



GSA SOUTH-CENTRAL SECTION MEETING

12–13 March

Little Rock Marriott, Little Rock, Arkansas, USA

www.geosociety.org/sc-mtg

Photo by Oliver Beland.

Program



Program
SOUTH-CENTRAL
52nd Annual Meeting of the South-Central Section, GSA
Little Rock, Arkansas, USA
12–13 March 2018

Geology in the Natural State



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NOTICE

By registering for this meeting, you have acknowledged that you have read and will comply with the GSA Code of Conduct for Events (full code of conduct listed on page 31). If you need to report unacceptable behavior, please contact:

GSA Executive Director, Vicki McConnell, vmcconnell@geosociety.org

GSA President-Elect, Robbie Griese, rrgries@gmail.com

You may also stop by registration or the GSA Bookstore to have them directly contacted via phone.

General Information



LOCATION

The 52nd Annual Meeting of the South-Central Section of the Geological Society of America, hosted by the University of Arkansas at Little Rock, is taking place at the Little Rock Marriott in downtown Little Rock, Arkansas. Situated on the Arkansas River, Little Rock is home to vibrant nightlife, big-time entertainment, world-class attractions and a booming dining scene. Learn about important events in the civil rights movement at the Central High School National Historic Site, explore the Clinton Presidential Center, and imagine a world free of hunger and poverty at the Heifer Village. Lace up your running shoes or hop on a bicycle and cruise the Arkansas River Trail that features more than 15 miles of scenic riverfront and one of the longest pedestrian and bicycle bridges in America. From digging for quartz or diamonds to soaking in a natural hot springs bath at Hot Springs National Park, Little Rock is the perfect starting point for a wide range of geology-related adventures.

Visitors interested in local culture, history, and entertainment will find abundant and varied opportunities in the Little Rock area. For more information about these opportunities, please visit <https://www.littlerock.com/>.

HISTORY

[Source: <https://www.littlerock.gov/>]

On April 9, 1722, Benard de la Harpe, a Frenchman leading an exploration party up the Arkansas River, noted the first outcropping of the rock that he had seen along the banks since leaving New Orleans. He reportedly called it 'la petite roche' or 'the little rock,' to distinguish it from a larger cliff across the river. The area was largely wilderness, inhabited by the Quapaw or Arkansas Indians, and had been explored by Spanish gold hunters and by itinerant hunter-trappers. On August 24, 1818, the Quapaw Line was drawn. Starting at La Petite Roche and heading due south, this line formed the boundary between the Quapaw tribe lands and public lands available for settlement. The 1818 treaty referred to La Petite Roche as the Little Rock. Some have speculated that this is the first official use of "Little Rock" to designate the area. On November 7, 1831, Little Rock was officially chartered as a town, and by November 2, 1835, Little Rock became a City. Arkansas became a state just eight months later on June 15, 1836. Arkansas seceded from the Union on May 8, 1861, and the Battle of Bayou Fourche took place outside of the City limits on September 10, 1863. Eleven days later, the City government ceased operation; it did not resume until January 1, 1866. In conjunction with a new state constitution, on March 8, 1875, Little Rock was re-chartered as Arkansas' first City of the First Class.

In September 1957, the eyes of the world were on Little Rock as nine African American children tried to integrate Little Rock Central High. Governor Orval Faubus attempted to delay the start, first through the courts and then by the National Guard. Eventually, President Dwight Eisenhower federalized the National Guard and replaced them with members of the 101st Airborne Division of the Army. On September 25, the nine African American students entered the school and began their school year. The 1960s through the 1990s saw the expansion of cultural life in Little Rock with the opening of the Arkansas Arts Center, Arkansas Symphony Orchestra, Arkansas Repertory Theatre, Ballet Arkansas, Wildwood Park for the Arts, the MacArthur Museum of Arkansas Military History, and the relocation of the Museum of Discovery to the River Market. In the 1990s, the City of Little Rock engaged in community-wide goal-setting programs. Future Little Rock led to the creation of many initiatives including the establishment of innovative Prevention, Intervention & Treatment programs; neighborhood resource centers; and the River Market district. The city also worked to expand citizen engagement through enhanced participation in neighborhood associations. As the 2000s dawned, Little Rock welcomed thousands of visitors for the opening of the William Jefferson Clinton Presidential Center and Park. President Clinton was a keynote speaker at the 1997 40th anniversary, the 2007 50th anniversary, and the 2017 60th anniversary of the integration of Little Rock Central High.

In 1820, Little Rock's population was less than 30. Little Rock's 2016 U.S. Census Bureau population estimate is 199,541.

ARKANSAS GEOLOGY

[Source: <http://www.geology.ar.gov/>]

Most surficial rocks in Arkansas are sedimentary, but there are also some igneous rocks (with adjacent contact metamorphic rocks) and very low grade regional metamorphic rocks in Arkansas. By studying rocks and depositional systems, geologists recognize that most of the sedimentary rocks in the Paleozoic Highlands of Arkansas are marine. In the southern and eastern parts of the state, the sedimentary deposits are predominantly fluvial (fresh-water processes). The exposures of igneous rocks in Arkansas are less than 0.1 percent of the entire area of the state. Most are exposed over 15 square miles, principally in Pulaski, Saline, Hot Spring, Garland, and Pike Counties. A few small igneous dikes and sills are present outside the Ouachita region, mostly in the Arkansas Valley, and in at least one case, in the Boston Mountains. Except for some localized contact metamorphism

adjacent to the larger igneous intrusions, only very low grade metamorphic rocks are present in the state.

Arkansas is divided into a highland area in the northwest and a lowland region in the south and east. The rocks in the highland area are dominated by well-lithified sandstones, shales, limestones, and dolostones of Paleozoic age. A thin drape of younger unconsolidated clays, sands, and gravel, termed alluvium, is often found in valley floors and associated with the streams and rivers. The sedimentary deposits of the lowlands are mainly unconsolidated clay, sand, and gravel of Quaternary age, poorly consolidated deposits of clay, sand, silt, limestone, and lignite of Tertiary age, and consolidated (to a limited extent) deposits of Cretaceous marl, chalk, limestone, sand, and gravel.

When most of the sediments that compose the rocks in the highland region of Arkansas were being deposited, north Arkansas was a shallow south-sloping sea floor (continental shelf), the Arkansas River Valley was near the edge of the shelf, and the Ouachita area was a deep abyssal plain. An abyssal plain is the relatively smooth and deep (more than 3,000 feet below sea level) parts of the ocean floor where accumulating sediments have buried the pre-existing topography. In the late PreCambrian, a broad uplift domed the Ozark strata with little structural disruption. During the late Paleozoic, a collision of two of Earth's mobile continental plates compressed the sediments of the abyssal plain into the Ouachita Mountains. This multimillion-year-long process folded and faulted the Ouachita strata into a structurally complex mountain chain. The Arkansas River Valley area is the transition zone between the structurally simple Ozarks and the structurally complex Ouachitas with subdued characteristics in each region.

Today, the rocks of the Ozarks tilt slightly to the south and have a dendritic drainage pattern. Since shales and siltstones erode faster than sandstones and limestones, the basic topography is flat-topped mountains with stepped flanks. By contrast, the topographic expression of the Ouachitas is controlled not only by the erosional resistance of the rocks, but also by their internal structure. The strata are complexly folded and frequently faulted. The mountains are mostly east-west-trending ridges supported by erosionally resistant rocks and separated by less resistant rocks. The Arkansas River Valley is characterized by much less intensely folded and faulted strata than the Ouachita region. Erosional processes left the synclines as mountains and the anticlines as valleys.

TRANSPORTATION

Little Rock is accessible by a number of different directions. From the east (Tennessee) and west (Oklahoma), Little Rock is readily accessible by Interstate 40; from the south-

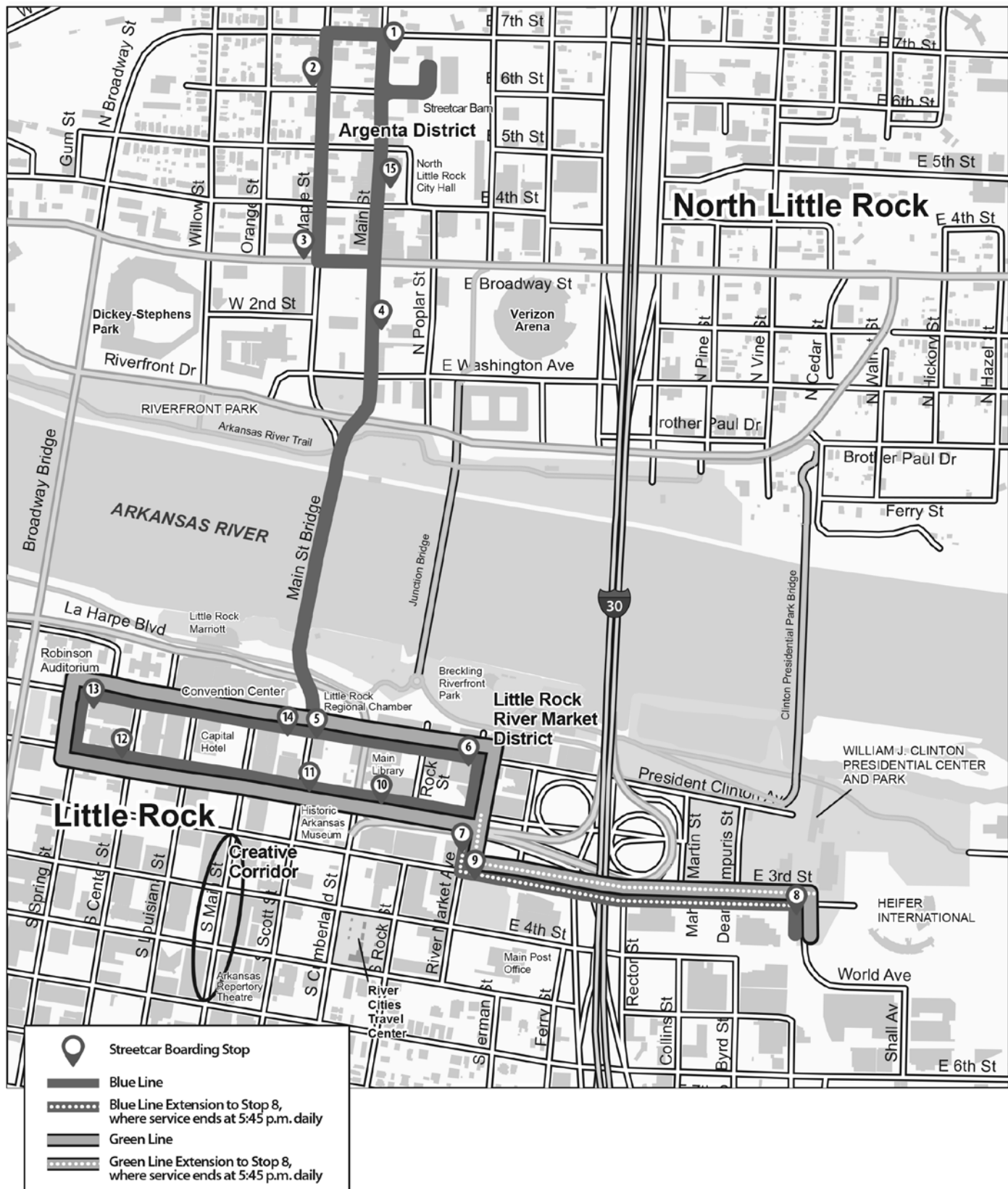
west (Texas) via Interstate 30; from the south (Louisiana) via Interstate 530/US 65 or US 167; and from the north (Missouri) via US 67/167 or US 65/Interstate 40. There are two bypasses and a loop through Little Rock, including an east-west bypass (Interstate 630) through downtown Little Rock, a north-south bypass (Interstate 430) connecting Interstate 30 to Interstate 40 on the west side of Little Rock, and a north-south loop (Interstate 440) around the east side of Little Rock connecting US 67/167 south to Interstate 40 southwest to Interstate 30/Interstate 530.

People preferring to fly will arrive at the Bill and Hillary Clinton National Airport (airport code: LIT), near the intersection of Interstate 440 and Bankhead Dr. in southeast Little Rock. From the airport, it is a 7-mile drive to the Little Rock Marriott. If using Google Maps or other internet mapping software, use the address: Little Rock Marriott, 3 Statehouse Plaza, Little Rock, AR 72201. The Little Rock Marriott provides complimentary shuttle service, but reservations are required and should be made in advance by calling +1-501-906-4000. Estimated taxi fare from the airport to the Little Rock Marriott is US\$17 (one way).

Rock Region Metro operates a streetcar connecting the Little Rock Marriott to several locations in the adjacent River Market District and the nearby Argenta District in North Little Rock (see map on page 5–7). Streetcar fares are US\$1 (per boarding) or US\$2 for a day pass. Rock Region Metro also operates bus lines connecting the Little Rock Marriott to locations throughout the city, including the airport. More information can be found at <https://rrmetro.org/>. Uber is also available in the Little Rock area. More information about Uber services can be found at <https://www.uber.com/cities/little-rock/>.

PARKING

The Little Rock Marriott has valet parking available for US\$27.25 (garage height clearance 6 feet 8 inches), including three electric car charge stations (additional fee required). Additional parking is available at the 650-space Statehouse Convention Center Parking Garage (201 Main St., Little Rock, Arkansas 72201) approximately one block south of the Little Rock Marriott for US\$6 per exit/per day/per car (garage height clearance 6 feet 10 inches.) To receive this discounted rate, please have your parking ticket validated at the GSA Registration desk. If after hours, please see the Marriott front desk for validated tickets. Or at the underground, 550-space Robinson Center Parking Garage (424 W Markham St, Little Rock, AR 72201) approximately one block west of the Little Rock Marriott for US\$12 per 24 hours. Several surface lots within walking distance of the Little Rock Marriott are also available.





DOWNTOWN ATTRACTIONS

Little Rock

LEGEND

- Arkansas River Trail
 - METRO Streetcar
 - Ⓜ Bus Station
 - Ⓟ Public Parking
 - Ⓜ Union Station
 - ⓘ Visitor Information
- River Lights in the Rock illuminate the downtown sky each night with LED lighting on the Clinton Presidential Park Bridge, Junction Bridge and the Main Street Bridge.

DOWNTOWN DESTINATIONS

- 1 Arkansas Baptist College
- 2 Arkansas Governor's Mansion
- 3 Arkansas Inland Maritime Museum
- 4 USS Razorback Submarine
- 5 USS Hoga Tugboat
- 6 Arkansas State Capitol
- 7 Bernice Garden
- 8 Bobby's Bike Hire
- 9 Central High National Historic Site
- 10 Curran Hall Visitor Center
- 11 Dickley-Stephens Park
- 12 Esse Purse Museum
- 13 Heifer Village & Heifer Int'l Headquarters
- 14 Historic Arkansas Museum
- 15 H.U. Lee Int'l Gate & Garden
- 16 Little Rock Convention & Visitors Bureau
- 17 Mosaic Temple Cultural Center
- 18 Mount Holy Cemetery
- 19 Museum of Discovery
- 20 Old State House Museum
- 21 Ottenheimer Market Hall & Shop the Rock
- 22 Philander Smith College
- 23 Riverside RV Park
- 24 Robinson Center
- 25 Rock Town Distillery
- 26 Sogway of Arkansas
- 27 Statehouse Convention Center
- 28 Studio Theatre
- 29 Verizon Arena
- 30 Weekend Theater

Clinton Presidential Center:

- 39 Anne Frank Tree
- 40 Clinton Presidential Center
- 41 Clinton School of Public Service

Main Library Campus:

- 33 Arkansas Studies Institute & Galleries
- 34 Cox Creative Center
- 35 Main Library
- 36 Ron Robinson Theater

MacArthur Park:

- 37 Arkansas Arts Center
- 38 MacArthur Military Museum
- 39 Firehouse Hotel & Museum

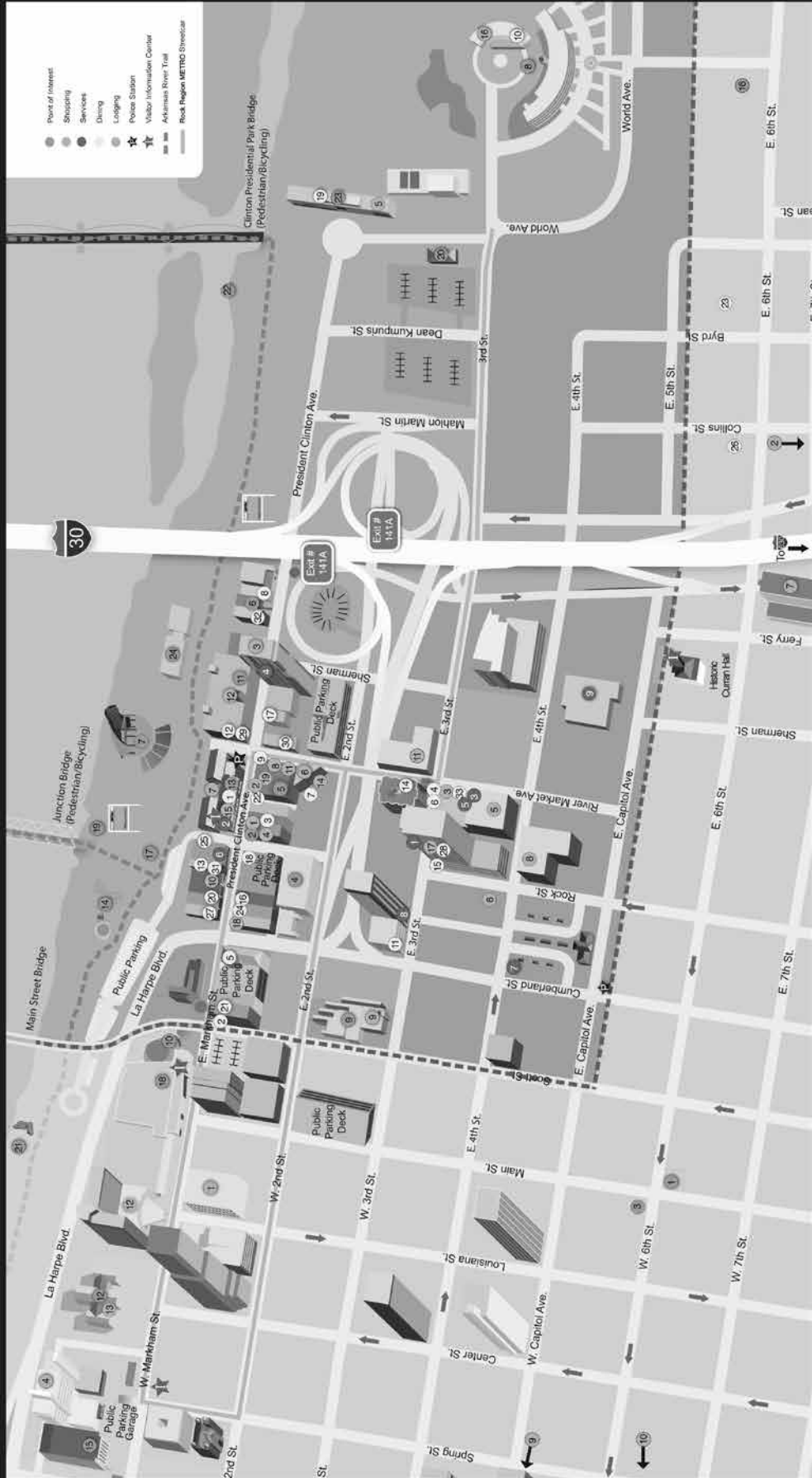
Riverfront Park:

