

2022 PROGRAM

Vol. 54, No. 2



JOINT CORDILLERAN- ROCKY MOUNTAIN SECTION

15–17 March
Las Vegas, Nevada, USA

<https://www.geosociety.org/cd-mtg>

Red Rock Canyon, Nevada
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We are grateful to the following sponsors who made a substantial contribution to help underwrite the costs of the meeting. To help promote the health & safety of GSA attendees, Bruker has provided hand sanitizers for this meeting. Be sure to thank them during the meeting.

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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 inside back cover). If you have any concerns about behavior that may violate the Code, please contact:

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

GSA Ethics and Compliance Officer, Nan Stout, ethics@geosociety.org

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

Registration for the meeting requires full vaccination status, and booster shots are strongly advised. Additionally, masks are required for all indoor events associated with this meeting.

Program Book

CORDILLERAN AND ROCKY MOUNTAIN SECTIONS JOINT MEETING

118th Annual Meeting of the Cordilleran Section, GSA
72nd Annual Meeting of the Rocky Mountain Section, GSA

15–17 March 2022
Las Vegas, Nevada, USA

<https://www.geosociety.org/cd-mtg>

Rendezvous at the Geologic Crossroads



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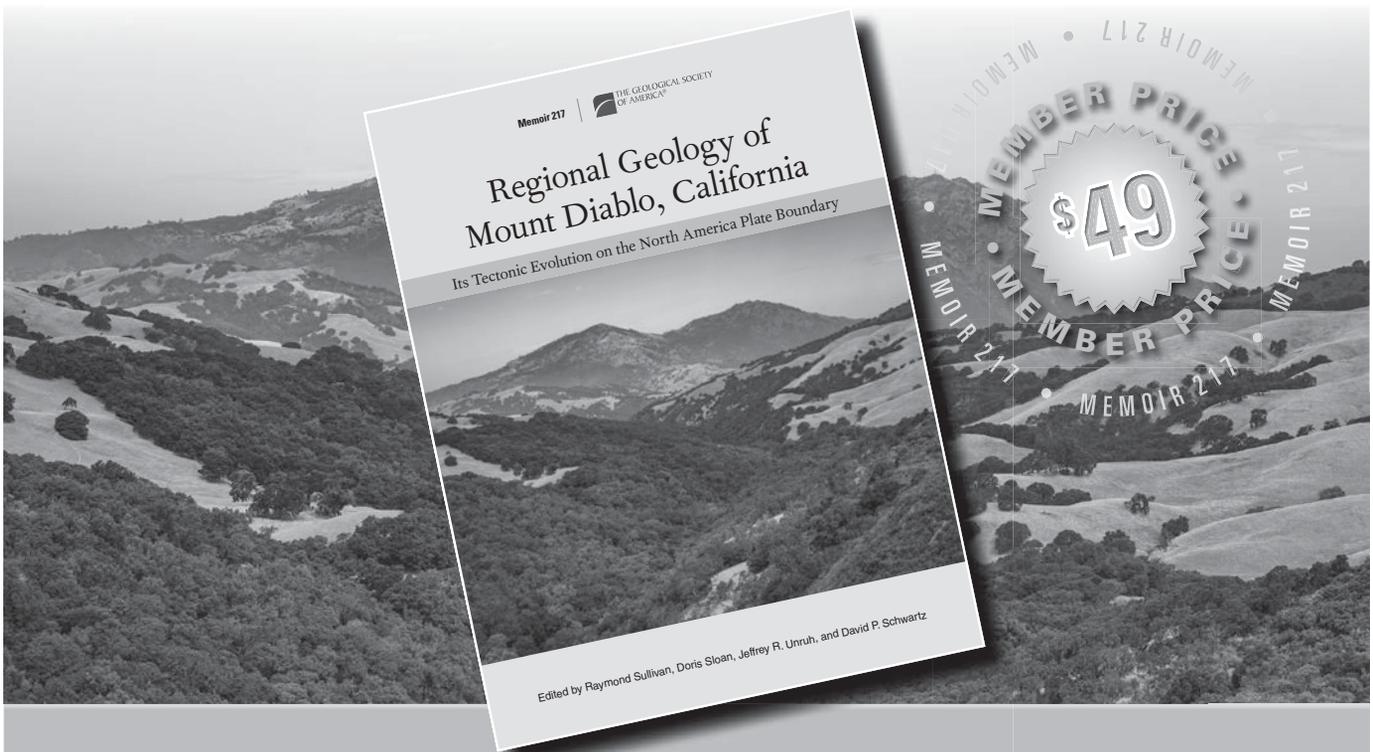
Regional Geology of Mount Diablo, California

Its Tectonic Evolution on the North America Plate Boundary

Edited by Raymond Sullivan, Doris Sloan, Jeffrey R. Unruh, and David P. Schwartz

Mount Diablo and the geology of the Central California Coast Ranges are the subject of a volume celebrating the Northern California Geological Society's 75th anniversary. The breadth of research illustrates the complex Mesozoic to Cenozoic tectonic evolution of the plate boundary. Recent faulting and folding along the eastern edge of the San Andreas system have exposed in the mountain a core of Franciscan accretionary wedge complex faulted against Cretaceous and Cenozoic forearc strata. The Memoir includes papers on structure, stratigraphy, tephrochronology, zircon provenance studies, apatite fission track analyses, and foraminifera and calcareous plankton assemblages tied to Cenozoic climate events. Chapters also address the history of geologic work in the area and the resource development of oil and gas, mercury, coal, and sand, and road aggregate.

MWR217, 472 p. + insert, ISBN 9780813712178 | list price \$70.00 | **member price \$49.00**



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General Information



The 2022 GSA Cordilleran and Rocky Mountain Joint Section Meeting is a *Rendezvous at the Geologic Crossroads* of the Cordillera, Great Basin, and Colorado Plateau, in Las Vegas, Nevada. The meeting is being held on the University of Nevada, Las Vegas campus, with easy access to museums, restaurants, shopping, and the neon metropolis of the Las Vegas strip. Las Vegas is pleasantly warm and dry in March, and it's a perfect time to explore the city, as well as the world class geology in nearby Red Rock Canyon National Conservation Area, Valley of Fire State Park, Lake Mead National Recreation Area, the Mojave Preserve, and Death Valley National Park. A diverse array of technical sessions, field trips and short courses highlight the exceptional regional geology including the Neoproterozoic-Paleozoic rift to passive margin stratigraphy, Mesozoic arc and retroarc histories and processes, and the magmatic, sedimentologic, and tectonic record of large magnitude Cenozoic extension. Additionally, current concerns of arid zone hydrogeology, drought science and paleoclimatology, and emerging technologies and mining demands for low CO₂ energy solutions are featured. We welcome you to the scenic Mojave Desert and exciting Las Vegas!

Venue

The meeting location is the University of Nevada Las Vegas (UNLV) campus (Figs. 1 and 2). Registration, student mentor events, posters and exhibits, and the speaker ready room will be on the second floor of the Student Union (Fig. 3). Oral technical sessions will be held in the Classroom Building Complex A (CBC-A) and in Wright Hall, close to the Student Union (Figs. 1 and 2). The evening banquet and reception events will be held in the Marietta-Tiberti Grand Hall in the Richard Tam Alumni Center. Location maps (Figs. 2 and 3) for the meeting facilities on the UNLV campus are provided on page 15. Field trips depart from the Embassy Suites by Hilton Las Vegas, 4315 S. University Center Drive, Las Vegas, NV 89119 (see Field Trips on pages 8, 16, and 20 for details). Short courses will be in the Science and Engineering Building (SEB, Fig. 2), adjacent to the Cottage Grove Parking Garage.

Accommodations

We strongly encourage meeting participants to reserve rooms at Embassy Suites by Hilton Las Vegas, 4315 S University Center Dr, Las Vegas, NV 89119, USA, within walking distance to the meeting location on the UNLV campus. Reservations can be made by calling +1-800-362-2779.

Transportation

The UNLV campus is located 3 kilometers from McCarran International Airport, which services Las Vegas. McCarran International Airport is a major airport with a variety of flight options. Transportation from the airport to hotel can be found either via taxi or rideshare. Rideshare providers Lyft and Uber

have pickup locations at Terminal 1 and Terminal 3. If flying into Terminal 1, rideshare pickup is on level 2 of the parking garage. For Terminal 3, rideshare pickup is on the Valet level of the parking garage.

Parking

Free parking is available at Embassy Suites by Hilton Las Vegas for registered guests associated with the conference. Free parking is available on the UNLV campus during the conference in spaces marked for student parking (not faculty-staff parking spaces). Student parking areas closest to the meeting venue are the Cottage Grove parking garage, the Tropicana parking garage, and the L parking lot (Fig. 1).

Weather

March brings sunny, warm weather and blue skies to Las Vegas and the Mojave Desert, with average high/low temperatures of 70/49 °F, 21/10 °C. Record high/low temperatures are 92/19 °F, 33/-7 °C. You will likely enjoy 12 hours of sunshine, as on average there is ~13 mm of rainfall over five days in March and the average relative humidity is ~31%. Light winds are possible with average speeds of ~8-12 mph.

Dining

Las Vegas offers an extensive variety of eateries, bars, and coffee houses within walking distance of the UNLV campus and Embassy Suites by Hilton Las Vegas Hotel. Lunch eateries can be found along Maryland Parkway on the east side of the UNLV campus, and in crossroads areas of University Center Drive, Harman Avenue, and Paradise Road by the Embassy Suites by Hilton Las Vegas, with limited food available at the Student Union. Walking distance dinner venues can be found along Flamingo Road, both east and west of Paradise Road, and along Paradise Road, north of Flamingo Road. A variety of excellent Asian restaurants, attractive to all budgets, can be found a short drive (4 miles) away in Chinatown, along Spring Mountain Road between Valley View and Jones. The Embassy Suites by Hilton Las Vegas serves a complimentary breakfast, made to order, for all guests.

Geology of Las Vegas, Nevada environs

Las Vegas is uniquely located at the *Geologic Crossroads* of the Cordillera, Great Basin, and Colorado Plateau. Travel in any direction and you encounter world-class geology showcased across striking desert landscapes. To the north are the Tule Springs Fossil Beds National Monument that contain the annals of a Pleistocene wetlands that were home to ancient Columbian mammoth, dire wolves, and giant ground sloths. Directly east is Frenchman Mountain that is a translated remnant of Colorado Plateau stratigraphy complete with the Great Unconformity delineated by tilted Cambrian Tapeats Sandstone overlying Paleoproterozoic Vishnu Schist. Further east is Lake Mead outlined in

white bathtub rings emphasizing historically low water levels, which is a constant reminder of the fragile hydrogeologic system of this oasis in the desert. South of the Hoover dam lies the parallel north-south trending ranges of the Colorado River Extensional Corridor that stretch across the Mojave and Sonoran deserts. This region features type localities of low-angle detachment faulting driven by early Basin and Range extension, which deformed a thick sequence of Miocene volcanic and sedimentary rock that override exhumed footwalls of Paleoproterozoic metamorphic basement and Miocene plutonic rocks. Western Las Vegas is walled by the world-famous Keystone Thrust system that places Cambrian Bonanza King Formation carbonates over the fire red eolian sandstones of the Jurassic Aztec Formation. These Cretaceous structures were once the frontal thrusts of the Cordilleran orogenic system. Westward, Death Valley National Park preserves a rich Mesoproterozoic to Cambrian stratigraphic record that captures interactions between climate and life during the growth and decay of the Rodinia supercontinent, that is exceptionally exposed due to overprinting Mesozoic shortening and Cenozoic transtension. The GSA 2022 Joint Cordilleran & Rocky Mountain Sections Meeting is pleased to offer Technical, Discipline, and Symposia Sessions, Field Trips, and Short Courses that encompass the breadth of geology, tectonics, sedimentology, geomorphology, hydrogeology, paleoclimatology, and igneous processes of the western US and Las Vegas, Nevada environs.

REGISTRATION

Registration is required for anyone attending technical sessions, field trips, short courses, or exhibits. Check-in and on-site registration are in the UNLV Student Union foyer, located outside of the ballrooms on the second floor. Badges will be available to pick up at the Welcome Reception from 5–7 p.m. at the Embassy Suites by Hilton Las Vegas for those who are pre-registered only. On-site registration will start on Tuesday morning, 15 March at the UNLV Student Union, and is open during the following times:

- Tuesday, 15 March 7 a.m.–5:30 p.m.
- Wednesday, 16 March 7 a.m.–5:30 p.m.
- Thursday, 17 March 7 a.m.–noon

Fees

On-site registration fees are represented below in U.S. dollars:

Standard Rates	Full Mtg.	One Day
Professional Member	\$335	\$270
Professional Senior Member 70+	\$230	\$170
Professional Senior Member 65+	\$335	\$270
Professional Nonmember	\$390	\$285
Early Career Professional Member	\$300	\$240
Student Member	\$140	\$110
Student Nonmember	\$175	\$120
K–12 Professional	\$135	\$90
Guest or Spouse	\$80	\$75
Field Trip/Short Course Only	\$25	n/a

*70 years of age or older, and a member for 30 or more years

**65 years of age or older, and a member for 25 or more years

Guest registration is intended for non-geoscientists accom-

panying a registered professional, student or K–12 professional. Guest registration does not include attendance at technical sessions. All guests, volunteers, exhibitors, GSA staff, service providers and others in attendance are expected to abide by the GSA Events Code of Conduct, which outlines specific expectations for participants at GSA-supported events.

Cancellations, Changes, Refunds

All requests for additions, changes, and cancellations must have been made in writing to GSA headquarters and received by 22 February 2022. There will be no refunds for cancellations received after this date.

Meeting App and Abstracts

A web-based app is available for this meeting. This app allows you to view and search the meeting program and create your own schedule of events to attend. You can also view the full abstracts text from this app. Please download the app at <https://gsa.confex.com/gsa/2022CD/meetingapp.cgi>.

Accessibility

GSA is committed to ensuring full participation for all conference attendees. The UNLV Student Union has automatic external doors and elevators with access to the second floor. Classrooms in the CBC-A used for some oral sessions are wheelchair accessible.

You may indicate special requirements on your registration form; please inform the local organizing committee of these requirements at least one month prior to the meeting.

Continuing Education Credits (CEU)

The Cordilleran-Rocky Mountain Joint Section Meeting offers an excellent opportunity to earn CEUs toward your continuing education requirements for your employer, K–12 school or professional registration. Please check the meeting website after the meeting to download your CEU certificate.

DAILY EVENTS

Monday, 14 March

Welcome Reception, 5–7 p.m., Embassy Suites by Hilton Las Vegas Atrium. Enjoy complimentary light snacks and beverages while connecting with your colleagues.

Tuesday, 15 March

GSA Rocky Mountain Section Management Board Meeting, 7–8 a.m., Embassy Suites by Hilton Las Vegas Atrium.

Session Chair Orientation, 7–7:15 a.m., Wright Hall 148. This meeting will include a review of session time management, AV procedures, and other information affecting the conduct of the day's sessions.

Coffee Break, 9:30–10:30 a.m., UNLV Student Union foyer.
Posters and Exhibits Reception, 4–6 p.m., Student Union Ballroom A/B. Enjoy complimentary light snacks and beverages while visiting the poster and exhibit hall.

Remembrance Reception for Paul J. Umhoefer, 6–7:30 p.m., Marietta Tiberti Grand Hall, Richard Tam Alumni Center, UNLV. Please join us to celebrate the incredible life and career of Paul J. Umhoefer, who passed away 24 November

2021. This casual event will allow Paul's friends to share some fond memories and reflect on his tremendous research career, including his valuable service and leadership to the Cordilleran Section and the Structural Geology and Tectonics Division of GSA. Please send your favorite 1 or 2 photographs of Paul to Scott Bennett (sekbennett@usgs.gov) to be included in a slideshow that will be shown during the event. A cash bar is available.

Wednesday, 16 May

Session Chair Orientation, 7–7:15 a.m., Wright Hall 148. This meeting will include a review of session time management, AV procedures, and other information affecting the conduct of the day's sessions.

GSA Cordilleran Section Management Board Meeting, 7–8 a.m., Embassy Suites by Hilton Las Vegas Atrium.

GeoCareers Workshop Part 1: Career Planning and Networking, 9–10 a.m., 208AB Student Union. Your job hunting process should begin with career planning, not when you apply to jobs. This workshop will help you begin this process and will help you practice your networking skills. This section is highly recommended for freshmen, sophomores, and juniors. The earlier you start your career planning the better.

Coffee Break, 9:30–10:30 a.m., UNLV Student Union foyer.

GeoCareers Workshop Part 2: Geoscience Career Exploration, 10–11 a.m., Student Union Meeting Room 208AB. 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 professionals in the field will address these issues.

Roy J. Shlemon Mentor Program in Applied Geoscience, noon–1:30 p.m., Student Union Meeting Room 208AB. GSA student members will have the opportunity to discuss career prospects and challenges with applied geoscientists from various sectors over a free lunch.

Geology Club Meet-Up, 2–3 p.m., Student Union Meeting Room 208AB. Chat with other representatives about their activities, goals, and accomplishments.

Posters and Exhibits Reception, 4–6 p.m., Student Union Ballroom A/B. Enjoy complimentary light snacks and beverages while visiting the poster and exhibit hall.

GSA Joint Cordilleran and Rocky Mountain Sections Business Meeting, 5–6 p.m., Student Union Meeting Room 211.

Recognition Banquet, 7–10 p.m., Marietta Tiberti Grand Hall, Richard Tam Alumni Center, UNLV. Join the celebrations of the careers of Clark Burchfiel, Gregory Davis, César Jacques-Ayala, Ernest Anderson, Les McFadden, and Grant Meyer. Dinner and some beverages included. Fee: \$65.

Thursday, 17 March

Session Chair Orientation, 7–7:15 a.m., Wright Hall 148. This meeting will include a review of session time management, AV procedures, and other information affecting the conduct of the day's sessions.

GeoCareers Workshop Part 3: Cover Letters, Résumés and CV's, 9–10 a.m., Student Union Meeting Room 208AB. How do you prepare a cover letter? Does your résumé need a good edit? Whether you are currently in the market for a job or not, learn how to prepare the best résumé possible. You will

review numerous résumés to help you to learn important résumé dos and don'ts.

Coffee Break, 9:30–10:30 a.m., UNLV Student Union foyer.

John Mann Mentors in Applied Hydrogeology, noon–1:30 p.m., Student Union Meeting Room 208AB. GSA student members interested in applied hydrogeology or hydrology as a career will have the opportunity to network with professionals in these fields over a free lunch.

Posters and Exhibits Reception, 4–6 p.m., Student Union Ballroom A/B. Enjoy complimentary light snacks and beverages while visiting the poster/exhibit hall.

BUSINESS MEETINGS

GSA Cordilleran Section Management Board Meeting, Wednesday, 16 March, 7–8 a.m., Embassy Suites by Hilton Las Vegas Atrium.

GSA Rocky Mountain Section Management Board Meeting, Tuesday, 15 March, 7–8 a.m., Embassy Suites by Hilton Las Vegas Atrium.

GSA Joint Cordilleran and Rocky Mountain Sections Business Meeting, Wednesday, 16 March, 5–6 p.m., Student Union Meeting Room 211.

TECHNICAL PROGRAM

The Meeting's Technical Program consists of Theme and Discipline Sessions, as well as Symposia arranged in oral and poster sessions. The Technical Program begins at 8 a.m. and ends at 6 p.m. each day, Tuesday–Thursday, 15–17 March 2022. Please direct questions related to the following sessions to the Technical Program Chairs, Tomas Capaldi (tomas.capaldi@unlv.edu) and Dennis Newell (dennis.newell@usu.edu).

Oral Presentations

Oral presentations are 20 minutes; 17 minutes for the talk and 3 minutes for questions and discussion. Presentations must be prepared using PowerPoint or PDF formats, using a 16:9 screen ratio. One laptop with Windows (no Macs available) and PowerPoint, one LCD projector, and one screen will be available in each oral presentation room. In addition, each room is equipped with a lectern, microphone, slide advancer, and speaker timer.

Poster Presentations

Each poster board is 6 x 4 feet (landscape), and posters can be hung with pushpins. Posters are located in the Student Union Ballroom A/B adjacent to the exhibitors. Please check the Program for specific times and topics. Numbers on each poster display correspond to the poster booth numbers listed in the Program. Presenters are expected to have their posters up by 8:30 a.m. and they are expected to be present at their posters from 4–6 p.m. Presenters are expected to take down their posters at the end of the session. Any posters not taken down will be discarded.

Speaker Ready Room

The Speaker Ready Room is located in Student Union Meeting Room 209 and is available at the following times:

Monday, 14 March, 3–7 p.m.

Tuesday, 15 March, 6:30 a.m.–5:30 p.m.
Wednesday, 16 March, 6:30 a.m.–5:30 p.m.
Thursday, 17 March, 6:30 a.m.–noon

All oral presenters must visit the speaker ready room before their scheduled presentation to ensure their PowerPoint or PDF file is properly configured and to upload it to the correct session folder on the meeting computers. All presentations are displayed as PowerPoint presentations or PDF files in technical sessions, and presentations should be prepared using a 16:9 ratio. The Speaker Ready Room can also be used to check presentations prior to uploading files. We ask that oral presenters upload their presentation the night before for morning sessions, and at least 2 hours prior to the beginning of their session for afternoon sessions. Tuesday morning speakers should upload their talks by 7 a.m. on the same day.

Session Chair Orientations

Each Session Chair is requested to attend a 15 minute “Session Chairs Orientation” held in the 148 Wright Hall on 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 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.

Technical Program Sessions

Please see pages 12–14 for technical session schedule. Direct questions to the Technical Program Chairs: Tomas Capaldi (tomas.capaldi@unlv.edu) and Dennis Newell (dennis.newell@usu.edu).

FIELD TRIPS

Most field trips depart from the Embassy Suites by Hilton Las Vegas, 4315 S. University Center Drive, Las Vegas, NV 89119, with the exception of FT11 and FT12. For detailed information, please contact the Field Trip chairs: Carol Dehler (carol.dehler@usu.edu) and Ganqing Jiang (ganqing.jiang@unlv.edu).

Pre-Meeting

FT1. Cretaceous Plutonic Rocks of the Mojave Desert: Markers of Subduction Dynamics. Sat.–Mon., 12–14 March. Check in Sat., 12 March at 7:30 a.m., at the Embassy Suites by Hilton Las Vegas. Trip departs at 8 a.m. Cost: \$380 (includes box lunches and snacks all three days; overnight single-occupancy lodging in Barstow Saturday and Sunday nights; field guide; roundtrip transportation from UNLV to field sites. Does not include dinners). Nicholas J. Van Buer, Rita C. Economos, David M. Miller, Keith A. Howard, and Calvin F. Miller.

This three-day field trip investigates how temporal and spatial changes in intrusive styles and compositions of Cretaceous plutons reflect the complex tectonic history of the Mojave Desert, which straddles the craton boundary and experienced more significant post-80 Ma lithospheric disruption than the flanking Sierra Nevada and Peninsular Ranges batholiths.

FT2. Geologic Highlights of Death Valley National Park. Sat.–Mon., 12–14 March. Check in Sat., 12 March at 11 a.m., at the Embassy Suites by Hilton Las Vegas. Trip departs promptly at 11:30 a.m. Cost: \$510 (includes round-trip transportation from Las Vegas to field sites; 2 nights lodging at Motel 6 in Beatty, Nevada; lunch on 13th and 14th; water and snacks; National Park entry fees. Not covered: lunch on the 12th; 2 breakfasts and 2 dinners; guidebook). Allen F. Glazner, Arthur G. Sylvester, and Nathan Niemi.

This field trip showcases some of the geologic wonders of Death Valley National Park, with emphasis on Mesozoic–Cenozoic deformation, desert geomorphology, and the pluvial environment. Stops include Titus Canyon, Mosaic Canyon, Gower Gulch, Badwater, and several spectacular low- and high-angle normal faults. The trip involves moderate hiking over easy terrain.

FT3. Miocene Extension and Magmatism in the Northern Colorado River Extensional Corridor. Sat.–Mon., 12–14 March. Check in Sat., 12 March at 7 a.m., at the Embassy Suites by Hilton Las Vegas. Trip departs at 7:30 a.m. Cost: \$615 (includes Roundtrip transportation from UNLV to field sites; box lunch and snacks for all three days; overnight lodging on Saturday in Boulder City and on Sunday in Laughlin; field guide. Not included: breakfasts and dinners). Phillip B. Gans and Evan Monroe.

This trip explores the history of Miocene extension and magmatism in the northern Colorado River Extensional Corridor. Key themes include the geometry and kinematics of normal faulting, the character of closely associated volcanism and plutonism, and the complex interplay between the two within the context of a propagating continental rift.

FT4. The Cryogenian Kingston Peak Formation. Sat.–Mon., 12–14 March. Check in Sat., 12 March at 7:30 a.m., at the Embassy Suites by Hilton Las Vegas. Trip departs promptly at 8 a.m. Cost: \$597 (includes Roundtrip transportation from Las Vegas to field sites; Field guidebooks; Park entrance fees; Meals in the field provided by trip leaders. Not included: tent, sleeping bag, sleeping pad, personal camping gear, and field gear). Lyle Nelson and Emmy Smith.

The Kingston Peak Formation of Death Valley is notorious for its stratigraphic record of Neoproterozoic rifting and Cryogenian Snowball Earth glaciations. We are examining the complex intraformational stratigraphic relationships of this unit in the Panamint Range and southeastern Death Valley, as well as discuss its geochronology and chemostratigraphy. This trip requires personal camping gear and strenuous hiking.

FT5. Cenozoic Vertebrate Paleontology and Depositional Environments of Death Valley National Park, California. Sat.–Sun., 12–13 March. Check in Sat., 12 March at 8:30 a.m., at the Embassy Suites by Hilton Las Vegas. Trip departs at 9 a.m.

Cost: \$415 (includes transportation to UNLV to field sites; lunch and dinner on Day 1; one overnight stay in a hotel in Beatty, Nevada; lunch on Day 2; Snacks and water throughout the trip). Torrey Nyborg and Bruce Lander.

