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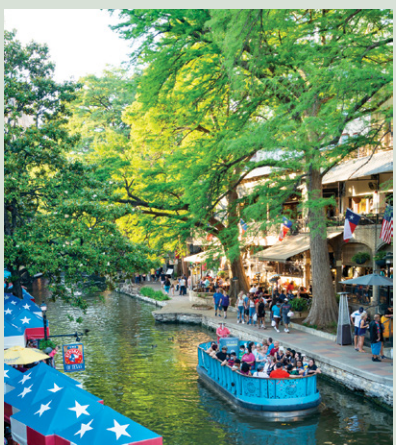

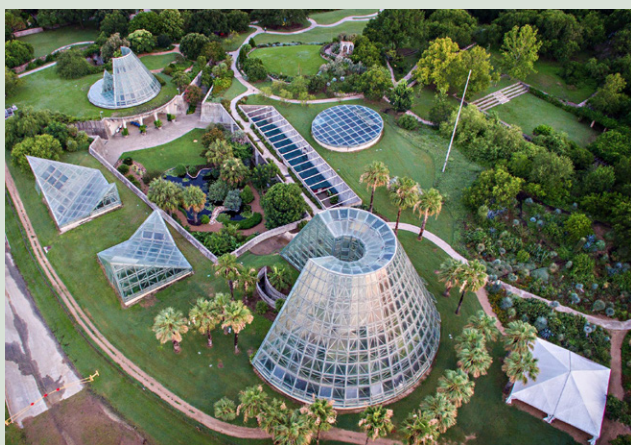

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Cover: Stunning balanced rock formation in Big Bend National Park, Texas, United States. Credit: Dean Fikar / Getty Images. See related content on p. 12–53.

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Picture of Mt Stuart, North Cascades, Washington. Photo by Tom Foster, provided by Nick Zentner.

1. We regret the printing error in the March/April 2025 issue that caused random bold letters to appear throughout the magazine. We have implemented additional quality control measures to prevent this from happening in the future.

2. In the print version of the March/April 2025 Science article, two passages mistakenly referred to the cover image. These references should have pointed to the thumbnail image on page 4. Additionally, the thumbnail image should have been credited to Eric Roper. These errors have been corrected in the online version.

3. In the January 2025 issue (p. 34), a photo caption incorrectly identified Tennessee State University. The correct institution is East Tennessee State University.

Figure 1. Picture of Mount Stuart, North Cascades, Washington. Photo by Tom Foster, provided by Nick Zentner.

Mt Stuart, Washington State: Beware Occam's Razor

Basil Tikoff*, [1] and Thomas F. Shipley[2]

Geology logline: *Paleomagnetic evidence, starting with a 1972 study of the Mount Stuart batholith, indicates significant northward movement of parts of the North American Cordillera starting ca. 100 Ma.*

Cognitive science logline: *Attentional limits that allow us to function in a world with many potential distractions provide opportunities and dangers when science encounters new information.*

"ENTITIES ARE NOT TO BE MULTIPLIED WITHOUT NECESSITY"
ONE STATEMENT OF OCCAM'S RAZOR
(FROM PONCIUS, 1639)

In 1972, a short paper by Myrl Beck and Linda Noson provided data that caused unease in our understanding of the North American Cordillera that continues today (Beck and Noson, 1972). The data came from a paleomagnetic study of the granitic Mount Stuart batholith, Washington (Fig. 1). The paleomagnetic study indicated that the batholith had been located 3000 km south (at the latitude of northern Mexico) shortly after it intruded into host rocks (ca. 100 Ma), relative to its current position in North America.

Here is a short review of the basics of paleomagnetism: The magnetic minerals in rocks can record the geomagnetic field. Igneous rocks acquire this paleomagnetic signal when they cool through ~500 °C (i.e., the Curie temperature) if they contain titanomagnetite (a common magnetic mineral in granites); sedimentary rocks acquire a paleomagnetic signal shortly after they are deposited. The magnetic and geographic poles align when averaged over thousands of years; consequently, the inclination of the paleomagnetic signal is horizontal (0°) at the equator and vertical (±90°) at the poles. If the rock containing magnetic minerals did not move af-

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ter the paleomagnetic signal was acquired, then there is a predictable relationship between the paleomagnetic orientations and the latitude. However, if the rock moved to a new latitude, it would have retained its original paleomagnetic inclination, which differs from the expected magnetic inclination at its new latitude.

The Mount Stuart batholith has a shallower paleomagnetic inclination than would be expected if it had been attached to northwest Washington State at 100 Ma (Fig. 2). A key challenge to interpreting paleomagnetic results in plutonic rocks is that paleohorizontal cannot be assumed from the current horizontal orientation. However, subsequent paleomagnetic data sets from the Mount Stuart region have determined the original horizontal plane using bedding planes, interlayered sedimentary and volcanic rocks, and paleomagnetic tests for quality (e.g., Wynne et al., 1995). Moreover, younger (ca. 70 Ma) Cretaceous rocks show less latitudinal offset, indicating that the paleomagnetic data record consistent and coherent northward transport of the terranes (Fig. 2). In aggregate, the paleomagnetic results from multiple sites—which have been remeasured, and for which the reproducibility of the results were demonstrated using different techniques and methods (e.g., Housen et al., 2003)—are generally consistent with the 1972 results from the Mount Stuart batholith (e.g., Enkin et al., 2006). Most of northwest Washington State, coastal British Columbia (BC), and some coastal parts of Alaska—which is collectively known as the Insular superterrane—have moved significantly northward (see the paleomagnetic review by B. Housen in Tikoff et al., 2023). The debate about the location of the Insular superterrane at ca. 100–55 Ma is known as the Baja-BC controversy (e.g., Cowan, 1994), because parts of British Columbia (BC) might have been located at the latitudes of Baja California (Baja).

Why are these data so problematic? Most models for the tectonic development of western North America call on orthogonal—or "straight in"—convergence. In the western United States, convergence involved orthogonal subduction of the Farallon plate, with proposed shallow subduction starting at ca. 80 Ma and linked to the formation of the eastern Rocky Mountains (Dickinson and Snyder, 1978). In western Canada, it involved orthogonal collision of two island arcs (the westernmost of which was the Insular superterrane; e.g., Monger et al., 1982). These two-dimensional models of orthogonal convergence were developed after the paleomagnetic data were published and were thus in conflict with the evidence for northward motion. Further, the Insular superterrane was very likely adjacent to North America in the Late Cretaceous: Geological evidence indicates that it collided at ca. 100 Ma with North America at some latitude (e.g., Rubin et al., 1990). If the accreted terranes (e.g., Insular superterrane) required thousands of kilometers of movement after this collision, these models might be invalidated (Fig. 3).

This essay addresses a topic of ongoing debate (e.g., Busby et al., 2023) in order to explore cognitive processes. In full transparency, one of the authors has been an active participant in this debate for years (hint: It is not the psychologist). We think, however, that the history of inferences about the movement of the Mount Stuart batholith offers a cognitive

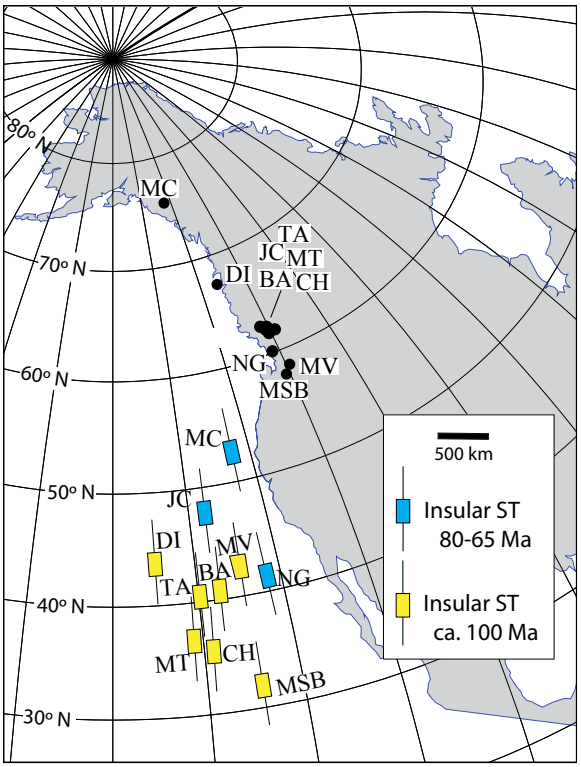

Figure 2. Reconstructed locations based on paleomagnetic data for sites from the Insular Superterrane (ST) in the mid-Cretaceous (ca. 100 Ma; yellow) and latest Cretaceous (80–65 Ma; blue) using Cretaceous North American reference poles from Tikoff et al. (2023). Paleolatitudes and 95% confidence limits from the paleomagnetic means are plotted (box plus whiskers). Insular Superterrane paleomagnetic sites are: BA—Battlement-Amazon volcanics and sediments; CH—volcanics and sediments of Churn Creek; DI—Duke Island ultramafics; JC—Jamison Creek volcanics and sediments; MC—MacColl Ridge; MSB—Mount Stuart batholith; MT—Mount Tatlow volcanics and sediments; MV—Methow valley remagnetized strata; NG—Nanaimo Group sediments; TA—Tete Angela volcanics and sediments. Data compiled by B. Housen; figure modified from Tikoff et al. (2023).

window through which to notice and incorporate new information into one's world view.

We start with an important analogy between the everyday duties of the mind and the science of geology. In both cases, one is typically confronted with limited, partial, and incomplete information, upon which one must act. Field geologists, whether they walk the high deserts of Chile, where there are almost complete surface exposures, or slog through the bogs of Ireland to find the next outcrop, know they work from incomplete observations of Earth. What may be less obvious is the same is true of every scene you look at. As we noted in Tikoff and Shipley (2024), the visual system is always filling in the occluded parts of objects. If the reader looks around, they will note that closer objects hide parts of more distant objects, and the fronts of objects hide their backs. The mental processes that complete the partially occluded objects have two components: (1) a detection that completion is needed, and (2) a filling in with the likely missing structure. What might be happening in the mind when new evidence becomes visible/available? In this

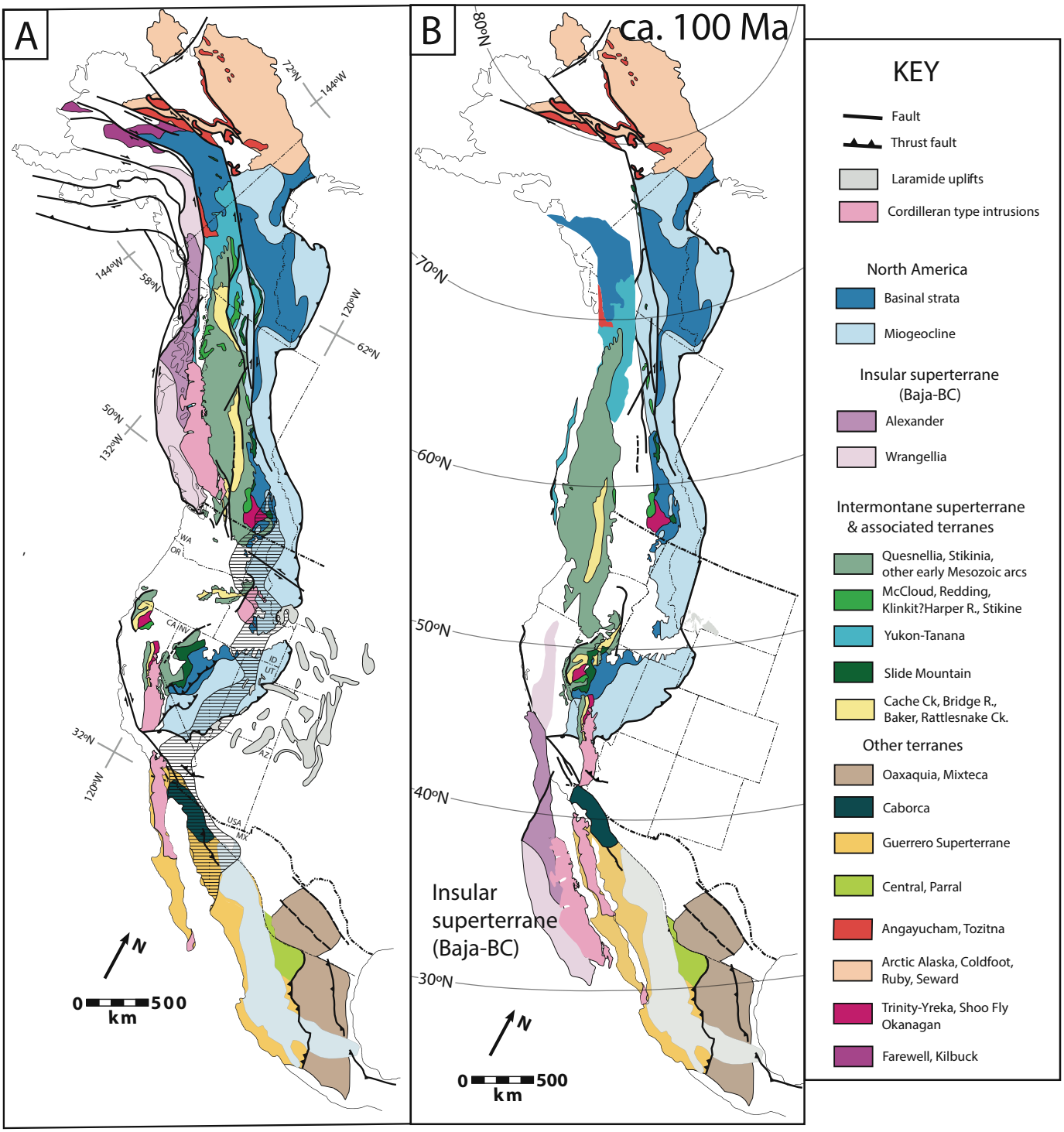

Figure 3. Terrane map for the western margin of North America: (A) now and (B) at 100 Ma. Mount Stuart batholith is located at the southern end of the Insular superterrane (pink and purple colors). BC—British Columbia; Ck—Creek; R—River; WA—Washington; OR—Oregon; CA—California; NV—Nevada; ID—Idaho; UT—Utah; AZ—Arizona; MX—Mexico.

essay, we address both how new evidence may or may not be noticed and, if noticed, how new evidence may be combined with other evidence from the world.

NOTICING

The dictionary of the American Psychological Association defines attention as "a state in which cognitive resources are focused on certain aspects of the environment rather than on others." The concept of attention is a recognition of the mind's limits to take in information as well as limits on the number of ideas it can hold and consider. If we do not attend to something, we literally do not see it or hear it, even when our eyes or ears are pointed right at the thing. The psychologists Robert Becklin and Ulric Neisser demonstrated this point by having participants monitor simple events, such as the ball passes during a basketball game (Neisser and Becklen, 1975). This was no ordinary game because, once the action started, a person in a gorilla suit walked among the players. Most participants did not report anything out of the ordinary when asked if they noticed anything unusual. Experts faired only a little better, with more than 80% of radiologists failing to notice a gorilla appearing in a lung X-ray they were viewing for lung nodules (Drew et al., 2013). If you need a simple demonstration to convince yourself, try watching two movies at the same time or listening to two conversations at the same time. You can abstract information from one, but you must guess (by filling in) the contents of the other.

Our attention can be guided by our goals, but it is also guided unconsciously by the world. Some events in the world, such as objects moving, automatically draw attention. Automatic attention likely had some survival value for early humans, for whom motion in the world may have signaled the presence of a dangerous animal. Attention is also drawn by unexpected events. Surprises are cases where our mental model of the world failed, revealing itself to be incomplete because it did not accurately anticipate what would happen next, and therefore must require updating.

What we notice requires attention, and therefore we do not notice when we are not noticing. Stated another way, you cannot tell when you are ignoring something. Consider the case of drivers talking on a cell phone, even when they are not holding the phone. The research on accidents and driving simulators is clear; the level of reaction time impairment while using a cell phone is equivalent to driving with blood alcohol levels three times the legal limit in the UK. Why do most drivers feel they are OK on the phone? Because the mind does not notice the errors it was making, in the form of not attending to stop signs, red lights, and pedestrians. If you need additional convincing, watch the public safety message from Transport of London (2017).

How are traffic accidents similar to failures to notice paleomagnetic orientations? The human mind functions well when working with a single event stream, analogous to a single theory. If your theory is that the Mount Stuart batholith has not moved, then your observation-gathering goals will be structured by that theory, and thus attention will be paid to observations that are consistent with stasis. So, in the absence of the paleomagnetic data, orthogonal convergence might be seen as the simplest model for the tectonic development of western North America. Further, there is no strike-slip fault with that much documented offset. The apparent continuity of rocks in the North American Cordillera likely led to their being mentally grouped together (see discussion on lumping and splitting; Tikoff and Shipley, 2025) and thus hypothesizing that nothing had moved by significant amounts up or down the margin of North America.

Once multiple paleomagnetic studies were published, why did not people reevaluate their understanding? We offer four possibilities. One possibility is that the shallow inclination values were seen as consistent with a large-scale series of normal faults that modified the values to shallower angles from their original expected steep values for the region (e.g., Butler et al., 1989). If you want to understand this effect, consider a stack of books on your bookshelf when the bookend is released: If an oblique line were drawn on a page of every book (our analogy for a paleomagnetic vector), then that inclined line in space would become nearly horizontal as the books slumped next to each other nearly parallel to the shelf. This alternative interpretation is fair for paleomagnetic results from intrusive igneous rocks. However, this source of uncertainty in interpretation is absent in paleomagnetic data in which paleohorizontal is constrained by bedding in fine-grained sedimentary rocks (e.g., Wynne et al., 1995).

A second possibility is that the paleomagnetic data were relegated to the do-not-know-what-to-do-with-it mental folder. The problem is that the do-not-know-what-to-do-with-it mental folder tends to slide into the mental recycling bin. Which is unfortunate, because the do-not-know-what-to-do-with-it mental folder may contain noncompliant data or, alternatively stated, data with negative salience (Nelson et al., 2024; see upcoming essay #10 on Sage Hen flat, California). Unless used, or brought into focus by a reviewer, noncompliant data tend to be forgotten because they do not fit with the larger mental model of the region.

A third possibility is the nonvisual nature of paleomagnetic data. Paleomagnetic signals are not available to perception, as they literally cannot be seen. Most geologists are highly influenced by visual observation through both training and experience. Visual cues are powerful attractors to the geological mind. In contrast, non-perceptional data cannot as easily remind geologists to keep them in mind as they move toward being forgotten (see Shipley and Tikoff, 2025).

The fourth possibility is that the paleomagnetic data were being actively ignored. This issue was raised by the geologist Darrel Cowan (D. Cowan, 2024, pers. comm.): "I'm convinced that most geologists working on late Mesozoic and early Cenozoic California geology and tectonics concluded that none of the transport models added any insights to their understanding, so basically ignored them." This hypothesis reflects how any given model works better if a particular type of data is ignored. This approach, however, delays the necessary reckoning, by either adjusting the model in a way that it can accommodate the data or discarding the old model for a new one. As a historically relevant example, consider the way that geological data from the Southern Hemisphere

supporting long-distance continental drift (e.g., du Toit and Reed, 1927) were ignored by much of the geological and geophysical community.

If expectations and attentional focus cause unexpected findings to be missed, how does progress occur? Surely writing a scientific paper requires utilizing single-minded focus. Coming across and noticing inconsistent data require less-goal-oriented exploration, in this case, reading papers that may not seem directly relevant to one's research program. Detection of conflicts between theory and inconsistent data can occur in the review process, when reviewers can advocate alternative theories. Working with multiple possible theories requires heterogeneity of papers read and data remembered. Thus, progress requires workflows for detecting inconsistent data and connecting them to theories.

INCORPORATING NEW EVIDENCE

Once one accepts the possibility that the Mount Stuart batholith has moved, why might some models have proposed paths shorter than the one suggested by the paleomagnetic data? If one charts a history of how far the Mount Stuart batholith has been proposed to have moved since ca. 100 Ma, one sees a distinct linear upward trend starting from zero. As tectonicists wrestled with the problem of aligning data to models, they proposed increasingly greater amounts of northward movement: none (Dickinson and Snyder, 1978) to 1000 km (Butler et al., 2001; Wyld et al., 2006) to 1600 km (Umhoefer and Blakey, 2006; Sauer et al., 2019). The slow acceptance of increasingly farther Insular superterrane movement likely reflects a desire to minimize the imagined distances traveled. It is also, however, evidence that people are reluctant to change their mental models. A critical reader might argue that in the absence of clear evidence for margin-parallel movement, such as a fault with a known offset, the simplest path is the shortest one. In effect, why propose anything more complicated than needed to explain the facts at hand? This idea, familiar to the practice of science, has been codified as "Occam's Razor." From Ptolemy to Ernst Mach, scientists and philosophers have argued that, "Entities must not be multiplied beyond necessity" (the actual words were Entia non sunt multiplicanda praeter necessitatem: Poncius, 1639).

Thus, one way to understand the slow evolution of the models is that Occam's razor acted as an intrinsic dampening force, only yielding as much movement as absolutely required by the data. A case in point was the estimate proposed by Wyld et al. (2006) of ~1000 km of offset of the Insular superterrane, which was the product of integration of all known fault offsets after 100 Ma in the Pacific Northwest of the United States and in the Canadian Cordillera. It is likely that unknown faults could have added kilometers of offset to the movement of the Insular superterrane, because all fault offsets are minimum estimates. That is, the study by Wyld et al. (2006) is the least-offset (most fixist) permissible model.

From the perspective of incomplete and uncertain knowledge, it is worth noting another application of simplicity in proposed paths between two points. In vision, when an object is shown at two locations in succession, the visual system fills in a path between the locations. This happens with movies, in which a series of static images are brought to movement by our visual system filling in the missing path. Notably, despite there being an infinite set of possible paths between two locations, we see only one, and that one is the shortest one. Tectonic motions are constrained by surrounding plates to move along a restricted set of paths, and some of those likely fit into the mind more easily than others (we will return to this in a future essay on the Falkland Islands).

The history of science is very clear on this point: It is hard to change a human (scientist's) mind. The question is: Why? Certainly, science is an inherently conservative enterprise in which new models have the burden of proof. That explanation, however, is insufficient for the rejection of the paleomagnetic data that are 50 years old and very consistent. We offer four possibilities. First, our mental models guide what we attend to, so that we may not notice inconsistent information. Further, even if we notice something is contradictory, we may "weigh" the consistent evidence higher than the inconsistent evidence. Second, we judge a mental model as right or wrong based on the ease of thinking it. A long-held and familiar model tends to feel correct and thus is unlikely to change. The third reason has to do with scientists' mental models of themselves. Everyone has a mental model of their mind, or a sense of self, known as an ego in psychology. If one's model of the mind is rational and competent, errors are inconsistent with that model. As described above, inconsistent data tend to be overlooked or ignored. Alternatively, one can adopt a model of the mind that embraces uncertainty and being the type of person who can be wrong. This approach allows mental models of the world to change.

The last possibility is that the complexity of Earth does not align well with the ways in which the mind constructs inferences from observations. There is general agreement that Earth is a complex system, so it should be expected that it does not always behave in simple ways. Simplicity is not, in itself, evidence for Earth processes. The title for this essay, "Beware Occam's Razor," is intended to convey the reasoning fallacy of calling on simple models to explain complex systems. One's perceptual and cognitive processes also follow the simplicity principle at the core of Occam's razor. This bias may be part of why minimal offsets—whether related to Cordilleran tectonics or continental drift—seem correct: It makes them easy to think and hard to see the alternatives. Thus, the appeal to simplicity reflects the way the mind works with incomplete data that impedes—for good and ill—changes to our minds.

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This essay series is a joint effort of the National Association of Geoscience Teachers (NAGT) and the Geological Society of America (GSA). Anne Egger, Executive Director of NAGT, served as the associate editor.

Drill, Baby, Drill – For Hydrogen

Robert J. Stern[*,1]

Hydrogen is a powerful, portable fuel that is especially useful for transportation. It has an energy density that is greater than that of diesel or gasoline and can refuel a vehicle as fast as liquid hydrocarbons. Today, hydrogen is mostly made from water or natural gas, requiring significantly more energy than it provides when used as a fuel. For that reason, hydrogen is generally regarded as an energy storage media, not an energy source. That may be changing as evidence accumulates that hydrogen gas is coming out of the Earth (Arrouvel and Prinzhofer, 2021; Zgonnik, 2020; Ellis and Gelman, 2024) and that there are significant hydrogen deposits (white or natural hydrogen) that we can economically access with modern drilling techniques. This is very exciting because using natural hydrogen as a fuel could transform our economy at the same time it allows us to address global climate change by reducing carbon dioxide emissions. A concerted effort to figure this out is needed, and the geoscientific community should lead the effort. How do we do this?

First, we need to figure out where natural hydrogen deposits exist so that somebody or some company can find it, exploit it, and make lots of money. Natural hydrogen needs the equivalent of Marshall's 1848 discovery of gold in California or Drake's 1859 discovery of oil in Pennsylvania. We need a "hydrogen rush," beginning with somebody getting rich by finding and exploiting a hydrogen deposit. How do we help make this happen?

To set the stage for the "hydrogen rush," we need to better understand how hydrogen is generated in the Earth and migrates up to a trap where it accumulates: the hydrogen system. Advancing our understanding of the hydrogen system requires modifying the well-established petroleum system approach (Perrodon, 1992). The petroleum system concept is based on a sequence of processes in a sedimentary basin, starting with the genesis of oil or gas from source rocks, which then migrates upward or laterally to be trapped beneath some sealing layer or structure where it accumulates. Adaptation of the petroleum system approach to develop a hydrogen system approach (Saucier, 2025) focuses attention on sedimentary basins as the best places to look for economic hydrogen deposits.

Only sedimentary basins can have all three hydrogen system components: source, migration pathway, and trap. Migration of hydrogen is expected because this minuscule molecule is light and easily escapes from its source, but sources and traps are more problematic. What overlying lithologies can serve as seals to trap hydrogen and keep hungry microbes away? That key question is not addressed here beyond the observation that such traps can only be found in sedimentary basins, both onshore and offshore; this is where the search for geologic hydrogen must focus. Understanding hydrogen source rocks is the other big challenge, which we explore below.

Eight ways to make hydrogen were identified by Blay-Roger et al. (2024), but four are important: radiolysis, serpentinization, pyrolysis, and flux from the mantle (Fig. 1). Breakdown of water due to radioactivity (radiolysis) may be important in old, K-rich granites (Crowell, 2003). Water-rock interactions involve the reduction of water by oxidization of Fe^{2+}-bearing minerals, especially accompanying serpentinization (Jackson et al., 2024); this is the Schikorr reaction (Blay-Roger et al., 2024). Methane dissociates at high temperatures into H_2 and graphite as a result of pyrolysis. Horsfield et al. (2022) studied the ultradeep drill-hole Songke-2 well, which was drilled to 7018 m and into

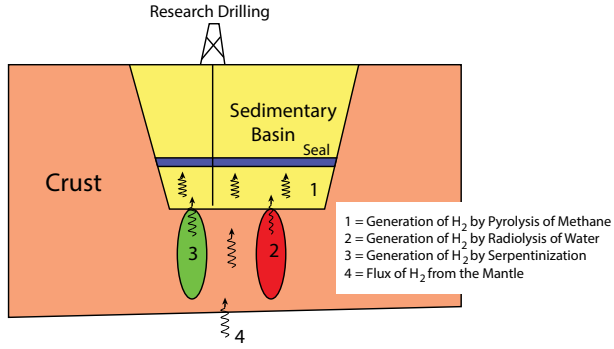

Fig. 1

Figure 1. Conceptual diagram for hydrogen formation, migration, and sedimentary basins.

