BESR

BOARD ON EARTH SCIENCES AND RESOURCES

OPEN SESSION MATERIALS

November 2, 2021

Virtual Meeting

The National Academies of

SCIENCES
ENGINEERING
MEDICINE

Natural and Prescribed Wildland Fire Impacts on Soil Health

Fall Event of the
Board on Earth Sciences and Resources

Climate change is increasing the odds of higher occurrence rates, intensity, and severity of wildland fires in drought-prone regions. High intensity wildfires not only denude the landscape and lower the resistance of soils to surface erosion, but they also change the physical properties of soils, alter the soil microbiome, and extend the recovery timescales relative to lower intensity fires. Rain-on-burn events can magnify multiple negative impacts, such as poor water quality and debris flows. Wildland management is at a critical juncture, requiring new knowledge and innovative tools to best support the mitigation and prevention of fire-induced hazards. The fall 2021 meeting of the Board of Earth Sciences and Resources will discuss the emerging frontiers in research and the outlook for implementing science-based tools to support equitable federal, state, and community responses to fire-induced hazards.

Register Here

Tuesday, November 2, 2021 All Times ET	
12:00 PM	**Welcome and Brief Overview of BESR** *Isabel Montañez, BESR Chair*
12:15 PM	**Keynote: Fire and Soil Health** *Tom DeLuca, Oregon State University* Moderator: Isabel Montañez, BESR Chair
12:45 PM	**Panel 1** **The Effects of Natural and Prescribed Fire on Soil and Watersheds** *Moderator: Pat McDowell, BESR Member*
	The Impacts of Fire on Soil Properties and Surface Hydrology *Brittany Johnson, University of Washington* **How Wildfire Drives Nutrient Cycling and Export in Dryland Watersheds: Linking Fine Scale Processes with Land Surface Models** *Erin Hanan, University of Nevada, Reno* **Debris-Flow-Dominated Sediment Transport in Recently Burned Areas** *Luke McGuire, University of Arizona* **Fire and Watershed Hydrology: Re-plumbing Source Water Supplies in the Western U.S.** *Kyle Blount, Washington State University*

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1:45 PM	**Panel 1 Discussion: Where are the gaps in the science?**
2:15 PM	**BREAK**
2:45 PM	**Panel 2** **Tools for the Mitigation and Prevention of Fire-Induced Hazards** *Moderator: Jeff Rubin, BESR Member*
	Knowing Where Black Water Flows: Predicting Post-Wildfire Watershed Response *Pete Robichaud, U.S. Forest Service* **Where, When, How Big, How Far, and How Long? Predicting Post-Fire Debris-Flow Hazards in Recent and Recovering Burn Areas** *Jason Kean, U.S. Geological Survey* **Aligning the Science to Match the Need: How Post-Fire Watershed Modeling Can Make Water Utilities More Resilient to Wildfire** *Julie Padowski, Washington State University*
3:30 PM	**Panel 2 Discussion: Technological advances & challenges to implementing/improving these tools?**
3:55 PM	**Closing Thoughts** *Isabel Montañez, BESR Chair*
ADJOURN OPEN SESSION 4:00 PM	

SPEAKER BIOS

Kyle Blount is a Postdoctoral Research Associate in the School of the Environment at Washington State University in Vancouver, Washington. Trained as a hydrologist, Dr. Blount's research primarily focuses on socio-ecohydrology, or interactions between hydrology, ecology, and human systems in the context of wildfire and urban development. Dr. Blount's fire-related research focuses on how wildland fire affects partitioning of the water budget, the impacts of these changes to downstream water supply in the Western U.S., and successful stakeholder engagement for collaborative management of watersheds after fire. When not working, Kyle enjoys hiking, CrossFit, craft beer, and spending time with his black lab, Gus. Dr. Blount received his B.S. in Environmental Geosciences from Texas A&M University and his M.S. and Ph.D. in Hydrology from Colorado School of Mines.