- 40 Belvedere Pavilion
- 41 Bill Clark Press Park Wetlands
- 42 Central Arkansas Nature Center
- 43 First Security Amphitheater
- 44 History Pavilion
- 45 La Petite Roche Plaza ("The Little Rock")
- 46 Little Rock Civil War Marker
- 47 Peabody Splash Park
- 48 Splash Pad/Children's Play Area
- 49 Vogel Schwartz Sculpture Garden

LittleRock.com
501-376-4781 or 1-800-844-4781

RIVER MARKET

ATTRACTIONS · SHOPPING · DINING · LODGING · SERVICES



RIVER MARKET



POINTS OF INTEREST

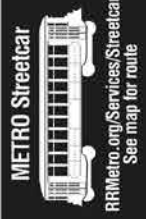
- 1. Arkansas Repertory Theatre
601 Main Street
(501) 378-0405
- 2. Arkansas Studies Institute
200 Galleries
Clinton Avenue
(501) 320-5700
- 3. Ballet Arkansas
520 Main Street
(501) 223-5150
- 4. Central Arkansas Library System
100 Rock Street
(501) 918-3000
- 5. CALS Ron Robinson Theater
100 River Market Avenue
(501) 320-9715
- 6. CIBC 27
614 President Clinton Avenue
(501) 414-0400
- 7. First Security Amphitheater
Julius Breckling Riverfront Park
- 8. Heifer Village & Heifer International World Headquarters
1 World Avenue
(501) 307-2600
- 9. Historic Arkansas Museum
200 East 3rd Street
(501) 324-9331
- 10. H.U. Lee International Gate and Garden
101 East Main Street
(501) 395-7650
- 11. Museum of Discovery
500 President Clinton Avenue
(501) 385-7650
- 12. Old State House Museum
300 West Markham Street
(501) 324-9685
- 13. Oneheimer Market Hall
400 President Clinton Avenue
(501) 919-5252
- 14. Peabody Park
Julius Breckling Riverfront Park
- 15. Robinson Center
426 West Markham Street
(501) 376-4761
- 16. Rock Town Distillery
1216 East 6th Street
(501) 307-5241
- 17. St. Vincent Medical Mile
Julius Breckling Riverfront Park
- 18. Statehouse Convention Center
1 Statehouse Plaza
(501) 376-4781
- 19. The "Little Rock" Plaza
US Parks Rock Plaza
Julius Breckling Riverfront Park
- 20. University of Arkansas Clinton School of Public Service
1200 President Clinton Avenue
(501) 383-5000
- 21. Vogel Schwartz Sculpture Garden
Julius Breckling Riverfront Park
- 22. William E. "Bill" Clark Presidential Park Walkways
1200 President Clinton Avenue
(501) 371-4510
- 23. William J. Clinton Presidential Center & Park
1200 President Clinton Avenue
(501) 374-4242
- Clinton Presidential Park Bridge
Adjacent to the William J. Clinton Presidential Center & Park
- 24. Wm. Stebbins Jr. Central Arkansas Nature Center
602 President Clinton Avenue
(501) 907-0636

LODGING

- 1. Capitol Hotel
111 West Markham Street
(501) 374-7474
- 2. Comfort Inn & Suites Presidential by Hilton
400 River Market Avenue
(501) 376-4662
- 3. Comfort Inn & Suites
521 President Clinton Avenue
(501) 379-9600
- 4. DoubleTree Hotel
424 West Markham Street
(501) 372-4371
- 5. Hampton Inn & Suites
320 River Market Avenue
(501) 244-0600
- 6. Hilton Garden Inn
322 River Market Avenue
(501) 244-0044
- 7. Holiday Inn Presidential
400 River Market Avenue
(501) 376-2100
- 8. Homewood Suites by Hilton
400 River Market Avenue
(501) 376-4662
- 9. Hotel Fredericks
625 West Capitol Avenue
(501) 373-9497
- 10. La Quinta Inn and Suites Conference Center
617 South Broadway Street
(501) 374-9000
- 11. Residence Inn By Marriott
219 River Market Avenue
(501) 376-2427
- 12. The Little Rock Marriott
3 Statehouse Plaza
(501) 306-0000

ANNUAL/RECURRING EVENTS

- River Lights in the Rock (Nightly)
RiverMarket.info
- Little Rock Marathon (March)
LittleRockMarathon.com
- Arkansas Literary Festival (April)
ArkansasLiteraryFestival.org
- Jazz in the Park (April)
RiverMarket.info
- Farmers' Market (May-September)
RiverMarket.info
- Movies in The Park (June-July)
MoviesInTheParkLR.net
- Pops on the River (July 4)
ArkansasOnline.com/Pops
- Jazz in the Park (September)
RiverMarket.info
- 2nd Friday Art Night
2ndFridayArtNight.com
- Arkansas Symphony Orchestra
ArkansasSymphony.org
- Clinton School Speaker Series
ClintonSchoolSpeakers.com



RRMetro.org/Services/Streetcar
See map for route

SHOPPING

- 1. ASquare Gifts
495 President Clinton Avenue
(501) 244-2622
- 2. Basket Remedy
417 West Markham Street
(501) 244-9870
- 3. Beige
300 River Market Avenue
(501) 894-2084
- 4. Butler Center Retail Gallery
401 President Clinton Avenue
(501) 320-5790
- 5. Clinton Museum Store
1200 President Clinton Avenue
(501) 749-0400
- 6. Cut Creative Center & Gallery
120 River Market Avenue
(501) 918-3093
- 7. Farmers' Market (May - Sept.)
(River Market Pavilion)
400 President Clinton Avenue
(501) 372-2455
- 8. Fringe
112 River Market Avenue
(501) 376-7000
- 9. Historic Arkansas Museum Store
200 East 3rd Street
(501) 324-9621
- 10. Lalaphe's Office Furniture
318 President Clinton Avenue
(501) 372-6884
- 11. LUV
116 River Market Avenue
(501) 319-7155
- 12. Museum of Discovery Explore Store
500 President Clinton Avenue
(501) 385-7050, Ext. 2090
- 13. Old State House Museum Store
111 West Markham Street
(501) 324-9686
- 14. River Market Books & Gifts
120 River Market Avenue
(501) 918-3093
- 15. Shop the Rock (Oneheimer Market Hall)
322 President Clinton Avenue
(501) 320-3816
- 16. Shop @ Heifer
1 World Avenue
(501) 507-2950
- 17. Stratton's Market
405 East 3rd Street
(501) 919-6700
- 18. The Barn Merchandise
301 President Clinton Avenue
(501) 615-5287
- 19. The Freedled Frog
419 President Clinton Avenue
(501) 514-2060

SERVICES

- A Cab Company
(501) 241-0750
- 1. 401 Tour Co.
401 East 3rd Street
(501) 304-9404
- 2. Bobby's Bike Hire
400 President Clinton Avenue
(501) 615-7001
- 3. Center Photography
300 River Market Avenue
(501) 434-4247
- 4. First Security Bank
500 President Clinton Avenue
(501) 907-9100
- 5. Jasmine Nail Salon
300 River Market Avenue
(501) 244-2686
- 6. People's Readings
322 President Clinton Avenue
(501) 372-4200
- 7. Rock Region Metro
River Cities Travel Ctr.
400 President Clinton Avenue
(501) 376-1163
- 8. Salon on Third
300 Third Street
(501) 434-4247
- 9. United States Post Office
500 East Capitol Avenue
(501) 376-5155
- Uber
Uber.com/app
- Yellow Cab
(501) 222-2222

DINING

- 1. Oneheimer Market Hall Vendors
400 President Clinton Avenue
(501) 374-2622
- 2. @ the Corner
201 East Markham Street
(501) 400-8468
- 3. ASquare Cafe and Gifts
405 President Clinton Avenue
(501) 244-2622
- 4. Arden's Cols & Not Not Tap Room
433 East 3rd Street
(501) 376-2326
- 5. Big Whiskey's
225 East Markham Street
(501) 324-2445
- 6. Blue Canoe Brewing Co.
425 East 3rd Street
(501) 246-5015
- 7. Bookends Cafe
120 River Market Avenue
(501) 918-3093
- 8. Bureau Area Grill and Cafe
614 President Clinton Avenue
(501) 904-2133
- 9. Cache Restaurant
425 President Clinton Avenue
(501) 650-6985
- 10. Cafe @ Heifer
1 World Avenue
(501) 907-8801
- 11. Caper's Grill
300 3rd Street
(501) 325-3333
- 12. Damaged Press
300 3rd Street
(501) 664-2239
- 13. Deep Ultra Lounge
322 President Clinton Avenue
(501) 244-9538
- 14. Dicky's Gypsy Bistro
200 River Market Avenue
(501) 246-9277
- 15. Duane's Pub
401 East 3rd Street
(501) 244-0542
- 16. Eric Biggs Chicago Style
Fried Potato
301 President Clinton Avenue
(501) 372-4782
- 17. Flying Fish
511 President Clinton Avenue
(501) 375-3474
- 18. Flying Slicer
323 President Clinton Avenue
(501) 372-9032
- 19. Forty Two
1200 President Clinton Avenue
(501) 507-0042
- 20. Gus's World Famous
Hot Chicken
500 President Clinton Avenue
(501) 372-2211
- 21. Indiana's Pizzeria
201 East Markham Avenue
(501) 374-3836
- 22. Kinetics
415 President Clinton Avenue
(501) 379-9685
- 23. Last Fourth Brewing
501 Boyd Street
(501) 319-7275
- 24. Neous Coffee & Creative
301 President Clinton Avenue
(501) 257-9715
- 25. Preet
120 Oneheimer Plaza
(501) 244-9539
- 26. Rebel Kettle Brewing
822 East 6th Street
(501) 374-2791
- 27. Revolution Taco and
Brewery
300 President Clinton Avenue
(501) 223-0930
- 28. Shye's Little Bistro
405 President Clinton Avenue
(501) 919-6700
- 29. Sunny Williams' Steak Room
500 President Clinton Avenue
(501) 324-2989
- 30. Sticky
107 River Market Avenue
(501) 322-7107
- 31. Willy D's Rock & Roll
Piano Bar
322 President Clinton Avenue
(501) 244-9539
- 32. Zebra Coffee
610 President Clinton Avenue
(501) 386-3227
- 33. Zix Urban Wine & Beer Bar
400 President Clinton Avenue
(501) 246-4876



(800) 844-4781 • LittleRock.com
(501) 376-0121 • DowntownLR.com

EATING AND DRINKING

There are a number of restaurants within walking distance of the Little Rock Marriott that should suit all tastes and finances. There are also places to enjoy local microbrews, coffee, or other lighter fare. These include the following (please refer to the map and guide on pages 7 and 8 for locations). Little Rock has a wide variety of dining options within easy driving distance, too, so be sure to explore your options online or with your smartphone.

- **Agasi 7 Rooftop Bar and Kitchen** (\$\$), Bars, American (Traditional)
- **Arbela** (\$), Mediterranean
- **At The Corner** (\$\$), Salad, Breakfast & Brunch, Sandwiches
- **Bark Bar** (\$\$), Coffee & Tea, Cocktail Bars
- **Best Impressions** (\$\$), American (New)
- **Big Whiskey's** (\$\$), Sports Bars, American (Traditional)
- **Blue Canoe Brewing** (\$\$), Breweries
- **Bruno's Little Italy** (\$\$), Italian, Cocktails Bars, Seafood
- **Buenos Aires Grill & Café** (\$\$), Argentine, Spanish, Italian
- **Cache Restaurant** (\$\$\$), American (New)
- **Capital Bar and Grill** (\$\$), American (Traditional), Cocktail Bars
- **Ciao Italian Restaurant** (\$\$), Italian
- **Core Brewery** (\$\$), Breweries
- **Cotija's Mexican Grill** (\$), Mexican
- **Damgoode Pies** (\$\$), Pizza, Desserts, Salad
- **Dave's Place** (\$), American (New), Salad, Soup, Sandwiches
- **David's Burgers** (\$), Burgers
- **Diamond Bear Brewing Company** (\$\$), Breweries
- **Dizzy's Gypsy Bistro** (\$\$), American (New), Comfort Food, Cocktail Bars
- **Doe's Eat Place** (\$\$), Steakhouses
- **Dugan's Pub** (\$\$), Irish, Pubs
- **EJ's Eats & Drinks** (\$), Burgers, Sandwiches, Soup
- **Flying Fish** (\$\$), Seafood
- **Flying Saucer** (\$\$), Beer Bar
- **Flyway Brewing** (\$\$), Breweries
- **Forty Two** (\$\$), American (New), Sandwiches, Salad
- **Green Leaf Grill** (\$), American (Traditional), Pizza
- **Gus's World Famous Fried Chicken** (\$), Southern, Chicken Shop
- **Gusano's** (\$\$) Pizza, Sports Bars
- **Heritage Grill Steak & Fin** (\$\$\$), Seafood, Steakhouses
- **Iriana's Pizza** (\$\$), Pizza, Salad
- **Lost Forty Brewing** (\$\$), Breweries
- **One Eleven At The Capital** (\$\$), American (New), Breakfast & Brunch, Steakhouses
- **Raduno** (\$\$), Bars, Pizza, Breakfast & Brunch
- **Rebel Kettle Brewing Company** (\$\$), Breweries
- **Samantha's Tap Room & Wood Grill** (\$\$), American (Traditional), Bars
- **Sonny Williams' Steak Room** (\$\$\$), Steakhouses, Seafood
- **Soul Fish Café** (\$\$), Seafood, Salad, Soul Food
- **Sticky Rock'n'Roll Chick Shack** (\$\$), Dive Bars, Venues & Event Spaces, Southern
- **Stone's Throw Brewing** (\$), Breweries, Gastropubs, Sandwiches
- **The New 610 Center** (\$\$), Bars, Burgers, American (Traditional)
- **The Southern Gourmasian** (\$\$), American (New), Southern, Asian Fusion
- **Three Fold Noodles and Dumpling** (\$), Chinese, Noodles, Breakfast & Brunch
- **Vino's** (\$), Pizza, Breweries, Music Venues
- **Wasabi Sushi Bar Grill** (\$\$), *Japanese, Sushi Bars*
- **Zin Urban Wine & Beer Bar** (\$\$), Wine Bars, Beer Bar

VENUE

The meeting location is in downtown Little Rock at the Little Rock Marriott. Most pre-meeting field trips are departing from the lobby of the hotel, and most workshops are being held in rooms inside the hotel complex. See Field Trip and Workshop section for details.

WEATHER

In mid-March, central Arkansas has daytime temperatures in the upper-60s, lows in the low 40s, spring breezes, and low humidity. Although March is a relatively dry month in Little Rock, rain is possible, so the well-prepared field trip attendee will bring rain gear.

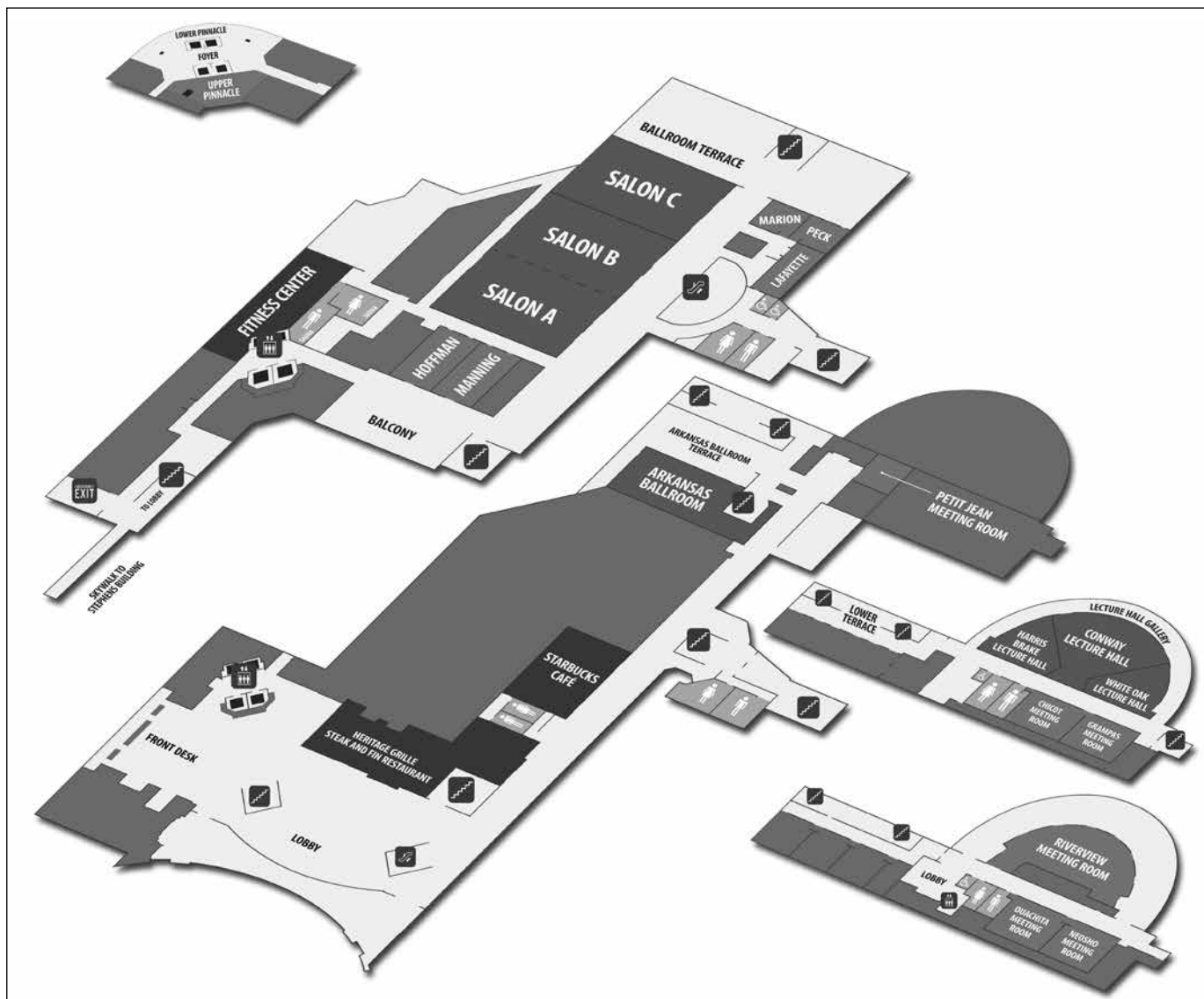
MEETING APP

A web-based app is available for this meeting. Please download the app at <https://gsa.confex.com/gsa/2018SC/meetingapp.cgi>.

REGISTRATION

Registration is required for anyone attending technical sessions, field trips, short courses, or exhibits. Check-in and on-site registration is in the Little Rock Marriott on the following schedule:

Sunday, 11 March	3–7:30 p.m.
Monday, 12 March	7 a.m.–4:30 p.m.
Tuesday, 13 March	7 a.m.–2 p.m.



