Presently, he is an Associate Professor in the Electrical Engineering and Computer Science Department, South Dakota State University, Brookings, USA. Dr. Tonkoski has authored over eighty technical publications in peer reviewed journals and conferences. His research interests include grid integration of renewable energy systems and batteries, distributed generation, power quality and power electronics.

Anthony van Buuren
*Deputy Division Director for
Materials Science, Lawrence
Livermore National Laboratory*

Tony van Buuren began at LLNL as a postdoctoral scholar in the Chemistry and Materials Science Division of Lawrence Livermore National Laboratory (LLNL) in 1995. He has been a staff scientist from 1998-present and the group leader of the Nanoscale Materials Science and Technology Group from 2008-2015. In 2015 he became Deputy Division Leader for S&T Materials Science Division and in 2017 the initiative lead for energy materials. Between 1988-91 he was a staff scientist at Moli energy LTD.

His main research interests are the determination of the electronic, surface and microstructural properties of nanostructures, composites and porous materials. Current research projects are in tailored materials for energy applications, in-situ and operando x-ray characterization methods; laser material interaction and advanced material processing. He is on the advisory boards of various national and international user facilities and has authored or coauthored more than 150 technical articles.

S. Cat Wong
Entergy Services, Inc.

Cat Wong, Ph.D., P.E., PMP is leading the planning, design, and implementation activities of Distributed Energy Resources (utility and retail scale) at Entergy, including PV, battery storage, micro-grids, etc. She is a registered Professional Engineer in the State of Louisiana. She was the lead of the Real Time Simulation Lab and performed hardware-in-the-loop simulation. She supported PMU deployment, transmission and distribution standard development, protection studies, and planning analysis. Prior to joining Entergy, Cat was invited to work with the real time simulation development team at the Hydro Quebec Research Institute in Montreal, Canada.



OBSERVERS

Name

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Cynthia B. Hall

District 1 Commissioner and Vice-Chair of the New Mexico Public Regulation Commission

Cynthia has served as District 1 Commissioner and Vice-Chair of the New Mexico Public Regulation Commission ("PRC") since January 1, 2017, following her election in November, 2016. She was elected in her wholly-urban district with a 15-point margin and a strong mandate to support clean, affordable energy. As a Commissioner, she initiated a successful rulemaking to require storage be considered as a resource in the Integrated Resource Planning process, and she supports market-based mechanisms that increase the use of renewable energy and reduce rates.

Cynthia previously served as associate general counsel in the PRC and as associate general counsel, hearing officer, felony insurance fraud prosecutor, and staff attorney in the New Mexico Office of Superintendent of Insurance. Previously, she served as assistant staff counsel in the New Mexico Public Service Commission, precursor agency to the PRC, and in the New Mexico Energy and Minerals Department.

Cynthia has worked in private practice in medical malpractice and tribal law, and as a corporate attorney in the general counsel's office of Sandia National Laboratories, where she was the first woman attorney, and in the general counsel's office of the United States Navy's Naval Facilities Engineering Command, Western Division, which oversees naval facility construction and maintenance in eight western states. At both Sandia Labs and the Navy, Cynthia's primary focus was environmental, land use, and regulatory compliance law. At the outset of her legal career, she was law extern for the Honorable Terry J. Hatter, Judge, United States District Court for the Central District of California, and law clerk for the Honorable Oliver Seth, Chief Judge, United States Court of Appeals for the Tenth Circuit.

Prior to her law career, Cynthia worked as a research supervisor of multi-generational toxicology research at the Raltech Scientific Services Division of Ralston Purina Company, as a contract researcher in air and water pollution, and as a research technician in neurochemistry in the Pharmacology Department of Washington University Medical School. Cynthia is a former board member and vice-president of the Renewable Energy Industries Association of New Mexico and a former Bernalillo County Planning Commissioner. She founded and led two non-profit advocacy organizations, one achieving the public purchase of 96 acres of open space in Albuquerque and the other achieving a doubling of music and art elementary education in Albuquerque Public Schools. She holds a J.D. from Southwestern Law School, an M.S. in Physiology from St. Louis University, and a B.A. in Biology from Washington University.

Garth Corey

Retired, Sandia National Laboratories

Garth P. Corey, recently retired as a Principal Member of the Technical Staff, Sandia National Laboratories, had project management responsibilities with the Energy Infrastructure and Distributed Energy Resources Department. Most of his Sandia career was dedicated to communicating his system engineering and battery system management knowledge to engineers involved in the integration of various energy storage technologies with the balance of plant needed for a successful operational energy storage system.

During his more than 15 years at Sandia, he was involved in high technology energy storage R&D projects. He has managed projects that span the utility scale energy storage arena that includes flywheels and ultra capacitor systems, sodium sulfur, nickel cadmium, lead acid, (including advanced lead-acid technologies), and lithium ion batteries, and several flow battery technologies. Much of his time was dedicated to assisting Sandia Renewable Power engineers in the proper integration of batteries in off-grid and grid-tied Photovoltaic systems.

He is a member of the IEEE Power and Energy Society and active with the PES Stationary Battery Committee. In addition to continuing his association with Sandia as a consultant, with responsibilities related to electric energy storage system development, he is also very active in a consulting role to industry in the evaluation of emerging energy storage technologies for distributed energy and storage applications on the national grid.

Alexander Headley

Alexander Headley recently joined the Energy Storage Technology & Systems department at Sandia National Laboratories. Here, his research will center around evaluating the potential of hydrogen storage for grid support, integrated system design, and the development of demonstration facilities for grid-connected energy storage. His previous work at Sandia focused on experimental and modeling support for thermal battery design efforts. Before joining Sandia, Alex earned his master's and doctorate in mechanical engineering from The University of Texas at Austin where he developed new methods of modeling and assessing the state-of-health of Proton Exchange Membrane (PEM) fuel cell systems.



Howard Passell

Howard Passell works in the Strategic Futures Group at Sandia National Laboratories in Albuquerque, New Mexico. His work focuses on emerging national security issues associated with water, energy, food, ecosystems (including climate), and population, with an emphasis on the relationships between resource scarcity and human security. Over the years his work has included resource monitoring, modeling, management, capacity building, and policy-related projects at various scales in the US, Central Asia, the Middle East, and North Africa. He teaches as an adjunct professor in the Water Resources Program at the University of New Mexico. His undergraduate studies were in classical literature and the liberal arts at St. John's College in Santa Fe, NM, and the Ohio State University in Columbus, Ohio. He earned his master's and doctorate degrees in conservation biology and hydrogeology at the University of New Mexico.

Susan Schoenung

Dr. Schoenung is president of Longitude 122 West, Inc., an energy consulting firm in Menlo Park, California, specializing in design and analysis of renewable energy systems, energy storage and alternative fuel infrastructure. She has performed energy systems analysis for the US Department of Energy, Clean Energy States Alliance, Electric Power Research Institute and numerous industry clients. Foundational work in energy storage for the DOE includes, among others, the EPRI-DOE Handbook of Energy Storage for Transmission and Distribution Applications. Previously, she worked for Chevron Research Laboratories, Bechtel Engineering and Schafer Associates. She holds a Bachelor of Science Degree in Physics from Iowa State University and a Masters and Doctorate in Mechanical Engineering from Stanford University. She is a registered Professional Engineer in California. Longitude 122 West is a member of the Energy Storage Association, EPRI Energy Storage Integration council, California Energy Storage Association and California Hydrogen Business Council.

