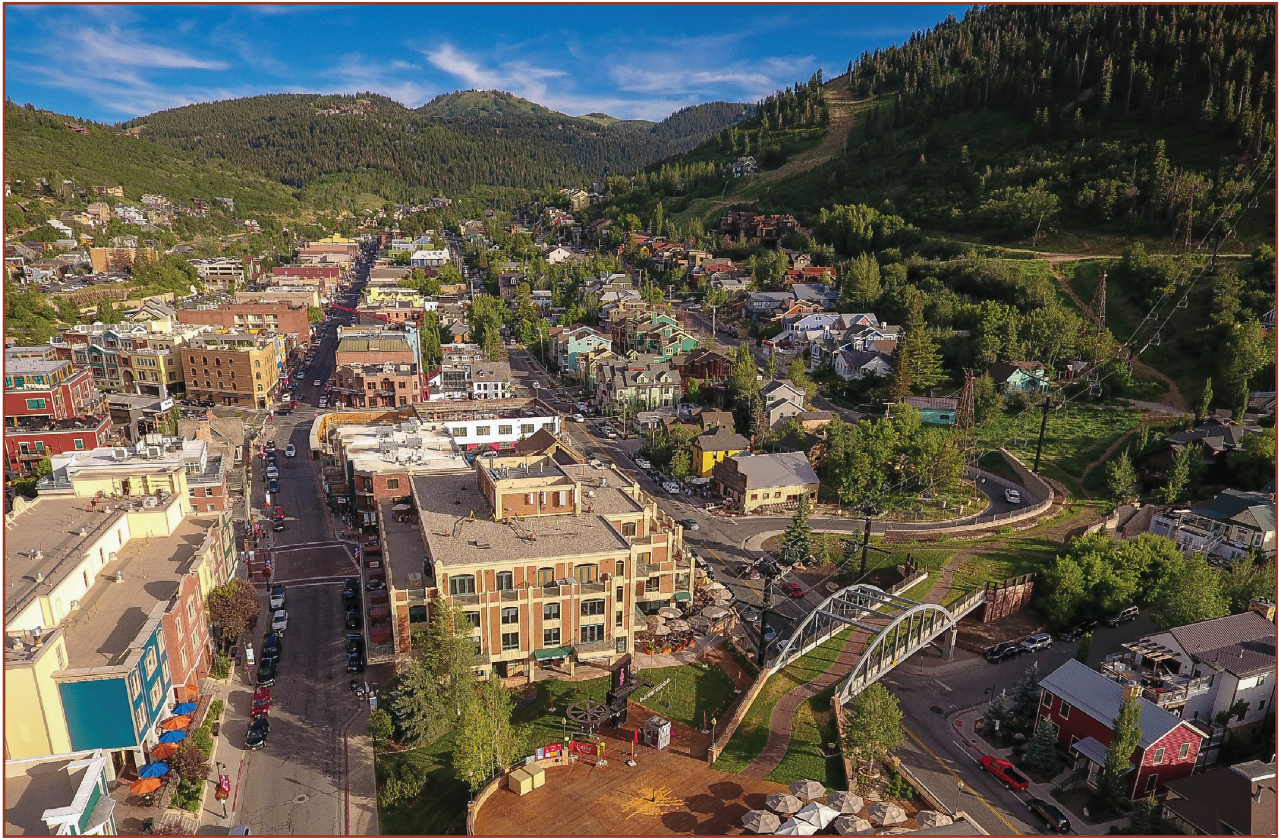


## PROGRAM GUIDE





It is with great pleasure that the Utah Geological Survey  
welcomes you to the 116th Annual Meeting of the  
Association of American State Geologists in Park City, Utah.



under which the survey evolved. Almost all function as a basic information source for their state governments' executive, legislative, and judicial branches. Some have regulatory responsibilities for water, oil and gas, land reclamation, etc.

The Association of American State Geologists (AASG) is an organization of the chief executives of the state geological surveys in 50 states and Puerto Rico. The responsibilities of the various state surveys differ from state to state, depending on the enabling legislation and the traditions

The first state geological survey was established in 1823 in North Carolina. By 1840, there were at least 15 state surveys, most of which were charged with the discovery of mineral, energy, land, and water resources in their state or territory. The State Geologists began formal meetings with the U.S. Geological Survey in 1879, the year that organization was established. Since 1908, the Association has met regularly to discuss issues of common interest and to initiate united actions when warranted.

# AASG PRESIDENT'S WELCOME



Welcome to Utah and the 116th annual meeting of the Association of American State Geologists (AASG), the last in a wonderful series of meetings in the West: Montana, Nevada (three times!), and Colorado. Utah provides another exciting opportunity to explore the geology of the West with the geology of the Basin and Range, Middle Rocky Mountains, and the Colorado Plateau surrounding the Park City venue. It truly is a beautiful state and a great reminder of the work we do as state surveys and as an association – and how much more we need to do.

The demand for “critical minerals”, new geologic mapping, energy and water development still seems relentless, but the new challenges are well met by state geologists, old-school and new-school alike. The need for new geologists to meet the demands grows each day; it is a great time to be a geologist, but the small available workforce has many surveys stretched thin and comes at a time when many long-time experts are leaving, or have already left, the field. The same is true for leadership in state surveys. In the past five years, AASG has welcomed 30 new State Geologists (60% turnover), 17 in just the past 3 years – with new ideas, new challenges, and 116 years of history to be learned.

AASG has played a crucial role fostering collaboration across state borders as well as with Federal partners; the annual meeting is your opportunity to meet your collaborators and build relationships that will last for many years to come. This is also an opportunity to get to know AASG and to consider your role in our collective efforts; there are 12+ standing committees and 8+ national committees to which AASG is a member. I found that serving on these committees is a great way to improve your survey’s proposals as well as your visibility on national issues. The best experience by far, however, has been serving on the Executive Committee (“ExComm”); I truly saw the best side of AASG: its strength, camaraderie, and support from all the members is memorable – if you haven’t served, I hope you will consider it.

Thank you all for coming, and I wish you a productive and enjoyable meeting.

A handwritten signature in blue ink, appearing to read "John M. Smith". The signature is fluid and stylized, with a large initial "J" and "M".

Director and State Geologist  
Montana Bureau of Mines and Geology



# AASG HOST WELCOME



Welcome to the 116th Annual Meeting of the Association of American State Geologists (AASG). I am pleased to welcome you to Utah, home of “The Greatest Snow on Earth” as well as some of the world’s most renowned scenery and geology. Utah boasts five national parks, eight national monuments, 46 state parks, and many sites having geoh heritage qualities. Utah Geological Survey (UGS) research serves to educate and provide a scientific context to the millions of visitors who come to be awed by these geologic wonders. This year holds special significance for the UGS as we celebrate our 75th anniversary!

Utah is home to some of the most important mining districts in the world, including Bingham (Kennecott/Rio Tinto), Park City, and Tintic; some mining sites are now best known as ski resorts, including Park City, Alta, and Snowbird. Our host location, Park City, began as a small silver mining town in the late 1860s. The Ontario mine generated millions in silver, lead, and zinc, but the Great Depression of the 1930s, declining reserves, and changing economic conditions pushed many mines to close, and by the mid-20th century, Park City was on the verge of becoming a ghost town. Park City underwent a significant transformation in the 1960s with the opening of the Treasure Mountain Resort (now Park City Mountain Resort).

Utah is full of geologic opportunities and challenges, including abundant and diverse energy resources (conventional fossil fuels, unconventional oil shale and oil sand resources, and renewables), extensive mineral resources (base and precious metals, industrial minerals, critical minerals, and uranium), geologic hazards (active faults near metropolitan areas, landslides, and avalanches), and the challenges posed by climate change and the sustainability of the precious resource that is the Great Salt Lake.

With a geologic record spanning nearly 2 billion years, Utah contains one of Earth’s most extensive fossil records, including the world’s most complete Cretaceous dinosaur record. If you are able to join us on the pre-meeting field trip, you will enjoy dinner at a world-class fossil exhibit at Dinosaur National Monument while learning about Utah’s unique paleontology resources from our renowned State Paleontologist, Dr. James Kirkland.

Our meeting is generously supported by contributions from many sponsors, for which we are truly grateful. Sponsors are highlighted in the meeting program and conference displays. If you have an opportunity, please thank each of them. Special thanks to the Utah Department of Natural Resources and the U.S. Geological Survey (USGS) for their unwavering support of this meeting.

In my short tenure of five+ years with AASG, I have come to appreciate the great camaraderie and collaboration that the association offers. G.K. Gilbert, first chief geologist for the USGS and author of USGS Monograph 1, *Lake Bonneville*, in 1890, once said, “The investigator becomes an educator when in giving his work to the world he describes the route by which his end was reached.” I look forward to engaging discussions, productive collaborations, and memorable experiences during this conference. Enjoy your stay in Utah!

## Bill Keach

Director and State Geologist  
Utah Geological Survey

*“As we crossed the Colorado-Utah border, I saw God in the sky in the form of huge gold sunburning clouds above the desert that seemed to point a finger at me and say, ‘Pass here and go on. You’re on the road to heaven.’”*

*Jack Kerouac, On the Road*





# AASG 2024 MEETING HOST

## Utah Geological Survey



In 1949, the Utah Geological and Mineralogical Survey was created within the University of Utah's State School of Mines and Mineral Industries. Today, the Utah Geological Survey (UGS) is a state executive branch applied science agency within the Utah Department of Natural Resources (DNR). Our mission is to provide timely scientific information about Utah's geologic environment, resources, and hazards. The UGS comprises six technical programs: Energy & Minerals, Geologic Hazards, Geologic Mapping & Paleontology, Groundwater & Wetlands, Geologic Information & Outreach, and Data Management. Additionally, we operate the Utah Core Research Center and Natural Resources Map & Bookstore retail outlet. Most of our approximately 90 employees work out of our main office in Salt Lake City, and five staff work out of our satellite office in Cedar City.