Thomas H. DeLuca is the Cheryl Ramberg-Ford and Allyn C. Ford Dean of the College of Forestry at Oregon State University (OSU). A forest soil scientist and ecosystem ecologist, Professor DeLuca's efforts in research, teaching, and administration have been focused on sustainable land management and advancing our understanding of forest ecosystem function. Prior to his post at OSU, Professor DeLuca served as Dean of the College of Forestry and Conservation at the University of Montana, Director of the School of Environmental and Forest Sciences at the University of Washington, was the NERC-University Chair in the School of Environment, Natural Resources and Geography at Bangor University, UK, was a Senior Forest Ecologist with the Wilderness Society, and was a Professor of Forest Soils at the University of Montana in the College of Forestry and Conservation. During the past 30 years, Professor DeLuca has conducted research in a variety of topics across temperate, boreal, maritime and Arctic settings. His primary research interests include the influence of disturbance on N and C cycling in forest, prairie, and tundra ecosystems, the fire ecology of temperate and boreal forests, biological N2 fixation in forest ecosystems, sustainable forest management, and forest restoration. Professor DeLuca has authored more than 120 refereed research papers. He received his B.S. in Soil Science from the University of Wisconsin-Madison, M.S. from Montana State University in Soils, and Ph.D. in Soil Biology and Biochemistry from Iowa State University.

Erin Hanan is an Assistant Professor at the University of Nevada, Reno (UNR) in the Department of Natural Resources and Environmental Sciences. She leads the Fire and Dryland Ecosystems Lab at UNR, which examines how climate change and management activities influence fire regimes and how shifting fire regimes affect biogeochemical and ecohydrological processes. Her lab uses both empirical analysis and modeling to understand wildfire drivers and effects at scales ranging from individual soil cores to ecoregions. Dr. Hanan received her B.S. in Environmental Studies from the University of Southern California, M.S. in Environmental Studies from Florida International University, and Ph.D. in Ecology, Evolution and Marine Biology from the University of California, Santa Barbara.

Brittany Johnson is an Assistant Professor of Forest and Wildland Soils in the School of Environmental and Forest Sciences at the University of Washington. Her research is focused on the connections between soil and the environment with interdisciplinary projects spanning an array of topics from food production to fire. She conducts research examining relationships between soil chemical, physical, and biological characteristics and changes in climate, disturbance (natural and anthropogenic), hydrology, and land use with the goal of supporting sustainable management practices. Dr. Johnson received her B.S. in Chemistry/Math from Concordia College and her M.S. and Ph.D. in Hydrology from the University of Nevada, Reno.

Jason Kean is a Research Hydrologist at the U.S. Geological Survey. His research focuses on post-fire debris-flow processes and hazards. This research seeks to answer the post-fire questions: Where will debris flows occur? How much rain will it take to cause a problem? How big will they be? How far will they travel? and How long will the hazard persist? Dr. Kean received his B.S. in Civil Engineering from Cornell University and his M.S. and Ph.D. in Civil Engineering from the University of Colorado.

Luke McGuire is an Assistant Professor in the Department of Geosciences at the University of Arizona. Prior to joining the faculty at the University of Arizona, he worked as a postdoctoral scholar with the U.S. Geological Survey's Landslide Hazards group. His current research focuses on understanding the role of wildfire in accelerating erosion and creating geologic hazards, including landslides and debris flows. He received a B.S. in Mathematics from Bucknell University and Ph.D. in Applied Mathematics from the University of Arizona.

Julie Padowski is the Assistant Director for the Center for Environmental Research, Education, and Outreach and a Research Associate Professor with the State of Washington Water Research Center at Washington State University. She also serves as the University Co-Lead for the Northwest Climate Adaptation Science Center. Dr. Padowski is an interdisciplinary researcher specializing in synthesis studies that examine the issues and dynamics of drinking water supply and demand management at local, regional, and global scales. Her broad interests have led her to work on a variety of projects ranging from identifying key concerns and impacts to water utility operations affected by wildfire to global assessments of urban water demand and water management. Dr. Padowski earned her B.S. in Environmental Sciences from the University of Rochester, M.S. in Soil and Water Science from the University of Florida, and Ph.D. from the Soil and Water Science Department at the University of Florida as a National Science Foundation Integrative Graduate Education and Research Traineeship Fellow, and was a Post-Doctoral Research Fellow at Stanford University with the Woods Institute for the Environment.