Two-day field trip to survey Cenozoic fossil vertebrate-bearing strata of Death Valley National Park. Trip includes a one-day hike to study vertebrate tracks and associated sedimentary structures and a second day driving along Titus Canyon Road to examine the fossil land-mammal-bearing interval of the Titus Canyon Formation and discuss various aspects of late Duchesnean Titus Canyon Fauna. There is limited hiking so participants should wear good hiking shoes and be able to be outdoors for an extended period of time.

FT6. Microbialites Right under Our Noses: A Trip to the Miocene Lakes of Northern Lake Mead. *Endorsed by GSA Limnogeology Division and GSA Geobiology and Geomicrobiology Division.* Sun.–Mon., 13–14 March. Check in on Sun., 13 March at 8 a.m., at the Embassy Suites by Hilton Las Vegas. Trip departs at 8:30 am. Cost: \$205 (includes Lunch, snacks, and drinks for both field days. Not included: hotel, breakfast, dinner – return to the conference area for both days). Thomas Hickson and Melissa Lamb.

On this trip you will examine the Lower Pahranaagat Lake, a potential analogue for a carbonate-rich lacustrine depositional system with a microbial signature. We will then investigate Miocene lacustrine microbialites that have exceptional textural and morphological diversity. The combination of a detailed carbon and oxygen isotope database and very well-constrained litho- and chronostratigraphic basin architecture will provide you the opportunity to examine these mostly stromatolitic and thrombolitic biosedimentary structures in unique ways. The trip includes a couple of hikes over rough terrain that could be strenuous for some participants. A box lunch is included but lodging is not included in the price.

FT8. Landslide Deposits and Mechanisms in the Eastern Spring Mountains, Nevada. Mon., 14 March. Check in at 7 a.m., at the Embassy Suites by Hilton Las Vegas. Trip departs at 7:30 a.m. Cost: \$120 (includes lunch, snacks, transportation, and field guide). Daniel M. Sturmer.

This one-day field trip visits rock avalanche (Blue Diamond, La Madre) and gravity glide (Red Rock Wash, Lone Mountain) landslide deposits sourced from the eastern Spring Mountains in the western Las Vegas Valley. We are investigating deposit textures and discussing how these textures relate to hypothesized emplacement mechanism(s).

FT9. Geology of Frenchman Mountain and Rainbow Gardens. Mon., 14 March. Check in at 7:30 a.m., at the Embassy Suites by Hilton Las Vegas. Trip departs promptly at 8 a.m. Cost: \$75 (includes transportation, box lunch, snacks, water, and an offprint copy of the field guide). Steve Rowland.

Frenchman Mountain, which is the westernmost cratonal section at the latitude of Las Vegas, provides excellent exposures of Paleozoic strata. Rainbow Gardens, immediately east of Frenchman Mountain, exposes Permian, Mesozoic, and Cenozoic strata, including Miocene debris flow deposits from the Gold

Butte area, ~60 km away. At Frenchman Mountain, participants examine exposures of Proterozoic crystalline basement rocks, the range-front Frenchman fault, the Great Unconformity, and the Cambrian Tonto Group (with special emphasis on the recently named Frenchman Mountain Dolostone). In Rainbow Gardens, participants examine evidence for Miocene extension within the Horse Spring Formation, as well as sedimentary features within the Oligocene/Miocene Rainbow Gardens Formation.

Post-Meeting

FT11. Geology and Paleontology of Tule Springs Fossil Beds National Monument. Fri., 18 March. Meet at the corner of North Aliante Parkway and Horse Drive in North Las Vegas, 8 a.m., Fri., 18 March. Participants will carpool into the monument in high clearance vehicles. Cost: \$40 (includes a boxed lunch, water, snacks and the field guide). Kathleen Springer, Jeff Pigati, and Eric Scott.

The Tule Springs Fossil Beds National Monument preserves the hydrologic and climatic history of the Las Vegas Valley in its extensive middle Pleistocene to early Holocene paleospring deposits. The sequence records dynamic ecosystem responses in temporal sync with globally abrupt climate oscillations, including centuries-long megadroughts, and entombs a uniquely significant vertebrate megafauna. Moderate hiking. Transportation is not included in the pricing for this trip. Participants will meet at a designated spot near the national monument and carpool in.

FT12. Structure, Metamorphism, and Geodynamic Significance of the Catalina Schist Terrane. Fri.–Sun., 18–20 March. Check in Fri., 18 March at 10:30 a.m. at the Southern California Marine Institute, 820 South Seaside Avenue, Terminal Island, California 90731. The boat departs promptly at 11 am. Cost: \$880 (includes boat and bus transportation; dormitory accommodation for 18 and 19 March; picnic lunches; snacks; breakfast and dinner at the Wrigley Institute). John Platt and Marty Grove.

The Catalina Schist records Mesozoic accretionary tectonics in southern California, including successive underplating of oceanic rocks, with grade decreasing over time from upper amphibolite to blueschist facies. Ductile deformation, mélange fabrics, and metasomatism may reflect seismic tremor and slow slip in rocks exhumed from 35–50 km depth. We will be doing some hiking on trails and in canyons that are steep and rocky, and cactus and spiky vegetation pose a hazard. Good walking boots and tough outer garments are essential. This trip starts at the Southern California Marine Institute.

FT13. The Buckskin-Rawhide and Northern Plomosa Mountains Metamorphic Core Complexes, West-Central Arizona. Fri.–Sun., 18–20 March. Check in Fri., 18 March at 7 a.m. at the Embassy Suites by Hilton Las Vegas. Trip departs at 7:30 a.m. Cost: \$480 (includes roundtrip transportation from Las Vegas; 2 nights of lodging at a hotel in Parker; snacks and water during the field trip. Not included: meals during the field trip period; lodging in Las Vegas the night of March 17 and 21). John Singleton and Nikki Seymour.

This trip will transect core complexes in the Plomosa and

Buckskin Mountains. Topics include exhumation and deformation of the Orocopia Schist, relations between early Miocene magmatism and extension, strain localization in metasedimentary rocks, and the timing, kinematics, and magnitude of displacement across the detachment fault systems. Includes moderately strenuous hiking.

FT14. Unraveling the Multi-Phase History of Southern Death Valley Geology. Fri.–Sat., 18–19 March. Check in on Fri., 18 March at 7:30 a.m. at the Embassy Suites by Hilton Las Vegas. Trip departs at 8 am. Cost: \$585 (includes lodging; field snacks, lunch and dinner for 3/18; breakfast, lunch, and dinner for 3/19). Zachariah Fleming, Terry Pavlis, and Ghislain Trullenque.

The field trip will showcase the current understanding of Death Valley geology, in particular, research that has improved our understanding of extensional and strike-slip faulting in the region. Evidence for multiple phases of normal faulting in the southern Death Valley region, based on recent mapping, will be shown in the outcrops of the Ibex Hills, where there is a structural stack of currently low-angle normal faults, cross-cut by higher angle normal and strike-slip faults. Further south and east, there will be stops within the adjacent tertiary basin to look at the basin stratigraphy and the differences seen from areas along the Ibex Hills, to those east, along the northern flank of the Saddle Peak Hills in Ibex Pass. The second day will highlight recent work along the Southern Death Valley Fault Zone; specifically, in areas of the Avawatz Mountains and Noble Hills. Here, we will see key relationships that tie the rocks of the Noble Hills to the Owlshhead Mountains, implying ~40 km of offset along the SDVfz. Final stops will be made in the Black Mountain turtlebacks to examine the implications of the previous stops, particularly for the displacement of the Panamint Mountains across the valley, by showing the high-grade metamorphic rocks within the Mormon Point turtleback. Additional context will be provided in the form of virtual models of outcrops in the Panamints. This field trip complements the technical session on new ideas regarding Death Valley geology. The stops will entail minor hiking on some unstable terrain.

SHORT COURSES

For detailed information, please contact the Short Course chair: Margo Odum (margaret.odum@unlv.edu).

SC1. Using the StraboSpot2 Digital Data System. Mon., 14 March, 8:30 a.m.–5 p.m. Science and Engineering Building, UNLV. Participants must meet in the ground floor atrium. Cost: \$25. Conveners: Doug Walker, University of Kansas, jdwalker@ku.edu; Nick Roberts, nmroberts@wisc.edu; Alex Lusk, alusk@wisc.edu; Basil Tikoff, University of Wisconsin, basil@geology.wisc.edu

This hands-on short course is designed to help practitioners use the StraboSpot2 digital data system. Participants learn the practicalities of using the StraboSpot2 application in the field, and how to upload offline maps, import drone images, and export data to other programs (including Stereonet) for display. Discussion of data structure and FAIR data standards will be discussed. Participants are encouraged to bring their own iPad, but iPads will be available for those who need one. The short

course includes a box lunch.

SC2. Critical Metal and Mineral Deposits: An Overview. *virtual only.* Mon., 14 March, 9 am–5 p.m., PDT. On Zoom or similar virtual meeting platform. Cost: \$10 students/\$50 all others. Convener: Simon Jowitt, University of Nevada Las Vegas, simon.jowitt@unlv.edu.

The critical metals and minerals are crucial to modern society, particularly with the coming need for low- and zero-CO₂ technology. Demand for these essential commodities is expected to rise sharply over the next few decades. This short course will outline what we know about the critical metals and minerals, their main hosting mineral deposits, and the challenges faced by the minerals industry relating to increased demand for these commodities. Online, 1 day.

SC3. OSL Dating Short Course: Essential Guide for Sampling and Dark Secrets Behind the Technique. *Endorsed by the GSA Geochronology Division and GSA Quaternary Geology and Geomorphology Division.* Mon., 14 March, 9 a.m.–5 p.m. Room 181/182, Desert Research Institute, 755 E Flamingo Rd, Las Vegas, NV 89119 (DRI). Participants must meet at the downstairs entrance and be escorted to the short course room. Cost: \$10. Convener: Tammy Rittenour, Utah State University, tammy.rittenour@usu.edu; Michelle Nelson, Utah State University; Shannon Mahan, US Geological Survey; Harrison Gray, US Geological Survey; Amanda Keen-Zebert, Desert Research Institute; Christina Neudorf, Desert Research Institute; and Kathleen Rodrigues, Desert Research Institute.

This short course will feature luminescence researchers and laboratory directors from Utah State University, the US Geological Survey, and the Desert Research Institute. Topics of discussion will include hands-on methods for sample collection and application of luminescence dating to geological and archaeological settings. The course also provides a primer on how the technique works and the nuts and bolts behind how the equivalent dose and dose rate are calculated, the two components of the age equation. Participants who wish to watch a demonstration of sample collection should attend the Tule Springs/Las Vegas Fm 1-day field trip (optional).

SC4. Practical PYTHON for Earth Scientists. *Endorsed by the Rocky Mountain Association of Geologists and the Colorado School of Mines Continuing & Professional Education Services.* Mon., 14 March, 9 a.m.–5 p.m. Science and Engineering Building, UNLV. Participants must meet in the ground floor atrium. Cost: \$50 students, \$400 all others. Convener: Matthew W. Bauer, PG; Colorado School of Mines & Sabata Energy Consultants; bauer@mines.edu.

Practical Python for Earth Scientists is a hands-on course intended to introduce basic concepts and give working examples of python code that can be used in daily geoscience workflows. No prior knowledge of python or other programming languages is necessary to attend this course.

SC5. Introduction to Inductively Coupled Plasma Mass Spectrometry. Mon., 14 March 9 a.m.–5 p.m. Science and Engineering Building, UNLV. Participants must meet in the

ground floor atrium. Cost: \$25. Conveners: Chris DeFelice, University of Nevada, Las Vegas, defelc1@unlv.nevada.edu; Shichun Huang, University of Nevada, Las Vegas, Shichun.huang@unlv.edu.

This short course offers an in-depth introduction to the use of inductively coupled plasma mass spectrometry (ICP-MS) for the analysis of geologic materials (solid and liquid). This course is designed for participants that have little to no experience in ICP-MS techniques, and highly encourages students with an interest in analytical geochemistry to attend.

STUDENT OPPORTUNITIES

Learn more about these opportunities at <https://www.geosociety.org/mentors/>.

Roy J. Shlemon Mentor Program in Applied Geoscience. Wed., 16 March, noon–1:30 p.m., Student Union Meeting Room 208AB. GSA student members will have the opportunity to discuss career prospects and challenges with applied geoscientists from various sectors over a FREE lunch. GSA student members will receive priority; any remaining space will be offered to student nonmembers on a first come, first served basis.

John Mann Mentors in Applied Hydrogeology Program. Thurs., 17 March, noon–1:30 p.m., Student Union Meeting Room 208AB. GSA student members interested in applied hydrogeology or hydrology as a career will have the opportunity to network with professionals in these fields over a FREE lunch. GSA student members will receive priority; any remaining space will be offered to student nonmembers on a first come, first served basis.

Geology Club Meet-Up. Wed., 16 March, 2–3 p.m., Student Union Meeting Room 208AB. Chat with other representatives about their activities, goals and accomplishments.

GeoCareers Workshop Series

GeoCareers Workshop Part 1: Career Planning and Networking. Wed., 16 March, 9–10 a.m., Student Union Meeting Room 208AB. Your job hunting process should begin with career planning, not when you apply to jobs. This workshop will

help you begin this process and will help you practice your networking skills. This section is highly recommended for freshmen, sophomores, and juniors. The earlier you start your career planning the better.

GeoCareers Workshop Part 2: Geoscience Career Exploration. Wed., 16 March, 10–11 a.m., Student Union Meeting Room 208AB. 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 professionals in the field will address these issues.

GeoCareers Workshop Part 3: Cover Letters, Résumés and CV's. Thur., 17 March, 9–10 p.m., Student Union Meeting Room 208AB. How do you prepare a cover letter? Does your résumé need a good edit? Whether you are currently in the market for a job or not, learn how to prepare the best résumé possible. You will review numerous résumés to help you to learn important résumé dos and don'ts.

Student Volunteers – Work opportunities may earn free registration. Students interested in volunteering must contact Pamela Burnley, pamela.burnley@unlv.edu.

Exhibits

Exhibits are located in the UNLV Student Union Ballroom C, on the second floor.

Set up: Monday, 14 March, 8 a.m.–4 p.m.

Open: Tuesday, 15 March, 8:30 a.m.–6 p.m.

Open: Wednesday, 16 March, 8:30 a.m.–6 p.m.

Open: Thursday, 17 March, 8:30 a.m.–4:30 p.m.

Tear down: Thursday, 17 March, 4:30–8 p.m.

Exhibitors (as of late February)

2023 Cordilleran Section Meeting

2023 Rocky Mountain Section Meeting

Utah State University, Department of Geosciences

University of Nevada Las Vegas, Department of Geosciences

Geological Society of America Bookstore

GSA Foundation

Technical Program Sessions

Tuesday, 15 March 2022			
Session	Time	Sponsor/Description	Location
1	9:30 AM	S1. Honorary Session for B. Clark Burchfiel and Gregory A. Davis for Their Seminal Contribution to the Modern Understanding of the North America Cordilleran Orogen I	CBC-A 106
2	8:00 AM	T13. Directly Dating Deformation, Metamorphism, and Metasomatism through Petrochronology I (<i>GSA Structural Geology and Tectonics Division; GSA Geochronology Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division</i>)	CBC-A 112
3	8:00 AM	T15. Records of Quaternary Paleoclimate in the Great Basin (<i>GSA Quaternary Geology and Geomorphology Division</i>)	CBC-A 108
4	8:00 AM	T18. Integrated Drought Science and Technology	CBC-A 110
5	8:30 AM	T7. Geology of Death Valley: Old versus New Ideas, Hypotheses, and Theories (Posters)	SU Ballroom A/B
6	8:30 AM	T15. Records of Quaternary Paleoclimate in the Great Basin (Posters) (<i>GSA Quaternary Geology and Geomorphology Division</i>)	SU Ballroom A/B
7	8:30 AM	T16. Quaternary Paleoclimate Records of the Rocky Mountain Region (Posters) (<i>GSA Quaternary Geology and Geomorphology Division</i>)	SU Ballroom A/B
8	8:30 AM	T18. Integrated Drought Science and Technology (Posters)	SU Ballroom A/B
9	8:30 AM	T27. Undergraduate Research (Posters) (<i>Council on Undergraduate Research Geosciences Division</i>)	SU Ballroom A/B
10	1:30 PM	S1. Honorary Session for B. Clark Burchfiel and Gregory A. Davis for Their Seminal Contribution to the Modern Understanding of the North America Cordilleran Orogen II	CBC-A 106
11	1:30 PM	T7. Geology of Death Valley: Old versus New Ideas, Hypotheses, and Theories	CBC-A 110
12	1:30 PM	T13. Directly Dating Deformation, Metamorphism, and Metasomatism through Petrochronology II (<i>GSA Structural Geology and Tectonics Division; GSA Geochronology Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division</i>)	CBC-A 112
13	1:30 PM	T16. Quaternary Paleoclimate Records of the Rocky Mountain Region (<i>GSA Quaternary Geology and Geomorphology Division</i>)	CBC-A 108
Wednesday, 16 March 2022			
Session	Time	Sponsor/Description	Location
14	8:00 AM	D3. Recent Advances in Hydrogeology of the Mountain West (<i>GSA Hydrogeology Division</i>)	WRI 144
15	8:00 AM	D4. Recent Advances in Paleontology, Paleoecology, and Paleoclimatology	WRI 148
16	8:00 AM	S3. The Tectono-Magmatic Evolution of the Basin and Range Province I: A Session in Honor of Ernie Anderson (<i>GSA Structural Geology and Tectonics Division</i>)	CBC-A 106
17	8:00 AM	S4. Science at the Intersection of Soils, Weathering, Geomorphology, Climate, Ecology and Wildfire—A Tribute to the Careers of Les McFadden and Grant Meyer (<i>GSA Quaternary Geology and Geomorphology Division</i>)	CBC-A 108
18	8:00 AM	T2. Neo-Insights into the Neoproterozoic of Western North America	CBC-A 112
19	8:30 AM	D1. Geoscience and STEM Education (Posters)	SU Ballroom A/B
20	8:30 AM	D2. Recent Advances in Geomorphology, Engineering Geology, and Environmental Geoscience (Posters)	SU Ballroom A/B
21	8:30 AM	D3. Recent Advances in Hydrogeology of the Mountain West (Posters) (<i>GSA Hydrogeology Division</i>)	SU Ballroom A/B

Wednesday, 16 March 2022			
Session	Time	Sponsor/Description	Location
22	8:30 AM	D4. Recent Advances in Paleontology, Paleocology, and Paleoclimatology (Posters)	SU Ballroom A/B
23	8:30 AM	S4. Science at the Intersection of Soils, Weathering, Geomorphology, Climate, Ecology and Wildfire—A Tribute to the Careers of Les McFadden and Grant Meyer (Posters) (<i>GSA Quaternary Geology and Geomorphology Division</i>)	SU Ballroom A/B
24	8:30 AM	T4. Cryptic and Slow-Moving Quaternary-Active Faults in the Western United States (Posters)	SU Ballroom A/B
25	8:30 AM	T9. Battery and Energy Metals: Mineral Potential of the Southwestern USA (Posters)	SU Ballroom A/B
26	1:30 PM	D2. Recent Advances in Geomorphology, Engineering Geology, and Environmental Geoscience	WRI 144
27	1:30 PM	S3. The Tectono-Magmatic Evolution of the Basin and Range Province II: A Session in Honor of Ernie Anderson (<i>GSA Structural Geology and Tectonics Division</i>)	CBC-A 106
28	1:30 PM	T1. Paleozoic Stratigraphy and Tectonics of the Southwestern Cordillera and Rocky Mountain Region (<i>GSA Sedimentary Geology Division; GSA Structural Geology and Tectonics Division</i>)	CBC-A 112
29	1:30 PM	T4. Cryptic and Slow-Moving Quaternary-Active Faults in the Western United States	CBC-A 108
30	1:30 PM	T9. Battery and Energy Metals: Mineral Potential of the Southwestern USA	WRI 148

Thursday, 17 March 2022			
Session	Time	Sponsor/Description	Location
31	8:00 AM	S2. Mesozoic–Cenozoic Tectonic History of Northwestern Mexico and Southwestern USA: A Tribute to César Jacques-Ayala for His Career and Contributions to Sonoran Geology	CBC-A 106
32	8:00 AM	T6. From the Sevier to Laramide: Connecting Hinterland to Foreland by Tectonics, Structure, and Sedimentation	CBC-A 112
33	8:00 AM	T12. Advances in Understanding Arc Magmatism in the Southwestern Cordillera I	CBC-A 108
34	8:00 AM	T14. Paleomagnetism, Rock Magnetism, Environmental Magnetism, Instrumentation, Archaeomagnetism, Planetary Magnetism, and Petrofabrics	CBC-A 110
35	8:30 AM	S2. Mesozoic–Cenozoic Tectonic History of Northwestern Mexico and Southwestern USA: A Tribute to César Jacques-Ayala for His Career and Contributions to Sonoran Geology (Posters)	SU Ballroom A/B
36	8:30 AM	S5. Celebrating the 50th Anniversary of the Department of Geoscience at University of Nevada, Las Vegas (Posters)	SU Ballroom A/B
37	8:30 AM	T3. Unraveling the History of the Rio Grande Rift: From Contraction to Extension and Evolution of the Rift (Posters)	SU Ballroom A/B
38	8:30 AM	T6. From the Sevier to Laramide: Connecting Hinterland to Foreland by Tectonics, Structure, and Sedimentation (Posters)	SU Ballroom A/B
39	8:30 AM	T12. Advances in Understanding Arc Magmatism in the Southwestern Cordillera (Posters)	SU Ballroom A/B
40	8:30 AM	T14. Paleomagnetism, Rock Magnetism, Environmental Magnetism, Instrumentation, Archaeomagnetism, Planetary Magnetism, and Petrofabrics (Posters)	SU Ballroom A/B
41	8:30 AM	T24. Sedimentary Record of Cordilleran Orogenic Systems (Posters) (<i>GSA Sedimentary Geology Division; GSA Geochronology Division; GSA Structural Geology and Tectonics Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; and GSA Quaternary Geology and Geomorphology Division</i>)	SU Ballroom A/B

Thursday, 17 March 2022			
Session	Time	Sponsor/Description	Location
42	1:30 PM	S5. Celebrating the 50th Anniversary of the Department of Geoscience at University of Nevada, Las Vegas	CBC-A 106
43	1:30 PM	T3. Unraveling the History of the Rio Grande Rift: From Contraction to Extension and Evolution of the Rift	CBC-A 110
44	1:30 PM	T12. Advances in Understanding Arc Magmatism in the Southwestern Cordillera II	CBC-A 108
45	1:30 PM	T24. Sedimentary Record of Cordilleran Orogenic Systems (<i>GSA Sedimentary Geology Division; GSA Geochronology Division; GSA Structural Geology and Tectonics Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; and GSA Quaternary Geology and Geomorphology Division</i>)	CBC-A 112

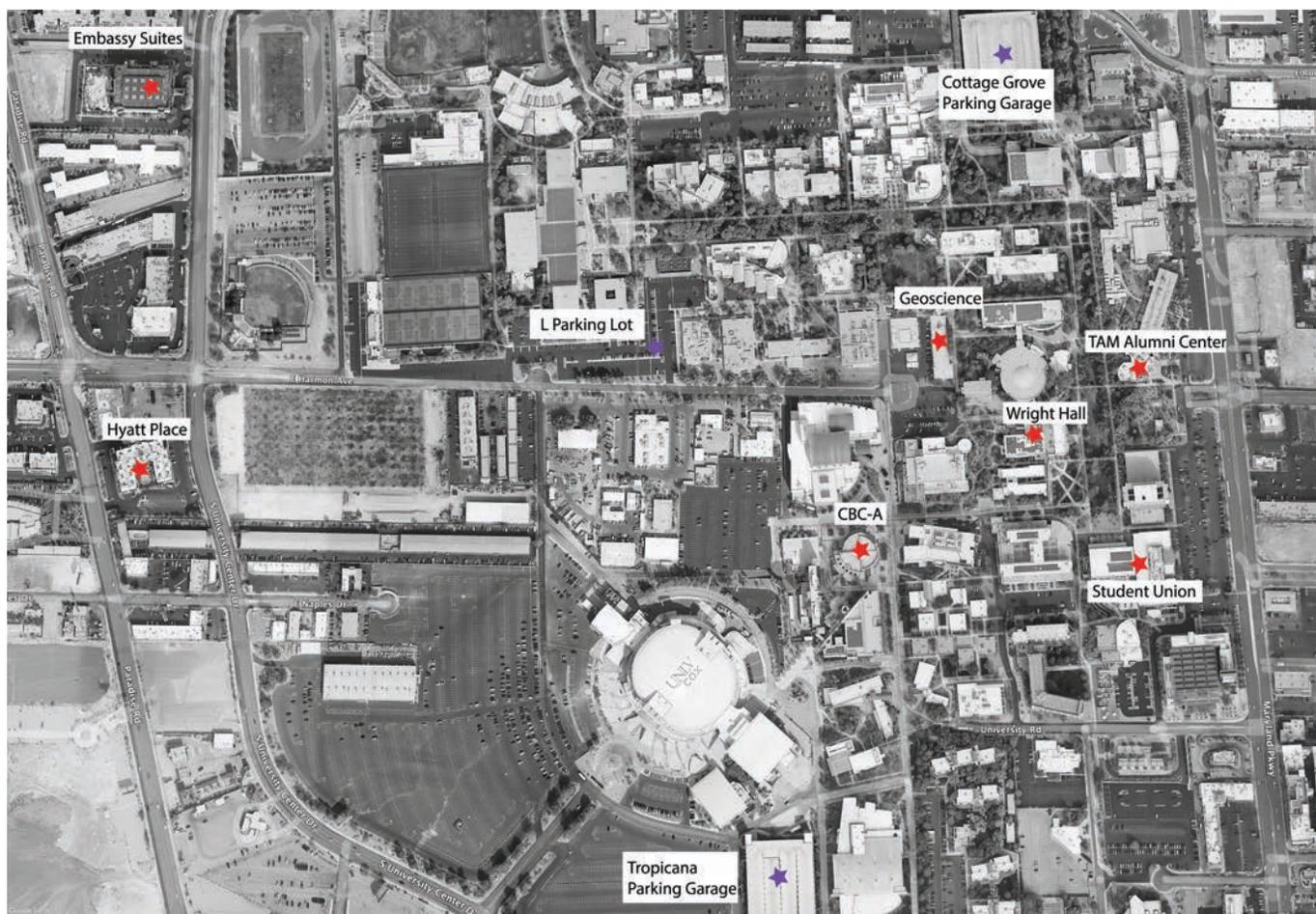


Figure 1. Google Satellite view of the UNLV Campus and meeting venue in the Student Union, Wright Hall, and CBC-A auditoriums. Free parking options (in student spaces) are in the Cottage Grove and Tropicana parking garages, Lot L and at Embassy Suites by Hilton Las Vegas. The Embassy Suites by Hilton Las Vegas conference hotel will host the Monday night welcome reception. The Tuesday evening remembrance reception and Wednesday night recognition banquet will be held in the TAM Alumni Center.