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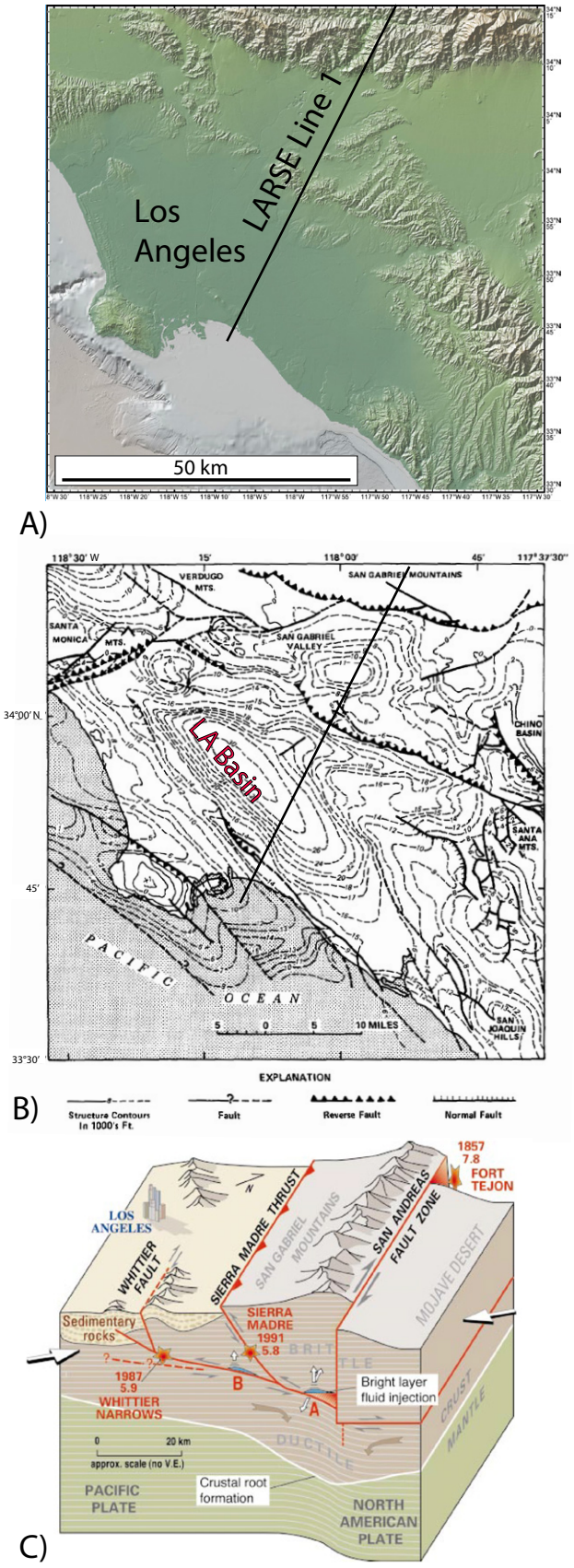

basement in the Songliao Basin of NE China, an established petroleum province. They found significant hydrogen in the crust under the sediments, beneath the stability field of methane. The helium isotope R/Ra ratio of 0.04–4.0 indicates that He (and perhaps H_2) was a mixture of crustal- and mantle-derived gases. Horsfield et al. (2022) concluded that hydrogen was created from breakdown of organic material. By analogy with 3He flux, hydrogen may also leak out of the mantle. These four processes dictate that we should look for economic hydrogen in sedimentary basins built above or around ancient evolved continental crust (radiolysis), that are methane-rich, deep, and hot (pyrolysis), that are underlain by olivine-rich rocks (serpentinization), and that are likely to have experienced a significant helium and hydrogen flux from the mantle. Figure 1 summarizes these four processes.

The inescapable conclusion is that we need to geophysically image and then drill deep into a sedimentary basin to better understand the hydrogen system and see how much hydrogen is there. But where to do this? Surprisingly, the Los Angeles basin, which lies beneath the United States' second largest city, may be best. This complex Neogene basin is one of the deepest onshore basins in the United States, filled with 30,000 ft (9144 m) of sediments (Fig. 2; Biddle, 1991). It is flanked on the east by ancient (Paleoproterozoic) rocks intruded by enriched Mesoproterozoic and Mesozoic plutons, providing opportunities for H_2 formation by radiolysis. The crust beneath the basin is thin (<10 km thick; Sawyer et al., 1987), suggesting that easily serpentinized olivine-rich oceanic crust may exist there, providing another source of hydrogen. Abundant faults provide many pathways for hydrogen generated in old continental crust, from serpentinization reactions, or escaping from the mantle to flow into the basin. Finally, the Los Angeles Basin is the richest basin in the world in terms of hydrocarbons per volume of sedimentary fill (Biddle, 1991). This, coupled with its great depth and high heat flow, means that there is excellent opportunity for hydrogen generation by pyrolysis.

Others may disagree that this is the best initial basin to explore for natural hydrogen, and other candidates such as the Permian Basin or Anadarko Basin, or a U.S. passive margin, should be considered. In any case, we need to identify one or more basin(s) to geophysically image and then choose one to drill into deeply and into basement, coring and sampling gasses all the way down. Let's get started, shall we?

Figure 2. The Los Angeles basin hydrogen target. (A) Topography map from GeoMapApp, showing approximate trend of LARSE 1 line (Fuis et al., 2001). (B) Major structures and structural contours on top of basement, Los Angeles Basin (adapted from Biddle, 1991). The deepest penetration was drilled to 20,736 ft (6320 m). (C) Block diagram showing interpreted tectonics from seismic experiment of Fuis et al. (2001). Active faults are in orange; moderate and large earthquakes are orange stars with dates, magnitudes, and names. Gray half-arrows show relative fault motions. Small white arrows show block motions near bright reflective zones A and B (hydrogen pockets?). Large white arrows show convergence direction of Pacific and North American plates. Fluid injection (hydrogen?) is indicated by small lenticular blue areas in bright reflective zones A and B. V.E.—vertical exaggeration.

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It is my pleasure to welcome you to San Antonio, Texas, for GSA Connects 2025! San Antonio, the seventh-largest city in the U.S., sits at the meeting of the coastal plain and the hill country, shaped by more than 300 years of history and a rich geologic past. The underlying geologic structure of the area was formed by the Late Triassic–Early Jurassic separation of the North American, South American, and African plates. The expanding and subsiding Gulf of Mexico basin accommodated as much as 15,000 meters of Mesozoic and Cenozoic sediments. The Balcones Fault Zone divides the uplifted Cretaceous marine section of the hill country from the Cenozoic terrigenous clastic formations of the coastal plain. The city of San Antonio owes its existence to groundwater from the fractured and karstic limestone of the Lower Cretaceous Edwards Group, which naturally discharges at valley springs along the Balcones Fault Zone, forming the headwaters of several coastal rivers.

Indigenous people camped near the headwaters of the San Antonio River and San Pedro Creek for nearly 10,000 years. Spanish settlers arrived in the early 1700s, followed in the 19th century by other European and U.S. settlers. Today, this unique history and geology are reflected in the themes of GSA Connects 2025: Energy & Resource Innovations in the 21st Century, highlighting the Eagle Ford Shale as one of Texas' most productive formations; Geology Without Borders, emphasizing the migration of agriculture, culture, and resources between nations; and From Earth to the Cosmos: Geoscience Beyond Our Planet, underscoring Texas' role as a hub for planetary science.

The 2025 GSA Connects meeting will be held at the Henry B. González Convention Center, the largest in South Texas and conveniently located near Austin, Dallas, and Houston. The meeting will feature a full program of technical sessions, Pardee Symposia, short courses, and field trips, with engaging activities designed for students, early career geoscientists, and K–12 educators, alongside a vibrant exhibit hall.

If you need a break from the meeting, San Antonio offers plenty to explore. Natural Bridge Caverns, the most extensive cave system in the area, invites visitors underground to experience Texas' karst landscapes. Mission Concepción and Mission Espada, both national historic landmarks, showcase 18th-century architecture and history. Enchanted Rock State Natural Area features an enormous pink granite dome perfect for hiking. You can also stroll along the San Antonio River Walk, take a boat tour, or visit the historic San Pedro Springs. And of course, no visit would be complete without experiencing the Alamo. A walk from the convention center through the Alamo leads to the San Antonio Museum of Art and the Pearl, a repurposed brewery now home to gourmet eateries, artisan shops, and a bustling marketplace.

San Antonio is also known for its culinary excellence, with a diverse dining scene within walking distance of the convention center. From traditional Mexican and Tex-Mex to Latin American, Caribbean, and Mediterranean cuisines, the city offers something for every palate.

We look forward to welcoming you to San Antonio for this exciting gathering of geoscientists, where you will engage in cutting-edge discussions, explore a fascinating landscape, and experience all that this vibrant city has to offer.

Enjoy GSA Connects 2025!

Saugata Datta
GSA Connects 2025 General Chair

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Important Dates

Abstracts Open: 1 May

Early Option Abstract Decision Deadline: 15 May

Housing Registration Opens: 2 June

Meeting Registration Opens: 3 June

Abstract Submission Deadline: 5 August

Early Meeting Registration Rate Deadline: 27 August

Student Travel Grant Application Deadline: 27 August

Standard Meeting Registration Opens: 28 August

Space Request Deadline: 29 August

Cancellation Deadline: 12 September

Housing Reservation Deadline: 24 September

Standard Meeting Registration Rate Deadline: 2 October

Late Meeting Registration Opens: 3 October

Registration

This year, GSA is offering three registration tiers: Early, Standard, and Late. Secure your spot at Connects 2025 in San Antonio, Texas (19–22 October) by registering early and taking advantage of the lowest available rates.

CATEGORY	MEMBER STATUS	DURATION	EARLY (by 27 August)	STANDARD (by 2 October)	LATE
Professional	**Member**	Full	$655	$735	$830
Professional	**Member**	One Day	$375	$425	$475
Professional	Non-Member	Full	$895	$980	$1060
Professional	Non-Member	One Day	$525	$575	$625
Senior Professional	**Member**	Full	$370	$375	$500
Senior Professional	**Member**	One Day	$240	$260	$280
Lifetime	**Member**	Full	$655	$735	$830
Lifetime	**Member**	One Day	$375	$425	$475
Affiliate	**Member**	Full	$655	$735	$830
Affiliate	**Member**	One-Day	$375	$425	$475
Early Career Professional	**Member**	Full	$400	$440	$530
Early Career Professional	**Member**	One Day	$265	$285	$350
Early Career Professional	Non-Member	Full	$510	$550	$640
Early Career Professional	Non-Member	One Day	$375	$395	$460
Student	**Member**	Full	$195	$239	$303
Student	**Member**	One Day	$125	$171	$216
Student	Non-Member	Full	$260	$305	$430
Student	Non-Member	One Day	$175	$222	$286
K–12 Teacher	**Member**	Full	$90	$90	$90
K–12 Teacher	**Member**	One Day	$60	$60	$60
K–12 Teacher	Non-Member	Full	$160	$160	$160
K–12 Teacher	Non-Member	One Day	$100	$100	$100
Guest/Companion			$125	$125	$125

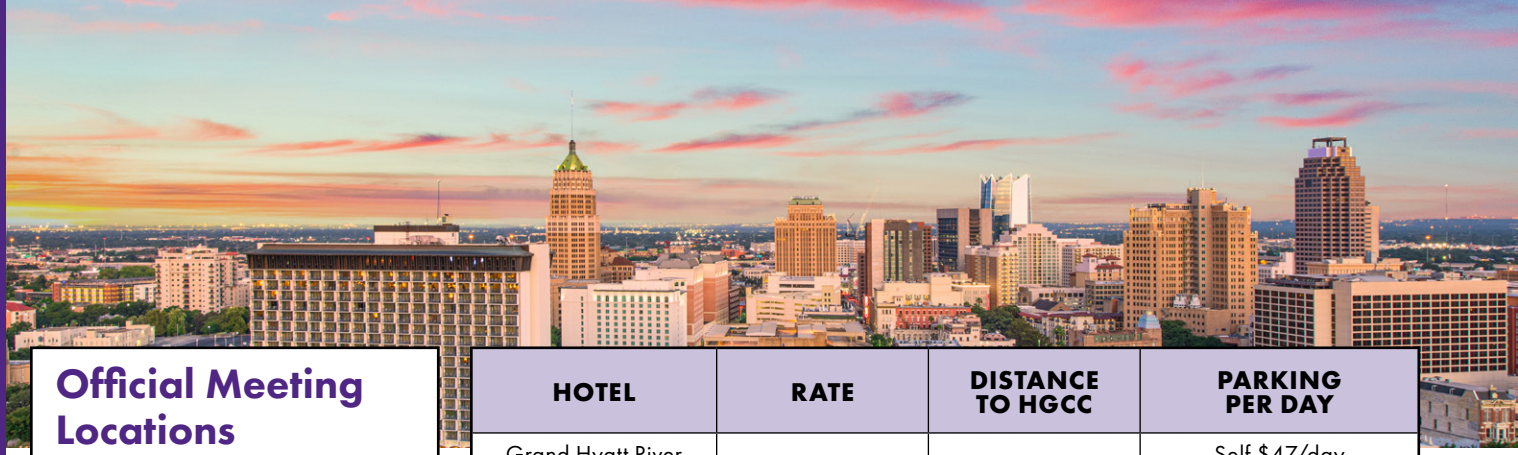
All rates are listed in U.S. dollars.

* The guest or companion registration fee is for nongeologists accompanying either a professional or student meeting registrant. This fee does not include access to technical sessions. Any guest wishing to see a specific presentation should go to the on-site Registration Desk to request a special pass.

GSA offers annual meeting registration discounts of 50% for individuals who both reside in and are citizens of upper-middle income countries, and 75% for those from low- and lower-middle income countries, as classified by the World Bank. These discounts do not apply to the K–12 or Guest registration categories.

Cancellation Policy: A $50 processing fee will be charged for the cancellation of a registration if received in writing prior to 11:59 p.m. MDT on 12 September 2025. No refunds will be given after the cancellation deadline for any registration type or events.

The Geological Society of America understands that unforeseen circumstances can prohibit attendance at the meeting. Refund requests for registration fees received after 12 September will be handled on a case-by-case basis. GSA will not accept any requests for refunds after 45 days from the end of the meeting.



Official Meeting Locations

HENRY B. GONZÁLEZ CONVENTION CENTER (HGCC)
900 E Market St,
San Antonio, Texas 78205

GRAND HYATT SAN ANTONIO RIVER WALK
600 E Market St,
San Antonio, Texas 78205

HOTEL	RATE	DISTANCE TO HGCC	PARKING PER DAY
Grand Hyatt River Walk (HQ)	$268	250 ft.	Self $47/day Valet $59/day
Hilton Palacio del Rio	$239	0.3 mi.	Valet only $55/day
Marriott Rivercenter	$264	0.2 mi.	Self $47/day Valet $60/day
Marriott Riverwalk	$264	210 ft.	Valet only $60/day
Sonesta ES Suites	$199	0.5 mi.	Valet only $40/day
Courtyard Marriott	$219	0.6 mi.	Valet only $49/day

ALERT: The official GSA housing bureau is Orchid.Events. To receive the GSA group rate at each hotel, reservations must be made through Orchid and not directly with the hotels. GSA and Orchid will NOT contact attendees directly to solicit new reservations. If you are contacted by a vendor who claims to represent GSA, please notify the GSA Meetings Department at meetings@geosociety.org. Please do not make hotel arrangements or share any personal information through any means other than a trusted, reliable source.

Transportation and Travel

San Antonio offers plenty of ways to explore, whether by car, bus, taxi, bike, scooter, or on foot! Stroll along the scenic River Walk, hop on a VIA Metropolitan Transit bus, rent a bike or e-scooter, or take a ride on a historic river barge taxi through downtown. Rideshare services and rental cars are also widely available, making it easy to venture beyond the city center. For a full guide to local transportation, visit **www.visitsanantonio.com**.

FLYING IN?

San Antonio International Airport (SAT) is your gateway to the heart of Texas, located just a short drive from downtown and the iconic River Walk. Alternatively, Austin-Bergstrom International Airport (AUS), about 80 miles north, offers another option—perfect for those who'd enjoy a scenic Texas road trip on their way to the city. However you arrive, San Antonio is ready to welcome you with its rich history, vibrant culture, and world-class attractions.

PREFER THE RAILS?

Amtrak's San Antonio Station, located at 350 Hoefgen Ave, provides convenient rail service for visitors and commuters alike. The station serves the Texas Eagle route, connecting San Antonio to major cities like Austin, Dallas, and Chicago. Just minutes from the Alamo and the River Walk, it's a relaxed and scenic way to reach the city.

Non-Technical Space Requests

Deadline for first choice
10 June

Please let us know about your non-technical events via our online event space and event-listing database via Submit Space Request: **https://community.geosociety.org/gsa2025/home.**
Meeting room assignments will be sent out mid-July.

Space is reserved on a first-come, first-served basis; in order to avoid increased fees, you must submit your request by 29 August 2025. The event space/event listing submissions should be used for:

- Business meetings, luncheons, receptions, town halls, etc.
- Events held at the Henry B. González Convention Center or Grand Hyatt San Antonio River Walk (HQ Hotel).
- Off-site events (events that are being held at another location in San Antonio that you have arranged on your own).

WHAT TO EXPECT WHEN PREPARING AND PRESENTING YOUR RESEARCH AT GSA CONNECTS 2025

Submit Your Abstracts!

Share your research at GSA Connects 2025! Abstract submissions related to the meeting themes—Energy and Resource Innovations in the 21st Century, Geology without Borders, and From Earth to the Cosmos: Geoscience Beyond Our Planet—are especially encouraged.

KEY ABSTRACT DEADLINES & GUIDELINES

- **Final Submission Deadline:** 5 August 2025
- **New Early Option Abstract Decision Deadline:** 15 May 2025
  - Authors who submit by this deadline will receive a review and decision by mid-June.
- Abstracts may be submitted to either a **topical session** or the **discipline pool.**
- **Title Limit:** 250 characters (including spaces)
- **Abstract Text Limit:** 375 words

THE TWO-ABSTRACT RULE

You may submit up to two abstracts as the presenting author **if:**

- One is for a **poster presentation**
- The abstracts cover **different content**

EXCEPTIONS:

- Invited submissions to **Pardee Keynote or topical sessions** do not count toward your limit.

Submission deadline:
5 August

SUBMIT HERE:

https://gsameetings.secure-platform.com/connects25

ABSTRACT FEES

- **GSA Members:** Professionals $60 | Students $25
- **Non-Members:** Professionals $80 | Students $50

PRESENTATION GUIDELINES

POSTER PRESENTERS

- GSA provides a free 8’ x 4’ (w x h) display board, push pins, and velcro for mounting.

ORAL PRESENTERS

- Presentation Length: 12 minutes + 3 minutes Q&A
- Check in at the Speaker Ready Room 24 hours before your session.
- Technical sessions include a PC with Windows; use a 16:9 screen ratio for slides.

KNOW BEFORE YOU GO

Submitting an abstract isn’t just about sharing research—it’s a commitment to presenting with **integrity and respect**. As an author and presenter, you agree to:

- **Commit to Present** – Ensure you’ll be there, ready to share and discuss your work.
- **Maintain Integrity** – Stay true to your abstract’s content and conclusions as reviewed.
- **Recognize Contributions** – Acknowledge co-authors, confirm their consent, and celebrate collaboration.
- **Ensure Excellence** – Deliver a high-quality presentation that reflects your dedication to research.

EXPLORING EARTH'S WONDERS

Field Trips at GSA Connects 2025 in San Antonio

GSA Connects 2025 in San Antonio, Texas, offers an exciting selection of field trips showcasing the region's geologic history, hydrogeologic systems, and cultural landscapes. These excursions provide hands-on exploration and expert-led discussions, offering insight into the processes that have shaped the landscape over millions of years.

STRATIGRAPHY & PLANETARY GEOLOGY

Stratigraphy and planetary geology are also key focuses, with excursions to the Grand Canyon and Las Vegas revisiting Cambrian stratigraphy with new geochemical insights. The Big Bend trip spans 500 million years of Earth history, from ancient marine platforms to Laramide deformation and volcanic activity. Impact crater studies take participants to Texas' confirmed and proposed structures, while the Kilbourne Hole trip explores maar volcanism and its significance for planetary analog research.

TEXAS GEOLOGY & HYDROGEOLOGY

Participants can explore Texas's varied geology through trips to Canyon Lake Gorge, the Balcones Fault System, and the Major Springs of the Balcones Escarpment, where they will investigate karst landscapes and regional water challenges. UT Austin's Choose Energy K–12 Outreach Program introduces educators and students to subsurface energy technologies, while other trips examine the Edwards and Trinity aquifers and their significance in one of the fastest-growing regions in the country.

GEOARCHAEOLOGY & CULTURAL LANDSCAPES

San Antonio's cultural heritage is deeply connected to its geology. The Valley of the Missions tour examines how geological resources shaped early Spanish settlements, while the San Marcos Springs trip integrates hydrogeology and archaeology. The Medina River Valley trip explores 18,000 years of climate change and human history through geoarchaeological analysis.

MODERN GEOSCIENCE APPLICATIONS

Modern geoscience applications round out the offerings. The San Miguel lignite mine tour provides a firsthand look at active mining operations and reclamation efforts. The Texas Hydro~Geo Workshop offers hands-on training in field methods, while the K/Pg boundary trip investigates impact evidence at Gulf Coast sites. The Permian Capitan Reef trip immerses participants in an ancient reef system with remarkable preservation.

These field trips provide a rare opportunity to engage with significant geologic sites, explore cutting-edge research, and gain valuable field experience. Secure your spot early for an unforgettable journey through deep time and dynamic landscapes! **For more details, visit https://community.geosociety.org/gsa2025/home or contact fieldtrip@geosociety.org.**

ADVANCE YOUR SKILLS

GSA Connects 2025 Short Courses

GSA Connects 2025 offers an exciting lineup of short courses designed to equip geoscientists with cutting-edge skills and knowledge across a range of disciplines. Whether you're looking to enhance your technical expertise, expand your research capabilities, or refine your communication and outreach strategies, these courses provide valuable professional development opportunities. Attendees can earn up to 0.8 CEUs for completing a course, with options available in online, hybrid, and in-person formats to suit different learning preferences.

EXPANDING TECHNICAL AND RESEARCH CAPABILITIES

Short courses will provide training in artificial intelligence applications for geoscience, data-driven research platforms, and advanced geospatial analysis techniques. Participants can explore digital outcrop modeling, 3-D visualization, and new approaches to structural geology.

APPLIED GEOSCIENCE AND INDUSTRY INNOVATIONS

Courses will cover topics such as aquifer storage and recovery, subsurface characterization, and the role of evaporitic sequences in energy decarbonization. Attendees can also gain insights into carbonate systems, geophysical exploration, and modeling techniques for resource management.

GEOCHEMISTRY, PETROLOGY, AND STRATIGRAPHY

Participants will have the opportunity to explore cutting-edge techniques in geochemical analysis, stratigraphy, and sedimentology. Topics will include applications of XRF, XRD, and X-ray CT analysis, petrochronology methods, and advancements in deltaic and carbonate sedimentology.

GEOSPATIAL AND REMOTE SENSING TECHNIQUES

Courses will offer training in remote sensing, GIS-based mapping, and LiDAR applications for geohazard assessment. Additional opportunities will focus on paleo-GIS software for plate tectonic reconstructions and mobile applications for field data collection.

PROFESSIONAL DEVELOPMENT AND OUTREACH

Science communication, education, and accessibility in geosciences will be central themes. Courses will explore best practices for outreach, fostering inclusive workplaces, and implementing strategies for sustainable productivity in academia.

CAREER DEVELOPMENT AND INDUSTRY APPLICATIONS

For those looking to advance their careers, courses will provide guidance on project valuation, capital markets, and career pathways in geoscience. Educators can also gain insights into innovative teaching strategies and curriculum development.

MENTOR AT CONNECTS 2025!

Share your knowledge with the rising community of geoscientists! We invite graduate students, early career professionals, professionals, and retirees to mentor students attending GeoCareers Day, Résumé Review, Drop-in Mentoring, Women in Geology, and the Networking Reception.

Contact Jennifer Nocerino at +1-303-357-1036 or jnocerino@geosociety.org to learn more.

SHARE YOUR RESEARCH

Submit Your Abstract to Any of These Exciting Technical Sessions

CONTINENTAL SCIENTIFIC DRILLING

T1. Integrating 20 Years of Scientific Drilling in the East African–Syrian Rift: A Session in Honor of Andrew Cohen

Endorsed by: GSA Continental Scientific Drilling Division; GSA Sedimentary Geology Division; SEPM (Society for Sedimentary Geology); GSA Limnogeology Division; GSA International
Advocates: Lisa Park Boush, Anders J. Noren, Michael M. McGlue, and Steven L. Goldstein

Continental drilling extending from the East African Rift into western Asia has yielded transformative discoveries, altering our understanding of paleoenvironments, paleoclimatology, paleoecology, and paleoanthropology. This session, in honor of Andrew Cohen, will celebrate these successes and define new directions.

T2. Investigating Earth's History with Continental Scientific Drilling

Endorsed by: GSA Continental Scientific Drilling Division; SEPM (Society for Sedimentary Geology); GSA Limnogeology Division; GSA Sedimentary Geology Division
Advocates: Lisa Park Boush, Michael M. McGlue, and Anders J. Noren

This session brings together research exploring Earth using subsurface geological datasets from continental scientific drilling, intended to be a broad showcase of research spanning structural geology, tectonics, natural hazards, sedimentology/stratigraphy, geothermal energy, critical minerals, deep biosphere, paleoclimatology, paleolimnology, and paleobiology

ECONOMIC GEOLOGY

T3. Critical Mineral Resources and Recovery in the Americas: Emerging Methods in Exploration and Sustainable Extraction

Endorsed by: GSA Energy Geology Division; GSA Environmental and Engineering Geology Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; GSA Geology and Society Division; GSA Geoscience Education Division; GSA Geoinformatics and Data Science Division; Association of American State Geologists (AASG); Sociedad Geológica Mexicana
Advocates: Daniel Alessi, Marek Locmelis, Fangshuai Wu, and Karthik Ramachandran Shivakumar

This session explores the role of critical minerals in technology and the low-carbon economy, focusing on geological discoveries, sustainable extraction methods, and recycling to support secure, environmentally responsible mineral supply chains in the Americas.

T4. Research to Accelerate Recovery of Critical Minerals from Primary and Secondary Resources

Endorsed by: GSA Energy Geology Division; GSA Sedimentary Geology Division; GSA Environmental and Engineering Geology Division; Association of American State Geologists (AASG); Sociedad Geológica Mexicana; Geochemical Society
Advocates: Guangping Xu, Dawn Wellman, Christina Lopano, and Mengling Stuckman

Innovative technology is needed to mine critical minerals to meet unprecedented demand. This session invites you to present research in characterization, extraction, separation, in situ recovery, and related areas that accelerate the recovery of critical minerals from traditional, secondary and unconventional resources.

T5. Sustainable Critical Mineral Extraction for the Global Energy Transition

Endorsed by: GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; GSA Environmental and Engineering Geology Division; GSA Energy Geology Division; Geochemical Society; Society of Economic Geologists; International Association of GeoChemistry; Association of American State Geologists (AASG); Sociedad Geológica Mexicana
Advocate: Ridi Diakondua Vuilawo

This session will explore sustainable practices in the extraction and management of critical minerals essential for the energy transition, focusing on energy storage, solar panels, batteries, and electric vehicles, addressing both technical and socio-environmental challenges.

ENERGY GEOLOGY

T6. Emerging Voices in Energy Geology Research: Contributions from Students and Early Career Professionals (Posters)

Endorsed by: GSA Energy Geology Division; GSA Sedimentary Geology Division; National Earth Science Teachers Association (NESTA); American Association of Petroleum Geologists (AAPG); Association of American

INDUSTRY TRACKS: Economic Geology · Energy · Engineering Geology · Hydrogeology and Environmental Geology

State Geologists (AASG)
Advocates: Qinhong Hu, Justin E. Birdwell, Marc L. Buursink, Denise J. Hills, Eric Stautberg, Anna Littlefield, and Lily Jackson

This session will focus on completed research and work in progress performed by students at all levels and early career professionals relevant to geologic energy with emphasis on the expansion of non-fossil energy resources.