Pete Robichaud is a Research Engineer with the U.S. Department of Agriculture Forest Service, Rocky Mountain Research Station in Moscow, Idaho. Dr. Robichaud studies and models soil erosion as affected by wildfires. His field research includes plot-scale infiltration, erodibility studies, paired watershed studies, and large-scale remote sensing projects. He is an international leader in post-fire hydrology effects and monitoring techniques. He leads various research teams, manages the Forest Service Water Erosion Prediction Project suite of models, developed the popular web-based probabilistic Erosion Risk Management Tool, and evaluates erosion mitigation treatments. He has published over 200 scientific articles, one book, holds two patents, and still spends his summers chasing wildfires and playing in the dirt. Dr. Robichaud received his B.S. in Civil Engineering from the University of Massachusetts and his M.S. and Ph.D. in Agricultural Engineering from the University of Idaho.

BOARD ON EARTH SCIENCES AND RESOURCES

Statement of Task

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The Board on Earth Sciences and Resources coordinates the National Research Council's activities on solid-earth science issues and organizes and oversees studies of important national issues in the earth sciences. The Board oversees the following standing committees:

* Committee on Earth Resources
* Geographical Sciences Committee
* Committee on Geological and Geotechnical Engineering
* Mapping Science Committee
* Committee on Solid Earth Geophysics

The Board and its standing committees serve as the focus for interaction with agencies; as a consequence of this interaction, multidisciplinary ad hoc study committees are established under the auspices of the Board or its standing committees to provide advice as identified by statements of task.

Through its activities, the Board identifies opportunities for advancing basic research and understanding of earth science information for policy decisions, reports on the applications of earth sciences to important societal issues, and addresses the overall health of research and education programs related to earth sciences and resources issues. The Board and its committees also serve as fora for discussions and exchange of information among scientists, engineers, and policy makers from government, universities, and industry.

Organized: 1988

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BOARD ON EARTH SCIENCES AND RESOURCES

2021 MEMBERSHIP BIOGRAPHIES

updated 6/3/2021

Isabel Patricia Montañez, NAS, Chair, is a distinguished professor and chancellor's leadership professor in the Department of Earth and Planetary Sciences, University of California, Davis. Dr. Montañez is a paleoclimatologist whose research focuses on geologic archives of past atmospheric gas and ocean geochemical compositions and their linkages to climate and ecosystem changes. She received her Ph.D. from Virginia Polytechnic Institute in 1990 and has received several awards including the James Lee Wilson Medal for Excellence by a Young Scientist, the Laurence L. Sloss Award from the The Geological Society of America, and the Jean-Baptiste Lamarck Medal from the European Geosciences Union. She is a fellow of several professional societies and a past fellow of the John Simon Guggenheim Memorial Foundation. She served as President of The Geological Society of America from 2017 to 2018.

Estella A. Atekwana is the dean of the College of Earth, Ocean, and Environment at the University of Delaware, where she has been since the fall of 2017. She spent the previous decade at Oklahoma State University, where she finished as department head of the Boone Pickens School of Geology. Prior to Oklahoma State, Dean Atekwana was a faculty member at Missouri University of Science and Technology, Indiana University-Purdue University Indianapolis, and Western Michigan University. Her main research interests are in the areas of biogeophysics and tectonics. Her biogeophysical research examines the geophysical signatures of microbial cells in the Earth, the interaction between microorganisms and subsurface geologic media, and the alternation of the physical properties of geologic media as a result of microbial activity. In the tectonic realm, she has conducted geophysical investigations of incipient continental rift forming processes to understand how and where continental rifts initiate. She received her B.S. and M.S. in geology from Howard University and her Ph.D. in geophysics from Dalhousie University.

Thorsten W. Becker is the Shell Foundation Distinguished Chair in Geophysics at the Institute for Geophysics and the Department of Geological Sciences, Jackson School of Geosciences, at the University of Texas at Austin. His main research interests are in geodynamics and seismology with a focus on interactions between mantle convection and surface tectonics—studying the inner workings of terrestrial planets and how their mantle and surface systems have co-evolved over time. He combines field, laboratory, and numerical approaches into dynamical models, focusing on the physics of plate tectonics from grain-scale deformation to plate-scale flow. Recent research projects include work on seismic anisotropy, mantle heat transport and the mechanics of plate tectonics, subduction dynamics, and fault system mechanics. He has co-authored more than 130 publications and was named an AGU Fellow in 2015. Dr. Becker holds an M.Sc. in physics from J. W. Goethe University, a Ph.D. in geophysics from Harvard University, and was a postdoctoral scholar at the Scripps Institution of Oceanography at the University of California, San Diego.