Registration Fees

On-site registration fees are below and are shown in U.S. dollars. Professionals registering for the meeting are encouraged to add US\$15 to their registration fee to help a student attend the meeting.

On-site Fees	Full Mtg.	One day
Professional Member	\$235	\$185
Professional Member 70+	\$160	\$120
Professional Nonmember	\$260	\$200
Early Career Professionals	\$180	\$130
Student Member	\$120	\$75
Student Nonmember	\$150	\$80
K-12 Professional	\$110	\$60
Guest or Spouse	\$60	n/a
Field Trip/Workshop Only	\$60	n/a

ABSTRACTS

To view abstracts for this meeting, please go to the meeting app at <https://gsa.confex.com/gsa/2018SC/meetingapp.cgi>.

ACCOMMODATIONS

Rooms may still be available at the Little Rock Marriott, 3 Statehouse Plaza, Little Rock, Arkansas, 72201. Reservations can be made by calling the Little Rock Marriott at +1 877 759 6290 (toll free) or +1 501 906 4000 (local). Please be sure to mention that you are attending the South-Central GSA meeting (Reservation Code "TAC").

SPECIAL EVENTS

Welcome Reception and Keynote Address.

Sunday 11 March, 5–7 p.m., Salon C. Enjoy snacks and a complimentary beverage before and during the keynote presentation at 6 p.m., *Pioneering Women in Petroleum Geology – Celebrating 100 Years!*, by Robbie Gries, President-Elect of GSA. Each participant receives a coupon for one free beer, wine, or non-alcoholic beverage in their registration packet.

Posters/Exhibits Reception.

Monday 12 March, 4:30–6 pm. Salons A and B. Enjoy a complimentary beverage while visiting the poster/exhibit hall. Each participant receives a coupon for one free

beer, wine, or non-alcoholic beverage in their registration packet.

Posters/Exhibits Reception.

Tuesday 13 March, 4:30–6 pm. Salons A and B.

Enjoy a complimentary beverage while visiting the poster/exhibit hall. Each participant receives a coupon for one free beer, wine, or non-alcoholic beverage in their registration packet.

Outstanding Student Presentation Awards Ceremony.

Sponsored by the GSA South-Central Section. Tuesday 13 March, 5:30–6 p.m., Salon A and B. Come find out which undergraduate and graduate students won awards for their oral or poster presentations!

BUSINESS MEETINGS

South-Central Section Management Board Meeting. Monday 12 March, noon–1:30 p.m., Lafayette Room.

South-Central Section Open Meeting. Tuesday 13 March, 7–8 a.m., Lafayette Room.

TECHNICAL PROGRAM

Speaker Ready Room

The Speaker Ready Room is located in the Peck Room on the second floor of the Little Rock Marriott, and is available at the following times:

Sunday, 11 March	4–7 p.m.
Monday, 12 March	7–5:30 p.m.
Tuesday, 13 March	7 a.m.–2 p.m.

Computers and assistance are available to view presentations. All presentations are displayed as PowerPoint presentations in technical sessions, and presentations should be prepared using a 16:9 screen ratio. The Speaker Ready Room can also be used to check presentations prior to uploading files. We ask that oral presenters upload their presentations the night prior for morning sessions, and at least 2 hours prior to the beginning of their session for afternoon sessions.

Session Chair Orientations

Each Session Chair is requested to attend the 15-minute “Session Chairs Orientation” held in the Chicot Room the morning of the day on which your session is to take place. This meeting will include a review of session time management, AV procedures, and other information affecting the conduct of the day’s sessions.

Session chairs are asked to strictly adhere to the technical program schedule and to limit speakers to their allotted time. If a speaker does not appear for an assigned time slot, session chairs should call for a break or discussion period and begin the following presentation at its scheduled time.

A student volunteer is assigned to each oral session. Session chairs are asked to meet with the assigned student volunteer before the start of the session. The volunteers are there to help the sessions run smoothly and to contact the AV Coordinator in the event of technical problems

Posters

Each poster board is 4 feet × 8 feet (landscape), and posters can be hung with stickpins or Velcro. Pins and Velcro will be available in the exhibit hall. Posters will be located in Salon A & B adjacent to the exhibitors. Presenters are expected to have their posters up by 8:30 am, and are expected to be at their posters during the afternoon poster sessions (4:30–6 p.m., Monday or Tuesday). Presenters should take down their posters at the end of the session. Any posters not taken down will be discarded.

Theme Sessions

Please direct questions related to the following sessions to the Technical Program Chair: Laura Ruhl, lsruhl@ualr.edu.

T1. Late Paleozoic Tectonic Framework of the South-Central USA and the Evolution of the Ouachita Orogen.

Oral Session: Monday, 8 a.m., Harris Brake Room.

Poster Session: Monday, 8:30 a.m., Salons A & B.

Cosponsored by GSA Sedimentary Geology Division.

Advocates: Robert Stern, Univ. of Texas at Dallas, rjstern@utdallas.edu; Daniel Rains, Arkansas Geological Survey, daniel.rains@arkansas.gov; Majie Fan, Univ. of Texas at Arlington, mfan@uta.edu.

Description: The Ouachita-Marathon orogen of the southern United States tells us about a great continental collision that happened in Pennsylvanian time. It is buried for most of its 2000 km length from Birmingham, Alabama, to far-west Texas but is superbly exposed in Arkansas and Oklahoma. This session welcomes a wide range of contributions, including those that shed light on the nature of this mountain-building event, the sediments that it produced, and the associated hydrocarbon and coal deposits.

T3. Paleontology of the South-Central Region.

Oral Session: Monday, 8 a.m., Conway Room.

Poster Session: Monday, 8:30 a.m., Salons A & B.

Advocates: Joseph Daniel, PaleoAERIE, paleoairie@gmail.com; René Shroat-Lewis, Univ. of Arkansas at Little Rock, rashroatlew@ualr.edu.

Description: The south-central section of North America has an abundance of paleontological treasures. Even though parts of the section, such as Texas and Kansas, are well known for the significance of their paleontological discoveries, important work is being done in all five states and the parts of Mexico encompassed by the section. New researchers to the section in the last few years have expanded upon the work by previous researchers and opened new paths of exploration and science communication. In honor of *Arkansaurus* being voted the official state dinosaur of Arkansas and new research on the specimen being produced, this session will highlight the paleontological research happening in the south-central section while showcasing the diversity of its fossils and rich paleobiological history.

T5. Structure and Stratigraphy of the Mid-Continent Region: Mountain Building and Related Sedimentation.

Oral Session: Monday, 1:30 p.m., Harris Brake Room.

Cosponsored by GSA Sedimentary Geology Division

Advocates: Keith Gray, Wichita State Univ., k.gray@wichita.edu; Xiangyang Xie, Texas Christian Univ.,

x.xie@tcu.edu; William Parcell, Wichita State Univ., william.parcell@wichita.edu; Matthew McKay, Missouri State Univ., matthewmckay@missouristate.edu.

Description: This session has presentations that are linking intra-plate deformation and depositional processes to orogenies and the stratigraphic record.

T6. Karst Development and Karst Hydrogeology in the Mid-Continent Region of the United States

Oral Session: Tuesday, 8 a.m., Conway Room.

Poster Session: Tuesday, 8:30 a.m., Salons A & B.

Cosponsored by GSA Quaternary Geology and Geomorphology Division; GSA Hydrogeology Division; GSA Sedimentary Geology Division.

Advocates: Phillip Hays, U.S. Geological Survey and Univ. of Arkansas, pdhays@usgs.gov; Matthew Covington, Univ. of Arkansas, mcoving@uark.edu.

Description: Karst aquifers are of key importance in the mid-continent region of the United States. Karst systems present one of the most complex examples of hydrogeologic framework, and these complexities are mirrored in the challenges presented in collecting data, managing, and protecting karst aquifers. Advancements in data collection methodologies and in conceptualization of karst systems are improving our understanding of karst and our ability to effectively manage karst aquifers. This session will provide a forum for describing our current state of knowledge of karst and the aquifers hosted in these systems.

T8. Carbon in the Geosphere.

Oral Session: Tuesday, 1:30 p.m., Conway Room.

Poster Session: Tuesday, 8:30 a.m., Salons A & B.

Cosponsored by GSA Sedimentary Geology Division

Advocates: Omar Harvey, Texas Christian Univ., omar.harvey@tcu.edu; Anna M. Weiss, University of Texas, anna.weiss@utexas.edu.

Description: This session will cover the occurrence, reactions, and cycling of inorganic and organic carbon in the geosphere. Presentations within the session may include experimental or modeling studies of carbon at the nano- to global-scale and natural or anthropogenic systems.

T9. Geologic Mapping in the South-Central Region of the United States (Posters)

Poster Session: Tuesday, 8:30 a.m., Salons A & B.

Cosponsored by GSA Quaternary Geology and Geomorphology Division; GSA Sedimentary Geology Division.

Advocates: Richard Hutto, Arkansas Geological Survey, richard.hutto@arkansas.gov; Garrett Hatzell, Arkansas Geological Survey, garrett.hatzell@arkansas.gov.

Description: This poster session highlights recent geologic mapping in the south-central region of the United States.

T10. Holistic Approaches to Coping with Induced Seismicity in the Mid-Continent.

Oral Session: Tuesday, 1:30 p.m., Harris Brake Room.

Advocates: Casee Lemons, Texas Bureau of Economic Geology, casee.lemons@beg.utexas.edu; Tandis Bidgoli, Kansas Geological Survey, tbidgoli@kgs.ku.edu; Jake Walter, Oklahoma Geological Survey, jwalter@ou.edu; Scott Ausbrooks, Arkansas Geological Survey, scott.ausbrooks@arkansas.gov.

Description: The rate of seismicity associated with wastewater disposal has increased dramatically in the south-central United States over the last decade. Many researchers are now collaborating to build models that integrate geological, geophysical, and engineering data, leading to a more complete understanding of injection-induced seismicity mechanisms, triggering thresholds, and strategies for mitigation. We welcome a range of contributions broadly related to induced seismicity, including but not limited to, research efforts identifying causal factors for inducing seismicity (i.e. volume, rate, local stress, local geology), integrated subsurface studies, probabilistic forecasts of seismicity hazard, analyses of past regulatory actions, and recommended injection management applications. This session also aims to promote cooperation among industry, academia, and governmental organizations to develop best practices for injection well siting, operations, and hazard mitigation.

T14. Geological Survey Support to Emergency Management.

Oral Session: Tuesday, 8 a.m., Chicot Room.

Advocates: Brian Blake, Central United States Earthquake Consortium (CUSEC), bblake@cusec.org; Martha Kopper, Arkansas Geological Survey, martha.kopper@arkansas.gov.

Description: Overview of Central U.S. Earthquake Consortium (CUSEC) effort to integrate geological surveys into emergency management response plans/procedures. This session will include a review of mission-ready packages developed in partnership with the CUSEC State Geological Surveys and the National Emergency Management Association and tested during an exercise led by the Arkansas Geological Survey.

T16. Geology and Health Research on Trace Elements in Drinking Waters, and Outreach and Education Activities

Oral Session: Monday, 8 a.m., Chicot Room.

Cosponsored by GSA Hydrogeology Division; GSA Sedimentary Geology Division.

Advocates: Saugata Datta, Kansas State Univ., sdatta@ksu.edu; Robert Finkelman, Univ. of Texas Dallas, bobf@utdallas.edu; Darcia Routh, Arkansas Dept. of Health, Darcia.Routh@arkansas.gov.

Description: Medical geology is the discipline that pertains to elements, minerals, naturally occurring radioactivity, and organics and their interactions with the environment and human health. This emerging field has gained significant scientific and social attention in recent years. At the same time, medical geology has initiated outreach and educational activities in both developing and developed countries. This session covers a broad spectrum of such topics that serve to advance the scientific and educational understanding of the behavior of trace elements and their cycling through the lithosphere and hydrosphere to ultimately affect human populations. This session will focus on studies related to known cases of toxicities within human populations caused by trace elements in both rural and urban environments, primarily in drinking waters. Emphasis will be placed on the health impacts of toxic trace elements (e.g. As, Se, Sb, Cr, W, Hg, Pb, REEs, among others) and the various uptake/intake mechanisms that may lead to human consumption, as well

as any potential tracing or remediation techniques. We also encourage submissions along the lines of various outreach and educational activities that are being undertaken to stimulate awareness of these issues.

T18. Earth and Space Science K–Higher Education

Oral Session: Tuesday, 8 a.m., Harris Brake Room.

Cosponsored by GSA Quaternary Geology and Geomorphology Division.

Advocates: Wendi Williams, Univ. of Arkansas at Little Rock and Northwest Arkansas Community College, wjwilliams@ualr.edu; Margaret (Beth) McMillan, Univ. of Arkansas at Little Rock, memcmillan@ualr.edu; Stephen K. Boss, Univ. of Arkansas, sboss@uark.edu; Jeffery Connelly, Univ. of Arkansas at Little Rock, jbconnelly@ualr.edu.

Description: Geoscience education with a focus K–higher education on pedagogy in Earth and space science (in memory of Dr. Philip Kehler, UA Little Rock emeritus professor).

T19. Undergraduate Student Research (Posters)

Poster Session: Monday, 8:30 a.m., Salons A & B.

Cosponsored by GSA Quaternary Geology and Geomorphology Division.

Advocate: Joshua Spinler, Univ. of Arkansas at Little Rock, jxspinler@ualr.edu.

Description: This poster session is designed to showcase undergraduate research efforts. The session is open to students working in all areas of the geosciences. All submissions should include a faculty mentor as co-author.

Discipline Sessions

D1. Hydrogeology and Water Quality of the Mid-Continent U.S. and Mexico

Oral Session: Monday, 1:30–4:25 p.m., Conway Room.

Poster Session: Monday, 8:30 a.m.–6 p.m., Salons A & B.

Advocates: Ralph K. Davis, ralphd@uark.edu; Brian E. Haggard, haggard@uark.edu; Phillip D. Hays, pdhays@uark.edu; Katherine J. Knierim, kknierim@usgs.gov; Samantha R. Wacaster, srwacaster@usgs.gov; Javier Vilcaez, vilcaez@okstate.edu.

Description: Water quality throughout the mid-continent region of the United States is impacted by a myriad of anthropogenic sources as well as natural sources that are exacerbated by human activities. These range across a spectrum of contaminants including fertilizers and pesticides, animal waste, treated and untreated human waste, commercial and industrial contaminants, and contaminants associated with extraction of water, oil, natural gas, ore minerals, construction materials, and other resources. This session aims to provide a snapshot of the primary impacts and drivers to water quality throughout the region, including observed trends.

D2. Sediment, Stratigraphy, and Climate (Posters)

Poster Session: Monday, 8:30 a.m.–6 p.m., Salons A & B.

Advocate: Laura Ruhl, Univ. of Arkansas at Little Rock, lsruhl@ualr.edu.

D3. Climate and Landscape Evolution

Oral Session: Monday, 1:30–3:45 p.m., Chicot Room.

Advocate: Randall Cox, Univ. of Memphis, randycox@memphis.edu.

D4. Igneous Activity, Geophysics, and Tectonics

Oral Session: Tuesday, 1:30–3:45 p.m., Chicot Room.

Poster Session: Tuesday, 8:30 a.m.–6 p.m., Salons A & B.

Advocates: Adriana Potra, Univ. of Arkansas, potra@uark.edu; Michael G. Davis, Arkansas Tech. Univ., mdavis@atu.edu.

FIELD TRIPS

All trips depart from the Little Rock Marriott unless otherwise noted. For additional information, please contact Field Trip Chair, Angela Chandler, angela.chandler@arkansas.gov.

Pre-meeting

FT1. Lithostratigraphy and Sequence Stratigraphy of the Mississippian across Northern Arkansas.

Cosponsored by GSA Sedimentary Division.

Friday and Saturday, 9–10 March, 8 a.m.–6 p.m. US\$130 (Includes transportation, lodging, and meals). **NOTE: Trip departs from the University of Arkansas–Fayetteville in Fayetteville, Arkansas.** Principal Organizer: Walter Manger, Univ. of Arkansas, wmanger@uark.edu. Co-organizers: Angela Chandler, Arkansas Geological Survey, angela.chandler@arkansas.gov; Richard Hutto, Arkansas Geological Survey, richard.hutto@arkansas.gov.

Description: This is a two-day field trip to explore Mississippian exposures (St. Joe–Boone to Pitkin–Imo) across northern Arkansas. The trip will emphasize the lithostratigraphy and sequence stratigraphy of the interval, the change in facies of the units in response to deepening regimes, and the resolution of various stratigraphic problems involved with the interval.

FT2. Minerals and Geologic History of Magnet Cove.

Saturday, 10 March, 9 a.m.–4 p.m. US\$40 (includes transportation, lunch, and a snack). Principal Organizer: Corbin Cannon, Arkansas Geological Survey, corbin.cannon@arkansas.gov. Co-Organizers: Lea Nondorf, Terracon, lea.m.tipton@gmail.com; Christopher DeGarmo, Arkansas Natural Resources Commission, christopher.degarmo@arkansas.gov.

Description: Magnet Cove is an area of unusual petrologic and mineralogical interest that is located in northern Hot Spring County, Arkansas, about 12 miles east of the city of Hot Springs. This field trip will take attendees through a series of stops exploring the Magnet Cove intrusive complex and the surrounding alteration zone, which have long been known for the presence of unusual minerals. Over 100 mineral species have been found, including some unique to the area. Attendees will be taken to sites that reveal examples of the different igneous rocks of the intrusion, typically varieties of syenites and ijolites that are nepheline-rich and silica-poor. Textures range from fine-grained to coarse-grained and are often porphyritic. We will also visit an intrusion of carbonate near the center of the cove. This igneous form of calcite is relatively rare in outcrop and contains a variety of interesting accessory minerals.

FT3. Educators in the Field: Bringing Earth and Space Science into Context.

Cosponsored by National Association of Geoscience Teachers Geo2YC Division; The International Association for Geoscience Diversity. Saturday 10 March, 1–5 p.m.

US\$20 students/US\$30 all others (Includes transportation and snacks). Principal Organizer: Wendi Williams, Univ. of Arkansas at Little Rock and Northwest Arkansas Community College, wwilliams@nwacc.edu, wjwilliams@ualr.edu. Co-organizer: Keith Harris, Arkansas Partnership for STEM Education at Univ. of Arkansas at Little Rock, krharris@ualr.edu. **NOTE: Trip will depart from the University of Arkansas, Science Lab Building Room 165, at Little Rock in Little Rock, Arkansas.**

Description: This field experience is to expand the understanding of earth and space sciences for in-service and pre-service teachers and higher education faculty outside of the geosciences. Our focus will be central Arkansas, and is designed to reinforce earth and space science K–12 standards in interdisciplinary applications. *Complement with the morning workshop W1. Earth and Space Sciences in the High School Integrated Approach (see Workshops section of the program).*

FT4. Healing Springs of Arkansas.