Figure 2. Enlargement of Google Satellite view of UNLV Campus and meeting venue.

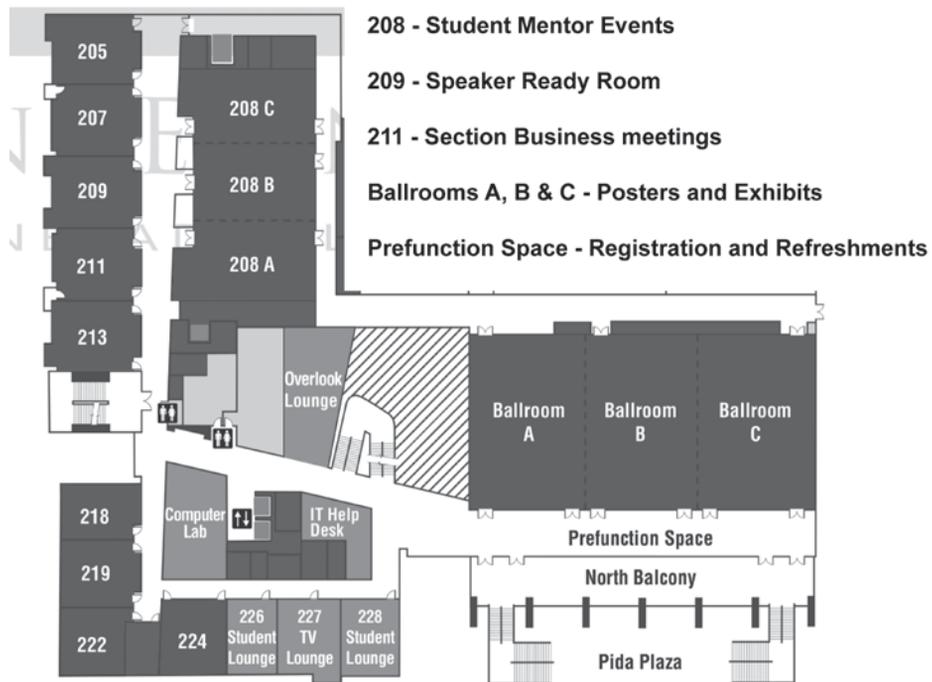


Figure 3: UNLV STUDENT UNION – 2ND FLOOR

Schedule of Events

CBC=Carol C. Harter Classroom Building Complex, UNLV

WRI=John S. Wright Hall Building, UNLV

EVENT	TIME	LOCATION
SATURDAY, 12 MARCH		
FT3. Miocene Extension and Magmatism in the Northern Colorado River Extensional Corridor Check In (Field Trip)	7–7:30 a.m.	Embassy Suites by Hilton Las Vegas
FT1. Cretaceous Plutonic Rocks of the Mojave Desert: Markers of Subduction Dynamics Check In (Field Trip)	7:30–8 a.m.	Embassy Suites by Hilton Las Vegas
FT4. The Cryogenian Kingston Peak Formation Check In (Field Trip)	7:30–8 a.m.	Embassy Suites by Hilton Las Vegas
FT5. Cenozoic Vertebrate Paleontology and Depositional Environments of Death Valley National Park, California Check In (Field Trip)	8:30–9 a.m.	Embassy Suites by Hilton Las Vegas
FT2. Geologic Highlights of Death Valley National Park Check In (Field Trip)	11–11:30 a.m.	Embassy Suites by Hilton Las Vegas
SUNDAY, 13 MARCH		
FT6. Microbialites Right under Our Noses: A Trip to the Miocene Lakes of Northern Lake Mead Check In (Field Trip)	8–8:30 a.m.	Embassy Suites by Hilton Las Vegas
MONDAY, 14 MARCH		
FT8. Landslide Deposits and Mechanisms in the Eastern Spring Mountains, Nevada Check In (Field Trip)	7–7:30 a.m.	Embassy Suites by Hilton Las Vegas
FT9. Geology of Frenchman Mountain and Rainbow Gardens Check In (Field Trip)	7:30–8 a.m.	Embassy Suites by Hilton Las Vegas
Exhibitor Set Up	8 a.m.–4 p.m.	Student Union Ballroom C
SC1. Using the StraboSpot2 Digital Data System (Short Course)	8:30 a.m.–5 p.m.	Science and Engineering Building, UNLV
SC2. Critical Metal and Mineral Deposits: An Overview VIRTUAL ONLY (Short Course)	9 a.m.–5 p.m.	Online Platform Link will be Provided to Registered Attendees
SC3. OSL Dating Short Course: Essential Guide for Sampling and Dark Secrets Behind the Technique (Short Course)	9 a.m.–5 p.m.	Desert Research Institute, 755 E Flamingo Rd, Room 181/182
SC4. Practical PYTHON for Earth Scientists (Short Course)	9 a.m.–5 p.m.	Science and Engineering Building, UNLV
SC5. Introduction to Inductively Coupled Plasma Mass Spectrometry (Short Course)	9 a.m.–5 p.m.	Science and Engineering Building, UNLV
Speaker Ready Room Open	3–7 p.m.	Student Union Meeting Room 209
Welcome Reception	5–7 p.m.	Embassy Suites by Hilton Las Vegas Atrium
TUESDAY, 15 MARCH		
Speaker Ready Room Open	6:30 a.m.–5:30 p.m.	Student Union Meeting Room 209
Session Chair Orientation	7–7:15 a.m.	WRI 148
GSA Rocky Mountain Section Management Board Meeting	7–8 a.m.	Embassy Suites by Hilton Las Vegas Atrium
Registration Open	7 a.m.–5:30 p.m.	Student Union Foyer

EVENT	TIME	LOCATION
Morning Oral Technical Sessions		
T13. Directly Dating Deformation, Metamorphism, and Metasomatism through Petrochronology I	8 a.m.–noon	CBC-A 112
T15. Records of Quaternary Paleoclimate in the Great Basin	8 a.m.–noon	CBC-A 108
T18. Integrated Drought Science and Technology	8 a.m.–noon	CBC-A 110
P1. Honorary Session for B. Clark Burchfiel and Gregory A. Davis for Their Seminal Contribution to the Modern Understanding of the North America Cordilleran Orogen I	9:30 a.m.–noon	CBC-A 106
Exhibits Open	8:30 a.m.–6 p.m.	Student Union Ballroom C
Coffee Break	9:30–10:30 a.m.	Student Union Foyer

Poster Sessions: authors present 4–6 PM

T7. Geology of Death Valley: Old versus New Ideas, Hypotheses, and Theories (Posters)	8:30 a.m.–6 p.m.	Student Union Ballroom A/B
T15. Records of Quaternary Paleoclimate in the Great Basin (Posters)	8:30 a.m.–6 p.m.	Student Union Ballroom A/B
T16. Quaternary Paleoclimate Records of the Rocky Mountain Region (Posters)	8:30 a.m.–6 p.m.	Student Union Ballroom A/B
T18. Integrated Drought Science and Technology (Posters)	8:30 a.m.–6 p.m.	Student Union Ballroom A/B
T27. Undergraduate Research (Posters)	8:30 a.m.–6 p.m.	Student Union Ballroom A/B

Afternoon Oral Technical Sessions

P1. Honorary Session for B. Clark Burchfiel and Gregory A. Davis for Their Seminal Contribution to the Modern Understanding of the North America Cordilleran Orogen II	1:30–5:30 p.m.	CBC-A 106
T7. Geology of Death Valley: Old versus New Ideas, Hypotheses, and Theories	1:30–5:30 p.m.	CBC-A 110
T13. Directly Dating Deformation, Metamorphism, and Metasomatism through Petrochronology II	1:30–5:30 p.m.	CBC-A 112
T16. Quaternary Paleoclimate Records of the Rocky Mountain Region	1:30–5:30 p.m.	CBC-A 108
Posters and Exhibits Reception	4–6 pm	Student Union Ballroom A/B
Remembrance Reception for Paul J. Umhoefer	6–7:30 p.m.	Marietta Tiberti Grand Hall, Richard Tam Alumni Center, UNLV

WEDNESDAY, 16 MARCH

Speaker Ready Room Open	6:30 a.m.–5:30 p.m.	Student Union Meeting Room 209
Session Chair Orientation	7–7:15 a.m.	WRI 148
GSA Cordilleran Section Management Board Meeting	7–8 a.m.	Embassy Suites by Hilton Las Vegas Atrium
Registration Open	7 a.m.–5:30 p.m.	Student Union Foyer

Morning Oral Technical Sessions

D3. Recent Advances in Hydrogeology of the Mountain West	8 a.m.–noon	WRI 144
D4. Recent Advances in Paleontology, Paleoecology, and Paleoclimatology	8 a.m.–noon	WRI 148

EVENT	TIME	LOCATION
T2. Neo-Insights into the Neoproterozoic of Western North America	8 a.m.–noon	CBC-A 112
P3. The Tectono-Magmatic Evolution of the Basin and Range Province I: A Session in Honor of Ernie Anderson	8 a.m.–noon	CBC-A 106
P4. Science at the Intersection of Soils, Weathering, Geomorphology, Climate, Ecology and Wildfire—A Tribute to the Careers of Les McFadden and Grant Meyer	8 a.m.–noon	CBC-A 108
Exhibits Open	8:30 a.m.–6 p.m.	Student Union Ballroom C
Coffee Break	9:30–10:30 a.m.	Student Union Foyer
GeoCareers Workshop Part 1: Career Planning and Networking (Workshop)	9–10 a.m.	Student Union Meeting Room 208AB
GeoCareers Workshop Part 2: Geoscience Career Exploration (Workshop)	10–11 a.m.	Student Union Meeting Room 208AB
Poster Sessions: authors present 4–6 PM		
D1. Geoscience and STEM Education (Posters)	8:30 a.m.–6 p.m.	Student Union Ballroom A/B
D2. Recent Advances in Geomorphology, Engineering Geology, and Environmental Geoscience (Posters)	8:30 a.m.–6 p.m.	Student Union Ballroom A/B
D3. Recent Advances in Hydrogeology of the Mountain West (Posters)	8:30 a.m.–6 p.m.	Student Union Ballroom A/B
D4. Recent Advances in Paleontology, Paleoecology, and Paleoclimatology (Posters)	8:30 a.m.–6 p.m.	Student Union Ballroom A/B
T4. Cryptic and Slow-Moving Quaternary-Active Faults in the Western United States (Posters)	8:30 a.m.–6 p.m.	Student Union Ballroom A/B
P4. Science at the Intersection of Soils, Weathering, Geomorphology, Climate, Ecology and Wildfire—A Tribute to the Careers of Les McFadden and Grant Meyer (Posters)	8:30 a.m.–6 p.m.	Student Union Ballroom A/B
T9. Battery and Energy Metals: Mineral Potential of the Southwestern USA (Posters)	8:30 a.m.–6 p.m.	Student Union Ballroom A/B
Roy J. Shlemon Mentor Program in Applied Geoscience	noon–1:30 p.m.	Student Union Meeting Room 208AB
Afternoon Oral Technical Sessions		
D2. Recent Advances in Geomorphology, Engineering Geology, and Environmental Geoscience	1:30–5:30 p.m.	WRI 144
T1. Paleozoic Stratigraphy and Tectonics of the Southwestern Cordillera and Rocky Mountain Region	1:30–5:30 p.m.	CBC-A 112
P3. The Tectono-Magmatic Evolution of the Basin and Range Province II: A Session in Honor of Ernie Anderson	1:30–5:30 p.m.	CBC-A 106
T4. Cryptic and Slow-Moving Quaternary-Active Faults in the Western United States	1:30–5:30 p.m.	CBC-A 108
T9. Battery and Energy Metals: Mineral Potential of the Southwestern USA	1:30–5:30 p.m.	WRI 148
Geology Club Meet-Up	2–3 p.m.	Student Union Meeting Room 208AB
Posters and Exhibits Reception	4–6 p.m.	Student Union Ballroom A/B

EVENT	TIME	LOCATION
GSA Joint Cordilleran and Rocky Mountain Sections Business Meeting	5–6 p.m.	Student Union Meeting Room 211
Recognition Banquet (Ticketed Event)	7–10 p.m.	Marietta Tiberti Grand Hall, Richard Tam Alumni Center, UNLV

THURSDAY, 17 MARCH

Speaker Ready Room Open	6:30 a.m.–noon	Student Union Meeting Room 209
Session Chair Orientation	7–7:15 a.m.	WRI 148
Registration Open	7 a.m.–noon	Student Union Foyer

Morning Oral Technical Sessions

P2. Mesozoic–Cenozoic Tectonic History of Northwestern Mexico and Southwestern USA: A Tribute to César Jacques-Ayala for His Career and Contributions to Sonoran Geology	8 a.m.–noon	CBC-A 106
T6. From the Sevier to Laramide: Connecting Hinterland to Foreland by Tectonics, Structure, and Sedimentation	8 a.m.–noon	CBC-A 112
T12. Advances in Understanding Arc Magmatism in the Southwestern Cordillera I	8 a.m.–noon	CBC-A 108
T14. Paleomagnetism, Rock Magnetism, Environmental Magnetism, Instrumentation, Archaeomagnetism, Planetary Magnetism, and Petrofabrics	8 a.m.–noon	CBC-A 110

Exhibits Open	8:30 a.m.–4:30 p.m.	Student Union Ballroom C
GeoCareers Workshop Part 3: Cover Letters, Résumés and CV's (Workshop)	9–10 a.m.	Student Union Meeting Room 208AB
Coffee Break	9:30–10:30 a.m.	Student Union Foyer

Poster Sessions: *authors present 4–6 PM*

P2. Mesozoic–Cenozoic Tectonic History of Northwestern Mexico and Southwestern USA: A Tribute to César Jacques-Ayala for His Career and Contributions to Sonoran Geology (Posters)	8:30 a.m.–6 p.m.	Student Union Ballroom A/B
T3. Unraveling the History of the Rio Grande Rift: From Contraction to Extension and Evolution of the Rift (Posters)	8:30 a.m.–6 p.m.	Student Union Ballroom A/B
P5. Celebrating the 50th Anniversary of the Department of Geoscience at University of Nevada, Las Vegas (Posters)	8:30 a.m.–6 p.m.	Student Union Ballroom A/B
T6. From the Sevier to Laramide: Connecting Hinterland to Foreland by Tectonics, Structure, and Sedimentation (Posters)	8:30 a.m.–6 p.m.	Student Union Ballroom A/B
T12. Advances in Understanding Arc Magmatism in the Southwestern Cordillera (Posters)	8:30 a.m.–6 p.m.	Student Union Ballroom A/B
T14. Paleomagnetism, Rock Magnetism, Environmental Magnetism, Instrumentation, Archaeomagnetism, Planetary Magnetism, and Petrofabrics (Posters)	8:30 a.m.–6 p.m.	Student Union Ballroom A/B
T24. Sedimentary Record of Cordilleran Orogenic Systems (Posters)	8:30 a.m.–6 p.m.	Student Union Ballroom A/B
John Mann Mentors in Applied Hydrogeology	noon–1:30 p.m.	Student Union Meeting Room 208AB

EVENT	TIME	LOCATION
Afternoon Oral Technical Sessions		
T3. Unraveling the History of the Rio Grande Rift: From Contraction to Extension and Evolution of the Rift	1:30–5:30 p.m.	CBC-A 110
P5. Celebrating the 50th Anniversary of the Department of Geoscience at University of Nevada, Las Vegas	1:30–5:30 p.m.	CBC-A 106
T12. Advances in Understanding Arc Magmatism in the Southwestern Cordillera II	1:30–5:30 p.m.	CBC-A 108
T24. Sedimentary Record of Cordilleran Orogenic Systems	1:30–5:30 p.m.	CBC-A 112
Posters and Exhibits Reception	4–6 p.m.	Student Union Ballroom A/B
Exhibitor Tear Down	4:30–8 p.m.	Student Union Ballroom C
FRIDAY, 18 MARCH		
FT13. The Buckskin-Rawhide and Northern Plomosa Mountains Metamorphic Core Complexes, West-Central Arizona Check In (Field Trip)	7–7:30 a.m.	Embassy Suites by Hilton Las Vegas
FT11. Geology and Paleontology of Tule Springs Fossil Beds National Monument Check In (Field Trip)	7:30–8 a.m.	Corner of North Aliante Parkway and Horse Drive, North Las Vegas
FT14. Unraveling the Multi-Phase History of Southern Death Valley Geology Check In (Field Trip)	7:30–8 a.m.	Embassy Suites by Hilton Las Vegas
FT12. Structure, Metamorphism, and Geodynamic Significance of the Catalina Schist Terrane Check In (Field Trip)	10:30–11 a.m.	Southern California Marine Institute

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

TUESDAY, 15 MARCH 2022

MORNING ORAL TECHNICAL SESSIONS

SESSION NO. 1

S1. Honorary Session for B. Clark Burchfiel and Gregory A. Davis for Their Seminal Contribution to the Modern Understanding of the North America Cordilleran Orogen I

9:30 AM, UNLV Classroom Building Complex A, CBC-A 106

An Yin and Brian Wernicke, Presiding

- 9:30 AM Yin, An; Wernicke, Brian*: **Introductory Remarks**
- 1-1 9:35 AM Schermer, Elizabeth*; Mulcahy, Sean; Cordova, Jeremy; Lang, Katherine E.: **SUBDUCTION COMPLEX ROCKS IN NW WASHINGTON: LINKING THE SUBDUCTION RECORD TO JURASSIC-CRETACEOUS OROGENIC EVENTS**
- 1-2 9:55 AM Gates, Katie*; Yoshinobu, Aaron S.: **THE ANATOMY OF A SHEAR ZONE: EVIDENCE FOR CONSTRICTIONAL DEFORMATION AND CRUSTAL THICKENING WITHIN THE NEVADAN-AGE CONDREY MOUNTAIN SHEAR ZONE**
- 1-3 10:15 AM Wakabayashi, John*: **ALONG-STRIKE VARIATION IN ACCRETION, NON-ACCRETION, AND SUBDUCTION EROSION, FRANCISCAN COMPLEX CALIFORNIA**
- 1-4 10:35 AM Welch, Robert*; Shaw, John H.: **KINEMATIC EVOLUTION OF THE FRONT RANGES OF THE CANADIAN ROCKIES INCLUDING THE ROLE OF FAULT PROPAGATION FOLD BREAKTHROUGHS AND MULTIPLE DETACHMENTS IN DEFINING THE THRUSTING SEQUENCE**
- 1-5 10:55 AM Borel, Megan*; Vogl, James J.: **BASEMENT-INVOLVED THRUST FAULT IN THE PIONEER METAMORPHIC**

CORE COMPLEX FOOTWALL: IMPLICATIONS FOR DEEP LEVELS OF THE SEVIER THRUST BELT, NEOPROTEROZOIC STRATIGRAPHY, AND CONTROLS ON EXTENSIONAL FAULT GEOMETRIES

- 1-6 11:15 AM Monroe, Evan*; Gans, Phillip: **MAGMATIC AND TECTONIC INTERACTIONS IN THE HINTERLAND OF THE SEVIER OROGEN: NEW INSIGHTS FROM THE DEEP CREEK RANGE AND KERN MOUNTAINS, EASTERN NEVADA**
- 11:35 AM **Discussion**

SESSION NO. 2

T13. Directly Dating Deformation, Metamorphism, and Metasomatism through Petrochronology I (GSA Structural Geology and Tectonics Division; GSA Geochronology Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division)

8:00 AM, UNLV Classroom Building Complex A, CBC-A 112

Margaret Odlum, Cailey Condit and Stacia M. Gordon, Presiding

- 8:00 AM **Introductory Remarks**
- 2-1 8:05 AM Moser, Amy*; Lusk, Alexander D.; Attia, Snir: **DATING DEFORMATION WITH TITANITE: AN EXAMPLE FROM CRETACEOUS SHEAR ZONES IN JOSHUA TREE NATIONAL PARK**
- 2-2 8:25 AM Gordon, Stacia*; Dektar, Emily C.; Blatchford, Hannah; Lim, Luz: **COMBINED ZIRCON PETROCHRONOLOGY AND MICROSTRUCTURAL ANALYSIS: INSIGHT INTO LONG-LIVED SHEAR ZONE ACTIVITY IN THE WESTERN GNEISS REGION, NORWAY**
- 2-3 8:45 AM Dietel, Matthew*; Miranda, Elena; Schwartz, Joshua; Klepeis, Keith A.: **IT'S ALL ABOUT PERSPECTIVE: USING NON-TRADITIONAL VORTICITY REFERENCE FRAMES**

- TO VIEW QUARTZ CRYSTALLOGRAPHIC PREFERRED ORIENTATIONS**
- 2-4 9:05 AM Brown, Virginia*; Miranda, Elena; Schwartz, Joshua; Klepeis, Keith: **INTEGRATING MICROKINEMATIC CRYSTALLOGRAPHIC VORTICITY AXIS (CVA) ANALYSIS AND PETROCHRONOLOGY TO INVESTIGATE THE TEMPORAL DEVELOPMENT OF FABRIC IN AN INTRA-ARC SHEAR ZONE, FIORDLAND, NEW ZEALAND**
- 2-5 9:25 AM Regan, Sean*; Marsh, Jeffrey; Waldien, Trevor; Holland, Mark; Suhey, Jane: **CLIMBING UP THE WALLS: OROGEN-SCALE INVERTED BARROVIAN METAMORPHISM DURING OBLIQUE CONVERGENCE ALONG A REACTIVATED SUTURE ZONE, NORTHERN CORDILLERA**
- 9:45 AM **Discussion**
- 10:00 AM **Break**
- 2-6 10:15 AM Möller, Andreas*; Berndt, Tyson; Walker, J. Douglas: **BEYOND ZIRCON: DATING METAMORPHISM AND DEFORMATION BY U-PB PETROCHRONOLOGY OF MONAZITE, APATITE AND GARNET IN A MEDIUM-GRADE METAMORPHIC SETTING**
- 2-7 10:35 AM Flansburg, Megan E.*; Stockli, Daniel F.: **DIRECTLY DATING COMPLEX DEFORMATION VIA STRUCTURALLY INTEGRATED MULTI-MINERAL U-PB PETROCHRONOLOGY AND (U-TH)/HE THERMOCHRONOLOGY (SE CALIFORNIA AND WEST-CENTRAL ARIZONA, USA)**
- 2-8 10:55 AM Armstrong, Emma*; Ault, Alexis; Kaempfer, Jenna; Guenther, William: **EXPANDING APPLICATIONS OF ZIRCON (U-TH)/HE THERMOCHRONOMETRY BY EVALUATING VISUAL METAMICTIZATION AS A RELIABLE PROXY FOR ACCUMULATED RADIATION DAMAGE**
- 11:15 AM **Discussion II**
- 11:35 AM **Concluding Remarks**

SESSION NO. 3

T15. Records of Quaternary Paleoclimate in the Great Basin (GSA Quaternary Geology and Geomorphology Division)

8:00 AM, UNLV Classroom Building Complex A, CBC-A 108

Matthew Lachniet, Brendon Quirk and Benjamin Laabs, Presiding

- 8:00 AM **Introductory Remarks**
- 3-1 8:05 AM Kirby, Matthew*; Knell, Edward; Dickey, Hank; Anderson, William T.; Leidelmeijer, Jenifer A.; Eeg, Holly; Arevalo, Andrea A.: **RE-VISITING LAKE MOJAVE USING A BASIN ANALYSIS APPROACH: TRYING TO RESOLVE A COMPLEX HISTORY OF LAKE LEVEL CHANGE**
- 3-2 8:25 AM Hudson, Adam*; Quade, Jay; Holliday, Vance T.; Fenerty, Brendan: **PALEOHYDROLOGY OF THE SOUTHWESTERN US SINCE THE LGM RECONSTRUCTED FROM PLUVIAL LAKE AND WETLAND SEDIMENTS OF THE SAN AGUSTIN PLAINS, NEW MEXICO**
- 3-3 8:45 AM Spaulding, W. Geoffrey*: **LATE- AND POSTGLACIAL HYDROCLIMATIC RECORDS IN A TRANSITIONAL DESERT: THE SOUTHERN GREAT BASIN**
- 3-4 9:05 AM Pigati, Jeff*; Springer, Kathleen: **HYDROCLIMATE RESPONSE OF SPRING ECOSYSTEMS TO A TWO-STAGE YOUNGER DRYAS EVENT IN WESTERN NORTH AMERICA**
- 9:25 AM **Break**
- 3-5 9:40 AM Springer, Kathleen*; Hudson, Adam M.; Pigati, Jeff: **HYDROCLIMATE AND THERMOMETRY OF AN EARLY HOLOCENE FLUVIAL TUFAL SYSTEM IN THE LAS VEGAS VALLEY, NEVADA**
- 3-6 10:00 AM Lora, Juan*: **UNDERSTANDING THE MECHANISMS UNDERLYING HYDROCLIMATE CHANGE IN WESTERN NORTH AMERICA SINCE THE LAST GLACIAL MAXIMUM**