Brenda B. Bowen is an associate professor of geology and geophysics and director of the Global Change and Sustainability Center at The University of Utah. She is an interdisciplinary geoscientist whose work focuses on how changing environmental conditions influence the composition of sediments, authigenic minerals, and fluids in both modern dynamic systems and ancient lithified strata. Her current projects are focused on anthropological impacts on modern surface and hydrological processes, sedimentology and

geobiology in extreme environments, geologic CO2 sequestration, and structural diagenesis and fluid flow. In addition to her geologic research and teaching, Dr. Bowen works to facilitate interdisciplinary environmental research and education that address critical issues related to understanding global change and creating sustainable solutions. She received her B.S. and M.S. in earth sciences from the University of California, Santa Cruz and her Ph.D. in geology and geophysics from The University of Utah.

Nelia W. Dunbar has a background in geochemistry and is now the director of the New Mexico Bureau of Geology and Mineral Resources. In that role, she has the title of "State Geologist." Dunbar has worked for the Bureau since 1992, focusing on geochemistry of volcanic rocks–particularly volcanic ashes and other explosive eruptions mainly in New Mexico and Antarctica. She also received funding from the National Science Foundation (NSF) for an electron microprobe in 1996 and, until recently, managed that laboratory. Her professional interests include research on a wide range of topics broadly focused on volcanic and igneous processes in New Mexico and elsewhere. These include studies of volcanic eruption processes, geochemical evolution of magmas, chronology and chemistry of volcanic ashes, fluid migration within magmas, and geochemical alteration caused by fluids that interact with volcanic rocks. Dunbar has also spent 23 field seasons in Antarctica working on NSF-funded projects all of which are related to Antarctic volcanism and interactions between volcanism, ice, and climate. In addition to New Mexico and Antarctica, she has worked in Tibet, Peru, Ethiopia, Bolivia, and Ecuador–all on projects related to volcanism. In addition to research, Dunbar is an adjunct faculty member at the Department of Earth and Environmental Sciences at the New Mexico Institute of Mining and Technology in Socorro, taught a graduate class on electron microprobe analysis, advised graduate students and served on student committees, and is involved in outreach activities for New Mexico teachers and students. She received her B.A. degree, summa cum laude, in geology at Mount Holyoke College (1983) and then went on to a Ph.D. in geochemistry at the New Mexico Institute of Mining and Technology (1989).

Rodney C. Ewing, NAE, is the Frank Stanton Professor in Nuclear Security in the Center for International Security and Cooperation in the Freeman Spogli Institute for International Studies and a professor in the Department of Geological Sciences in the School of Earth, Energy and Environmental Sciences at Stanford University. He is also the Edward H. Kraus Distinguished University Professor Emeritus in the Department of Earth and Environmental Sciences at the University of Michigan. He is the author or co-author of over 750 research publications and the editor or co-editor of 18 monographs, proceedings volumes, or special issues of journals. He has published widely in mineralogy, geochemistry, materials science, nuclear materials, physics, and chemistry in over 90 different ISI journals. He is a founding editor of the magazine, Elements, which is now supported by 17 earth science societies. Ewing received the Hawley Medal of the Mineralogical Association of Canada in 1997 and 2002, a Guggenheim Fellowship in 2002, the Dana Medal of the Mineralogical Society of America in 2006, the Lomonosov Gold Medal of the Russian Academy of Sciences in 2006, a honorary doctorate from the Université Pierre et Marie Curie in 2007, and is a foreign fellow of the Royal Society of Canada. He was elected a member of the National Academy of Engineering in 2017. He is also a fellow of the Geological Society of America, Mineralogical Society of America, American Geophysical Union, Geochemical Society, American Ceramic Society, the American Association for the Advancement of Science, and the Materials Research Society. He has been president of the Mineralogical Society of America and the International Union of Materials Research Societies. Ewing has served on the board of directors of the Geochemical Society and the Board of Governors of the Gemological Institute of America and the Science and Security Board of the Bulletin of the Atomic Scientists. Professor Ewing has served on twelve committees and boards for the National Academies of Sciences, Engineering, and Medicine that have reviewed issues related to nuclear waste and nuclear weapons. In 2008, he was a technical cooperation expert for the International Atomic Energy Agency at the Comissão Nacional de Energia Nuclear in Rio de Janeiro, Brazil. In 2012, he was appointed by President