T7. Energy-Water Nexus: Regional Issues and Potential Solutions

Endorsed by: GSA Energy Geology Division; GSA Hydrogeology Division; GSA Environmental and Engineering Geology Division; American Association of Petroleum Geologists (AAPG)
Advocates: Margo Regier, Deborah Glickson, Berry Tew, and Shemin Ge

Water and energy are deeply connected. Most energy production requires water, and water utilities can make up to 30–40% of municipal energy consumption. This session will explore regional water-energy issues and potential research, technological, and partnership solutions.

T8. Estimating Natural Resources Using Geoscience Data

Endorsed by: GSA Energy Geology Division; Society of Economic Geologists; GSA Geoinformatics and Data Science Division; American Association of Petroleum Geologists (AAPG); GSA Hydrogeology Division; Association of American State Geologists (AASG)
Advocates: Stanley Mordensky, Michael Chris Jenkins, and Lisa Stright

Methods to estimate the availability, location, and quantity of natural resources (e.g., geothermal, petroleum, critical minerals) vary by resource type, scale, and the availability of data. This session addresses resource modeling that targets any of these aspects.

T9. Faults, Fractures, and Geomechanics for the Energy Transition

Endorsed by: GSA Energy Geology Division; GSA Structural Geology and Tectonics Division; GSA Geophysics and Geodynamics Division; GSA Geoinformatics and Data Science Division; American Association of Petroleum Geologists (AAPG)
Advocates: Adam Cawood, David Ferrill, Kevin J. Smart, Qiqi Wang, John Hooker, Elizabeth Horne, Estibalitz Ukar, Amanda Hughes, Benjamin Surpless, and John Cannon

This session explores the critical role of structural geology and geomechanics in the energy transition, emphasizing multidisciplinary research on faults, fractures, and deformation processes to ensure sustainable and efficient management of subsurface resources.

T10. Geologic Energy Resources and Storage for Now and the Future

Endorsed by: GSA Energy Geology Division; GSA Sedimentary Geology Division; GSA Environmental and Engineering Geology Division; GSA Continental Scientific Drilling Division; American Association of Petroleum Geologists (AAPG); Association of American State Geologists (AASG)
Advocates: Qinhong Hu, Justin E. Birdwell, Marc L. Buursink, Denise J. Hills, Eric Stautberg, Anna Littlefield, and Lily Jackson

This session seeks contributions describing research on multi-resource development efforts, non-traditional uses of fossil fuels, natural hydrogen and helium, CCUS, enhanced geothermal energy, storage of hydrogen and compressed air, and enhanced methane recovery and carbon storage in coal.

T11. Joint SGD-SEPM-IAS Focus on Sedimentary Geology and Energy Transitions

Endorsed by: GSA Sedimentary Geology Division; SEPM (Society for Sedimentary Geology); International Association of Sedimentologists (IAS); GSA Energy Geology Division; GSA Continental Scientific Drilling Division; Association of American State Geologists (AASG)
Advocates: Jean Hsieh, Andrew Leier, and Amy L. Weislogel

This topical session is designed to explore how sedimentary geology underpins cutting-edge research, exploration, and decision-making in energy-resource development and to identify workforce-development priorities for sedimentary geologists supporting the energy transition.

T12. Lacustrine Depositional Systems Around the World: A Growing Energy Resource

Endorsed by: GSA Energy Geology Division; GSA Limnogeology Division; GSA Sedimentary Geology Division; GSA Continental Scientific Drilling Division; American Association of Petroleum Geologists (AAPG); GSA International
Advocates: Josh Sigler, Justin E. Birdwell, Qinhong Hu, and Ryan Gall

This session seeks contributions describing research into understanding the geologic features and petroleum system elements of modern and ancient lakes, with emphases on those being developed in the ancient lake basins of Western North America, Eastern China, and their analogues.

T13. Micro-Nano Scale Pore-Fracture Architecture and Fluid Dynamics in Shale and Coal Reservoirs

Endorsed by: GSA Energy Geology Division; SEPM (Society for Sedimentary Geology); GSA Structural Geology and Tectonics Division; American Association of Petroleum Geologists (AAPG); Microanalysis Society
Advocates: Mengdi Sun, Kouqi Liu, Rui Yang, Shengyu Yang, and Qiming Wang

THEMES: Geology without Borders · From Earth to the Cosmos: Geoscience Beyond Our Planet · Energy and Resource Innovations in the 21st Century

The exploration and development of shale and coal reservoirs are pivotal to modern unconventional fossil energy production. The intricate micro-nano scale pore-fracture architecture within these reservoirs significantly influences storage capacity, fluid occurrence, and migration dynamics.

T14. Sustainable Subsurface Pore Space Utilization: Site Selection, Characterization, and Modeling

Endorsed by: GSA Energy Geology Division; GSA Environmental and Engineering Geology Division; GSA Structural Geology and Tectonics Division; GSA Sedimentary Geology Division; GSA Geophysics and Geodynamics Division; GSA Hydrogeology Division
Advocates: Amanda Calle, Lily Jackson, Autumn Eakin, and Lorena Moscardelli

This session explores site selection, characterization, and modeling for pore space utilization, including hydrogen, natural gas, and CO^2 storage, waste disposal, geothermal development, and energy recovery. Emphasis is on project interactions, synergies, and storage integrity.

ENGINEERING GEOLOGY

T15. Landslide Instrumentation and Monitoring Systems: From "Tried and True" to Novel Methods

Endorsed by: GSA Environmental and Engineering Geology Division; GSA Quaternary Geology and Geomorphology Division; Association of American State Geologists (AASG); American Association of Petroleum Geologists (AAPG)
Advocates: Kelli Baxstrom, Skye C. Corbett, and Yuankun Xu

This session will showcase advances, innovations, failures, and reliable techniques in landslide instrumentation and monitoring. From satellite to drone-based to underground monitoring, telemetry, and everything in between, we invite contributions highlighting lessons learned and challenges overcome in landslide monitoring system evolution.

T16. Landslide Inventory Mapping and Next Steps: Assessing Susceptibility, Hazard Models, Risk, and Policy

Endorsed by: GSA Environmental and Engineering Geology Division; GSA Quaternary Geology and Geomorphology Division; GSA Geoinformatics and Data Science Division; Association of American State Geologists (AASG)
Advocates: Stephen Slaughter, Matthew Crawford, William J. Burns

This session will showcase approaches to landslide inventory mapping, landslide susceptibility, debris flow modeling, risk assessments, and data implementation at many stakeholder levels.

T17. Wildland Fire: An Agent of Geomorphic, Ecologic, and Societal Change

Endorsed by: GSA Environmental and Engineering Geology Division; GSA Hydrogeology Division; GSA Quaternary Geology and Geomorphology Division; GSA Geology and Society Division; GSA Soils and Soil Processes Division
Advocates: Andrew Graber, Alex Gorr, Luke McGuire, Jennifer Pierce, and Ann Youberg

This session will consider the impacts of wildland fire on landscapes and society and invites presentations from a wide variety of disciplines, such as water quality management, post-fire hazard prediction, fire ecology, soil science, and landscape and community recovery.

ENVIRONMENTAL GEOSCIENCE

T18. A Change in Focus for Sustainability in Geoscience Education

Endorsed by: GSA Geoscience Education Division; International Association for Promoting Geoethics (IAPG); National Earth Science Teachers Association (NESTA); Association of American State Geologists (AASG)
Advocates: Lisa Chaddock, Ellen Metzger, Jeffrey K. Greenberg, and Tricia R. Sears

This session explores innovative multidisciplinary structural and institutional strategies to incorporate sustainability and geoethics, geoheritage, cultural-environmental interactions, and traditional knowledge into geoscience education, making it more dynamic and appealing.

T19. Advances in Geospatial Applications for Environmental and Engineering Geology

Endorsed by: GSA Environmental and Engineering Geology Division; GSA Quaternary Geology and Geomorphology Division; GSA Hydrogeology Division; GSA Geoinformatics and Data Science Division; American Association of Petroleum Geologists (AAPG)
Advocates: Norman Levine, K. Adem Ali, and John Chadwick

Recent advancements in geospatial technologies have enhanced our ability to analyze, model, and predict geological and environmental processes with high precision. This session will explore the latest innovations in remote sensing, GIS, and data analytics applied to environmental engineering geosciences.

T20. Dynamics of Natural and Built Environments

Endorsed by: GSA Environmental and Engineering Geology Division; GSA Quaternary Geology and Geomorphology Division; GSA Hydrogeology Division; GSA Geology and Society Division; GSA Soils and Soil Processes Division; GSA Marine and Coastal Geoscience Division
Advocates: Ann M. Youberg, W. Paul Burgess, Luke McGuire, Ben Leshchinsky, Lauren Guido, and Grace Braver

INDUSTRY TRACKS: Economic Geology · Energy · Engineering Geology · Hydrogeology and Environmental Geology

Our communities, economies, and infrastructure depend on interactions between the natural and built environments. Engineered systems (e.g., earthworks, structures, utilities) must be resilient to evolving natural forcings, and similarly engineered systems must also minimize negative effects on the natural environment.

T21. Federal PFAS Remediation: Successes and Challenges

Endorsed by: GSA Environmental and Engineering Geology Division; GSA Hydrogeology Division; International Association of Hydrogeologists; International Association of GeoChemistry; Association of American State Geologists (AASG); American Association of Petroleum Geologists (AAPG)
Advocates: Sriram Madabhushi and Kent Glover

This session is focusing on recent successes and ongoing challenges for PFAS investigation and remediation projects within the federal government remediation programs. Agency representatives, support contractors, and PFAS remediation practitioners are welcome to present project successes and challenges.

T22. Fixing the Silent Leak: Identifying, Quantifying, Prioritizing, and Mitigating the Environmental and Health Impacts of Legacy Oil and Gas Drilling in North America

Endorsed by: Environmental and Engineering Geophysical Society; GSA Geology and Health Division; GSA Energy Geology Division; GSA Geoinformatics and Data Science Division; GSA Hydrogeology Division; GSA Environmental and Engineering Geology Division; Association of American State Geologists (AASG)
Advocates: Gianni Micucci, Ruta Basijokaite, Tao Wen, Katie Smye, Jean-Philippe Nicot, and Isabelle Cozzarelli

This session invites abstracts applying field studies, laboratory experiments, process-based and machine learning modeling, or multidisciplinary datasets to identify, quantify, and mitigate impacts from oil/gas wells of all types and statuses (active, abandoned, orphaned).

T23. Microplastics in the Environment

Endorsed by: SEPM (Society for Sedimentary Geology); GSA Environmental and Engineering Geology Division
Advocates: William Bailey, Madhumita Chakraborty, and Raja Das

Microplastics are becoming increasingly ubiquitous on Earth. This session aims to address sources and distribution of microplastics globally, characterization and quantification of microplastic hazards; impacts throughout the microplastic life cycle, and mitigation of microplastics-induced health effects.

T24. The Current Understanding of the Role of Wetland Hydrology in the Cycling of Elements and other Substances: A Technical Session in Memory of Paul H. Glaser

Endorsed by: GSA Hydrogeology Division; International Association of GeoChemistry; GSA Marine and Coastal Geoscience Division
Advocates: Donald Siegel and Don Rosenberry

This session addresses how wetland hydrology affects the cycling of carbon and other elements from both a scientific and regulatory perspective. Contributors to this session will address how changing wetland hydrology affects geochemical cycling on a global to local basis.

GEOARCHAEOLOGY

T25. Advances and Applications of Geochemistry in Archaeology

Endorsed by: GSA Geoarchaeology Division; Paleontological Society; GSA Geochronology Division; International Association of GeoChemistry
Advocate: Fred Andrus

Geochemistry has broad applications in archaeology. This session's goal is to stimulate collaborations between archaeologists and technical experts. Techniques and applications of interest include, but are not limited to, provenance, paleoenvironmental reconstruction, site formation, diet, subsistence, and age-dating.

T26. Aerial Imaging in Geoarchaeology: Advancing Landscape Interpretation and Site Discovery

Endorsed by: GSA Geoarchaeology Division; GSA Geoinformatics and Data Science Division; GSA Geology and Society Division; GSA Geoscience Education Division; GSA International; Society for American Archaeology
Advocate: Scott Pike

This session explores how aerial imaging technologies like drones, LiDAR, and multispectral imaging enhance geoarchaeological research. Presentations highlight applications in site discovery, landscape reconstruction, and heritage preservation, emphasizing interdisciplinary approaches and emerging trends in remote sensing for archaeological interpretation.

THEMES: Geology without Borders | From Earth to the Cosmos: Geoscience Beyond Our Planet | Energy and Resource Innovations in the 21st Century

T27. Geoarchaeology of Sites to Landscapes: Current Research on Long-Term Water and Soil Management and Maladaptation

Endorsed by: GSA Geoarchaeology Division; GSA Soils and Soil Processes Division; GSA Quaternary Geology and Geomorphology Division; GSA Geology and Society Division; GSA Hydrogeology Division; Society for American Archaeology

Advocates: Timothy Beach, Sheryl Luzzadder-Beach, Wilhemina Colón Loder, William S. Pratt, Byron Ashley Smith, Chris Ploetz, and J. Baldwin

This session brings together geoarchaeological projects from around the world that study ancient water and soil or agricultural management. This session will compare techniques, timing, and evidence for adaptation to past and present environmental changes.

T28. Geoarchaeology of the South-Central and Southwestern USA: Classic Questions and New Innovations

Endorsed by: GSA Geoarchaeology Division; Society for American Archaeology; GSA Soils and Soil Processes Division

Advocates: Samantha Krause and Marie White

The American Southwest and South-Central regions are rich locations for geoarchaeological investigation and have been for many decades. This session explores both geoarchaeological sites with prolific histories of excavation over many field seasons, and new areas/methods of study.

T29. The Future of Geoarchaeology: Advancing Methods, Accessibility, and Applications

Endorsed by: GSA Geoarchaeology Division; GSA Quaternary Geology and Geomorphology Division; GSA Soils and Soil Processes Division; Society for American Archaeology; GSA Geoinformatics and Data Science Division; American Quaternary Association

Advocates: Laura Murphy and Rebecca Taormina

This session explores the evolving role of geoarchaeology in cultural resource management, methodological advancements, and increasing accessibility to data. We invite discussions on training new researchers, expanding digital resources, and shaping the discipline's future in archaeological science.

T30. Timestamped Biomineralized Structures in Coastal Environmental Monitoring and Cultural Research

Endorsed by: GSA Geoarchaeology Division; GSA Marine and Coastal Geoscience Division; GSA Geobiology and Geomicrobiology Division; GSA Quaternary Geology and Geomorphology Division; Paleontological Society; GSA Geochronology Division

Advocates: Natasha Leclerc, Veronica Vriesman, and Meghan Burchell

Sclerochronology, the study of biomineralized accretionary tissues, provides temporal reconstructions of biogeochemistry, climate, and human-environmental interactions over millennia. We invite sclerochronological abstracts with societal impacts related to environmental monitoring, conservation, and cultural or policy efforts.

GEOBIOLOGY AND GEOMICROBIOLOGY

T31. New Advances in Geobiology

Endorsed by: GSA Geobiology and Geomicrobiology Division; Paleontological Society; GSA Karst Division; GSA Limnogeology Division; Society for Environmental Geochemistry and Health; American Association of Petroleum Geologists (AAPG)

Advocates: Trinity Hamilton, Dylan Wilmeth, Ana Gonzalez-Nayeck, Katie Maloney, Lydia Tackett, Brandt Gibson, Diana Velazquez, Joseph Hoberg, and Caden Williams

This session will focus on new research at the intersection between geologic and biologic processes with special emphasis on novel materials and methods, new field sites, and advances at the intersections of scientific fields.

T32. New Approaches to Old Fossil Collections

Endorsed by: Paleontological Society; GSA History, Philosophy, and Geoheritage Division; ProGEO (International Association for the Conservation of Geological Heritage); Paleontological Research Institution

Advocates: William Matthaeus, Bryton A. Smith, Ingrid Romero, Jonathan P. Wilson, and Scott Wing

Material collected during the early history of paleontology conserves deep-time ecosystems and remains available for study. We invite presentations of new analyses and interpretations of well-studied collections in the context of the broader history of the discipline.

T33. New Voices in Geobiology

Endorsed by: GSA Geobiology and Geomicrobiology Division; American Association of Petroleum Geologists (AAPG)

Advocates: Trinity Hamilton, Dylan Wilmeth, Ana Gonzalez-Nayeck, Katie Maloney, Lydia Schiavo Tackett, Brandt Gibson, Diana Velazquez, Joseph Hoberg, and Caden Williams

This session will bring together new research focusing on the interplay between geologic and biologic processes with a special emphasis on work by early career scientists exploring new questions and hypotheses.

INDUSTRY TRACKS: Economic Geology · Energy · Engineering Geology · Hydrogeology and Environmental Geology

GEOCHRONOLOGY

T34. Advances and Applications in Geochronology for Interpreting Stratigraphic and Basin Records

Endorsed by: GSA Geochronology Division; GSA Sedimentary Geology Division; GSA Structural Geology and Tectonics Division; GSA Limnogeology Division; Microanalysis Society

Advocates: Glenn Sharman, Matthew A. Malkowski, Trystan Herriott, and Erin Donaghy

This session welcomes submissions related to applications of geochronology (e.g., U-Pb, $^{40}Ar/^{39}Ar$) in stratigraphic research, including topics such as eruption and maximum depositional age estimation, provenance analysis, numerical modeling of geochronological data, and multidisciplinary chronostratigraphic characterization.

T35. Broad Applications of Thermochronology to Understanding Geologic Rates and Processes Through the Sedimentary Record

Endorsed by: GSA Geochronology Division; GSA Sedimentary Geology Division; GSA Structural Geology and Tectonics Division; SEPM (Society for Sedimentary Geology)

Advocates: Barra Peak, Haley Thoresen, and Julie Fosdick

This session showcases the many ways mid-to-low temperature thermochronometers can be used in isolation or with additional chronometers to understand geologic processes preserved in the sedimentary record such as sediment provenance, source exhumation, burial, and/or erosion history.

T36. Building the South American Cordillera, Paleozoic to Recent: Insights from Geo-Thermochronology

Endorsed by: GSA Geochronology Division; GSA Structural Geology and Tectonics Division; GSA Sedimentary Geology Division; GSA International; SEPM (Society for Sedimentary Geology); American Association of Petroleum Geologists (AAPG); Sociedad Geológica Mexicana

Advocates: Julian Biddle, Chelsea Mackaman-Lofland, Juan E. Otamendi, and Ozan Sinoplu

An overview of the lithospheric development of the South American Cordillera since the Paleozoic. We invite submissions that utilize geochronology and thermochronology data for basement evolution, structural geology, basin analysis, and landscape evolution.

T37. Chronology of Orogenesis: Unlocking the Timelines of Mountain Building

Endorsed by: GSA Geochronology Division; Microanalysis Society

Advocates: Isabella Muller, Florian Hofmann, and Madison Preece

The focus of this session is the use of geochronological methods (including but not limited to U-Pb, Ar/Ar, FT, (U/Th)-He) to establish the timing of key events in mountain building, including different orogenic phases, exhumation, and uplift rates.

T38. From the Cosmos Back to Earth: Novel Applications of Cosmogenic Nuclide Dating Techniques

Endorsed by: GSA Geochronology Division; GSA Quaternary Geology and Geomorphology Division; GSA Structural Geology and Tectonics Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; American Quaternary Association

Advocates: Veronica Prush and Brad Sion

Cosmogenic nuclide (CN) dating techniques have revolutionized our ability to constrain timescales of geologic processes. We invite submissions that highlight novel techniques/applications of CN dating across Quaternary timescales in the expanding fields of soils, tectonics, geomorphology, and beyond.

T39. Geochronology of Critical Mineral Deposits with Special Reference to U-Th-Pb Dating of Common-Pb-Rich Minerals

Endorsed by: GSA Geochronology Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; Society of Economic Geologists; Mineralogical Society of America; Mineralogical Association of Canada; Microanalysis Society

Advocates: Paul Sylvester and A. Kate Souders

Radiometric dating of ore deposits containing critical minerals. Studies discussing analytical aspects of methods such as U-Th-Pb, Ar-Ar, Rb-Sr, Sm-Nd, Re-Os, and/or using radiometric ages for ore genesis research or critical mineral resource evaluation.

T40. Planetary Geochronology and Thermochronology: How Lessons Learned from Earth Samples, Meteorites, and Returned Samples Inform Future Research

Endorsed by: GSA Planetary Geology Division; GSA Geochronology Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division

Advocates: Kip Hodges and Blair Schoene

This session brings together GSA's solid earth science and planetary science communities to consider the current state and future prospects for isotopic geochronology and thermochronology of planetary samples.

THEMES: Geology without Borders · From Earth to the Cosmos: Geoscience Beyond Our Planet · Energy and Resource Innovations in the 21st Century

T41. Snowballs, Unconformities, BIFs, and Beyond: Navigating the Neoproterozoic Rock and Climate Records Using Geochronology

Endorsed by: GSA Geochronology Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; GSA Sedimentary Geology Division
Advocates: Liam Courtney-Davies, Anthony Fuentes, Barra Peak, and Adrian Tasistro-Hart

The Neoproterozoic comprised periods of upheaval in Earth's climate which changed the course of life and resulted in unique geologic features and formations. We welcome contributions applying geochronometers to investigate the timing of events and processes which shaped the Neoproterozoic.

GEOINFORMATICS AND DATA SCIENCE

T42. A Showcase of Student Research in Geoinformatics and Data Science (Posters)

Endorsed by: GSA Geoinformatics and Data Science Division; GSA Hydrogeology Division; GSA Geology and Health Division; GSA Environmental and Engineering Geology Division; GSA Geoscience Education Division
Advocates: Tao Wen, Anirudh Prabhu, Samuel Shaheen, Shanan Peters, Mir Md Tasnim Alam, C. Brenhin Keller, and Kerstin Lehnert

Students are invited to present original research posters relevant to geoinformatics and data science, including geospatial analysis, machine learning, big data, modeling, and visualization. Posters will be judged for divisional awards.

T43. Advancing Geologic Analysis with Digital Outcrops and Close-Range Remote Sensing Data

Endorsed by: GSA Structural Geology and Tectonics Division; GSA Geoinformatics and Data Science Division; Geological Society of Italy; GSA Marine and Coastal Geoscience Division; GSA Energy Geology Division
Advocates: Adam Cawood, Zachariah Fleming, Terry Pavlis, and Paul Nesbit

This session highlights close-range remote sensing techniques (e.g., photogrammetry, LiDAR, hyperspectral imaging) in geologic analysis, focusing on innovative methodologies, workflows, case studies, and applications in structural geology, sedimentology, paleobiology, and critical mineral exploration.

T44. Bridging the Past and Future: AI-Driven Insights from Paleoclimate to Modern Climate Adaptation

Endorsed by: GSA Geoinformatics and Data Science Division; GSA Continental Scientific Drilling Division; GSA Geophysics and Geodynamics Division; GSA International; GSA Marine and Coastal Geoscience Division
Advocates: Zong-Liang Yang, Manmeet Singh, Daniel O. Breecker, Anna Ruth Halberstadt, and Cornel Olariu

This session explores how AI integrates paleoclimate reconstructions with modern Earth system models to uncover mechanisms, controls, and tipping points in climate systems, fostering insights for adaptation and mitigation strategies amidst contemporary climate change.

T45. Deep-Time Digital Earth

Endorsed by: GSA Geoinformatics and Data Science Division; GSA Geoscience Education Division; GSA Geobiology and Geomicrobiology Division; SEPM (Society for Sedimentary Geology); GSA Marine and Coastal Geoscience Division; American Association of Petroleum Geologists (AAPG)
Advocates: Shuzhong Shen, James Ogg, and Monica Juvane

We invite overviews related to compiling and deciphering large regional to global-scale data sets on the fascinating history of our Earth and solar system, and to unraveling the interplay of processes that shaped the past.

T46. Digital Twin in Geosciences: Combining Real-Time Monitoring Data, AI, Modeling, and Simulation

Endorsed by: GSA Geoinformatics and Data Science Division; American Geosciences Institute; Geoscience Information Society; GSA Hydrogeology Division
Advocates: Dev Niyogi, Hassan Dashtian, Manmeet Singh, and Katie Smye

This session invites papers on all aspects of digital twins, from foundations to applications. Of particular interest are different case studies that the community would have used for DT applications ranging from subsurface to atmosphere.

T47. Expanding Geology's Horizons: Geoinformatics, Open Science, and Open Data

Endorsed by: GSA Geoinformatics and Data Science Division; GSA Marine and Coastal Geoscience Division
Advocates: Tao Wen, Anirudh Prabhu, Samuel Shaheen, Shanan Peters, Mir Md Tasnim Alam, C. Brenhin Keller, and Kerstin Lehnert

This session highlights the development of new methodologies for collecting, sharing, and analyzing geological datasets and the advancement of FAIR (findable, accessible, interoperable, and reusable) data practices.

INDUSTRY TRACKS: Economic Geology · Energy · Engineering Geology · Hydrogeology and Environmental Geology

T48. Geologic Maps and Their Derivatives (Posters)

Endorsed by: Association of American State Geologists (AASG); Geological Society of Italy; Sociedad Geológica Mexicana

Advocates: Richard Berg and Harvey Thorleifson

This poster session will highlight new geologic maps, mapping programs, and innovations in geological mapping, including data management, web accessibility, 3-D, and applications in water and land management.

T49. GIS-Based Risk Assessment and Hazard Mapping

Endorsed by: GSA Geoinformatics and Data Science Division; GSA Quaternary Geology and Geomorphology Division; GSA Structural Geology and Tectonics Division; GSA Hydrogeology Division; GSA Environmental and Engineering Geology Division; GSA Geology and Health Division

Advocate: Ashvin Wickramasooriya

This session on "GIS-Based Risk Assessment and Mapping" aims to explore the critical role of Geographic Information Systems (GIS) in identifying, analyzing, and visualizing various types of risks, including natural hazards, environmental threats, and public health challenges.

T50. Harnessing Earth Intelligence to Promote Data-Driven Geoscience Innovation and International Collaboration

Endorsed by: GSA Geobiology and Geomicrobiology Division; Paleontological Society; GSA Geoinformatics and Data Science Division

Advocates: Zhenhong Du and Jin Qi

Artificial intelligence (AI) is rapidly being integrated into earth science, and geology also needs empowerment through AI and advanced technologies. This session will discuss how Earth Intelligence can help geoscientists to innovate and foster future international cooperation.

T51. LLMs and other AI Tools: A Revolution for Geoscience Research

Endorsed by: GSA Geoinformatics and Data Science Division; GSA Geoscience Education Division; SEPM (Society for Sedimentary Geology); GSA International; GSA Energy Geology Division

Advocates: Jiepeng Ye, Richard Chuchla, Yitian Xiao, and James Ogg

We will explore the transformative potential of large language models (LLMs) and related AI tools for deciphering geoscience datasets and for unraveling the interplay of processes that govern the Earth system.

T52. Transforming Earth and Planetary Science Through Data and Data Management: In Honor of MSA Distinguished Public Service Medal Awardee, Kerstin Lehnert

Endorsed by: GSA Geoinformatics and Data Science Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; GSA Planetary Geology Division; Geochemical Society; Mineralogical Society of America; European Geosciences Union

Advocates: Shaunna Morrison, Anirudh Prabhu, and Xiaogang Ma

This session honors MSA Distinguished Public Service Medalist Kerstin Lehnert, celebrating her transformative contributions to geoinformatics and data stewardship. We invite studies on data-driven science, FAIR data practices, and large-scale data resources in earth and planetary science.