- 3-7 10:20 AM Bryant, Mana*; Larson, Will B.; Schoenemann, Spruce; Corbett, Lee; Bierman, Paul R.: **INVESTIGATING ARID ALPINE PLEISTOCENE GLACIATION IN THE PIONEER MOUNTAINS OF MONTANA USING COSMOGENIC 10-BERYLLIUM EXPOSURE DATING**
- 3-8 10:40 AM Laabs, Benjamin*; Dahle, Jordan; Munroe, Jeffrey: **COSMOGENIC CHRONOLOGIES OF LATE PLEISTOCENE MOUNTAIN GLACIER RETREAT IN THE GREAT BASIN, USA**

SESSION NO. 4

T18. Integrated Drought Science and Technology

8:00 AM, UNLV Classroom Building Complex A, CBC-A 110

Rebecca Frus, Katharine Dahm, Todd J. Hawbaker, Adrian Monroe and Patrick Anderson, Presiding

- 8:00 AM **Introductory Remarks**
- 4-1 8:05 AM Bishop, Bunny*: **UTILIZING SCIENCE AND TECHNOLOGY FOR WATER PLANNING AND DROUGHT RESILIENCY IN NEVADA**
- 4-2 8:25 AM Hill-Gabriel, Julie*: **AUDUBON'S INTEGRATED APPROACH TO SCIENCE-BASED CONSERVATION FOR SALINE LAKE ECOSYSTEMS**
- 4-3 8:45 AM Finger-Higgins, Rebecca*: **IMPACTS OF EXPERIMENTAL AND OBSERVED DROUGHT ON UPPER COLORADO RIVER BASIN DRYLANDS**
- 4-4 9:05 AM Monroe, Adrian*; O'Donnell, Michael S.; Tarbox, Bryan C.; Manier, Daniel J.; Heinrichs, Julie A.; Pilliod, David S.; Jeffries, Michelle I.; Welty, Justin L.; Coates, Peter S.; Anderson, Patrick; Aldridge, Cameron L.: **INTEGRATING SOIL MOISTURE ESTIMATES WITH MULTIPLE RANGE-WIDE DATASETS TO STUDY SAGEBRUSH RECOVERY AND RESPONSES TO RESTORATION ACROSS THE WESTERN UNITED STATES**
- 4-5 9:25 AM Frus, Rebecca*; Hawbaker, Todd J.; Anderson, Patrick; Qi, Sharon; Andrews, William; Monroe, Adrian; Bradford, John; Dahm, Katharine: **ASSESSING STAKEHOLDER SCIENCE NEEDS TO PRIORITIZE INTEGRATED DROUGHT-RELATED SCIENCE IN THE COLORADO RIVER BASIN**
- 9:45 AM **Break**
- 4-6 10:00 AM Carlson, Christopher*: **INTEGRATED SCIENCE IN THE FOREST SERVICE UNDER CHANGING CONDITIONS**
- 4-7 10:20 AM Bailard, Jennifer*: **IMPLEMENTATION OF A LONG-TERM DESERT SPRINGS MONITORING PROTOCOL**
- 4-8 10:40 AM Nuyttens, Kaleigh*; Springer, Abe E.; Stevens, Lawrence E.: **SPRINGS OF GRAND CANYON'S SOUTH RIM: ECOLOGICAL INVENTORIES, ASSESSMENTS, AND UPDATED HYDROLOGIC TRENDS**
- 4-9 11:00 AM Buesch, David C.*; Miller, David M.; Ball, Lyndsay B.; Kohel, Christopher A.; Densmore, Jill N.: **IMPROVED HYDROGEOLOGIC FRAMEWORK FROM INTEGRATED GEOLOGIC MAPPING, BOREHOLE LOGGING, AND REGIONAL RESISTIVITY REVEAL HYDROGEOLOGIC INFLUENCE OF FAULTS IN LARGE-SCALE AQUIFER TEST, NORTHERN MOJAVE DESERT, FORT IRWIN, CALIFORNIA**
- 4-10 11:20 AM Hevesi, Joseph*; Stern, Michelle; Flint, Lorraine; Flint, Alan: **CHARACTERIZING DROUGHT, SNOW, AND LANDSCAPE HYDROLOGY IN THE COLORADO RIVER BASIN USING A HIGH RESOLUTION, GRID-BASED WATER BALANCE MODEL**
- 4-11 11:40 AM Shipp, Allison*: **INTEGRATED SCIENCE IN THE US GEOLOGICAL SURVEY**

POSTER TECHNICAL SESSIONS

SESSION NO. 5

T7. Geology of Death Valley: Old versus New Ideas, Hypotheses, and Theories (Posters)

8:30 AM, UNLV Student Union, Student Union Ballroom A/B

Authors will be present from 4 to 6 PM

Booth #

- 5-1 1 Thompson, Ren*; Gilmer, Amy K.; Souders, A. Kate; Miggins, Daniel P.: **MIOCENE MAGMATISM OF THE CENTRAL DEATH VALLEY RHOMBOCHASM, USA**
- 5-2 2 Johnsen, Racheal*; Smith, Eugene: **DISCOVERY OF ASH IN SEDIMENTS AROUND THE LAS VEGAS VALLEY: IMPLICATIONS FOR FUTURE ASHFALL HAZARDS FROM DISTAL VOLCANOES**
- 5-3 3 White, Sarah*; Ibarra, Daniel E.: **QUESTIONS POSED AND QUESTIONS ANSWERED BY PLOCENE LAKES IN DEATH VALLEY AND ACROSS WESTERN NORTH AMERICA**

SESSION NO. 6

T15. Records of Quaternary Paleoclimate in the Great Basin (Posters) (GSA Quaternary Geology and Geomorphology Division)

8:30 AM, UNLV Student Union, Student Union Ballroom A/B

Authors will be present from 4 to 6 PM

Booth #

- 6-1 4 Boccignone, Leah*; Theissen, Kevin; Tripathi, Aradhna; Arnold, Alexandra: **CLUMPED ISOTOPE PALEOTHERMOMETRY AND PALEOHYDROLOGIC ESTIMATES FOR THE HOLOCENE FROM MULTIPLE LACUSTRINE CARBONATE SOURCES IN THE PAHRANAGAT VALLEY, NEVADA**
- 6-2 5 White, Marie*; Larsen, Dan; Robbins, Olivia: **EARLY PLEISTOCENE PLUVIAL LAKE ENVIRONMENTS OF THE TECOPA BASIN, SOUTHEASTERN CALIFORNIA, USA**
- 6-3 6 Bacon, Steven*; Schumer, Rina A.: **HOLOCENE PALEOCLIMATE RECONSTRUCTION FROM INTEGRATED GEOLOGIC, TECTONIC, GLACIAL, AND HYDROLOGIC MODELING OF THE SOUTH-EASTERN SIERRA NEVADA, GREAT BASIN**
- 6-4 7 Springer, Kathleen*; Pigati, Jeff: **CLIMATICALLY DRIVEN DISPLACEMENT ON THE EGLINGTON FAULT, LAS VEGAS, NV**
- 6-5 8 Pecchia-Bekkm, Epiphany*; Power, Mitchell J.; Krahulec, Joshua; Struhs, Rachel; Carter, Vachel; Clark, Ian: **LONG-TERM PERSPECTIVE ON HARMFUL ALGAL BLOOMS FROM UTAH LAKE**
- 6-6 9 Freutel, William*; Enterkine, Joshua; Cogswell, Jack; Rad, Arash; Van der weide, Thomas; Pierce, Jennifer: **USING ALLUVIAL TERRACE DEPOSITIONAL CHARACTERISTICS OF THE TEN MILE TERRACE NEAR BOISE, IDAHO TO UNDERSTAND PAST CHANGES IN CLIMATE AND DEPOSITIONAL HISTORY**

SESSION NO. 7

T16. Quaternary Paleoclimate Records of the Rocky Mountain Region (Posters) (GSA Quaternary Geology and Geomorphology Division)

8:30 AM, UNLV Student Union, Student Union Ballroom A/B

Authors will be present from 4 to 6 PM

Booth #

- 7-1 10 Cyr, Andrew*; Ruleman, Cal; Nicovich, Sylvia R.; Hudson, Adam M.; Johnstone, Samuel A.; Welch, Jessica Lynn: **TEMPORAL AND SPATIAL PATTERNS OF DEGLACIATION AND ALLUVIAL FAN DEPOSITION IN THE SOUTHERN ROCKY MOUNTAINS, COLORADO, USA**
- 7-2 11 Christiansen, Shannon*; Steinman, Byron A.; Brown, Erik; Fawcett, Peter: **MODELING LAST INTERGLACIAL AND LAST GLACIAL**

MAXIMUM HYDROCLIMATE IN THE NEOTROPICS WITH A FOCUS ON THE BASIN OF MEXICO

- 7-3 12 Larson, Will B.*; Bryant, Mana M.; Schoenemann, Spruce; Corbett, Lee B.; Bierman, Paul R.: **GLACIAL MAPPING IN THE ARID PIONEER MOUNTAINS, MONTANA: ASSESSING PALEO-ELAS DURING THE LAST GLACIAL MAXIMUM**
- 7-4 13 Holmes, Aria*; Pearthree, Kristin; Fawcett, Peter; Sharp, Zachary: **QUATERNARY CLIMATIC AND HYDROLOGIC VARIATIONS IN THE NORTH AMERICAN TROPICS: STABLE ISOTOPE ANALYSIS OF ORGANIC MATTER FROM LAKE CHALCO, MEXICO**

SESSION NO. 8

T18. Integrated Drought Science and Technology (Posters)

8:30 AM, UNLV Student Union, Student Union Ballroom A/B

Authors will be present from 4 to 6 PM

Booth #

- 8-1 14 Dahm, Katharine*; Anderson, Eric D.; Anderson, Patrick; Bradford, John; Dick, Meghan; Frus, Rebecca; House, Sally; Jones, Daniel; Monroe, Adrian; Qi, Sharon; Tillery, Anne C.; Thomas, Kathryn: **COLORADO RIVER BASIN INTEGRATED SCIENCE AND TECHNOLOGY USGS APPROACH TO CONVERGENT RESEARCH**
- 8-2 15 Frus, Rebecca*; Nagler, Pam; Shafroth, Patrick; Miller, Olivia; Jones, Daniel: **A MULTI-SCALE ANALYSIS OF BIOCLIMATIC AND ECOHYDROLOGIC FACTORS FOR GROUNDWATER DEPENDENT ECOSYSTEMS**
- 8-3 16 Abbasi, Neda*; Nouri, Hamideh; Siebert, Stefan; Chavoshi Borujeni, Sattar; Barreto-Muñoz, Armando; Sall, Ibrahima; Didan, Kamel; Nagler, Pam: **HOW CHANGES IN HARVESTED AREAS OVER TIME AFFECTS THE ACTUAL EVAPOTRANSPIRATION OF CROPLANDS: THE CASE OF LOWER COLORADO RIVER**
- 8-4 17 Nagler, Pam*; Barreto-Muñoz, Armando; Sall, Ibrahima; Didan, Kamel: **ESTIMATES OF EVAPOTRANSPIRATION AND CONSUMPTIVE WATER USE FOR THE RIPARIAN AREAS OF THE LITTLE COLORADO RIVER IN THE DRYLANDS OF NORTHEAST ARIZONA, USA**

SESSION NO. 9

T27. Undergraduate Research (Posters) (Council on Undergraduate Research Geosciences Division)

8:30 AM, UNLV Student Union, Student Union Ballroom A/B

Authors will be present from 4 to 6 PM

Booth #

- 9-1 18 Rasmussen, Kristi*; Wilcock, Laura; Athalye, Roxolana; Balgord, Elizabeth; Yonkee, Adolph: **AGE AND EVOLUTION OF THE FARMINGTON CANYON COMPLEX, NORTHERN UTAH: INSIGHTS FROM U-PB ZIRCON GEOCHRONOLOGY**
- 9-2 19 Schroeder, Hannah*; McFadden, Rory; Hentges, Cora: **COMPARISON OF LEUCOSOME NETWORKS IN MIGMATITIC ORTHOGNEISS AND PARAGNEISS FROM THE PIONEER MOUNTAINS, IDAHO**
- 9-3 20 Woo, Kelli*; Barutha, Daniel; Nourse, Jonathan: **FIELD INVESTIGATION OF PALEOPROTEROZOIC(?) METAMORPHIC ROCKS AND JURASSIC(?) INTRUSIONS ON CENTRAL GLENDORA RIDGE, SAN GABRIEL MOUNTAINS, CALIFORNIA**
- 9-4 21 Center, Marc*; Möller, Andreas: **TIMING OF BRITTLE DEFORMATION IN THE CAÑON CITY EMBAYMENT, CO: LASER ABLATION U-PB DATING OF CARBONATE FRACTURES**
- 9-5 22 Morris, Alice*: **GEOSPATIAL ANALYSIS OF APATITE FISSION TRACK AND APATITE (U-TH)/HE IN RELATION TO ELEVATED TOPOGRAPHY ALONG ACTIVE FAULTS**
- 9-6 23 Ferrie, Nicole*; Condit, Cailey; French, Melodie; Ott, Jason: **CONSTRAINING DEFORMATION PROCESSES IN THE BRITTLE-DUCTILE TRANSITION REGION BELOW A SUBDUCTION SEISMOGENIC ZONE**

- 9-7 24 Ryerson, Owen*; Kirby, Eric: **EVALUATING PERMANENT STRAIN AND SURFACE UPLIFT IN THE SOUTHERN CASCADIA FOREARC**
- 9-8 25 Nguyen, Sadie*; Burks, Taylor P.; Cockram, Chloe L.; Maher, Teagan; McDade, Baylee R.; Mecham, Ski L.; Mora, Yasmin I.; Steiner, Hannah R.; Quinones, David G.; Lundblad, Steven: **LEVELING SURVEY OF KOAE FAULT SYSTEM DURING THE 2021 KILAUEA DIKE INTRUSION**
- 9-9 26 Cooper, Spencer*; Abbey, Alyssa: **QUATERNARY FAULT ANALYSIS IN THE STEWART VALLEY, NEVADA**
- 9-10 27 Neuhoff, Jackson*; Nachlas, William O.; Tikoff, Basil; Neuhoff, Philip: **LAMPROITE-LIKE VOLCANICS ALONG THE WESTERN IDAHO SHEAR ZONE**
- 9-11 28 Brown, Kaya*; Krantz, Robert W.: **A GIS BASED STUDY OF MAFIC DIKE ORIENTATION IN SOUTHEAST UTAH**
- 9-12 29 Aguilar, Brian*: **DETERMINING THE ABUNDANCE AND CHEMICAL COMPOSITION OF MAFIC CRYSTALS IN A LUNAR METEORITE**
- 9-13 30 Wanda, Matthew*; Gonzales, David: **GENESIS OF SKARN DEPOSITS IN THE TWO KIDS MINE, OURAY, COLORADO**
- 9-14 31 Goetz, Silas*; Runyon, Simone: **PUMPKIN HOLLOW DEPOSIT, YERINGTON DISTRICT, NV: INSIGHTS ON MINERALIZATION BASED ON ASSOCIATED ALTERATION AND COMPOSITION OF EPIDOTE GROUP MINERALS**
- 9-15 32 Bartlett, Brooks*; Gonzales, David: **AN INVESTIGATION OF THE FLUORSPAR VEINS AND LOST GOLD MINES FOUND WITHIN THE ALLARD STOCK, LA PLATA MINING DISTRICT, COLORADO, U.S.A**
- 9-16 33 Rich, Adelaide*; Shimer, Grant: **EARLY JURASSIC MOENAVE FORMATION STRATIGRAPHY AND PETROGRAPHY, CEDAR CITY, UTAH**
- 9-17 34 Cover, Zachary*; Gianniny, Gary; Miskel-Gerhardt, Kim: **IS THE TRANSITION IN "HOT WATER?"; PETROGRAPHIC ANALYSIS OF THE MARINE TO NONMARINE TRANSITION IN THE PENNSYLVANIAN HONAKER TRAIL FORMATION AND CUTLER FORMATION, PARADOX BASIN, SOUTHWESTERN COLORADO**
- 9-18 35 Beukema, Aiden*; Irmis, Randall; Milner, Andrew R.C.: **CARBON ISOTOPIC VARIABILITY IN PALEOSOLS AND ITS EFFECTS ON RECONSTRUCTING PCO₂: INSIGHTS FROM THE UPPER TRIASSIC CHINLE FORMATION**
- 9-19 36 Jones, Colby*; Rosscoe, Steven J.: **AN ENIGMATIC LIMESTONE CONGLOMERATE IN THE PREDOMINATELY SILICICLASTIC ANTLERS FORMATION, TAYLOR COUNTY, TEXAS**
- 9-20 37 Calligas, Thomas*; Gianniny, Gary; Geslin, Jeff: **CONSTRAINING THE ORIGIN OF CLIMACTICHNITES FOUND IN FLOAT AND POSSIBLE IMPLICATIONS FOR THE IGNACIO FORMATION, SOUTHWESTERN COLORADO, USA**
- 9-21 38 O'Callaghan, Ezekiel Vincent*; Lassiter, Linda Sue: **TUFF ANIMALS: MAMMAL TRACKS FROM MIOCENE TUFF DEPOSITS IN ARIZONA**
- 9-22 39 Spendlove, Karrah*; Milner, Andrew R.C.; Harris, Jerald D.; Irmis, Randall: **GRALLATOR TRACKS AS A WINDOW TO GROWTH STRATEGIES OF SMALL-BODIED EARLY THEROPODS**
- 9-23 40 Meek, Jessica*; Shimer, Grant; Maxwell, David J.: **USE OF ARSGIS ONLINE STORY MAPS FOR ENGINEERING AND GEOTECHNOLOGY AWARENESS IN THE UTAH CEDAR VALLEY, IRON COUNTY, UTAH**
- 9-24 41 Hoffstatter, Andrew*; Harvey, Jonathan: **USING LIDAR DIFFERENCING TO BETTER UNDERSTAND POST-FIRE DEBRIS FLOWS FOLLOWING THE 416 FIRE NORTH OF DURANGO, CO**
- 9-25 42 Smith, Kailee*; Harvey, Jonathan: **MAPPING MASS WASTING HAZARDS ON ANNETTE ISLAND RESERVE, ALASKA**
- 9-26 43 Tingwall, Jack*; Harvey, Jonathan: **CHANNEL COMPLEXITY ON THE DOLORES RIVER: USING PLANET LABS IMAGERY TO MEASURE SIDE CHANNEL LENGTH FOR DIFFERENT**

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- 9-27 44 Ashton, Shadrach*; Sudweeks, Garrett; Olson, Micah; Mueller, Erich: **PRECIPITATION AND STREAMFLOW HYDROLOGY DURING THE SUMMER 2021 MONSOON FLOODING OF THE CEDAR VALLEY, UTAH**
- 9-28 45 McCormick, William*; Kasprak, Alan; Christle, Kenneth: **INTEGRATING REMOTE SENSING AND IN-SITU MEASUREMENTS TO PRODUCE A COST-EFFECTIVE BATHYMETRIC MAP OF HAVILAND LAKE IN DURANGO, COLORADO**
- 9-29 46 Edmundson, Tomas*; Theissen, Kevin: **LAKE CORE HISTORIES OF HUMAN IMPACTS ON TWIN CITIES METRO AREA LAKES OVER THE LAST TWO CENTURIES**

AFTERNOON ORAL TECHNICAL SESSIONS

SESSION NO. 10

S1. Honorary Session for B. Clark Burchfiel and Gregory A. Davis for Their Seminal Contribution to the Modern Understanding of the North America Cordilleran Orogen II

1:30 PM, UNLV Classroom Building Complex A, CBC-A 106

An Yin and Brian Wernicke, Presiding

- 10-1 1:30 PM Medwedeff, Donald*: **PREVIOUSLY UNDOCUMENTED CONTINUITY OF A PALEOGENE STRUCTURAL TREND CONSTRAINS CUMULATIVE STRIKE-SLIP OFFSET ON THE EASTERN SAN FRANCISCO BAY FAULT SYSTEM, CALIFORNIA TO <30 KM**
- 10-2 1:50 PM Akciz, Sinan*: **THE SAN ANDREAS FAULT ZONE IN THE CARRIZO PLAIN, CALIFORNIA: REVIEW OF GEOMORPHOLOGICAL, PALEOSEISMOLOGICAL AND GEOCHRONOLOGICAL ANALYSES**
- 10-3 2:10 PM Ingersoll, Raymond*; Bird, Peter: **PALEOTECTONICS AND PALEO GEOGRAPHY OF SOUTHWESTERN CALIFORNIA 30-0 MA BASED ON FINITE-ELEMENT RECONSTRUCTION**
- 10-4 2:30 PM Andrew, Joseph*; Walker, Douglas: **THE GARLOCK FAULT ZONE AS A WIDE ZONE OF ACCOMMODATION, A LONG-LIVED PASSIVE STRUCTURE EMBEDDED IN THE EVOLVING EXTENSIONAL TO DEXTAL SHEAR DEFORMATION SYSTEMS OF EASTERN CALIFORNIA**
- 10-5 2:50 PM Kirby, Eric*: **GEOMORPHIC EVIDENCE FOR ACTIVE SLIP ALONG A LOW-ANGLE NORMAL FAULT: PANAMINT VALLEY, CALIFORNIA**
- 3:10 PM **Break**
- 10-6 3:25 PM Miller, Elizabeth*; Raftrey, Mark E.: **THE BOUNDARY CANYON DETACHMENT FAULT (BCF), FUNERAL MOUNTAINS, CA-NV: NEW INSIGHT INTO ITS DEVELOPMENT**
- 10-7 3:45 PM Niemi, Nathan*; Midttun, Nikolas; Gallina, Bianca: **ELUCIDATING DRIVING FORCES OF EOCENE EXTENSIONAL TECTONISM IN THE BASIN AND RANGE THROUGH THE LENS OF THE TITUS CANYON FORMATION, DEATH VALLEY, CALIFORNIA**
- 10-8 4:05 PM Wernicke, Brian*; Axen, Gary; Polcino, Christina; Sinha, Simmi; Swanson, Erika; Taylor, Wanda: **BEDROCK GEOLOGIC MAP OF THE MORMON PEAK-TULE SPRINGS DETACHMENT SYSTEM, MORMON MOUNTAINS AND TULE SPRINGS HILLS AREA, SOUTHERN NEVADA**
- 10-9 4:25 PM Hodges, Kip*: **HOW INSIGHTS INTO CORDILLERAN EXTENSIONAL TECTONICS HAVE REVOLUTIONIZED OUR UNDERSTANDING OF COLLISIONAL OROGENESIS**

4:45 PM Discussion

SESSION NO. 11**T7. Geology of Death Valley: Old versus New Ideas, Hypotheses, and Theories**

1:30 PM, UNLV Classroom Building Complex A, CBC-A 110

Jeffrey R. Knott and James Calzia, Presiding

1:30 PM **Introductory Remarks**

- 11-1 1:35 PM Ramo, Tapani*; Calzia, James P.: **PETROGENESIS OF THE MESOPROTEROZOIC MOUNTAIN PASS IGNEOUS SUITE, CALIFORNIA**
- 11-2 1:55 PM Anderson, Nicolas*; Mohr, Michael T.; Zhang, Yiming; Swanson-Hysell, Nicholas L.; Hodgkin, Eben B.; Macdonald, Francis A.; Schmitz, Mark: **PALEOMAGNETISM AND GEOCHRONOLOGY OF MESOPROTEROZOIC DIABASE SILLS FROM DEATH VALLEY, CALIFORNIA: EVALUATING THE BIFURCATING PLUME HYPOTHESIS FOR THE SOUTHWESTERN LAURENTIA LARGE IGNEOUS PROVINCE**
- 11-3 2:15 PM Gordon, Janet*; Calzia, James; Ramo, Tapani: **A NEW LOOK AT THE DIABASE OF THE SOUTHWEST LAURENTIA LARGE IGNEOUS PROVINCE (SWLLIP): SPEEDING LAURENTIA AND STAGNANT SLABS**
- 11-4 2:35 PM Serpa, Laura*; Pavlis, Terry: **3-D PHOTOGRAMMETRY MODELS FROM NEAR DEATH VALLEY, CA: A NEW PARADIGM FOR GEOSCIENCE RESEARCH AND EDUCATION**
- 11-5 2:55 PM Pavlis, Terry*; Serpa, Laura: **MESOZOIC SYN-METAMORPHIC STRUCTURE OF THE PANAMINT MOUNTAINS WITH IMPLICATIONS FOR RECONSTRUCTION OF NEOGENE EXTENSION**
- 11-6 3:15 PM Davidson, Christopher*; Caskey, John; Calzia, James P.; Niles, John H.: **TIMING AND AMOUNT OF RIGHT-LATERAL OFFSET ON THE SHEEPHEAD FAULT ZONE: EARLY DEVELOPMENT OF THE CHINA RANCH BASIN**
- 3:35 PM **Break**
- 11-7 3:50 PM Phillips, Fred*: **A REEXAMINATION OF EVIDENCE AGAINST RECENT SLIP ON THE LOW-ANGLE TOWNE PASS FAULT AT WILDROSE CANYON, PANAMINT VALLEY, CALIFORNIA**
- 11-8 4:10 PM Sada, Donald*; Friel, Ariel D.; Umek, John; Hedlund, Brian P.: **HYDROGEOLOGY, SPRINGS, AND BIOGEOGRAPHY OF BENTHIC MACROINVERTEBRATE AND MICROBIAL COMMUNITIES. ARE THERE SIMILAR PATTERNS ACROSS A DESERT LANDSCAPE?**
- 11-9 4:30 PM Umek, John*; Sada, Donald: **ENVIRONMENTAL AND BIOLOGICAL FACTORS INFLUENCING ANCIENT AND CONTEMPORARY AQUATIC LIFE IN SOUTHERN GREAT BASIN SPRING SYSTEMS'**
- 11-10 4:50 PM Knott, Jeffrey*; Mahan, Shannon; Bright, Jordon; Langer, Lindsey; Ramirez, Adam; McCarty, Kyle; Garcia, Anna: **PLIOCENE DEVELOPMENT AND MIS-4 FRESHWATER LAKE DEPOSITS OF DEEP SPRINGS VALLEY, WESTERN GREAT BASIN, INYO COUNTY, CALIFORNIA: IMPLICATIONS FOR REGIONAL TECTONICS AND PALEOCLIMATE**
- 11-11 5:10 PM Sylvester, Arthur G.*; Glazner, Allen: **EIGHTY YEARS OF EROSION AND DAMAGE CAUSED BY DIVERSION OF FURNACE CREEK WASH INTO GOWER GULCH, DEATH VALLEY, CALIFORNIA**