Obama to serve as the chair of the Nuclear Waste Technical Review Board (NWTRB), which is responsible for ongoing and integrated technical review of DOE activities related to transporting, packaging, storing, and disposing of spent nuclear fuel and high-level radioactive waste. He stepped down from the NWTRB in 2017. Ewing received a B.S. in geology from Texas Christian University and M.S. and Ph.D. degrees from Stanford University where he held an NSF Fellowship.

Mary Feeley retired as chief geoscientist from ExxonMobil Exploration Company in 2014. Her responsibilities included advising senior ExxonMobil Upstream management on strategic geoscience matters and identifying global geoscience opportunities for ExxonMobil. Dr. Feeley's graduate work was focused on understanding depositional patterns in upper slope salt basins and the Mississippi Fan using seismic stratigraphy techniques. She also spent many years working on lease sales, prospect maturation, and energy development in the Gulf of Mexico. Dr. Feeley's National Academies of Sciences, Engineering, and Medicine experience includes membership on the Ocean Studies Board from 2005 to 2010 and serving on several committees, including the 2015 Committee on Guidance for NSF on National Ocean Science Research Priorities: Decadal Survey of Ocean Sciences and most recently on the Committee on Offshore Science and Assessment for BOEM. Dr. Feeley earned her Ph.D. in oceanography from Texas A&M University.

Robert L. Kleinberg, NAE, is a Senior Research Scholar at the Center on Global Energy Policy of Columbia University and is a Senior Fellow of the Institute for Sustainable Energy at Boston University. From 1980 to 2018, he was employed by Schlumberger, the premier oilfield service company, and attained the rank of Schlumberger Fellow, one of about a dozen who hold this rank in a workforce of 100,000. Prior to joining Schlumberger, Dr. Kleinberg worked at the Exxon Corporate Research Laboratory. Dr. Kleinberg's work at Schlumberger focused on geophysical measurements and the characterization and delineation of unconventional fossil fuel resources including shale gas and tight oil. His current work centers on energy technology and economics and on environmental issues connected with oil and gas development. Dr. Kleinberg has authored more than 120 academic and professional papers, holds 41 U.S. patents, and is the inventor of several geophysical instruments that have been commercialized on a worldwide basis. Dr. Kleinberg was the 2018-2019 American Physical Society's Distinguished Lecturer on the Application of Physics and is a member of the National Academy of Engineering. He received his B.S. in chemistry (1971) from the University of California, Berkeley and his Ph.D. in physics (1978) from the University of California, San Diego.

Zelma Maine-Jackson has been a hydrologist with the Washington State Department of Ecology Nuclear Waste Program for over 20 years–providing technical oversight for groundwater cleanup of radioactive and hazardous waste for the Hanford Site. Ms. Maine-Jackson was an exploration geologist in the early 1970s with Atlantic Richfield Oil Company where she explored the Rocky Mountain Region for sandstone-type uranium deposits and located several successful, productive mines. In the early 1980s, she transitioned from uranium exploration to environmental remediation of uranium contamination at the U.S. Department of Energy's 586-square-mile Hanford Nuclear Site in eastern Washington State. To integrate a scientific dialog into communities across the country, she has served on Washington's African American Affairs Commission through four governors and as a two-term appointee to the Washington State Community Economic Revitalization Board. She was an advisory member to the Washington State Department of Natural Resources, holds founding membership in the National Association of Black Geoscientists, and board positions with the American Red Cross, United Way, Rotary International, STEM education high schools, and various public schools. Recently, Ms. Maine-Jackson was named a Daughter of Hanford because of her connection and longevity of work at the Hanford Site. As an indigenous member of the Gullah-Geechee Nation, she is dedicated to conserving Loggerhead sea turtles at South Carolina's

Hunting Island State Park and to sustaining and restoring wildlife population and habitats in the Ashepoo, Combahee and Edisto Basin. She attended Virginia State University for her undergrad work and holds a master's degree in economic geology from the University of Washington in Seattle.