GEOLOGY AND HEALTH

T53. Emerging Contaminants: Geochemical Insights and Impacts on Human and Environmental Health

Endorsed by: GSA International; GSA Geology and Health Division; GSA Hydrogeology Division; GSA Environmental and Engineering Geology Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; International Association of GeoChemistry

Advocates: Srimanti Duttagupta, Avishek Dutta, and Abhijit Mukherjee

This session addresses advanced detection techniques, ecological impact assessments, and innovative remediation strategies for emerging contaminants focusing on safeguarding geohealth and ensuring sustainable protection of ecosystems and human health.

T54. Indigenous Teaching and Research in the Geosciences: Approaches to Indigenizing Geoscience Across Multiple Contexts

Endorsed by: GSA Geology and Health Division; GSA Environmental and Engineering Geology Division; GSA Diversity in the Geosciences Committee; International Association for Geoscience Diversity; GSA Geoscience Education Division

Advocates: Darryl Reano, Wai Allen, Abhishek RoyChowdhury, Darlene Wilson, and Kenneth Ridgway

We will discuss the outcomes and evidence of successful approaches to Indigenous community-driven science. We invite abstracts on convergence research relating to water use, energy/mineral needs, climate change, STEM curricula, and Traditional Ecological Knowledge as they pertain to Native communities.

THEMES: Geology without Borders | From Earth to the Cosmos: Geoscience Beyond Our Planet | Energy and Resource Innovations in the 21st Century

GEOLOGY AND SOCIETY

T55. Beyond the Traditional Geologic Map: Geologic Data Synthesis to Serve Societal Needs

Endorsed by: Association of American State Geologists (AASG); GSA Environmental and Engineering Geology Division; GSA Energy Geology Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; GSA Quaternary Geology and Geomorphology Division; GSA Structural Geology and Tectonics Division
Advocates: Jenna Shelton and Donald Sweetkind

Geologic maps of the surface and subsurface are foundational tools applicable to addressing many societally relevant earth science issues. This session welcomes submissions related to innovative uses of geologic map data to solve critical earth science problems.

T56. Community Engaged Research for Environmental Sustainability and Community Resilience

Endorsed by: International Association of GeoChemistry; Geoscience Society of New Zealand; GSA Marine and Coastal Geoscience Division
Advocates: David Bahamon Pinzon, Helen Siegel, and Jay L. Banner

We welcome transdisciplinary submissions with a strong focus on community engagement in research development or implementation, especially research addressing issues of sustainability in water, air quality, land use, energy, climate change, and environmental justice.

T57. Disabled and Neurodivergent Perception, Community, and Identity in Geoscience

Endorsed by: GSA Geology and Society Division; GSA Geoscience Education Division; International Association for Geoscience Diversity; National Association of Geoscience Teachers (NAGT); NAGT Geoscience Education Research Division (GER); NAGT Teacher Education Division (TED); NAGT Geoscience Two-Year College Division (Geo2YC); National Earth Science Teachers Association (NESTA); American Association of Petroleum Geologists (AAPG); European Geosciences Union
Advocates: Taormina Lepore and Ian O. Castro

We invite contributors and audience participants of all backgrounds to learn, lead, and celebrate disability and neurodivergence as core to our fields and our collective and intersectional science identities.

T58. Estimating and Minimizing Health Impacts of Mining and Mine Wastes

Endorsed by: GSA Geology and Society Division; GSA Geology and Health Division; GSA Environmental and Engineering Geology Division; Society for Mining, Metallurgy & Exploration, Inc.; Association of Geoscientists for International Development; GSA Hydrogeology Division; Association of American State Geologists (AASG)
Advocates: James Kubicki and Gregory Wessel

This session addresses the impacts of mining where it crosses borders, be they national, administrative, or cultural, and how people on opposites sides of the borders can work together effectively for the benefit of all.

T59. Joint SGD-SEPM-IAS Focus on Sedimentologic and Societal Consequences of Extreme Weather Events

Endorsed by: GSA Sedimentary Geology Division; SEPM (Society for Sedimentary Geology); International Association of Sedimentologists (IAS); GSA Quaternary Geology and Geomorphology Division; Association of American State Geologists (AASG); GSA Geology and Health Division; American Association of Petroleum Geologists (AAPG)
Advocates: Bosiljka Glumac and Michael Savarese

This session explores the sedimentologic and geomorphic consequences of extreme weather events, their exacerbation by climate change, the risks they pose to society, and science's efforts to manage and mitigate these hazards.

T60. Opportunities for Geoscientists in the Rapidly Expanding Nuclear Energy Industry

Endorsed by: GSA Geology and Society Division
Advocate: Deb Luchsinger

The rapid growth of the nuclear energy industry has created a great need for geoscientists in a variety of capacities to support siting and licensing activities. Please join current experts to learn of their experience in this exciting industry.

T61. Shaping a Sustainable Future with Geology in the Twenty-First Century: Geology and Society Division Turns 22

Endorsed by: GSA Environmental and Engineering Geology Division; GSA Energy Geology Division; GSA Marine and Coastal Geoscience Division; GSA Geology and Society Division; Geological Society of Italy; Association of American State Geologists (AASG); GSA Energy Geology Division
Advocates: Alan Benimoff, M. Scott Harris, Denise J. Hills

This broadly interdisciplinary session seeks presentations on how geology positively impacts society for a globally sustainable future through workforce training, scientific advancement, resource development, hazard mitigation, energy challenges, climate change analysis, environmental stewardship, infrastructure development, and international collaboration.

INDUSTRY TRACKS: Economic Geology · Energy · Engineering Geology · Hydrogeology and Environmental Geology

GEOPHYSICS AND GEODYNAMICS

T62. Geophysical and Tectonic Investigations in Africa

Endorsed by: GSA Geophysics and Geodynamics Division; Geological Society of Africa; GSA Energy Geology Division; GSA Structural Geology and Tectonics Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division

Advocates: Kevin Mickus and Luelseged Emishaw

Abstracts are requested for geophysical and tectonic investigations in Africa. These investigations can involve mineral, energy, and groundwater resources, as well as tectonic, geomorphological, and archaeological studies that involve geophysics.

T63. Geophysics in Investigating and Exploring for Mineral, Energy, and Groundwater Resources

Endorsed by: GSA Geophysics and Geodynamics Division; GSA Energy Geology Division; GSA Hydrogeology Division; Society of Economic Geologists; Society of Exploration Geophysicists; Association of American State Geologists (AASG)

Advocate: Kevin Mickus

Abstracts are requested for research that incorporates geophysics to investigate and explore for mineral, energy, and groundwater resources.

T64. Linking Mineral Resources and the Geologic Framework of North America: The USGS Earth Mapping Resources Initiative (Earth MRI) and Related Activities

Endorsed by: GSA Geophysics and Geodynamics Division; Association of American State Geologists (AASG); Society of Economic Geologists; GSA Structural Geology and Tectonics Division; Society of Exploration Geophysicists

Advocates: Benjamin Drenth, James V. Jones III, Anjana Shah, Douglas Kreiner, Arthur Merschat, and Laurel Woodruff

Knowledge of the geologic framework and mineral resources is improving through new geologic mapping, airborne geophysics, geochemistry, and LiDAR acquisition, especially through Earth MRI. We welcome submissions of Earth MRI research and similar studies linking framework geology and mineral resources.

T65. Using Near-Surface Geophysics to investigate Geological Problems

Endorsed by: GSA Geophysics and Geodynamics Division; GSA Energy Geology Division; GSA Environmental and Engineering Geology Division; GSA Geoarchaeology Division; GSA Hydrogeology Division; GSA Karst Division

Advocate: Kevin Mickus

Abstracts are requested that use geophysics to solve a wide variety of near-surface geological problems including hydrology, karst, environmental, engineering, archaeological and geological mapping.

T66. Woollard Session: How Are Mountains Built? Insights from Observations, Subsurface Imaging, and Modeling of Orogenic Terranes

Endorsed by: GSA Geophysics and Geodynamics Division; GSA Structural Geology and Tectonics Division; American Association of Petroleum Geologists (AAPG)

Advocates: Anjana Shah, Shannon Dulin, Amanda Hughes, and Ting Chen

New insights into mountain-building processes in compressional environments can be obtained from various types of subsurface imaging, modeling, and other approaches. This session honors 2024 Woollard Awardee Larry Brown and will include the 2025 Woollard Award keynote talk.

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GEOSCIENCE AND PUBLIC POLICY

T67. Geoscience and Water: How Geoscience Affects Water-Related Public Policy–Past, Present, and Future

Endorsed by: GSA Hydrogeology Division; GSA Geology and Society Division; GSA Environmental and Engineering Geology Division; Geological Society of Africa; Association of American State Geologists (AASG)

Advocates: Christopher Carlson and Maureen Muldoon

A session highlighting how applied geoscience research affects water policy and management at local to international scales.

T68. Science and Stewardship of U.S. National Park Service Paleontological Resources

Endorsed by: Paleontological Society; ProGEO (International Association for the Conservation of Geological Heritage); National Earth Science Teachers Association (NESTA); Paleontological Research Institution

Advocates: Vincent Santucci, Justin S. Tweet, and Christy C. Visaggi

The National Park Service continues to advance and implement strategic approaches in the management of paleontological resources. This session showcases contributions to inventorying, monitoring, research, outreach, and other aspects of management, stewardship, and science of park fossils.

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GEOSCIENCE EDUCATION

T69. 2YC and 4YCU Geoscience Student Research Poster Showcase

Endorsed by: GSA Geoscience Education Division; American Geophysical Union; GSA Limnogeology Division; Geological Society of Africa; National Association of Geoscience Teachers (NAGT); NAGT Geoscience Two-Year College Division (Geo2YC); NAGT Teacher Education Division (TED)
Advocates: Gretchen L. Miller, Kelsey Russo-Nixon, Jessica Kelley, Ian Brown, and Stephanie Rollins

This session is designed for two-year college (2YC) and four-year college and university (4YCU) students presenting research posters in any sub-discipline of geoscience.

T70. Balancing Tradition and Innovation: Evolving Geoscience Curricula for a Changing World

Endorsed by: GSA Geoscience Education Division; American Geosciences Institute; National Association of Geoscience Teachers (NAGT); NAGT Teacher Education Division (TED)
Advocates: Miriam Barquero Molina and Angela Van Boening

This session examines geoscience curricula balancing traditional foundations and innovative, interdisciplinary approaches. We invite abstracts exploring how programs address evolving societal challenges while preparing students for licensure exams and diverse career pathways.

T71. Current Advances in Geoscience Education Research

Endorsed by: GSA Geoscience Education Division; National Association of Geoscience Teachers (NAGT); NAGT Geoscience Education Research Division (GER); GSA Geoinformatics and Data Science Division; Geological Society of Italy; National Earth Science Teachers Association (NESTA)
Advocates: Larry Collins Jr., Victor J. Ricchezza, Stacy Yager

This session will highlight empirical research being done in the field of geoscience education. We welcome submissions from geoscience education researchers at all career stages to showcase projects that highlight current areas of interest in the discipline.

T72. Diversifying Geoscience Education Across the Academic Playing Field: Using Creative Methods to Foster the Current and Next Generations of Geoscience Professionals

Endorsed by: GSA Geoscience Education Division; National Association of Geoscience Teachers (NAGT); NAGT Teacher Education Division (TED); NAGT Geoscience Two-Year College Division (Geo2YC); National Earth Science Teachers Association (NESTA); American Association of Petroleum Geologists (AAPG)
Advocates: Leonard Melzer, Steven Jaret, Maya Pincus, and Sarah L. Sheffield

A wide range of geoscience educators across several disciplines will share a multitude of diverse and innovative ideas regarding lesson plans, projects, and pedagogical techniques best suited for today's ever-changing classrooms.

T73. Geology Programs in an Environmental Science World

Endorsed by: GSA Geoscience Education Division; GSA Hydrogeology Division; GSA Environmental and Engineering Geology Division
Advocates: Edwin Romanowicz and Ben DeJong

This session explores ways to better promote geology degree programs as relevant and essential at a time when environmental science degree programs are flourishing while many geology programs are being closed.

T74. Geoscience Outreach Efforts to Broaden Participation

Endorsed by: GSA Geology and Society Division; Environmental and Engineering Geophysical Society; GSA Geoscience Education Division; GSA Geoinformatics and Data Science Division; National Earth Science Teachers Association (NESTA)
Advocates: Nazrul Khandaker and Taufique Mahmood

This session will highlight interdisciplinary outreach efforts that aim to broaden participation among high school and undergraduate students in the geosciences.

T75. Incorporating Course Based Research Experiences (CUREs) into Your Curriculum

Endorsed by: GSA Geoscience Education Division; Geological Society of Africa
Advocate: Evelynn Mitchell

The SERC site is great resource for geoscience educators, including the CURE collection on CUREnet. This session will allow educators to present about research they facilitate through their courses and provide information on publishing through CUREnet.

T76. Iris Moreno Totten Research in Geoscience Education Session

Endorsed by: GSA Geoscience Education Division; National Association of Geoscience Teachers (NAGT); NAGT Geoscience Education Research Division (GER); National Earth Science Teachers Association (NESTA)
Advocates: Elizabeth Kenderes and Larry Collins Jr.

This session will highlight empirical research being done in the field of geoscience education. Early career and student presenters will be considered for the Geoscience Education Division's Totten Awards.

INDUSTRY TRACKS: Economic Geology · Energy · Engineering Geology · Hydrogeology and Environmental Geology


Photo by Sara Cottle on Unsplash

T77. Making Sense of Methodologies and Theoretical Frameworks in Geoscience Education Research

Endorsed by: GSA Geoscience Education Division; National Association of Geoscience Teachers (NAGT); NAGT Geoscience Education Research Division (GER); NAGT Geoscience Two-Year College Division (Geo2YC); Geological Society of Italy
Advocates: Caitlin Callahan, Larry Collins Jr., Chris Mead, Kathryn Boyd, Samuel Nyarko, and Nina Morris

This session will explore the methods and theoretical frameworks from within and outside of GER that shape our field. Presenters are encouraged to highlight their decision-making process in research studies. New approaches and applications of established methods/frameworks are encouraged.

T78. Quantitative and Data Analytics Skills in Geoscience Education: Supporting Student, Course, and Program Outcomes

Endorsed by: GSA Geoscience Education Division; National Association of Geoscience Teachers (NAGT); NAGT Teacher Education Division (TED); GSA Geoinformatics and Data Science Division; National Earth Science Teachers Association (NESTA)
Advocates: Eric Baer, Rory McFadden, and Beth Pratt-Sitaula

Quantitative and data analytics skills are critical for geoscientists but often a barrier for students. This session includes strategies for skill development, from activities to geoscience-focused quantitative skills courses to departmental innovations supporting quantitative and analytics skills across degree programs.

T79. Undergraduate and Graduate Geoscience Student Lightning Talk Showcase (Lightning Talks)

Endorsed by: Council on Undergraduate Research Geosciences Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; Association of American State Geologists (AASG)
Advocates: Claire McLeod, James MacDonald Jr., and Ken Brown

This hybrid session offers undergraduate and graduate students the opportunity to present research findings in a brief, one-slide oral presentation (morning) and a poster presentation (afternoon). This session promotes science communication skills to audiences in multiple formats.

GEOSCIENCE INFORMATION/COMMUNICATION

T80. Best Practices for Developing International Collaborations in the Geosciences

Endorsed by: GSA International; International Association of GeoChemistry; European Geosciences Union
Advocates: W. Berry Lyons, Sharon Locke, and Ester Sztein

This session invites presentations on successful scientist-to-scientist international collaborations in the geosciences in research and educational activities, focusing on how they developed and keys to their success. It will also explore how organizations can help foster international collaborations/engagements.

T81. Fantastical Geographies: How to Use Your Geoscience Degree in Creative Outlets

Endorsed by: GSA Geoscience Education Division; National Earth Science Teachers Association (NESTA); American Association of Petroleum Geologists (AAPG); GSA Marine and Coastal Geoscience Division
Advocate: Ava Healy

What's the difference between paleogeosciences and fantasy? Nothing. Paleogeosciences rely on theories to hypothesize what happened millions of years ago, all with geological evidence. Isn't fantasy similar? This session focuses on expanding geoscientists' imaginations onto settings similar and unlike Earth.

T82. Geologic Mapping

Endorsed by: USGS National Cooperative Geologic Mapping Program; GSA Hydrogeology Division; Geological Society of Italy; Association of American State Geologists (AASG); American Association of Petroleum Geologists (AAPG); Sociedad Geológica Mexicana
Advocates: Brian Hunt, Jeffrey Paine, and Mark Helper

Showcase your latest geologic mapping methods, techniques, and map products! This poster session highlights new detailed geologic maps addressing critical minerals, land management, groundwater, coastal resources, geologic hazards, and other derivative maps. NCGMP map submissions are encouraged.

T83. Geoscience and Hydrology of Your Public Lands: STEM Internships, Research, Science, Mapping, Resource Management, and Education

Endorsed by: GSA Hydrogeology Division; National Cave and Karst Research Institute; GSA Soils and Soil Processes Division; Association of American State Geologists (AASG)
Advocates: Jason Kenworthy, Lesley Petrie, Limaris Soto, Chelsea Bitting, Steve Rice, and Brent H. Breithaupt

An interdisciplinary forum for geoscientists, land managers, educators, Scientists in Parks, Geoscientists in Forests, or GeoCorps participants or sponsors, to present their work and describe its relevance to the public and land managers.

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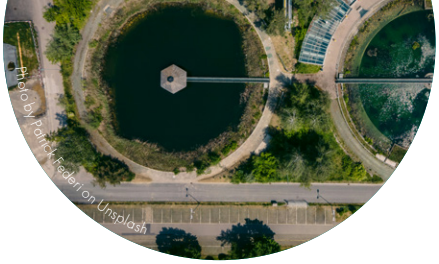

T84. Transforming Water Data into Actionable Information for Policy, Planning, and Management

Endorsed by: American Water Resources Association; Association of American State Geologists (AASG); GSA Geoinformatics and Data Science Division; GSA Hydrogeology Division
Advocates: Justin Thompson, Marcus Gary, and Mary Eminue

An exploration of contemporary methods, tools, and processes to transform the myriad available hydrologic data into information that is actionable by policymakers and water resource managers and planners. Presentations are expected to address forecasting and planning tools, info "dashboards," and more.

HISTORY AND PHILOSOPHY OF GEOLOGY

T85. Crossing Borders in the History and Philosophy of the Geosciences

Endorsed by: GSA History and Philosophy of Geology Division; History of Earth Sciences Society; Geological Society of Africa; GSA International
Advocates: Kerry Magruder, David Spanagel, Rex Hanger, Christopher Hill, and Patricia Coorough Burke

Presentations explore how the geosciences cross borders, whether disciplinary, geographical, national, political, institutional, social, or philosophical in nature, including women and minorities in geology, international and interdisciplinary collaborations, connecting the field and lab, colonialism, social aspects of geological maps, etc.

T86. Crossing Boundaries: Histories of Geoheritage

Endorsed by: GSA History and Philosophy of Geology Division; History of Earth Sciences Society; ProGEO (International Association for the Conservation of Geological Heritage); Spanish Geological Society's Geoheritage Commission; GSA International; European Geosciences Union
Advocates: Kerry Magruder, Rex Hanger, Renee M. Clary, Stephen K. Boss, Christopher Hill, and Patricia Coorough Burke

Presentations explore the range of meanings of geoheritage from a variety of perspectives that cross boundaries, whether historical, disciplinary, geographical, national, political, institutional, or philosophical in nature. Papers may address geo-sites and geo-collections which are contested, marginalized, or unjustly forgotten.

T87. One Century of Oil and Gas in the Permian Basin

Endorsed by: GSA History and Philosophy of Geology Division; History of Earth Sciences Society; American Association of Petroleum Geologists (AAPG); GSA Energy Geology Division; Sociedad Geológica Mexicana
Advocates: Francesco Gerali, Daniel Minisini, and Julie Bloxson

Times, colleagues, tools, and technology have all changed over the past 100 years. The professionalism and comradery of geologists in the Permian Basin remains. Historical perspectives to help innovate for the future.

HYDROGEOLOGY

T88. A Showcase of Undergraduate Research in Hydrogeology

Endorsed by: GSA Hydrogeology Division
Advocates: Megan Jones, Riliwan Abioye, Miguel Valencia, and Ayobami Oladapo

This session is designed for undergraduates presenting research and senior theses in the field of hydrogeology. Prizes will be awarded for top presentations. Employers and graduate advisers are encouraged to attend.

T89. Advanced Ground Surface Modeling for Hydrological and Environmental Applications

Endorsed by: GSA Hydrogeology Division; GSA Environmental and Engineering Geology Division; American Geophysical Union; American Institute of Professional Geologists; National Association of Black Geoscientists; GSA Geoinformatics and Data Science Division; GSA Marine and Coastal Geoscience Division
Advocates: Esther Oyedele and Oluwaseyi Dasho

This session will highlight advancements in ground surface modeling for hydrological and environmental applications, focusing on innovative techniques, integration with remote sensing, GIS, and hydrological models. We invite submissions on new methodologies, case studies, challenges, and interdisciplinary approaches.

T90. Advances in Ecohydrogeology

Endorsed by: Hydrogeology Division
Advocates: Abraham Springer, Susan Swanson, Dorothy Vesper, and Jeffrey Wilcox

Ecohydrogeology is the unifying, synthetic field of study integrating the approaches from the ecological and hydrogeological sciences in the study of groundwater-related ecosystems, habitats, and organisms. We encourage submissions of research that advances the science, stewardship, and policy at the intersection of ecology and hydrogeology.

INDUSTRY TRACKS: Economic Geology · Energy · Engineering Geology · Hydrogeology and Environmental Geology

T91. Advances in Managed Aquifer Recharge

Endorsed by: GSA Environmental and Engineering Geology Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; GSA Geophysics and Geodynamics Division; GSA Hydrogeology Division; International Association of Hydrogeologists; Association of American State Geologists (AASG)
Advocates: Gordon Osterman, Madeline Schreiber, and Desire Piphus

This session will present an interdisciplinary overview of the hydrological, geochemical, and geobiological processes and interactions associated with the practical implementation and operation of managed aquifer recharge strategies.

T92. Advancing the Understanding and Management of Groundwater Pollution with Arsenic and Other Geogenic Contaminants Using Geospatial Tools, Machine Learning, and Data Science

Endorsed by: GSA Hydrogeology Division; GSA Geology and Health Division; GSA International; GSA Geoinformatics and Data Science Division; GSA Geology and Society Division; International Society of Groundwater for Sustainable Development (ISGSD); Association of American State Geologists (AASG)
Advocates: Prosun Bhattacharya, Abhijit Mukherjee, Saugata Datta, Mohammad Ayaz Alam, Julian Ijumulana, and Bibhash Nath

The growing trend of data aggregation and analysis, along with emerging technologies like machine learning, has significantly improved our understanding of groundwater basins, enabling better assessments of water quality for direct consumption and treatment in groundwater supply management.

T93. Big Data and Machine Learning Applications in Hydrogeology

Endorsed by: GSA Hydrogeology Division; GSA Geoinformatics and Data Science Division; American Association of Petroleum Geologists (AAPG)
Advocates: Katherine J. Knierim, Paul Stackelberg, and Mason Stahl

This session welcomes research into the use of big data and machine-learning techniques to address complex problems in hydrogeology that were previously intractable.

T94. Coastal Hydrogeology in an Age of Rising Seas

Endorsed by: GSA Hydrogeology Division; International Society of Groundwater for Sustainable Development (ISGSD); GSA Environmental and Engineering Geology Division; National Ground Water Association; GSA Marine and Coastal Geoscience Division; Association of American State Geologists (AASG)
Advocates: Tara Root, Michael C. Sukop, Shellie Habel, Alicia Wilson, Holly Michael, Barret Kurylyk, Christopher Russoniello, and Miguel Valencia

As sea levels rise, understanding hydrogeology is crucial in coastal areas. Seawater intrusion can lead to loss of potable or agricultural water supplies, and water table rise due to increasing sea level can lead to increased flooding and affect infrastructure.

T95. Contaminants Near Groundwater-Surface Water Interfaces

Endorsed by: GSA Hydrogeology Division; International Association of Hydrogeologists; International Society of Groundwater for Sustainable Development (ISGSD); International Association of GeoChemistry; American Association of Petroleum Geologists (AAPG); GSA Geology and Health Division; Association of American State Geologists (AASG)
Advocates: Reid Buskirk, William D. Nguyen, and Holly Michael

Groundwater-surface water interfaces influence the transport and fate of contaminants in groundwaters and surface waters. Thus, learning about the behavior and interactions at and near the interfaces are important for understanding hydrogeochemical cycles as well as groundwater and watershed management.


Photo by Mathias Reding on Unsplash

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Photo by Jeremy Bishop on Unsplash

T96. Exploring Innovative Groundwater Use and Management: From Brackish Groundwater Mapping to Managed Aquifer Recharge and Other Tools for Water Supply Development and Operations

Endorsed by: GSA Hydrogeology Division; National Ground Water Association; American Water Resources Association; GSA Environmental and Engineering Geology Division; Association of American State Geologists (AASG); Sociedad Geológica Mexicana

Advocates: James Golab and Andrea D. Croskrey

Growing demand for water has led to innovations in groundwater management and production methods. This session explores developments in alternative groundwater water supplies and infrastructure, including brackish groundwater desalination, managed aquifer recharge, stormwater management, and others.

T97. Geoscience in the AI Era: From Predictive Models to Real-Time Applications

Endorsed by: International Association of Hydrogeologists; Environmental and Engineering Geophysical Society; SEPM (Society for Sedimentary Geology); GSA Hydrogeology Division; GSA Geoinformatics and Data Science Division; GSA Marine and Coastal Geoscience Division

Advocates: Md Lal Mamud, Maruti K. Mudunuru, Piyoosh Jaysaval, Md Kibria, Andrew O'Reilly, Robert M. Holt, and Arindam Mukherjee

This session offers a unique platform to showcase advancements in Artificial Intelligence (AI), Machine Learning (ML), and physics-informed methodologies, focusing on subsurface flow and transport, real-time geophysical inversion, critical minerals, and energy applications.

T98. Groundwater and Sustainability: Integrating Science, Technology, and Policy

Endorsed by: GSA Hydrogeology Division; GSA International; International Society of Groundwater for Sustainable Development (ISGSD); International Association of Hydrogeologists; GSA Geology and Society Division; Association of American State Geologists (AASG); WaterAid, Bangladesh

Advocates: Abhijit Mukherjee and Prosun Bhattacharya

Groundwater is vital for clean water and food security but faces threats from climate change, population growth, and mismanagement. Integrating science, technology, and policy fosters collaboration, innovation, and effective strategies to ensure its sustainable use for future generations.

T99. Hydrology and Hydrogeology of Thawing Cold Regions

Endorsed by: GSA Hydrogeology Division; GSA Environmental and Engineering Geology Division; GSA Geoinformatics and Data Science Division; American Association of Petroleum Geologists (AAPG); GSA Soils and Soil Processes Division

Advocates: Barret Kurylyk, Michelle Walvoord, David L. Rudolph, Cansu Demir, and Neelarun Mukherjee

Ongoing amplified climate change at high latitudes and altitudes is driving hydro(geo)logic regime shifts by transforming snow-rain partitioning, snowmelt timing, and the spatiotemporal extent of frozen ground. This session welcomes all cold-region surface and subsurface hydrology studies.

T100. Innovations in Research of Groundwater-Surface Water Interactions over Multiple Spatio-Temporal Scales

Endorsed by: GSA Hydrogeology Division; International Association of Hydrogeologists; International Association of GeoChemistry; Association of American State Geologists (AASG); American Association of Petroleum Geologists (AAPG)

Advocates: Anner Paldor and David M. Rey

This session will focus on fluxes of water and solutes between groundwater and surface water, which play a crucial role in freshwater supplies for humans and ecosystems.

T101. Land Surface Subsidence: Processes, Impacts, and Ongoing Challenges

Endorsed by: Hydrogeology Division

Advocates: John Ellis and James W. Borchers

This session explores the diverse causes, impacts, and monitoring of land subsidence, including the relationship with sea-level rise, to advance subsidence understanding and mitigation strategies.