Saturday and Sunday 10–11 March, 8:30 a.m.–5 p.m. US\$98 (includes transportation, lodging, and meals) Principal Organizer: John Svendsen, Univ. of Arkansas–Little Rock, docnlr@sbcglobal.net. Co-organizer: Van Brahana, Univ. of Arkansas, brahana@uark.edu.

Description: This field trip will highlight the natural springs of Arkansas, which are purported to have healing properties. Over 100 springs in Arkansas have been identified as having health-giving properties, many of which supported large health resorts and spas prior to the 20th century. The geological background of the state's natural hot and mineral springs will be discussed in considerable detail with emphasis on the hydrogeological, hydrochemical, and biological processes that give rise to the groundwater's unique medicinal properties. The relevance of beneficial minerals to health, wellness, and recreational tourism are well established, but rarely discussed is the role that geophysical, mineralogical, and biological factors play in mediating the location, type, and chemical composition of the state's healing springs.

FT5. Hot Springs National Park and Finding Quartz Crystals.

Sunday 11 March, 7:30 a.m.–5 p.m. US\$40 (includes entrance fees and transportation; participants are responsible for meals) Principal Organizer: Doug Hanson, Arkansas Geological Survey, doug.hanson@arkansas.gov. Co-organizer: Ty Johnson, Arkansas Geological Survey, ty.johnson@arkansas.gov.

Description: Spend half a day along Central Avenue in Hot Springs learning about the geology of the hot springs and geo-hazards in the area. Hear about the long, strange trip rainwater has undergone before becoming a hot spring. Next, spend the rest of the day looking for world famous quartz crystals (Arkansas' state mineral) at a local mine.

FT6. Lake Ouachita Geofloat.

Sunday 11 March, 9 a.m.–4:30 p.m. US\$40 (includes transportation and meals). Principal Organizer: Ty Johnson, Arkansas Geological Survey, ty.johnson@arkansas.gov. Co-organizers: Garrett Hatzell, Arkansas Geological Survey, garrett.hatzell@arkansas.gov; Doug Hanson, Arkansas Geological Survey, doug.hanson@arkansas.gov.

Description: Spend a day in the heart of the Ouachita Mountains on the third cleanest lake in the nation with more than 2,800 miles of shoreline. You will have a chance to see exposures of the oldest rocks (Ordovician) in the core of the Ouachita fold and thrust belt. Highlights of this float include olistoliths, graptolites, quartz veins, and beautiful recumbent folds.

Post-Meeting

FT7. Crater of Diamonds State Park.

Wednesday 14 March, 7:30 a.m.–5 p.m. US\$50 (includes transportation, entrance fees, and meals) Principal Organizer: Doug Hanson, Arkansas Geological Survey, doug.hanson@arkansas.gov. Co-organizer: Danny Rains, Arkansas Geological Survey, danny.rains@arkansas.gov.

Description: Visit Crater of Diamonds State Park, the only place in the world where anyone may pay a small entrance fee, search for diamonds, and keep what you find! This site presents a window into the geologic past and Earth's mantle, a rare thing indeed. The geologic story is a fascinating one, not just for geologists, but for anyone wanting to learn why the diamonds are present, their age, and the past environment that existed when the diamondiferous igneous rocks were explosively emplaced.

WORKSHOPS

All workshops are located at the Little Rock Marriott unless otherwise noted. For additional information, please contact Workshop Chair, Katherine Knierim, kknierim@usgs.gov.

W1. Earth and Space Sciences in the High School Integrated Approach.

Cosponsored by the National Association of Geoscience Teachers Geo2YC Division; The International Association for Geoscience Diversity. Saturday, 10 March, 8 a.m.–noon. Fee: US\$20 students/US\$30 all others (includes snacks and course materials). Principal Organizer: Keith Harris, Arkansas Partnership for STEM Education at Univ. of Arkansas–Little Rock, krharris@ualr.edu. Co-organizer: Michele Snyder, Arkansas Department of Education, michele.synder@arkansas.gov; Wendi Williams, Univ. of Arkansas at Little Rock and Northwest Arkansas Community College, wwilliams@nwacc.edu, wjwilliams@ualr.edu. **NOTE: Workshop will take place at the University of Arkansas at Little Rock, Science Lab Building Room 165, in Little Rock, Arkansas.**

Description: Geared toward pre-service and in-service teaching practitioners and higher education faculty. Lessons aligned with Next Generation Science Standards (or in the spirit of) for Earth and Space Sciences with Life Science,

Chemistry, and Physics. *Complement with the field trip F3. Educators in the Field: Bringing Earth and Space Science into Context* (see *Field Trips* section of the program).

W2. High-Resolution Geophysical Imaging: An Aid for Geological Mapping.

Sunday, 11 March, 8 a.m.–5 p.m., Little Rock Marriott, Manning Room. Fee: US\$100 students/US\$250 all others (includes lunch, snacks, and course materials). Principal Organizer: Ahmed Ismail, Boone Pickens School of Geology, Oklahoma State University, ahmed.ismail@okstate.edu.

Description: In this workshop, we will demonstrate the commonly used geophysical methods used for near-surface geological mapping/characterization. Geophysical methods presented will include P- and S-wave seismic reflection, active surface waves, resistivity tomography, and ground penetrating radar. The basic principles of each method, field operation, and advantages and limitations of each method will be presented. The last hour of the one-day workshop will be in the form of a geophysical clinic where the attendees can describe the geologic situation under investigation and we can discuss/subscribe the optimum geophysical method that resolves that situation.

W3. Basic Seismic Attributes.

Sunday, 11 March, 1–5 p.m., Little Rock Marriott, Hoffman Room. Fee: US\$50 (Includes snacks and course materials) Principal Organizer: Robert Schneider, Texas A&M Univ.-Kingsville, robert.schneisder@tamuk.edu. Co-organizer: Gary Jones, Yosh Geophysical, gljones@sbcglobal.net.

Description: This class is designed to provide basic seismic attribute understanding to geologists, engineers, geotechs, and geophysicists.

W4. Gaming Engines and Geospatial Imaging: An Introduction to Unity as a Visualization Tool.

Sunday, 11 March, 1–4:30 p.m. Meet in lobby area at 12:45 p.m. to be transported to university campus; Returning 4:30 p.m. Fee: US\$45. Principal Organizer: J. Aaron Baggett, Department of Earth Sciences, UA Little Rock, jabaggett@ualr.edu. Co-organizer: Dirk Reiners, Emerging Analytics Center, UA Little Rock, dpreiners@ualr.edu.

Description: Unity, a powerful gaming engine, has become increasingly popular amongst geoscientists, who are using it as a tool for visualizing data. Unity's flexibility makes it useful for creating interactive and immersive experiences of 3D models derived from sources including photogrammetry, 360-degree images and video, LiDAR and other geospatial data. This half-day course will provide attendees with an introduction to Unity as a real-world data visualization tool by using hands-on activities and demonstrations to outline the basic functionality of Unity in the context of the geosciences. Workshop includes a tour of the Emerging Analytics Center on the UA Little Rock campus.

EXHIBITS

Exhibits are located in Salons A and B and are open from 8 a.m. to 6 p.m., both Monday and Tuesday, 12–13 March. For additional information, please contact the Exhibits Coordinator, Joshua Spinler, jxspinler@ualr.edu.

OPPORTUNITIES FOR STUDENTS

Outstanding Student Presentation Awards

Cosponsored by GSA South-Central Section. South-Central Section GSA will award cash prizes and plaques to the best graduate and undergraduate posters and oral presentations. Judging of student oral and poster presentations will take place throughout the meeting, and award winners will be announced at the awards reception on Tuesday afternoon, 5:30–6 p.m. in Salon A and B. To be eligible, students must be lead authors and presenters, and should be capable of answering detailed questions about their research.

Mentor Programs

Cosponsored by GSA Foundation. For more information about the Mentor Programs, please contact Jennifer Nocerino at jnocerino@geosociety.org.

Roy J. Shlemon Mentor Program in Applied Geoscience. Monday 12 March, noon– 1:30 p.m., Arkansas Ballroom. Students and early career professionals will have the opportunity to discuss career prospects and challenges with applied geoscientists from various sectors over a FREE lunch.

John Mann Mentors in Applied Hydrogeology Program. Tuesday 13 March, noon–1:30 p.m., Arkansas Ballroom. Students and early career professionals interested in applied hydrogeology or hydrology as a career will have the opportunity to network with professionals in these fields over a FREE lunch.

Geoscience Career Workshops

For more information about the Geoscience Career Workshops, please contact Jennifer Nocerino at jnocerino@geosociety.org.

Part 1. Career Planning and Informational Interviewing. Monday 12 March, 9–10 a.m., Hoffman Room. Your job-hunting process should begin with career planning, not when you apply for jobs. This workshop will help you begin this process and will introduce you to informational interviewing. This section is highly recommended for freshman, sophomores and juniors. The earlier you start your career planning the better.

Part 2. Geoscience Career Exploration. Monday 12 March, 10–11 a.m., Hoffman Room. What do geologists in various sectors earn? What do they do? What are the pros and cons to working in academia, government, and industry? Workshop presenters, and when possible, professionals in the field, will address these issues.

Part 3. Cover Letters, Résumés, and CVs. Tuesday 13 March, 9–10 a.m., Hoffman Room. How do you prepare a cover letter? Does your résumé need a good edit? Whether you are currently in the job market or not, learn how to prepare the best résumé possible. You will review numerous examples to help you learn important résumé dos and don'ts.

VOLUNTEER

The South-Central Section offers free meeting registration to student volunteers in return for ~7 hours of work during the meeting. If you are a student interested

in volunteering, please contact the Student Volunteer Coordinator, René Shroat-Lewis at rashroatlew@ualr.edu.

Students will meet with the Student Volunteer Coordinator before the meeting begins at the Student Volunteer Table (located near Registration) for their assignments. Students can leave personal items at the Student Volunteer Table while they are working.

SPOUSE & GUEST ACTIVITIES

The Little Rock Marriott offers a wide variety of activities for both recreation and relaxation. These include a 24-hour fitness facility, the M Club lounge, the Heritage Grille Steak & Fin restaurant, and the hotel concierge can arrange for a wide range of recreational activities. For more information about Little Rock recreation options, please visit: <https://www.littlerock.com/>.

Schedule of Events

EVENT	TIME	LOCATION
FRIDAY, 9 MARCH		
FT1. Lithostratigraphy and Sequence Stratigraphy of the Mississippian across Northern Arkansas (Field Trip)	9 a.m.–11:55 p.m.	departs from the University of Arkansas–Fayetteville
SATURDAY, 10 MARCH		
W1. Earth and Space Sciences in the High School Integrated Approach (Workshop)	8 a.m.–noon	University of Arkansas, Little Rock Campus, Science Lab Building Room 165
FT4. Healing Springs of Arkansas (Field Trip)	8:30 a.m.–11:55 p.m.	Lobby
FT2. Minerals and Geologic History of Magnet Cove (Field Trip)	9 a.m.–4 p.m.	Lobby
FT3. Educators in the Field: Bringing Earth and Space Science into Context (Field Trip)	1-5 p.m.	Lobby
SUNDAY, 11 MARCH		
FT5. Hot Springs National Park and Finding Quartz Crystals (Field Trip)	7:30 a.m.–5 p.m.	Lobby
W2. High-Resolution Geophysical Imaging: An Aid for Geological Mapping (Workshop)	8 a.m.–5 p.m.	Manning Room
FT6. Lake Ouachita Geofloat (Field Trip)	9 a.m.–4:30 p.m.	Lobby
W4. Gaming Engines and Geospatial Imaging: An Introduction to Unity as a Visualization Tool (Workshop)	12:45–4:30 p.m.	Lobby
W3. Basic Seismic Attributes (Workshop)	1–5 p.m.	Hoffman Room
Registration Open	3–7:30 p.m.	Salons A & B Foyer
Student Volunteers Table	3–7:30 p.m.	Salons A & B Foyer
Speaker Ready Room	4–7 p.m.	Peck Room
Welcome Reception and Keynote Address	5–7 p.m.	Salon C
Exhibitor Set-Up	6–8 p.m.	Salons A & B
MONDAY, 12 MARCH		
Registration Open	7 a.m.–4:30 p.m.	Salons A & B Foyer
Student Volunteers Table	7 a.m.–4:30 p.m.	Salons A & B Foyer
Speaker Ready Room	7 a.m.–5:30 p.m.	Peck Room
Session Chair Orientation	7:15–7:30 a.m.	Chicot Room
Exhibits Open	8 a.m.–6 p.m.	Salons A & B
Geoscience Career Workshops: Part 1. Career Planning and Informational Interviewing (Workshop)	9–10 a.m.	Hoffman Room
Geoscience Career Workshops: Part 2. Geoscience Career Exploration (Workshop)	10–11 a.m.	Hoffman Room

EVENT	TIME	LOCATION
Morning Oral Technical Sessions		
T1. Late Paleozoic Tectonic Framework of the South-Central USA and the Evolution of the Ouachita Orogen	8–11:15 a.m.	Harris Brake
T3. Paleontology of the South-Central Region	8 a.m.–noon	Conway Room
T16. Geology and Health Research on Trace Elements in Drinking Waters, and Outreach and Education Activities	8–11 a.m.	Chicot Room

Poster Sessions: Authors will be present from 4:30 to 6 PM

D1. Hydrogeology and Water Quality of the Mid-Continent U.S. and Mexico (Posters)	8:30 a.m.–6 p.m.	Salons A & B
D2. Sediment, Stratigraphy, and Climate (Posters)	8:30 a.m.–6 p.m.	Salons A & B
T1. Late Paleozoic Tectonic Framework of the South-Central USA and the Evolution of the Ouachita Orogen (Posters)	8:30 a.m.–6 p.m.	Salons A & B
T3. Paleontology of the South-Central Region (Posters)	8:30 a.m.–6 p.m.	Salons A & B
T19. Undergraduate Student Research (Posters)	8:30 a.m.–6 p.m.	Salons A & B
Roy J. Shlemon Mentor Program in Applied Geoscience	noon–1:30 p.m.	Arkansas Ballroom
South-Central Section Management Board Meeting	noon–1:30 p.m.	Lafayette Room

Afternoon Oral Technical Sessions

D1. Hydrogeology and Water Quality of the Mid-Continent U.S. and Mexico	1:30–4:25 p.m.	Conway Room
D3. Climate and Landscape Evolution	1:30–3:45 p.m.	Chicot Room
T5. Structure and Stratigraphy of the Mid-Continent Region: Mountain Building and Related Sedimentation	1:30–4:05 p.m.	Harris Brake
Posters/Exhibits Reception	4:30–6 p.m.	Salons A & B

TUESDAY, 13 MARCH

South-Central Section Open Meeting	7–8 a.m.	Lafayette Room
Registration Open	7 a.m.–2 p.m.	Salons A & B Foyer
Student Volunteers Table	7 a.m.–2 p.m.	Salons A & B Foyer
Speaker Ready Room	7 a.m.–2 p.m.	Peck Room
Session Chair Orientation	7:15–7:30 a.m.	Chicot Room
Exhibits Open	8 a.m.–6 p.m.	Salons A & B

Morning Oral Technical Sessions

T6. Karst Development and Karst Hydrogeology in the Mid-Continent Region of the United States	8–11:20 a.m.	Conway Room
T14. Geological Survey Support to Emergency Management	8 a.m.–noon	Chicot Room
T18. Earth and Space Science K-Higher Education	8 a.m.–noon	Harris Brake

EVENT	TIME	LOCATION
Poster Sessions: Authors will be present from 4:30 to 6 PM		
D4. Igneous and Tectonic Activity (Posters)	8:30 a.m.–6 p.m.	Salons A & B
T6. Karst Development and Karst Hydrogeology in the Mid-Continent Region of the United States (Posters)	8:30 a.m.–6 p.m.	Salons A & B
T8. Carbon in the Geosphere (Posters)	8:30 a.m.–6 p.m.	Salons A & B
T9. Geologic Mapping in the South-Central Region of the United States (Posters)	8:30 a.m.–6 p.m.	Salons A & B
Geoscience Career Workshops: Part 3. Cover Letters, Resumes, and CVs (Workshop)	9–10 a.m.	Hoffman Room
John Mann Mentors in Applied Hydrogeology Program	noon–1:30 p.m.	Arkansas Ballroom
Afternoon Oral Technical Sessions		
D4. Igneous and Tectonic Activity	1:30–3:45 p.m.	Chicot Room
T8. Carbon in the Geosphere	1:30–4:25 p.m.	Conway Room
T10. Holistic Approaches to Coping with Induced Seismicity in the Mid-Continent	1:30–3:45 p.m.	Harris Brake
Posters/Exhibits Reception	4:30–6 p.m.	Salons A & B
Outstanding Student Presentation Awards Ceremony	5:30–6 p.m.	Salons A & B
Exhibitors Tear Down	6–9 p.m.	Salons A & B
WEDNESDAY, 14 MARCH		
FT7. Crater of Diamonds State Park (Field Trip)	7:30 a.m.–5 p.m.	Lobby

Technical Sessions

Meeting policy prohibits the use of cameras or sound-recording equipment at technical sessions and poster sessions.



A no-smoking policy has been established by the Program Committee and will be followed in all meeting rooms for technical sessions.

NOTICE

In the interest of public information, the Geological Society of America provides a forum for the presentation of diverse opinions and positions. The opinions (views) expressed by speakers and exhibitors at these sessions are their own and do not necessarily represent the views or policies of the Geological Society of America.



NOTE INDEX SYSTEM

Numbers (3-4, 15-4) indicate session and order of presentation within that session.

