National Election Officer Candidates
The Way of Light
61st Annual National Conference
Water Resources in Gaza
Challenge categories:
1. Off the Beaten Path - Unique feature/formation.
2. Ancient Life - Fossil hunting finds.
3. Geologists in the Field - People at work/field trips.

Challenge Rules:
- Image requirements: digital, 300 dpi, 8.5”x11”, portrait orientation full color.
- Members are allowed one entry per category with up to four submissions (one per category).
- All images must be original and taken by the member.
- Submit entries via email to aipg@aipg.org.
- Entries must include:
  - Name
  - Member number
  - Section
  - Title of image
  - Less than 200 word description of the image
  - Names of any identifiable persons in the image and permission to publish their photo
  - Year photo taken
- Entry deadline: November 1, 2024.

Awards:
- First place in each category: Image published on the cover of TPG in 2025. Winners will receive a personalized Estwing rock hammer engraved with their name and member number or AIPG Gear of choice up to $50.
- Runners Up in each category: Images will be published in the TPG in a special feature album. Runners up will receive AIPG gear of choice up to $30.
On the Cover: 2023 Photo Contest Winner - Geologists in Action

Description: Geologic Guidance Underground. This photo illustrates part of the daily work of an underground grade control geologist at the Galena Mine in Wallace, Idaho. Geologist Emily Fredericks is showing two miners the geologic structures mapped in their area to better help them stay on grade. This picture was taken on the 3200 Level, which is 3,200 feet below the surface in a narrow - vein Ag/Cu/Pb stope.

Photograph by Sadae Lortz, CPG-12097, Idaho Section, 2022.
Welcome to the 2024 Student Edition of TPG! As can be expected from past editions, we have quite a variety of information for your reading enjoyment and professional edification. Much of it is information for students or written by students, including several of the standing columns (including this one). I hope you enjoy it, but even more, I hope you consider writing a piece yourself. Get involved, and support our profession with your experiences, research, or opinions!

This edition is the customary one for introducing our membership to those candidates who are standing for election to the various National offices. This year, those offices to be filled include President Elect, Vice President, Treasurer, and Early Career Professional (ECP). Unfortunately, the nominating committee had an extremely difficult time in identifying people willing to stand for election. Once again, we have a situation where we have a single candidate running for a position. This is troubling to the Executive Committee and is not a case where the Executive Committee is trying to “stack the deck” or select who will be allowed to serve on the board. On the contrary, we much prefer to have a full slate of candidates and an election with two outstanding candidates running for each position. If you have not given thought to participating in AIPG at the National level, please consider doing so. We need YOU! And in the meantime, please be sure to VOTE for your choice of candidate.

Information on the 2024 Annual Conference in Durango, Colorado is also included. There are six great field trip options to learn from area experts while you see some of Colorado’s spectacular geology. One trip includes viewing incredible geology via train ride to or from the primary stop, and another trip includes access to an underground mine. This year’s meeting will be held early (in August), much like the 2022 Annual Meeting that was held in Marquette, Michigan. And like that meeting, this one will be held on a college campus.

Something you will note while perusing this edition of TPG is a feature you haven’t seen in a few years; the complete listing of AIPG student chapters. In case you are wondering, there are currently 57 student chapters, and we’ve had inquiries about the formation of a couple of new ones. Hopefully, we’ll continue to see our members help to establish new student chapters each year, in spite of the closure or reduction of geology departments across the country.

So, you ask, what do all of these things have to do with the title of this column? They all are a mechanism for you to make a connection with your peers. Or a mentor or mentee. Knowledge sharing and making contacts with other professionals is just as important today as it has ever been. Those of us who have years of experience know that it is not just what you know, but who you know that can make a difference when you are looking for a first or a new position. And back at the dawn of our membership in AIPG, most of us knew very few people in the organization. That changes with time if you participate in activities that are offered.

You’ve undoubtedly heard the expression “There’s strength in numbers.” This is very true and in more ways than you think, especially, connecting with other AIPG members who share the values of competence, integrity, and ethics gives you surety of the quality of their work and the organizations for which they work. First, the more of your peers you know, the better your odds of knowing someone who might have the answer to a question you have or you could partner with to land that big project with a high profile client. If you are seeking a job and/or career advice, whether it is your first, you have experienced corporate downsizing, or you are searching for a more fulfilling position to better fit your skillset or career aspirations, knowing more people greatly increases the odds that you will find one that fits your needs. Your connections may serve as references, offer you an inside scoop on an unadvertised position, or be the connection that helps you land that dream job. Having more geologists who are able to stand together and uphold high standards of professionalism as one also gives credibility to our science in the eyes of the public or legislators when it comes to particular issues or concerns.

Allow me to share a little about the Michigan Section (of which I’m a member) and how it enables its members to make connections. Being a very active Section is important; it is necessary to have activities to encourage members to participate. We have four professional development Section meetings with technical presentations and a social hour before dinner to give members...
LETTERS TO THE EDITOR

Adam,

Thank you for including the list of new CPGs January 1, 2023 – November 17, 2023 in TPG Jan/Feb/Mar 2024 edition. The announcement layout is very nice as well.

It was nice to chat at the annual meeting. I appreciated having you follow up on my observation that TPG used to include a list of new CPGs and members and I had not seen it for several years. It is nice to acknowledge new CPGs especially. The list is also a great resource for Sections to see new CPG members, and hopefully follow up by contacting them directly.

Many of you have probably heard about the Michigan Section’s Environmental Risk Management Workshop. Now in its 13th year, this event brings together both seasoned and emerging professionals from the state and around the country for two days of cutting-edge technology presentations and demonstrations, not to mention the social mixer we have the evening of the first day. This event is open to all, although registration is limited to the number that can be accommodated by the facility. If you plan to attend, register early because it sells out each year.

I’d like to hear stories from you about how your Section enables your members to make connections, or what you as individuals do or have done. Writing a technical article or an opinion piece for TPG is another way of growing your network and making connections. Start making yours today!

Barbara Murphy, AZ Section, CPG-06203

Erratum

There is an error in Table 2, page 24 of the Jan/Feb/Mar 2024 edition of TPG in the article Stormwater Infiltration Design System. The value for ft/d for Low Bulk Density, High Ksat is incorrect. It is shown as 0.3 ft/d and should be 3.0 ft/d.

A typographical error was in the title of Table 7 on page 28 for the same article. It reads Model Mounding versus Design Standards, it should be versus.

Thanks to the author, Andrew Koenigsberg, CPG-07973 for the correction.

2023 Photo Contest

Runner Up Geologists in Action.

Description: Glacier in Perú

The photograph of Edgar William Alayo León was taken in the Central Andean of Perú is the last Glacier called "Huagaruncho Glacial" in Junin Region and the altitude is around to 4600 meters above the sea. The Granodiorite of Paleozoic age also called Paucartambo Granodiorite is a very important host of gold veins quartz. The exploration in the area is very difficult because the mountains are very steep, the geologist must be in good condition to face these challenges. However, many geologist in the world like me enjoy of landscape and nature.