SESSION NO. 12**T13. Directly Dating Deformation, Metamorphism, and Metasomatism through Petrochronology II (GSA Structural Geology and Tectonics Division; GSA Geochronology Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division)**

1:30 PM, UNLV Classroom Building Complex A, CBC-A 112

Margaret Odlum, Cailey Condit and Stacia M. Gordon, Presiding

1:30 PM **Introductory Remarks**

- 12-1 1:35 PM Levy, Drew*; Gordon, Stacia; Zuza, Andrew V.; Kylander-Clark, Andrew R.C.: **DECIPHERING THE CENOZOIC DEVELOPMENT OF THE RUBY-EAST HUMBOLDT METAMORPHIC CORE COMPLEX USING MONAZITE, TITANITE AND ALLANITE PETROCHRONOLOGY**
- 12-2 1:55 PM Ortiz-Guerrero, Carolina*; Vogl, James J.; Foster, David: **USING ZIRCON, MONAZITE, AND TITANITE U/PB GEOCHRONOLOGY AND PHASE EQUILIBRIUM MODELING TO CONTRAIN PRESSURE, TEMPERATURE, AND TIME CONDITIONS FOR DECOUPLED MID-CRUSTAL FLOW IN THE PIONEER MOUNTAINS METAMORPHIC CORE COMPLEX**
- 12-3 2:15 PM Mulligan, Suzanne R.*; Wells, Michael L.; Wright, Samuel; Hoisch, Thomas D.: **POLYMETAMORPHISM IN THE FUNERAL MOUNTAINS METAMORPHIC CORE COMPLEX RECORDED IN MONAZITE, TITANITE, AND ZIRCON**
- 2:35 PM **Discussion**
- 2:50 PM **Break**
- 12-4 3:05 PM Bogatu, Adina*; Bédard, Jean H.; Labrousse, Loic; Tremblay, Alain; Zagorevski, Alex: **A PRESERVED OCEANIC CORE COMPLEX IN THE CACHE CREEK TERRANE, NORTHERN CORDILLERA, CANADA**
- 12-5 3:25 PM Eden, Ryan*; Sundell, Kurt E.; Gehrels, George E.; Saylor, Joel E.: **LATE CENOZOIC FOUNDERING OF MANTLE LITHOSPHERE IN THE WESTERN CORDILLERA OF SOUTHERN PERU**
- 12-6 3:45 PM Hernandez, Micah*; Mauk, Jeffrey: **GEOCHRONOLOGY OF THE WALLACE AND KALISPELL 1 X 2-DEGREE QUADRANGLES, IDAHO AND MONTANA, USA, AND ALBERTA AND BRITISH COLUMBIA, CANADA: INSIGHTS INTO THE GEOLOGIC EVOLUTION OF THE MESOPROTEROZOIC BELT SUPERGROUP**
- 4:05 PM **Concluding Remarks**

SESSION NO. 13**T16. Quaternary Paleoclimate Records of the Rocky Mountain Region (GSA Quaternary Geology and Geomorphology Division)**

1:30 PM, UNLV Classroom Building Complex A, CBC-A 108

Shannon A. Mahan, Tammy M. Rittenour and Peter Fawcett, Presiding

- 13-1 1:30 PM Pigati, Jeff*; Springer, Kathleen; Bennett, Matthew R.; Bustos, David; Urban, Thomas; Holliday, Vance T.; Reynolds, Sally C.; Honke, Jeffrey; Santucci, Vincent L.; Odess, Daniel: **ANCIENT HUMAN FOOTPRINTS IN WHITE SANDS NATIONAL PARK AND THEIR LINK TO ABRUPT CLIMATE CHANGE**
- 13-2 1:50 PM Mooney, Kori*; Schoenemann, Spruce: **5,000-YEAR LAKE CARBONATE AND TREE-RING BASED SNOWPACK RECONSTRUCTIONS REVEAL LONG-TERM TRENDS IN SOUTHWEST MT HYDROCLIMATE**
- 13-3 2:10 PM Munroe, Jeffrey*: **CAVE MONITORING AND DRIPWATER SAMPLING TO SUPPORT INTERPRETATION OF A LONG SPELEOTHEM RECORD FROM WHITEROCKS CAVE, UTAH**
- 13-4 2:30 PM Vitelli-Hawkins, Quinton*: **ICE IN LAVA TUBES FROM WEST-CENTRAL NEW MEXICO AS ARCHIVE OF PAST VOLCANIC ERUPTIONS AND CLIMATE CHANGE**

Tuesday, 15 March 2022

- 2:50 PM **Break**
- 13-5 3:05 PM Cornachione, Harriet S.*; Rittenour, Tammy; Nelson, Michelle Summa: **EOLIAN ACTIVITY RECORDS FROM TWO SOUTHERN UTAH DUNE FIELDS: AN INSIGHT TO NATURAL HYDROCLIMATE VARIABILITY DURING HOLOCENE**
- 13-6 3:25 PM Finley, Judson*; Robinson, Erick: **FLOODPLAIN STABILITY CONTROLS THE GROWTH POTENTIAL AND RESILIENCE OF INDIGENOUS NORTHERN COLORADO PLATEAU AGRICULTURAL COMMUNITIES: A CASE STUDY FROM, DINOSAUR NATIONAL MONUMENT**
- 13-7 3:45 PM Rittenour, Tammy*: **HOLOCENE CLIMATE AND ENVIRONMENTAL CHANGE ON THE COLORADO PLATEAU**
- 13-8 4:05 PM Slade, Noah*; Rittenour, Tammy: **THE ALLUVIAL DEPOSITS OF LOWER WAHWEAP CREEK: LINKING CLIMATE AND INCISION RECORDS IN THE CENTRAL COLORADO PLATEAU**
- 13-9 4:25 PM Capaldi, Tomas*; Rittenour, Tammy; Pederson, Joel; Nelson, Michelle S.: **DETRITAL ZIRCON GEOCHRONOLOGY AND QUARTZ OSL TRACK THE PROGRESSIVE PLEISTOCENE FILL AND SPILL OF PALEO BEAR RIVER BASINS OF UTAH AND IDAHO**

WEDNESDAY, 16 MARCH 2022

MORNING ORAL TECHNICAL SESSIONS

SESSION NO. 14

D3. Recent Advances in Hydrogeology of the Mountain West (GSA Hydrogeology Division)

8:00 AM, UNLV Wright Hall, WRI 144

William Sanford, Presiding

- 8:00 AM Sanford, William*: **Introductory Remarks**
- 14-1 8:05 AM Sanford, William*; Chohan, Nick; Fassnacht, Steven: **THE ROLE OF WETLAND DRAINAGE IN MAINTAINING LATE-SEASON BASEFLOW IN HIGH-ELEVATION HEADWATER STREAMS**
- 14-2 8:25 AM Han, Kyungdoe*; Wilson, John L.: **CHANGES IN GROUNDWATER CONTRIBUTION TO MOUNTAIN RIVERS UNDER VARYING TECTONIC AND CLIMATE CONDITIONS: OBSERVED INTERACTIONS BETWEEN BASEFLOW AND FORCINGS**
- 14-3 8:45 AM Chohan, Nick*: **IMPORTANCE OF WETLAND DRAINAGE IN A HIGH-ELEVATION, SNOWMELT-DOMINATED CATCHMENT, SENATOR BECK BASIN, SAN JUAN MOUNTAINS, SW COLORADO**
- 14-4 9:05 AM Harvey, Jonathan*; Kasprak, Alan; Tingwall, Jack; Brockway, Charles: **DECADAL-SCALE SIMPLIFICATION OF THE DOLORES RIVER, SW COLORADO, IN RESPONSE TO FLOW REGULATION**
- 9:25 AM **Break**
- 14-5 9:40 AM Farmer, Neal*; Blew, David: **A NEWLY DEVELOPED 3D HYDROGEOLOGIC MODEL OF SPRING AREAS FOR THE EAST SNAKE PLAIN AQUIFER IN SOUTHERN IDAHO BUILT ON 100 YEARS OF PREVIOUS WORK**
- 14-6 10:00 AM Farmer, Neal*; Blew, David: **RESULTS OF 25 GROUNDWATER DYE TRACER TESTS IN THE EAST SNAKE PLAIN AQUIFER OF SOUTHERN IDAHO NEAR SPRINGS AND FROM AQUIFER RECHARGE SITES SINCE YEAR 2008**

- 14-7 10:20 AM Moser, Duane*; Devlin, Molly; Saidi-Mehrabad, Alireza; Stepanauskas, Ramunas; Sackett, Joshua; Munson-McGee, Jacob; Lindsay, Melody; D'Angelo, Tim; Orcutt, Beth; Becraft, Eric D.; McGonigle, Julia: **THE DEATH VALLEY REGIONAL FLOW SYSTEM: AN ANALOG FOR SUBSURFACE ROCK-HOSTED ECOSYSTEMS OF ROCKY PLANETS**
- 14-8 10:40 AM Florea, Lee*; Stenner, Christian; Burgess, Sarah A.; Paton, Michael; Sobolewski, Linda; Ionescu, Artur; Pflitch, Andreas; Nadeau, Jay: **GLACIOVOLCANIC CAVES OF THE PACIFIC NORTHWEST, USA: PLANETARY GEOMORPHOLOGICAL AND BIOLOGICAL ANALOGS**

SESSION NO. 15

D4. Recent Advances in Paleontology, Paleoecology, and Paleoclimatology

8:00 AM, UNLV Wright Hall, WRI 148

Susan Hertfelder, Presiding

- 8:00 AM **Introductory Remarks**
- 15-1 8:05 AM Balisi, Mairin*: **SMALL MAMMALS CAN TELL BIG STORIES: MESOCARNIVORE INSIGHTS ON RANCHO LA BREA**
- 15-2 8:25 AM Rice, Karin*; Kely, Clay; Gonzalez, Tania; Campbell, Sean C.; Wall, Laura; Dunn, Regan; Lindsey, Emily: **NOVEL RANCHO LA BREA FOSSIL DEPOSIT PRESERVES EVIDENCE OF FAULTING**
- 15-3 8:45 AM DeNeve Weeks, Danaan*; Lindsey, Emily; Davis, Matt; Kennedy, Alana; Nye, Benjamin; Nelson, David; Porter, Molly; Swartout, William; Sinatra, Gale: **TAR AR: RESEARCHING HOW AUGMENTED REALITY ACTIVITIES CAN FACILITATE VISITOR LEARNING AT LA BREA TAR PITS**
- 15-4 9:05 AM Wall, Laura R. Tewksbury*; Morley, Stevie L.: **GROUND-BREAKING TECHNIQUES: MATERIALS & METHODS OF HISTORICAL EXCAVATION AT RANCHO LA BREA, CALIFORNIA**
- 9:25 AM **Break**
- 15-5 9:40 AM Lodise, Augustine*; McLaughlin, Win; Benoy, Russell; Budd, Susannah: **TAXONOMY AND PALEOECOLOGY OF A LATE MIOCENE LOCALITY NEAR WELLS NV**
- 15-6 10:00 AM Hertfelder, Susan*; Springer, Kathleen: **FOSSIL PRESERVATION IN THE LAS VEGAS FORMATION: TAPHONOMIC MODES AND DEPOSITIONAL ENVIRONMENTS**
- 15-7 10:20 AM Irmis, Randall*; Kelley, Neil P.; dePolo, Paige E.; McGaughey, Gary; Noble, Paula; Fasig, Nadine; Fasig, Forrest: **GIANT ICHTHYOSAURS PROVIDE INSIGHTS INTO LATE TRIASSIC MARINE ECOSYSTEM STRUCTURE**
- 15-8 10:40 AM Devlin, Molly*; Moser, Duane P.; Northup, Diana; Hathaway, Jennifer J.M.; Briggs, William C.; Blank, Jennifer G.: **LIFE IN THE LAVA TUBES: PROKARYOTIC AND EUKARYOTIC COMMUNITIES IN A MARS ANALOG ENVIRONMENT**

SESSION NO. 16

S3. The Tectono-Magmatic Evolution of the Basin and Range Province I: A Session in Honor of Ernie Anderson (GSA Structural Geology and Tectonics Division)

8:00 AM, UNLV Classroom Building Complex A, CBC-A 106

Paul Umhoefer, L. Sue Beard, James Faulds and David Miller, Presiding

- 8:00 AM **Introductory Remarks**
- 16-1 8:10 AM Beard, L. Sue*; Anderson, Vera Rose; Umhoefer, Paul; Faulds, James; Miller, David: **REMEMBERING R. ERNEST ANDERSON: A PIONEER IN BASIN AND RANGE EXTENSIONAL TECTONICS**
- 16-2 8:30 AM Osborn, Gerald*; Griffith, Martin: **EARLY EVOLUTION OF TECTONIC CONCEPTS IN THE BASIN AND RANGE PROVINCE**

- 16-3 8:50 AM Gans, Phillip*: **MAGMATIC-TECTONIC INTERACTIONS IN THE COLORADO RIVER EXTENSIONAL CORRIDOR (CREC)**
- 16-4 9:10 AM Lamb, Melissa*; Umhoefer, Paul J.; Beard, L. Sue; Hickson, Thomas: **UNRAVELING THE DETAILED STRUCTURAL EVOLUTION OF BASIN AND RANGE EXTENSION NORTH OF LAKE MEAD: AN EXAMPLE OF BUILDING ON THE LEGACY OF ERNIE ANDERSON**
- 9:30 AM **Break**
- 16-5 9:45 AM Geissman, Professor*: **PALEOMAGNETIC DATA FROM THE MIOCENE TUFF OF HOOVER DAM STRONGLY SUPPORT ERNIE ANDERSON'S ARGUMENT HE PRESENTED TO ME IN MY CSM OFFICE IN EARLY 1981 AS A VERY WET BEHIND THE EARS NEW MEMBER OF THE PROFESSORIATE**
- 16-6 10:05 AM Lutz, Brandon*: **HIGH-RESOLUTION TECTONIC RECONSTRUCTION OF THE CENTRAL BASIN AND RANGE**
- 16-7 10:25 AM Faulds, James*: **PLATE BOUNDARY INFLUENCES ON THE COMPLEX MIOCENE STRAIN FIELD OF THE LAKE MEAD REGION AND NORTHERN COLORADO RIVER EXTENSIONAL CORRIDOR, SOUTHERN NEVADA AND NORTHWESTERN ARIZONA: FROM PROPAGATING RIFTS TO INDENTER TECTONICS**
- 16-8 10:45 AM Polcino, Christina*; Houchin, Shane; Sinha, Simmi; Jory, Billyjack; Wernicke, B.P.: **CORRELATION OF THE MORMON PEAK AND PETROGLYPH DETACHMENTS IN THE SOUTHERN MORMON MOUNTAINS, SOUTHERN NEVADA**
- 16-9 11:05 AM Hacker, David*; Biek, Robert; Rowley, Peter; Griffith, William; Braunagel, Michael; Malone, David; Rivera, Tiffany: **A CASE OF MISTAKEN IDENTITY: LOW-ANGLE NORMAL FAULTS VERSUS GRAVITY SLIDES IN THE BASIN AND RANGE PROVINCE OF SOUTHWEST UTAH**

SESSION NO. 17

S4. Science at the Intersection of Soils, Weathering, Geomorphology, Climate, Ecology and Wildfire—A Tribute to the Careers of Les McFadden and Grant Meyer (GSA Quaternary Geology and Geomorphology Division)

8:00 AM, UNLV Classroom Building Complex A, CBC-A 108

Jennifer Pierce, Ph.D, Lyman P. Persico, Anne Tillery, Jennifer Aldred and Catherine Opalka, Presiding

- 17-1 8:00 AM Burnett, Benjamin*; Meyer, Grant: **INITIAL DEVELOPMENT AND EVOLUTION OF STREAM NETWORKS AND LONGITUDINAL PROFILES ON YOUNG RHYOLITE FLOWS, YELLOWSTONE NATIONAL PARK, AND THE IMPORTANCE OF BEDROCK STRUCTURES**
- 17-2 8:20 AM Glazner, Allen*; Harrington, Robert; Sylvester, Arthur: **ROCKSLIDE ORIGIN OF THE BUTTERMILK BOULDERS, EASTERN CALIFORNIA**
- 17-3 8:40 AM Keenan, Sarah*; Beeler, Scott R.: **LONG-TERM IMPACTS OF BURIED ANIMAL CARCASSES ON SOIL BIOGEOCHEMISTRY IN THE NORTHERN GREAT PLAINS**
- 17-4 9:00 AM Hanif, Tanzila*; Huber, David; Jin, Lixin; Finney, Bruce P.; Ghahremani, Zahra; Pierce, Jennifer: **DO DRYLANDS SOILS ACT AS A NET SINK OF CO₂ TO REDUCE ATMOSPHERIC CO₂ IN THE GLOBAL CARBON CYCLE?**
- 17-5 9:20 AM Molina, Valeria*; Ma, Lin; Engle, Mark; Darrouzet-Nardi, Anthony; Kaye, Jason; Jin, Lixin: **DIFFERENTIATING BIOTIC VS. ABIOTIC CO₂ IN THE FORMATION OF PEDOGENIC CARBONATE IN AN AGRICULTURAL SITE**
- 9:40 AM **Break**
- 17-6 9:55 AM Ghahremani, Zahra*; Pierce, Jennifer; Huber, David; Reynard, Linda; Murray, Erin; Swanson, Caitlyn: **THE IMPORTANCE OF DUST IN THE FORMATION OF SOIL INORGANIC CARBON IN DRYLANDS**

- 17-7 10:15 AM Staley, Spencer*; Fawcett, Peter; Anderson, R. Scott; Jimenez-Moreno, Gonzalo; Markgraf, Vera; Brown, Erik: **STONEMAN LAKE, ARIZONA: ARCHIVING SURFACE PROCESSES AT LOCAL TO REGIONAL SCALE SINCE THE EARLY PLEISTOCENE**
- 17-8 10:35 AM Aldred, Jennifer*; Eppes, M.C.; Kayser, Brandt; Layzell, Tony; Deal, Rebecca; Johnson, Bradley: **A SOIL STRATIGRAPHIC ANALYSIS: LINKING TRIBUTARY BASINS AND ALLUVIAL FANS IN THE SE SAN JUAN MOUNTAINS, CO, USA**
- 17-9 10:55 AM Persico, Lyman*; McFadden, Leslie D.; McAuliffe, Joseph R.; Rittenour, Tammy; Stahlecker, Tara; Brody, Saisha; Dunn, Sarah; Suhr, Jens: **THE IMPORTANCE OF VEGETATION AND SOIL DEVELOPMENT IN MODULATING HILLSLOPE RESPONSE TO CLIMATE CHANGE IN THE MOJAVE DESERT**
- 17-10 11:15 AM Harrison, James*: **HILLSLOPE SOIL LANDSCAPES**
- 17-11 11:35 AM Pierce, Jennifer*; Persico, Lyman P.; Tillery, Anne C.; Eppes, Martha; Levine, Rebekah; Burnett, Benjamin; McAuliffe, Joseph R.; Breecker, Dan; Ellwein, Amy L.; Opalka, Catherine; Aldred, Jennifer: **EARTH, WIND AND FIRE: GRANT MEYER AND LES MCFADDEN'S LEGACY OF SCIENTIFIC CONTRIBUTIONS AND MENTORSHIP**
- 11:55 AM **EARTH, WIND, AND FIRE DENOUEMENT: A FEW MORE REMARKS ABOUT LES & GRANT**

SESSION NO. 18

T2. Neo-Insights into the Neoproterozoic of Western North America

8:00 AM, UNLV Classroom Building Complex A, CBC-A 112

William Guenther, Kendra Murray, Devon Orme and David Pearson, Presiding

- 18-1 8:00 AM Craig, Jason*; Miller, Elizabeth: **PROTEROZOIC ROCK UNITS IN THE SOUTHERN BROOKS RANGE, ARCTIC ALASKA, TIES TO BALTICA?**
- 18-2 8:20 AM Eyster, Athena*; Smith, Emily F.; Aguilar, Valerie; Miller, Rachel; Wells-Moran, Sarah: **NEW STRUCTURAL, STRATIGRAPHIC, AND GEOCHRONOLOGIC CONSTRAINTS FROM NORTHEASTERN WASHINGTON WITH IMPLICATIONS FOR THE NEOPROTEROZOIC RIFTING OF RODINIA**
- 18-3 8:40 AM Pearson, David*; Brennan, Daniel; Link, Paul K.: **NEOPROTEROZOIC TO CAMBRIAN RIFTING IN THE NORTHERN ROCKY MOUNTAINS OF IDAHO AND MONTANA: A TECTONIC MODEL**
- 18-4 9:00 AM Kaempfer, Jenna*; Guenther, William; Pearson, David: **PROTEROZOIC TECTONISM IN SOUTHWESTERN MONTANA: DEEP-TIME LOW-TEMPERATURE THERMOCHRONOLOGY OF BASEMENT ROCKS**
- 18-5 9:20 AM Dehler, Carol*; Yonkee, Adolph; Schmitz, Mark; Sundberg, Fred A.; Cothren, Hannah; Ellison, Matthew: **UPDATED NEOPROTEROZOIC-CAMBRIAN AGE MODEL AND SUBSIDENCE ANALYSIS OF THE NORTH AMERICAN CORDILLERAN MARGIN, NORTHERN UTAH AND SOUTHEAST IDAHO**
- 18-6 9:40 AM Jensen, Jordan L.*; Ault, Alexis: **CAN MARTITE FORMATION AND (U-TH)/HE CHRONOMETRY RECORD THE DEVELOPMENT OF ANCIENT NONCONFORMITIES?**
- 18-7 10:00 AM Zinto, Joneel*: **TECTONOSTRATIGRAPHIC ANALYSIS OF THE NEOPROTEROZOIC MCCOY CREEK GROUP IN THE NORTHERN EGAN RANGE, EASTERN NEVADA**
- 18-8 10:20 AM Nelson, Lyle L.*; Smith, Emily F.; Macdonald, Francis A.: **SORTING SNOWBALLS IN DEATH VALLEY**
- 18-9 10:40 AM Martinez, Daniela*; Barron, Arturo; Hagadorn, James: **EDIACARAN AND CAMBRIAN VOLCANICS OF NEVADA: IMPLICATIONS FOR THE LATE NEOPROTEROZOIC LAURENTIAN MARGIN"**

- 18-10** 11:00 AM Sears, James*: **INVERTED NEOPROTEROZOIC GRABENS ON WESTERN NORTH AMERICAN AND SIBERIAN RIFT MARGINS: CONJUGATE PIERCING POINTS IN RODINIA?**
- 18-11** 11:20 AM Barron, Arturo*; Hagadorn, James; Paz Moreno, Francisco A.; Martinez, Daniela; Holm-Denoma, Chris: **EDIACARAN-CAMBRIAN RIFT RELATED VOLCANISM IN WESTERN LAURENTIA: ABORTED RIFT EVENT(S)?**
- 18-12** 11:40 AM Sundell, Kurt*; Macdonald, Francis: **THE LATEST NEOPROTEROZOIC HAFNIUM ISOTOPE EXCURSION: SNOWBALL EROSION OR PAN-AFRICAN OROGENS?**

DIFFERENTIATE FLUVIAL FANS FROM DELTAS ON EARTH AND MARS

SESSION NO. 21

D3. Recent Advances in Hydrogeology of the Mountain West (Posters) (GSA Hydrogeology Division)

8:30 AM, UNLV Student Union, Student Union Ballroom A/B

Authors will be present from 4 to 6 PM

Booth #

- 21-1** 12 Jackson, Megan*; Whitehead, Rhiannon; Gazis, Carey: **A GEOCHEMICAL STUDY OF THE TEANAWAY RIVER AND ITS TRIBUTARIES, CENTRAL WASHINGTON**
- 21-2** 13 Greenwood, Cameron*; Bershaw, John: **SPATIAL AND SEASONAL VARIATIONS OF STABLE ISOTOPES (¹⁸O AND ²H) IN PRECIPITATION, SPRINGS, AND SURFACE WATER IN THE OCHOCO MOUNTAINS, OREGON, USA**
- 21-3** 14 Rosales Lagarde, Laura*; Vogel, Lee B; Lachniet, Matthew: **EXPLORATION OF THE MICROBIAL DIVERSITY AND THE GEOCHEMICAL CHARACTERISTICS OF HOT SPRING WATERS IN THE BLACK CANYON, SOUTH OF HOOVER DAM, LAKE MEAD NATIONAL RECREATION AREA, NEVADA AND ARIZONA**

SESSION NO. 22

D4. Recent Advances in Paleontology, Paleoecology, and Paleoclimatology (Posters)