*denotes speaker

MONDAY, 12 MARCH 2018

MORNING ORAL TECHNICAL SESSIONS

SESSION NO. 1

T1. Late Paleozoic Tectonic Framework of the South-Central USA and the Evolution of the Ouachita Orogen (GSA Sedimentary Geology Division)

8:00 AM, Little Rock Marriott Harris Brake

Robert J. Stern, Daniel S. Rains and Majie Fan, Presiding

- 8:00 AM **INTRODUCTORY REMARKS**
- 1-1 8:05 AM Stern, Robert, J.*: **PENNSYLVANIAN COLLISION AND ITS CONTROL ON MESOZOIC RIFTING AROUND THE NORTHERN GULF OF MEXICO**
- 1-2 8:25 AM Clift, Peter D.*; Heinrich, Paul V.; Dunn, Dennis; Jacobus, Andrew; Blusztajn, Jerzy S.: **ORIGIN OF THE SABINE BLOCK: A PROMONTORY OF NORTH AMERICA**
- 1-3 8:45 AM Pirouz, Mortaza*; Fan, Majie; Stern, Robert J.; Bader Al Salem, Ohood: **3D STRUCTURAL MODELING OF THE FORT WORTH BASIN IN TEXAS**
- 1-4 9:05 AM Alsalem, Ohood*; Fan, Majie; Basu, Asish; Adams, Tamara L.: **NEODYMIUM ISOTOPE AND REE CONSTRAINTS ON PALEOZOIC SEDIMENT DISPERSAL TO THE FORT WORTH BASIN**
- 9:25 AM **BREAK**
- 1-5 9:40 AM Xie, Xiangyang*; Manger, Walter L.: **DETRITAL ZIRCON SIGNATURES OF PALEOZOIC SUCCESSIONS IN SOUTHERN OZARK DOME: IMPLICATIONS OF TECTONICS AND SEDIMENT DISPERSAL IN SOUTHERN MIDCONTINENT**
- 1-6 10:00 AM Price, Jonathan D.*: **POTENTIALLY INHERITED INFLUENCES ON LATE PALEOZOIC DEFORMATION IN THE WICHITA GRANITE GROUP, OKLAHOMA**
- 1-7 10:20 AM Wang, Ning*; Stern, Robert, J.: **MAKING AND ASSESSING A SHORT VIDEO TO TEACH UPPER DIVISION**

UNDERGRADUATE GEOSCIENCE MAJORS ABOUT THE PERMIAN BASIN OF TEXAS AND NEW MEXICO

- 1-8 10:40 AM Kinsland, Gary L.*: **WHAT WAS BETWEEN THE YUCATAN PENINSULA AND THE OUACHITA MOUNTAINS AT THE END OF THE PALEOZOIC?: HISTORIES OF PRESENT STRUCTURES OFFER CLUES**
- 11:00 AM **DISCUSSION**

SESSION NO. 2

T3. Paleontology of the South-Central Region

8:00 AM, Little Rock Marriott Conway Room

Joseph Daniel and René A. Shroat-Lewis, Presiding

- 8:00 AM **INTRODUCTORY REMARKS**
- 2-1 8:05 AM Morris, Noah Steven*; Manger, Walter L.: **THE CHRONOSTRATIGRAPHIC NOMENCLATORIAL HISTORY OF THE PENNSYLVANIAN: SERIES TO SYSTEM TO SUBSYSTEM**
- 2-2 8:25 AM Lumsden, David N.*: **PETRIFIED WOOD IN THE UPLAND COMPLEX: A MOGANITE MYSTERY**
- 2-3 8:45 AM Wehrbein, Randol*: **COMPARISONS OF FOSSIL BIOTAS OF THE LATE CARBONIFEROUS GARNETT AND HAMILTON QUARRY LOCALITIES, EASTERN KANSAS**
- 2-4 9:05 AM Barrick, James E.*; Ruppel, Stephen C.; Castro, Jesse L.: **CONODONT BIOSTRATIGRAPHY OF MISSISSIPPIAN CARBONATES AND SHALES ON THE BEND ARCH, NORTH TEXAS**
- 2-5 9:25 AM Marrone, Tatiana*; Macrini, Thomas E.; Turner, David R.: **LIVE OAK, VERY DEAD FISH: AN ANATOMICAL DESCRIPTION OF A LEGACY COLLECTION OF MIOCENE FISH FOSSILS FROM LIVE OAK COUNTY, TX**
- 9:45 AM **BREAK**
- 2-6 10:00 AM Daniel, Joseph*: **FOSSIL VERTEBRATE DIVERSITY IN ARKANSAS**
- 2-7 10:20 AM Hunt-Foster, ReBecca*: **PALEOBIOGEOGRAPHICAL IMPLICATIONS OF A NEW ORNITHOMIMOSAUR**

DINOSAUR FROM THE EARLY CRETACEOUS TRINITY GROUP OF ARKANSAS

- 2-8 10:40 AM Suarez, Celina*; Frederickson, Joseph; Cifelli, Richard L.; Pittmann, Jeff; Morgan, Kirsty; Frucci, Mason N.; Nydam, Randall L.; Foster-Hunt, Rebecca: **THE FIRST MULTI-TAXA VERTEBRATE ASSEMBLAGE FROM THE MESOZOIC OF ARKANSAS, USA**
- 2-9 11:00 AM Morgan, Kirsty*; Suarez, Celina; Pittmann, Jeff; Kirkland, J.I.: **FIRST OCCURRENCE OF AN ARKANSAS ANKYLOSAUR**
- 2-10 11:20 AM Frucci, Mason N.*; Suarez, Celina: **OXYGEN ISOTOPIC COMPOSITION OF SEMI-AQUATIC TURTLE PHOSPHATES FROM THE EARLY CRETACEOUS HOLLY CREEK FORMATION, SOUTHERN ARKANSAS**
- 2-11 11:40 AM Stringer, Gary Layne*; Sloan, James Carson: **SIGNIFICANCE OF EARLY PALEOCENE FISH OTOLITHS FROM TWO CLAYTON FORMATION (DANIAN) SITES IN CENTRAL ARKANSAS**

Booth

- 4-1 1 Emishaw, Luelseged*; Abdel Salam, Mohamed: **HOW FAR HAS THE FAILED ANZA RIFT PROPAGATED INTO AFRICA?**
- 4-2 2 Messmer, Martin*; Barker, Chris A.: **STRUCTURAL EVOLUTION OF THE SOUTHERN CADDO GAP QUADRANGLE, ARKANSAS: FIELD EVIDENCE FOR STRIKE-SLIP AND BACKTHRUST FAULTING IN THE OUACHITA MOUNTAINS**
- 4-3 3 McKim, Sydney*; McFarlin, Forrest D.; Chick, Jonathan T.; Cains, Julie M.; Potra, Adriana: **TEXTURAL AND COMPOSITIONAL COMPARISON OF LOWER ORDOVICIAN (COTTER) AND LOWER MISSISSIPPIAN (BOONE) CHERTS WITH THE ARKANSAS NOVACULITE (DEVONIAN-MISSISSIPPIAN), ARKANSAS**
- 4-4 4 West, Logan M.*: **TAKING THE OUTCROP HOME: IMAGING OF DEEPWATER CHANNEL ARCHITECTURAL ELEMENTS OF THE JACKFORK FORMATION, ARKANSAS, USING GROUND PENETRATING RADAR AND AERIAL PHOTOGRAMMETRY TO GENERATE AND ANALYZE DIGITAL VERSIONS OF CLASSIC OUTCROPS (AND THEIR SUBCROPS)**

SESSION NO. 3**T16. Geology and Health Research on Trace Elements in Drinking Waters, and Outreach and Education Activities (GSA Hydrogeology Division; GSA Sedimentary Geology Division)**

8:00 AM, Little Rock Marriott Chicot Room

Saugata Datta, Robert B. Finkelman and Darcia Routh, Presiding

- 8:00 AM **INTRODUCTORY REMARKS**
- 3-1 8:05 AM Yelderman, Joe C.*; Wong, Stephanie S.: **HEALTH, TRACE ELEMENTS, AND HYDROGEOLOGY: WHAT ARE THE RESEARCH TOPICS?**
- 3-2 8:25 AM Finkelman, Robert B.*; Selinus, Olle; Mouri, Hassina: **MEDICAL GEOLOGY IN AFRICA: AN EXAMPLE OF A SUCCESSFUL MEDICAL GEOLOGY EDUCATIONAL INITIATIVE**
- 3-3 8:45 AM Simmons, Jason D.*; Ruhl, Laura S.; Pollock, Erik: **GEOCHEMICAL ANALYSIS OF A SMALL URBAN FLOODPLAIN: FOURCHE CREEK BOTTOMS IN LITTLE ROCK, ARKANSAS**
- 3-4 9:05 AM Watkins, Joseph D.*; Faulkner, Melinda: **GEOLOGIC CONTROL OF MERCURY TRANSPORT IN BIG CYPRESS BAYOU AND CADDO LAKE WATERSHEDS HARRISON COUNTY, TEXAS**
- 9:25 AM **BREAK**
- 3-5 9:40 AM Varnell, Curtis*: **THE INFLUENCE OF COAL QUALITY VARIATION ON UTILIZATION OF WATER FROM ABANDONED COAL MINES AS A MUNICIPAL WATER SOURCE**
- 3-6 10:00 AM Horn, Jackie D.*; Brikowski, Tom: **COMPOSITE LANDFILL AND NATURAL BIOGENIC LEACHATE DISCHARGE FROM THE AUSTIN CHALK, NORTH TEXAS**
- 3-7 10:20 AM Shepherd, Forest*; Datta, Saugata: **DISTRIBUTION OF LEACHABLE ARSENIC AND FLUORIDE IN THE INDEPENDENCE BASIN AQUIFER**
- 3-8 10:40 AM Baba, Alper; Finkelman, Robert B.*: **MEDICAL GEOLOGY OUTREACH: A MAJOR SUCCESS STORY FROM TURKEY**

POSTER TECHNICAL SESSIONS**SESSION NO. 4****T1. Late Paleozoic Tectonic Framework of the South-Central USA and the Evolution of the Ouachita Orogen (Posters) (GSA Sedimentary Geology Division)**

8:30 AM, Little Rock Marriott Salons A & B

Authors will be present from 4:30 to 6 PM

SESSION NO. 5**T3. Paleontology of the South-Central Region (Posters)**

8:30 AM, Little Rock Marriott Salons A & B

Authors will be present from 4:30 to 6 PM

Booth

- 5-1 5 Hartley, James C.*: **PLEISTOCENE MEGAFAUNA REMAINS (ARCHAEOLOGICAL VS. PALEONTOLOGICAL) AND PALEOINDIAN PREY CHOICE IN OKLAHOMA**
- 5-2 6 Wehrbein, Randol*; McElroy, Aleksander P.: **EVIDENCE OF THE OLDEST HEALING LIMB BONE FRACTURE IN AMNIOTES**
- 5-3 7 Richmond, Dean R.*; Lupia, Richard; Hunt, Tyler C.; Philippe, Marc: **THE FIRST FOSSIL WOODS FROM THE UPPER JURASSIC MORRISON FORMATION OF WESTERN OKLAHOMA**

SESSION NO. 6**T19. Undergraduate Student Research (Posters) (GSA Quaternary Geology and Geomorphology Division)**

8:30 AM, Little Rock Marriott Salons A & B

Authors will be present from 4:30 to 6 PM

Booth

- 6-1 8 Wynn, Joshua C.*; Walsh, Tim R.: **GEOCHEMICAL AND PETROGRAPHIC CHARACTERIZATION OF CHERT WORKABILITY**
- 6-2 9 Whaley, Carol Ann*; Ali, Hendratta; Atekwana, Eliot: **GEOCHEMICAL AND ISOTOPIC INVESTIGATIONS OF THE EFFECT OF MINE DRAINAGE ON A SMALL STREAM (WEST LITTLE SUGAR CREEK) IN THE GREEN VALLEY MINE AREA, INDIANA USA**
- 6-3 10 Smith, Zachary J.*; Ruhl, Laura S.; Pollock, Erik D.: **BOTTOMS UP: A WATER QUALITY ANALYSIS ALONG THE FOURCHE BOTTOMS WETLANDS**
- 6-4 11 Cumnock, Allie*; Leslie, Deborah L.; Reba, Michele L.; Adviento-Borbe, M. Arlene A.: **WATER QUALITY ASSESSMENT OF ON-FARM STORAGE-TAILWATER RECOVERY SYSTEMS IN NORTHEAST ARKANSAS**
- 6-5 12 Gowing, Kenyon*; Vickers, Hunter; Patton, Jason A.; Davis, Michael G.: **DEVELOPING EFFICIENT METHODS TO LOCATE LEGACY OIL AND GAS WELLS**
- 6-6 13 Hilliard, Christopher*; Leslie, Deborah L.; Reba, Michele L.: **CHARACTERIZATION OF EXISTING BORROW PITS FOR FEASIBILITY AS INFILTRATION BASINS IN CRAIGHEAD COUNTY, ARKANSAS**
- 6-8 15 Mungia, Zachary J.*; Cardenas, M. Bayani: **DIGGING DEEPER FOR GROUNDWATER**
- 6-9 16 Perkins, Lenora Diane*; Sanchez, Veronica: **MIGRATION RATES AND STORM IMPACTS ON DUNES IN SOUTHEAST TEXAS, LANDWARD SIDE OF THE LAGUNA MADRE**

MONDAY, 12 MARCH

- 6-10 17 Corbin, Tanner W.*; Baker, Cathy: **VERIFICATION OF THE MANNING FLOW EQUATION IN THE ILLINOIS BAYOU DRAINAGE BASIN**
- 6-11 18 Reinhart, Joshua A.*; Walsh, Tim R.: **ANALYZING LIDAR SLOPE DATA TO CREATE GEOLOGIC MAPS**
- 6-12 19 Behrman, Caroline S*.; Van Arsdale, Roy B.; Kwon, Youngsang; Sterk, Kerry; Leverett, Dave: **DRONE IMAGING OF AN ACTIVE SAND AND GRAVEL QUARRY IN DESOTO COUNTY, MS**
- 6-13 20 Forrest, Ryan W.*; Elmore, R. Douglas: **PALEOMAGNETIC AND MAGNETIC FABRIC INVESTIGATION OF THE FAYETTEVILLE SHALE, AR**
- 6-14 21 Hett, Stephen J.*; Patton, Jason A.: **FAYETTEVILLE SHALE SWEET SPOT ANALYSIS USING PRODUCTION DATA**
- 6-15 22 Dingmore, Lindy*; Befus, Kenneth; Bassoo, Ray: **H₂O CONCENTRATION OF NOMINALLY ANHYDROUS GARNET AND CLINOPYROXENE IN ECLOGITE**
- 6-16 23 Carr, Danelle*; Loocke, Matthew; Snow, Jonathan E.: **MELT-ROCK REACTION IN PERIDOTITES FROM THE SANTA ELENA OPHIOLITE, NW COSTA RICA**
- 6-17 24 Kee, Michael*; Waddell, Lindsey: **ANALYZING CONTACT METAMORPHISM OF THE STANLEY SHALE IN THE MAGNET COVE IGNEOUS INTRUSIVE COMPLEX**
- 6-18 25 Steger, Jared W.*; Price, Jonathan D.: **EDGY GROWTH: PRELIMINARY ASSESSMENT OF SECTIONED HOPPER MICROSTRUCTURE USING SYNTHETIC BISMUTH**
- 6-19 26 Perkins, Lenora Diane*; Schneider, Robert V.; Wilhelm, Margarita; Villarreal, Ivan: **SEISMIC IMAGING OF THE CATAHOULA ASH NEAR RIO GRANDE CITY, TX**
- 6-20 27 Caylor, Jordan*: **GEOPHYSICAL AND ARCHAEOLOGICAL SURVEY OF THE SHALLOW SUBSURFACE AT FT. KASKASKIA**
- 6-21 28 Juenger, Jessica*: **ELECTRICAL RESISTIVITY TOMOGRAPHY SURVEYS OF THE PAWNEE BILL MANSION CREEP, BLUE HAWK PEAK, OKLAHOMA**
- 6-22 29 Lewis, Jesse D.*; Emishaw, Luelseged; Abdel Salam, Mohamed: **REMOTE SENSING BASED STRUCTURAL MAPPING OF THE SOUTHWESTWARD DIVERTED EXTENSION OF THE WESTERN BRANCH OF THE EAST AFRICAN RIFT SYSTEM**
- 8-2 34 Stevens, Joshua K.*; Dickson, Riley J.: **AMMONOID TAPHONOMY AND ITS RELATIONSHIP TO UPPER CHESTERIAN SEQUENCE STRATIGRAPHY IN NORTHERN ARKANSAS**
- 8-3 35 Imsalem, Mohamed*: **POLLEN ANALYSIS FROM ECOLOGICAL AND LATITUDINAL GRADIENT IN MOROCCO**
- 8-4 36 Hughlett, Taylor M.*; Winguth, Arne M.E.; Rosenbloom, Nan; He, Feng; Otto-Bliesner, Bette: **CLIMATIC AND OCEANIC RESPONSE TO YOUNGER DRYAS AGE FORCINGS IN THE COMMUNITY EARTH SYSTEM MODEL VERSION 1.2**
- 8-5 37 Nikmard, Cameron*; Suarez, Celina: **ISOTOPE GEOCHEMISTRY AND PETROLOGY OF THE LOWER CRETACEOUS (ALBIAN) DEQUEEN FORMATION, SOUTHWEST ARKANSAS**
- 8-6 38 Wilkerson, Austin*: **PETROGRAPHIC AND STRATIGRAPHIC ANALYSIS ALONG THE LOWER CRETACEOUS STRATA, IN KIMBLE COUNTY TEXAS**
- 8-7 39 Grosskopf, Jacob*; Baker, Andrew: **MAGNETIC SUSCEPTIBILITY OF BEDS FROM THE UPPER LOWER ATOKA FORMATION**
- 8-8 40 Warner, Griffin W.*: **STRATIGRAPHIC ANALYSIS OF THE MOOREFIELD SHALE (MIDDLE-LATE MISSISSIPPIAN) IN ITS TYPE AREA, NORTHEASTERN ARKANSAS**
- 8-9 41 Urwin, Richard*: **PETROGRAPHIC AND MICRO-FACIES ANALYSES OF THE FORT TERRETT FORMATION OF THE LOWER CRETACEOUS EDWARDS GROUP, IN KIMBLE COUNTY, TEXAS**
- 8-10 42 Colby, Thomas A.*; Schmitz, Mark D.: **A REFINED APPROACH FOR USING DETRITAL ZIRCON TO INTERPRET THE MAXIMUM DEPOSITIONAL AGE OF CLASTIC ROCKS: USING LA-ICPMS AND CA-IDTIMS IN TANDEM**
- 8-11 43 Roberson, J.W.*; Enriquez, Olivia R.; Urbanczyk, Kevin M.: **X-RAY DIFFRACTION AND ENERGY DISPERSIVE SPECTROSCOPY OF TERLINGUA CREEK AND ALAMITO CREEK SEDIMENTS, TRANS-PECOS REGION, TX**
- 8-12 44 Cantu, Karen*; Gonzalez, Juan L.: **MORPHOMETRIC ANALYSIS OF MEANDERBELTS IN THE RIO GRANDE DELTA, A TEST OF HUMAN INTERVENTION**
- 8-13 45 Dailey, Sarah*; Clift, Peter D.; Kulhanek, Denise K.; Calves, Gerome: **THE ARCHITECTURE AND PROVENANCE OF A GIANT MASS-TRANSPORT DEPOSIT IN THE ARABIAN SEA: THE NATARAJA SLIDE**
- 8-14 46 Rowden, Kyle W.*; Aly, Mohamed H.: **A GIS BASED TRIGGERLESS APPROACH FOR MODELING MASS WASTING SUSCEPTIBILITY**

SESSION NO. 7

D1. Hydrogeology and Water Quality of the Mid-Continent U.S. and Mexico (Posters)

8:30 AM, Little Rock Marriott Salons A & B

Authors will be present from 4:30 to 6 PM

Booth #

- 7-1 30 Shelden, William Reese*: **THE COLLECTIVE IMPACT OF DIMINISHING LONG-TERM WATER SECURITY IN OKLAHOMA AND NORTH TEXAS**
- 7-2 31 Carey, Matthew*; Ruhl, Laura; Payne, Forrest E.; Pollock, Erik: **GEOCHEMICAL AND PLANKTONIC DYNAMICS IN THE LAKE MAUMELLE RESERVOIR (ARKANSAS) DRINKING WATER SOURCE**
- 7-3 32 Gonzalez, Eli*; Cheng, Chu-Lin; Gonzalez, Juan L.: **ASSESSING SHALLOW GROUNDWATER VULNERABILITY IN THE SOUTH TEXAS SAND SHEET USING A GIS-BASED DRASTIC MODEL**

SESSION NO. 8

D2. Sediment, Stratigraphy, and Climate (Posters)