Photo taken in 2021 by Edgar William Alayo León, CPG-12026 - International Section.
This year, AIPG will be holding its 61st Annual Conference in the foothills of the magnificent San Juan Mountains of Colorado! You cannot miss this spectacular geologic opportunity! The conference will be held at Fort Lewis College in Durango from August 10 through 13; a perfect place to escape the heat for those of us that live in hotter parts of the country. The theme of the conference is “Resources of the West” and will include two days of field trips and a day of technical presentations. We have organized three field trips on Sunday, August 11 and two trips on Tuesday, August 13 that include an opportunity to ride the historic Durango-Silverton Narrow Gauge Railroad train between Durango and Silverton. We also have trips to the La Plata Mountains, the mine remediation activities of the Bonita Peak Mining District near Silverton including an underground tour of the Old Hundred Mine, and a field trip to spectacular exposures of Mesozoic sedimentary formation in the vicinity of Durango. Another field trip on Tuesday will be made to Sand Canyon, about an hour west of Durango. Sand Canyon has exceptional exposures of Jurassic dune deposits that have been sculpted by wind and rain to form arches and alcoves used by ancient native societies for dwellings. For those who can’t get enough of this area, we have also organized a post-conference, two-day field trip to Ouray, Colorado also known as the “Switzerland of the U.S.”

Please make your hotel reservations as soon as possible. August is peak tourist season in Durango and Ouray and hotel rooms fill up fast!

Please plan to join us for what will undoubtedly be a very memorable event! We look forward to seeing you in August!

Doug Bartlett, CPG
Chair, Organizing Committee
## Conference Agenda

### Saturday, August 10, 2024

<table>
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<tr>
<th>Time</th>
<th>Event</th>
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<tr>
<td>7:30 am - Noon</td>
<td>Registration Open</td>
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<tr>
<td>8:00 am - Noon</td>
<td>AIPG Executive Committee Business Meeting</td>
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<td>9:00 am - 5:00 pm</td>
<td>AIPG Student &amp; Early Career Professional (ECP) Workshop</td>
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<td>Noon - 1:00 pm</td>
<td>Lunch (open to all registrants)</td>
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<td>1:00 pm - 4:00 pm</td>
<td>AIPG Advisory Committee Meetings</td>
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<tr>
<td>4:00 pm - 4:30 pm</td>
<td>AIPG 2024-2025 Executive Committee Incoming/Outgoing Meeting</td>
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<td>4:30 pm - 5:30 pm</td>
<td>Foundation of the AIPG Meeting</td>
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<td>5:00 pm - 8:00 pm</td>
<td>Student Welcome Reception, Speed Networking &amp; Trivia Game Night</td>
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### Sunday, August 11, 2024

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<th>Time</th>
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<tr>
<td>7:30 am - 7:00 pm</td>
<td>Registration Open</td>
</tr>
<tr>
<td>8:00 am - 4:00 pm</td>
<td>Mine ARD Remediation and Old Hundred Mine Tour</td>
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<tr>
<td>9:00 am - 5:00 pm</td>
<td>Exploring the Geology of the La Plata Mountains</td>
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<tr>
<td>9:00 am - 5:00 pm</td>
<td>Geologic Highlights of Animas Valley</td>
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<tr>
<td>10:00 pm - 4:00 pm</td>
<td>Exhibitor and Poster Set Up at Ft. Lewis College</td>
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<tr>
<td>6:00 pm - 8:30 pm</td>
<td>Welcome Reception and Foundation Silent Auction</td>
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### Monday, August 12, 2024

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<td>7:30 am - 5:00 pm</td>
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<td>7:00 am - 7:50 am</td>
<td>Section Representative Meeting (open to all registrants)</td>
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<td>7:00 am - 7:50 pm</td>
<td>AIPG Past Presidents' Breakfast</td>
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<tr>
<td>8:00 am - 9:00 am</td>
<td>Welcome and Plenary Session</td>
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<tr>
<td>9:00 pm - 5:00 pm</td>
<td>Technical Sessions</td>
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<tr>
<td>Noon - 1:30 pm</td>
<td>Lunch with Keynote Speaker (open to all registrants)</td>
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<tr>
<td>6:00 pm - 8:30 pm</td>
<td>AIPG Awards Dinner</td>
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### Tuesday, August 13, 2024

<table>
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<tr>
<th>Time</th>
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<tr>
<td>7:00 am - 3:00 pm</td>
<td>Field Trip - Sand Canyon Geology and Archeology</td>
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<tr>
<td>8:00 am - 5:00 pm</td>
<td>Field Trip - Durango and Silverton Narrow Gauge Railroad Train Trip</td>
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<td>Trip 1 - Ride the train to Silverton and take a bus back to Durango</td>
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<td>Trip 2 - Ride a bus to Silverton and take the train back to Durango</td>
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### Wednesday, August 14 - Thursday, August 15, 2024

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<tr>
<th>Time</th>
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<tr>
<td>8:00 am - 5:00 pm</td>
<td>2-day Field Trip in Ouray, Colorado</td>
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</table>
Join the American Institute of Professional Geologists (AIPG) and the AIPG Colorado Section for the 2024 61st National Conference "Resources of the West," in Durango, Colorado. This is a great opportunity to promote your company and increase your brand exposure to hundreds of professionals locally and throughout the US.

**All sponsors receive the following standard benefits:**
- Company logo on the AIPG Conference website with a link to your website
- Signs displayed throughout the conference will include your company logo
- Company logo will be included on the online conference program

If you have a sponsorship idea you don’t see on our list, we can create a custom package for your company.

### Additional benefits with these levels:

**San Juan Level: $3,000**
- Registration bag sponsor
- One free exhibit booth (includes a free registration) or one free registration
- Full page color ad in *The Professional Geologist* (TPG) one issue

- **Add $300** for an additional year of TPG, half-page color advertisement, 4-issues

**Eolus Level: $2,500**
- Lanyard Sponsor - lanyards provided by sponsor
- One free registration
- Half page full color ad in *The Professional Geologist* (TPG) one issue

- **Add $300** for an additional year of TPG, half-page color advertisement, 4-issues

**La Plata Level: $1,500**
- Welcome Reception Sponsor
- Quarter page full color ad in *The Professional Geologist* (TPG)
- Company logo on Welcome Reception signs

- **Add $100** for an additional year of TPG, quarter-page color advertisement, 4-issues

**Silverton Level: $1,000**
- Lunch Sponsor
- Company logo on lunch signage

**Durango Level: $500**
- Break Sponsor
- Company logo tents on food tables

**Hesperus Level: $250 Coffee Sponsor**
- Company logo tents on coffee tables

**Ft. Lewis Level: $100 Student Sponsor**
- Company logo tents on coffee tables

**TOTAL AMOUNT:** $________________   Date:_________________

- Check enclosed (payable to AIPG)
- Please invoice - payment due within 30 days
- Credit Card (circle one) Master Card, Visa, Discover, or American Express

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**Signature**

**Sponsoring Individual or Company:**

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*Send Sponsorship Form to: AIPG, 1333 W. 120th Avenue, Suite 211, Westminster, CO 80234 (303) 412-6205 • Fax (303) 253-9220 • www.aipg.org, cld@aipg.org

AIPG will contact you upon receipt of this form to complete arrangements.*
The 61st American Institute of Professional Geologists National Conference will be held in Durango, Colorado, August 10-13, 2024.