In an environment with an ever-growing population, Utah faces multiple challenges to provide the citizens with the necessary services and resources. To that end, the UGS seeks to provide objective, foundational information to enable the legislature, local governments and the public to understand the world around them and make informed decisions.

The UGS assists government, industry and the general public by gathering, interpreting and publishing geoscience information. Our goal is to have that information used for wise stewardship of public and private resources. Knowledge of the location and resource potential of Utah's geologic commodities—including oil and gas, coal, metals, industrial minerals and groundwater—as well as the location, magnitude and frequency of geologic hazards such as landslides and earthquakes, are essential inputs to local and statewide plans addressing resource development, infrastructure expansion and community resiliency.

Major policy and management issues and priorities for the UGS include:

- Groundwater and wetlands – Quantifying groundwater location and quality to best manage its use for future generations and developing a statewide database of wetland permits.
- Great Salt Lake – Characterizing wetlands and hydrologic systems related to the lake.
- Geologic hazards and urban growth – Mapping and characterizing the potential for geologic hazards such as landslides, debris flows and radon gas to facilitate appropriate mitigation.
- Earthquake preparedness – Increasing public awareness about the dangers to infrastructure, including major aqueducts and working toward implementing an Earthquake Early Warning System in Utah.
- Energy resources – Advancing geologic knowledge of conventional energy resources, such as oil and gas, to improve production. Characterizing alternative energy resource potential, such as geothermal, to diversify Utah's energy portfolio. Evaluating opportunities for Carbon Capture, Utilization, and Storage.
- Mineral resources – Improving our understanding of the occurrence and development potential of critical minerals, core minerals, and aggregates.
- Geologic mapping – Improving the coverage and availability of detailed geologic mapping to meet regional land management, resource exploration, scientific research and other needs.
- Paleontological resources – Researching, protecting and publishing information on the state's paleontological resources, particularly its world-class dinosaur fossils.



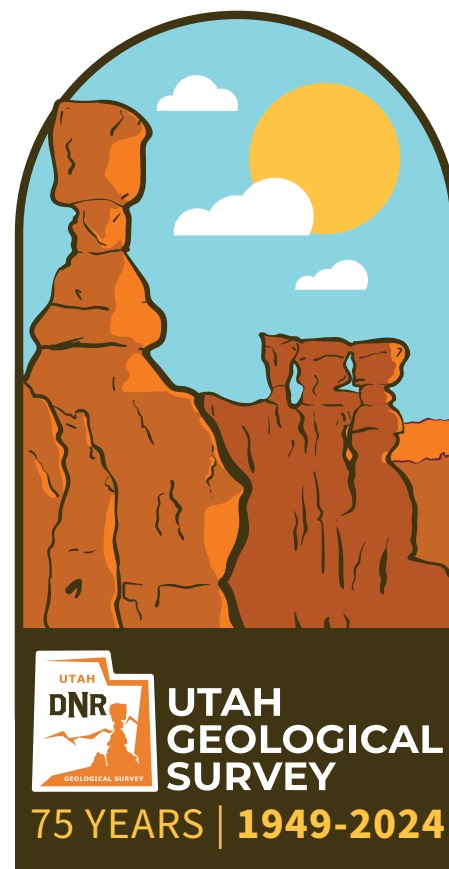
This year marks the 75th anniversary of the UGS. Although faces and names have changed over the years, our mission to provide timely scientific information about Utah's geologic environment, resources, and hazards remains the same. And our commitment to fulfilling our mission remains unwavering.

There have been seven Utah State Geologists in the past 75 years:

- Arthur L. Crawford (1949–1961)
- William P. Hewitt (1961–1974)
- Donald T. McMillan (1974–1981)
- Genevieve Atwood (1981–1989)
- M. Lee Allison (1989–1999)
- Richard G. Allis (2000–2019)
- R. William (Bill) Keach II (2019–present)

### UGS' FOCUS AREAS

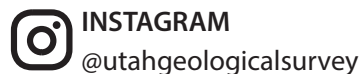
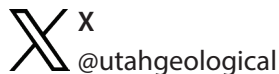
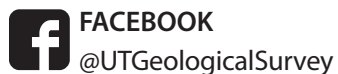
- Geologic Mapping
- Energy and Mineral Resources
- Geologic Mapping
- Groundwater and Wetlands
- Paleontology
- Utah Core Research Center
- Data Preservation and Management
- GIS and Cartography
- Education and Outreach
- Publications



### CONNECT WITH US!

**UGS WEB** [geology.utah.gov](http://geology.utah.gov)

**UGS BLOG** [geology.utah.gov/blog](http://geology.utah.gov/blog)





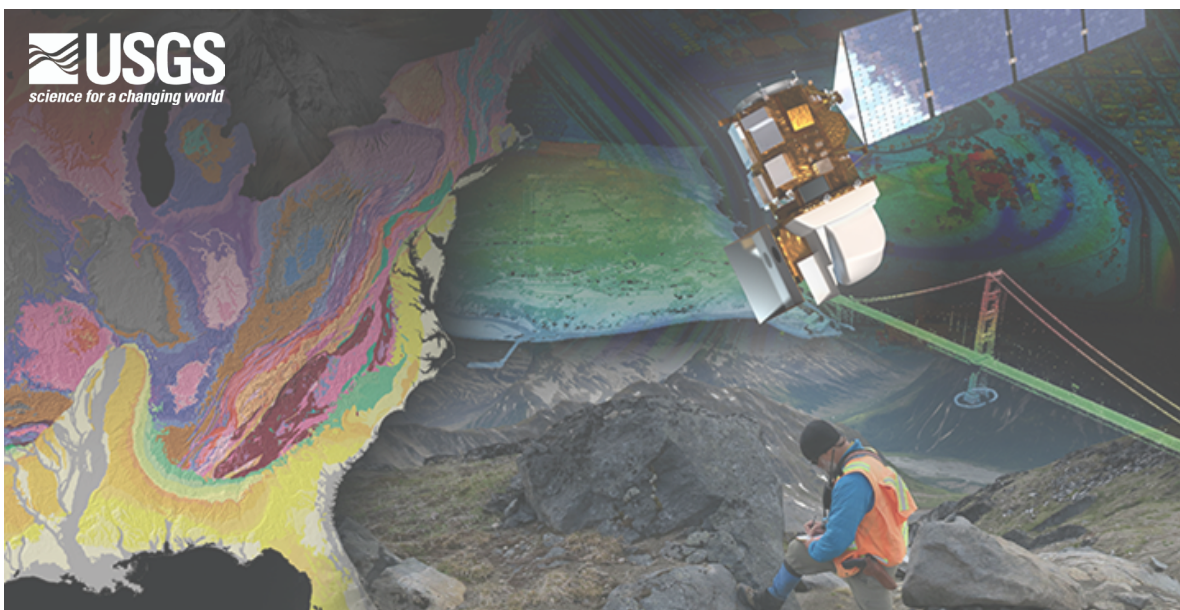


# U.S. Geological Survey (USGS)

**www.usgs.gov**  
**1-888-392-8545**

**Follow us on social media at**  
**<http://www.usgs.gov/socialmedia/>**

**Created by an act of Congress in 1879, the USGS provides science for a changing world, which reflects and responds to society's continuously evolving needs. As the science arm of the Department of the Interior, the USGS brings an array of earth, water, biological, and mapping data and expertise to bear in support of decision-making on environmental, resource, and public safety issues.**



**U.S. Department of the Interior**  
**U.S. Geological Survey**

# FINANCIAL SUPPORT

The AASG acknowledges the generous contributions of the following organizations and individuals, whose support contributed to the successful implementation of the annual meeting.

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## LITHIUM SPONSORS





# ADDITIONAL SUPPORT

Jake Alexander (UGS)  
Zach Anderson (UGS)  
Darlene Batatian (UGS)  
Steve Bowman (UGS)  
Hollie Brown (UGS)  
Jennifer Campbell  
Mackenzie Cope (UGS)  
Wendy Davidson (AIPG)  
Jim Davis (UGS)  
Tom Dempster (UGS)  
Jackie DeWolfe (UGS)  
Ben Dlin (UGS)  
Patrick Engberson (UGS)  
Ben Erickson (UGS)  
Russ Fillmore (UGS)

Paul Gedge (DNR)  
John Good (UGS)  
Jay Hill (UGS)  
Hugh Hurlow (UGS)  
Jodi Hylland  
Jerod Johnson (Reaveley)  
Karen Keeley (AASG)  
Stefan Kirby (UGS)  
Emily Kleber (UGS)  
Seth Magers (DNR)  
Abby Mangum (UGS)  
Ammon McDonald (UGS)  
Greg McDonald (UGS)  
Adam McKean (UGS)  
Jen Miller (UGS)

Mark Milligan (UGS)  
Stephanie Mills (UGS)  
Matthew Morriss (UGS)  
Winnie Pan (UGS)  
Lauren Reeher (UGS)  
Marshall Robinson (UGS)  
Andrew Rupke (UGS)  
Jackson Smith (UGS)  
Starr Soliz (UGS)  
Cristie Valero (AIPG)  
Michael Vanden Berg (UGS)  
Janae Wallace (UGS)  
Cheryl Wing (UGS)

AASG – Association of American State Geologists  
AIPG – American Institute of Professional Geologists  
DNR – Utah Department of Natural Resources

Reaveley – Reaveley Engineers  
UGS – Utah Geological Survey



We're raising money to benefit the Association of American State Geologists Foundation, using the Zeffy.com donation site.