Michael Manga, NAS, is professor and chair in the Department of Earth and Planetary Science at the University of California, Berkeley (UCB). His research focuses on the processes that control the storage, ascent, and eruption of magmas and the impacts of those eruptions on surface environments. Current projects also include studies of geysers, the interactions between hydrological processes and earthquakes including the origin of induced seismicity, the evolution of hydrological systems on Mars, and the tectonics of Jupiter's moon Europa. He chaired the National Academies of Sciences, Engineering, and Medicine's 2017 report "Volcanic Eruptions and Their Repose, Unrest, Precursors, and Timing." He is the recipient of several awards including a MacArthur fellowship in 2005, The Geological Society of America's Donath Medal, the American Geophysical Union's Macelwane Medal, the European Geoscience Union's Bunsen Medal for research in geochemistry, mineralogy, and petrology, and UCB's campus Distinguished Teaching Award in 2017 – the first to be issued from the Department of Earth and Planetary Science. In 2018, he was elected to the National Academy of Sciences for internationally recognized work including elegant experimental and theoretical work and creative field studies. Dr. Manga received a B.Sc. in solid Earth geophysics from McGill University and a M.Sc. in engineering sciences and a Ph.D. in Earth and planetary sciences from Harvard University.

Martin W. McCann is president of Jack R. Benjamin and Associates, Inc. and is also a consulting professor of civil and environmental engineering at Stanford University. At Stanford, he is a former chair of the National Performance of Dams Program, which created a national network to report dam safety incidents and to archive this information for use by the geotechnical and seismic engineering communities. Dr. McCann's professional background and research have focused on probabilistic hazards analysis including hydrologic events, risk assessment, reliability and uncertainty analysis, and systems analysis. He has been a consultant to several government and private sector groups in the U.S. and abroad and has served on three National Research Council committees including the Committee on Integrating Dam and Levee Safety and Community Resilience. He currently chairs the BESR's standing Committee on Geological and Geotechnical Engineering. Dr. McCann received a B.S. in civil engineering from Villanova University and an M.S. in structural engineering and a Ph.D. in civil engineering from Stanford University.

Patricia McDowell is a physical geographer whose work has focused on fluvial geomorphology, particularly natural and human controls of river channel and floodplain morphology, response of river systems to environmental change, biogeomorphology, river restoration, and restoration monitoring. Her work has been conducted in Oregon, the Midwest U.S., New England, and Alaska. She teaches courses in geomorphology, fluvial geomorphology, and watershed science and policy. She is active in several organizations and committees charged with planning, implementing, and monitoring river restoration in various river basins of Oregon. She has served on several National Academies of Sciences, Engineering, and Medicine study committees on aspects of river management. The Geomorphology Specialty Group of the American Association of Geographers awarded her its distinguished career award. She is professor emerita of the Department of Geography and the Environmental Studies Program at University of Oregon, where she has been a faculty member since 1982. She was department head of the Department of Geography for seven years and served as Associate Vice President of Research for two years. She has degrees in architecture and city and regional planning from Illinois Institute of Technology and a Ph. D. from the University of Wisconsin-Madison.

Harvey J. Miller is the Bob and Mary Reusche Chair in Geographic Information Science, director of the Center for Urban and Regional Analysis, and professor in the Department of Geography, The Ohio State University. He is also a courtesy professor in the City and Regional Planning program in the Knowlton School of Architecture, on the advisory board of the Sustainability Institute, and an affiliated faculty of the Translational Data Analytics Institute, all at Ohio State. Dr. Miller's research and teaching interests are at the intersection between geographic information science and transportation, in particular, the analysis of human mobility within cities and regions. The main questions driving his research include sustainable transportation, livable cities, and the relationships between human mobility, health, and social equity. Dr. Miller's awards and honors include the Edward L. Ullman Award for Outstanding Contributions to Transportation Geography from the Association of American Geographers (2009) and the Research Award for scholarly contributions to Geographic Information Science from the University Consortium for Geographic Information Science (2015). Dr. Miller received his B.A. and M.A. in geography from Kent State University and his Ph.D. in geography from Ohio State University.