8:30 AM, Little Rock Marriott Salons A & B

Authors will be present from 4:30 to 6 PM

Booth #

- 8-1 33 Becker, Martin A.; Maisch, Harry M.*; Mautz, Clint F.; Kline, Christi G.; Chamberlain, John A.: **NAUTILOIDS FROM NORTHERN NEW JERSEY GLACIAL ERRATICS: EVIDENCE FOR LAG DEPOSIT FORMATION IN THE RICKARD HILL FACIES (LOWER DEVONIAN-LATE EMSIAN), HELDERBERG MOUNTAIN REGION, NEW YORK**

AFTERNOON ORAL TECHNICAL SESSIONS

SESSION NO. 9

T5. Structure and Stratigraphy of the Mid-Continent Region: Mountain Building and Related Sedimentation (GSA Sedimentary Geology Division)

1:30 PM, Little Rock Marriott Harris Brake

K. Gray, Xiangyang Xie, William C. Parcell and Matthew P. McKay, Presiding

- 9-1 1:30 PM Dickerson, Patricia Wood*; Rodriguez, Edna; Stockli, Daniel F.; Hanson, Richard E.; Roberts, Jonathon M.; Fanning, C. Mark: **MESOPROTEROZOIC TO LATE PALEOZOIC SUPERCONTINENT COLLISIONS AND FRAGMENTATION - THE RECORD FROM SOUTH-CENTRAL LAURENTIA AND INSIGHTS FROM ZIRCON U/PB DATA**
- 9-2 1:50 PM Brahana, Van*: **A CONCEPTUAL MODEL EXPLAINING THE OCCURRENCE OF CHERT IN THE LOWER CARBONIFEROUS LIMESTONES OF THE MIDCONTINENT U.S.**
- 9-3 2:10 PM Van Arsdale, Roy B.*; Cox, Randel T.; Lumsden, David N.: **POSSIBLE ISOSTATIC RESPONSE TO QUATERNARY EROSION IN THE CENTRAL MISSISSIPPI RIVER VALLEY**

- 9-4 2:30 PM Scott, Robert W.*; Campbell, Whitney; Diehl, Brian C.; Edwards, William Brockton; Gargili Altintas, Damla; Harlton, Kirk; Hojnacki, Rachel; Lai, Xin; Porter, Allison; Rush, Natalie K.; Wang, Yulun: **ALBIAN-CENOMANIAN (CRETACEOUS) SHALE-ON-CARBONATE SEQUENCE BOUNDARIES: TEXAS AND MEXICO**
- 2:50 PM **BREAK**
- 9-5 3:05 PM Eason, Audrey Colleen*; Counts, Ronald; Larsen, Daniel; Woolery, Edward W.; Van Arsdale, Roy B.; Baghai-Riding, Nina L.: **CONFIRMING QUATERNARY DISPLACEMENT RATES ON THE MEEMAN-SHELBY FAULT AND JOINER RIDGE HORST, EASTERN ARKANSAS**
- 9-6 3:25 PM Weathers, Taylor Andrew*; Van Arsdale, Roy B.; Arellano, David: **GEOLOGICAL MAPPING IN LAKE COUNTY, TENNESSEE**
- 9-7 3:45 PM Hudson, Mark R.*; Rodriguez, Brian D.; Turner, Kenzie J.: **THE BEAR CREEK UPLIFT DEFINED BY GEOLOGIC MAPPING AND MAGNETOTELLURIC SOUNDINGS IN THE WESTERN BUFFALO RIVER REGION, NORTHERN ARKANSAS**

- 11-2 1:50 PM Nanis, Hafid*; Aly, Mohamed H.: **INVESTIGATION OF LAKE CHANGES IN THE AFAR DEPRESSION OF ETHIOPIA USING REMOTE SENSING AND GIS**
- 11-3 2:10 PM Knight, John A.*; Suarez, Marina B.; Ludvigson, Greg: **PALEOTEMPERATURE AND PALEOPRECIPITATION ANALYSIS OF PALEOSOLS FROM THE EARLY CRETACEOUS RUBY RANCH MEMBER OF THE CEDAR MOUNTAIN FORMATION, EAST-CENTRAL UTAH**
- 2:30 PM **BREAK**
- 11-4 2:45 PM Cox, Randel Tom*: **SOUTHERLY PREVAILING PALEOWINDS RECORDED BY LATE PLEISTOCENE EOLIAN SAND DUNES IN THE LOWER MISSISSIPPI VALLEY**
- 11-5 3:05 PM Breeding, Alex*; Covington, Matthew D.: **REMOVAL AND TRANSPORT OF SANDSTONE CAPROCK MATERIAL AS A RATE-LIMITING STEP IN LANDSCAPE EVOLUTION, BUFFALO RIVER BASIN, AR**
- 11-6 3:25 PM Nielson, Russell*: **ORIGIN AND DEVELOPMENT OF RILL MARKS ON THE BEACH FACE AT GALVESTON ISLAND STATE PARK, TEXAS**

SESSION NO. 10**D1. Hydrogeology and Water Quality of the Mid-Continent U.S. and Mexico**

1:30 PM, Little Rock Marriott Conway Room

Ralph K. Davis, Brian E. Haggard, Phillip D. Hays, Katherine J. Knierim, Samantha R. Wacaster and Javier Vilcaez, Presiding

- 10-1 1:30 PM Kingsbury, James A.*; Haugh, Connor; Knierim, Katherine J.; Clark, Brian R.: **GROUNDWATER-AGE DISTRIBUTIONS AND IMPLICATIONS FOR DRINKING WATER QUALITY IN THE CLAIBORNE AQUIFER, SOUTH-CENTRAL UNITED STATES**
- 10-2 1:50 PM Knierim, Katherine J.*; Kingsbury, James A.; Clark, Brian R.; Haugh, Connor: **USING MACHINE LEARNING TO MAP PH AND REDOX CONDITIONS IN THE MISSISSIPPI EMBAYMENT REGIONAL AQUIFER SYSTEM**
- 10-3 2:10 PM Bolin, Kayla*; Ruhl, Laura S.: **GEOCHEMICAL AND BACTERIAL CHANGES ALONG THE BUFFALO NATIONAL RIVER**
- 10-4 2:30 PM Raley, Kristina Marie*; Hays, Phillip D.; Brahana, John V.; Davis, Ralph K.: **CALCULATING THE AGE OF THE WATER IN HOT SPRINGS NATIONAL PARK, AR BY USE OF CARBON-14 ISOTOPIES**
- 2:50 PM **BREAK**
- 10-5 3:05 PM Cardona, Antonio*; Alonso Torres, Socrates; Rivera-Armendariz, Cristian Abraham; Castro Larragoitia, Guillermo Javier: **WATER QUALITY CHARACTERIZATION OF AQUIFERS IN MEXICO: A PROPOSAL FOR MONITORING GROUNDWATER SYSTEMS IN AREAS OF SHALE-GAS PRODUCTION**
- 10-6 3:25 PM Noonan, Erin Preslee*; Yelderman, Joe C.: **IDENTIFYING SALINITY SOURCES IN THE NORTHERN SEGMENT OF THE BRAZOS RIVER ALLUVIUM AQUIFER**
- 10-7 3:45 PM Minsley, Burke*; Thayer, Drew; Bloss, Benjamin R.; Bedrosian, Paul A.; White, Eric A.; Johnson, Carole D.; Pappas, Katherine L.; Kress, Wade H.: **GEOPHYSICAL CHARACTERIZATION OF THE MISSISSIPPI ALLUVIAL PLAIN HYDROGEOLOGIC FRAMEWORK**
- 10-8 4:05 PM Murray, Kyle E.*: **DERIVING HYDRAULIC PROPERTIES FOR A CONFINED RESERVOIR FROM RESPONSES TO EARTH-TIDAL STRESS**

SESSION NO. 11**D3. Climate and Landscape Evolution**

1:30 PM, Little Rock Marriott Chicot Room

Randel T. Cox and Alex Breeding, Presiding

- 11-1 1:30 PM Goff, Paepin D.*; Ballinger, Thomas J.: **LARGE-SCALE CLIMATIC INFLUENCES ON THE GRAND TETON MOUNTAIN RANGE**

TUESDAY, 13 MARCH 2018**MORNING ORAL TECHNICAL SESSIONS****SESSION NO. 12****T6. Karst Development and Karst Hydrogeology in the Mid-Continent Region of the United States (GSA Hydrogeology Division; GSA Quaternary Geology and Geomorphology Division; GSA Sedimentary Geology Division)**

8:00 AM, Little Rock Marriott Conway Room

Phillip Hays and Matthew D. Covington, Presiding

- 8:00 AM **INTRODUCTORY REMARKS**
- 12-1 8:05 AM Sharp, John M.*: **EVOLUTION OF EDWARDS (BALCONES FAULT ZONE) AQUIFER CONCEPTUAL MODELS AND RECHARGE ESTIMATES**
- 12-2 8:25 AM Leonard, Ashlon E.*; Hays, Phillip D.: **MARGARET WHITE SPRINGS RECHARGE STUDY, BUFFALO NATIONAL RIVER, NORTH-CENTRAL ARKANSAS, USA**
- 12-3 8:45 AM Brahana, Van*: **KARST HYDROGEOLOGIC DEVELOPMENT IN THE BOONE FORMATION (LOWER CARBONIFEROUS) OF THE SOUTHERN OZARKS**
- 12-4 9:05 AM Sutton, Kenadi Lynn*; Yelderman, Joe C.; Hamilton, Wayne: **HYDROGEOLOGY OF SPILLWAY CREEK, BELTON, TEXAS**
- 12-5 9:25 AM O'Shay, Lillian*; Stafford, Kevin W.: **THE CHARACTERIZATION OF GYPSIC SOIL IN CULBERSON COUNTY, TEXAS**
- 9:45 AM **BREAK**
- 12-6 10:00 AM Baggett, Jeffrey A.*; McMillan, Margaret E.: **GAMING ENGINES AND GEOSPATIAL IMAGING: VISUALIZING HIGH-RESOLUTION POINT CLOUD DATA FROM BIG BAT CAVE IN UNITY**
- 12-7 10:20 AM Covington, Matthew D.*; Vaughn, Kiefer A.; Young, Holly A.: **THE IMPACT OF VENTILATION ON DISSOLUTION RATES WITHIN KARST CONDUITS**
- 12-8 10:40 AM Williams, Sarah G.*; Blackstock, Joshua M.; Covington, Matthew D.: **CARBON DIOXIDE DYNAMICS WITHIN THE CRITICAL ZONE OF A KARST LANDSCAPE: SAVOY EXPERIMENTAL WATERSHED, ARKANSAS**
- 12-9 11:00 AM Paces, James B.*; Hudson, Mark R.; Bitting, Chuck; Hudson, Adam M.; Turner, Kenzie J.: **SR- AND U-ISOTOPE STUDIES**

OF KARST LANDSCAPE EVOLUTION AT BUFFALO
NATIONAL RIVER, NORTHERN ARKANSAS, USA

SESSION NO. 13

T14. Geological Survey Support to Emergency Management

8:00 AM, Little Rock Marriott Chicot Room

Brian Blake and Martha Kopper, Presiding

- 13-1 8:00 AM Blake, Brian*: **EARTHQUAKE & GEOHAZARD RESPONSE COORDINATION**
- 13-2 8:20 AM Weaver, Danna*: **EMERGENCY MANAGEMENT & GEOLOGICAL SURVEY INTEGRATION**
- 13-3 8:40 AM Daniel, Melody*: **GEOLOGICAL SURVEY SUPPORT TO EMERGENCY MANAGEMENT**
- 13-4 9:00 AM Kopper, Martha*: **ARKANSAS GEOLOGICAL SURVEY PLANNING AND SUPPORT TO THE 2017 EARTHQUAKE EXERCISE**
- 13-5 9:20 AM Farmahan, Inderpreet Singh*: **OVERVIEW AND IMPORTANCE OF MEMORANDUM OF AGREEMENT BETWEEN ARKANSAS GEOLOGICAL SURVEY AND GIS APPLICATIONS LABORATORY, UNIVERSITY OF ARKANSAS AT LITTLE ROCK**
- 13-6 9:40 AM Beck, Kacy*; Clark, Jerry; Kopper, Martha: **GIS EMERGENCY PREPAREDNESS FOR A STATE GEOLOGICAL SURVEY**
- 13-7 10:00 AM Smith, Lee*: **ARKANSAS GEOLOGICAL SURVEY COMMUNICATIONS PLANNING FOR THE 2017 EARTHQUAKE EXERCISE**
- 13-8 10:20 AM Sturgeon, Polly Root*: **COMMUNICATING INDIANA'S SEISMIC HAZARDS: EARTHQUAKE OUTREACH AND RESPONSE PLANNING**
- 13-9 10:40 AM Ebersole, Sandy*: **GEOLOGICAL HAZARDS, EMERGENCY MANAGEMENT SUPPORT, AND MISSION READY PACKAGES OF THE GEOLOGICAL SURVEY OF ALABAMA**
- 13-10 11:00 AM Lynch, Michael J.*; Wang, Zhenming; Andrews, William; Crawford, Matthew M.; Taylor, Charles; Greb, Stephen F.: **REVISING A GEOLOGIC HAZARD ASSESSMENT TO UPDATE KENTUCKY'S MITIGATION PLAN**
- 13-11 11:20 AM Parrish, Paul C.*; Newcomb, Andrew P.: **NEW MADRID SEISMIC ZONE (NMSZ) EARTHQUAKE: EMERGENCY RESPONSE ROLES OF THE MISSISSIPPI OFFICE OF GEOLOGY'S ENVIRONMENTAL GEOLOGY DIVISION**
- 13-12 11:40 AM Parrish, Paul C.; Newcomb, Andrew P.*: **ENVIRONMENTAL GEOLOGY DIVISION'S WEB PAGE: STATEWIDE SHALLOW GEOPHYSICAL INFORMATION**

SESSION NO. 14

T18. Earth and Space Science K-Higher Education (GSA Quaternary Geology and Geomorphology Division)

8:00 AM, Little Rock Marriott Harris Brake

Wendi J.W. Williams, Margaret E. McMillan, Michele Snyder, Stephen K. Boss and Jeffrey B. Connelly, Presiding

- 14-1 8:00 AM McMillan, Margaret E.*; Connelly, Jeffrey B.: **DR. PHILIP L. KEHLER: A CHAMPION FOR GEOSCIENCE EDUCATION IN ARKANSAS**
- 14-2 8:20 AM Harris, Keith R.*: **INTEGRATING EARTH SCIENCES INTO HIGH SCHOOL SCIENCE COURSE PATHWAY**
- 14-3 8:40 AM Tomlinson, Shelley*; Windel, Nathan: **ARKANSAS SUMMER CAMP: PROJECT C.A.V.E.S**
- 14-4 9:00 AM Williams, Wendi J.W.*: **ANCIENT TO MODERN CONSIDERATIONS TO BUILD CAPACITY: USING UNIVERSAL DESIGN-MODIFIED LEARNING MATERIALS IN INTRODUCTORY LAB SCIENCE GEOLOGY COURSES**
- 14-5 9:20 AM Moosavi, Sadredin*: **THE IMPACT OF SEMESTER-LONG PLACE-BASED GEOSCIENCE CASE STUDIES ON GEOSCIENCE LEARNING IN AN ENVIRONMENTAL GEOLOGY COURSE**

- 14-6 9:40 AM Black, Alice*: **RELATIONSHIP OF INSERVICE TEACHERS' UNDERSTANDING OF PRINCIPLES OF GEOLOGIC TIME AND THEIR VNOS (VIEWS OF NATURE OF SCIENCE) SCORES**
- 14-7 10:00 AM Hamilton, Wayne*; Yelderman, Joe C.; Jarvis, Jacob: **EDUCATIONAL AND RESEARCH EXPERIENCE USING GEOPROBE 6620DT TO CONDUCT SHALLOW SEDIMENT ASSESSMENT AT A RESEARCH UNIVERSITY**
- 14-8 10:20 AM Boss, Stephen K.*: **DEMOGRAPHY AND THE GEOSCIENCE PROFESSIONS: DIFFUSION IS NOT PROGRESS**
- 14-9 10:40 AM Connelly, Jeffrey B.*; McMillan, Margaret E.: **ABET ACCREDITATION OF NATURAL SCIENCE PROGRAMS**
- 14-10 11:00 AM Schneider, Robert V.*; Yelisetti, Subbarao; McGehee, Thomas: **INITIATION OF A NEW GEOPHYSICS DEGREE IN SOUTH TEXAS**
- 14-11 11:20 AM McMillan, Margaret E.*; Connelly, Jeffrey B.: **UA LITTLE ROCK GEOLOGY PROGRAM'S PATHWAY TO ABET ACCREDITATION**
- 14-12 11:40 AM Patton, Jason A.*; Corbin, Tanner W.; Davis, Michael G.; Grosskopf, Jacob: **ALIGNMENT OF A GEOLOGY PROGRAM CURRICULUM TO INDUSTRY SKILLS AT ARKANSAS TECH UNIVERSITY**

POSTER TECHNICAL SESSIONS

SESSION NO. 15

T6. Karst Development and Karst Hydrogeology in the Mid-Continent Region of the United States (Posters) (GSA Hydrogeology Division; GSA Quaternary Geology and Geomorphology Division; GSA Sedimentary Geology Division)

8:30 AM, Little Rock Marriott Salons A & B

Authors will be present from 4:30 to 6 PM

Booth #

- 15-1 1 Shaw Faulkner, Melinda*; Stafford, Kevin W.: **STRUCTURAL CONTROL OF RELICT KARST FEATURES IN THE OWL MOUNTAIN PROVINCE, FORT HOOD MILITARY INSTALLATION, TEXAS**
- 15-2 2 Stafford, Kevin W.*; Brown, Wesley; Faulkner, Melinda: **DELAWARE BASIN EVAPORITE KARST GEOHAZARD CHARACTERIZATION, TEXAS: COUPLING OF TRADITIONAL KARST ANALYSES WITH REMOTE SENSING CHARACTERIZATION**
- 15-3 3 Henry, Kaleb J.*; Faulkner, Melinda: **PRELIMINARY GEOCHEMICAL ANALYSES OF KARST SPRINGS WITHIN THE FORT HOOD MILITARY INSTALLATION, TEXAS**
- 15-4 4 Meinerts, Jacob A.*; Faulkner, Melinda: **EVIDENCE FOR A MIDDLE SHELF TO SHELF MARGIN ENVIRONMENT: FACIES ANALYSES AND DEPOSITIONAL ENVIRONMENT OF THE OWL MOUNTAIN PROVINCE, FORT HOOD MILITARY INSTALLATION, TEXAS**
- 15-5 5 Reece, Colby B.*; Faulkner, Melinda: **USING ELECTRICAL RESISTIVITY SURVEYS TO DETERMINE SUBSURFACE CONNECTIVITY IN A KARST TERRAIN, FORT HOOD MILITARY INSTALLATION, TEXAS**
- 15-6 6 Smith, Bernard Jakob*: **CHARACTERIZATION OF CLASTIC PSEUDOKARST AND ASSOCIATED PHENOMENA IN EAST TEXAS**
- 15-7 7 Dailey, Heather J.*; Faulkner, Melinda: **DELINEATION AND CLASSIFICATION OF KARST DEPRESSIONS USING LIDAR: OWL MOUNTAIN PROVINCE, FORT HOOD MILITARY INSTALLATION, TEXAS**
- 15-8 8 Niznik, Billie G.*; Blackstock, Joshua M.; Hays, Phillip D.; Pollock, Erik: **CONNECTING PRECIPITATION AND SHALLOW GROUNDWATER IN NORTH WEST ARKANSAS: GEOCHEMICAL AND ISOTOPIC APPROACHES**