The AASG Foundation is a 501(c)3 non-profit that supports the operational, educational, and research activities of the Association of American State Geologists (AASG). AASG effectively promotes geological mapping, preserving geoscience information, reducing the risk from geologic hazards, and many other efforts of broad, national scope.

Every donation will help make an impact. Thanks in advance for your contribution.



Zeffy sets an 18% donation/tip for their services. You can set this to \$0.

# MEETING ATTENDEES

## State Geological Surveys

<b>William Andrews*</b>	Kentucky Geological Survey	<b>Guy “Harley” Means*</b>	Florida Geological Survey
<b>Scott Ausbrooks*</b>	Arkansas Geological Survey	<b>John Metesh*</b>	Montana Bureau of Mines and Geology
<b>Darlene Batatian</b>	Utah Geological Survey	<b>Matt Morgan*</b>	Colorado Geological Survey
<b>Dick Berg*</b>	Illinois State Geological Survey	<b>Robert Morrow</b>	South Carolina Geological Survey
<b>Claudio Berti*</b>	Idaho Geological Survey	<b>Sara Pearson</b>	Michigan Geological Survey
<b>Gale Blackmer*</b>	Pennsylvania Geological Survey	<b>Phil Pearthree*</b>	Arizona Geological Survey
<b>Carey Bridges*</b>	Missouri Geological Survey	<b>Amy Pitts</b>	North Carolina Geological Survey
<b>Erin Campbell*</b>	Wyoming State Geological Survey	<b>Nicole Potter</b>	Kansas Geological Survey
<b>Jill Carlson</b>	Colorado Geological Survey	<b>Jerry Prewett</b>	Missouri Geological Survey
<b>Bart Cattanaach</b>	North Carolina Geological Survey	<b>Kyle Rybacki</b>	Pennsylvania Geological Survey
<b>Matthew Crawford</b>	Kentucky Geological Survey	<b>Keith Schilling*</b>	Iowa Geological Survey
<b>Jessica Czajkowski</b>	Washington Geological Survey	<b>Meghan Seremet*</b>	Connecticut Department of Energy and Environmental Protection
<b>Ruarri Day-Stirrat*</b>	Oregon Department of Geology and Mineral Industries	<b>Mark Shuster*</b>	Bureau of Economic Geology, University of Texas at Austin
<b>Ben DeJong*</b>	Vermont Geological Survey	<b>Alex Steely</b>	Washington Geological Survey
<b>William Doar</b>	South Carolina Geological Survey	<b>Polly Sturgeon</b>	Indiana Geological and Water Survey
<b>David Dockery*</b>	Mississippi Department of Environmental Quality	<b>Susan Swanson*</b>	Wisconsin Geological and Natural History Survey
<b>Nelia Dunbar</b>	New Mexico Bureau of Geology and Mineral Resources	<b>Eugene Szymanski</b>	Utah Geological Survey
<b>Clare Falcon*</b>	Louisiana Geological Survey	<b>Nick Tew*</b>	Geological Survey of Alabama
<b>James Faulds*</b>	Nevada Bureau of Mines and Geology	<b>Todd Thompson*</b>	IU – Indiana Geological and Water Survey
<b>Greg Guthrie</b>	Geological Survey of Alabama	<b>J. Michael Timmons*</b>	New Mexico Bureau of Geology and Mineral Resources
<b>Casey Hanell*</b>	Washington Geological Survey	<b>Scott Tinker</b>	Bureau of Economic Geology, University of Texas at Austin
<b>Nicholas Hayman*</b>	Oklahoma Geological Survey	<b>Stephen Van Ryswick*</b>	Maryland Geological Survey
<b>Matt Heller*</b>	Virginia Department of Energy	<b>Dwain Veach</b>	North Carolina Geological Survey
<b>Scott Howard*</b>	South Carolina Geological Survey	<b>Daniel Warner</b>	Delaware Geological Survey
<b>Michael Hylland</b>	Utah Geological Survey	<b>Melanie Werdon*</b>	Alaska Geological & Geophysical Surveys
<b>D. Mark Jones*</b>	Ohio Geological Survey	<b>Chris Wieberg</b>	Missouri Geological Survey
<b>Jay Kalbas*</b>	Kansas Geological Survey	<b>Sherilyn Williams-Stroud</b>	Illinois State Geological Survey
<b>Bill Keach*</b>	Utah Geological Survey	<b>David Wunsch*</b>	Delaware Geological Survey
<b>Jay Kipper</b>	Bureau of Economic Geology, University of Texas at Austin	<b>John Yellich*</b>	Michigan Geological Survey
<b>John LaFave</b>	Montana Bureau of Mines and Geology	<b>*State Geologists</b>	
<b>Jeremy Lancaster*</b>	California Geological Survey		
<b>Katherine Luciano</b>	South Carolina Geological Survey		
<b>Ranie Lynds</b>	Wyoming State Geological Survey		
<b>Jessica Moore*</b>	West Virginia Geological & Economic Survey		
<b>Christopher Mattheus</b>	Illinois State Geological Survey		
<b>Jason McClaughry</b>	Oregon Department of Geology and Mineral Industries		
<b>Peter McLaughlin</b>	Delaware Geological Survey		





## Other Professionals

<b>Faris Abanumay</b>	Oklahoma State University	<b>Darcy McPhee</b>	U.S. Geological Survey
<b>David Applegate</b>	U.S. Geological Survey	<b>Christopher Moses</b>	U.S. Geological Survey
<b>Jonathan Arthur</b>	American Geosciences Institute	<b>David O’Leary</b>	U.S. Geological Survey
<b>Rachel Atkins</b>	U.S. Geological Survey	<b>Stephen Palmes</b>	Bureau of Ocean Energy Management
<b>Megan Carr</b>	Bureau of Ocean Energy Management	<b>Alice Pennaz</b>	U.S. Geological Survey
<b>Joseph Colgan</b>	U.S. Geological Survey	<b>Geoffrey Plumlee</b>	U.S. Geological Survey
<b>Kerby Dobbs</b>	Bureau of Ocean Energy Management	<b>Lindsay Powers</b>	U.S. Geological Survey
<b>Elizabeth Duffy</b>	The Federal Affairs Office	<b>Jeffrey Reidenauer</b>	Bureau of Ocean Energy Management
<b>Jason Fine</b>	U.S. Geological Survey	<b>Tim Reilly</b>	U.S. Geological Survey
<b>Amy Gilmer</b>	U.S. Geological Survey	<b>Kate Ritzel</b>	U.S. Geological Survey
<b>Jonathan Godt</b>	U.S. Geological Survey	<b>Sally Roberts</b>	U.S. Geological Survey
<b>Gavin Hayes</b>	U.S. Geological Survey	<b>Tina Roberts-Ashby</b>	U.S. Geological Survey
<b>Aaron Johnson</b>	American Institute of Professional Geologists	<b>Linda Rowan</b>	Congressional Research Service
<b>Michaela (Mikki) Johnson</b>	U.S. Geological Survey	<b>Kendra Russell</b>	U.S. Geological Survey
<b>Samuel Johnstone</b>	U.S. Geological Survey	<b>Sarah Ryker</b>	U.S. Geological Survey
<b>Daniel Jones</b>	U.S. Geological Survey	<b>Carma San Juan</b>	U.S. Geological Survey
<b>James Jones</b>	U.S. Geological Survey	<b>Jenna Shelton</b>	U.S. Geological Survey
<b>Randy Kath</b>	University of West Georgia	<b>Deana Sneyd</b>	National Association of State Boards of Geology
<b>Darcee Killpack</b>	U.S. Geological Survey	<b>Jennifer Steele</b>	Bureau of Ocean Energy Management
<b>Mojisola Kunledare</b>	U.S. Geological Survey	<b>Hilary Stockdon</b>	U.S. Geological Survey
<b>Alicia Lindauer</b>	U.S. Geological Survey	<b>Donald Sweetkind</b>	U.S. Geological Survey
<b>Carol Lydic</b>	U.S. Geological Survey	<b>Christopher Swezey</b>	U.S. Geological Survey
<b>Michael Marketti</b>	U.S. Geological Survey	<b>Ethan Weikel</b>	U.S. Geological Survey
<b>Jeffrey Mauk</b>	U.S. Geological Survey	<b>Colin Williams</b>	U.S. Geological Survey
<b>Gari Mayberry</b>	U.S. Geological Survey		

## Honorary Members and Emeriti

<b>Rick Allis</b>	Utah
<b>Genevieve Atwood</b>	Utah
<b>William Kelly</b>	New York
<b>Vicki McConnell</b>	AASG
<b>Karl Muessig</b>	New Jersey
<b>John Parrish</b>	California
<b>Jonathan Price</b>	Nevada

## Guests

<b>Barbara Arthur</b>	Guest of Jonathan Arthur	<b>Elizabeth Muessig</b>	Guest of Karl Muessig
<b>Terri Ausbrooks</b>	Guest of Scott Ausbrooks	<b>Elisabeth Price</b>	Guest of Jonathan Price
<b>Eileen Dallabrida</b>	Guest of David Wunsch	<b>Edward Sague</b>	Guest of Karl Muessig
<b>Gratia Deane</b>	Guest of William Kelly	<b>Virginia Sague</b>	Guest of Karl Muessig
<b>Carolyn Dockery</b>	Guest of David Dockery	<b>Linda Thompson</b>	Guest of Todd Thompson
<b>Nick Falcon</b>	Guest of Clare Falcon	<b>Jennifer Thornburg</b>	Guest of John Parrish
<b>Jodi Hylland</b>	Guest of Michael Hylland	<b>Lisa Veach</b>	Guest of Dwain Veach
<b>Diane Klund</b>	Guest of Jim Faulds	<b>Karen Yellich</b>	Guest of John Yellich
<b>Yvonne Metesh</b>	Guest of John Metesh		