T102. Occurrence, Fate, and Transformation of Emerging Contaminants in Environments: An Overarching Advancement of Knowledge

Endorsed by: GSA Hydrogeology Division; International Society of Groundwater for Sustainable Development (ISGSD); GSA Marine and Coastal Geoscience Division; GSA Geology and Health Division

Advocates: Rakesh Kumar, Prosun Bhattacharya, Dora Chiang, Saugata Datta, Bibhash Nath, and Sharon Kahara

Emerging contaminants, such as pharmaceuticals, personal care products, and microplastics, pose risks to aquatic life and human health. Integrating emerging technologies with data analysis improves understanding, facilitates treatment strategies, and informs policy decisions for environmental and public health protection.

INDUSTRY TRACKS: Economic Geology · Energy · Engineering Geology · Hydrogeology and Environmental Geology

T103. Quantifying Groundwater Recharge Processes: From Atmosphere to Soils to Aquifers

Endorsed by: GSA Hydrogeology Division; National Cave and Karst Research Institute; GSA Karst Division; Association of American State Geologists (AASG)
Advocates: Marcus Gary, Michael Young, Todd Caldwell, and Todd Halihan

This session focuses on hydrologic processes beginning with precipitation, ET, and climate, through soils and the vadose zone, ending in groundwater recharge. We invite talks that address these interesting and complex processes of aquifer recharge.

T104. Recent Developments in Research Related to High-Level Radioactive Waste Disposal

Endorsed by: GSA Hydrogeology Division; GSA Structural Geology and Tectonics Division; GSA Environmental and Engineering Geology Division; Geological Society of Korea (GSK); GSA International
Advocate: Kwangmin Jin

Securing long-term geological safety is most important for high-level radioactive waste disposal. For this purpose, the multidisciplinary study should be concentrated to improve our knowledge of geological disposal sites.

T105. Recent Investigations of the Hydrogeology Edwards (Balcones Fault Zone) Aquifer, the Trinity (Hill Country) Aquifer, and Their Interactions, South-Central Texas

Endorsed by: GSA Karst Division; GSA Hydrogeology Division; GSA Environmental and Engineering Geology Division; National Cave and Karst Research Institute
Advocates: Yongli Gao, F. Paul Bertetti, Brian Smith, and Brian Hunt

Recent research into the hydrogeological characteristics of the Edwards (Balcones Fault Zone) and/or Trinity (Hill Country) aquifers, south-central Texas, including their inter-aquifer connections, vulnerability, and prospects for long-term sustainability given changes in population, land use, and climate of the region.

T106. Redox-Driven Nutrient and Contaminant Dynamics in Terrestrial Systems

Endorsed by: GSA Geology and Health Division; GSA Geobiology and Geomicrobiology Division; GSA Hydrogeology Division; International Society of Groundwater for Sustainable Development (ISGSD)
Advocates: Saugata Datta, Alec Graves, Harshad Kulkarni, Prosun Bhattacharya, and Joe C. Yelderman Jr.

Redox-sensitive environments and nutrient and metalloid cycling in natural waters.

KARST

T107. Cave and Karst Biogeochemistry, on Earth and Beyond

Endorsed by: GSA Karst Division; GSA Geobiology and Geomicrobiology Division; GSA Environmental and Engineering Geology Division; GSA Hydrogeology Division; Geochemical Society; National Cave and Karst Research Institute
Advocates: Laura Rodriguez, Anika Baloun, Mackenzie Best, Evan Bowen, Joseph Hoberg, Cassandra Skaar, and Daniel Jones

We welcome submissions on the biogeochemistry and astrobiology of caves and karst features, including but not limited to microbe-mineral interactions, subsurface habitability, subterranean ecosystems, and microbial ecology.

T108. Communicating Karst: Success, Challenges and New Ideas to Translate Scientific Discoveries to Broad Audiences

Endorsed by: GSA Karst Division; GSA Geoscience Education Division; GSA Hydrogeology Division; GSA Sedimentary Geology Division; National Cave and Karst Research Institute; Association of American State Geologists (AASG); American Association of Petroleum Geologists (AAPG)
Advocates: Devra Willingham and Raquel Lugo

This session explores techniques, strategies, and programs that communicate karst concepts, hazards, sensitivity, processes, interrelations with other fields, or translating scientific discoveries to broad audiences.

T109. Hypogene Speleogenesis: An Overview of Research in Memory of Dr. Alexander Klimchouk

Endorsed by: GSA Karst Division; National Cave and Karst Research Institute; GSA Hydrogeology Division; Karst Waters Institute
Advocates: Geary Schindel and George Veni

This session will present an overview of current hydrogeological and morphogenetic research on hypogene speleogenesis, its identification and occurrence, and effective resource management.

T110. Karst Hazards and Monitoring

Endorsed by: GSA Karst Division; GSA Environmental and Engineering Geology Division; GSA Geophysics and Geodynamics Division; National Cave and Karst Research Institute; Karst Waters Institute; GSA Hydrogeology Division; Association of American State Geologists (AASG)
Advocates: Daniel Jones, Kashif Mahmud, and Lewis Land

Hazards (e.g., sinkholes, pollution, radon, development) and monitoring approaches (e.g., GIS applications, historical data analyses) in karst landscapes, including technical applications (e.g., LiDAR, 3-D scanning, geodatabase development) and management implications (resource management, education, policy, regulation).

THEMES: Geology without Borders · From Earth to the Cosmos: Geoscience Beyond Our Planet · Energy and Resource Innovations in the 21st Century

T111. Karst Hydrology and Hydrogeology

Endorsed by: GSA Karst Division; GSA Hydrogeology Division; GSA Environmental and Engineering Geology Division; National Cave and Karst Research Institute; Karst Waters Institute; National Cave and Karst Research Institute
Advocates: Jeanne Lambert Sumrall, Kashif Mahmud, Natasha Sekhon, Lewis Land, and Daniel Jones

This session covers fundamental aspects of fluid-rock interactions within karst landscapes, including geologic, hydrogeologic, and hydrologic investigations. Appropriate topics range from dye tracing and aquifer processes to surface-subsurface hydrologic interactions and quantitative modeling.

T112. Karst Sedimentary, Paleoclimate, and Historical Records

Endorsed by: GSA Karst Division; GSA Quaternary Geology and Geomorphology Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; GSA Sedimentary Geology Division; GSA Geochronology Division; National Cave and Karst Research Institute; GSA Marine and Coastal Geoscience Division
Advocates: Natasha Sekhon, Daniel Jones, and Jeanne Lambert Sumrall

Cave deposits (sediments, speleothems, tufa, etc.), karst environmental records (sedimentary, carbonate stratigraphy, etc.), and geoarchaeological and historical investigations to interpret past climates, landscapes, extreme events, and land-use histories, and to model or predict future changes.

T113. Monitoring the Vadose Zone in Karst: Advancing Studies of Paleoclimatology, Hydrogeology, and Biogeochemical Cycling

Endorsed by: GSA Karst Division; GSA Geobiology and Geomicrobiology Division; GSA Quaternary Geology and Geomorphology Division; GSA Hydrogeology Division; National Cave and Karst Research Institute
Advocates: Alexander Janelle and Mielle Lee

This session will explore monitoring of the unsaturated zone of karst systems. We encourage abstracts with broader impacts including improved water resource management, biogeochemical cycling, and proxy system modeling for paleoclimate studies.

T114. New Frontiers in Cave and Karst Science

Endorsed by: GSA Karst Division; GSA Hydrogeology Division; GSA Environmental and Engineering Geology Division; GSA Geobiology and Geomicrobiology Division; GSA Quaternary Geology and Geomorphology Division; National Cave and Karst Research Institute
Advocates: Jeanne Lambert Sumrall, Patricia N. Kambesis, Natasha Sekhon, Sierra Heimel, Joshua Sebree, Lewis Land, and Daniel Jones

We encourage submissions in any field of cave and karst science, with special emphasis on novel techniques, interdisciplinary approaches, and contributions from diverse early career researchers (students, postdocs, and faculty).

T115. Understanding Karst Aquifer Complexity Using Innovative Tracers and New Technologies

Endorsed by: GSA Karst Division; GSA Hydrogeology Division; Karst Waters Institute; GSA Geoinformatics and Data Science Division; National Cave and Karst Research Institute
Advocates: MaryLynn Musgrove and Stephen P. Opsahl

We welcome submissions applying innovative tracers and new technologies to investigate karst aquifers, such as complex interactions between surface water and groundwater, recharge processes, flow pathways, sediment transport, sustainability, and susceptibility to contaminants.

LIMNOGEOLOGY

T116. Lakes of the World Through Space and Time: Archives of Climate, Paleoenvironments, Ecosystems, Geohazards, and Economic Resources

Endorsed by: GSA Limnogeology Division; GSA Marine and Coastal Geoscience Division; GSA Geobiology and Geomicrobiology Division; GSA Quaternary Geology and Geomorphology Division; GSA Hydrogeology Division; GSA Sedimentary Geology Division; GSA Continental Scientific Drilling Division; Geoscience Society of New Zealand; GSA International
Advocates: Scott W. Starratt, Kirsten M. Menking, and Elana Leithold

This session celebrates lacustrine research across the globe. Lake sediments are excellent archives of changing climate, paleoenvironments, human impacts, and economic resources. This session explores limnogeological research on all time and spatial scales.

MARINE/COASTAL GEOSCIENCE

T117. Recent Advances and New Voices in Marine and Coastal Geoscience

Endorsed by: GSA Marine and Coastal Geoscience Division; GSA Limnogeology Division; SEPM (Society for Sedimentary Geology); GSA Sedimentary Geology Division; GSA Quaternary Geology and Geomorphology Division; GSA Hydrogeology Division; GSA Geophysics and Geodynamics Division
Advocates: Scott W. Starratt, Nicole Khan, Kelly Lazar, Ashley Long, and Emma Bouie

We seek abstracts on physical oceanography, marine geology, geomorphology, sediment transport, geophysics,

tectonic processes, climate change, paleobiology, or any aspect of oceans and coasts, past and present. We encourage students to participate in this session.

T118. Understanding Temporal Dynamics in Hydrogeochemistry and Sedimentary Processes in Estuarine Environments

Endorsed by: GSA Marine and Coastal Geoscience Division; GSA Sedimentary Geology Division; GSA Geochronology Division; GSA Environmental and Engineering Geology Division
Advocates: Henry Agbogun, Onema Adojoh, and Claris Nyuysoni Sunjo

This session explores temporal changes in estuarine environments with respect to water chemistry and sediment inputs. Effects of evolving physiochemical properties and isotopic composition of water, as well as the geochemical attributes of sediments on the environment will be presented.

MINERALOGY/CRYSTALLOGRAPHY

T119. A Tribute to Rodney C. Ewing: Celebrating a Half-Century of Transformative Contributions to Geoscience, Mineralogy, and Material Science

Endorsed by: Mineralogical Society of America; Geochemical Society; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; Microanalysis Society
Advocates: Michael Hochella Jr., Gordon Brown Jr., Georges Calas, and Satoshi Utsunomiya

Honoring Prof. Rodney C. Ewing (1946–2024), this session celebrates over 50 years of groundbreaking contributions to mineralogy, geoscience, and materials science, from atomic-scale processes to field-scale applications.

T120. Early Career Investigators in Mineralogy and Crystallography

Endorsed by: GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; Mineralogical Society of America; American Association of Petroleum Geologists (AAPG)
Advocates: Tyler Spano and Si Athena Chen

This session provides a platform for early-career mineralogists and crystallographers to share their research. Early career, postdoctoral, and student researchers are encouraged to submit abstracts and provide fresh perspectives, new ideas, and creative answers to mineralogical problems.

T121. Mineralogical Characterization of Economic Resources: From Critical Minerals to Gemstones

Endorsed by: GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; GSA Geoinformatics and Data Science Division; Microanalysis Society
Advocates: Aaron Palke, James Shigley, Barbara Dutrow, Kenneth Befus, and Christopher M. Breeding

From ore materials to precious gemstones, minerals play an important role in almost every aspect of our lives. This session will focus on characterization of economic minerals employing spectroscopic techniques, geochemical analysis, and microanalytical techniques.

T122. Mineralogy and Spectroscopy Across the Solar System in Honor of MSA Roebling Medalist M. Darby Dyar

Endorsed by: GSA Planetary Geology Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; Microanalysis Society; Geochemical Society
Advocates: Janice Bishop, Penelope L. King, and Molly C. McCanta

This session honors MSA Roebling Medalist M. Darby Dyar, celebrating her contributions to the mineralogy and spectroscopic properties of planetary bodies, especially the Earth, Moon, Mars, and Venus. Investigations probing mineral structures, iron valence, and planetary surface reactions are invited.

T123. Minerals in Motion: Tracking Mineral Reactions Using In Situ and Synchrotron Techniques, A Celebration of the Career of Peter Heaney

Endorsed by: Mineralogical Society of America; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; GSA Soils and Soil Processes Division; National Earth Science Teachers Association (NESTA); Microanalysis Society; Geochemical Society
Advocates: Florence Ling, Si Athena Chen, Daniel Hummer, Hongwu Xu, and Joanne Stubbs

In celebration of the career of Dr. Peter Heaney, we invite submissions using in situ, synchrotron, X-ray, neutron, or electron techniques to study rates and mechanisms of mineral reactions, alongside contributions exploring new approaches to mineralogy education.


Photo by J Yeo on Unsplash

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GEOCHEMISTRY

T124. Developments and Applications of Compositional Mapping Techniques of Geologic and Extraterrestrial Materials

Endorsed by: GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; GSA Planetary Geology Division; International Association of GeoChemistry; Geochemical Society; Microanalysis Society

Advocates: Ashley Prow-Fleischer and Pulkit Singh

Microbeam visualization techniques revolutionize our understanding of Earth and planetary materials by enabling high-resolution imaging and geochemical mapping. Advances in analytical detection support diverse applications, from dating crustal deformation to tracing planetary evolution. Abstracts on various techniques are invited.

T125. Environmental Geochemistry and Health

Endorsed by: GSA Geology and Health Division; GSA Hydrogeology Division; GSA Environmental and Engineering Geology Division; GSA Geobiology and Geomicrobiology Division; GSA Geology and Society Division

Advocates: Ann Ojeda, Jean Morrison, Sarah Hayes, and Peter S.K. Knappett

We invite presentations on the environmental fate of contaminants and their impact on human and environmental health. Transdisciplinary contributions are encouraged, especially those examining the rock-soil-water-human nexus at all scales with strong public outreach or societal impact.

T126. Urban Geochemistry

Endorsed by: International Association of GeoChemistry; GSA Hydrogeology Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; GSA Environmental and Engineering Geology Division; GSA Geology and Health Division

Advocates: W. Berry Lyons and David T. Long

This session encourages presentations dealing with the geochemistry and biogeochemistry of urban and suburban water, soil, and air as well as the impact of urban geochemistry on ecosystem and human health.

PETROLOGY, IGNEOUS

T127. Crustal Petrology

Endorsed by: GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; Geochemical Society

Advocates: Francisco Apen, Wentao Cao, Charlotte Connop, Victor Guevara, David Hernández Uribe, and Chris Yakymchuk

This session explores various igneous and metamorphic processes that have shaped Earth's crust. We welcome contributions from the micro- to macroscale, from the deep to shallow crust, and from field- to laboratory- to modeling-based.

T128. GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division Awards Session

Endorsed by: GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division

Advocates: Elisabeth Widom and Jade Star Lackey

The GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division honors their 2024 student research, Distinguished Geological Career (DGCA), and Early Geological Career (EGCA) awardees.

T129. Harnessing the Potential of Mafic and Ultramafic Rocks for the Energy Transition

Endorsed by: GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; GSA Geoinformatics and Data Science Division; GSA Environmental and Engineering Geology Division; International Association of GeoChemistry

Advocates: Estibalitz Ukar and Andras Fall

This session examines how mafic and ultramafic rocks contribute to the energy transition by (1) generating hydrogen gas, (2) trapping CO_2 through carbon mineralization, and (3) providing critical minerals for climate change mitigation and renewable energy production.

T130. How Are Plutons Made? Physical and Chemical Records of Pluton Construction and Evolution

Endorsed by: GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; GSA Structural Geology and Tectonics Division; Geochemical Society

Advocates: Katie Ardill and Aaron S. Yoshinobu

This session integrates structural and petrologic views of plutonic systems, exploring the crustal response to pluton formation, and processes that control the physical and chemical characteristics of pluton-host rock systems from initial emplacement to solidification.

INDUSTRY TRACKS: Economic Geology · Energy · Engineering Geology · Hydrogeology and Environmental Geology

T131. Mineralogy, Geochemistry, Petrology, and Volcanology Student Session

Endorsed by: GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; Council on Undergraduate Research Geosciences Division; Microanalysis Society
Advocates: Madeline Murchland, Emily L. Fischer, and Charles Lewis

GSA's MGPV student representatives invite the Division's student population to present their research (oral or poster). We encourage abstracts from any subdiscipline within our respective fields with hopes of stimulating a multidisciplinary, early career researcher (ECR) community within MGPV.

T132. Old and the New, Long and the Short: Perspectives on Integration of Timescales of Magmatic Processes: Special Session Related to MGPV Awards to Madison Myers and Anita Grunder

Endorsed by: GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; GSA Geochronology Division; GSA Structural Geology and Tectonics Division
Advocates: Anita Grunder and Madison Myers

We encourage papers that challenge and give insights into the interplay between timescales, methodologies, and processes to build a cohesive understanding of the lifespan, evolution, storage, and eruption of magma, from plutonic to volcanic systems.

T133. Petrology and Volcanology of Earth and Other Bodies

Endorsed by: GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; GSA Planetary Geology Division; International Association of GeoChemistry; Microanalysis Society; Geochemical Society
Advocates: Jade Star Lackey, Claire McLeod, Gary Michelfelder, Alan Whittington, and Elisabeth Widom

This session will bring together scientists studying petrologic processes on Earth and other planets, moons, and asteroids, using field observations, experiments, geochemical analysis, and theoretical exploration.

T134. The Importance of Petrology, Volcanology, and Geochemistry to Issues of Societal Relevance

Endorsed by: GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; International Association of GeoChemistry; GSA Geochronology Division; Geoscience Society of New Zealand
Advocates: Michelle Gevedon, Besim Dragovic, Amy Moser, Margo Odlum, Eirini Poulaki, Nikki M. Seymour, Clémentine Hamelin, Hannah Shabatian, Victor Guevara, and Tyler Grambling

This session highlights the critical societal and global impacts of petrology and high-temperature geochemistry, from resource exploration to hazard mitigation, climate change, and sustainability, inspiring recognition of their essential role in shaping Earth's dynamic systems and future resilience.

VOLCANOLOGY

T135. Using Volcanic Deposits to Help Us Understand Volcanic and Magmatic Processes

Endorsed by: GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; Microanalysis Society
Advocates: Alison Graettinger, Kurt Knesel, and Alan Whittington

This session invites presentations that leverage volcanic deposits to reconstruct magmatic and eruptive processes. We welcome contributions from field and experimental volcanology, petrology, geochemistry, thermodynamics, and fluid mechanics, ranging from the landform to nanoscale.

PALEOCLIMATOLOGY/PALEOCEANOGRAPHY

T136. Climate Transitions in the Paleozoic

Endorsed by: Geochemical Society; Paleontological Society; American Geophysical Union; GSA Sedimentary Geology Division; SEPM (Society for Sedimentary Geology); Paleontological Research Institution; GSA Soils and Soil Processes Division
Advocates: Ethan Grossman, Lucien Nana Yobo, Shuang Zhang, Bryce B. Barney, Shihan Li, and Ayush Sharma

This session will examine the major climate transitions in the Paleozoic Era, the paleoclimate evidence for their identification, their causes, and their consequence to the Earth System (e.g., ocean and atmospheric chemistry, sedimentology, biodiversity).

T137. Climate, Ocean, and Environmental Changes Through Earth History: From Marine and Terrestrial Proxies to Model Assessments (Posters)

Endorsed by: Cushman Foundation; GSA Marine and Coastal Geoscience Division; SEPM (Society for Sedimentary Geology); Paleontological Society; Geochemical Society; GSA Limnogeology Division; GSA Soils and Soil Processes Division
Advocates: Megan Fung, Vanessa Londono, and Miriam E. Katz

This session brings together marine and terrestrial proxies and modelling to reconstruct rapid ocean, environment, and climate events, and shifts between long-term climate/ocean/environment states, within the context of normal variability throughout Earth history.

THEMES: Geology without Borders · From Earth to the Cosmos: Geoscience Beyond Our Planet · Energy and Resource Innovations in the 21st Century

T138. Cushman Symposium: Microfossils of Extremophiles: Living in the Danger Zone

Endorsed by: Cushman Foundation; Paleontological Society; GSA Marine and Coastal Geoscience Division; Geochemical Society; Paleontological Research Institution
Advocates: Joan Bernhard, Scott Ishman, and Fabiana K. Almeida

This session will assemble studies documenting microfossil presence and/or microfossil-generating taxa in extreme environments, widely defined present and past, and those elucidating adaptations employed by extremophiles, to inform interpretations of the geologic record.

T139. Environmental Instability During Greenhouse Periods: Impact on Terrestrial and Marine Ecosystems

Endorsed by: GSA Sedimentary Geology Division; GSA Soils and Soil Processes Division; Paleontological Society; GSA Geobiology and Geomicrobiology Division; GSA Geoinformatics and Data Science Division; Paleontological Research Institution; GSA Marine and Coastal Geoscience Division
Advocates: Alexis Godet, Marina B. Suarez, and Celina Suarez

Greenhouse conditions and transitions to and from such climate states put environmental stress on terrestrial and marine ecosystems. We invite contributions that leverage multidisciplinary/proxy approaches to constrain the impact of environmental changes on paleobiodiversity.


Photo by Roxanne Desgagnés on Unsplash

T140. Hydroclimate Variability Across Timescales in Western North America: Causes and Consequences

Endorsed by: GSA Quaternary Geology and Geomorphology Division; GSA Limnogeology Division; GSA Sedimentary Geology Division
Advocates: Timothy Shanahan, Daniel Ibarra, Jeff Pigati, and Kathleen B. Springer

This session aims to bring together researchers studying past climate change over a range of timescales using innovative data and modeling approaches and using these data to inform future changes in climate and their impacts.

T141. Insights from Microfossils and Their Modern Analogs: From Traditional to Emerging Approaches

Endorsed by: Cushman Foundation; Paleontological Society; Geochemical Society; Paleontological Research Institution; GSA Marine and Coastal Geoscience Division
Advocates: Natalia Szymanska, Crystal Renae Pletka, and Marci M. Robinson

Traditional applications of microfossils are central to many studies, while novel approaches (especially geochemistry) utilizing microfossils have expanded recently. This session highlights traditional and innovative microfossil applications in terrestrial and marine environments, including modern analogs.

T142. Joint SGD-SEPM-IAS Focus on the Sedimentary Record of Climate Change

Endorsed by: SEPM (Society for Sedimentary Geology); International Association of Sedimentologists (IAS); GSA Sedimentary Geology Division; GSA Limnogeology Division; GSA Geoinformatics and Data Science Division; GSA Marine and Coastal Geoscience Division; GSA Soils and Soil Processes Division; American Association of Petroleum Geologists (AAPG)
Advocates: Joanna Pszonka, Elias Samankassou, and Lauren Birgenheier

Explore how sedimentary records reveal Earth's climatic history and processes driving environmental change. This session highlights proxies, stratigraphy, and emerging technologies, advancing understanding of past climates and informing predictions of future climate dynamics through interdisciplinary collaboration.

143. Long- and Short-Term Environmental Consequences of Large Igneous Provinces Throughout Earth's History

Endorsed by: GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; Paleontological Society; GSA Geochronology Division
Advocates: Michael Hudgins, Morgan Schaller, and Sean Kinney

We invite submissions to an interdisciplinary session on Large Igneous Provinces (LIPs), exploring their environmental impacts using geochronology, paleomagnetism, geochemistry, paleoenvironmental proxies, and modeling to integrate diverse data into understanding LIP-induced environmental changes.

T144. New Perspectives on Beringian Paleoecology, Paleoclimate, and Paleoceanography

Endorsed by: GSA Quaternary Geology and Geomorphology Division; GSA Marine and Coastal Geoscience Division; GSA Sedimentary Geology Division; GSA Geoarchaeology Division; GSA Limnogeology Division; Paleontological Society; GSA Geoinformatics and Data Science Division; GSA Soils and Soil Processes Division

INDUSTRY TRACKS: Economic Geology · Energy · Engineering Geology · Hydrogeology and Environmental Geology

Advocates: Sarah Fowell, Beth Caissie, Duane Froese, and Ali Monteath

This session will showcase the use of new sedimentary records and analytical techniques to augment reconstructions of Beringian and North Pacific Gateway paleoclimate and paleoecology and elucidate the role of terrestrial and marine linkages.

T145. Sequence Stratigraphic, Geochemical, and Geochronologic Correlation of the Cenomanian-Turonian Ocean Anoxic Event 2 (OAE2) in the Cretaceous Western Interior Seaway (KWIS) and the Gulf Coast

Endorsed by: GSA Energy Geology Division; GSA Sedimentary Geology Division; American Association of Petroleum Geologists (AAPG); SEPM (Society for Sedimentary Geology); International Association of GeoChemistry; GSA Geochronology Division
Advocates: Michael Pope, Arthur D. Donovan, and Alexis Godet

The Cenomanian-Turonian Ocean Anoxic Event 2 (OAE2) is a global event; however, its stratigraphic, geochemical, and geochronologic records are locally quite variable. This session will correlate the OAE2 records in the Cretaceous Western Interior Seaway (KWIS) and the Gulf Coast.

PALEONTOLOGY

T146. Future Leaders in Paleontology

Endorsed by: Paleontological Society
Advocates: John Huntley, Sarah M. Jacquet, and David Bapst

The Paleontological Society is pleased to offer the "Future Leaders in Paleontology" topical session. This session will showcase the outstanding work of our student and early career members in a high-profile setting.

T147. Life and Environments Through Time and Space: Multi-Record Approaches to Stratigraphic Paleobiology

Endorsed by: Paleontological Society; GSA Geobiology and Geomicrobiology Division; GSA Sedimentary Geology Division; SEPM (Society for Sedimentary Geology)
Advocates: Annaka M. Clement, Pedro M. Monarrez, Katharine Loughney, and Madeline S. Marshall

As the field of stratigraphic paleobiology expands, we incorporate additional taphonomic, morphological, ecological, geochemical, and other records into stratigraphic frameworks. This session welcomes research using fossils, stratigraphy, and beyond to understand changes in life and environments through time and space.

T148. Refining the Cambrian: Biotas, Multiproxy Correlations, Workable Global Divisions, and Paleogeography: Discussions in Honor of Fred Sundberg

Endorsed by: Paleontological Society; GSA Geochronology Division; GSA Sedimentary Geology Division; International Association of Sedimentologists (IAS); Western Interior Paleontological Society
Advocates: Ed Landing, Carol Dehler, Mark Webster, and Brian R. Pratt

Eumetazoan diversification and origin of relatively modern marine ecosystems make the Cambrian a key Phanerozoic interval. This session focuses on the correlation significance of improved chemostratigraphic, biostratigraphic, astrochronologic, atmospheric, and oceanic syntheses; geochronology; and new paleogeographic and paleoclimatologic work.

T149. Cephalopods Through Time: Insights into Evolution, Ecology, and Environmental Reconstruction

Endorsed by: Paleontological Society; Western Interior Paleontological Society; Paleontological Research Institution; GSA Sedimentary Geology Division; Society of Vertebrate Paleontology; GSA Geobiology and Geomicrobiology Division
Advocates: Matthew Allen, Jessie McCraw, Corinne Myers, Joshua Slattery, and James Witts

This session explores cephalopod biology, ecology, and evolution, highlighting their role in paleoenvironmental reconstruction. We welcome analytical and computational research that advances understanding of these organisms, providing new perspectives on their evolution and ecological significance.