You are invited to join us as an exhibitor and offer your support and services to the geoscientists and partners gathering to address the critical needs of our communities and world. This conference will showcase how geoscience professionals are helping to solve environmental and economic challenges.

Participants will be coming from: Environmental Consulting, Energy, Oil and Gas, Mining, Laboratory Analytical Services, Hydrology, Engineering and Environmental Services, Universities, Government Agencies and Non-Profit Industry Sectors.

All Exhibitors Receive the Following Standard Benefits

- One complimentary meeting registration that includes technical presentations, the welcome reception on Sunday and lunch and breaks on Monday
- Company logo on the AIPG Conference website with a link to your website
- Signs displayed throughout the conference will include your company logo
- Company logo will be included in the online conference program
- Skirted table and two chairs

Exhibitor fees do not include hotel registration. Refer to our list of hotels with contracted room blocks on the AIPG website (www.aipg.org). **coming soon!**

This is a great time to visit Durango and the hotels may fill up, so be sure to make a reservation soon!

**Set-Up / Tear Down**
Exhibitor set-up is on Sunday, August 11th, from 10:00 am to 4:00 pm. Booth tear down is on Monday, August 12th from 3:30 pm – 9:00 pm.

**Space Assignments and Deadlines**
Exhibit contracts and a final payment of exhibit fees are due within 30 days of the submittal of the agreement and no later than three weeks before the event. All spaces and space location requests will be assigned on a first-come, first-served basis until filled.

**Acceptance of Terms**
I acknowledge that photographs, videotapes, and other media images may be taken during the conference. I hereby grant permission to AIPG to use these images in any manner AIPG decides for advertising, display, audiovisual, exhibition, or editorial use. I waive any right to compensation in connection with the use of such images.

**Location - Fort Lewis College**
Student Union Building, Second Floor
1000 Rim Drive
Durango, CO 81301
YES!! We want to be part of the AIPG 2024 61st National Conference "Resources of the West," August 10-13, in Durango, Colorado. Completed forms can be sent to: 1333 W. 120th Avenue, Westminster, CO 80234, faxed to (303) 253-9220, or email to cld@aipg.org.

___ $600.00 Exhibit Booth (Includes one complimentary meeting registration)
___ $350.00 Reduced Rate Color Advertising in The Professional Geologist, half-page, 4-issues
___ $325.00 Additional Exhibitor Registrant

Exhibit Booth Form

Exhibitor Information

Name (as you wish it to appear on your badge)

Title

Company

Address

City, State/Province, Zip

Phone

E-mail Address

Website

Additional Exhibitor Registrant

$325 for each additional person.

Name (as you wish it to appear on your badge)

Title

Company

Address

City, State/Province, Zip

Phone

E-mail Address

TOTAL AMOUNT: $

___ Check enclosed (payable to AIPG)
___ Please invoice immediately - payment due within 30 days
___ Credit Card (circle one): Visa MC AmEx Discover

Card Number: _____________________________

Expiration Date: ____________ CVV (3-4 digit) ____________

Card Holders Name: ____________________________

Card Holders Address: ____________________________

Signature: ____________________________

Exhibit Hours

- Set-up Sunday, August 11, 2024, 10:00 am – 4:00 pm
- Sunday, August 11, 2024, 6:00 pm – 8:30 pm (reception)
- Monday, August 12, 2024, 8:00 am – 3:30 pm
- Tear down, August 12, 2024, 3:30 pm - 9:00 pm

Space Requirements/Accommodations

Space will be reserved on a first-come, first-served basis and we will try to honor special requirements.

Indicate your space requirements or accommodations below:

☐ Electrical (please bring your own power strips/electrical cords)
☐ Other ____________________________

Please note that AIPG is not responsible for any lost or stolen items. The exhibit room will be locked at night, but we cannot guarantee security.

Authorization

I, on behalf of my company, hereby acknowledge that we have received, read, and understand the 2024 Exhibitor Prospectus and Terms & Conditions. Furthermore, we understand that these Terms & Conditions are a part of this contract and that by signing this application, we agree to be bound by all the terms contained therein.

Signature ____________________________ Date ____________________________
ANNUAL CONFERENCE FIELD TRIPS

Mine ARD Remediation and Old Hundred Gold Mine Tour
Leader - Staff from the Old Hundred Mine
Sunday, August 11, 2024 - 8:00 am - 4:00 pm

The U.S. Environmental Protection Agency (EPA) is leading efforts to remediate Acid Rock Drainage from the Bonita Peak Mining District north of Silverton, Colorado. The Bonita Peak Mining District consists of 48 historic mines or mining-related sources where ongoing releases of metal-laden water and sediments are occurring within the Mineral Creek, Cement Creek and Upper Animas River drainages in San Juan County, Colorado. Historic mining operations have contaminated soil, groundwater, and surface water with heavy metals. A remedial investigation to determine the nature and extent of contamination is underway. EPA continues to treat mine-impacted water from the Gold King Mine at the Interim Water Treatment Plant (IWTP) at Gladstone. EPA established an interim sludge management location at the Kittimac Tailings area near Silverton. At this location, 14,000 cubic yards of sludge from the IWTP were mixed with 20,000 cubic yards of tailings.

This field trip will include a tour of the EPA's treatment facilities at Gladstone near the Gold King Mine and the American Tunnel. In addition, we will visit the sludge management facility at the Kittimac Tailings. Following the field visit to Gladstone and Kittimac, we will tour the Old Hundred Gold Mine – an underground mine that has been converted to a tourist and education center allowing visitors to observe a former underground mine operation.

The field trip will include short hikes and participants should be prepared for variable weather as rain storms are common in the afternoon in the San Juan Mountains.

Exploring the Geology of the La Plata Mountains
Leader – David Gonzales
Sunday August 24, 2024 - 9:00 am – 5:00 pm

The La Plata Mountains are one of several Late Cretaceous laccolithic complexes that were developed in northwestern New Mexico and southwestern Colorado ~70 Ma during the Laramide orogeny. The La Plata Mountains straddle a major regional structural boundary between the Four Corner plateau and the San Juan uplift.

These mountains were created by emplacement of 70-60 Ma subalkaline to alkaline plutons into Paleozoic to Mesozoic sedimentary rocks causing contact metamorphism and skarn formation. The intrusive rocks in the La Plata Mountains are mostly potassic calc-alkaline to alkaline monzonite and diorite with lesser syenite and gabbro. Base and precious metals mineralization were allied with magmatism and related thermal metamorphism. The rugged landscape in this mountain range was created by glaciation and fluvial erosion along with numerous mass movement events.

This tour will provide a sampling of the geology in the La Plata Mountains. We will stop at various points on this 4 x 4 tour to examine various intrusive masses, contact metamorphic zones, ore deposits, and recent surficial deposits. At Kennebec Pass we will have one of the most magnificent views of the landscape and geology in southwestern Colorado.