8:30 AM, UNLV Student Union, Student Union Ballroom A/B

Authors will be present from 4 to 6 PM

Booth #

- 22-1** 15 Richmond, Dean*; Philippe, Marc; Lupia, Richard: **THE FIRST REPORT OF THE FOSSIL WOOD *PROTODROXYLON SCOTICUM* FROM THE UPPER JURASSIC MORRISON FORMATION OF CENTRAL MONTANA**
- 22-2** 16 Dooley, Brett*; Stoneburg, Brittney E.; Dooley, Alton C.: **FIRST OCCURRENCE OF HOMOTHERIUM SERUM IN THE IRVINGTONIAN SAN TIMOTEO FORMATION, SAN BERNARDINO COUNTY, CALIFORNIA**
- 22-3** 17 Sunderlin, David*; Landon, Tessa C.: **RECONSTRUCTING A JURASSIC ISLAND FOREST, TALKEETNA VOLCANIC FORMATION, TALKEETNA MOUNTAINS, ALASKA**
- 22-4** 18 Chameroy, Eric J.*; Rowland, Stephen; Caputo, Mario: **HIDDEN IN PLAIN SIGHT: REVISITING SOME KNOWN TETRAPOD TRACKWAYS OF THE WESCOGAME FORMATION (LATE PENNSYLVANIAN) OF GRAND CANYON NATIONAL PARK, ARIZONA, USA**
- 22-5** 19 Potze, Stephany*; Morley, Stevie; Clarke, Cornelia: **IMPROVED PREPARATION METHODS FOR ASPHALT-PRESERVED FOSSILS FROM RANCHO LA BREA, CALIFORNIA**
- 22-6** 20 Bonde, Aubrey*; Eichenberg, Erin: **PALEONTOLOGICAL RESOURCES SURVEY OF THE NORTH UNIT OF TULE SPRINGS FOSSIL BEDS NATIONAL MONUMENT, SOUTHERN NEVADA**
- 22-7** 21 Hickson, Thomas*; Landrud, Owen; Frisk, Madilyn; Lamb, Melissa A.: **MIOCENE LACUSTRINE MICROBIALITES OF THE LOVELL WASH MEMBER, HORSE SPRING FORMATION: EXCELLENT MARTIAN MICROBIALITE ANALOGS RIGHT HERE IN THE LAS VEGAS AREA**

SESSION NO. 23

S4. Science at the Intersection of Soils, Weathering, Geomorphology, Climate, Ecology and Wildfire—A Tribute to the Careers of Les McFadden and Grant Meyer (Posters) (GSA Quaternary Geology and Geomorphology Division)

8:30 AM, UNLV Student Union, Student Union Ballroom A/B

Authors will be present from 4 to 6 PM

Booth #

POSTER TECHNICAL SESSIONS

SESSION NO. 19

D1. Geoscience and STEM Education (Posters)

8:30 AM, UNLV Student Union, Student Union Ballroom A/B

Authors will be present from 4 to 6 PM

Booth #

- 19-1** 1 Parry, Lauren*; Eichenberg, Erin: **DEVELOPING A PALEONTOLOGY WORKSHOP FOR VISUALLY IMPAIRED HIGH SCHOOL STUDENTS**
- 19-2** 2 Wang, Ping*: **INVESTIGATING THE IMPACT OF NASA SPACE APPS HACKATHON IN PROMOTING YOUTH'S STEM SELF-EFFICACY**
- 19-3** 3 Teasdale, Rachel*; Czajka, C.; Viskupic, Karen; Ryker, Katherine: **DO OUR SYLLABI ACCURATELY REPRESENT CLASSROOM PRACTICES IN GEOSCIENCE UNDERGRADUATE COURSES?**

SESSION NO. 20

D2. Recent Advances in Geomorphology, Engineering Geology, and Environmental Geoscience (Posters)

8:30 AM, UNLV Student Union, Student Union Ballroom A/B

Authors will be present from 4 to 6 PM

Booth #

- 20-1** 4 Edwards, Julie*; Anderson, Triana; Rochner, Maegen: **AVALANCHE AND LANDSLIDE EVENT HISTORY OF AN AVALANCHE CHUTE, ROCK CREEK VALLEY, MONTANA USING DENDROGEOMORPHOLOGY**
- 20-2** 5 Pollock, Nicholas*; Rollins, Wyatt: **QUANTIFYING THE EFFECTS OF POST-WILDFIRE DEBRIS FLOWS ON LANDSCAPE EVOLUTION FROM UAV AERIAL IMAGES – AN EXAMPLE FROM THE SOUTHERN WASATCH MOUNTAINS**
- 20-3** 6 Rollins, Wyatt*; Pollock, Nicholas: **POST-WILDFIRE DEBRIS FLOWS IN THE SOUTHERN WASATCH MOUNTAINS**
- 20-4** 7 Geddes, Chloe*; Finley, Judson: **CERAMIC PETROGRAPHIC ANALYSIS OF THE INTERMOUNTAIN WARES OF EARLY SHOSHONE PEOPLE IN THE GREATER YELLOWSTONE AREA**
- 20-5** 8 Spain, Kelsey*; Green, Hunter: **GEOMORPHIC CAVE ANALYSIS AND ALTERATION OF IGNEOUS FEATURES WITHIN: LAKE SHASTA CAVERNS**
- 20-6** 9 Kennedy, Elisabeth M.*; Aird, Hannah M.; Wagoner, Matthew; McCracken, Julianna; Diaz, Alonso: **POTENTIAL NATURALLY OCCURRING ASBESTOS IN METAVOLCANIC AND SERPENTINIZED ULTRAMAFIC ROCKS AROUND PARADISE, CA**
- 20-7** 10 Estrada, Alfredo*; Ikeda, Kyle H.; Campos, Georgina; Salek, Shaparak; Yunes Katz, Badhia; Ganguli, Priya; Hauswirth, Scott: **ORGANIC GEOCHEMISTRY AND ENVIRONMENTAL IMPACTS OF OIL SEEPS IN COASTAL WATERSHEDS**
- 20-8** 11 Gezovich, Luke*; Plink-Bjorklund, Piret; Henry, Jack: **QUANTIFICATION OF CHANNEL NETWORKS TO**

- 23-1 22 Quiroz, Michelle*; Molina, Valeria; Garcia, Aimee; Doser, Diane; Jin, Lixin: **A SURVEY OF TREE SIZE IN A PECAN ORCHARD AS A PROXY OF CARBON FLUX, SOIL SALINITY AND TEXTURE**
- 23-2 23 Marquette, Danielle*; Pierce, Jennifer; Marlon, Jennifer; Viskupic, Karen; Frary, Megan; Taylor, Chris: **EXPLORING AND ASSESSING K-12 WILDFIRE TEACHING METHODS AND CURRICULUM**
- 23-3 24 Griffith, Emma*; Jones, Carson; Persico, Lyman; Bader, Nicholas: **TOPOCLIMATIC CONTROLS ON HILLSLOPE ENVIRONMENTS: IMPLICATIONS FOR BEDROCK WEATHERING AND LANDSCAPE EVOLUTION AT WALLULA GAP, WA**
- 23-4 25 Axness, Abigail*; Pierce, Jennifer; Glenn, Nancy; Sadegh, Mojtaba: **USING HISTORIC AND MODERN DATA TO UNTANGLE THE ROLE OF CLIMATE VERSUS MANAGEMENT IN DRIVING LARGE STAND-REPLACING FIRES IN HIGH ELEVATION FORESTS IN CENTRAL IDAHO**
- 23-5 26 Huber, David*; Lohse, Kathleen A.; Germino, Matthew J.: **SOIL DEPTH DICTATE'S FUNCTION: A REVISED PERSPECTIVE ON CONTROL VOLUME AND PLANT-MICROBE ASYNCHRONY IN WATER-LIMITED ECOSYSTEMS**
- 23-6 27 Mosher, Stella*; Power, Mitchell J.; Quick, Lynne J.; Haberzettl, Torsten; Adler, Emily; Faith, J. Tyler: **EXPLORING HIGH-RESOLUTION MID-HOLOCENE FIRE-CLIMATE LINKAGES IN THE HYPER BIODIVERSE FYNBOS, SOUTH AFRICA**
- 23-7 28 Adler, Emily*; Mosher, Stella; Power, Mitchell J.: **SOIL GEOCHEMISTRY AND CHARCOAL MORPHOTYPE RESPONSES TO PALEOFIRE IN EILANDVLEI IN THE SOUTH AFRICAN FYNBOS**

SESSION NO. 24

T4. Cryptic and Slow-Moving Quaternary-Active Faults in the Western United States (Posters)

8:30 AM, UNLV Student Union, Student Union Ballroom A/B

Authors will be present from 4 to 6 PM

- | Booth # | Author(s) | Title |
|---------|---|--|
| 24-1 | 29 Chupik, Colin*; Redwine, Joanna; Thompson Jobe, Jessica: | POTENTIAL ACTIVE FAULTING IN SOUTHWESTERN COLORADO REVEALED BY LIDAR AND RECONNAISSANCE-LEVEL MAPPING |
| 24-2 | 30 Burkett, Faith*; Onderdonk, Nate: | COMPARING LIDAR DATASETS FROM AIRCRAFTS AND DRONES FOR USE IN GEOMORPHIC MAPPING OF THE DENSELY-VEGETATED SANTA YNEZ FAULT IN SOUTHERN CALIFORNIA |
| 24-3 | 31 Swanson, Brian J.*; Hoirup, Don; Lindvall, Scott; Kemp, Chris; Mahan, Shannon; Schwartz, Jonathon Yonni: | ADVANCES IN UNDERSTANDING THE RECENCY OF ACTIVITY AND POST-MIOCENE SLIP HISTORY OF THE NORTHWESTERN "PALOMAS" SECTION OF THE SAN GABRIEL FAULT, BLACK MOUNTAIN AND ALAMO MOUNTAIN 7.5' QUADRANGLES, SOUTHERN CALIFORNIA |
| 24-4 | 32 DiMonte, Alexandra*; Ault, Alexis; Hirth, Greg: | FLUID-ROCK INTERACTIONS AND DISTRIBUTED DEFORMATION ALONG SHALLOW HEMATITE-CLAY FAULTS IN THE SOUTHERNMOST SAN ANDREAS FAULT SYSTEM |
| 24-5 | 33 Pickerel, Molly*; Odum, Margaret; Capaldi, Tomas: | CHARACTERIZATION OF BEDROCK FAULT SCARPS AND HEMATITE FAULT MIRRORS IN THE NORTHERN COLORADO RIVER EXTENSIONAL CORRIDOR NEAR LAKE MEAD, NV |
| 24-6 | 34 Bradford, Timothy*; Surpless, Benjamin: | STRUCTURAL AND LITHOLOGIC CONTROLS ON FRACTURE DEVELOPMENT WITHIN A SEGMENTED NORMAL FAULT ZONE, SOUTHERN UTAH |

SESSION NO. 25

T9. Battery and Energy Metals: Mineral Potential of the Southwestern USA (Posters)

8:30 AM, UNLV Student Union, Student Union Ballroom A/B

Authors will be present from 4 to 6 PM

- | Booth # | Author(s) | Title |
|---------|--|--|
| 25-1 | 35 Karl, Nick*; Hall, Susan; Van Gosen, Bradley S.; Mauk, Jeffrey: | URANIUM DEPOSITS OF THE COLORADO PLATEAU |
| 25-2 | 36 Carey, Nathan*; Jowitt, Simon; Mills, Stephanie: | AGE AND GENESIS OF W-MO-CU MINERALIZATION, GOLD HILL, UTAH |
| 25-3 | 37 Hoffman, Haeden*; Mattinson, Chris; Halfpenny, Angela: | AN ALUMINOPHOSPHATE MINERAL ASSEMBLAGE IN THE CENTRAL MOJAVE DESERT, CA |
| 25-4 | 38 Fischer, Emily*; Hetherington, Callum J.: | TRACE ELEMENT ANALYSIS OF MAGNETITE REVEALS LARGE-SCALE OPEN-SYSTEM AND SMALL-SCALE CLOSED-SYSTEM PROCESSES CONTRIBUTE TO MAGNETITE LAYER FORMATION, BUSHVELD COMPLEX, SOUTH AFRICA |

AFTERNOON ORAL TECHNICAL SESSIONS

SESSION NO. 26

D2. Recent Advances in Geomorphology, Engineering Geology, and Environmental Geoscience

1:30 PM, UNLV Wright Hall, WRI 144

Michelle S. Nelson, Presiding

- | | | |
|------|---------|--|
| | 1:30 PM | Introductory Remarks |
| 26-1 | 1:35 PM | Laycock, Dallin*; Bremner, Paul; Fletcher, Sean D.T.; Mackenzie, Richard A.: UTILIZING REMOTE SENSING VIDEOS TO ENHANCE GEOSCIENCE EDUCATION |
| 26-2 | 1:55 PM | Nelson, Michelle*; Eppes, Martha Cary; Rittenour, Tammy: QUARTZ LUMINESCENCE FROM SOIL AND SAPROLITE: A TEST CASE FROM THE WESTERN PIEDMONT OF NORTH CAROLINA |
| 26-3 | 2:15 PM | Deans, Benjamin*; Ely, Lisa L.; Hackenberger, Steven; MacInnes, Breanyn: LARGE COLUMBIA RIVER FLOODS AND THEIR IMPACT ON CULTURAL MATERIAL WITHIN THE HANFORD REACH, WASHINGTON STATE |
| 26-4 | 2:35 PM | Agbogun, Henry*; Ali, Hendratta; Atekwana, Eliot; Njilah, Isaac Konfor; Latimer, Jennifer: INVESTIGATION OF WATER - SEDIMENTS INTERACTION IN ESTUARINE RIVERS |
| | 2:55 PM | Break |
| 26-5 | 3:10 PM | Keith, Bradley*; Anfinson, Owen A.; Coakley, Bernard: PERI-GLACIAL FEATURES MAPPED IN THE CHUKCHI BORDERLAND; CONSTRAINTS ON GLACIAL EXTENT AND MOTION |
| 26-6 | 3:30 PM | Santos, Joao*; Gomes, Alberto; Costa, Jorge; Figueira, Edgar: TILL MACROFABRIC AND GRAIN SIZE ANALYSIS OF GLACIAL DIAMICTONS IN THE SERRA DA CABREIRA MOUNTAINS, NW PORTUGAL |
| 26-7 | 3:50 PM | Bhandari, Bharat*: SEASONAL VARIATION IN THE SHEAR STRENGTH BEHAVIORS OF LANDSLIDE SOIL FROM THE SIWALIK HILLS OF NEPAL |
| 26-8 | 4:10 PM | Rasmussen, Gary*: THE SAN ANDREAS FAULT DOES NOT BEND THROUGH SAN GORGONIO PASS |

SESSION NO. 27

S3. The Tectono-Magmatic Evolution of the Basin and Range Province II: A Session in Honor of Ernie Anderson (GSA Structural Geology and Tectonics Division)

1:30 PM, UNLV Classroom Building Complex A, CBC-A 106

Paul Umhoefer, L. Sue Beard, James Faulds and David Miller, Presiding

- 27-1 1:30 PM Taylor, Wanda*; Abdelhaleem, S.; Ely, R.; Evans, M.; Muhammad, M.; Peck, A.; Price, T.; Reed, Nathan; Reid, Andrew J.: **THE BOUNDARY ZONE BETWEEN THE NORTHERN AND CENTRAL BASIN & RANGE SUBPROVINCES: A DEVELOPING RIFT SEGMENT BOUNDARY**
- 27-2 1:50 PM Abdelhaleem, Shaimaa*; Taylor, Wanda J.; dePolo, Craig M.: **THE ROLE OF NORMAL AND STRIKE-SLIP FAULT INTERACTION IN THE SEGMENTATION OF THE BASIN AND RANGE PROVINCE: AN EXAMPLE FROM THE QUATERNARY-ACTIVE KANE SPRINGS WASH FAULT ZONE, NEVADA, USA**
- 27-3 2:10 PM Miller, David*; Langenheim, Victoria E.: **LATE MIOCENE AND PLIOCENE STRIKE-SLIP FAULTING IN THE EASTERN MOJAVE DESERT, CALIFORNIA**
- 27-4 2:30 PM Bennett, Scott*; Darin, Michael H.; Miller, David M.; Dorsey, Rebecca; Mavor, Skyley P.; Nuriel, Perach; Thompson, Lisa A.; Oskin, Michael E.; Beard, L. Sue; Cyr, Andrew; Brickey, Timothy A.; Umhoefer, Paul J.: **THE REAL EASTERN CALIFORNIA SHEAR ZONE**
- 27-5 2:50 PM Smith, Eugene*; Johnsen, Racheal: **LATE MIOCENE TO QUATERNARY SILICIC VOLCANISM IN THE WALKER LANE: AN EXAMPLE FROM THE GREENWATER RANGE, CALIFORNIA**
- 3:10 PM **Break**
- 27-6 3:25 PM Onderdonk, Nate*; Anderson, Ernie; Miller, David: **STRUCTURAL OBSERVATIONS IN UPPER-PLATE ROCKS OF THE CENTRAL MOJAVE METAMORPHIC CORE COMPLEX DO NOT SUPPORT MODELS OF LARGE-MAGNITUDE EXTENSION**
- 27-7 3:45 PM Murray, Bryan*; Hames, Willis E.: **EVIDENCE OF EARLY MIOCENE SYNEXTENSIONAL VOLCANISM AND DEPOSITION OF THE JACKHAMMER AND PICKHANDLE FORMATIONS IN THE NORTHERN CALICO MOUNTAINS, CENTRAL MOJAVE METAMORPHIC CORE COMPLEX, SOUTHERN CALIFORNIA**
- 27-8 4:05 PM Scoggin, Shane*; Chapman, James; Trzinski, Adam; Jepson, Gilby; Schaen, Allen; Reiners, P.W.: **EXHUMATION OF THE PINALEÑO-JACKSON MOUNTAIN METAMORPHIC CORE COMPLEX, SOUTHEASTERN ARIZONA: CONSTRAINTS FROM MULTI-SYSTEM THERMOCHRONOLOGIC ANALYSIS**
- 27-9 4:25 PM Vermillion, Karissa*; Johnson, Emily; Amato, Jeffrey; Heizler, Matthew T.: **SPATIAL AND TEMPORAL VARIATIONS OF EOCENE-OLIGOCENE CALDERA VOLCANISM IN SOUTHERN NEW MEXICO**
- 27-10 4:45 PM Miller, Elisha*; Goldsby, Ryan; Thigpen, Ryan; Swallow, Meredith L.; Clark, Gillian; Preece, Madison; Guenther, William: **A LOW TEMPERATURE THERMOCHRONOLOGIC INVESTIGATION OF THE NORTHERNMOST TETON RANGE, WY: TESTING THE PALEO-TETON COLLAPSE HYPOTHESIS**
- 5:05 PM **Concluding Remarks**

SESSION NO. 28

T1. Paleozoic Stratigraphy and Tectonics of the Southwestern Cordillera and Rocky Mountain Region (GSA Sedimentary Geology Division; GSA Structural Geology and Tectonics Division)

1:30 PM, UNLV Classroom Building Complex A, CBC-A 112

John Singleton, Ryan J. Leary, Dustin E. Sweet and Sven Egenhoff, Presiding

- 28-1 1:30 PM Cothren, Hannah*; Sundberg, Fred A.; Farrell, Thomas; Schmitz, Mark D.; Dehler, Carol: **THE RELIABILITY OF THE SPICE AS A GLOBAL CORRELATION TOOL: CASE STUDY FROM NORTHERN UTAH**
- 28-2 1:50 PM Dehler, Carol*; Hagadorn, James W.; Reynolds, Stephen; Sundberg, Fred A.; Rose, Eben; Foster, John R.; Farrell, Thomas; Schmitz, Mark; Kirchner, Kory; Karlstrom, Karl E.; Crossey, Laura J.; Cothren, Hannah: **DICING AND SPICING UP THE CAMBRIAN: CHEMOSTRATIGRAPHY OF THE TONTO GROUP, GRAND CANYON AREA, ARIZONA AND NEVADA**
- 28-3 2:10 PM Warren, Audrey*; Jiang, Ganqing; Morales, Deborah: **THE HANGENBERG CARBON ISOTOPE EXCURSION (HICE) ACROSS THE DEVONIAN-CARBONIFEROUS BOUNDARY IN THE GREAT BASIN**
- 28-4 2:30 PM Morales, Deborah*; Jiang, Ganqing; Huang, Shichun; Warren, Audrey: **DO TEMPORAL VARIATIONS IN SM/ND RATIOS RECORD SEA-LEVEL CHANGE IN CARBONATE PLATFORMS?**
- 28-5 2:50 PM Arnold, Josiah*; Gianniny, Gary; Kasprak, Alan; Caster, Joshua: **LIDAR ANALYSIS OF MUD MOUNDS IN THE THUNDER SPRINGS MEMBER OF THE MISSISSIPPIAN (TOURNAISIAN) REDWALL LIMESTONE, GRAND CANYON, ARIZONA**
- 3:10 PM **Break**
- 28-6 3:25 PM Duncan, James*; Capaldi, Tomas; Wells, Michael; Odlum, Margaret; DeFelice, Chris: **THE ANTLER OROGENY RECORDED IN DETRITAL MULTI-MINERAL U-PB GEOCHRONOLOGY, SOUTHERN NEVADA**
- 28-7 3:45 PM Clemens-Knott, Diane*; Gevedon, Michelle: **USING DISCORDANT ZIRCON TO RE-EVALUATE THE NORTHERN EL PASO TERRANE: LATE PALEOZOIC TECTONIC EVOLUTION OF SOUTHWESTERN LAURENTIA, EXTENSION OF THE PERMIAN ARC, AND A MIDDLE JURASSIC HYDROTHERMAL EVENT WITHIN THE SOUTHEASTERN SIERRA NEVADA ARC**
- 28-8 4:05 PM Brotherton, John*; Sweet, Dustin E.: **INITIATION AND DESTRUCTION OF THE PENNSYLVANIAN-EARLY PERMIAN OROGRANDE BASIN REVEALED THROUGH GEOHISTORY CURVES AND STRUCTURAL ANALYSIS: IMPLICATIONS FOR ANCESTRAL ROCKY MOUNTAINS TECTONISM**
- 28-9 4:25 PM Sweet, Dustin*: **EARLY PERMIAN SUBSIDENCE PATTERNS OF CRATONIC BASINS IN SOUTHWESTERN LAURENTIA**
- 28-10 4:45 PM Johnson, Erinn*; Singleton, John: **STRUCTURAL ANALYSIS ALONG THE OURAY FAULT, SOUTHWESTERN COLORADO: IMPLICATIONS FOR THE KINEMATIC DEVELOPMENT OF THE LATE PALEOZOIC ANCESTRAL ROCKY MOUNTAINS**

SESSION NO. 29

T4. Cryptic and Slow-Moving Quaternary-Active Faults in the Western United States

1:30 PM, UNLV Classroom Building Complex A, CBC-A 108

Rich Koehler, Joanna Redwine, Sylvia Nicovich, Sinan Akciz and Alexis Ault, Presiding

- 1:30 PM **Introductory Remarks**
- 29-1 1:35 PM Trexler, Charles C*; Willard, Jack: **ACTIVE DEFORMATION AND THE ROLE OF INHERITED STRUCTURES IN THE SACRAMENTO-SAN JOAQUIN DELTA, NORTHERN**

CALIFORNIA, CONSTRAINED USING A COMPILATION OF GEOMORPHIC, GEOLOGIC, AND GEODETIC DATASETS

- 29-2 1:55 PM Jobe, Jessica Ann*; Chupik, Colin; Cline, Michael L.; Reitman, Nadine; Howe, Julia; Longnecker, Paul: **LOW-RATE QUATERNARY FAULTING IN NORTHERN NEW MEXICO**
- 29-3 2:15 PM Ben-Horin, Jeri*; Gootee, Brian F.; Pearthree, Philip A.; Fenton, Cassandra; Balco, Greg; Marso, Jean Thomas; Davidson, Reno; Rittenour, Tammy: **TIMING OF MEAD SLOPE FAULT RUPTURES, LAKE MEAD AREA, ARIZONA**
- 29-4 2:35 PM Koehler, Rich*: **CHARACTERIZING CRYPTIC FAULTS ACROSS THE NORTHERN WALKER LANE/BASIN AND RANGE TRANSITION ZONE, CALIFORNIA AND NEVADA**
- 29-5 2:55 PM Gavillot, Yann*; Lonn, Jeff; Stickney, Mike; Hidy, Alan J.: **LATE QUATERNARY SLIP RATES AND SURFACE RUPTURE OF THE BITTERROOT FAULT, WESTERN MONTANA: AN ENIGMATIC SEISMOGENIC FAULT IN THE NORTHERN ROCKIES BASIN AND RANGE**
- 3:15 PM **Break**
- 29-6 3:30 PM Nicovich, Sylvia*; Klinger, Ralph E.; Chupik, Colin; Wittke, Seth J.; Gray, Harrison: **LATE QUATERNARY ACTIVITY OF THE SOUTH GRANITE MOUNTAINS FAULT SYSTEM IN CENTRAL WYOMING: IMPLICATIONS FOR CRYPTIC REACTIVATION OF LARAMIDE FEATURES**
- 29-7 3:50 PM Gomez, Francisco*; Polun, Sean; DeLisle, Clarke; Sandvol, Eric: **GEOPHYSICAL AND NEOTECTONIC EVIDENCE OF QUATERNARY REVERSE FAULTING IN THE NORTHERN WIND RIVER BASIN, WYOMING**
- 29-8 4:10 PM Berti, Claudio; Anastasio, David*; Truxal, Sarah: **NEW AGE AND GEOMORPHIC CONTROLS ON THE BOULDER FRONT FAULT, WOOD RIVER BASIN, NORTHERN BASIN AND RANGE PROVINCE, IDAHO**
- 29-9 4:30 PM Rowe, Christie*; Angombe, Moses; Coleman, Mark; Boianju, Inga; Perry, Emily; Bilodeau, Maude: **RETHINKING THE VOCABULARY FOR CARBONATE FAULT ROCKS**
- 29-10 4:50 PM Odlum, Margaret*; Ault, Alexis; Rittenour, Tammy; Nelson, Michelle S.: **MICROSTRUCTURAL AND LUMINESCENCE EVIDENCE OF FAULT MATERIAL TRANSFORMATION AND COSEISMIC HEATING ALONG THE HURRICANE FAULT, UTAH**
- 29-11 5:10 PM Newell, Dennis*; Benowitz, Jeff; Regan, Sean: **MANTLE FLUID CONTRIBUTION TO SPRINGS ALONG THE DENALI FAULT SYSTEM: ³HE/⁴HE CONSTRAINTS ON THE CRUSTAL SCALE NATURE OF THE MAIN STRAND, HINES CREEK AND SPLAYS**

SESSION NO. 30
T9. Battery and Energy Metals: Mineral Potential of the Southwestern USA