T150. Conodonts from North America and Beyond: Honoring the Career of Dr. James E. Barrick

Endorsed by: Paleontological Society
Advocates: Steven Rosscoe and Jeremy Bader

Talks concerning recent developments in the study of conodonts in North America and beyond. The session is held by the Pander Society in honor of the contributions of Dr. James E. Barrick, Texas Tech University.

T151. Linking Biodiversity Loss to Environmental Stressors Through Integrated Approaches

Endorsed by: GSA Geobiology and Geomicrobiology Division; Paleontological Research Institution; Paleontological Society; American Geophysical Union; GSA Marine and Coastal Geoscience Division
Advocates: Jonathan Payne, Zunli Lu, Pedro Monarrez, Ashley Prow-Fleischer, Jood Al Aswad, and Pulkit Singh

Biodiversity crises serve as natural experiments to explore extinction selectivity and ecosystem restructuring. We highlight studies using model-data comparisons to link biodiversity loss with environmental stressors by integrating paleobiology, geochemistry, ecophysiology, and Earth system modeling.

T152. The Cretaceous-Paleogene (K-Pg) Boundary Interval: From Large-Scale Geological Events to Mass Extinction Mechanisms

Endorsed by: Paleontological Society; GSA Planetary Geology Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; GSA Geochronology Division; GSA Geobiology and Geomicrobiology Division; Sociedad Geológica Mexicana
Advocates: Pim Kaskes, James Witts, and Courtney Sprain

The Cretaceous-Paleogene boundary interval witnessed extreme geological events: the Chicxulub impact and Deccan Traps volcanism, and a biological catastrophe. New proxy-records, coupled with numerical modelling, unravel the mechanisms driving the environmental change and mass extinction.

153. The Neoproterozoic Earth and Life Co-evolution

Endorsed by: Paleontological Society; American Association of Petroleum Geologists (AAPG)
Advocates: Qing Tang, Wentao Zheng, Huan Cui, and Feifei Zhang

This session aims to enhance discussions and foster interdisciplinary collaborations to advance understanding of the Neoproterozoic Earth and life co-evolution. Contributions from paleontologists, geochemists, sedimentologists, Earth system modelers, and related fields are highly encouraged.

T154. Coprolite Happens: Insights into Geobiology

Endorsed by: Paleontological Society; GSA Geobiology and Geomicrobiology Division; Society of Vertebrate Paleontology; GSA Geoarchaeology Division; Western Interior Paleontological Society; Paleontological Research Institution
Advocates: Morrison Nolan, Ben T. Kligman, and Mason Scher

Coprolites are significant sources of paleobiological data, providing insights into trophic ecology, migration, taphonomy, chemical cycling, and other geological/ecological fields. In this session, we invite talks about coprolite and other bromolite research.

T155. Evolution of Life in the Cambrian Seas: Biotic, Biogeochemical, and Sedimentological Contexts

Endorsed by: Paleontological Society; GSA Geobiology and Geomicrobiology Division; SEPM (Society for Sedimentary Geology); Geochemical Society; GSA Geochronology Division
Advocates: Rudy Lerosey-Aubril, Robert R. Gaines, Javier Ortega-Hernandez, and Lidya Tarhan

This session is dedicated to studies that illuminate the biotic, geobiological, sedimentological, and geochemical contexts of the evolution of early animal life in the oceans, with a particular focus on the Cambrian Period.

T156. Laws of the Grave: Advances in Taphonomy Across the Paleontologic Record

Endorsed by: Paleontological Society; GSA Geobiology and Geomicrobiology Division; Paleontological Research Institution; SEPM (Society for Sedimentary Geology); GSA Sedimentary Geology Division
Advocates: Broc Kokesh and Rachel Laker

This session emphasizes the interdisciplinary and ubiquitous nature of taphonomy for analysis of the fossil record. We welcome submissions focused on understanding taphonomic processes or its impacts across any paleontologic subdiscipline, taxon, or geologic era.

T157. Recent Advances in Fossil Imaging

Endorsed by: GSA Geobiology and Geomicrobiology Division; Paleontological Society; Western Interior Paleontological Society; Paleontological Research Institution; Microanalysis Society
Advocates: Julien Kimmig and Russell D.C. Bicknell

This session will bring together an array of scientists who are tackling the application of imaging fossils with modern techniques.

T158. Working Up an Apatite: Teeth as Paleo-Ecological and -Climatological Archives

Endorsed by: Society of Vertebrate Paleontology; Paleontological Society; GSA Geobiology and Geomicrobiology Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; GSA Geology and Health Division; GSA Geoarchaeology Division
Advocates: Mason Scher and Alliya Akhtar

Teeth are used as archives of paleoecological, -climatological, and -biological information. This session welcomes presentations using teeth as archives or testing new methods, from morphology, microwear, and histology to geochemical tools.

INDUSTRY TRACKS: Economic Geology · Energy · Engineering Geology · Hydrogeology and Environmental Geology

T159. Phylogenetic and Computational Approaches in Paleobiology and Paleoecology

Endorsed by: Paleontological Society; Paleontological Research Institution; GSA Geoinformatics and Data Science Division; GSA Geobiology and Geomicrobiology Division; American Association of Petroleum Geologists (AAPG)
Advocates: Mark C. Nikolic and Katherine Jordan-Burmeister

This session highlights recent advances integrating phylogenetics, modeling, and computational methods with fossil data to address evolutionary and ecological questions through deep time. Topics include macroevolutionary trends, diversification dynamics, trait evolution, macroecology, and paleobiogeography.

PLANETARY GEOLOGY

T160. Advancing Mineral Science and Exploring Planetary Surfaces: In Honor of MSA Dana Medalist, Elizabeth B. Rampe

Endorsed by: GSA Planetary Geology Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; Mineralogical Society of America; Geochemical Society; Microanalysis Society; The Mineralogical Society
Advocates: Shaunna Morrison, Michael T. Thorpe, Janice Bishop, Aditi Pandey, and Sarah Simpson

This session honors MSA Dana Medalist Elizabeth B. Rampe, celebrating her contributions to Martian mineralogy and planetary science. We invite studies on in situ and orbital planetary observations, lab/field data integration, and analog materials for extraterrestrial exploration.

T161. Asteroid Observations, Return Missions, and Meteoritics: Interweaving Perspectives and Data

Endorsed by: GSA Planetary Geology Division; Geochemical Society; American Geophysical Union
Advocates: Graham Edwards and Anicia Arredondo

The new age of sample return missions affords opportunities to intercalibrate observational and laboratory results. This session invites studies using observational tools, return mission data and materials, and meteorites to advance our knowledge of asteroids.

T162. Even Better Than the Real Thing? Development, Production and Properties of Analogs and Simulants for Solar System Materials

Endorsed by: GSA Planetary Geology Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division
Advocates: Xinting Yu, Alan Whittington, Austin Patridge, and Rostislav Kovtun

This session will bring together scientists and engineers studying analogs for Earth, planetary, and astrophysical materials, such as simulants of regolith, ices and organics, and circumstellar dust. Suitable topics include synthesis techniques, material properties, figures of merit, and ground-truthing (or space-truthing).

T163. Exploring the Diversity of Volcanism in the Solar System

Endorsed by: American Geophysical Union
Advocates: Sean Peters and Ian T.W. Flynn

This session focuses on recent advances in characterizing and quantifying volcanic processes throughout the solar system in light of recent and upcoming missions to volcanically active worlds and resurgence in volcano science.

T164. Extraterrestrial Soils: Processes, Properties, and Implications

Endorsed by: GSA Planetary Geology Division; GSA Soils and Soil Processes Division; SEPM (Society for Sedimentary Geology); GSA Sedimentary Geology Division
Advocate: Rebecca Taormina

This session explores extraterrestrial soils, including regolith formation, chemical and physical properties, and analog studies. We invite research on planetary surface processes, space weathering, in situ resource utilization, and comparative soil science across terrestrial and extraterrestrial environments.

T165. Friends of Hoth, Episode IX: The Rise of Icy Ocean Worlds

Endorsed by: GSA Planetary Geology Division
Advocates: Alex Patthoff, Erin Leonard, Emily Martin, and Kelly Miller

We invite abstracts relating to surface, structural, and tectonic processes; interior, and thermal evolution; geochemistry and astrobiology; and planetary analogs as they pertain to outer planet icy satellites. This includes experimental, observational, and theoretical approaches.

T166. From Atoms to Asteroids and Habitable Planets: Coordinated Analysis of Planetary Samples and Their Terrestrial Analogues

Endorsed by: GSA Planetary Geology Division; Microanalysis Society; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; Mineralogical Society of America

THEMES: Geology without Borders · From Earth to the Cosmos: Geoscience Beyond Our Planet · Energy and Resource Innovations in the 21st Century

Advocates: Brittany Cymes, Timmons Erickson, Jennifer Gorce, Lindsay P. Keller, Jacob B. Setera, and Justin Simon

This session aims to highlight recent advances in coordinated analytical methodologies used in the study of planetary samples and terrestrial analogues. Approaches integrating multiple tools across different spatial scales, and cross-discipline method innovations are encouraged.

T167. Impact Cratering Processes Across the Solar System

Endorsed by: GSA Continental Scientific Drilling Division; GSA Geochronology Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; GSA Planetary Geology Division; GSA Structural Geology and Tectonics Division

Advocates: Jeffrey Plescia, Christian Koeberl, Steven J. Jaret, and Neeraja Chinchalkar

Session focuses on the nature of impact craters and their influence on planetary geologic evolution. We solicit contributions on aspects of impact crater formation, ejecta, shock processes, geochemical and mineralogical signatures, modeling, geologic implications, and comparison among planetary bodies.

T168. Lunar Science and Exploration in the Artemis Era

Endorsed by: GSA Planetary Geology Division

Advocates: Tracy Becker and Akbar Whizin

Current and anticipated science return in the areas of geology, composition, and interior of the Moon from current lunar-focused studies and upcoming payloads expected to land on the Moon in the next decade.

T169. Mantle Plumes on Terrestrial Planets (Including Earth)

Endorsed by: GSA Planetary Geology Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division

Advocates: Allan Treiman and Justin Filiberto

All the terrestrial planets have (or had) magmatism associated with mantle plumes. We will explore plume-related magmatism on the terrestrial planets from petrologic, geochemical, and geophysical constraints. Of particular interest are the implication from plume properties for planetary mantles.

T170. Planetary Exploration and Education: How We Learn About Our Solar System and Beyond

Endorsed by: GSA Planetary Geology Division; GSA Geoscience Education Division; National Earth Science Teachers Association (NESTA); National Association of Geoscience Teachers (NAGT); GSA Geobiology and Geomicrobiology Division

Advocate: Nicholas Lang

This session links how we teach and learn about the solar system to how we have gained that information (i.e., space missions). Descriptions of teaching activities, courses, and strategies for working with students are encouraged.

T171. Planetary Geologic Mapping Across the Solar System

Endorsed by: GSA Planetary Geology Division; GSA Geoinformatics and Data Science Division

Advocates: Jeannette Luna, Corey Fortezzo, and Samuel Cartwright

We invite abstracts that showcase planetary geologic maps, discuss mapping strategies, and leverage map-based investigations of planetary surfaces at multiple scales.

T172. Powering Discovery Using 3-D Petrology of Earth and Solar System Materials

Endorsed by: GSA Planetary Geology Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; GSA Structural Geology and Tectonics Division; Microanalysis Society

Advocates: Richard Ketcham, Romy Hanna, and Scott Eckley

We seek contributions demonstrating the utilization and potential of 3-D imaging and textural analysis for making new observations and deriving new insights on Earth and solar system materials.

T173. Reaching for the Stars: Inspiring Collaborations in the Exploration of Outer Space

Endorsed by: GSA Planetary Geology Division

Advocates: Nicholas Lang and Natasha Stephen

The armada of space missions underway/in development makes this a great time to think about future endeavors for space exploration. This session is geared to brainstorming future collaborations for outer space exploration.

T174. Recent Volcanism on the Moon: A Challenge for Lunar Thermal Evolution

Endorsed by: GSA Planetary Geology Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; GSA Geochronology Division; American Association of Petroleum Geologists (AAPG)

Advocates: Sarah Braden and James W. Head

Radiometric dating of recently returned mare basalt glasses and surface geomorphology research have reported ages as young as <150 million years, challenging lunar thermal evolution models. This session explores this conundrum and investigates paths forward.

T175. Silica-rich Meteorites and Petrogenesis of Early Planetesimal Crust

Endorsed by: GSA Planetary Geology Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division

Advocates: Robert William Nicklas and Cyrena Goodrich

Recently, evolved achondrites have shown that the earliest solar system bodies contained significant Si-rich crust.

INDUSTRY TRACKS: Economic Geology · Energy · Engineering Geology · Hydrogeology and Environmental Geology

This session concerns the petrogenesis of Si-rich achondrites and what they reveal about the first generation of solar system bodies.

T176. The G.K. Gilbert Award Session: TBD

Endorsed by: GSA Planetary Geology Division
Advocates: Jennifer L. Piatek, Lauren M. Jozwiak, Alexander Morgan, R. Terik Daly, Margaret Deahn, Sarah Lamm, and Sam Birch

This session highlights the work of the G. K. Gilbert Award winner. The award is given by the Planetary Geology Division for outstanding contributions to the solution of fundamental problems within planetary geology, in the broadest sense.

T177. Tiny Worlds with Big Potential

Endorsed by: GSA Planetary Geology Division
Advocates: Danielle Wyrick, Jennifer Scully, Debra Buczkowski, and Kynan H.G. Hughson

We encourage abstracts related to geologic, spectroscopic, geophysical, and compositional analyses of small bodies in the solar system, including comparative studies of more than one body, or in-depth studies of a single body.

PRECAMBRIAN GEOLOGY

T178. Laurentia Without Borders: Pre-Pangea Intercontinental Connections

Endorsed by: GSA Geophysics and Geodynamics Division; GSA International; GSA Structural Geology and Tectonics Division; Asociación Geológica Argentina; Sociedad Geológica Mexicana
Advocates: Ian Dalziel, Staci L. Loewy, Patricia W. Dickerson, and Joshua Malone

The ancient core of North America is surrounded by Neoproterozoic to early Paleozoic rifts, indicating former juxtaposition with several other cratons. This session will explore these former connections and their paleogeographic, tectonic, and paleoenvironmental implications.

QUATERNARY GEOLOGY

T179. Advances in Mountain Hydrology: Connecting Cryosphere, Surface, and Subsurface Processes

Endorsed by: GSA Quaternary Geology and Geomorphology Division; GSA Hydrogeology Division; American Water Resources Association; GSA Geoinformatics and Data Science Division; Geological Society of Italy; Geoscience Society of New Zealand
Advocates: Olivia Stanley, Rainey Aberle, Claire Todd, and Glenn Thackray

We aim to highlight studies addressing the spatial and temporal complexity of mountain hydrology across diverse climatic, geological, and ecological contexts.

T180. Philosophy of Extreme Events and Landscape Evolution on Earth and Other Planets: Thinking Geologically in the Spirit of Victor Baker

Endorsed by: GSA Quaternary Geology and Geomorphology Division; GSA Planetary Geology Division; GSA History and Philosophy of Geology Division; SEPM (Society for Sedimentary Geology); GSA Sedimentary Geology Division; American Quaternary Association
Advocates: Tao Liu, Lisa L. Ely, and Virginia Claire Gulick

This session highlights Victor Baker's contributions to Earth-based and planetary research on catastrophic events in shaping landscapes and the role of outrageous hypotheses in scientific inquiry. Presentations explore these transformative influences on understanding surface processes.

T181. Quaternary Research to Characterize Environmental and Geological Hazards

Endorsed by: GSA Quaternary Geology and Geomorphology Division; GSA Limnogeology Division; GSA Structural Geology and Tectonics Division; GSA Geochronology Division; GSA Hydrogeology Division; GSA Environmental and Engineering Geology Division; American Quaternary Association; GSA Marine and Coastal Geoscience Division
Advocates: Lesleigh Anderson, Benjamin Laabs, Colin Chupik, and Jonathan Obrist-Farner

Quaternary geosciences research features many valuable tools for understanding environmental and geologic hazards. This multidisciplinary session seeks presentations that encompass a wide range of processes and environments relevant to managing critical infrastructure and resources.

T182. Recent Advances in Glacial Geology, Geomorphology, and Chronology

Endorsed by: GSA Quaternary Geology and Geomorphology Division; GSA Limnogeology Division; GSA Geochronology Division; American Quaternary Association; GSA Soils and Soil Processes Division
Advocates: Randall Schaetzl and Lucas Zoet

We invite papers on topics related to glacial systems, landforms, and chronology, especially work that has connections to (A) interpretations of past climates and/or (B) surficial geology and resource extraction.

GEOMORPHOLOGY

T183. Advances in Fluvial Processes and Sediment Transport

Endorsed by: GSA Quaternary Geology and Geomorphology Division; International Association of Geomorphologists; SEPM (Society for Sedimentary Geology); GSA Hydrogeology Division; GSA Sedimentary Geology Division; American Quaternary Association; American Association of Petroleum Geologists (AAPG)
Advocates: Karen Gran, Sara L. Rathburn, and Sunil Kumar De

We encourage submissions on fluvial geomorphology, fluvial processes, and sediment transport including field studies, numerical modeling, physical modeling, and spatial analyses.

T184. Aeolian Systems in Time and Space

Endorsed by: GSA Quaternary Geology and Geomorphology Division; SEPM (Society for Sedimentary Geology); GSA Sedimentary Geology Division; American Quaternary Association; GSA Soils and Soil Processes Division
Advocates: Madeline Kelley and Alana Archbold

This session explores research focused on all aspects of aeolian processes and landforms, including dunes, dust, and loess in modern and ancient aeolian systems on Earth and other planets.

T185. Channel Responses to Disturbance and Restoration

Endorsed by: GSA Quaternary Geology and Geomorphology Division; GSA Hydrogeology Division; GSA Environmental and Engineering Geology Division
Advocates: Jordan Fields and Evan Dethier

We seek talks evaluating how channels respond to perturbation. How are post-disturbance changes affected by the scale or type of disturbance? How is channel recovery aided or hindered by human involvement and/or natural processes?

T186. Critical Zone Science: Intersection of Processes Linked to Geomorphology, Ecology, Fire, and Climate

Endorsed by: GSA Hydrogeology Division; GSA Quaternary Geology and Geomorphology Division; GSA Soils and Soil Processes Division; GSA Geoinformatics and Data Science Division; International Association of GeoChemistry
Advocates: Tammy M. Rittenour, Carmel G. Murillo, Dave P. Huber, Nora Vaughan, Jennifer Pierce, and Martha Eppes

This session welcomes interdisciplinary studies that investigate the rates and processes of soil development, regolith formation, carbon storage, and the role of ecological and/or hydrologic feedbacks in shaping the landscape (both past and present).

T187. From Paris of the Plains to the Venice of Texas: An Outdoor Exploration of Urban Flood Management on the San Antonio River

Endorsed by: GSA Quaternary Geology and Geomorphology Division; GSA Geoarchaeology Division; GSA Hydrogeology Division; GSA Geology and Society Division; GSA Environmental and Engineering Geology Division
Advocates: Jennifer Pierce, Jennifer Aldred, and Rachel Atkins

This session explores the geomorphology and hydrology of the San Antonio River, examining sediment transport, historical flooding, river channel changes, and notable sites like the San Antonio Missions, highlighting their impact on urban planning and water management.

T188. Geomorphology and Surface Processes Across the Solar System

Endorsed by: GSA Planetary Geology Division; SEPM (Society for Sedimentary Geology); GSA Sedimentary Geology Division; GSA Quaternary Geology and Geomorphology; GSA Hydrogeology Division; GSA Soils and Soil Processes Division
Advocates: Marisa Palucis, Alexander Morgan, Timothy Goudge, Benjamin Cardenas, and Abdallah Zaki

This session welcomes abstracts on any aspect of planetary geomorphology and surface processes, including but not restricted to: Earth analogues, laboratory experiments, numerical models, planetary comparison, mapping, in situ data, or remote sensing studies.

T189. Moving Beyond the Mean: The Roles of Temporally and Spatially Stochastic Processes in Landscape Evolution

Endorsed by: GSA Quaternary Geology and Geomorphology Division; American Quaternary Association; GSA Soils and Soil Processes Division
Advocates: Adam M. Forte and Matthew W. Rossi

Interpretations of landscape form and function typically embed simplifying assumptions in climate and tectonic forcing, even though many processes occur as discrete events with substantial variability. This session explores which elements of variability may be needed for landscape evolution studies.

T190. Quantifying Geomorphic Processes and Rates of Landscape Evolution

Endorsed by: GSA Quaternary Geology and Geomorphology Division; GSA Soils and Soil Processes Division; SEPM (Society for Sedimentary Geology); GSA Geochronology Division; GSA Environmental and Engineering Geology Division; American Quaternary Association
Advocates: Arjun M. Heimsath and Jennifer Pierce

This session explores how methods such as cosmogenic nuclides, apatite (U-Th)/He thermochronometry, U-series geochemistry, luminescence, and chemical mass balances

quantify relationships between climate, tectonics, and erosion.

T191. Soil, Dust, and Everything in Between: Current, Quaternary and Earlier Geological Processes and Records

Endorsed by: GSA Quaternary Geology and Geomorphology Division; GSA Soils and Soil Processes Division; International Society for Aeolian Research; GSA Sedimentary Geology Division; SEPM (Society for Sedimentary Geology)
Advocates: Onn Crouvi, Mark Sweeney, and Yehouda Enzel

This session will explore research on the interaction between soils, dust deposits (e.g., loess), dust emission, and landscape evolution in modern and geological time scales.

T192. The Rupture: Shaping Earth's Evolution via Progressive Rock Failure

Endorsed by: GSA Quaternary Geology and Geomorphology Division; GSA Environmental and Engineering Geology Division; GSA Structural Geology and Tectonics Division; GSA Soils and Soil Processes Division
Advocates: Jenn Aldred, Martha Eppes, and Stephanie R. Forstner

We welcome all fracture-focused research including field, experimental, and modeling work related to surficial processes, soils, structural geology, volcanism, and human infrastructure. This session explores fracture processes, rates, and how fractures influence Earth systems.

SEDIMENTARY GEOLOGY

T193. Sedimentary Geology Division/SEPM Student Research Poster Competition: Dynamics of Stratigraphy and Sedimentation

Endorsed by: GSA Sedimentary Geology Division; SEPM (Society for Sedimentary Geology); GSA Limnogeology Division; American Association of Petroleum Geologists (AAPG)
Advocates: Andrew Leier, Jason Flaum, Majie Fan, and Joel E. Saylor

Students (at any level) may present posters of original research on any topics within sedimentary geology: carbonates, clastics, chemical sediments, and ancient and/or modern systems. Posters are judged for monetary awards distributed at the reception.

T194. Twenty-Seven Years of Advances in Understanding Salt-Sediment Interaction: A Legacy of Katherine A. Giles

Endorsed by: GSA Sedimentary Geology Division; GSA Structural Geology and Tectonics Division; GSA Geobiology and Geomicrobiology Division; SEPM (Society for Sedimentary Geology); GSA Marine and Coastal Geoscience Division; Sociedad Geológica Mexicana
Advocates: Mark Fischer, Benjamin Brunner, Richard P. Langford, and Cora Gannaway Dalton

This session seeks contributions that highlight the interconnections between coevolving salt bodies and depositional systems in continental, shallow marine and deep marine settings. Field, geobiological, geophysical, and geochemical, as well as theoretical, physical, and numerical modeling studies are encouraged.

T195. Delta Evolution from Rivers to the Shelf: Past, Present and Future Perspectives for Society

Endorsed by: SEPM (Society for Sedimentary Geology); GSA Sedimentary Geology Division; GSA Quaternary Geology and Geomorphology Division; GSA Hydrogeology Division; GSA Marine and Coastal Geoscience Division
Advocates: Ariana Osman, Abdallah Zaki, and Cornel Olariu

The session focuses on deltas and adjacent depositional environments from fluvial systems to the continental shelf. Research on modern, ancient, or extraterrestrial deltas that emphasize their importance to our society is welcome.

T196. Reconstructing Earth Surface Processes in Orogenic Systems

Endorsed by: GSA Sedimentary Geology Division; SEPM (Society for Sedimentary Geology); GSA Structural Geology and Tectonics Division; GSA Geochronology Division; GSA Quaternary Geology and Geomorphology Division; GSA Limnogeology Division
Advocates: Matthew A. Malkowski, Sarah W.M. George, Emilia Caylor, and Brandon Keough

Advances and applications of detrital and stratigraphic records for reconstructing lithospheric, climatic, and earth surface interactions over geologic time scales.

T197. Sedimentary Signatures of Climate, Neotectonics, and/or Environmental Contamination from the Quaternary into the Future

Endorsed by: SEPM (Society for Sedimentary Geology); GSA Sedimentary Geology Division; GSA Geoarchaeology Division; GSA Quaternary Geology and Geomorphology Division; GSA Limnogeology Division; American Quaternary Association; GSA Marine and Coastal Geoscience Division; GSA Soils and Soil Processes Division
Advocates: Nicholas Perez and Zachary Sickmann

This session will highlight studies that improve our understanding of short-timescale (years to millennia) signals of changes in climate, tectonics and human activity in the recent sedimentary record. All data types and approaches are welcomed.

THEMES: Geology without Borders · From Earth to the Cosmos: Geoscience Beyond Our Planet · Energy and Resource Innovations in the 21st Century

STRATIGRAPHY

T198. Capitanian Environmental Crises: Precursors to the Great Dying

Endorsed by: GSA Sedimentary Geology Division; SEPM (Society for Sedimentary Geology); Paleontological Society; American Association of Petroleum Geologists (AAPG)
Advocates: Christopher Fielding, Tracy Frank, Stephen McLoughlin, Chris Mays, and Michael T. Hren

This session will focus on research aimed at understanding paleoenvironmental and biotic crises that occurred both during and at the end of the Capitanian stage (middle Permian) worldwide, as precursors to the end-Permian apocalypse.

T199. Phanerozoic Earth System Shifts in the Marine Sedimentary Record

Endorsed by: GSA Geobiology and Geomicrobiology Division; GSA Sedimentary Geology Division; SEPM (Society for Sedimentary Geology); Paleontological Society; GSA Marine and Coastal Geoscience Division; GSA Energy Geology Division
Advocates: Makram Hedhli and Stephen E. Grasby

This session explores Earth system shifts documented as perturbations to the Phanerozoic geochemical, lithological, and biogeochemical marine records, leading to climate shifts, anoxia, ocean acidification, and extinction events.

T200. Wheels in the Sky Keep on Turning: Advances in Astrochronology and Geochronology

Endorsed by: GSA Sedimentary Geology Division; GSA Geochronology Division; SEPM (Society for Sedimentary Geology); GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division
Advocates: Daniel Segessenman, Linda Hinnov, and Hamdi Omar

This session seeks to bring together researchers working to integrate high-resolution chronostratigraphy from cyclostratigraphic data with high-precision geochronology throughout Earth's history.

SOILS AND SOIL PROCESSES

T201. 37th Annual Undergraduate Research Exhibition Sponsored by Sigma Gamma Epsilon

Endorsed by: Sigma Gamma Epsilon; GSA Limnogeology Division; GSA Marine and Coastal Geoscience Division; GSA Soils and Soil Processes Division; GSA Hydrogeology Division
Advocates: Steve Bennett, Richard Ford, Alexander K. Stewart, Claire Marshall, Norman Levine, Diane Burns, and Scott Beason

All students are encouraged to submit research to this poster session. Investigations from ANY geological subdiscipline are welcome. Presenters who are SGE members are eligible to compete for monetary awards distributed at the meeting.

T202. Emerging Voices in Soil and Paleosol Science

Endorsed by: GSA Soils and Soil Processes Division; GSA Quaternary Geology and Geomorphology Division; Soil Science Society of America; GSA Sedimentary Geology Division
Advocates: Dennis Terry Jr. and Venanzio Munyaka

This session promotes research from students at all levels that are investigating soils and paleosols. We invite submissions from field, laboratory, and modeling studies that leverage or examine pedogenic processes and archives, from deep time through modern systems.