Participants should expect unpredictable summer weather; hikes up to 0.5 miles.
Geologic Highlights of Animas Valley

Leader – Gary Gianniny
Sunday, August 24, 2024 - 9:00 am to 5:00 pm

The Animas River Valley in which the town of Durango lies includes some of the best geologic exposures of Precambrian to Tertiary geology in the Southwest U.S. This field trip will focus on outcrops of various Mesozoic formations including the Triassic arkosic sandstones of the Cutler Formation deposited in alluvial fans and streams that flanked the Ancestral Rocky Mountains, the Triassic Dolores Formation of the Chinle Group which includes floodplain deposits of siltstones and sandstones, Jurassic dune deposits of the Entrada Sandstone, and cliff-forming upper Cretaceous sandstones and conglomerates of the Dakota and Burro Canyon Formations. These beautifully colored formations are tilted to the south and southwest as a result of the uplift of the San Juan Mountains area during the Laramide and mid-Tertiary orogenic events.

Transportation in vans will be provided. Because of limited space for parking at field trip stops, the number of participants will be limited.

You should expect unpredictable summer weather; hikes up to 0.5 miles.

Rocks and Rails

Leader - TBA
Tuesday, August 13, 2024 – 8:00 am - 5:00 pm (all day)

Participants have the option to ride the Durango & Silverton Narrow Gauge Railroad to Silverton and return on a bus; ride the bus to Silverton and return on the train.

The train ride from Durango to Silverton will navigate a geologic record from the late Mesozoic into the Proterozoic complex of the Needle Mountains, and end in the boundary of the Silverton caldera. The train route follows the Animas River which flows down a glaciated canyon exposing the geologic history. The landscape and vistas on this ride are amazing and unforgettable.

The bus ride will give participants a different perspective of the geology of southwestern Colorado with fantastic vistas of the landscape and rock record.

Be prepared for changing weather conditions and cooler conditions at the higher elevations near Silverton. It is difficult to have conversations on the train, so it might be helpful to review the geologic train guide before the trip. The guide ‘Geology of the Durango-Silverton Train Route’ by David Gonzales and Lauren Heerschap can be purchased in the gift shop and is published by D&SNGRR & Fort Lewis College.
ANNUAL CONFERENCE FIELD TRIPS

Sand Canyon Geology and Archeology

Leaders – Chris Heine and Jim Corken
Tuesday, August 13, 2024 – 7:00 am – 3:00 pm

Sand Canyon is located about an hour west of Durango. This field trip will include a hike through Lower Jurassic and Upper Cretaceous formations in the Southwest corner of Colorado, 12 miles west of Cortez. We will see three-major aeolian (ancient dune sands) packages within the Jurassic: the Navajo SS, the Entrada SS, and the Junction Creek member of the Morrison Fm. The Entrada is a major arch and alcove former in Sand Canyon as well as in Arches National Park. In addition to the outstanding geology, the hiking trail gets very close to a few well-preserved archaeological ruins.

The area is at an elevation of around 6,000 feet. In August it will likely be hot with afternoon temperatures around 90 degrees or so. For this reason, the trip will start early in the morning to avoid the hottest parts of the day. Broad brimmed hats, sunglasses, sun protective clothing, decent hiking shoes and lots of water are highly recommended. The trail for the most part is flat with a few mild slopes to contend with. The trail is considered 'easy'.

Additional side trips may be made to a nearby winery and archeological museum.

Call for Abstracts

AIPG is currently accepting abstracts for oral presentations and poster presentations for the 61st American Institute of Professional Geologists' National Conference to be held at Ft. Lewis College in Durango, Colorado, August 10-13, 2024. The theme of the conference is "Resources of the West."

Presentations regarding the challenges and opportunities of both utilizing and preserving the natural resources of the western states are sought for this conference. All geoscience disciplines are welcome to contribute!

The national conference provides opportunities to present and learn from experts in various geology and geoscience fields, with networking opportunities throughout the conference. Earn CEUs/PDHs too!

Deadline: May 13, 2024

Scan for Details
Geology of Ouray, “Switzerland of America”

Leaders – David Gonzales, Steve Cumella

Wednesday, August 14, 2024 – Thursday, August 15, 2024 -
9:00 am to 5:00 pm (both days)

Cost – No fees to AIPG, but we do need to keep a list of those attending (you will drive to Ouray and make your own hotel reservations)

Sometimes called the “Switzerland of America” the town was named for Chief Ouray who was leader of the Ute Tribe around 1875. The town was first settled by prospectors in 1875 and was incorporated in October of 1876. It was the hub of the Ouray mining district for nearly 100 years.

An extensive record of geologic events is exposed in this area ranging from 1705 Ma to present day. On this two-day trip we will explore the geologic history of the area, focusing on some of the key events that have shaped the geologic record.

- Proterozoic crustal evolution
- Paleozoic to Cenozoic stratigraphic and structural history.
- Late Cretaceous to Miocene magmatic history including breccia pipes and dikes.
- Eocene uplift and erosion.
- Mineralization
- Glacial history

Participants are required to drive personal vehicles to Ouray and reserve lodging. You will also be driving throughout the field trip (sharing rides may be an option).

Driving times between stops vary from as little as 15 minutes to as much as 30 minutes. Please plan accordingly. Restroom facilities are limited outside the town of Ouray.

You should expect unpredictable summer weather; hikes up to 1.5 miles.
If someone had told me that joining the ranks of geology was “coming to the light”, I would have been incredulous. Despite all of geology’s virtues, light did not seem to be among them. Rocks, absolutely, ocean currents, understandable, even animals of ages past – those all I can understand, but light? As it turns out, even light has been pressed into the service of geology for investigation of things both great and small. In more recent years, the reflectance of light off vegetation has formed the foundation of remote sensing. Yet before even satellites was optical mineralogy, the study of the careful dance of light through rocks (Figure 1). Unlocking this microscopic world, however, requires the dedication of many hours of labor over the course of several weeks.

The journey begins as every good journey ought to: in the field. Specimens judiciously selected depending on the desired information, hand samples are sent to the thin section lab where the samples are cut using a rock saw to roughly two centimeters across, three to four centimeters long and a centimeter or two thick, a small slab of sample known as a ‘billet’ (Figure 2, page 15). This now in hand, it is the responsibility of such rare practitioners to produce a sample a fraction of the thickness of a human hair. For many samples, their journey from two centimeters to 30 micrometers thick will take place over the course of several weeks, beginning with smoothing the sample on a grinding wheel. Once the smallest micrometer-scale bump or groove has been worn away and no longer evident to the touch of a finger, the samples are whisked away for a “mud mask” made of epoxy glue and hardener. This mixture is applied to the working side of the billets before being left for two hours to harden in any pores or cracks in the samples’ surfaces. This is once again taken to the grinding wheel and worn away down to the working face of the billet, but not so far as to remove the newly epoxy-filled surface.

At this juncture begins the billets’ transformation under the attention of more sophisticated tools and technical prowess. The samples are introduced to a special automated grinding stone for first-phase lapping to provide a more precise grind. Each sample must be inspected for scratches or remaining epoxy, intended for quality control but often becoming a favorite time to get a closer look at the samples (who knew so much pyrite can be found in granite!). If meeting the qualifications, the
working faces of the billets are mounted onto previously frosted slides and allowed to harden for two hours. Next, the sample must be “shaved” and “ground” with half of the billet shaved from the mounted sample and the newly exposed face ground until the sample is only 300 to 500 micrometers thick on the slide. The samples once again make their way onto the lapping machine until the rock sample is 60 micrometers thick or 1,260 micrometers thick if including the 1,200 micrometer-thick slide.