# SCHEDULE AT-A-GLANCE

June 1 SATURDAY		June 2 SUNDAY		June 3 MONDAY			
REGISTRATION 7:00 - 8:00 am	<div>PRE-MEETING FIELD TRIP Day 1 (optional)</div> <div>Diverse Geology of Northeast Utah — Energy, Dinosaurs, Microbialites, and More!</div> <div>7:00 am - 9:00 pm</div> <div>Overnight stay in Vernal, Utah</div> <div>(lunch, dinner &amp; lodging included)</div>	<div>PRE-MEETING FIELD TRIP Day 2 (optional)</div> <div>Diverse Geology of Northeast Utah — Energy, Dinosaurs, Microbialites, and More!</div> <div>7:00 am - 5:00 pm</div> <div>(breakfast &amp; lunch included)</div>	REGISTRATION 7:00 am - 5:00 pm	BREAKFAST (included all attendees ) SUMMIT BALLROOM A&B 7:00 - 7:45 am			
				GUEST FIELD TRIP (optional)		OPENING PLENARY SESSION SUMMIT BALLROOM A&B 8:00 - 10:00 am	
BREAKOUT SESSION MINERALS IVERS-HEARST 10:15-11:45 am						BREAKOUT SESSION COASTAL I MOUNTAIN VIEW 10:15-11:45 am	
LUNCH (included all attendees ) SUMMIT BALLROOM A&B 11:45 am - 12:45 pm							
Scenic Alpine Motor Tour: Cascade Springs– Sundance Resort  9:30 am - 4:00 pm  (lunch included)				BREAKOUT SESSION DATA PRESERVATION IVERS-HEARST 12:45-2:15 pm	BREAKOUT SESSION WATER MOUNTAIN VIEW 12:45-2:15 pm		
				BREAKOUT SESSION GEOTHERMAL IVERS-HEARST 2:25-3:55 pm	BREAKOUT SESSION COASTAL II MOUNTAIN VIEW 2:25-3:55 pm		
				Intersection of Geology & Culture in Utah IVERS-HEARST 4:05-5:35 pm	AASG CLOSED SESSION SUMMIT BALLROOM A&B 4:05-5:35 pm		
Dinner on your own							
Hospitality Suite ROOM TBD 9:00 - 10:00 pm							

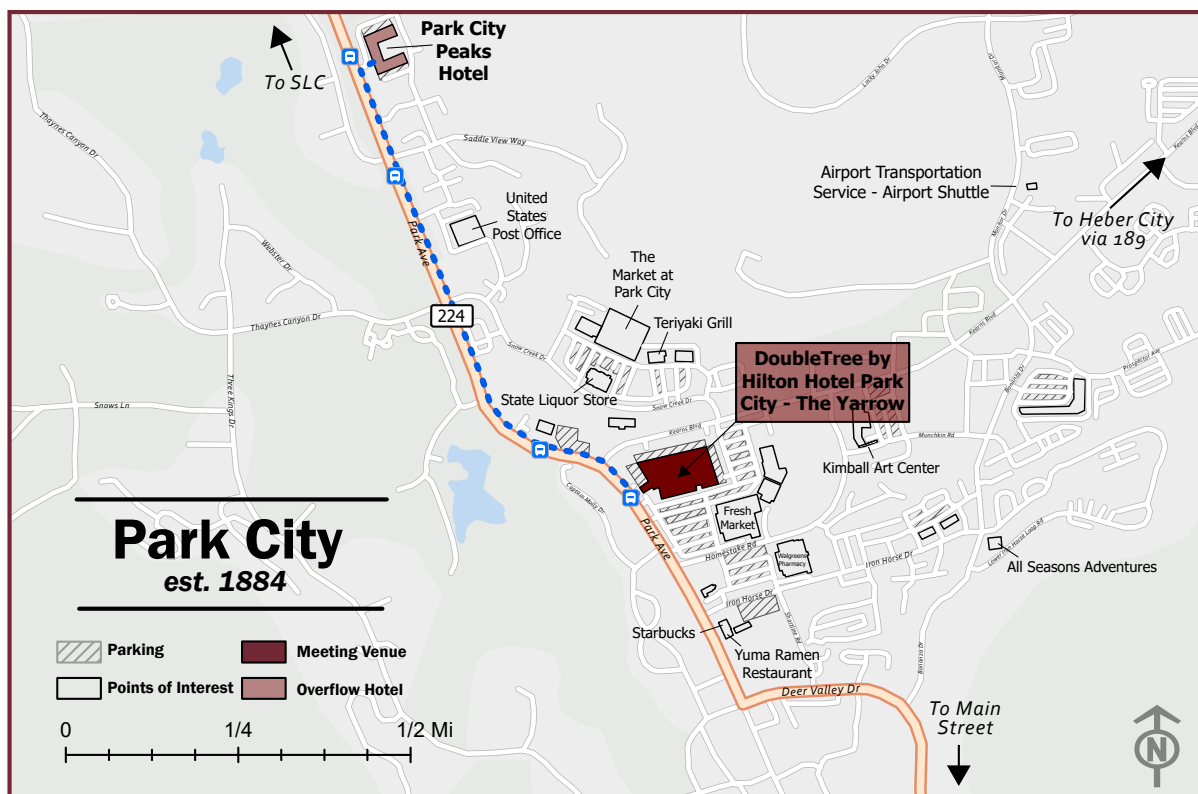




# SCHEDULE AT-A-GLANCE

June 4 TUESDAY			June 5 WEDNESDAY			June 6 THURSDAY	
REGISTRATION 7:00 - 10:30 am	BREAKFAST <i>(included all attendees )</i> SUMMIT BALLROOM A&B 7:00 - 7:45 am		REGISTRATION 7:00 - 10:00 am	BREAKFAST <i>(included all attendees )</i> SUMMIT BALLROOM A&B 7:00 - 7:45 am		BREAKFAST <i>(included all attendees )</i> SUMMIT BALLROOM A&B 7:00 - 7:45 am	
	BREAKOUT SESSION ENERGY IVERS-HEARST 8:00 - 10:00 am	BREAKOUT SESSION EDUCATION/DEI/ WORKFORCE MOUNTAIN VIEW 8:00 - 10:00 am		JOINT BREAKOUT SESSION MAPPING (incl. Geologic Mapping Cost-Benefit Analysis Q&A/Discussion) SUMMIT BALLROOM A&B 8:00 - 10:00 am		POST-MEETING FIELD TRIP <i>(optional )</i>  Geologic Hazards and Water Issues on the Wasatch Back  8:00 am - 3:00 pm  (lunch included)	
<div>MID-MEETING FIELD TRIP <i>(included all attendees )</i>  Geologic Overview of the Central Wasatch Range and Salt Lake Valley  10:30 am - 6:00 pm  (lunch included)</div>			<div><div>GUEST FIELD TRIP <i>(optional )</i>  Explore World- Renowned Park City's Mining and Skiing History  10:00 am - 4:00 pm  (lunch included)</div><div>BREAKOUT SESSION HAZARDS IVERS-HEARST 10:15 am - 11:45 pm</div><div>BREAKOUT SESSION ENVIRONMENT MOUNTAIN VIEW 10:15 - 11:45 am</div><div>LUNCH <i>(included all attendees )</i> SUMMIT BALLROOM A&amp;B 11:45 am - 12:45 pm</div><div>CLOSING PLENARY SESSION SUMMIT BALLROOM A&amp;B 12:45 - 2:45 pm</div><div></div><div>AASG CLOSED SESSION SUMMIT BALLROOM A&amp;B 3:00 - 5:00 pm</div><div>AASG MEETING GROUP PHOTOS 5:00 - 5:30 pm</div></div>				
<div>POST-TRIP EVENING SOCIAL Dinner at the Utah State Capitol Rotunda <i>(included all attendees )</i> 6:00 - 9:00 pm</div>			<div>CLOSING RECEPTION AND BANQUET <i>(included all attendees )</i> "A Changing Landscape: Geoheritage, Sampling Ethics, &amp; Technology" Dr. Marjorie A. Chan SUMMIT BALLROOM A&amp;B 6:00 - 9:00 pm</div>				
<div>Hospitality Suite ROOM TBD 9:00 - 10:00 pm</div>			<div>Hospitality Suite ROOM TBD 9:00 - 10:00 pm</div>				