Jeffrey N. Rubin was the emergency manager for Oregon's largest fire district from 2001 to 2019. His work focuses on hazard and threat analysis, planning, and risk perception and communication. Dr. Rubin served on the U.S. Department of Homeland Security (Science and Technology Directorate) First Responder Resource Group from 2009 to 2020 and was the vice chair of the Governor's Task Force on Resilience Plan Implementation in Oregon. He is a Fellow and elected Councilor of the Geological Society of America, a certified emergency manager, and a nationally registered emergency medical technician. He holds a B.S. in geology and geophysics from Yale University and a M.A. and Ph.D. in geological sciences from the University of Texas at Austin.

Jim Slutz is the director of study operations for the National Petroleum Council (NPC), an independent federal advisory committee to the United States, reporting to the Secretary of Energy. Prior to NPC, Jim led a global consulting practice with projects in North America, Asia, and Europe. Previously, Mr. Slutz served as Acting Assistant Secretary of Fossil Energy at the United States Department of Energy (DOE) and before that as Deputy Assistant Secretary of Oil and Natural Gas at DOE. Prior to joining DOE, Jim served as the Indiana Oil and Gas Director, regulating the State's upstream oil and gas industry and natural gas storage wells. He is a former Vice-Chair of the Interstate Oil and Gas Compact Commission. Mr. Slutz holds an MBA degree from The Ohio State University, Fisher College of Business, and a B.S. degree from The Ohio State University, School of Natural Resources. Jim serves as chair of the Committee on Earth Resources and is a member of the Board of Earth Sciences and Resources of the National Academies of Sciences. In addition, he serves as an advisor to the National Bureau of Asia Research and is a Board Member of the local chapter of the Society of Petroleum Engineers (SPE), currently serving as program chair for the Inaugural 2021 SPE/AAPG/SEG Washington DC Technology and Sustainability Symposium. Jim has published papers in collaboration with the American Enterprise Institute, The East West Center, the U.S. Chamber of Commerce Foundation, and the National Bureau of Asia Research.

Elizabeth J. Wilson is the inaugural director of the Arthur L. Irving Institute for Energy and Society and professor in the Environmental Studies Department at Dartmouth College. She studies how energy systems are changing in the face of new technologies and new societal pressures. Her work focuses on the implementation of energy and environmental policies and laws in practice. She is interested in how institutions support and thwart energy system transitions and focuses on the interplays between technology innovation, policy creation, and institutional decision making. Her recent books include *Energy Law and Policy* (West Academic Publishing with Davies, Klass, Tomain, and Osofsky) and *Smart Grid (R)evolution: Electric Power Struggles* (Cambridge Press with Stephens and Peterson). Wilson's research group is working on an NSF supported grant on decision making in regional transmission organizations.

Wilson was a professor at the University of Minnesota and was recently awarded a 2015 Andrew Carnegie Fellowship and spent the 2016-2017 academic year at the Danish Technical University. She was selected as a 2014-2015 Committee on Institutional Cooperation's Academic Leadership Fellow. She was chosen as a Leopold Leadership Fellow in 2011. She spent the 2009-2010 academic year as a visiting professor at Tsinghua University in Beijing, supported by McKnight Land-Grant Professorship. Prior to joining the University of Minnesota, she worked with the U.S. Environmental Protection Agency. Before that, Wilson worked in Belgium, Burundi, and Tanzania. She holds a masters degree in human ecology from the Free University of Brussels in Belgium and a doctorate in engineering and public policy from Carnegie Mellon University.