1:30 PM, UNLV Wright Hall, WRI 148

Simon Jowitt and Brian McNulty, Presiding

- 1:30 PM **Introductory Remarks**
- 30-1 1:35 PM Mauk, Jeffrey*; Karl, Nick; Ringer, Amanda; Boardman-Larson, Emma; Funk, Jonathan; San Juan, Carma A.; Van Gosen, Bradley S.: **BATTERY AND ENERGY METALS: SIGNIFICANT DEPOSITS OF COBALT, GALLIUM, GERMANIUM, GRAPHITE, INDIUM, LITHIUM, MANGANESE, PGES, REES, AND TELLURIUM IN THE WESTERN USA**
- 30-2 1:55 PM Jowitt, Simon*; Mudd, Gavin M.: **A NEW CENTURY FOR NICKEL? ASSESSING RESOURCES, RESERVES AND SUSTAINABILITY OF THE DEVIL'S METAL**
- 30-3 2:15 PM Mills, Stephanie E.*: **THE GEOLOGY AND POTENTIAL OF UTAH'S SEDIMENT-HOSTED URANIUM-VANADIUM**

DEPOSITS IN THE AGE OF CRITICAL MINERALS AND CARBON NEUTRALITY

- 30-4 2:35 PM Barkoff, Drew*: **PETROGENESIS AND HYDROTHERMAL ALTERATION OF AN EVOLVED RHYOLITE, THE BLAWN FORMATION, SOUTHERN WAH WAH MOUNTAINS, UTAH**
- 2:55 PM **Break**
- 30-5 3:10 PM Szymanski, Eugene*; Vanden Berg, Michael D.; Moodie, Nathan; Jagniecki, Elliot; Hardwick, Christian; Jensen, Austin; Hurlbut, Will; Smith, Kayla: **ASSESSING THE GEOLOGIC CARBON (CO₂) SEQUESTRATION POTENTIAL OF MULTIPLE SUBSURFACE TARGETS IN THE IRON SPRINGS DISTRICT, IRON COUNTY, UTAH**
- 30-6 3:30 PM McCaffrey, Dalton*: **MINERALOGICAL AND GEOCHEMICAL CHARACTERIZATION OF THE VIRGIN MOUNTAIN PEGMATITE FIELD, NEVADA-ARIZONA**
- 30-7 3:50 PM Empro, Christopher*; Benson, Thomas; Simon, Adam C.: **THE CLAY MINERALOGY OF SEDIMENTARY LITHIUM DEPOSITS**
- 4:10 PM **Concluding Remarks**

THURSDAY, 17 MARCH 2022
MORNING ORAL TECHNICAL SESSIONS
SESSION NO. 31
S2. Mesozoic–Cenozoic Tectonic History of Northwestern Mexico and Southwestern USA: A Tribute to César Jacques-Ayala for His Career and Contributions to Sonoran Geology

8:00 AM, UNLV Classroom Building Complex A, CBC-A 106

Alexander Iriondo, Arturo Barron, and Felipe de J. Escalona-Alcázar, Presiding

- 8:00 AM **Introductory Remarks**
- 31-1 8:15 AM Iriondo, Alexander*; Molina-Garza, Roberto S.: **COMPETING HYPOTHESES TO EXPLAIN LARGE LATITUDINAL DISPLACEMENTS OF THE CABORCA BASEMENT BLOCK OF NORTHWESTERN MEXICO: WHAT ABOUT NOT HAVING DISPLACEMENTS AT ALL?**
- 31-2 8:35 AM Nourse, Jonathan*; Lawton, Timothy; Price, Jason; González-León, Carlos M.: **A LATE CRETACEOUS DEPOSITIONAL AGE FOR SOME METACONGLOMERATES PREVIOUSLY INTERPRETED AS UPPER JURASSIC IN NORTHERN SONORA**
- 31-3 8:55 AM Lawton, Timothy*; González-León, Carlos M.; Nourse, Jonathan A.; Hampton, Brian; Stopka, Cody J.: **SEDIMENT SOURCES RECORDED IN CRETACEOUS METACONGLOMERATES OF NORTHERN SONORA AND A POSSIBLE CONNECTION TO THE CORDILLERAN FORELAND**
- 31-4 9:15 AM Molina Garza, Roberto*: **PALEOMAGNETIC EVIDENCE OF A CRETACEOUS AGE FOR THE CERRO SAN LUIS FORMATION, SIERRA SANTA ROSA, SONORA**
- 9:35 AM **Break**
- 31-5 9:50 AM Jacobson, Carl*; Barth, Andrew; Grove, Marty J.; Haxel, Gordon B.: **COMPARISON OF SEVIER-LARAMIDE TECTONICS OF SONORA, MEXICO, AND SOUTHWESTERN ARIZONA-SOUTHEASTERN CALIFORNIA, UNITED STATES**
- 31-6 10:10 AM Gomez valencia, Alejandra*; Barron, Arturo; Espinoza Encinas, Ivan Rosario; Lozano SantaCruz, Rufino; Iriondo, Alexander; Vidal Solano, Jesus Roberto; Paz Moreno, Francisco A.: **PETROGENESIS OF LATE CRETACEOUS**

- ADAKITE INTRUSIVES IN PUERTO LIBERTAD, SONORA, MÉXICO**
- 31-7 10:30 AM Eguiluz, Samuel*; Juárez-Arriaga, Edgar; Chávez-Cabello, Gabriel; Ramírez-Peña, César; Aranda-Gómez, Jorge: **GEOCHRONOLOGY AND DEFORMATION OF THE AHUICHILA FORMATION IN COAHUILA, DURANGO AND ZACATECAS STATES, MEXICO**
- 31-8 10:50 AM Pina, Adriana*; Vidal Solano, Jesus Roberto; Stock, Joann: **NEW INSIGHTS INTO THE NORTH OF BAJA CALIFORNIA MICROPLATE RECONSTRUCTION ATCA. 12 MA: PETROGRAPHY, GEOCHEMISTRY, AND PALEOMAGNETISM OF THE IGNIMBRITE OF HERMOSILLO – TUFF OF SAN FELIPE IN SAN CARLOS, SONORA, MÉXICO**
- 11:10 AM Discussion
- 11:30 AM Concluding Remarks

SESSION NO. 32

T6. From the Sevier to Laramide: Connecting Hinterland to Foreland by Tectonics, Structure, and Sedimentation

8:00 AM, UNLV Classroom Building Complex A, CBC-A 112

Carla Eichler and Jacob Thacker, Presiding

- 8:00 AM **Introductory Remarks**
- 32-1 8:05 AM Trzinski, Adam*; Chapman, James; Scoggin, Shane; Shields, Jessie: **EVIDENCE FOR A SYNCLINE-ANTICLINE PAIR AND MULTIPLE PHASES OF DEFORMATION DURING THE LARAMIDE OROGENY IN THE DRAGOON MOUNTAINS, ARIZONA**
- 32-2 8:25 AM Angombe, Moses*; Bilodeau, Maude; Rowe, Christie: **CAN CO-SEISMIC PORE PRESSURE OF ANCIENT CONTINENTAL EARTHQUAKES BE ESTIMATED FROM FAULT-RELATED INJECTION VEINS?**
- 32-3 8:45 AM Marder, Eyal*; Gallen, Sean: **NEW EVIDENCE FOR LATE CENOZOIC DEFORMATION IN THE SOUTHERN COLORADO FRONT RANGE**
- 32-4 9:05 AM Zelt, Fred*: **CRETACEOUS TROPIC SHALE OF SOUTHERN UTAH: AN UNDERUTILIZED NATURAL OBSERVATORY ON PUBLIC LANDS FOR RESEARCH IN SHALE DEPOSITIONAL FACIES AND PROCESSES, MID-CRETACEOUS PALEOCLIMATES AND CARBON BURIAL**
- 32-5 9:25 AM Tikoff, Basil*; Ruggles, Claire; Nelson, Ellen: **A SPECULATIVE MODEL FOR EARLY CRETACEOUS DEFORMATION IN THE SOUTHERN IDAHO SECTION OF THE NORTH AMERICAN CORDILLERA**
- 9:45 AM Discussion
- 32-6 10:00 AM Pearson, David*; Parker, Stuart; Finzel, Emily; Rosenblume, Justin; Porter, E. Chase; Guenther, William; Kaempfer, Jenna; Gardner, Cole: **KINEMATICS, TIMING, AND MAGNITUDE OF SHORTENING WITHIN THE CRETACEOUS SEVIER-LARAMIDE FOLD-THRUST BELT OF IDAHO AND MONTANA**
- 32-7 10:20 AM Weeks, Chloe*; Stanley, Jessica R.: **APATITE (U-TH)/HE COOLING DATES FROM THE MADISON RANGE, SOUTHWEST MONTANA AND IMPLICATIONS FOR EXHUMATION DRIVEN BY THE YELLOWSTONE HOTSPOT**
- 32-8 10:40 AM Shields, Jessie E.*; Chapman, James B.: **LARGE MELT VOLUMES AS POSSIBLE INDICATOR FOR WATER PRESENT CRUSTAL MELTING IN THE NORTH AMERICAN CORDILLERA**
- 32-9 11:00 AM Thacker, Jacob*: **MID-CRETACEOUS INTRAFORLAND TECTONISM IN THE WESTERN INTERIOR USA: THE ROLE OF THE FLAT SLAB ON ACCENTING THE NORTH AMERICAN CORDILLERAN SYSTEM**
- 32-10 11:20 AM Li, Zhiyang*; Aschoff, Jennifer: **PALEOGEOGRAPHIC EVOLUTION OF THE LATE CRETACEOUS NORTH AMERICAN CORDILLERAN FORELAND BASIN: AN**

EXEMPLAR OF THE COMBINED INFLUENCE OF TECTONICS, SEA LEVEL, AND SEDIMENT SUPPLY THROUGH TIME

11:40 AM Concluding Remarks

SESSION NO. 33

T12. Advances in Understanding Arc Magmatism in the Southwestern Cordillera I

8:00 AM, UNLV Classroom Building Complex A, CBC-A 108

Robinson Cecil, Joshua Schwartz, PhD and Jade Star Lackey, Presiding

- 33-1 8:00 AM Nelson, Ellen*; Tikoff, Basil; Morgan, Sven; de Saint Blanquat, Michel; Law, Richard D.: **HORIZONTAL LENS-LIKE EMPLACEMENT OF THE SAGE HEN FLAT PLUTON, CALIFORNIA**
- 33-2 8:20 AM Hirt, William*: **WHY DOES ALKALI-FELDSPAR COMMONLY GROW TO MEGACRYSTIC SIZES IN FELSIC MAGMAS WHEREAS COEXISTING QUARTZ AND PLAGIOCLASE DO NOT? INSIGHTS FROM THE MOUNT WHITNEY INTRUSIVE SUITE, SIERRA NEVADA, CALIFORNIA**
- 33-3 8:40 AM Glazner, Allen*; Bartley, John; Coleman, Drew: **GRANITES ARE UPPER GREENSCHIST FACIES ROCKS**
- 33-4 9:00 AM Attia, Snir*; Paterson, Scott R.; Jiang, Dazhi; Miller, Robert B.: **LITHOSPHERIC STRENGTHENING AND INDIRECT TECTONOMAGMATIC LINKS DURING MID-CRETACEOUS OROGENESIS IN THE CENTRAL SIERRA NEVADA**
- 33-5 9:20 AM Brackman, Adam*; Schwartz, Joshua: **MINERAL-MELT EQUILIBRIUM MODELS VS BULK-ROCK GEOCHEMISTRY: WHICH TELLS THE TRUE STORY OF CORDILLERAN ARC FORMATION?**
- 9:40 AM Break
- 33-6 9:55 AM Ratschbacher, Barbara*; Paterson, Scott R.; Anderson, J. Lawford: **CHANGES IN ARCHITECTURE, GEOCHEMISTRY, AND CONSTRUCTION TIMESCALES OF INTRUSIVE COMPLEXES IN THE UPPER ~35 KM OF A TRANSCRUSTAL MAGMATIC SYSTEM: THE CRETACEOUS CASCADES ARC, WASHINGTON, USA**
- 33-7 10:15 AM Economos, Rita*; Barth, Andrew; Wooden, Joseph L.; Friesenhahn, Brody P.; Bradley, Ben: **LATE CRETACEOUS MAGMATIC-TECTONIC EVOLUTION OF THE CENTRAL MOJAVE DESERT**
- 33-8 10:35 AM Stone, Paul*; Brown, Howard J.; Cecil, Robinson; Fleck, Robert J.; Vazquez, Jorge; Johnson, Craig A.: **TECTONIC IMPLICATIONS OF PERMIAN-TRIASSIC, LATE JURASSIC, AND LATE CRETACEOUS PLUTONIC ROCKS THAT INTRUDE THE EL PASO TERRANE IN THE LANE MOUNTAIN AREA, CENTRAL MOJAVE DESERT, CALIFORNIA**
- 33-9 10:55 AM Gevedon, Michelle*; Bradley, Ben; Economos, Rita: **POTENTIAL SIGNIFICANCE AND IMPLICATIONS OF THE LATE CRETACEOUS TEUTONIA BATHOLITH (MOJAVE NATIONAL PRESERVE, CA) FOR LARAMIDE TECTONISM**
- 33-10 11:15 AM Chapman, James*; Seymour, Nikki: **USING ISOTOPIC COMPOSITIONS OF THE MID-CENOZOIC FLARE UP TO PROBE FOR THE PELONA-OROCOPIA-RAND SCHIST AT DEPTH**

SESSION NO. 34

T14. Paleomagnetism, Rock Magnetism, Environmental Magnetism, Instrumentation, Archaeomagnetism, Planetary Magnetism, and Petrofabrics

8:00 AM, UNLV Classroom Building Complex A, CBC-A 110

Klaus Petersen and Emilio Herrero-Bervera, Presiding

- 34-1 8:00 AM Lund, Steven*: **ON THE RELATIONSHIP BETWEEN EXCURSIONS AND NORMAL SECULAR VARIATION**

- 34-2** 8:20 AM Piispa, Elisa*; Lerner, Geoffrey; Bowles, Julie; Ort, Michael H.: **PALEOMAGNETIC AND ROCK MAGNETIC METHODS AS TOOLS FOR VOLCANOLOGY, WITH RECENT EXAMPLES FROM AROUND THE WORLD**
- 34-3** 8:40 AM Calvo-Rathert, Manuel*; García-Redondo, Natalia; Carrancho, Angel; Licheli, Vachtang; Gogichaishvili, Avto; Dekkers, Mark; Bradak-Hayashi, Balazs: **FIRST ARCHAEOMAGNETIC RESULTS FROM THE PROTOHISTORIC GRAKLIANI HILL SITE (GEORGIA, CAUCASUS)**
- 34-4** 9:00 AM Sciascia borlina, Caue*; Weiss, Benjamin P.; Bai, Xue-Ning; Mansbach, Elias N.; Lima, Eduardo A.; Chatterjee, Nilanjan; Tissot, Francois L.H.; McKeegan, Kevin D.: **PALEOMAGNETISM OF CALCIUM-ALUMINUM-RICH INCLUSIONS**
- 34-5** 9:20 AM Herrero-Bervera, Emilio*; Jicha, Brian: **NEW 40AR/39AR AGES AND FULL VECTOR RESULTS OF THE UPPER MAMMOTH TRANSITION AND NORWEGIAN-GREENLAND SEA EXCURSION FROM VOLCANIC SEQUENCES ON OAHU, HAWAII**
- 34-6** 9:40 AM Tarduno, John*; Cottrell, Rory D.; Zhou, Tinghong: **EARTH'S HADEAN TO EOARCHEAN MAGNETIC FIELD RECORDED BY DETRITAL ZIRCONS**
- 10:00 AM **Break**
- 34-7** 10:15 AM Camps, Pierre*; Dubois, Mathilde; Bentaleb, Ilhem: **AFRICAN SPELEOTHEMS: A PROMISING ARCHIVE OF THE SECULAR VARIATION OF THE EARTH'S MAGNETIC FIELD OVER THE LAST MILLENNIA FOR A CONTINENT LACKING IN EXPERIMENTAL DATA**
- 34-8** 10:35 AM Letaïef, Sarah*; Camps, Pierre; Poidras, Thierry; Nicol, Patrick: **MAGNETIC CHARACTERIZATION OF TRAFFIC-RELATED PM TO CHARACTERIZE URBAN AIR POLLUTION**
- 34-9** 10:55 AM Calvo-Rathert, Manuel*; Carrancho, Angel; Morales, Juan; Perez-Rodriguez, Nayeli; Lebedev, V.A.; Caccavari, Ana; Vegas, Nestor; Gogichaishvili, Avto: **A PALEOMAGNETIC AND PALEOINTENSITY STUDY ON A RAPIDLY EMITTED UPPER MIOCENE LAVA FLOW SEQUENCE FROM CAPE VERDE**
- 34-10** 11:15 AM Eckley, Scott*; Ketcham, Richard A.; Herrero-Bervera, Emilio: **COORDINATED 3D PETROFABRIC ANALYSES IN BASALT USING AMS AND X-RAY CT**
- 34-11** 11:35 AM Kletetschka, Gunther*; Kavkova, Radana; Ucar, Hakan: **EFFECT OF INFLATING PLASMA BUBBLE DURING AN IMPACT CRATERING ON ROCK MAGNETISM**
- 35-3** 3 Tapia, Fernando*; Sarmiento, Alicia; Vega, Ricardo; Barron, Arturo: **GENETIC CONDITIONS OF THE LA CEMENTERA SKARN SYSTEM AND ASSOCIATED INTRUSIVE BODIES, SONORA, MÉXICO**
- 35-4** 4 Sanchez Loera, Erendira Maria*; Barron, Arturo: **THE LARAMIDIC CERRO BACHOCO INTRUSIVE AND RELATED DIKES, SONORA, MEXICO**

SESSION NO. 36**S5. Celebrating the 50th Anniversary of the Department of Geoscience at University of Nevada, Las Vegas (Posters)**

8:30 AM, UNLV Student Union, Student Union Ballroom A/B

Authors will be present from 4 to 6 PM

Booth

- 36-1** 5 Agcproa, Brandon; Hoehn, Ted; Rowland, Stephen*: **ARE DECIMETER-SCALE CYCLES OF CORAL BIOSTROMES IN THE CARBONIFEROUS-PERMIAN BIRD SPRING FORMATION, NYE COUNTY, NEVADA, A BIOLOGICAL RESPONSE TO GLACIO-EUSTATIC SEA-LEVEL OSCILLATIONS?**
- 36-2** 6 Ciravolo, Amber*; Konrad, Kevin: **MAPPING THE JARVIS, KINGMAN, AND PALMYRA UNITS OF THE PACIFIC REMOTE ISLANDS MARINE NATIONAL MONUMENT**
- 36-3** 7 Kidman, Genevieve*; Burnley, Pamela C.; Salamat, Ashkan: **STRESS DISTRIBUTIONS IN POLYCRYSTALLINE QUARTZ USING RAMAN SPECTROSCOPY**
- 36-4** 8 Panduro-Allanson, Richard*; Burnley, Pamela C.: **EXAMINING STRESS DISTRIBUTION AND ITS EFFECT ON SHEAR LOCALIZATION IN POLYCRYSTAL MODELS**
- 36-5** 9 Traylor, Taryn*; Burnley, Pamela C.; Whitaker, Matthew: **THE ACOUSTOELASTIC EFFECT: MEASURING THE EFFECT OF STRESS ON P- AND S- WAVE VELOCITIES**

SESSION NO. 37**T3. Unraveling the History of the Rio Grande Rift: From Contraction to Extension and Evolution of the Rift (Posters)**

8:30 AM, UNLV Student Union, Student Union Ballroom A/B

Authors will be present from 4 to 6 PM

Booth

- 37-1** 10 Amato, Jeffrey*; Johnson, Emily; Ricketts, Jason; Wyatt, Michael; Vermillion, Karissa B.; Gavel, Michelle M.; Swenton, Vanessa: **INVESTIGATING THE TRANSITION FROM EOCENE SUBDUCTION TO OLIGOCENE EXTENSION IN SOUTHERN NEW MEXICO, USA**
- 37-2** 11 Woodard, Mason*; Iverson, Nels: **RE-EVALUATING THE EMPLACEMENT HISTORY OF THE CORNUDAS MOUNTAINS**
- 37-3** 12 Gilmer, Amy*; Thompson, Ren; Turner, Kenzie J.; Morgan, Leah: **EXTENSION-RELATED VOLCANISM ALONG THE MARGIN OF THE NORTHERN RIO GRANDE RIFT IN SOUTHERN COLORADO AND NORTHERN NEW MEXICO, USA**

SESSION NO. 38**T6. From the Sevier to Laramide: Connecting Hinterland to Foreland by Tectonics, Structure, and Sedimentation (Posters)**

8:30 AM, UNLV Student Union, Student Union Ballroom A/B

Authors will be present from 4 to 6 PM

Booth

- 38-1** 13 Vig, Zachary*; Finzel, Emily: **GEOCHEMICAL PROVENANCE ANALYSIS OF CONGLOMERATE CLASTS IN THE CRETACEOUS BEAVERHEAD GROUP OF SOUTHWESTERN MONTANA**
- 38-2** 14 Reed, Nathan*; Bidgoli, Tandsi; Moore, Kimberly: **STRUCTURAL STYLE AND EXHUMATION HISTORY OF THE FRISCO THRUST SHEET, SEVIER FOLD-THRUST BELT, UTAH**

POSTER TECHNICAL SESSIONS

SESSION NO. 35**S2. Mesozoic–Cenozoic Tectonic History of Northwestern Mexico and Southwestern USA: A Tribute to César Jacques-Ayala for His Career and Contributions to Sonoran Geology (Posters)**

8:30 AM, UNLV Student Union, Student Union Ballroom A/B

Authors will be present from 4 to 6 PM

Booth

- 35-1** 1 Siqueiros, Natalia*; Barron, Arturo; Hagadorn, James; Paz Moreno, Francisco A.: **PETROLOGIC CHARACTERIZATION OF MAFIC SCHIST PROTOLITHS, BAJA CALIFORNIA, MÉXICO: TESTING HYPOTHESIZED RELATIONSHIP TO CAMBRIAN VOLCANISM OF SONORA**
- 35-2** 2 Velderrain rojas, Luis*; Vidal Solano, Jesus Roberto; Alva valdivia, Luis Manuel: **ISLA SAN PEDRO NOLASCO: A LATE MIOCENE INTRUSIVE RECORD AT THE EASTERN MARGIN OF THE GULF OF CALIFORNIA: INSIGHTS FROM**

- 38-3 15 Konavaluk, Hanna*: **COMPARISON BETWEEN GEOCHRONOLOGIC AND GEOCHEMICAL PROVENANCE MODELS FOR CRETACEOUS SEDIMENTARY ROCKS IN SOUTHWESTERN MONTANA**
- 38-4 16 Neal, Bryce*; Laskowski, Andrew; Burrell, Will; Lonn, Jeff: **KINEMATIC EVOLUTION OF A WEST-VERGING FOLD NAPPE IN THE GEORGETOWN THRUST FOOTWALL, SW ANACONDA RANGE, MONTANA, USA**

SESSION NO. 39

T12. Advances in Understanding Arc Magmatism in the Southwestern Cordillera (Posters)

8:30 AM, UNLV Student Union, Student Union Ballroom A/B

Authors will be present from 4 to 6 PM

- | | | Booth # |
|-------|----|---|
| 39-1 | 17 | Bradley, Ben*; Economos, Rita; Gevedon, Michelle: CRETACEOUS MAGMATISM WITHIN THE MIDHILLS QUADRANGLE, TEUTONIA BATHOLITH, MOJAVE NATIONAL PRESERVE |
| 39-2 | 18 | McClure, Hollianne*; Miller, Robert B.: CONSTRUCTION, EMPLACEMENT, AND STRUCTURE OF TWO MAJOR INTRUSIVE SUITES IN THE NORTHERN SIERRA NEVADA BATHOLITH |
| 39-3 | 19 | Arnold, Victoria*; Miller, Robert B.: CONSTRUCTION AND STRUCTURE OF THE NORTHERN MARGIN OF THE LATE CRETACEOUS SONORA PASS INTRUSIVE SUITE, NORTH-CENTRAL SIERRA NEVADA BATHOLITH, CALIFORNIA |
| 39-4 | 20 | Dreger, Ethan*; Ardill, Katie: ANALYZING THE EFFECTS OF PLUTON SIZE AND COMPOSITION ON SCHLIEREN-BOUND MAGMATIC STRUCTURES IN THE SIERRA NEVADA, CALIFORNIA |
| 39-5 | 21 | Torres Andrade, Eneas*; Tikoff, Basil: MICROSTRUCTURAL EVIDENCE OF KINEMATICS IN THE MID-CRETACEOUS COURTRIGHT-WISHON SHEAR ZONE, CENTRAL SIERRA NEVADA BATHOLITH, CALIFORNIA |
| 39-6 | 22 | Pitsillides, Iason*; Johnston, Scott; Kylander-Clark, Andrew R.C.: PROTRACTED INTRUSION AND LATE HIGH TEMPERATURE DEFORMATION DURING CRETACEOUS HIGH FLUX MAGMATISM, SALINIAN ARC MIDDLE CRUST, CENTRAL COAST RANGES, CALIFORNIA |
| 39-7 | 23 | Nourse, Jonathan*; Thompson, Mark A.: NEWLY RECOGNIZED PERMO-TRIASSIC INTRUSIONS IN THE CLAREMONT WILDERNESS BLOCK, SAN GABRIEL MOUNTAINS, CALIFORNIA |
| 39-8 | 24 | Reid, Allison; Tapanes, Steven; Webber, Jeffrey*; Kemble, Richard; Elliott, Colleen: STRUCTURAL AND PETROLOGIC CHARACTERIZATION OF THE MOUNT POWELL BATHOLITH, WESTERN MONTANA |
| 39-9 | 25 | Grandy, Samuel*; Hausback, Brian; Bennett, Scott; Dorsey, Rebecca; Darin, Michael: MIOCENE-PLIOCENE VOLCANISM IN THE SIERRA SAN FRANCISCO, CENTRAL BAJA CALIFORNIA PENINSULA, MEXICO |
| 39-10 | 26 | Chango, Jaycee*; Mcleod, Jennifer; Kent, Adam: TEXTURAL AND GEOCHEMICAL ANALYSIS OF PLAGIOCLASE FROM TODD LAKE VOLCANO AND TRIANGLE HILL DOME COMPLEX OF CENTRAL OREGON |
| 39-11 | 27 | Marine, Henry*; Teasdale, Rachel; Harp, Andrew: CORRELATING PYROXENE CRYSTALS IN LAVAS OF MT. YANA WITH CLASTS IN VOLCANICLASTIC DEBRIS FLOW DEPOSITS OF THE TUSCAN FORMATION: AN ELEMENT OF THE MYANA EXPLORER SELF-GUIDED FIELD TRIP APP |
| 39-12 | 28 | Thompson, Erica*; Marine, Henry; Harp, Andrew; Teasdale, Rachel: TUSCAN FORMATION VOLCANICLASTIC DEBRIS FLOW DEPOSITS FROM ANCIENT MT. YANA: USING THE MYANA EXPLORER APP TO COMMUNICATE GEOLOGIC HISTORY TO THE PUBLIC |