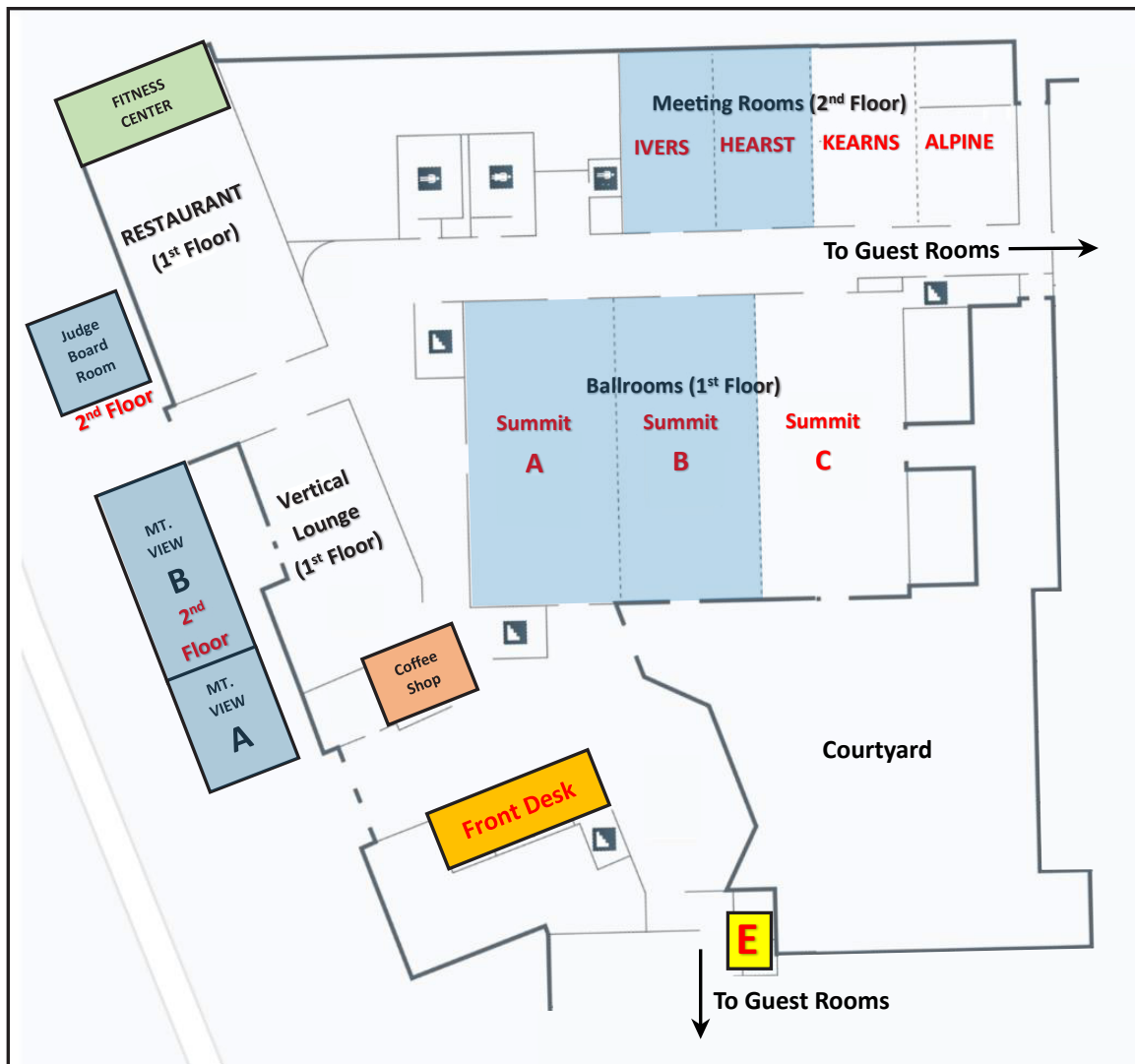
# AREA MAPS





# MEETING ROOMS

## DOUBLETREE BY HILTON – THE YARROW HOTEL



# DAILY SCHEDULE

Saturday, June 1		
7:00–8:00 a.m.	REGISTRATION	
7:00 a.m.–9:00 p.m.	PRE-MEETING FIELD TRIP Diverse Geology of Northeast Utah: Energy, Dinosaurs, Microbialites, and More! <i>(lunch, dinner, &amp; lodging in Vernal, Utah, included)</i>	
Sunday, June 2		
7:00 a.m.–5:00 p.m.	PRE-MEETING FIELD TRIP (continued) <i>(breakfast &amp; lunch included)</i>	
3:00–8:00 p.m.	REGISTRATION	
	DINNER ON YOUR OWN	
7:00–9:00 p.m.	WELCOMING RECEPTION	Courtyard
Monday, June 3		
7:00 a.m.–5:00 p.m.	REGISTRATION	
7:00–7:45 a.m.	BREAKFAST <i>(included for all attendees)</i>	Summit Ballroom A&B
8:00–10:00 a.m.	OPENING PLENARY SESSION	Summit Ballroom A&B
9:30 a.m.–4:00 p.m.	GUEST FIELD TRIP 1 Scenic Alpine Motor Tour: Cascade Springs–Sundance Resort <i>(lunch included)</i>	
10:15–11:45 a.m.	BREAKOUT SESSIONS 1–2	
	1. Minerals Ivers-Hearst	2. Coastal I Mountain View
11:45 a.m.–12:45 p.m.	LUNCH <i>(included for all attendees)</i>	Summit Ballroom A&B
12:45–2:15 p.m.	BREAKOUT SESSIONS 3–4	
	3. Data Preservation Ivers-Hearst	4. Water Mountain View
2:25–3:55 p.m.	BREAKOUT SESSIONS 5–6	
	5. Geothermal Ivers-Hearst	6. Coastal II Mountain View
4:05–5:35 p.m.	AASG Closed Session Summit Ballroom A&B	INTERSECTION OF GEOLOGY & CULTURE IN UTAH Moderator: Stephanie Mills, Utah Geological Survey JW Powell’s Journey Down the Green & Colorado Rivers - Tom Chidsey Climate Change and a Shrinking Great Salt Lake - David Parrott The Utah Utes - Forrest S. Cuch, Ute Tribal Elder Ivers-Hearst
	DINNER ON YOUR OWN	
9:00–10:00 p.m.	HOSPITALITY SUITE	



# DAILY SCHEDULE

Tuesday, June 4		
7:00–10:30 a.m.	REGISTRATION	
7:00–7:45 a.m.	BREAKFAST <i>(included for all attendees)</i>	Summit Ballroom A&B
8:00–10:00 a.m.	BREAKOUT SESSIONS 7–8	
	<b>7. Energy</b> Ivers-Hearst	<b>8. Education/DEI/Workforce</b> Mountain View
10:30 a.m.–6:00 p.m.	<b>MID-MEETING FIELD TRIP</b> Geologic Overview of the Central Wasatch Range and Salt Lake Valley <i>(included for all attendees, trip ends at the Utah State Capitol for dinner)</i> <i>(lunch included)</i>	
6:00–9:00 p.m.	<b>POST-TRIP EVENING SOCIAL</b> Dinner at the Utah State Capitol Rotunda <i>(included for all attendees)</i> <i>(transportation and dinner included)</i>	
9:00–10:00 p.m.	HOSPITALITY SUITE	

Wednesday, June 5		
7:00–10:00 a.m.	REGISTRATION	
7:00–7:45 a.m.	BREAKFAST <i>(included for all attendees)</i>	Summit Ballroom A&B
8:00–10:00 a.m.	JOINT BREAKOUT SESSION	
	<b>9. Mapping (Including Geologic Mapping Cost-Benefit Analysis Q&amp;A/ Discussion)</b>	Summit Ballroom A&B
10:00 a.m.–4:00 p.m.	<b>GUEST FIELD TRIP 2</b> Explore World-renowned Park City's Mining and Skiing History <i>(lunch included)</i>	
10:15–11:45 a.m.	BREAKOUT SESSIONS 10–11	
	<b>10. Hazards</b> Ivers-Hearst	<b>11. Environment</b> Mountain View
11:45 a.m.–12:45 p.m.	LUNCH <i>(included for all attendees)</i>	Summit Ballroom A&B
12:45–2:45 p.m.	CLOSING PLENARY SESSION	Summit Ballroom A&B
3:00–5:00 p.m.	AASG Closed Session	Summit Ballroom A&B
5:00–5:30 p.m.	AASG Meeting Group Photos	
6:00–9:00 p.m.	<b>CLOSING RECEPTION AND BANQUET</b> A Changing Landscape: Geoheritage, Sampling Ethics and Technology Dr. Marjorie A. Chan, University of Utah <i>(included for all attendees)</i>	Summit Ballroom A&B
9:00–10:00 p.m.	HOSPITALITY SUITE	

Thursday, June 6		
7:00–7:45 a.m.	BREAKFAST <i>(included for all attendees)</i>	Summit Ballroom A&B
8:00 a.m.–3:00 p.m.	<b>POST-MEETING FIELD TRIP</b> Geologic Hazards and Water Issues on the Wasatch Back <i>(lunch included)</i>	



# OPENING PLENARY SESSION

**Monday, June 3, 8:00–10:00 a.m.**

*Summit Ballroom A&B*

8:00–8:05 a.m.	<b>AASG President Welcome and Remarks</b> John Metesh, AASG President and Montana State Geologist
8:05–8:15 a.m.	<b>Host Welcome and Remarks</b> Bill Keach, Utah State Geologist
8:15–8:30 a.m.	<b>Welcome and Remarks</b> Joel Ferry, Executive Director, Utah Department of Natural Resources
8:30–8:45 a.m.	<b>Remarks from the U.S. Geological Survey Director</b> David Applegate, USGS Director
8:45–9:00 a.m.	<b>U.S. Geological Survey Energy and Minerals Collaboration</b> Sarah Ryker, USGS Associate Director, Energy and Mineral Resources
9:00–9:15 a.m.	<b>Future of U.S. Geological Survey Core Science Systems</b> Darcee Killpack, USGS Associate Director (Acting), Core Science Systems
9:15–9:30 a.m.	<b>Update on the Landslide Hazards Program</b> Jonathan Godt, USGS Program Coordinator for Landslide Hazards
9:30–9:50 a.m.	<b>Geologic Mapping Cost-Benefit Analysis</b> Dick Berg, Illinois State Geologist
9:50–9:55 a.m.	<b>Discussion–AASG Code of Conduct</b> John Metesh, AASG President and Montana State Geologist
9:55–10:00 a.m.	<b>Host Administration Instructions</b> Bill Keach/Mike Hylland, Utah Geological Survey



# DAY 1 BREAKOUT SESSIONS

Monday, June 3, 10:15–11:45 a.m.