Up until this point, the process has primarily focused on the macroscopic, hand-sample appearance of the sample, but at this juncture the spotlight shifts to the unique interplay of light as it passes through the sample. Light ‘dances’ through every crystal structure in uniquely defined patterns, thereby allowing different crystals to appear specific colors depending on how light interacts with the crystal. Quartz, at its optimum thickness of 30 micrometers, should be a dull gray tan color, but at a thickness of 60 micrometers, it is more of a dull orange yellow color. These colors as viewed through the microscope then guide the final phase of polishing (or rather, four steps within the polishing phase) that hones the sample to the optimum 30 micrometers. After an afternoon or two of dedicated polishing, the samples will reach the proper thickness, and the petrology fully appreciated. The dance of light, with all the mysteries it reveals, may now be unlocked to the researcher (Figure 3).

Be it geotechnical, geohazard, exploration, or academic in nature, a proper appreciation for hand sample identification and the information that can be revealed through thin section analysis is tantamount for many working geologists. Even so, many geologists are hampered in working with thin sections from being so far separated from the process that produces the thin sections. From my time working as a technician in a thin section lab, I can now look forward to my future petrological endeavors with a few lessons in mind:

Your lab manager may be one of the most knowledgeable petrologists you will ever meet. My supervisor received her Master’s degree in igneous petrology which she continually hones through her management of the lab. Conversations with the lab manager and technicians alike can help you gain a deeper insight into the nuances of this broad field.

Be wary of your fingers! When preparing samples before submitting to the lab or while working as a technician, you can expect some damage to eventually catch up with you, but there is no need to sacrifice your fingers to the dance.

If you are ordering samples, think twice before you rush order. Not only does it add unnecessary stress onto your dedicated lab technicians and manager (which could impact the final quality of your thin sections), but it inadvertently (usually accidentally!) contributes to a class system in the sciences where those with more funding can “cut in line” before other researchers who may have been submitted orders weeks earlier.

Choose your samples carefully — there is no reason to order five duplicates for $150 when you could work with one for $30. Be judicious and wise to maximize the returns on your funding.

Talk to your lab manager about the geologic setting and specific data you require. Many petrologists and graduate students surprisingly know little about sample preparation, which can be a significant hurdle when ordering samples. Discussing your needs with the lab manager can help overcome this knowledge gap while increasing the likelihood of success by making the lab an active participant in the project goals.

Consider working in a thin sections lab if the opportunity arises. Though I was already taking a junior level mineralogy course when I began, working in my university’s thin sections lab provided significant hands-on experience with hand samples and thin sections from across the world as well as one-on-one mentoring with an experienced petrologist, which may not always be available in a classroom setting. Understanding the process will also help you make informed decisions should you ever order thin sections for a future project.
AIPG Wants Your Unwanted Geology Textbooks, Geology Maps and Other Books About Science and Nature

Do you have overflowing bookcases?
Piles of geologic maps?
Feel like doing some spring cleaning or looking for a good home for your unwanted textbooks and coffee table books?

AIPG wants to help you reduce, reuse, and recycle!

AIPG has a long history of partnering with a public university in Hermosillo, Sonora (Mexico) to help them populate a library for their geology students. Books on any discipline related to geology, chemistry, hydrogeology, engineering geology, environment...you name it and if it’s related to natural sciences, it can be useful. The department would also be very appreciative of maps and field guides. The books can be in English (and of course books in Spanish are also useful!). The geology students are encouraged to have a working knowledge of English, which is a big boost in their future careers.

What are the logistics of donating books and maps? You would need to ship materials to Tucson, Arizona. The US Postal Service has a special book rate called "Media Mail". The cost is based on weight and the cost can be calculated at postcalc.usps.com. For example, a 12-inch square box weighing 10 pounds costs about $10 to ship from Illinois to Arizona. AIPG will sort, organize, and arrange transport to Mexico.

To make a donation of materials, please contact the AIPG headquarters (email aipg@aipg.org or call 303-412-6205).

Thank You!

-Dawn H. Garcia, CPG-08313
Start Them Early: 
Geology in Elementary School

Andrew T. Jones, PG, MEM-3347

The weekly email blast from my daughter’s principal contained an extra blurb in late August.

“Do you have an area of interest or expertise that you could share with a grade level? We would love to have you come in and do a short presentation for the classes in a grade level to help support connections to the world around us as well as our community!”

“Well,” I thought to myself, “I certainly do. I’d better fill out that survey.” So began the road to speaking to two entire grades, plus my daughter’s class, on our profession.

I was hooked on geology early myself; a summer on the North Rim of the Grand Canyon between 4th and 5th grades will do that to a boy from Kentucky. The extent of my exposure to geology previously was a handful of trips to Mammoth Cave National Park, and the occasional road cut or stony creek bed. Five weeks exploring the Southwest with my dad’s parents, going to places I couldn’t have even imagined previously: Zion National Park, Bryce Canyon National Park, adjacent public lands, and of course, the aforementioned Grand Canyon National Park. I could appreciate the opportunity to enlighten kids to the incredible world of geology. One of the things I love about geology is that it is a scientific discipline you can hold in your hands. You can go out and observe it, from an early age.

A date was set; I prepared an interesting PowerPoint, and I packed up specimens to pass around. I brought examples of all three rock types: fossiliferous Devonian limestone from the Muscatatuck Group in Southern Indiana, banded iron formation from the Upper Peninsula of Michigan, basaltic lava and tuff from northern New Mexico, plus many others. Of particular interest to the 4th graders was the black obsidian that I kept on the table, as Minecraft is still a very popular game with that age group. I spoke to approximately 90 4th graders, with my 1st grade daughter serving as my assistant, helping to pass around samples. Topics covered included what a geologist does, earth processes, materials that come from geologic exploration, and of course, dinosaurs. The presentation went so well, I was asked to speak to the 2nd grade as well, and I also spoke to my daughter’s class on career day.

My advice is the following: do not pass up an opportunity to share your passion, our discipline, with the generations coming up behind us. You cannot consider an option that you do not know exists! I hope that I lit a spark in a few kids, to consider geology as a field of study, career, or simply a greater understanding of the world underneath their feet.
Candidate for AIPG National President-Elect

Charles Drake
CPG-11179
Belle Isle, Florida

Hello, fellow geologists and geoscientists! I thought that I should add a little more about my background and why I’d like to be and am qualified to be, President of AIPG.

I began my career in geology, after graduating from the University of Florida in 1982, working for the St. Johns River Water Management District in northeast Florida. I was one of the first few geologists hired to implement the consumptive use permitting program, and because of that work, I was able to work with research geologists in other departments, water supply planners, geologists working for consultants drilling and testing production wells and injection wells, and also environmental attorneys. In short order, I received a broad education in the geology and hydrogeology of northeast Florida in particular, and Florida water law.