T203. Recent Advances in Soil and Paleosol Science

Endorsed by: GSA Soils and Soil Processes Division; GSA Quaternary Geology and Geomorphology Division; Soil Science Society of America
Advocates: Dennis Terry Jr. and Michael Young

This session highlights recent research in soil and paleosol science. We invite submissions from field, laboratory, and modeling studies that leverage or examine pedogenic processes and archives from deep time through modern systems.

STRUCTURAL GEOLOGY

T204. Best Student Geologic Map Competition

Endorsed by: USGS National Cooperative Geologic Mapping Program; Association of American State Geologists (AASG); American Geosciences Institute; American Institute of Professional Geologists; GSA Foundation; Sociedad Geológica Mexicana
Advocates: Daniel Colwell, Kate Ritzel, Michael Marketti, and Jenna Shelton

Students will present their research through geologic mapping projects (with a significant field mapping component) that address scientific or societal issues. The top three student-authored geologic maps will receive awards following this session.

T205. Going with the Flow: New Insights into Large-Magnitude Lithospheric Extension

Endorsed by: Structural Geology and Tectonics Division
Advocates: Daniel F. Stockli, Margo Odlum, Susie Cook, and Tatiana Sihpol

This session explores the evolution of low-angle normal faults and metamorphic core complexes. Submissions may elucidate the kinematic, temporal, thermal, and/or rheologic behavior of these high-strain systems.

INDUSTRY TRACKS: Economic Geology · Energy · Engineering Geology · Hydrogeology and Environmental Geology

T206. Honoring the Late Professor Mohamed Abdelsalam: Outstanding Researcher, Generous Colleague, Legendary Mentor, and Ambassador for the Geosciences In Africa

Endorsed by: GSA International; GSA Structural Geology and Tectonics Division; Geological Society of Africa; GSA Geophysics and Geodynamics Division; Association of Geoscientists for International Development
Advocates: Barbara Tewksbury, Francisca Oboh-Ikuenobe, Estella Atekwana, Todd Halihan, and Daniel Laó-Dávila

To honor the late Professor Mohamed Abdelsalam, we invite abstracts on research in Africa by those who worked with him and those inspired by his outstanding work in structural geology, tectonics, geophysics, and remote sensing.

T207. Latest Research Advances in Structural Geology and Tectonics

Endorsed by: Structural Geology and Tectonics Division; Microanalysis Society
Advocates: Andrew V. Zuza, Elena Miranda, James Kirkpatrick, Benjamin Surpless, and Rebecca Flowers

This session addresses deformation across spatial and temporal scales through analytical techniques, computational advances, and/or novel interdisciplinary methods. We encourage submissions that address the five Grand Challenges for tectonics research.

T208. Recent Developments on the Structural Evolution of Ancient to Modern Strike-slip Fault Systems

Endorsed by: Structural Geology and Tectonics Division; Microanalysis Society
Advocates: Erin Donaghy, Trevor Waldien, Margo Odlum, and Sydney Maguire

This session explores the structural evolution of strike-slip fault systems in continental and oceanic settings. We invite contributions that apply field, analytical, numerical, and/or experimental analysis to these fault networks.

T209. Rock Deformation and the Dynamics of Mountain Building: A Session Honoring the Scientific Contributions of John P. Platt

Endorsed by: GSA Structural Geology and Tectonics Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; GSA Geophysics and Geodynamics Division; Geological Society of Italy
Advocates: Frances Cooper and Simon Wallis

We welcome contributions inspired by the diverse research of John Platt in structural geology and tectonics showing how the rock record can be used to illuminate the fundamental processes of crustal deformation and mountain building.

T210. Strain and Displacement: Patterns, Gradients, Partitioning, and Reconstructions

Endorsed by: GSA Structural Geology and Tectonics Division; GSA Geophysics and Geodynamics Division; Geological Society of Italy
Advocates: Sarah Trevino and Basil Tikoff

This session aims to bring together researchers from structure-related disciplines to facilitate discussions of approaches that inform our understanding of strain and displacement. We welcome contributions from observations, experiments, theory, and modeling that characterize deformation from micro to tectonic scales.

T211. The Deformation-Metamorphism-Fluid Triplet Governing Plate Boundaries and Orogens

Endorsed by: GSA Structural Geology and Tectonics Division; GSA Geochronology Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division
Advocates: Drew Levy, Simone Masoch, Terry Lee, and Nicole Aikin

Investigating orogens requires establishing relationships between deformation, fluids, metamorphism, and timing from within and adjacent to faults and shear zones. We seek presentations that combine new and traditional structural, petrochronology, and other microanalytical techniques.

TECTONICS

T212. Advances and Challenges in Seismotectonic Studies in Slow-Deforming Regions

Endorsed by: GSA Structural Geology and Tectonics Division; American Geophysical Union; Geological Society of Korea (GSK); GSA International; Geological Society of Italy; Sociedad Geológica Mexicana
Advocates: Jin-Hyuck Choi and Jeonghyeop Kim

This session explores advances and challenges in understanding tectonic deformation in slow-deforming regions, integrating geodetic, geological, and modeling approaches to address earthquake hazards in seemingly stable yet vulnerable intraplate settings.

T213. Advancing Earthquake Geology and Surficial Deformation Through Multidisciplinary High-Resolution Data

Endorsed by: GSA Geology and Society Division; GSA Structural Geology and Tectonics Division; GSA Quaternary Geology and Geomorphology Division; GSA Geophysics and Geodynamics Division; Geological Society of Italy; GSA Marine and Coastal Geoscience Division; Sociedad Geológica Mexicana
Advocates: Shreya Arora, Tina Niemi, Paula Figueiredo, and Mary Braza

Understanding earthquakes and surface deformation requires integrating geologic, geophysical, and remote sensing data. This session welcomes research using diverse

methods—paleoseismology, LiDAR, structure-from-motion photogrammetry, geochronology, and analog modeling—to refine fault behavior, rupture dynamics, segmentation, and recurrence from various tectonic settings.

T214. Earthquake Hazards in Boundary Regions, from Geologic Provinces to Political Entities

Endorsed by: GSA Structural Geology and Tectonics Division; GSA Quaternary Geology and Geomorphology Division; GSA International; GSA Geophysics and Geodynamics Division; Geological Society of Italy
Advocates: Eduardo Francisco Guerrero, Lydia Staisch, Reed Burgette, and Stephen Angster

This session invites contributions that aim to characterize, mitigate, and communicate earthquake hazards in regions where geologic, physiographic, or political boundaries exist; we seek to learn from work in discrete provinces or work that spans the boundaries that separate them.

T215. Evolution of Orogenic Belts Through Time: Insights from Sedimentation, Deformation, Magmatism, and Metamorphism

Endorsed by: GSA Structural Geology and Tectonics Division; GSA Geochronology Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; GSA Sedimentary Geology Division; Geological Society of Italy
Advocates: Supratik Roy, Athena Eyster, and Ross Salerno

This session explores the evolution of orogenesis on Earth, encompassing applications of sedimentology, petrology, geochemistry, paleomagnetism, geochronology, and structural geology. We encourage studies combining field observations with laboratory and modeling techniques to unravel tectonic processes.

T216. Exploring Feedbacks Between Tectonics and Climate on Lithospheric Evolution Using Multidisciplinary Approaches

Endorsed by: GSA Geochronology Division; GSA Structural Geology and Tectonics Division; GSA Quaternary Geology and Geomorphology Division; GSA Sedimentary Geology Division; GSA Limnogeology Division
Advocates: Veleda Muller, Gilby Jepson, Tshering Sherpa, and Joel Leonard

This session explores the dynamic interplay between climate and tectonic processes shaping our planet. We welcome multidisciplinary contributions that reveal and quantify these interactions through geo-thermochronology, (bio) geochemistry, sedimentology, geomorphology, structural geology, geodesy, and numerical modeling.

T217. Integrating Geochronology and Geochemistry to Decipher the Tectonic Evolution of Orogenic Belts

Endorsed by: GSA Structural Geology and Tectonics Division; GSA Geochronology Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; Geological Society of Italy; American Association of Petroleum Geologists (AAPG)
Advocates: I. Dogancan Yasar, Yvette Kuiper, Christopher Holm-Denoma, and David Foster

This session focuses on deciphering magmatic, metamorphic, depositional, and deformational events recorded in orogenic belts via the integration of geochemistry and geochronology. We welcome contributions from modern applications of analytical methods aimed at unraveling orogenic events worldwide, fostering interdisciplinary discussion.

T218. Paleozoic Tectonics of SW Laurentia Without Borders: Final Amalgamation of Pangea in the USA, Mexico, and South America

Endorsed by: GSA International; American Association of Petroleum Geologists (AAPG); Sociedad Geológica Mexicana
Advocates: Sandra Juárez-Zúñiga, Daniel Stockli, Elisa Fitz-Díaz, Norma Palacios Garcia, and Tyson Smith

We invite contributions that explore the Paleozoic tectonic evolution of southwestern Laurentia during the final assembly of western Pangea. Research on Paleozoic tectonic belts in Gondwana, particularly from Mexico and South America, is especially welcome.

T219. Presentaciones de Geociencias en Español: Continuamos con la experiencia en la GSA 2025 / Geoscience Presentations in Spanish: Continuing the Experience at GSA 2025

Endorsed by: GSA International; GSA Diversity in the Geosciences Committee; GSA Structural Geology and Tectonics Division; GSA Geochronology Division; Paleontological Society; GSA Geoinformatics and Data Science Division; Sociedad Geológica Mexicana; Mineralogical Society of America
Advocates: Alexander Iriondo, Gabriela Mora-Klepeis, Arturo Barron, and Jay Chapman

This session invites geoscience presentations in Spanish at all proficiency levels; abstracts can be submitted in English or Spanish, and they do not count toward the limit of one abstract oral presentation per person.

INDUSTRY TRACKS: Economic Geology · Energy · Engineering Geology · Hydrogeology and Environmental Geology

T220. Questioning Conventional Wisdom: Celebrating and Advancing the Geoscience Contributions of David B. Rowley

Endorsed by: GSA Structural Geology and Tectonics Division; GSA Geophysics and Geodynamics Division
Advocates: Brian Currie, Miquela Ingalls, Jerry X. Mitrovica, and Alessandro Forte

We invite submissions related to the professional contributions of David B. Rowley, including the tectonics of the Himalaya and Tibet, the paleoaltimetry orogenic belts, and the interactions between mantle geodynamics, sea level, and the tectonic evolution of oceans and continents.

T221. Role of Tectonic Inheritance in the Evolution of Orogenic Systems and Basin Configuration

Endorsed by: GSA Structural Geology and Tectonics Division; GSA Geochronology Division; GSA Sedimentary Geology Division; GSA Geophysics and Geodynamics Division; Geological Society of Italy; American Association of Petroleum Geologists (AAPG); Microanalysis Society; Sociedad Geológica Mexicana
Advocates: Amanda Calle, Nicholas Perez, Elizabeth Horne, and Lily Jackson

This session explores the influence of inherited tectonic fabric on deformation, magmatism, and basin configuration in orogenic systems, and potential hazard implications. We welcome contributions related to Grenville, Ouachita-Sonora, Midcontinent, pre-Andean systems, and beyond.

T222. Subduction Zone Processes: Insights from Geology, Geochemistry, and Petrochronology

Endorsed by: GSA Structural Geology and Tectonics Division; GSA Geochronology Division; GSA Geophysics and Geodynamics Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; Geological Society of Italy; European Geosciences Union; Microanalysis Society; Sociedad Geológica Mexicana
Advocates: Daniel Stockli, Eirini Poulaki, and Sage Turek

We invite contributions that explore the geologic processes of subduction zones from new field observations, analytical methodologies, and numerical modeling of metamorphic rocks along the subduction interface or try to integrate or reconcile the rocks record with geophysical observations.

T223. Tectónica de las Américas: Sesión en español

Endorsed by: GSA Structural Geology and Tectonics Division; Unión Geofísica Mexicana (UGM); GSA International; Sociedad Geológica de Chile; Sociedad Geológica Mexicana
Advocates: Gerardo Suarez, José Luis Macías, Daniel Laó-Dávila, Cristobal Ramírez de Arellano, and Elisa Fitz-Díaz

North, Central, and South America have a complex and active tectonic activity. We invite contributions that will help expand our knowledge of the geology, stratigraphy, sedimentology, geochemistry, geophysical characteristics and tectonic history of this region.

T224. The Geodynamic Evolution of the Himalaya: From Mountain Building to Modern Seismicity and Climate Change

Endorsed by: GSA International; GSA Geophysics and Geodynamics Division; Geological Society of India; Geological Society of Italy; European Geosciences Union
Advocates: Christopher Bailey and G.M. Bhat

The Himalaya are an active mountain chain whose geology affects people in more than six Asian countries. This interdisciplinary session focuses on the geodynamics of the region as well as the impact of modern seismicity and climate change.

T225. Toe to Toe: Cordilleran Systems from Trench to Retroarc Domains

Endorsed by: GSA Structural Geology and Tectonics Division; GSA Sedimentary Geology Division; GSA Geophysics and Geodynamics Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; GSA Quaternary Geology and Geomorphology Division
Advocates: Chelsea Mackaman-Lofland, Nikki M. Seymour, and Nicholas Perez

This session highlights research across geoscience disciplines to advance understanding of the deformation, magmatism, seismicity, topography, and sedimentation processes governing trench to retroarc evolution during ocean-continent plate convergence.

Photo by Carolyn on Unsplash

THEMES: Geology without Borders · From Earth to the Cosmos: Geoscience Beyond Our Planet · Energy and Resource Innovations in the 21st Century

Thank You to the 2025 Joint Technical Program Committee (JTPC)

We appreciate their invaluable expertise and dedication to reviewing abstract submissions. The committee's commitment to maintaining the highest standards will contribute to the quality and diversity of the technical meeting program.

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Figure 1. The Wasatch fault lies at the foot of the snow-capped Wasatch Mountains. Downtown Salt Lake City, Utah, with the state capitol building, is visible in the foreground. The city is built on the downdropped hanging wall of the Wasatch fault. Attribution: Photo by Andrew Smith, Wikimedia Commons.

The Wasatch Fault: Geoheritage that Informs Society About Seismic Risk

Lon D. Abbott*,[1] and Terri L. Cook[2]

At 7:09 a.m. on 18 March 2020, a magnitude Mw = 5.7 earthquake shook Salt Lake City, Utah. The Magna earthquake (so designated because its epicenter lay near the western suburb of Magna) was the largest to occur since monitoring began on the Wasatch fault. Fortunately, few injuries occurred, but this moderate-sized earthquake caused $150 million in damage. Experiencing seismic shaking of the normally static surface is always disconcerting, but the timing of the Magna earthquake, just days after many area schools and businesses had shut down in response to the coronavirus 2019 (COVID-19) pandemic, compounded residents' already heightened anxiety. One manifestation of that anxiety was the proliferation on social media of rumors that a monster, magnitude M = 9 earthquake would strike in the coming hours (Pankow et al., 2021).

Geoscientists at the University of Utah Seismograph Stations (UUSS), which spearheads seismic monitoring of the fault, faced the urgent challenge of simultaneously allaying unfounded fears (for example, communicating that the Wasatch fault is incapable of generating an M = 9 earth-

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quake), helping to inform the public of the area's very real seismic risk, and explaining the large scientific uncertainty inherent in earthquake forecasting. They quickly swung into action—On the day of the earthquake, they participated in a virtual press conference, gave 16 media interviews, and issued social media posts to combat misinformation. They have continued to use the Magna earthquake as an opportunity to educate the public through (1) tweets sent to their much-expanded post-earthquake social media following, (2) by creating earthquake education YouTube videos, and (3) adding a Magna Earthquake Frequently Asked Questions (FAQ) page and tips for how to prepare for a major earthquake to their Web site (Pankow et al., 2021).

GEOHERITAGE EXPLAINS THE PRESENT AND INFORMS THE FUTURE

Not all geoheritage sites are formally designated, but they can be recognized by their importance to humanity. For example, geological and geophysical studies of the Wasatch fault "advance our knowledge of natural hazards" and "demonstrate the relevance and importance of geology to society," two geoheritage hallmarks (GSA, 2022). The activities of UUSS, the Utah Geological Survey, and other scientific organizations in response to the Magna earthquake sequence carry on the long tradition of scientific advancement and public education about the hazard posed by the Wasatch fault that began with G.K. Gilbert's pioneering fault mapping and the 1883 letter he sent to the Salt Lake Tribune newspaper warning the population of the fault's dangers (Gilbert, 1884).

Today, nearly 3 million people live along the Wasatch front, the interface between the Wasatch Mountains and the urbanized valleys at their feet, separated by the Wasatch fault (Fig. 1). They face a serious and often underappreciated seismic risk (Pankow et al., 2015) from the very feature on which movement has raised the metropolis' impressive mountain backdrop and formed the well-watered valleys that have sustained people here for thousands of years.

A MIGHTY FAULT AT THE EDGE OF THE BASIN AND RANGE

The 370-km-long Wasatch fault forms the eastern boundary of the 700-km-wide Basin and Range Province (DuRoss et al., 2016). The interface between each range and basin in the province is marked by a normal fault, which accommodates extension as the province's crust is stretched. Each basin formed when a block of crust on the fault's hanging wall (the block resting on the inclined fault plane) dropped down relative to the adjacent mountain range (on the fault footwall) during repeated earthquakes (Fig. 2). The Wasatch fault exemplifies this regional configuration, but bigger: It is one of the world's longest normal faults, and its slip rate is higher than that of most other Basin and Range faults. The fault consists of 10 segments, with the

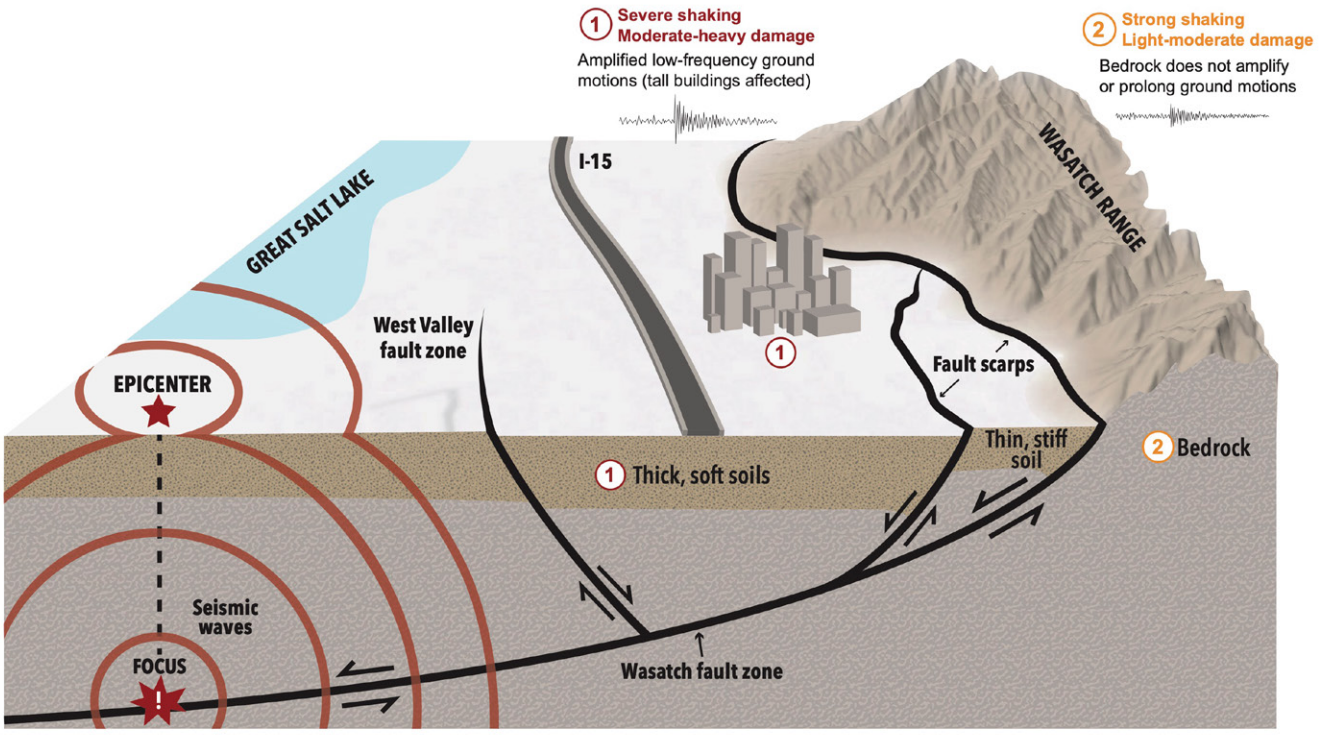

Figure 2. Cross-sectional view of the Wasatch normal fault. The fault's two strands lie at or near the foot of the Wasatch Mountains. The block of rock resting atop the fault (the hanging wall, on the left side of each fault strand) moves down relative to the footwall (right side) block during each earthquake. Notice how the fault dips below Salt Lake City (depicted by the buildings near the number 1 on the diagram). That means the epicenter for the next "Big One" will be in the valley, subjecting the population to considerable shaking. That is illustrated by the marked location of the Magna earthquake epicenter (the point on Earth's surface directly above the focus, the spot where the rupture began). Shaking in Salt Lake City will be further compounded because the city is built on loose sediment that amplifies ground motion. This diagram depicts the Wasatch fault as a listric fault, with a downward-shallowing dip angle, but recent research has called that specific geometry into question (see text). Attribution: Utah Geological Survey.

five central segments, each 35–59 km long, being the most seismically active (Fig. 3; DuRoss et al., 2016).

The best estimates of the Wasatch fault's lifespan and total displacement come from the southern portion of the Salt Lake City segment, near the mouth of Little Cottonwood Canyon, home of the famous Alta and Snowbird ski resorts. Thermochronology and fluid inclusion studies here indicate this section of the fault has accommodated an impressive ~11 km of total vertical displacement over its ~12–17 m.y. lifespan, with a long-term average slip rate of ~0.7–0.8 mm/yr (Parry and Bruhn, 1987; Ehlers et al., 2003; Armstrong et al., 2003). Although slip-rate data are sparser for the other segments, studies averaging rates over both short (10^4–10^5 yr; Machette et al., 1992; Stock et al., 2009) and long (~5 m.y.; Armstrong et al., 2004) time scales suggest that slip rates are slower, 0.2–0.4 mm/yr, on them.

HAS LAKE BONNEVILLE MODULATED WASATCH FAULT SLIP?

G.K. Gilbert is renowned for his shoreline reconstructions of Pleistocene Lake Bonneville and the prescient inferences he made about crustal isostasy based on their elevations (Gilbert, 1890). Lake Bonneville, which was a much larger version of today's Great Salt Lake, gradually filled between ca. 30 and 17 ka in response to increased precipitation during the last glacial cycle, reaching a maximum depth of ~270 m, at which time it covered ~40% of Utah. The lake drained catastrophically sometime between 17.6 and 17.0 ka, reaching its present, shallow depth by ca. 13 ka (Oviatt, 2020).

Gilbert noted that almost all the lake's weight was concentrated on the Wasatch fault's hanging wall (Fig. 2) and speculated that this added weight might promote fault slip when the lake was full, with activity decreasing after the lake drained (Gilbert, 1890, p. 357). One-hundred years later, Machette et al. (1992) documented the opposite trend: 2–3 times faster slip rates (0.5–1.5 mm/yr) during the last 15 k.y. compared to 0.1–0.3 mm/yr recorded since 200–150 ka (see Machette et al., 1992, their fig. 21). The authors extolled Gilbert's astute observation and hypothesized that he had the cause right but the effect backward: The weight of Lake Bonneville increased the normal force acting on the Wasatch fault, thereby inhibiting slip; the slip rate increased after the lake drained at 15 ka, which reduced the normal force.

Analysis of a 307-m-long sediment core collected on the shore of the Great Salt Lake revealed that Lake Bonneville was just the most recent of four large lakes that filled northwestern Utah since 780 ka. Predecessor lakes filled the basin during earlier phases of especially extensive Northern Hemisphere glaciation at ca. 620 ka, 417 ± 55 ka, and ca. 150 ka (Oviatt et al., 1999). A recent study concluded that fault slip decreased at the zenith of each lake (Smith et al., 2024), consistent with the hypothesis proposed by Machette et al. (1992). On a much shorter time scale, the study by Young et al. (2021) on changes in microseismicity in and around the Great Salt Lake between 1987 and 2020 further supports this idea. Those authors found that earthquakes occur 20% more often during dry periods than during wet periods. That finding is not encouraging given that drought and water diversions in recent years have shrunk the volume of the Great Salt Lake to half its historic average volume (Siegler, 2024).

THE WASATCH FAULT'S UNCERTAIN GEOMETRY

The Wasatch front harbors significant seismic hazard, highlighted by the fact that at least 22 large, surface-rupturing earthquakes have occurred along the Wasatch fault in the last 6000 yr (Fig. 3), averaging about one every 300 yr (DuRoss et al., 2016). Combine that history with the fact that it is home to 80% of Utah's population, and it is easy to see why experts conclude that earthquakes pose the greatest natural threat to Utah's people, built environment, and economy (Pankow et al., 2015).

Multiple modeling studies have assessed the hazard, but as Kristine Pankow, UUSS's associate director, points out, despite over 140 yr of research, we remain unsure which values to select for several key parameters that affect the model results, with the fault dip being perhaps the most important. That is because the fault's westward dip (Gilbert, 1928) places it beneath the populated valleys at depth, so most Utahans live, quite literally, atop the fault (Fig. 2). Earthquakes originate at depth, so the epicenter (the spot on Earth's surface directly above the rupture point), where seismic shaking is typically most violent, will be in the middle of the city, not on its fringes. The epicenter of the Magna quake, west of downtown Salt Lake City, illustrates this point. A shallower earthquake will generate more ground shaking than a comparable but deeper quake, so the depth of the fault at the initial rupture point matters.

Two different fault geometries have historically been assumed in hazard models: one in which a planar Wasatch fault dips 40°–70° beneath the western valleys, and another in which it is "listric," curving to shallower dip angles at depth (Fig. 2 depicts this latter geometry). Rock mechanics theory and earthquake focal mechanisms are cited as evidence for the steeper dip, whereas geodetic data and seismic reflection profiles better fit the listric model (Wells et al., 2024). If the steep, planar fault model is correct, then the seismic hazard, while still considerable, is lower than if the fault is listric, because the latter implies that the fault lies at a much shallower depth, where future earthquakes are likely to nucleate.

The UUSS seismologists recognized the unprecedented opportunity the Magna earthquake and its aftershocks presented to better constrain the fault geometry. Within one week after the main shock, they had added five temporary telemetered seismometers and 180 self-recording, three-component geophones to the already extensive seismic network they operated. Deployment of those additional stations allowed them to record over 5000 aftershocks down to M = 0.4 with unprecedented depth resolution (Pankow et al., 2021). The surprising result was that the Wasatch fault geometry is complicated and appears to be neither clearly steep nor listric, but rather could be a low-angle normal fault dipping ~25°, like the detachment faults that bound metamorphic core complexes elsewhere in the Basin and Range (Wells et al., 2024).