## 1. MINERALS

*Ivers-Hearst Meeting Room*

Moderator: Dick Berg, Illinois State Geologist, AASG Minerals Committee Chair

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|------------------|---|
| 10:15–10:30 a.m. | <b>USGS Earth Mapping Resources Initiative Present and Future</b><br>Jamey Jones, U.S. Geological Survey  |
| 10:30–10:45 a.m. | <b>State Geological Surveys and USGS Collaborate to Build a New National Inventory of Non-fuel Mine Waste</b><br>Jeff Mauk, U.S. Geological Survey                              |
| 10:45–11:00 a.m. | <b>Earth MRI in Action: A Source-to-Sink Study of Heavy Mineral Sands in the South Carolina Upper Atlantic Coastal Plain</b><br>Robert Morrow, South Carolina Geological Survey |
| 11:00–11:15 a.m. | <b>Utah's Mineral Resource Landscape: Geology, Endowment, and Research Updates</b><br>Stephanie Mills, Utah Geological Survey   |
| 11:15–11:30 a.m. | <b>Geophysical Surveying and Geologic Mapping in Alaska</b><br>Melanie Werdon, Alaska Division of Geological and Geophysical Surveys  |
| 11:30–11:45 a.m. | <b>Open Discussion</b>  |

## 2. COASTAL I

*Mountain View Meeting Room*

Moderator: Scott Howard, South Carolina State Geologist, AASG Coastal Committee Chair

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|------------------|---|
| 10:15–10:45 a.m. | <b>Possible Shifts in Geologic Understanding through Sand Surveys in the Gulf of Mexico</b><br>Jennifer Steele, Bureau of Ocean Energy Management                           |
| 10:45–11:15 a.m. | <b>Addressing Coastal Resilience Sediment Needs</b><br>Ashley Long, Bureau of Ocean Energy Management   |
| 11:15–11:45 a.m. | <b>Partnership Success Story with BOEM and the Delaware Geologic Survey</b><br>Jeff Reidenauer, Bureau of Ocean Energy Management<br>Dan Warner, Delaware Geological Survey |

## Monday, June 3, 12:45–2:15 p.m.

### 3. DATA PRESERVATION

*Ivers-Hearst Meeting Room*

Moderator: Ruarri Day-Stirrat, Oregon State Geologist, AASG Data Preservation Committee Chair

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|------------------|---|
| 12:45–12:50 p.m. | <b>Introduction to the AASG Data Preservation Committee and Breakout Session</b><br>Ruarri Day-Stirrat, Oregon Department of Geology and Mineral Industries       |
| 12:50–1:05 p.m.  | <b>Preserving Legacies, Empowering Futures: NGGDPP's Partnership Triumphs and the Significance of Data Preservation</b><br>Mikki Johnson, U.S. Geological Survey  |
| 1:05–1:20 p.m.   | <b>DGGS Data Preservation Update</b><br>Melanie Werdon, Alaska Division of Geological and Geophysical Surveys   |
| 1:20–1:35 p.m.   | <b>Overview of the Data Preservation Program at the Kentucky Geological Survey</b><br>William Andrews, Elizabeth Adams, and Doug Curl, Kentucky Geological Survey |
| 1:35–1:50 p.m.   | <b>Washington Geological Survey Data Preservation</b><br>Jessica Czajkowski, Washington Geological Survey   |
| 1:50–2:05 p.m.   | <b>A Decadal Review of NGGDPP Activities in West Virginia</b><br>Jessica Moore, West Virginia Geological Survey   |
| 2:05–2:15 p.m.   | <b>Open Discussion</b>  |

### 4. WATER

*Mountain View Meeting Room*

Moderator: Keith Schilling, Iowa State Geologist, AASG Water Committee Chair

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|-----------------|---|
| 12:45–1:05 p.m. | <b>The Southwest Wisconsin Groundwater and Geology (SWIGG) Study: Fractured Bedrock, Land Use, and Private Well Contamination</b><br>Sue Swanson, Wisconsin Geological and Natural History Survey |
| 1:05–1:35 p.m.  | <b>Vulnerabilities in Two Utah Aquifers: Pahvant's Water Quantity and Sanpete's Water Quality Challenges</b><br>Greg Gavin and Janae Wallace, Utah Geological Survey                              |
| 1:35–1:55 p.m.  | <b>Don't Panic: Quantifying the Hydro-Economic Impacts of Groundwater Under Stress</b><br>Justin C. Thompson and Michael H. Young, Texas Bureau of Economic Geology                               |
| 1:55–2:15 p.m.  | <b>Overview of Karst Groundwater Research at the Kentucky Geological Survey</b><br>William Andrews, Charles Taylor, Ben Tobin, Junfeng Zhu, and Sarah Arpin, Kentucky Geological Survey           |





## Monday, June 3, 2:25–3:55 p.m.

### 5. GEOTHERMAL

*Ivers-Hearst Meeting Room*

Moderator: Jim Faulds, Nevada State Geologist, AASG Geothermal Committee Chair

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|----------------|--|
| 2:25–2:40 p.m. | <b>Overview of DOE Geothermal Programs</b><br>Michael Weathers, Office of Energy Efficiency and Renewable Energy, Department of Energy   |
| 2:40–2:55 p.m. | <b>Scaling Geothermal Development with Next-generation Exploration Methods</b><br>Carl Hoiland, Zanskar  |
| 2:55–3:05 p.m. | <b>INGENIOUS – The Search for Hidden Conventional Geothermal Systems</b><br>Jim Faulds, Nevada Bureau of Mines and Geology   |
| 3:05–3:20 p.m. | <b>Current Activities at the Utah Frontier Observatory for Research in Geothermal Energy (FORGE): A Laboratory for Characterizing, Creating and Sustaining Enhanced Geothermal Systems</b><br>Joe Moore, Energy & Geoscience Institute, University of Utah |
| 3:20–3:35 p.m. | <b>Demonstrating Commercial Readiness of Next-generation Geothermal</b><br>Greg Rhodes, Fervo Energy   |
| 3:35–3:55 p.m. | <b>Open Discussion</b>   |

### 6. COASTAL II

*Mountain View Meeting Room*

Moderator: Scott Howard, South Carolina State Geologist, AASG Coastal Committee Chair

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|----------------|--|
| 2:25–2:55 p.m. | <b>Heavy Minerals Sands in Virginia</b><br>Kerby Dobbs, Bureau of Ocean Energy Management  |
| 2:55–3:25 p.m. | <b>Research, Mapping, and Collaborative Efforts by the South Carolina Geological Survey to Support Coastal Management Decisions</b><br>Katie Luciano and Will Doar, South Carolina Geological Survey |
| 3:25–3:55 p.m. | <b>Geological Mapping and Monitoring Activities along the SW Lake Michigan Coast</b><br>Christopher Mattheus, Illinois State Geological Survey   |

# DAY 2 BREAKOUT SESSIONS

Tuesday, June 4, 8:00–10:00 a.m.

## 7. ENERGY

*Ivers-Hearst Meeting Room*


Moderator: Nicholas Hayman, Oklahoma State Geologist, AASG Energy Committee Chair

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|-----------------|--|
| 8:00–8:10 a.m.  | <b>Introduction to the Energy Session: What is the AASG Energy Committee?</b><br>Nicholas Hayman, Oklahoma Geological Survey |
| 8:10–8:35 a.m.  | <b>Great Basin Carbon Capture and Storage: Examples from Utah</b><br>Eugene Szymanski, Utah Geological Survey                |
| 8:35–9:00 a.m.  | <b>Carbon Sequestration on the Outer Continental Shelf</b><br>Stephen Palmes, Bureau of Ocean Energy Management              |
| 9:00–9:25 a.m.  | <b>Harnessing Hydrogen: A Key Element of the U.S. Energy Future</b><br>Mark Shuster, Texas Bureau of Economic Geology        |
| 9:25–9:35 a.m.  | <b>TBD</b><br>TBD  |
| 9:35–9:45 a.m.  | <b>Program Notes from USGS</b><br>Alicia Lindauer, U.S. Geological Survey  |
| 9:45–10:00 a.m. | <b>Open Discussion</b>   |

## 8. EDUCATION/DEI/WORKFORCE

*Mountain View Meeting Room*

Moderator: Ben DeJong, Vermont State Geologist, AASG Education Committee Chair

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|-----------------|---|
| 8:00–8:15 a.m.  | <b>Opening Remarks and Education Committee Update</b><br>Ben DeJong, Vermont Geological Survey  |
| 8:15–8:40 a.m.  | <b>Potter Scholarship and Impacts of Supreme Court Decision</b><br>Dick Berg and Sherilyn Williams-Stroud, Illinois State Geological Survey |
| 8:40–9:05 a.m.  | <b>Tech Partnership for First Nation Recruitment and Cooperation</b><br>Nelia Dunbar, New Mexico Bureau of Geology & Mineral Resources      |
| 9:05–9:30 a.m.  | <b>Impacts of Programming on Licensure</b><br>Randy Kamp, Association of State Boards of Geology (ASBOG)                                    |
| 9:30–10:00 a.m. | <b>Open Discussion</b><br>Polly Root Sturgeon, Indiana Geological Survey  |
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# DAY 3 JOINT BREAKOUT SESSION

Wednesday, June 5, 8:00–10:00 a.m.