- 39-13 29 Sutherland, Rebecca*; Murray, Kendra; Pu, Xiaofei; McCurry, Michael: **EVIDENCE OF RAPID PHENOCRYST GROWTH AND CONSTRAINTS ON PRE-ERUPTIVE TEMPERATURE AND MELT H₂O CONTENT OF BASALTIC FLOW SAMPLES FROM EASTERN SNAKE RIVER PLAIN OLIVINE BASALTS**

SESSION NO. 40

T14. Paleomagnetism, Rock Magnetism, Environmental Magnetism, Instrumentation, Archaeomagnetism, Planetary Magnetism, and Petrofabrics (Posters)

8:30 AM, UNLV Student Union, Student Union Ballroom A/B

Authors will be present from 4 to 6 PM

- | | | Booth # |
|------|----|---|
| 40-1 | 30 | Stevens, Zachary*; Mattinson, Chris G.; Anderson, Megan: USING PETROLOGIC TECHNIQUES TO CONSTRAIN GEOPHYSICAL PROPERTIES: EXAMPLES FROM THE CENTRAL CASCADES, WASHINGTON |
| 40-2 | 31 | Petersen, Klaus*: MAKING PALEOMAGNETISM A BUSINESS: TOWARDS DEVELOPMENT AND PRODUCTION OF A COMPREHENSIVE INSTRUMENTATION SUITE FOR PALEOMAGNETISM ANALYSIS APPLICATIONS - HARDWARE, SOFTWARE AND BEYOND |

SESSION NO. 41

T24. Sedimentary Record of Cordilleran Orogenic Systems (Posters) (GSA Sedimentary Geology Division; GSA Geochronology Division; GSA Structural Geology and Tectonics Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; and GSA Quaternary Geology and Geomorphology Division)

8:30 AM, UNLV Student Union, Student Union Ballroom A/B

Authors will be present from 4 to 6 PM

- | | | Booth # |
|------|----|---|
| 41-1 | 32 | Stone, Joshua S.*; Mattinson, Chris G.; Halfpenny, Angela; Lackey, Jade Star; McCarty, Kyle: EVALUATING THE IMPACT OF TRIPLE QUADRUPOLE LA-ICP-MS ACQUISITION METHODS ON ZIRCON U/PB ANALYSIS PRECISION |
| 41-2 | 33 | Alford, Ryan*; Surpless, Kathleen; Weis, Natalee; Yoshinobu, Aaron; Barnes, Calvin: LATE JURASSIC EVOLUTION OF THE GALICE BASIN, KLAMATH MOUNTAINS, CA AND OR, FROM DETRITAL ZIRCON AGES |
| 41-3 | 34 | Miller, David*: EXHUMATION, SUBSIDENCE, INVERSION, AND UNDERTHRUSTING OF AN INTRA-ARC RIFT BASIN IN THE NORTH FORK TERRANE OF THE KLAMATH MOUNTAINS, CA |
| 41-4 | 35 | Alamillo, Lauren A.*; Johnston, Scott; Kylander-Clark, Andrew R.C.: DETRITAL ZIRCON GEOCHRONOLOGY AND GEOCHEMISTRY OF SOUTHERN CALIFORNIA CRETACEOUS FOREARC STRATA, WESTERN TRANSVERSE RANGES |
| 41-5 | 36 | Lund Snee, Jens-Erik*: AGE CONSTRAINTS AND DEPOSITIONAL SETTING OF THE EARLIEST CENOZOIC SEDIMENTARY ROCKS DEPOSITED IN SEVERAL RANGES THROUGHOUT SOUTHERN NEVADA, USA |
| 41-6 | 37 | Ridl, Shay P.*; Hampton, Brian A.; Bartnik, Samantha R.: NEW CHRONOSTRATIGRAPHIC CONSTRAINT ON LATE JURASSIC (?) – EARLY CRETACEOUS SEDIMENTATION IN THE DISTAL CORDILLERAN FORELAND BASIN IN NORTHERN NEW MEXICO |
| 41-7 | 38 | Friend, Justin*; Hampton, Brian A.; Bonar, Alicia: DETERMINING THE EXTENT AND DEGREE OF DIAGENETIC ALBITIZATION OF DETRITAL FELDSPAR IN EARLY PERMIAN (WOLFCAMPAN) ARKOSIC, SYNOROGENIC, NONMARINE, STRATA THROUGHOUT NEW MEXICO |
| 41-8 | 39 | Preece, Madison*; Goldsby, Ryan; Thigpen, Ryan; Swanger, William: QUANTIFYING STRESS CONDITIONS OF DEFORMATION BAND FORMATION IN THE PARADOX BASIN, UTAH: IMPLICATIONS FOR RESERVOIR QUALITY PREDICTIONS |

AFTERNOON ORAL TECHNICAL SESSIONS

SESSION NO. 42

S5. *Celebrating the 50th Anniversary of the Department of Geoscience at University of Nevada, Las Vegas*

1:30 PM, UNLV Classroom Building Complex A, CBC-A 106

Eugene Smith and Matthew Lachniet, Presiding

- 1:30 PM **Introductory Remarks**
- 42-1 1:35 PM Lachniet, Matthew*; Smith, Eugene: **A BRIEF EARLY HISTORY OF GEOSCIENCE AT UNLV: FROM TUMBLEWEED TECH TO TOP TIER**
- 42-2 1:55 PM Rowland, Stephen*: **FROM EDIACARAN TAPHONOMY TO PLEISTOCENE MAMMOTHS: FIFTY YEARS OF RESEARCH IN PALEONTOLOGY AT UNLV**
- 42-3 2:20 PM Jiang, Ganqing*: **STUDYING SEDIMENTARY GEOLOGY AT THE UNIVERSITY OF NEVADA LAS VEGAS**
- 42-4 2:40 PM Konrad, Kevin*; Zanetti, Kathleen: **RECENT ADVANCEMENTS IN ⁴⁰AR/³⁹AR ANALYTICAL CAPABILITIES AT THE NEVADA ISOTOPE GEOCHRONOLOGY LABORATORY**
- 42-5 3:00 PM Bell, Aaron*; Waters, Laura: **DEVELOPING NEW TOOLS TO ASSESS REDOX DIVERSITY IN BASALTS AND THEIR MANTLE SOURCES: A CASE STUDY IN THE RIO GRANDE RIFT**
- 42-6 3:20 PM Brock-Hon, Amy*: **FROM NEVADA SOILS TO TENNESSEE DEPRESSIONS: INVESTIGATING FEATURES AT VARIOUS SCALES**
- 3:40 PM **Break**
- 42-7 3:50 PM Hausrath, Elisabeth M.*; Cardarelli, Emily; Cousin, Agnes; Lasue, Jeremie; Legett, Chip; Madariaga, Juan Manuel; Meslin, P.Y.; Sullivan, Robert; Udry, Arya; Wiens, Roger: **INVESTIGATING SOIL SURFACE CRUSTS AT JEZERO CRATER, MARS**
- 42-8 4:10 PM Carman, Nancy*; Hausrath, Elisabeth M.; Rampe, Elizabeth; Archer, Paul Douglas; Adcock, Christopher; Millan, Maeva: **WHERE SHOULD WE LOOK FOR EVIDENCE OF PAST LIFE ON MARS? CLUES FROM GLEN TORRIDON AND VERA RUBIN RIDGE, GALE CRATER, MARS**
- 42-9 4:30 PM Feldman, Anthony*; Hausrath, Elisabeth; Rampe, Elizabeth; Tschauner, Oliver; Peretyazhko, Tanya S.: **ULTRAMAFIC SOILS: ANALOGUES FOR INCIPIENT WEATHERING ON MARS**
- 42-10 4:50 PM Bonde, Aubrey*; Jones, AnnMarie; Rowland, Stephen; Breithaupt, Brent H.; Matthews, Neffra A.: **PALEONTOLOGICAL AND PALEOENVIRONMENTAL ANALYSIS OF THE MUDDY CREEK FORMATION NEAR LAKE MEAD, SOUTHERN NEVADA**
- 42-11 5:10 PM Mulligan, Suzanne R.*; Wells, Michael L.; Hoisch, Thomas D.; Wills, Marci: **ESTIMATES OF GEOLOGIC PRESSURES IN THE FUNERAL MOUNTAINS AND THE WOOD HILLS METAMORPHIC CORE COMPLEXES: QUIG VERSES THERMODYNAMIC MODELING**

SESSION NO. 43

T3. *Unraveling the History of the Rio Grande Rift: From Contraction to Extension and Evolution of the Rift*

1:30 PM, UNLV Classroom Building Complex A, CBC-A 110

Theresa Schwartz, Amy Gilmer, Jens-Erik Lund Snee, Jeremy Rugenstein and Jason Ricketts, Presiding

- 43-1 1:30 PM Abbey, Alyssa*; Niemi, Nathan: **DEVELOPMENT OF THE RIO GRANDE RIFT SYSTEM FROM ASSESSMENT OF SPATIOTEMPORAL PATTERNS IN FAULTING AND MAGMATISM**

- 43-2 1:50 PM Malavarca, Samantha*; Singleton, John; Sitar, Michael; Byars, Benjamin; Magloughlin, J.F.; Rahl, Jeffrey: **CHARACTERISTICS AND ORIGIN OF HIGH-GRADE METAMORPHISM OF THE PENNSYLVANIAN MINTURN FORMATION IN THE SANGRE DE CRISTO MOUNTAINS, SOUTHERN COLORADO**
- 43-3 2:10 PM McCormick, W. Mathew*; Gonzales, David: **ASSESSING CRUSTAL CONTAMINATION IN ~25 MA MAFIC ROCKS IN THE DULCE SWARM WITH ND-SR ISOTOPIC DATA, SOUTHWESTERN COLORADO**
- 43-4 2:30 PM Sitar, Michael*; Singleton, John; Rahl, Jeffrey; Caine, Jonathan; King, Jacob: **GEOLOGIC MAPPING AND KINEMATIC ANALYSIS OF THE BRITTLE-PLASTIC INDEPENDENCE MINE SHEAR ZONE IN THE SANGRE DE CRISTO RANGE, SOUTHERN COLORADO: OLIGOCENE-MIOCENE EXTENSIONAL REACTIVATION OF A LARAMIDE REVERSE FAULT**
- 2:50 PM **Break**
- 43-5 3:05 PM Koning, Daniel*; WoldeGabriel, Giday; Broxton, David E.: **AGE AND FLUVIAL EVOLUTION OF THE PALEO-RIO CHAMA, THE MAIN HEADWATER OF THE LATE MIOCENE AXIAL RIVER IN THE RIO GRANDE RIFT, USA**
- 43-6 3:25 PM Ridl, Shay P.*; Hampton, Brian A.: **DETRITAL ZIRCON PROVENANCE TRENDS FROM PLIO-PLEISTOCENE, AXIAL-FLUVIAL STRATA OF THE RIO GRANDE RIFT: A ~4 M.Y. HISTORY OF THE ANCESTRAL RIO GRANDE FLUVIAL SYSTEM, NEW MEXICO**
- 43-7 3:45 PM Spaur, Siânin*; Rugenstein, Jeremy; Koning, Daniel; Heizler, Matthew T.; Aby, Scott B.; Driscoll, Elizabeth: **THE HYDROCLIMATE RESPONSE TO WARMING IN THE SOUTHWESTERN US: A STUDY ACROSS THE MID-MIOCENE CLIMATE OPTIMUM**
- 43-8 4:05 PM Ruleman, Cal*; Hudson, Adam; Sortor, Rachel; Goehring, Brent M.; Brugger, Keith; Caffee, Marc W.; Goehring, Tanya; Frothingham, Michael; Nicovich, Sylvia; Rogers, John B.; Reheis, Marith; Turner, Kenzie J.; Thompson, Ren: **THE CENTRAL COLORADO ICEFIELD AND MIS 12-11 (~480-370 KA): A MECHANISM FOR PROTRACTED FLUVIAL INTEGRATION OF FRAGMENTED WATERSHEDS, AND ~250-300 METERS OF LANDSCAPE RELIEF, NORTHERN RIO GRANDE RIFT-SOUTHERN ROCKY MOUNTAINS, COLORADO AND NEW MEXICO, U.S.A**

SESSION NO. 44

T12. *Advances in Understanding Arc Magmatism in the Southwestern Cordillera II*

1:30 PM, UNLV Classroom Building Complex A, CBC-A 108

Robinson Cecil, Joshua Schwartz, PhD and Jade Star Lackey, Presiding

- 44-1 1:30 PM Campbell, Joella*; Cecil, Robinson; Lackey, Jade Star: **SPATIAL VARIABILITY IN ZIRCON TRACE ELEMENT GEOCHEMISTRY OF THE CRETACEOUS CALIFORNIA ARC**
- 44-2 1:50 PM Brady, Graham*; Lackey, Jade Star: **ASSESSING CRUSTAL INFLUENCE ON SILICIC CORDILLERAN ARC VOLCANISM IN THE MESOZOIC: WHOLE ROCK AND ZIRCON TRACE ELEMENT INSIGHTS**
- 44-3 2:10 PM Mcleod, Jennifer*; Kent, Adam: **INSIGHT INTO REGIONAL TECTONICS REVEALED THROUGH GEOCHEMICAL AND PETROGRAPHIC ANALYSIS OF THE RHYOLITES OF THE TUMALO VOLCANIC CENTER, CENTRAL OREGON**
- 44-4 2:30 PM Hausback, Brian*; Grandy, Samuel; Dorsey, Rebecca; Darin, Michael; Bennett, Scott: **VOLCANIC AND TOPOGRAPHIC EVOLUTION OF THE SIERRA SAN FRANCISCO, BAJA CALIFORNIA SUR, MEXICO**
- 2:50 PM **Break**
- 44-5 3:05 PM Bersson, Jessica*; Till, Christy; Schlieder, Tyler; Cooper, Kari M.: **EMPLOYING CRYSTAL ZONATION TO QUANTIFY ERUPTION INITIATION MECHANISMS**

Thursday, 17 March 2022

- 44-6 3:25 PM Huggins, Elynn*; Ruprecht, Philipp: **USING THERMODYNAMIC MODELING TO UNDERSTAND DISEQUILIBRIUM TEXTURES PRESERVED IN SILICIC ERUPTIONS**
- 44-7 3:45 PM Huggins, Elynn*; Ruprecht, Philipp: **MAGMA STORAGE DEPTHS PRIOR TO THE 2018 MOUNT VENIAMINOF ERUPTION, ALASKA**
- 44-8 4:05 PM Hosseini, Behnaz*; Myers, Madison L.; Saalfeld, Megan A.: **REASSESSING EMBAYMENT-BASED MAGMA ASCENT RATES FROM SILICIC TO INTERMEDIATE ARC ERUPTIONS**

SESSION NO. 45

T24. Sedimentary Record of Cordilleran Orogenic Systems (GSA Sedimentary Geology Division; GSA Geochronology Division; GSA Structural Geology and Tectonics Division; GSA Mineralogy, Geochemistry, Petrology, and Volcanology Division; and GSA Quaternary Geology and Geomorphology Division)

1:30 PM, UNLV Classroom Building Complex A, CBC-A 112

Tomas Capaldi, Alex Tye and Elizabeth Balgord, Presiding

- 1:30 PM **Introductory Remarks**
- 45-1 1:35 PM Perez, Nicholas*: **DERAILING A CORDILLERAN SYSTEM IN THE SOUTHERN PERUVIAN ANDES**
- 45-2 1:55 PM Plonka, Zoey*; Capaldi, Tomas; Odum, Margaret; Ortiz, Gustavo; Alvarado, Patricia A.: **TRACKING THE NEOGENE TECTONIC EVOLUTION OF THE ACTIVE ANDEAN THRUST FRONT USING THE FORELAND BASIN RECORD AND DETRITAL GEO-THERMOCHRONOLOGY, WESTERN ARGENTINA (31-32°S)**
- 45-3 2:15 PM Surpless, Kathleen*; Alford, Ryan; Weis, Natalee; Barnes, Calvin; Yoshinobu, Aaron: **PALEOGEOGRAPHY OF THE LATE JURASSIC KLAMATH ARC FROM DETRITAL ZIRCON HAFNIUM ANALYSIS OF THE GALICE FORMATION, KLAMATH MOUNTAINS, OR AND CA**
- 45-4 2:35 PM Richmond, Dean*: **THE TIDAL-FLAT PARASEQUENCE OF THE OXFORDIAN SWIFT FORMATION OF CENTRAL MONTANA**
- 45-5 2:55 PM Parrish, Judith Totman*; Chan, Marjorie A.; Hasiotis, Stephen T.; Hyland, Ethan G.: **DOLOMITIZATION PATTERNS IN FRESHWATER CARBONATE AS EVIDENCE OF DIFFERENTIAL BURIAL DEPTH OF THE JURASSIC NAVAJO SANDSTONE, UTAH, USA**
- 3:15 PM **Break**
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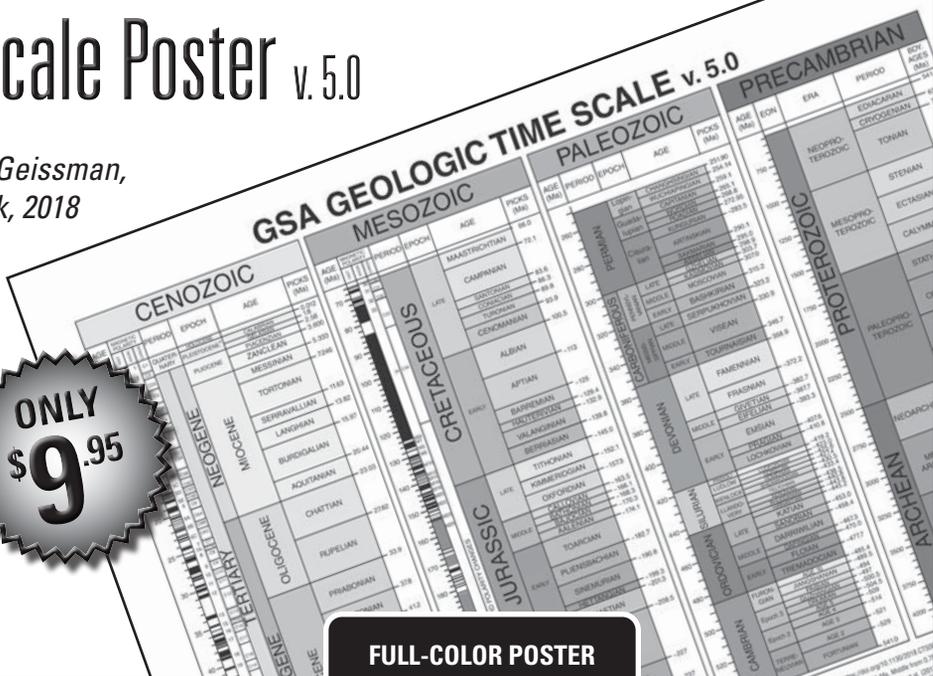
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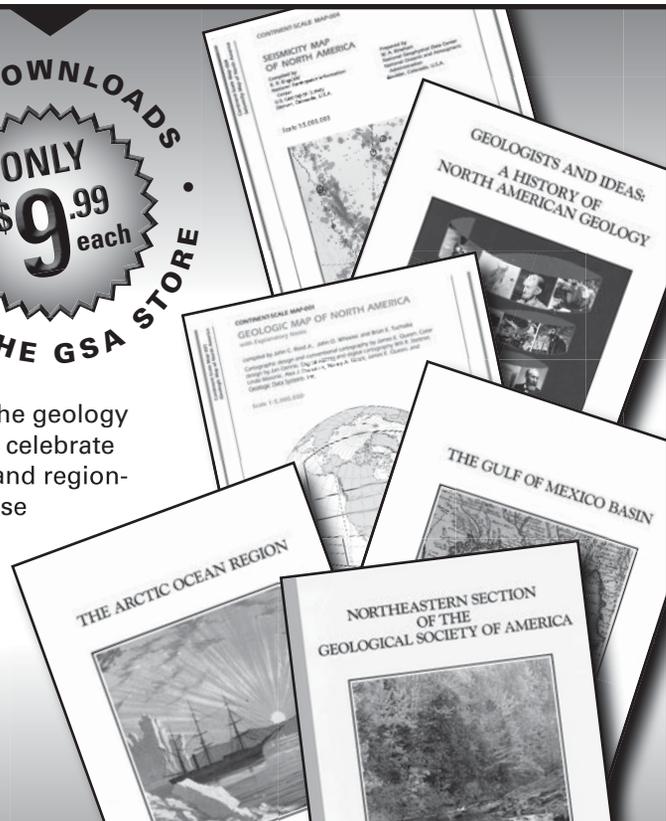
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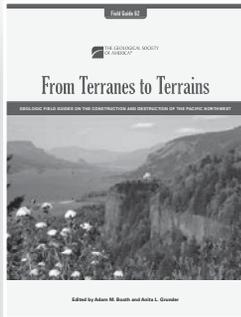


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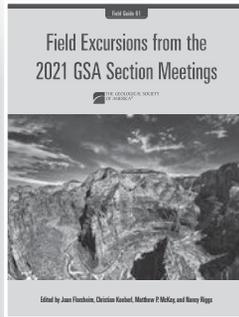


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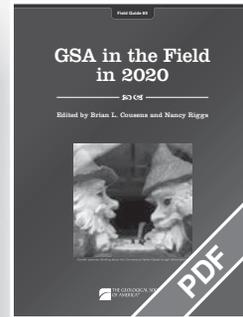
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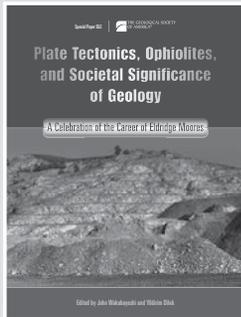
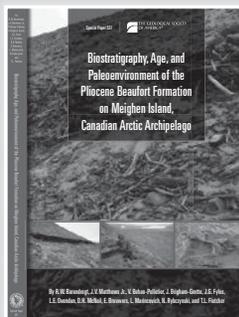
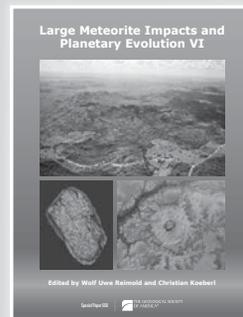


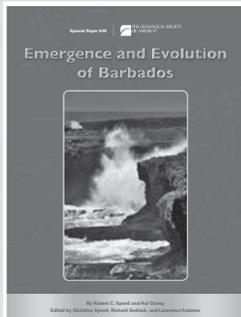
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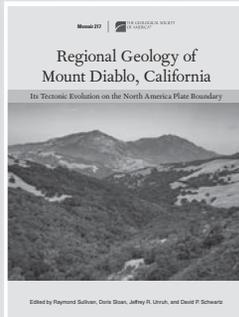
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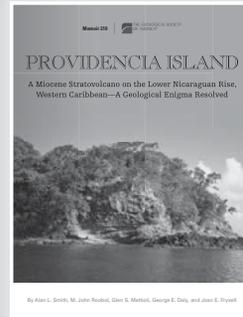
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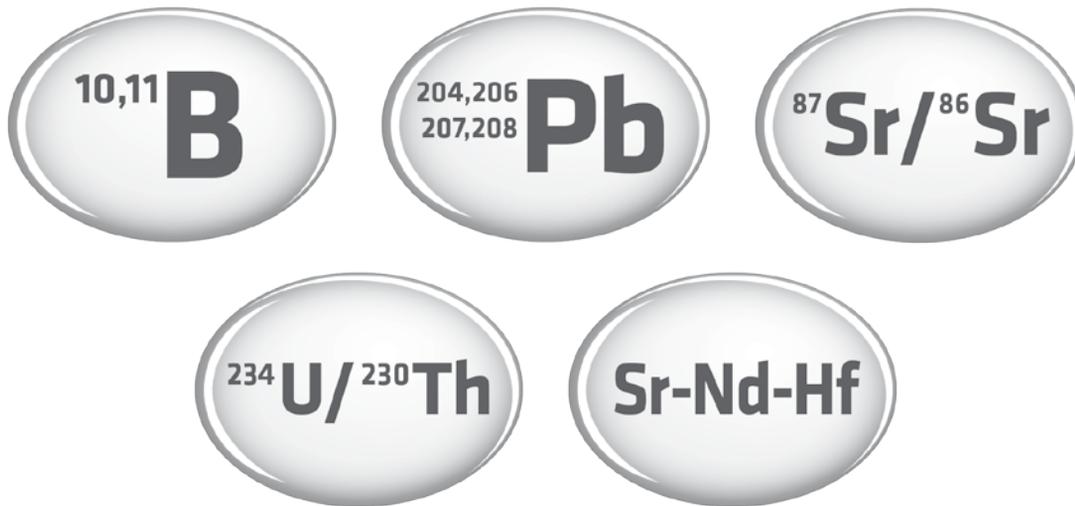
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