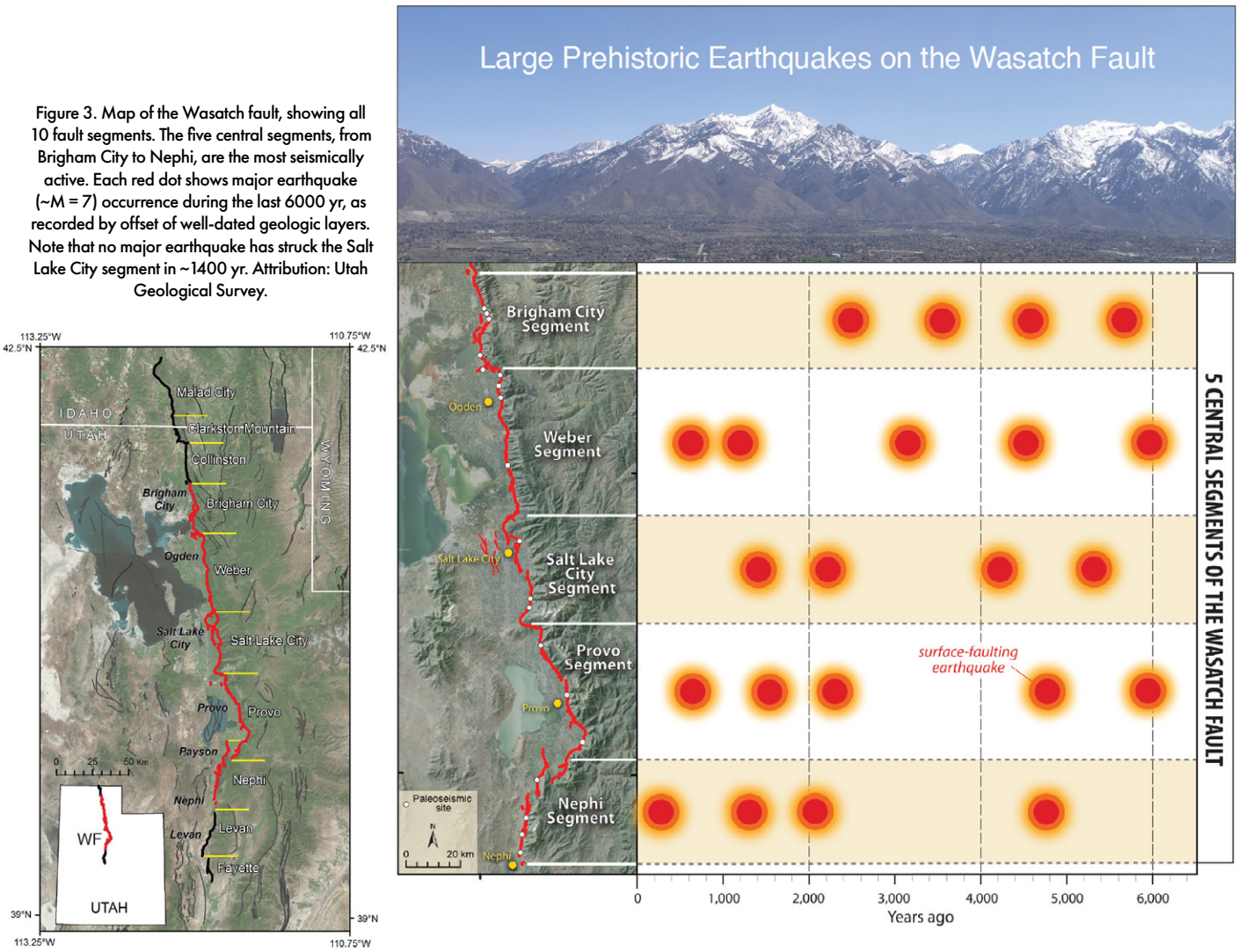

Figure 3. Map of the Wasatch fault, showing all 10 fault segments. The five central segments, from Brigham City to Nephi, are the most seismically active. Each red dot shows major earthquake (~M = 7) occurrence during the last 6000 yr, as recorded by offset of well-dated geologic layers. Note that no major earthquake has struck the Salt Lake City segment in ~1400 yr. Attribution: Utah Geological Survey.

WHAT TO EXPECT WHEN THE "BIG ONE" STRIKES

If the latest conclusion about the Magna earthquake sequence, i.e., that it indicates a shallowly dipping Wasatch fault, is correct (Wells et al., 2024), then that means the seismic hazard is even higher than previously estimated—and the previous estimate was grim enough. A 2015 study used Federal Emergency Management Agency (FEMA) modeling software to simulate the impact of a M = 7 earthquake that ruptures the entire Salt Lake segment. The study estimated there will be 2000–2500 deaths and 7400–9300 injuries severe enough to require hospitalization. There were only 3200 hospital beds in the Salt Lake area in 2015, and the scenario projected that almost all area hospitals would sustain damage, meaning some of those beds likely would not be available during the emergency (Pankow et al., 2015).

Beyond the human suffering, the economic toll would devastate Utah's economy. Short-term economic losses were projected at >$33 billion, representing a large fraction of Utah's 2013 gross domestic product (GDP) of $131 billion. There are more than 147,000 unreinforced masonry buildings, the type most vulnerable to seismic shaking, on the Wasatch front (20% of all structures, with most being residences), and 7800 of those are projected to collapse. That will place an overwhelming demand on search-and-rescue operations in the short term, and in the recovery phase, it will require safety inspections of >300,000 buildings. To accomplish that task in a reasonable (30 day) time frame would require 2400 building inspectors (Pankow et al., 2015). The list of both short- and long-term challenges Utah will face in the aftermath of the "Big One" goes on and on.

The report concludes that Utah is not prepared for the major earthquake that, while no geoscientist can predict its exact timing, all agree is inevitable. The Salt Lake City segment's last surface-rupturing event occurred ~1400 yr ago (Fig. 3), and its recurrence interval is 1300–1500 yr (Pankow et al., 2015). Geoscientists have learned a great deal about the fault's history and have repeatedly warned of its hazard in the more than 140 yr since G.K. Gilbert first mapped it. Unfortunately, everything we have learned has only reinforced the chilling warning Gilbert communicated to the local newspaper in 1883 (Gilbert, 1884, p. 52): "Continuous as are the fault scarps at the base of the Wasatch, there is one place where they are conspicuously absent, and that place is close to this city", going on to say, "It is useless to ask when this disaster will occur . . . by the time experience has taught us this, Salt Lake City will have been shaken down . . .." The

Wasatch fault is a geoheritage site that harbors the clues geoscientists read to warn residents about the valley's unstable seismic future—a monument to the importance of geology for society.

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GEOLOGY THROUGH THE LENS

Roadside Geology in Action

Upper contact between the intruded Jurassic Tasmanian Dolerite and the overlying Permian Sandstone near Hobart, Tasmania

Credit: Bill Henley is a geology student from Marysville, Washington, USA.

Want your photo to be featured in *GSA Today*? Email submissions to gsatoday@geosociety.org.

CALL FOR NOMINATIONS

GSA Division Awards

ENERGY GEOLOGY DIVISION

Curtis-Hedberg Award

Nominations due: 31 July
Submit to: Justin Birdwell, jbirdwell@usgs.gov

The Curtis-Hedberg Award will be considered annually in accordance with the bylaws of the Society. The award will be made for outstanding contributions in the field of petroleum geology.

More information: *https://community.geosociety.org/energydivision/awards/curtishedberg*

GEOARCHAEOLOGY DIVISION

Richard Hay Student Paper/Poster Award

Nominations due: 30 August
Submit to: gsa.agd@gmail.com

Richard Hay was a long-standing member of the Division and had a long and distinguished career in sedimentary geology, mineralogy, and archaeological geology. He is particularly well known for his work on the Olduvai Gorge and Laetoli Hominid-bearing sites and was awarded the Division's Rip Rapp Award in 2000. The Division is proud to have our student travel award bear his name. The award is a travel grant for a student (undergraduate or graduate) presenting a paper or poster at GSA Connects. The grant is competitive and will be awarded based on the evaluation of the scientific merit of the research topic and the clarity of an expanded abstract for the paper or poster prepared by a student for presentation in the Division's technical session at the meeting.

More information: *https://community.geosociety.org/geoarchdivision/awards/student/hay*

GEOLOGY AND SOCIETY DIVISION

E-an Zen Fund for Geoscience Outreach Grant

Nominations due: 10 July
Submit to: Lily Jackson, Lily.Jackson@uwyo.edu

This is a grant opportunity for Geology and Society Division members interested in developing innovative methods to bring geoscience knowledge to public audiences. Two grants of $1,500 each will be awarded to fund projects designed by the applicants to communicate geoscience information to a lay audience with the goal of increasing the understanding of geoscience and its impact on society among non-geoscientists and decision-makers. Applicants may apply as individuals or as groups, depending on the best fit for their project design. While the grant application requirements are intentionally broad to encourage creative thinking and innovation, review of applications will emphasize the potential for impacting communities that traditionally have not had significant exposure to the geosciences.

More information: *https://community.geosociety.org/gsocdivision/news/zenfund*

HISTORY AND PHILOSOPHY OF GEOLOGY DIVISION

History and Philosophy of Geology Student Award

Nominations due: 9 August
Submit to: Christopher Hill, chill2@boisestate.edu

The History, Philosophy, and Geoheritage Division provides a student award in the amount of US$1000 for a paper to be given at GSA Connects. Awards may also be given for second place. Oral presentations are preferred. Faculty advisors may be listed as second author, but not as the lead author of the paper. The proposed paper may be (1) a paper in the history or philosophy of geology; (2) a literature review of ideas for a technical work or thesis/dissertation; or (3) some imaginative aspect of the history or philosophy of geology we have not thought of before. Students should submit an abstract of their proposed talk and a 1,500-2,000–word prospectus for consideration. The Awards Committee will assist the winner(s) with review of abstracts facilitating presentation according to GSA standards. Currently enrolled undergraduates and graduate students are eligible as are students who received their degrees at the end of the fall or spring terms immediately preceding the national GSA meeting. The award is open to all students regardless of discipline, provided the proposed paper is related to the history or philosophy of a geological idea/person. The award is made possible by a bequest from the estate of Mary C. Rabbitt.

More information: *https://community.geosociety.org/histphildiv/awards/student*

PLANETARY GEOLOGY DIVISION

Eugene and Carolyn Shoemaker Impact Cratering Award

Nominations due: 15 August
Apply at: https://www.lpi.usra.edu/Awards/shoemaker/
For questions: David Kring, kring@lpi.usra.edu

The Eugene and Carolyn Shoemaker Impact Cratering Award is for undergraduate or graduate students, of any nationality, working in any country, in the disciplines of geology, geophysics, geochemistry, astronomy, or biology. The award, which will include US$2500, is to be applied to the study of impact craters, either on Earth or on the other solid bodies in the solar system. Areas of study may include but shall not necessarily be limited to impact cratering processes; the bodies (asteroidal or cometary) that make the impacts; or the geological, chemical, or biological results of impact cratering.

More information: *https://community.geosociety.org/pgd/awards/shoemaker*

Ronald Greeley Award for Distinguished Service

Nominations due: 15 August
Submit to: Jennifer Piatek, piatekjel@ccsu.edu

In 2011, the PGD established the Ronald Greeley Award for Distinguished Service. This award may be given to those members of the PGD, and those outside of the Division and GSA, who have rendered exceptional service to the PGD for a multi-year period. The award is not open to currently serving members of the management board but may be awarded to past members of the management board who have provided exceptional service to the PGD after their term on the management board has ended. Nominations for the award, which should include a description of what the nominee has given to the PGD community, may be made by any PGD member to the management board.

More information: *https://community.geosociety.org/pgd/awards/greeley*

The Pete Mouginis-Mark Prize in Planetary Volcanology

Nominations due: 6 August
Submit to: Lauren Jozwiak, lauren.jozwiak@jhuapl.edu

The Pete Mouginis-Mark Prize in planetary volcanology recognizes outstanding undergraduate and graduate student presentations in planetary volcanology (talks or posters) at the annual GSA Connects Meeting. Planetary volcanology, for the purpose of this prize, is defined as research into volcanoes and volcanic processes on the planets (Mercury, Venus, Mars, Moon), asteroids, or the moons of the outer planets. Volcano studies may include the geomorphology and tectonics of summit craters, the lava flows on their flanks, and the deformation of the flanks. Volcanic processes may include numerical modeling of eruptions, as well as petrologic studies of samples from known volcanic areas of the Moon, Mars or asteroids. Remote sensing (spectral, radar, gravity) of volcanoes and their products is also appropriate. Studies of terrestrial volcanoes and volcanic processes are only eligible if the primary focus is on extraterrestrial volcanism.

More information: *https://community.geosociety.org/pgd/awards/mouginis-mark-prize*

SOILS AND SOIL PROCESSES DIVISION

Peter W. Birkeland Distinguished Career Award

Nominations due: 1 August
Submit to: Steven Driese, Steven_Driese@baylor.edu

The Peter W. Birkeland Distinguished Career Award recognizes individuals who have made outstanding contributions to the general field of soil or paleosol (buried or fossilized soil) science. Dr. Birkeland's main area of research was soil geomorphology, and his steady stream of publications, often with his students, demonstrated the application of pedology to address landform and landscape evolution.

More information: *https://community.geosociety.org/soilsdivision/awards/peter-w-birkeland-distinguished-career-award*

Distinguished Service Award

Nominations due: 1 August
Submit to: Steven Driese, Steven_Driese@baylor.edu

The Soil and Soil Processes Division Distinguished Service Award recognizes individuals who have contributed significantly to the advancement of the Division either through service as an officer, service as a chair or member of a committee (or committees), or any other service-related activities (e.g., sponsorship of symposia or topical sessions, field trips, workshops, etc.) that draw positive attention to the research aims and activities of the Division. It includes lifetime membership in the Division.

More information: *https://community.geosociety.org/soilsdivision/awards/soils-and-soil-processes-division-distinguished-service-award*

CALL FOR NOMINATIONS

GSA Leadership and Committee Service

WHY SELF-NOMINATE?

1. You are the best source of information about your skills and expertise.
2. You directly signal a commitment to serve on specific committees.
3. Self-nomination is an excellent way to enhance your career.

SERVING ON A GSA COMMITTEE ALLOWS YOU TO:

1. Contribute to strengthening GSA.
2. Grow your professional network.
3. Gain skills and knowledge that enhance your career.

MAKE AN IMPACT!

Self-Nominate! Deadline: 15 June 2025

Terms begin 1 July 2026 (unless otherwise indicated)

OPEN POSITIONS

GSA COUNCIL
- (3) Councilor (4-year term; E, M)
- President-elect (3-year term; E, M)

ACADEMIC AND APPLIED GEOSCIENCE RELATIONS COMMITTEE
- Member-at-Large, Industry (3-year term; E, M)

ANNUAL PROGRAM COMMITTEE
- (2) Member-at-Large (4-year term; B, E, M)

ARTHUR L. DAY MEDAL AWARD COMMITTEE
- (2) Member-at-Large (3-year term; E, T)

BASCOM MAPPING AWARD COMMITTEE
- Member-at-Large (3-year term; E, T)

DIVERSITY IN THE GEOSCIENCES COMMITTEE
- (2) Member-at-Large (3-year term; E, M)
- (1) Member-at-Large, Industry (3-year term; E, M)
- (1) Member-at-Large, Student (3-year term; E, M)

EDUCATION COMMITTEE
- Informal Science Educator Representative (4-year term; B, E, M)
- Graduate Educator Representative (4-year term; B, E, M)

GEOLOGY AND PUBLIC POLICY COMMITTEE
- (2) Member-at-Large (3-year term; E, M)
- (1) Member-at-Large, Student (3-year term; E, M)

GSA INTERNATIONAL COMMITTEE
- (2) Member-at-Large (4-year term; E, M)
- (1) Member-at-Large, Outside North America (4-year term; E, M)
- (1) Member-at-Large, North America (4-year term; E, M)
- (1) Member-at-Large, Student (2-year term; E, M)

MEMBERSHIP COMMITTEE
- Member-at-Large, Academia (3-year term; E)

NOMINATIONS COMMITTEE
- (2) Member-at-Large (3-year term; B, E)

NORTH AMERICAN COMMISSION ON STRATIGRAPHIC NOMENCLATURE
- GSA Representative (3-year term; E, M) (Term begins 1 December 2025)

PENROSE CONFERENCES AND FIELD FORUMS COMMITTEE
- (1) Member-at-Large (3-year term; E)

PENROSE MEDAL AWARD COMMITTEE
- (2) Member-at-Large (3-year term; E, T)

PROFESSIONAL DEVELOPMENT COMMITTEE
- (2) Member-at-Large, Student (3-year term; E)

PUBLICATIONS COMMITTEE
- (1) Member-at-Large (4-year term; B, E, M)
- (1) Member-at-Large, Early Career Professional (4-year term; B, E, M)

PUBLIC SERVICE AWARD COMMITTEE
- (1) Member-at-Large (3-year term; B, E, M)

RESEARCH GRANTS COMMITTEE
- (10) Member-at-Large (3-year term; B, T)

YOUNG SCIENTIST AWARD (DONATH MEDAL) COMMITTEE
- (3) Member-at-Large (3-year term; E, T)

B – Meets in Boulder or elsewhere

E – Communicates electronically

M – Meets at Connects

T – Extensive time commitment required during application review period

NOMINATION PORTAL: *https://rock.geosociety.org/forms/viewopenpositions.asp*

GSA HEADQUARTERS CONTACT: *Darlene Williams, +1-303-357-1060; dwilliams@geosociety.org*

"As a mid-career professional geoscientist, I am fortunate to have had many opportunities to give back to the greater geology community that has done so much for me; my volunteerism through GSA Committees has been one of the most rewarding and satisfying professional experiences. During my service, I contributed to student recognition and career advancement by granting research awards, expanded my professional network by serving on committees with new colleagues, exposed myself to (formerly) unfamiliar and burgeoning geologic sub-disciplines and methodologies, and learned about leading science topics and prominent geologists working for academic departments and governmental agencies outside of the United States. All geoscientists should consider GSA Committee service as an important part of their professional development."

—Eugene Szymanski

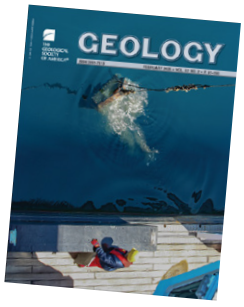
PUBLICATIONS

2024 Exceptional Reviewers

GSA appreciates the many individuals who make its peer-reviewed journals possible: the authors, science editors, editorial board members, associate editors, and, most of all, the reviewers. Peer review is the cornerstone of scientific publishing, yet it is all too often a thankless task. To those who provide timely, thorough, and even-handed reviews, GSA extends its sincere gratitude. GSA's journal science editors have selected the following individuals for special recognition in appreciation of the many prompt, insightful, meticulous, and tactful reviews they have completed. (Photos of these reviewers are posted at https://www.geosociety.org/GSA/Publications/GSA/Pubs/exceptional_reviewers.aspx.)

GSA BULLETIN

Chris Heinrich, ETH Zurich
Zhongwu Lan, Chinese Academy of Sciences
Penglei Liu, China University of Geosciences (Wuhan)
Alida Timar-Gabor, Babes-Bolyai University, Cluj-Napoca
Zhixiang Wang, China University of Geosciences
Chen Wu, Institute of Tibetan Plateau Research, Chinese Academy of Sciences
Yuan-Bao Wu, China University of Geosciences
Andrew V. Zuza, University of Nevada, Reno



GEOLOGY

Thierry Adatte, University of Lausanne
Michael Anenburg, Australian National University
Joe Cartwright, The University at Oxford
David Chew, Trinity College Dublin
Matthew J. Comeau, Delft University of Technology
Adriana Dutkiewicz, The University of Sydney
Roberto Ferrez Weinberg, Monash University
Sami Mikhail, University of St Andrews
Paul B. Wignall, University of Leeds

GEOSPHERE

Holli Frey, Union College
Daniel Larsen, University of Memphis
Brandon Lutz, Appalachian State University
Fabin Pan, China University of Geosciences, Wuhan
Sarah Roeske, University of California, Davis
Tom Sisson, U.S. Geological Survey
Jon Spencer, University of Arizona
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Want to join GSA's incredible group of reviewers? Learn more about becoming a reviewer at **https://www.geosociety.org/GSA/Publications/GSA/Pubs/becomeaGSAreviewer.aspx.**

GSA | CENTER FOR PROFESSIONAL EXCELLENCE

Support Your Geoscience Journey with On To the Future

The On To the Future (OTF) program provides geoscience scholars with opportunities to join GSA, receive mentorship, network with professionals, and build community within the discipline.

With support from the **GSA Foundation** and a new **NSF collaborative research award (Award #2333261/62)**, GSA is expanding OTF, allowing both scholars and mentors to participate for up to four years!

WHAT OTF OFFERS:

- **Financial support** for attending GSA Connects, including travel funding, meeting registration, and GSA membership.
- **Mentorship connections** with geoscience professionals.
- **Networking & community-building** among fellow OTF scholars.
- **Exclusive access** to OTF field trips, mentor meetings, and workshops.

APPLY NOW

Visit https://www.geosociety.org/OTF to learn more about eligibility and the application process.

For a more thorough overview of the program and application, please watch the OTF Application Walkthrough Webinar available in the GSA webinar library!

Interested in becoming a mentor? We are actively recruiting! Learn about mentor expectations and apply at **https://www.geosociety.org/OTF**. Travel and registration support is available! Scholar Application Deadline: 6 May. Mentor Application Deadline: 29 May.

GEOLOGY ROCKS!

DEATH VALLEY ROCKS!

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MARLI B. MILLER

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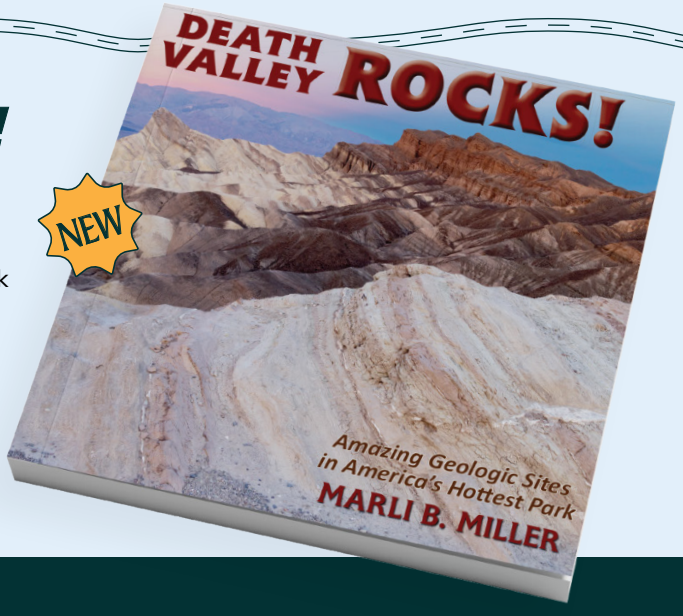

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—Matthew Millado
2024 Natural Resource Management Assistant, Channel Islands National Park, California

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- Access in-depth, localized salary insights
- Ace your interviews with professional coaching

Get started using the ultimate resource for geology jobs at **careers.geosociety.org.**

The Role of Professional Organizations in My Career: My Experience with GSA

Chioma Onwumelu

Your career journey and its growth are influenced by a mix of factors that work together. While personal ambition and hard work are key, other elements, like being involved in professional organizations, can play a huge role in shaping your career and even personal life path. Advancing your career through these organizations is about combining collaboration and flexibility to position yourself as a dynamic and adaptable leader in your field. For instance, my involvement with The Geological Society of America (GSA) helped me land an internship, where I was able to build valuable connections and network with industry leaders.

DISCOVERING THE VALUE OF PROFESSIONAL ASSOCIATIONS

Like many students, I initially saw professional societies as a platform for attending conferences and accessing publications. But joining GSA and the American Association of Petroleum Geologists (AAPG) completely changed my view. I started as a general member, but before long, I took on leadership roles—first as secretary, then vice president, and eventually student chapter president. These experiences allowed me to organize events, connect with industry professionals, and lead teams. Along the way, I developed valuable skills in project management, communication, public speaking, and leadership.

A PATHWAY TO LEADERSHIP AND MENTORSHIP

Taking on leadership roles in professional societies was truly transformative. Volunteering not only helped me develop key leadership skills but also connected me with mentors who offered invaluable career advice. They helped me grasp industry expectations, fine-tune my research focus, and discover new opportunities.

Beyond the mentorship, volunteering gave me the opportunity to interact with professionals from various geoscience disciplines, expanding my view of the career possibilities out there. It also deepened my appreciation for the value of giving back to the field, contributing to the profession, and growing personally through service.

SCHOLARSHIPS AND RESEARCH SUPPORT

GSA's influence on my career went far beyond networking and leadership opportunities—it played a key role in supporting my research. I was fortunate to receive GSA scholarships twice, which provided crucial funding for fieldwork, lab analyses, and conference travel. These scholarships eased financial pressures and validated my research, giving me the confidence to tackle more ambitious projects.

GSA's recognition also helped strengthen my professional profile, leading to new opportunities for collaborations, internships, and speaking engagements. This experience showed me that professional societies don't just connect people—they actively invest in your growth and development.

ONGOING LEARNING AND SKILL DEVELOPMENT

My time with GSA has been a constant learning experience. I used workshops, technical sessions, and online courses to stay on top of industry trends, sharpening my skills in data analysis, groundwater modeling, and site characterization—skills that have been vital to my career.

GSA's career development workshops also helped me refine my professional goals and improve how I present scientific findings. Attending these early on made the transition from academia to applied geoscience much smoother.

NETWORKING: LEVERAGING NEW OPPORTUNITIES

Networking through GSA has been one of the most valuable aspects of my career. Attending annual meetings and industry events allowed me to connect with experts, industry leaders, and peers. Some of these connections led to job opportunities, collaborative research projects, and even

invitations to speaking engagements, such as the GSA-GSN webinar on career advancement.

Casual conversations at GSA events often turned into mentorship opportunities, and informal discussions provided insights that helped shape my career. Again, these experiences show the role of GSA in creating a supportive community that fosters career growth.

INSPIRING THE NEXT GENERATION

Reflecting on my journey, my involvement with GSA has been one of the most rewarding aspects of my professional career. The leadership skills, mentorship, and professional connections I have gained have helped me grow as a geoscientist.

My advice for students and early career professionals is simple: get involved. Volunteering, networking, and continuous learning are key to career advancement. Even small contributions, like helping organize an event or serving on a committee, can lead to significant opportunities.

Every career path is unique, but engaging in organizations like GSA provides essential tools for professional growth. I encourage geoscientists at all career stages to take advantage of these opportunities to advance their careers and to contribute to and strengthen the geoscience community as a whole.

JOIN GEOSCIENCE LEADERS AT

GSA Connects 2025

AS AN **EXHIBITOR** OR **SPONSOR**!

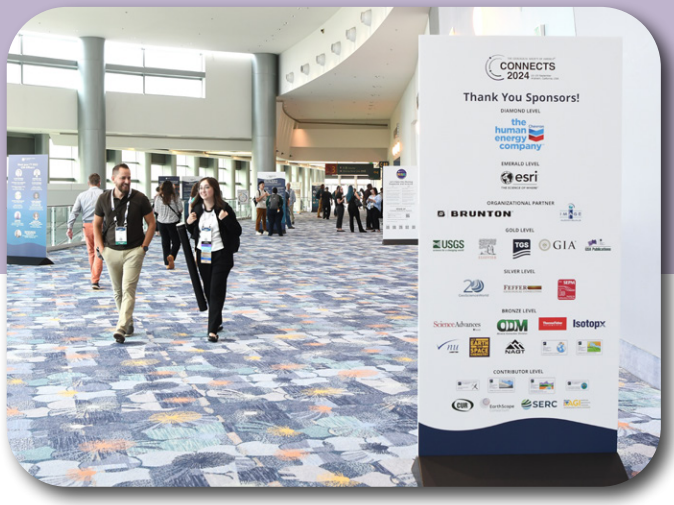
Be part of GSA Connects 2025, taking place 19–22 October in San Antonio, Texas, USA. This premier event unites the global geoscience community to share cutting-edge research, spark innovation, and forge valuable connections.

Showcase your latest technologies, services, and innovations to:

DEVELOP PARTNERSHIPS
50% of attendees have 11+ years of experience.

BUILD TALENT
40% of attendees are students seeking opportunities.

GAIN GLOBAL RECOGNITION
Attendees represented 49 countries in 2024.



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