My background then and over the last 40 years has allowed me to assist my fellow geologists and the Florida Association of Professional Geologists (FAPG) and later the AIPG after the FAPG merged with AIPG to educate elected officials at the state and local levels, and even other professionals, on the importance of our profession to everyday life.

In 1987 I was a founding member of the FAPG which represents geologists in front of the State Legislature and protect our professional geologist licenses. We at the FAPG and the Florida section of the AIPG, have successfully protected our licenses for more than 30 years. As the FAPG Vice-President and President 2007-2010, I led these efforts, and as a member, I continue to contribute to this on-going effort.

In talking with geologists across the U.S., there is a recurring theme of legislators trying to de-regulate geologists in many states. I will bring to the AIPG presidency my experience with working with Florida geologists and legislators regarding the importance of the geosciences in our society.

Continuing the education of officials at all levels and getting more high school and college level students interested in the geosciences are my top two goals. I will do this by engaging our officers and executive committee members to meet with AIPG section presidents to conduct an inventory of educational materials that are in AIPG or AGIs libraries and in the public domain, then determine how to get these resources to the local level. AIPG members will have to go to individual school boards or science fairs/ events/ science centers to distribute this information. Developing the outreach program will take time and teamwork from our members across AIPG sections, but it is essential to let high-school students, teachers, guidance counselors and school boards know about careers in the earth sciences.

I will lead development of an outreach program and template that each AIPG section can use and modify to get their message to the public through various media.

With input and guidance from the AIPG professional staff, I will also develop an outreach fund where our members can contribute specifically to it. In Florida, we raise funds internally to retain the services of a lobbyist to help us at the state level. Engaging our members in making connections with companies directly involved in geosciences to contribute to the outreach fund. Many companies support geoscience departments through scholarships and grants so we should engage them through our members to start the outreach program fund.

As for experience in developing policy, I served on the Governing Board of the St. Johns River Water Management District, which is a governor-appointed position, for eight years. Throughout that time, I was involved at the policy level implementing the water management district’s statutory requirements, meeting and interacting with the public on water supply and water quality issues, meeting with state legislators, and also meeting the district’s financial responsibilities. That experience will help me assist Aaron and Wendy (and also in making public presentations on behalf of the AIPG and geoscientists).

In 2010, I led the AIPG Conference held in Orlando and helped organize it and enlist the help of my geologist friends and colleagues to make presentations and support the conference proceedings. I will use those same organizational skills and connections with geologists across the AIPG to serve as president.

My experience as a geologist for 40 years, and professional geologist for 35 years and my service to and membership in the FAPG and AIPG and serving on the Governing Board of the St. Johns River Water Management District provides me with the skill set and dedication to serve as your president, and I appreciate the opportunity to serve.

I look forward to working with Aaron and Wendy and the Executive Committee on the geosciences issues which are so important to us.
As President Elect I would continue to support previous presidential goals to:

- increase and broaden membership and membership value,
- expand our diversity, equity and inclusion efforts, and
- encourage sustainability efforts of our organization.

In order to make continued progress on these goals, I would increase our connections with new geoscience partners and advocate joint National and Multi-Section events, activities and projects.

I would make it a priority for myself and the National AIPG Vice President and Advisory Board to reach out to members who haven’t had their stories included in our communications yet, and include their experiences and knowledge in our strategic planning for AIPG’s future.

I currently serve on the National AIPG Membership and Diversity Committees and support our members and efforts already being implemented. During my co-chair leadership of the 2023 National AIPG Conference in Covington, KY, I was proud of our joint efforts to bring geoscientists from many walks of life to our diversity panels and seminar. We were able to apply for a Foundation grant for the filming of a virtual field trip and obtain Diamond Sponsors to pay for virtual connections to many of our conference activities. This provided access to members who were unable to afford or travel to the conference. Students who never attended our Student/Early Career Day were able to connect to the day’s activities virtually. Another deliverable created during the 2023 Conference planning was a sustainability screening tool that can be used for other National and Section events.

While the 2023 Conference brought many new geoscientists, sponsors and exhibitors to the event, we still have a long way to go in connecting and providing value to groups that have never heard of AIPG. I would like to use the broad network I created during the 2023 Conference planning to reach into all the corners of our industry. Both existing and new members can help us create long lasting value and purpose to our organization that already offers so much value and purpose to us.

Your Path to Becoming a CPG Just Got Faster and Easier

In the world of geoscience, being a Certified Professional Geologist (CPG) is the gold standard. It signifies that you meet the highest standards of ethics, competence, and integrity in your profession. And now, applying to become a CPG is easier and faster than ever before, thanks to the American Institute of Professional Geologists (AIPG) online application process.

Gone are the days of lengthy paper applications and waiting months for approval. With the new online application system, your complete application package can be reviewed and vetted within a month. This means you can become a CPG in far less time than before, allowing you to advance your career and professional standing more quickly.

The CPG credential is particularly valuable in industries like mining, where ensuring that professionals adhere to the highest standards is crucial. By becoming a CPG, you demonstrate to employers and clients that you are committed to excellence and are equipped to handle the challenges of the geoscience field.

So why wait? Take the next step in your geoscience career and apply to become a Certified Professional Geologist with AIPG today. Join the ranks of professionals who are leading the way in the industry and making a difference in the world.
I sincerely appreciate the consideration to run for Vice President of AIPG, and I would like to thank those on the nominating committee for the opportunity. The standards of competence, integrity and ethics align with my own expectations of my career, and AIPG has been such a welcome inclusion into my professional advancement that I desire to share that with others! Since joining AIPG, I have been proud to be colleagues with such an accomplished group of professional geologists from the multitude of sectors geologists serve in. Personally, I take great pride in the CPG on my business card, as it states an individual’s skill and ethics in no uncertain terms to other professionals!

I was blessed early in my career with internships and long-tenured geologists to work alongside. These individuals helped guide my ethics and sense of good stewardship to all resources and impacts on and off property in my field of mine geology. I feel it is my duty to offer that same level of care and mentoring relationship to young professionals just starting their career - to include those at the collegiate level that may be working toward a geology degree and are not fully aware of all the potential a geologist can influence in a company or regulatory agency. Geologists possess such a diverse skill set and deep understanding - it is easy to see why our group is quite often the key group of “problem solvers” in a project.

During my six years in the Institute, I’ve seen AIPG steadily supporting the element of economic geology and education for responsible, sustainable principles in everything from resource estimation to exploration discussions - to include all impacts from that extractive process. The support of these responsible principles not only grow the knowledge base of our membership but will ultimately gather another facet of professionals to add to the team of AIPG’s membership in the coming years. In my position as Mine Geology Superintendent, I’ve been able to host AIPG field trips to the Viburnum Trend mines operated by The Doe Run Company, along with speaking at the national conference in 2017 regarding the Tennessee sphalerite deposits and have been a webinar presenter in the Lunch and Earn series. I greatly enjoy the collaboration with college students and professionals, but also take opportunities with my staff of geologists to speak at local public schools about the science of geology. The excitement of students (and fellow AIPG members I have networked with) toward the science have been some of most rewarding moments of my career!