- 15-9 9 Shields, Jessica*; O'Shay, Lillian; Stafford, Kevin W.: **THE COMPLEX SPELEOGENETIC HISTORY OF THE GYPSUM PLAIN OF WEST TEXAS AND SOUTHEASTERN NEW MEXICO WITH IMPROVED REMOTE SENSING METHODOLOGIES FOR IDENTIFICATION AND DELINEATION OF KARST FEATURES**

SESSION NO. 16**T8. Carbon in the Geosphere (Posters) (GSA Sedimentary Geology Division)**

8:30 AM, Little Rock Marriott Salons A & B

Authors will be present from 4:30 to 6 PM

Booth #

- 16-1 10 Krug, Russell*; Ali, Hendratta: **PETROPHYSICAL AND SEDIMENTOLOGICAL ANALYSIS OF RESERVOIR UNITS IN ELLIS CENTRAL KANSAS UPLIFT**
- 16-2 11 Wolfe, Kristina*; Winguth, Arne M.E.; Zhuang, Kelin; Hughlett, Taylor M.: **SENSITIVITY OF OXYGEN MINIMUM ZONES DUE TO CARBON DIOXIDE RADIATIVE FORCINGS**
- 16-4 13 Gauvey, K.L.*; Sumrall, Jonathan B.; Larson, E.B.: **CAVE AND PALEOSOL MINERALOGY FROM ELEUTHERA, THE BAHAMAS**
- 16-5 14 Sumrall, Jonathan B.*; Larson, E.B.: **GEOMORPHIC CONSTRAINTS USING FLANK MARGIN CAVES AND REMNANT VOIDS FROM THE CARIBBEAN**
- 16-6 15 Gautam, Mitali D.*; Winguth, Arne M.E.: **SIMULATION OF CLIMATE ACROSS THE PERMIAN-TRIASSIC BOUNDARY WITH AN EMPHASIS ON THE PHYTO-GEOGRAPHICAL DISTRIBUTIONS**
- 16-7 16 Hullum, Heather*; Gautam, Mitali; Hughlett, Taylor M.; Winguth, Arne M.E.; Winguth, Cornelia: **CLIMATE RECONSTRUCTION UTILIZING CLIMATE-SENSITIVE SEDIMENTS AT THE PERMIAN-TRIASSIC BOUNDARY**
- 16-8 17 Brown, Mikaela*; Hughlett, Taylor M.; Winguth, Arne M.E.: **CLIMATE CHANGE OF THE SOUTHERN OCEAN IN RESPONSE TO TOPOGRAPHIC FORCING DURING THE PALEOCENE-Eocene THERMAL MAXIMUM**

SESSION NO. 17**T9. Geologic Mapping in the South-Central Region of the United States (Posters) (GSA Quaternary Geology and Geomorphology Division; GSA Sedimentary Geology Division)**

8:30 AM, Little Rock Marriott Salons A & B

Authors will be present from 4:30 to 6 PM

Booth #

- 17-1 18 Chandler, Angela*: **GEOLOGY OF THE WAR EAGLE QUADRANGLE, BENTON COUNTY, NORTHWEST ARKANSAS**
- 17-2 19 Collins, Edward W.*; Paine, Jeffrey G.; Elliott, Brent; Woodruff, C.M.; Costard, Lucie: **STATEMAP PROGRAM GEOLOGIC MAPPING IN TEXAS**
- 17-3 20 Hutto, Richard S.*; Hatzell, Garrett: **GEOLOGY OF THE DURHAM QUADRANGLE, MADISON AND WASHINGTON COUNTIES, ARKANSAS**
- 17-4 21 Swan, Benjamin T.; Shepherd, Stephanie L.*: **IMPROVED MAPPING OF GEOMORPHIC FEATURES THROUGH MACHINE LEARNING IN THE BUFFALO RIVER WATERSHED, ARKANSAS**
- 17-5 22 Richter, Jenny*; Owens, Phillip R.; Libohova, Zamir; Adhikari, Kabindra; Fuentes Ponce, Bryan: **USING DIGITAL TERRAIN ATTRIBUTES TO MAP SOIL PARENT MATERIAL IN THE ARKANSAS RIVER VALLEY**
- 17-6 23 Turner, Kenzie J.; Hudson, Mark R.*: **GEOLOGY OF THE OSAGE SW 7.5-MINUTE QUADRANGLE ADJACENT TO BUFFALO NATIONAL RIVER, NORTHERN ARKANSAS**
- 17-7 24 Flotron, Alyssa N.*; Franseen, Evan K.; Goldstein, Robert: **SEDIMENTOLOGICAL AND STRATIGRAPHIC CONTROLS ON RESERVOIR SWEET SPOTS IN WOLFCAMP 'A,' HOWARD COUNTY, MIDLAND BASIN**
- 17-8 25 Stevenson, Alexandria M.*; Quevy, Amber L.; Price, Jonathan D.: **MAPPING OF THE QUANAH PLUTON MARGIN AND ADJACENT DIKES, WICHITA MOUNTAINS, OKLAHOMA**

SESSION NO. 18**D4. Igneous and Tectonic Activity (Posters)**

8:30 AM, Little Rock Marriott Salons A & B

Authors will be present from 4:30 to 6 PM

Booth #

- 18-1 26 Minteer, Danielle Renee*: **A GEOPHYSICAL DELINEATION OF A LISTRIC FAULT WITHIN THE GULF COASTAL PLAIN, MONTGOMERY COUNTY, TEXAS**
- 18-2 27 Leggett, Tyler Nathan*; Befus, Kenneth; Kenderes, Stuart M.: **HIGH-RESOLUTION UAV MAPPING OF SOUTH COULEE, MONO CHAIN, CALIFORNIA: CONSTRAINTS ON EMPLACEMENT CONDITIONS**
- 18-3 28 Holsteen Bruyere, Rachel*; Befus, Kenneth: **WERE THE VOLATILE CONTENTS OF YELLOWSTONE CALDERAS LAVA CREEK TUFF THE SAME?**
- 18-4 29 McDowell, Jeremy*; Brikowski, Tom H.: **INFRARED SPECTROMETRY AT DETACHMENT FAULT GOUGE FOR FLUID PATHWAY ANALYSIS, SILVER PEAK RANGE AND SYLVANIA MOUNTAINS, NEVADA, USA**
- 18-5 30 Vaughn, Lochlan Wright*; Stern, Robert; Ryan, Jeffrey G.; Pearce, Julian A.: **CREATING AND ASSESSING A NEW COMPUTER ANIMATION ABOUT MANTLE MELTING**
- 18-6 31 Ohrmundt, Sierra C.*; Hanson, Richard E.; Andrews, Virginia P.: **ANDESITIC PYROCLASTIC INTRUSIONS INJECTED LATERALLY INTO WEAK LACUSTRINE SEDIMENTS WITHIN A MESOPROTEROZOIC VOLCANIC ARC SUCCESSION, BARBY FORMATION, SW NAMIBIA**
- 18-7 32 Lamb, Andrew P.*; Blakely, Richard J.; Wells, Ray E.; Sherrod, Brian L.; Amaral, Chelsea: **THE COLUMBIA PLATEAU CENTRAL GRAVITY HIGH AND ITS RELATION TO THE YAKIMA FOLD AND THRUST BELT, WASHINGTON**
- 18-8 33 Stevens, Liane M.*: **INVESTIGATING THE P-T HISTORY OF THE PACKSADDLE DOMAIN, LLANO UPLIFT, VIA PHASE EQUILIBRIA MODELING**

AFTERNOON ORAL TECHNICAL SESSIONS

SESSION NO. 19**T8. Carbon in the Geosphere (GSA Sedimentary Geology Division)**

1:30 PM, Little Rock Marriott Conway Room

Omar Harvey, Presiding

- 19-1 1:30 PM Bhattacharya, Joyeeta*; Dickens, Gerald: **EOCENE CARBONATE DISSOLUTION EVENTS IN NORTHWEST PACIFIC OCEAN**
- 19-2 1:50 PM Winguth, Arne M.E.*; Brown, Mikaela; Hughlett, Taylor M.; Shields, Christine; Rothstein, Mathew; Winguth, Cornelia; Zhuang, Kelin: **SIMULATED EOCENE HOTHOUSE CLIMATE - A DEEPMIP STUDY**
- 19-3 2:10 PM Molinares Blanco, Carlos E.*; Turner, Bryan W.; Slatt, Roger M.; Kozik, Nevin P.; Young, Seth A.; Philp, Richard P.; Elmore, Douglas; Miceli-Romero, Andrea; Etayo-Cadavid, Miguel F.: **LATE DEVONIAN ORGANIC-RICH WOODFORD SHALE DEPOSITS AND THE FRASNIAN/FAMENNIAN (F/F) AND DEVONIAN-CARBONIFEROUS (D/C) GLOBAL ANOXIC EVENTS**
- 19-4 2:30 PM DeBone, Kristin*; Harvey, Omar R.: **ENERGETICS OF DISSOLVED ORGANIC MATTER AT THE SiO₂-WATER INTERFACE**
- 2:50 PM **BREAK**
- 19-5 3:05 PM Blackstock, Joshua M.*; Covington, Matthew D.; Williams, Sarah G.; Myre, Joseph; Rodriguez, Josue; Hays, Phillip D.; Cooper, Max P.; Perne, Matija: **LOW-COST MONITORING OF CO₂ CONCENTRATIONS AND FLUXES WITHIN THE**

TUESDAY, 13 MARCH

CRITICAL ZONE: INSIGHTS FROM THE SPRINGFIELD PLATEAU AQUIFER, NORTHWEST ARKANSAS

- 19-6 3:25 PM Vilcaez, Javier*; Ebrahimi, Pouyan; Shabani, Babak: **COUPLING THE DISPOSAL OF CO₂ AND PRODUCED WATER FROM UOG RESERVOIRS INTO CONVENTIONAL DEPLETED OIL RESERVOIRS**
- 19-7 3:45 PM Lazzarino, Patrick B.; Harvey, Omar R.*: **MINERAL EFFECTS ON HEADSPACE CO₂-TO-CH₄ Å CONVERSION RATIOS BY ARCHAELLATED AND NON-ARCHAELLATED METHANOGENS**
- 19-8 4:05 PM Kirk, Matthew F.*; Marquart, Kyle A.; Paper, Janet M.; Haller, Ben R.; Shodunke, Ganiyat; Flynn, Theodore M.; Jin, Qusheng: **PH-DEPENDENT INTERACTION BETWEEN IRON REDUCERS AND METHANOGENS AND ITS IMPACT ON CARBON BUDGETS**

SESSION NO. 20

T10. Holistic Approaches to Coping with Induced Seismicity in the Mid-Continent

1:30 PM, Little Rock Marriott Harris Brake

Casee Lemons, Tandis S. Bidgoli, Jake Walter and Scott M. Ausbrooks, Presiding

- 20-1 1:30 PM Ausbrooks, Scott M.*; Horton, Stephen P.: **DEVELOPING CRITERIA TO CHARACTERIZE AND CLASSIFY DISCRETE CLUSTERS OF EARTHQUAKES FROM 2012-2016 IN NORTH-CENTRAL ARKANSAS AS NATURAL OR INDUCED**
- 20-2 1:50 PM Sickbert, Tim*; Ismail, Ahmed: **CORRELATION AND THE LACK THEREOF: INJECTION, EARTHQUAKE, AND MAGNITUDE DISTRIBUTIONS IN OKLAHOMA**
- 20-3 2:10 PM Walter, Jake*; Murray, Kyle E.: **THE EVOLVING SPATIO-TEMPORAL ASSOCIATION BETWEEN EARTHQUAKES AND WASTEWATER INJECTION WELLS IN OKLAHOMA**
- 2:30 PM **BREAK**
- 20-4 2:45 PM Ansari, Esmail*; Bidgoli, Tandis S.; Hollenbach, Andrew Michael: **STATISTICAL ANALYSIS OF THE ARBUCKLE PRESSURE AND STATIC FLUID LEVEL**
- 20-5 3:05 PM Lemons, Casee*; McDaid, Guin; Smye, Katie; Hennings, Peter: **THE EVOLUTION OF SALTWATER DISPOSAL PRACTICES**

IN THE FORT WORTH AND DELAWARE BASINS OF TEXAS AND NEW MEXICO, USA

- 20-6 3:25 PM Birdie, Tiraz*; Bidgoli, Tandis S.; Holubnyak, Eugene; Hollenbach, Jennifer: **ECONOMICAL MONITORING OF PORE PRESSURES IN DEEP SALINE AQUIFER TO ASSIST IN INDUCED SEISMICITY EVALUATIONS**

SESSION NO. 21

D4. Igneous and Tectonic Activity

1:30 PM, Little Rock Marriott Chicot Room

Adriana Potra and Michael G. Davis, Presiding

- 21-1 1:30 PM Franks, Challenga*; Price, Jonathan D.; Puckett, Robert E.: **MICROANALYTICAL CHARACTERIZATION OF SUBSURFACE SAMPLES OF THE WICHITA GRANITE GROUP, SOUTHERN OKLAHOMA AULACOGEN**
- 21-2 1:50 PM Hanson, Richard E.*; Andrews, Virginia P.; Ohrmundt, Sierra C.; Lehman, Katelyn M.; Baylor, David J.; Williams, John W.: **ERUPTIVE MECHANISMS, LITHOFACIES PATTERNS AND SUBVOLCANIC MAGMA PLUMBING SYSTEMS IN A 1.2 GA EXTENSIONAL CONTINENTAL MARGIN ARC ON THE EDGE OF THE KALAHARI CRATON, SW NAMIBIA**
- 21-3 2:10 PM Chase, Brandon Franklin*; Katumwehe, Andrew B.; Abdel Salam, Mohamed: **KAFUE RIFT: THE FORGOTTEN SEGMENT OF THE SOUTHWESTERN BRANCH OF THE EAST AFRICAN RIFT**
- 2:30 PM **BREAK**
- 21-4 2:45 PM Quevy, Amber L.*; Stevenson, Alexandria M.; Price, Jonathan D.: **FILLING THE CRACKS: MAGMA INJECTIONS AT THE EDGE OF THE QUANAH PLUTON, OKLAHOMA**
- 21-5 3:05 PM Nyalugwe, Victor*; Abdel Salam, Mohamed; Katumwehe, Andrew B.; Atekwana, Estella A.: **LITHOSPHERIC STRUCTURE BENEATH THE MESOZOIC CHILWA ALKALINE PROVINCE IN SOUTHERN MALAWI AND NORTHEASTERN MOZAMBIQUE**
- 21-6 3:25 PM Dadi, Sireesh*: **MULTICHANNEL SEISMIC DATA ACQUIRED RECENTLY OVER SHATSKY RISE**

Index of Authors

How to use the indexing system:

The first number (preceding the dash) represents the session number in which the paper will be presented.

The second number (following the dash) indicates the presentation order of the paper within its session.

Example: Shepherd, Stephanie L. 17-4*

Find Session #17 in the Technical Session portion of the Program, and look at the fourth paper in the session.

Page numbers are not listed in this index. Refer to session number and order of presentation to locate the author you are searching for.