## 9. MAPPING – INCLUDING GEOLOGIC MAPPING COST-BENEFIT ANALYSIS Q&A/DISCUSSION

*Summit Ballroom A&B*

Moderator: Gale Blackmer, Pennsylvania State Geologist, AASG Mapping Committee Chair

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|-----------------|---|
| 8:00–8:05 a.m.  | <b>Introduction</b><br>Gale Blackmer, Pennsylvania Geological Survey  |
| 8:05–8:20 a.m.  | <b>Update on the National Cooperative Geologic Mapping Program (NCGMP)</b><br>Chris Swezey, U.S. Geological Survey                      |
| 8:20–8:35 a.m.  | <b>Progress on New National Geologic Maps</b><br>Joe Colgan and Sam Johnstone, U.S. Geological Survey                                   |
| 8:35–8:50 a.m.  | <b>Regional to National-scale Subsurface Mapping and 3D Modeling: Status and Future Plans</b><br>Don Sweetkind, U.S. Geological Survey  |
| 8:50–9:30 a.m.  | <b>Discussion</b><br>Gale Blackmer, Pennsylvania Geological Survey  |
| 9:30–10:00 a.m. | <b>Geologic Mapping Cost-Benefit Analysis</b><br>Dick Berg, Illinois State Geologist and Jim Faults, Nevada Bureau of Mines and Geology |





# DAY 3 BREAKOUT SESSIONS

Wednesday, June 5, 10:15–11:45 a.m.

## 10. HAZARDS

*Ivers-Hearst Meeting Room*

Moderator: Casey Hanell, Washington State Geologist, AASG Hazards Committee Chair

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|------------------|--|
| 10:15–10:45 a.m. | <b>Geologic Hazards of Utah and the Utah Geological Survey</b><br>Steve Bowman, Utah Geological Survey       |
| 10:45–11:15 a.m. | <b>Emerging Landslide Challenges in California</b><br>Jeremy Lancaster, California Geological Survey         |
| 11:15–11:45 a.m. | <b>Update on National Landslide Preparedness Act Implementation</b><br>Jonathan Godt, U.S. Geological Survey |

## 11. ENVIRONMENT

*Mountain View Meeting Room*

D. Mark Jones, Ohio State Geologist, AASG Environment Committee Chair


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|------------------|--|
| 10:15–10:20 a.m. | <b>Introduction</b><br>D. Mark Jones, ODNR Division of Geological Survey                                       |
| 10:20–10:50 a.m. | <b>PFAS in Utah: A Collaborative Approach</b><br>Kim Shelley, Department of Environmental Quality              |
| 10:50–11:20 a.m. | <b>TBD</b><br>TBD  |
| 11:20–11:45 a.m. | <b>Environmental Justice and the DOJ</b><br>Ruth Hackford-Peer, U.S. Attorney's Offices and University of Utah |



# CLOSING PLENARY SESSION

Wednesday, June 5, 12:45–2:45 p.m.

*Summit Ballroom A&B*

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|------------------|---|
| 12:45–12:50 p.m. | <b>AASG President Closing Remarks</b><br>John Metesh, AASG President and Montana State Geologist                            |
| 12:50–1:35 p.m.  | <b>Summaries of Breakout Sessions</b><br>AASG Committee Chairs  |
| 1:35–1:45 p.m.   | <b>Geosciences and Opportunities for Collaboration</b><br>Geoff Plumlee, Chief Scientist, U.S. Geological Survey            |
| 1:45–1:55 p.m.   | <b>Updates from AGI</b><br>Jon Arthur, Director, American Geosciences Institute   |
| 1:55–2:05 p.m.   | <b>AIPG and AASG Shared Visions</b><br>Aaron Johnson, Executive Director, American Institute of Professional Geologists     |
| 2:05–2:15 p.m.   | <b>BOEM and AASG Shared Visions</b><br>Meghan Carr, Bureau of Ocean Energy Management, Chief, Office of Strategic Resources |
| 2:15–2:25 p.m.   | <b>AASG 2025 Annual Meeting Overview</b><br>Clare Falcon, AASG Vice-President and Louisiana State Geologist                 |
| 2:25–2:35 p.m.   | <b>Remarks from the Outgoing AASG President</b><br>John Metesh, AASG President and Montana State Geologist                  |
| 2:35–2:40 p.m.   | <b>Remarks from the Incoming AASG President</b><br>Jessica Moore, AASG President-Elect and West Virginia State Geologist    |
| 2:40–2:45 p.m.   | <b>Host Announcements</b><br>Bill Keach, Utah State Geologist   |
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# CLOSING RECEPTION AND BANQUET

Wednesday, June 5, 6:00–9:00 p.m.

*Summit Ballroom A&B*

Cost included in general meeting registration fee for all attendees and guests

## PRESENTATION: “A Changing Landscape: Geoheritage, Sampling Ethics, and Technology”

**Dr. Marjorie A. Chan**

Distinguished Professor of Geology, Dept. of Geology & Geophysics, University of Utah

Today, earth science is experiencing a changing landscape, and now is an opportune time to shape our future through advances in geoheritage, sampling ethics, and technology.

The diverse terrains where geologists conduct research comprise our geoheritage—the geologic sites or areas with significant scientific, educational, cultural, and/or aesthetic value. Geoheritage sites are vital to advancing knowledge and for understanding geodiversity as well as the biodiversity the land supports. Significant geosites have implications for understanding Earth history and future. Over the last few decades, a rising international geoconservation movement is bringing attention to these special geological features with intrinsic value. State geological surveys can help contribute to awareness and good stewardship of important geoheritage sites.

Growing concerns about the ethics of geologic sampling are relevant to teaching, research, and our geoheritage. The topic of sampling is complex. Our professional societies see the need to develop standards and training resources for ethical geologic sampling and clearly stated guidelines for professional practice (e.g., as a requisite for publication). Ultimately, sample and data repositories with key metadata can be valuable for future generations of geoscientists.

Finally, technology will continue to change the way we conduct our research from data collection to archiving, processing, visualizing, and sharing. Both geoheritage studies and sampling efforts of the past, present, and future can benefit from the use of digital technology, accompanied by open data and more avenues for communicating what our science is about. The more we capitalize on new digital technologies, the more we can share and make new discoveries.

## ABOUT DR. CHAN



Dr. Chan has led an active nationally and internationally recognized research program emphasizing sedimentary geology and terrestrial analogs to Mars. Her research extends from sedimentology and diagenesis to geoconservation, geoheritage, and ethics. In her career of leadership and service, she has led major initiatives for women and diversity (e.g., GSA’s highly successful “On to the Future” program, and AAPG’s Professional Women in Earth Sciences—now AAPG Women’s Network). Her leadership and visionary efforts in outreach and fundraising resulted in an award-winning experiential geoscience building that has influenced many other university buildings across the country. Her advocacy and expert testimonies have led to conservation of important geologic landscapes relevant to societal quality of life. Currently, she is a leader in GSA efforts to articulate geologic sampling ethics. From art to architecture, Chan finds innovative ways to share science and engage the public and citizens of all ages.



# FIELD TRIPS

## PRE-MEETING FIELD TRIP

### Diverse Geology of Northeast Utah—Energy, Dinosaurs, Microbialites, and More!

**SATURDAY, JUNE 1, 7:00 A.M. TO SUNDAY, JUNE 2, 5:00 P.M.**

Cost: \$350/person, includes two lunches, Saturday dinner, Sunday breakfast, and lodging in Vernal, Utah

Led by Stefan Kirby and Michael Vanden Berg, Utah Geological Survey

The Vernal area of northeast Utah is home to a geological wonderland that includes impressive energy and mineral resources and some of the best exposed examples of Cenozoic lacustrine sedimentation, Mesozoic paleontology, and Laramide tectonics in the western U.S. We plan to visit diverse geologic locations to investigate:

- Eocene lacustrine Green River Formation, the source for the majority of Utah's petroleum resources, including a stop to look at the world's largest lacustrine microbialites;
- nationally important phosphate deposits in the Permian Park City Formation;
- exposures of unique Gilsonite veins;
- world-class outcrops of Mesozoic stratigraphy exposed along dramatic Laramide structures; and
- dramatic outcrops of Neoproterozoic rocks near Flaming Gorge.

A highlight of the trip will include a private, after-hours dinner at the world-famous Dinosaur National Monument "bone wall" Quarry, with special lecture by State Paleontologist James Kirkland.

It is preferable if all participants travel to Utah on Friday, May 31, and spend the night at the Yarrow Hotel so we can plan to leave on time Saturday morning. Saturday lunch, Saturday dinner, and Sunday lunch are all included in the trip, as well as lodging in Vernal Saturday night (breakfast Sunday morning is included with hotel room). Several stops will include moderate hiking (less than ¼ mile) over uneven terrain.

### Indigenous Lands Acknowledgment

We acknowledge that the 2024 AASG Annual Meeting and associated field trips will take place on the traditional and ancestral homelands of multiple indigenous peoples, including the Goshute, Newe Sogobia (Eastern Shoshone), Timpanogos, and Ute (including the Uintah, Uncompahgre, and Whiteriver bands). We recognize and honor the distinct histories and experiences of each of these tribal communities; affirm Indigenous sovereignty, history, and experiences; and commit to fostering respectful and collaborative relationships with the tribal communities on whose ancestral lands our activities will take place.