The use of multiple media outlets and the variety of education and discussion opportunities - be it webinars, our YouTube channel, section field trips, and certainly national conferences are great outlets that AIPG can further leverage to develop interest among those younger geologists looking to grow their skill set. That steady, fresh advancement of fact-based theory and creativity can keep the organization healthy and dynamic to support the challenging needs of our world. I also believe that environment of diverse geologic knowledge application can attract those driven professionals to our organization - so long as we all do our part in mentoring and outreach through opportunities like AIPG’s student chapters and early career professional development. Personally, I continue to grow in my knowledge of geology that I haven’t yet been exposed to through AIPG and networking with its members. The balance of value-added support for existing members and the inclusive culture of a group of unified professionals holds strong promise for improvement in the membership count as well as the knowledge base of our organization.

“Personally, I continue to grow in my knowledge of geology that I haven’t yet been exposed to through AIPG and networking with its members. The balance of value-added support for existing members and the inclusive culture of a group of unified professionals holds strong promise for improvement in the membership count as well as the knowledge base of our organization.”

TPG subscriptions are a great gift to your alma mater, local high school, college or university with geoscience related programs, or geoscience enthusiast friends and family.

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The Professional Geologist is an excellent publication to share with students.
Building the Future of Geology

Support the Foundation of the AIPG

The Foundation of the AIPG supports a variety of programs including student scholarships, student and young professional workshops, educational programs aimed at practitioners, the public, and policy makers, and some special needs requested by AIPG or other professional organizations. In 2023, the Foundation provided grants to AIPG for preparing a virtual field trip in conjunction with the 2023 National Meeting and in support of the undergraduate scholarships awarded by AIPG. Additionally, the Foundation has awarded its own William J. Siok Graduate Student Scholarship. The Foundation is proud to be able to serve AIPG and the geosciences by providing financial support for these programs. Every donation helps the Foundation to contribute toward building the future of geology. If you have any questions or comments about the Foundation, please contact me or any of the other Trustees of the Foundation for additional details and check the AIPG web site for more information about the Foundation. Your continued support is greatly appreciated. Thank you.

Mike Lawless

Michael D. Lawless, CPG, PG
Chairperson, Foundation of the AIPG
540-557-1319 office phone; mlawless@trecompanies.com

The Foundation of the American Institute of Professional Geologists is a 501(c)(3) organization.
Contributions are tax deductible. EIN 45-2870397

AIPG Annual Conference Silent Auction: Bid High, Support the Geosciences!

Each year, the American Institute of Professional Geologists (AIPG) holds its Annual Conference, featuring a silent auction filled with museum-quality specimens, artwork, collectible books, jewelry, and other exciting items donated by members. This auction is a fantastic opportunity to acquire unique items while supporting a great cause—the Foundation of the AIPG.

All donations and bids are tax-deductible, making it a win-win situation for everyone involved. Your contributions will help raise money to support student scholarships and special projects that benefit the geosciences.

So, get your donations ready and mark your calendars for this year’s auction. Be prepared to bid often and bid high to help us make a difference in the geoscience community. Together, we can support the future of our profession and ensure that it continues to thrive for generations to come.

Contact Conference Chair, Doug Bartlett, to donate items. (480) 659-7131

www.aipg.org
Candidate for AIPG National Treasurer

Joe Brinton
CPG-11437
Grand Junction, Colorado

I am grateful to the Nominating Committee for the opportunity to be nominated for the position of AIPG Treasurer. I am excited for the opportunity to serve the AIPG membership in general, as well as the National Leadership team.

Throughout my 25-year career as a geologist, I have lived in various locations throughout the Western U.S. With each move, I felt fortunate to find a community of geologists. My membership in the AIPG has been instrumental in finding these communities. And because of these rewarding experiences, I am motivated to continue to serve in the AIPG. In the past five years, I have volunteered for some of the leadership roles within my local section of the AIPG. I have learned a lot from serving with such fine people. One salient experience that I had with the AIPG was to judge a high school science fair in the spring of 2020. Because of COVID-19, the entire event was held online. While I would have preferred to put my hands on the science project and meet with the students face to face; I was still impressed with the tenacity and creativity with which the students were able to design and undertake experiments and present their findings. The other members of the AIPG judging panel created an amazing collaborative environment to work in.

I have a passion for earth sciences, and I hope that my enthusiasm will help the geologic community grow. Five years ago, I had the opportunity to take a rafting trip down the Colorado River through the Grand Canyon. Once I started talking geology, I was peppered, non-stop, with geologic questions from my fellow raft passengers. It was so rewarding to both have a chance to see some amazing geology and share it with others. Living in Colorado, I have ample opportunities to “show and tell” geology with anyone that I happen to be travelling with, skiing with, bicycling with, hiking with… (you get the picture!). In doing so I have made some very rewarding connections with people from all walks of life. To me, this seems to be a microcosm of the AIPG. By sharing our collective enthusiasm for earth sciences, the AIPG can make some rewarding connections with other professional organizations.

In my career, I have had the opportunity to gain experience in environmental remediation, hydrology, geohydrology, land management, NEPA, drilling, mineral exploration, mining, oil and gas drilling, well logging, structural geology analyses, remote sensing, geotechnical investigations, field mapping, geomechanical analyses, and geochemistry. I have worked in almost all 50 of the United States, and in seven foreign countries. My curiosity is not yet satisfied, and I would love to keep learning for the next 25 years.

From this experience, I have learned that while there is a wide range of interests and specialties within the geologic community, as geoscientists we share some important core values. Not coincidentally, these are the same as the core values of the AIPG: competence, integrity, and ethics. I believe that as we as individuals exhibit these characteristics, this will reflect on the entire geologic community. One of my favorite features of The Professional Geologist (TPG) is the “Test Your Knowledge” quiz by Dr. Robert Font. Being that I don’t always get 100% on the quizzes reminds me of the importance of continuing to study geology in order to maintain a high level of competency. And the “Ethics and Practices Column” feature of TPG does a great job in instructing and reminding us all of our commitment to ethics. And for integrity, simply look around at your local section leadership and the national leaders, it won’t be hard to find examples of integrity, worthy of emulation.

I currently have the privilege of teaching introductory geology at a local university. I relish this experience for two main reasons. First, I get to see students experience a sense of awe as they learn something new and amazing. I am constantly reminded of the awe and wonder that I first experienced when I first started studying geology. It is also a wonderful experience to see young people exercise their curiosity and creativity (and some pretty amazing new technology) as they work hard to expand and deepen their knowledge of earth sciences. It is my hope that through interacting with these students and young professionals, we can instill both a passion for earth sciences and the core values of competence, integrity, and ethics into the geologists of the future.

Thank you for your consideration of my nomination. I look forward to serving you.