Past Meeting Topics

Board on Earth Sciences and Resources

- May 2021: Energy and Resources Needs for a Nation in Transition
- Oct 2020: Increasing Diversity and Inclusion for Underrepresented Scholars in Earth Sciences: Addressing an Urgent Challenge
- May 2020: Research Highlights from BESR Members
- Jun 2019: Geohazards and Cascading Effects: Opportunities for leveraging instruments, monitoring approaches, and science capabilities among different science communities
- Oct 2018: Minerals, Water, and Energy: The Science That Drives Their Interdependencies, Feedback, and Tradeoffs
- Apr 2018: Environmental Dynamics and Exposure Pathways of Subsurface Contaminants, Part 3 of 4
- Nov 2017: Geoscience in Four Dimensions – Seafloor Mining
- May 2017: Space Observations of Earth's Surface, Interior, and Dynamics
- Nov 2016: The Cascadia Subduction Zone: Science, Impacts, and Response
- Apr 2016: The Evolving Soil Interface of the Earth System

Committee on Earth Resources

- Jun 2021: Earth Resources for the Energy Transition: Webinar Series
- May 2021: Earth Resources for the Energy Transition: Webinar Series
- Apr 2021: Earth Resources for the Energy Transition: Webinar Series
- Dec 2020: Pathways Toward the Future Just, Equitable, Diverse, and Inclusive (JEDI) Energy Workforce
- May 2020: Earth Resources in the Energy Transition: A Focus on Carbon Capture, Utilization, and Storage
- Oct 2019: Characterization and Management of the Subsurface: Insights from the Development of Geothermal, Oil and Gas, and Mineral Resources
- Jun 2019: Subsurface Data and Machine Learning
- Oct 2018: Process, Challenges, and Opportunities for Research on Upstream Aspects of U.S. Coal Production
- May 2018: Critical Minerals and Materials
- Nov 2017: Geoscience in Four Dimensions; Seafloor Mining
- Apr 2017: Hard-Rock Mines
- Nov 2016: Mineral and Energy Resource Issues for the Coming Decade
- May 2016: Next Generation Oil and Gas Research: Science and Technology to Drive Innovation

Committee on Geological and Geotechnical Engineering

- Oct 2021: Multi-Scale Monitoring for Improved Infrastructure Safety, Resilience, and Service Life
- Apr 2021: Advancing Geo-Professional Perspectives in Risk-Informed Decision Making

- Oct 2020: Incorporating Geoprofessional Input into Improved Infrastructure Decision Making
- Oct 2019: Recent and emerging geological and geotechnical issues faced by federal government agencies
- Jun 2019: Managing Mine Waste Risks—Practice, Limitations, Needed Research
- Oct 2017: Corrosion of Buried Steel in Earth Applications
- Feb 2017: Advancing the State of Practice in the Assessment of Earthquake-Induced Soil Liquefaction and Its Consequences

Committee on Solid Earth Geophysics

- Oct 2021: How Are Plates Made and Preserved?
- Mar 2021: Novel Geophysical Datasets for Environmental Applications: Moving from Discovering Signals to Societal Benefits
- Nov 2020: Solid Earth Science and Sea Level Change
- Apr 2020: Enhancing Quantitative Capacity of Geoscience Programs
- Oct 2019: Beyond the Black Box: The Future of Machine Learning and Data-Intensive Computing in the Solid Earth Geosciences
- May 2019: New Opportunities to Study Tectonic Precursors
- Nov 2018: (Re)assessing Seismic Hazard Across the United States
- June 2018: Seismic Hazards in Near- and Long-Term Nuclear Waste Storage and Legacy seismic data
- Nov 2017: Integrative Subduction Zone Science: Moving into the next decade
- May 2017: Communicating the Value of Geoscience to Society
- Nov 2016: The Cascadia Subduction Zone: Science, Impacts, and Response
- Apr 2016: Collaborative Graduate Training Initiatives in High Performance Computing for the Solid Earth Sciences

Geographical Sciences Committee

- May 2021: Disaster Response During a Pandemic
- Oct 2020: COVID-19 and the Geography of Vulnerability
- Nov 2019: Federal Landscape of Geographical Mapping Science (joint w/MSC)
- May 2019: Effects of Energy Transition on Opportunities in Rural America
- Dec 2018: Vulnerability of U.S. Energy Infrastructure to Coastal Flooding
- May 2018: Opportunities and Consequences of Using Sensors to Capture Human Geographical Behaviors
- Oct 2017: Equity in Access and Health Effects of Exposure to Nature

Mapping Science Committee

- May 2021: Geospatial Needs for Environmental Justice
- Nov 2019: Federal Landscape of Geographical and Mapping Science (joint w/GSC)
- Mar 2017: Cloud-Enabled Mapping Science
- Apr 2016: National Address Database/Smart Cities