## MID-MEETING FIELD TRIP

### Geologic Overview of the Central Wasatch Range and Salt Lake Valley

**TUESDAY, JUNE 4, 10:30 A.M.–9:00 P.M.**

Included with full registration, lunch and dinner provided

Led by Zach Anderson, Darlene Batatian, Michael Hylland, Stefan Kirby, Emily Kleber, Adam McKean, Mark Milligan, Matthew Morris (Utah Geological Survey), and Jerod Johnson (Reaveley Engineers)

Positioned on the boundary between the Basin and Range Province and Middle Rocky Mountains, the Wasatch Range forms a grand scenic backdrop to Utah's capital city. This trip will afford the opportunity to view and discuss a variety of topics related to the geologic development and evolution of the central Wasatch Range and adjacent Salt Lake Valley. Field trip stops will include: (1) Big Cottonwood Regional Park, where the sweeping view will facilitate discussion of bedrock geology and structural evolution during the Cretaceous–Eocene Sevier orogeny, vertical displacement on the Wasatch fault over 12 million years of Basin and Range extension, and occupation of Salt Lake Valley by Lake Bonneville in the Late Pleistocene; (2) G.K. Gilbert Geologic View Park, with its world-class examples of glacial geomorphology and scarps from active normal faulting; (3) the mouth of Little Cottonwood Canyon, with its exposures of the intrusive contact between Oligocene quartz monzonite of the Little Cottonwood Stock and Proterozoic metasedimentary rocks, (4) Snowbird Resort, where we'll summarize recent and ongoing geologic mapping in the area and discuss historical mining activity; and (5) the Utah State Capitol, where we'll view base isolators installed as part of a major seismic upgrade to the Capitol building, and discuss new insights into Salt Lake Valley's seismic hazard gleaned from the 2020 Mw 5.7 Magna earthquake. The trip will conclude with dinner in the Capitol Rotunda, featuring a special address by former Utah State Geologist Genevieve Atwood.



Red Pine Lakes, Little Cottonwood Canyon



## POST-MEETING FIELD TRIP

### Water Issues and Geologic Hazards on the Wasatch Back

**THURSDAY, JUNE 6, 8:00 A.M.–3:00 P.M.**

Cost: \$50, includes lunch



Led by Janae Wallace, Hugh Hurlow, Greg McDonald, and Ben Erickson, Utah Geological Survey

This trip will highlight water issues and geologic hazards affecting Utah's Wasatch Back, with a focus on Ogden Valley. Ogden Valley is home to about 7,000 residents but is growing rapidly, and its streams, reservoirs and groundwater are tributary to the Ogden metropolitan area 20 miles to the west, itself undergoing explosive land development and population growth. We will review the methods and results of a comprehensive study of the quantity and quality of Ogden Valley's groundwater and its connection to surface water. We will visit the South Fork of the Ogden River to briefly compare stream flows at two sites that demonstrate a typical losing stream reach. Our lunch will provide views of scenic Pineview Reservoir with the Wasatch Mountains as a backdrop.

The geologic hazards part of the trip will review how the UGS is mapping and investigating geologic hazards including those that impact the Wasatch Back. From an Ogden Valley overlook, we will give an overview of the geology of the area and the associated hazards, including landslides, problem soils, Quaternary faults, debris flows, flooding, and shallow groundwater. We will visit landslides in the Snowbasin area, including some that the UGS has been monitoring for over 20 years and review how the methods we use to investigate them have evolved over time.

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Photo Courtesy of Gary Crandall

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## GUEST FIELD TRIP 1

### Scenic Alpine Motor Tour: Cascade Springs–Sundance Resort

**MONDAY, JUNE 3, 9:30 A.M.–4:00 P.M.**

Cost: \$100, includes lunch and all tickets/fees

Led by Jackson Smith, Jim Davis, and Mark Milligan, Utah Geological Survey

This trip will wind along backcountry mountain roads, stopping to explore the serene limestone terraces and sparkling pools of Cascade Springs. We will then continue to Sundance Ski Resort to ride ski lifts up to 8,200 feet above sea level for lunch at the Bearclaw Cabin cafe. Dependent upon time and popular vote, the trip may end with either a stop at the scenic Bridal Veil Falls or Park City Sunrise Rotary Regional Geologic Park.



Cascade Springs, Wasatch County

## GUEST FIELD TRIP 2

### Explore World-Renowned Park City's Mining and Skiing History

**WEDNESDAY, JUNE 5, 10:00 A.M.–4:00 P.M.**

Cost: \$120, includes lunch and all tickets/fees

Led by Cheryl Wing, Utah Geological Survey

This trip will explore Park City's transformation from a rough-and-tumble silver mining town to world-class ski destination, with guided tours of the Park City Museum, historic Main St., Alf Engen Ski Museum, and Utah Olympic Park—venue for the 2002 Winter Olympics and Paralympics. Lunch will be at Park City's oldest restaurant.







## Mission

The Bureau of Ocean Energy Management's mission is to manage development of U.S. Outer Continental Shelf (OCS) energy, mineral, and geological resources in an environmentally and economically responsible way.

## Partnership

BOEM and the Association of American State Geologists have collaborated on information sharing on marine minerals and energy resources. Since the 1990's, BOEM has partnered with numerous state geological surveys on Cooperative Agreements of offshore sand resources to support the nation's coastal resilience efforts in the face of climate change.

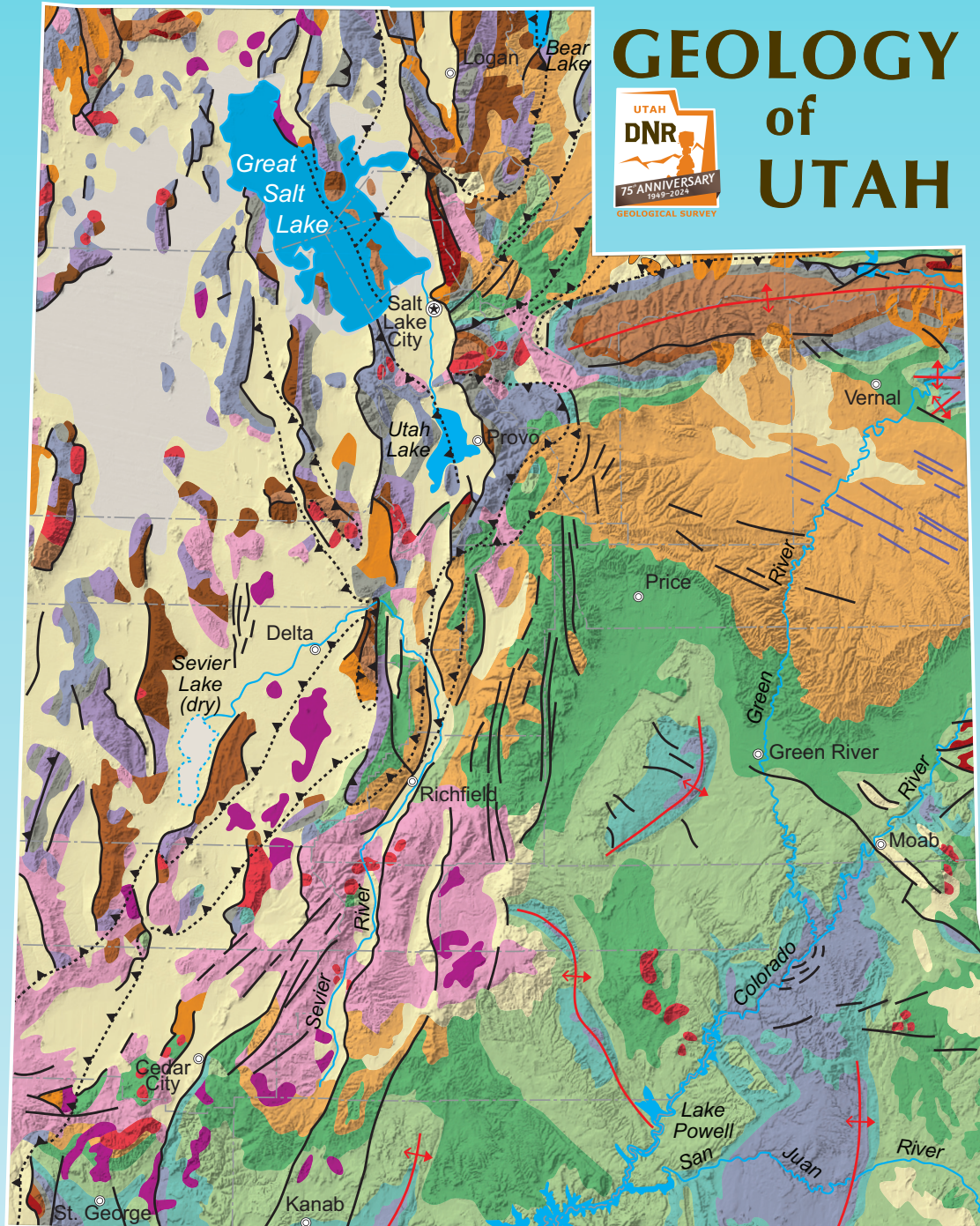
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# GEOLOGY of UTAH



Quaternary (salt flats)	Middle Tertiary	Triassic	Cambrian
Quaternary (other)	Early Tertiary	Permian-Pennsylvanian	Precambrian (sedimentary)
Quaternary-Tertiary	Cretaceous	Mississippian	Precambrian (igneous, metamorphic)
Late Tertiary	Jurassic	Devonian-Silurian-Ordovician	

Thank you for attending!

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