*denotes presenter

-
- A**
- Abdel Salam, Mohamed 4-1, 6-22, 21-3, 21-5
Adams, Tamara L. 1-4
Adhikari, Kabindra 17-5
Adviento-Borbe, M. Arlene A. 6-4
Ali, Hendratta 6-2, 16-1
Alonso Torres, Socrates 10-5
Alsalem, Ohood 1-4*
Aly, Mohamed H. 8-14, 11-2
Amaral, Chelsea 18-7
Andrews, Virginia P. 18-6, 21-2
Andrews, William Jr. 13-10
Ansari, Esmail 20-4*
Arellano, David 9-6
Atekwana, Eliot 6-2
Atekwana, Estella A. 21-5
Ausbrooks, Scott M. 20-1*
-
- B**
- Baba, Alper 3-8
Bader Al Salem, Ohood 1-3
Baggett, Jeffrey A. Jr. 12-6*
Baghai-Riding, Nina L. 9-5
Baker, Andrew 8-7
Baker, Cathy 6-10
Ballinger, Thomas J. 11-1
Barker, Chris A. 4-2
Barrick, James E. 2-4*
Bassoo, Ray 6-15
Basu, Asish 1-4
Baylor, David J. 21-2
Beck, Kacy 13-6*
Becker, Martin A. 8-1
Bedrosian, Paul A. 10-7
Befus, Kenneth 6-15, 18-2, 18-3
Behrman, Caroline S. 6-12*
Bhattacharya, Joyeeta 19-1*
Bidgoli, Tandis S. 20-4, 20-6
Birdie, Tiraz 20-6*
Bitting, Chuck 12-9
Black, Alice 14-6*
Blackstock, Joshua M. 12-8, 15-8, 19-5*
Blake, Brian 13-1*
Blakely, Richard J. 18-7
Bloss, Benjamin R. 10-7
Blusztajn, Jerzy S. 1-2
Bolin, Kayla 10-3*
Boss, Stephen K. 14-8*
Brahana, John V. 10-4
Brahana, Van 9-2*, 12-3*
Breeding, Alex 11-5*
Brikowski, Tom 3-6
Brikowski, Tom H. 18-4
Brown, Mikaela 16-8*, 19-2
Brown, Wesley 15-2
-
- C**
- Cains, Julie M. 4-3
Calves, Gerome 8-13
-
- Campbell, Whitney 9-4
Cantu, Karen 8-12*
Cardenas, M. Bayani 6-8
Cardona, Antonio 10-5*
Carey, Matthew 7-2*
Carr, Danelle 6-16*
Castro, Jesse L. 2-4
Castro Larragoitia, Guillermo Javier 10-5
Caylor, Jordan 6-20*
Chamberlain, John A. Jr. 8-1
Chandler, Angela 17-1*
Chase, Brandon Franklin 21-3*
Cheng, Chu-Lin 7-3
Chick, Jonathan T. 4-3
Cifelli, Richard L. 2-8
Clark, Brian R. 10-1, 10-2
Clark, Jerry 13-6
Clift, Peter D. 1-2*, 8-13
Colby, Thomas A. 8-10*
Collins, Edward W. 17-2*
Connelly, Jeffrey B. 14-1, 14-9*, 14-11
Cooper, Max P. 19-5
Corbin, Tanner W. 6-10*, 14-12
Costard, Lucie 17-2
Counts, Ronald 9-5
Covington, Matthew D. 11-5, 12-7*, 12-8, 19-5
Cox, Randel T. 9-3
Cox, Randel Tom 11-4*
Crawford, Matthew M. 13-10
Cumnock, Allie 6-4*
-
- D**
- Dadi, Sireesh 21-6*
Dailey, Heather J. 15-7*
Dailey, Sarah 8-13*
Daniel, Joseph 2-6*
Daniel, Melody 13-3*
Datta, Saugata 3-7
Davis, Michael G. 6-5, 14-12
Davis, Ralph K. 10-4
DeBone, Kristin 19-4*
Dickens, Gerald 19-1
Dickerson, Patricia Wood 9-1*
Dickson, Riley J. 8-2
Diehl, Brian C. 9-4
Dingmore, Lindy 6-15*
Dunn, Dennis 1-2
-
- E**
- Eason, Audrey Colleen 9-5*
Ebersole, Sandy 13-9*
Ebrahimi, Pouyan 19-6
Edwards, William Brockton 9-4
Elliott, Brent 17-2
Elmore, Douglas 19-3
Elmore, R. Douglas 6-13
Emishaw, Luelseged 4-1*, 6-22
Enriquez, Olivia R. 8-11
Etayo-Cadavid, Miguel F. 19-3
-
- F**
- Fan, Majie 1-3, 1-4
Fanning, C. Mark 9-1
Farmahan, Inderpreet Singh 13-5*
Faulkner, Melinda 3-4, 15-2, 15-3, 15-4, 15-5, 15-7
Finkelman, Robert B. 3-2*, 3-8*
Flotron, Alyssa N. 17-7*
Flynn, Theodore M. 19-8
Forrest, Ryan W. 6-13*
Foster-Hunt, ReBecca 2-8
Franks, Challenga 21-1*
Fransen, Evan K. 17-7
Frederickson, Joseph 2-8
Frucci, Mason N. 2-8, 2-10*
Fuentes Ponce, Bryan 17-5
-
- G**
- Gargili Altintas, Damla 9-4
Gautam, Mitali D. 16-6*
Gautum, Mitali 16-7
Gauvey, K.L. 16-4*
Goff, Paepin D. 11-1*
Goldstein, Robert 17-7
Gonzalez, Eli 7-3*
Gonzalez, Juan L. 7-3, 8-12
Gowing, Kenyon 6-5*
Greb, Stephen F. 13-10
Grosskopf, Jacob 8-7*, 14-12
-
- H**
- Haller, Ben R. 19-8
Hamilton, Wayne 12-4, 14-7*
Hanson, Richard E. 9-1, 18-6, 21-2*
Harlton, Kirk 9-4
Harris, Keith R. 14-2*
Hartley, James C. 5-1*
Harvey, Omar R. 19-4, 19-7*
Hatzell, Garrett 17-3
Haugh, Connor 10-1, 10-2
Hays, Phillip D. 10-4, 12-2, 15-8, 19-5
He, Feng 8-4
Heinrich, Paul V. 1-2
Hennings, Peter 20-5
Henry, Kaleb J. 15-3*
Hett, Stephen J. 6-14*
Hilliard, Christopher 6-6*
Hojnacki, Rachel 9-4
Hollenbach, Andrew Michael 20-4
Hollenbach, Jennifer 20-6
Holsteen Bruyere, Rachel 18-3*
Holubnyak, Eugene 20-6
Horn, Jackie D. 3-6*
Horton, Stephen P. 20-1
Hudson, Adam M. 12-9
Hudson, Mark R. 9-7*, 12-9, 17-6*
Hughlett, Taylor M. 8-4*, 16-2, 16-7, 16-8, 19-2
Hullum, Heather 16-7*
Hunt, Tyler C. 5-3
-
- Hunt-Foster, ReBecca** 2-7*
Hutto, Richard S. 17-3*
-
- I**
- Imsaleem, Mohamed 8-3*
Ismail, Ahmed 20-2
-
- J**
- Jacobus, Andrew 1-2
Jarvis, Jacob 14-7
Jin, Qusheng 19-8
Johnson, Carole D. 10-7
Juenger, Jessica 6-21*
-
- K**
- Katumwehe, Andrew B. 21-3, 21-5
Kee, Michael 6-17*
Kenderes, Stuart M. 18-2
Kingsbury, James A. 10-1*, 10-2
Kinsland, Gary L. 1-8*
Kirk, Matthew F. 19-8*
Kirkland, J.I. 2-9
Kline, Christi G. 8-1
Knierim, Katherine J. 10-1, 10-2*
Knight, John A. II 11-3*
Kopper, Martha 13-4*, 13-6
Kozik, Nevin P. 19-3
Kress, Wade H. 10-7
Krug, Russell 16-1*
Kulhanek, Denise K. 8-13
Kwon, Youngsang 6-12
-
- L**
- Lai, Xin 9-4
Lamb, Andrew P. 18-7*
Larsen, Daniel 9-5
Larson, E.B. 16-4, 16-5
Lazzarino, Patrick B. 19-7
Leggett, Tyler Nathan 18-2*
Lehman, Katelyn M. 21-2
Lemons, Casee 20-5*
Leonard, Ashlon E. 12-2*
Leslie, Deborah L. 6-4, 6-6
Leverett, Dave 6-12
Lewis, Jesse D. 6-22*
Libohova, Zamir 17-5
Loocke, Matthew 6-16
Ludvigson, Greg 11-3
Lumsden, David N. 2-2*, 9-3
Lupia, Richard 5-3
Lynch, Michael J. 13-10*
-
- M**
- Macrini, Thomas E. 2-5
Maisch, Harry M. IV 8-1*
Manger, Walter L. 1-5, 2-1
Marquart, Kyle A. 19-8

Marrone, Tatiana 2-5*
Mautz, Clint F. 8-1
McDaid, Guin 20-5
McDowell, Jeremy 18-4*
McElroy, Aleksander P. 5-2
McFarlin, Forrest D. 4-3
McGehee, Thomas 14-10
McKim, Sydney 4-3*
McMillan, Margaret E. 12-6, 14-1*, 14-9, 14-11*
Meinerts, Jacob A. 15-4*
Messmer, Martin 4-2*
Miceli-Romero, Andrea 19-3
Minsley, Burke 10-7*
Minteer, Danielle Renee 18-1*
Molinales Blanco, Carlos E. 19-3*
Moosavi, Sadredin 14-5*
Morgan, Kirsty 2-8, 2-9*
Morris, Noah Steven 2-1*
Mouri, Hassina 3-2
Mungia, Zachary J. 6-8*
Murray, Kyle E. 10-8*, 20-3
Myre, Joseph 19-5

N

Nanis, Hafid 11-2*
Newcomb, Andrew P. 13-11, 13-12*
Nielsen, Russell 11-6*
Niknard, Cameron 8-5*
Niznik, Billie G. 15-8*
Noonan, Erin Preslee 10-6*
Nyalugwe, Victor 21-5*
Nydam, Randall L. 2-8

O

O'Shay, Lillian 12-5*, 15-9
Ohrmundt, Sierra C. 18-6*, 21-2
Otto-Bliesner, Bette 8-4
Owens, Phillip R. 17-5

P

Paces, James B. 12-9*
Paine, Jeffrey G. 17-2
Paper, Janet M. 19-8
Pappas, Katherine L. 10-7
Parrish, Paul C. 13-11*, 13-12
Patton, Jason A. 6-5, 6-14, 14-12*
Payne, Forrest E. 7-2
Pearce, Julian A. 18-5
Perkins, Lenora Diane 6-9*, 6-19*

Perne, Matija 19-5
Philippe, Marc 5-3
Philp, Richard P. 19-3
Pirouz, Mortaza 1-3*
Pittmann, Jeff 2-8, 2-9
Pollock, Erik 3-3, 7-2, 15-8
Pollock, Erik D. 6-3
Porter, Allison 9-4
Potra, Adriana 4-3
Price, Jonathan D. 1-6*, 6-18, 17-8, 21-1, 21-4
Puckett, Robert E. 21-1

Q

Quevy, Amber L. 17-8, 21-4*

R

Raley, Kristina Marie 10-4*
Reba, Michele L. 6-4, 6-6
Reece, Colby B. 15-5*
Reinhart, Joshua A. 6-11*
Richmond, Dean R. 5-3*
Richter, Jenny 17-5*
Rivera-Armendariz, Cristian Abraham 10-5
Roberson, J.W. 8-11*
Roberts, Jonathon M. 9-1
Rodriguez, Brian D. 9-7
Rodriguez, Edna 9-1
Rodriguez, Josue 19-5
Rosenbloom, Nan 8-4
Rothstein, Mathew 19-2
Rowden, Kyle W. 8-14*
Ruhl, Laura 7-2
Ruhl, Laura S. 3-3, 6-3, 10-3
Ruppel, Stephen C. 2-4
Rush, Natalie K. 9-4
Ryan, Jeffrey G. 18-5

S

Sanchez, Veronica 6-9
Schmitz, Mark D. 8-10
Schneider, Robert V. 6-19, 14-10*
Scott, Robert W. 9-4*
Selinus, Olle 3-2
Shabani, Babak 19-6
Sharp, John M. Jr. 12-1*
Shaw Faulkner, Melinda 15-1*
Shelden, William Reese 7-1*
Shepherd, Forest 3-7*

Shepherd, Stephanie L. 17-4*
Sherrod, Brian L. 18-7
Shields, Christine 19-2
Shields, Jessica 15-9*
Shodunke, Ganiyat 19-8
Sickbert, Tim 20-2*
Simmons, Jason D. 3-3*
Slatt, Roger M. 19-3
Sloan, James Carson 2-11
Smith, Bernard Jakob 15-6*
Smith, Lee 13-7*
Smith, Zachary J. 6-3*
Smye, Katie 20-5
Snow, Jonathan E. 6-16
Stafford, Kevin W. 12-5, 15-1, 15-2*, 15-9
Steger, Jared W. 6-18*
Sterk, Kerry 6-12
Stern, Robert 18-5
Stern, Robert J. 1-3
Stern, Robert, J. 1-1*, 1-7
Stevens, Joshua K. 8-2*
Stevens, Liane M. 18-8*
Stevenson, Alexandria M. 17-8*, 21-4
Stockli, Daniel F. 9-1
Stringer, Gary Layne 2-11*
Sturgeon, Polly Root 13-8*
Suarez, Celina 2-8*, 2-9, 2-10, 8-5
Suarez, Marina B. 11-3
Sumrall, Jonathan B. 16-4, 16-5*
Sutton, Kenadi Lynn 12-4*
Swan, Benjamin T. 17-4

T

Taylor, Charles 13-10
Thayer, Drew 10-7
Tomlinson, Shelley 14-3*
Turner, Bryan W. 19-3
Turner, David R. 2-5
Turner, Kenzie J. 9-7, 12-9, 17-6

U

Urbanczyk, Kevin M. 8-11
Urwin, Richard 8-9*

V

Van Arsdale, Roy B. 6-12, 9-3*, 9-5, 9-6
Varnell, Curtis 3-5*
Vaughn, Kiefer A. 12-7
Vaughn, Lochlan Wright 18-5*
Vickers, Hunter 6-5

Vilcaez, Javier 19-6*
Villarreal, Ivan 6-19

W

Waddell, Lindsey 6-17
Walsh, Tim R. 6-1, 6-11
Walter, Jake 20-3*
Wang, Ning 1-7*
Wang, Yulun 9-4
Wang, Zhenming 13-10
Warner, Griffin W. 8-8*
Watkins, Joseph D. 3-4*
Weathers, Taylor Andrew 9-6*
Weaver, Danna 13-2*
Wehrbein, Randal 2-3*, 5-2*
Wells, Ray E. 18-7
West, Logan M. 4-4*
Whaley, Carol Ann 6-2*
White, Eric A. 10-7
Wilhelm, Margarita 6-19
Wilkerson, Austin 8-6*
Williams, John W. 21-2
Williams, Sarah G. 12-8*, 19-5
Williams, Wendi J.W. 14-4*
Windel, Nathan 14-3
Winguth, Arne M.E. 8-4, 16-2, 16-6, 16-7, 16-8, 19-2*
Winguth, Cornelia 16-7, 19-2
Wolfe, Kristina 16-2*
Wong, Stephanie S. 3-1
Woodruff, C.M. Jr. 17-2
Woolery, Edward W. 9-5
Wynn, Joshua C. 6-1*

X

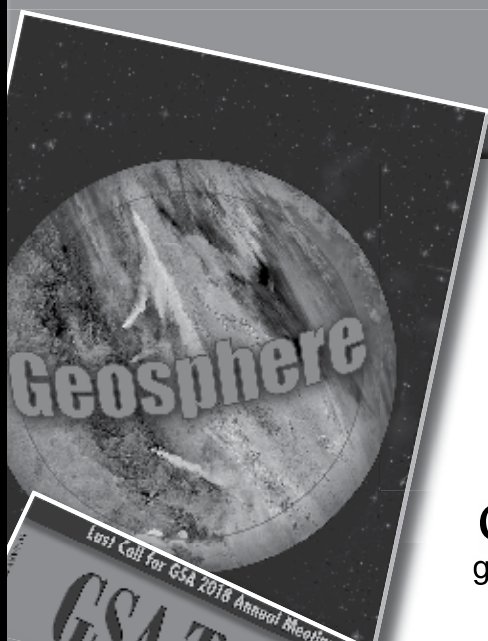
Xie, Xiangyang 1-5*

Y

Yelderman, Joe C. Jr. 3-1*, 10-6, 12-4, 14-7
Yelisetti, Subbarao 14-10
Young, Holly A. 12-7
Young, Seth A. 19-3

Z

Zhuang, Kelin 16-2, 19-2



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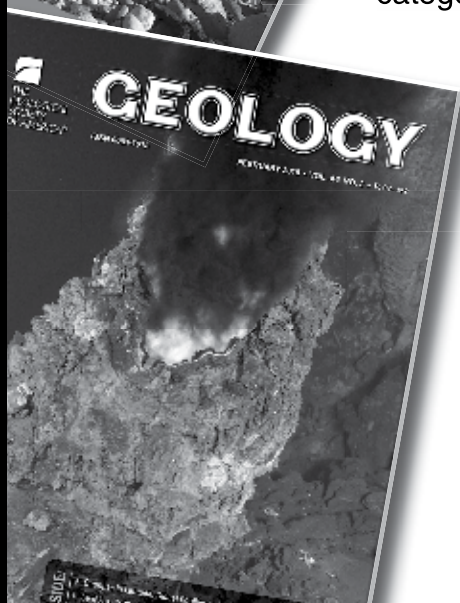
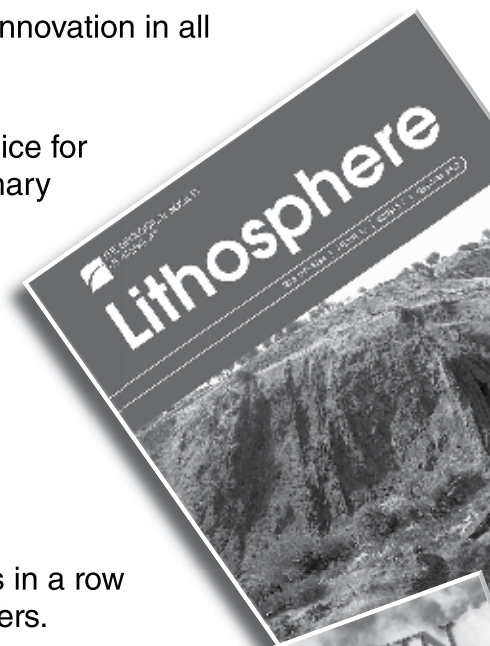
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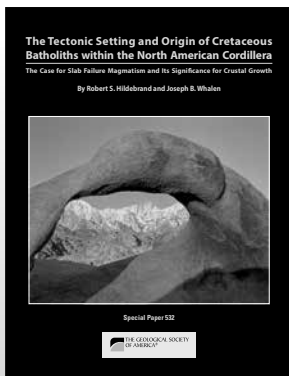
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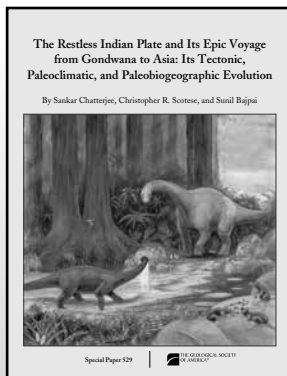
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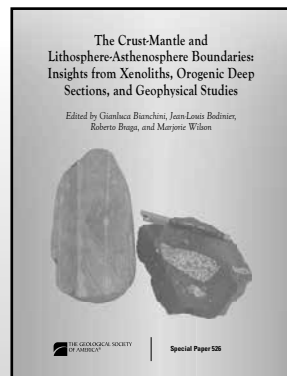
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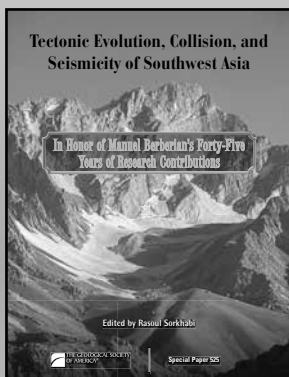
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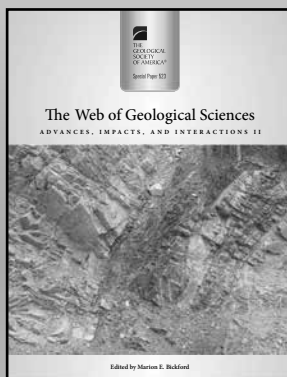
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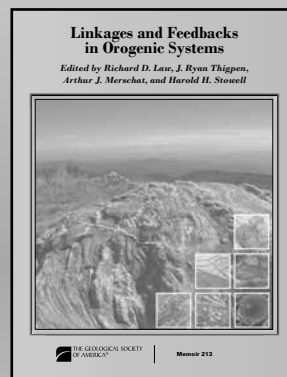
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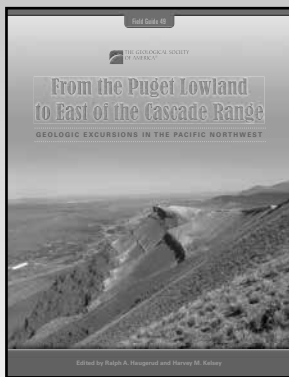
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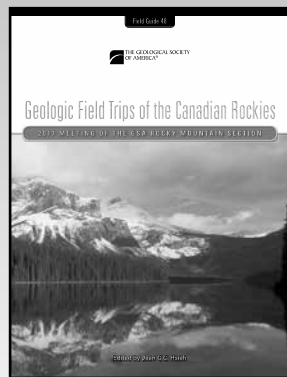
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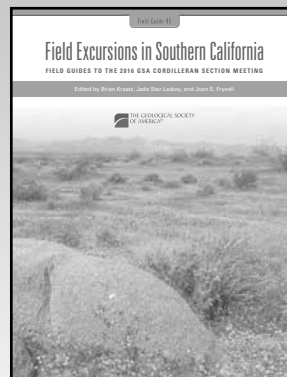
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- Avoid personal attacks directed toward other registrants, guests, volunteers, exhibitors, GSA staff, service providers, and others in attendance.
- Obey the rules and policies of the meeting venue, hotels, GSA contracted facility, or any other venue where your meeting badge and GSA affiliation is likely to be displayed.
- Alert meeting security personnel, GSA staff, or GSA leadership if you notice someone in distress, or perceive a potentially dangerous situation, or witness a dangerous situation.

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- Be as observant as possible in order to communicate to emergency staff.

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