"...I have learned that while there is a wide range of interests and specialties within the geologic community, as geoscientists we share some important core values. Not coincidentally, these are the same as the core values of the AIPG: competence, integrity, and ethics. I believe that as we as individuals exhibit these characteristics, this will reflect on the entire geologic community."
I am thankful for the opportunity to be nominated for Treasurer of AIPG and would like to thank the nominating committee for this opportunity. I have enjoyed multiple opportunities to participate on the Executive Committee and have thoroughly enjoyed each one. I joined AIPG in 2008 and upgraded to a CPG in 2010. I was initially involved with the organization on the Section level and became the Tennessee Section President in 2013. My first annual AIPG meeting was the 2013 meeting in Colorado where I was subsequently elected to the Advisory Committee for 2014 and then served as Vice President in 2015. I was the general chairman for the 2017 National Meeting in Nashville, Tennessee. I served as AIPG President in 2020 as AIPG navigated through the Covid pandemic. Although far from a traditional presidential tenure, it was a great experience to see how we all adapted to the constant changes. I am the current (2024) Vice President.

When I started my first job as a practicing geologist, I wasn’t sure what to expect. I spent the next few years behind a drill rig and quickly learned what it meant to be a field geologist. However, I didn’t realize how much that role would change as I continued to advance in my career. I went from logging soil, installing monitoring wells, and sampling various media to managing people and managing budgets. Those two skill sets were not on my radar when I started my career. However, I have always enjoyed the mathematical component of the Geosciences. These days I spend most of my time preparing cost estimates, reviewing project budgets, and reviewing profit and loss statements for my team. What I have learned over the last few years as my role has changed, is that I truly enjoy this side of the business.

As Treasurer, I will get to be involved with the financial management of the Institute including assisting with the collection and disbursement of funds and other financial investments of the Institute, reviewing audit reports prepared for the Institute, and reviewing financial resources and investments. In my current role, I review profit and loss statements on a regular basis and understand the importance of maintaining a positive cash flow so that the Institute can continue to provide the services to the members. This is a unique opportunity to develop a deeper understanding of how the AIPG functions from a financial perspective with an opportunity to provide suggestions to the Executive Committee on how to strengthen AIPG's financial position.

The Treasurer is also a part of the Executive Review Committee tasked with reviewing the performance of the Executive Director. As a manager for several years, I have completed numerous annual performance reviews and realize the importance of direct communication to encourage change and growth regardless of experience level. I am excited to have the opportunity to run for Treasurer and appreciate your support.

ADVANCEing FieldSafety: Training for diverse and inclusive geoscience teams – A new course and toolkit

ADVANCEing FieldSafety is a program that provides field research teams with the training and tools to promote safe and inclusive environments, identify and mitigate unsafe and harmful behaviors, and create a culture within field teams that reduces the likelihood and impact of these behaviors in the future.

Panelists are:
- Anne U. Gold - Cooperative Institute for Research in Environmental Sciences, University of Colorado Boulder
- Blair Schneider - Kansas Geological Survey, University of Kansas
- Mariama Dryák-Vallies - Cooperative Institute for Research in Environmental Sciences, University of Colorado Boulder
- Alexandra M. Padilla - Cooperative Institute for Research in Environmental Sciences, University of Colorado Boulder

During this webinar, the panelists will discuss:
- the development of an asynchronous online training course and an accompanying toolkit of references and resources for field teams,
- the different certification pathways for training participants,
- how the training addresses the new NSF PAPPG for safe and inclusive field environments (2E9),
- and our research plan for studying the effectiveness of the training course and Toolkit resources for participants and field teams.

Free Webinar
May 3, 2024
1-2 pm EDT

Scan to register.

www.aipg.org
Hello to fellow AIPG members! I am honored to have been nominated for the AIPG Early Career Professional Representative of the Executive Committee. This nomination is humbling, and I am committed to serving my fellow ECP members and student members proudly, if elected. Because of the particular point that I currently reside in my early career, I believe many ECP members of AIPG will easily relate to my experiences and goals. Although I might not be an ECP or student currently, I think I will still relate to the student members as well.

In recent years, I have become increasingly interested and involved in AIPG. As I entered my early career a few years ago, I began seeking out mentorship and opportunities to connect with other geoscientists - enter AIPG. As an ECP member, I have not only been invited to connect with fellow early career members, but also with experienced, certified geologists. I have been overwhelmed with the kindness that my fellow members have shown me, and I admire the professionalism all members demonstrate.

I greatly value the AIPG organization, and I have connected strongly with the emphasis that the Institute puts on ethics and advocating for the geoscience profession. These two core principles align with my own personal and professional values.

I believe personal integrity and professional conduct are essential for being a certified geologist (and a good person!). My work with the Bureau of Safety and Environmental Enforcement revolves around ensuring that developers and operators of offshore energy production projects maintain safety and environmental compliance throughout their operations. Ethics is an important factor in this role; as a federal employee tasked with these responsibilities, it is essential that I have integrity and display competence in my work. I hold myself and the operators of which BSEE regulates to a high standard of ethical conduct.

Advocating for the geoscience profession is a strong passion of mine and another point of connection that I have with the AIPG principles. This passion developed when my undergraduate institute discontinued the Geology major shortly after I graduated with my Bachelor of Science in Geology. It is unfortunate to see a decrease in support and opportunities for students entering this field. In these situations, it is often the non-geologist who does not always realize the impact geology has on their everyday life, that is making these decisions. Despite advocating from the geology department and past students, the decision makers did not realize the importance of a geology degree. This is not the only instance of a decline in the interest and support for the geosciences and this is why advocating for the profession from accredited, professional organizations like AIPG is so crucial. I greatly appreciate the work that AIPG has done, and continues to do, in this regard and it is something I hope to contribute to if elected to the ECP position.

As the ECP Representative, I will act as the connection between the student and ECP members, advocate for their interests and goals for the Institute, and provide insight to the Executive Committee on their priorities. In this position, I aim to encourage and grow the involvement from this demographic and to build professional relationships with and between members of these categories. Additionally, I will continue the advocacy and emphasis on ethics for the profession of geoscience. Particularly for student and ECP members, I want to encourage not only networking and advice for landing your first or next geoscience job - but also insight on how to excel in that job and uphold professional standards while doing so.

Growing the student and ECP Membership and Involvement:

This goal involves both outreach and interactive opportunities, with the purpose of:

- Increasing student chapters through communication with university geology programs and providing assistance stepping through the process of chapter creation.
- Increasing social media engagement and content through interactive posts and involvement with geoscience communicators.
- Continuing quarterly ECP and student webinars. Some ideas for topics I have for these webinars focus on geoscience in the federal government, geoscience communication, and geoscience in the energy transition.

Contribute to the advocacy for the profession and the ethical conduct of geoscientists:

By providing opportunities that encourage professional certification in various stages, I aim to contribute to AIPG’s advocating efforts. Such opportunities would include:

- Training sessions for ECPs and students through which attendees could gain knowledge and earn accredited certificates in various topics (e.g., ArcGIS, field methodology, seismic interpretation software, etc.).
- An ASBOG Fundamentals of Geology Exam study group to encourage professional accreditation of geologists.

I greatly appreciate the nomination for the ECP position and would be honored to serve in this role. I would approach this role as an opportunity to begin giving back to this institution that gives so much to the geosciences. Thank you for your time and consideration.
CANDIDATE FOR AIPG NATIONAL 2024 PRESIDENT-ELECT

Charles Drake
CPG-11179
Belle Isle, Florida

Statement of Purpose or Goals you have for AIPG: Increase awareness of importance of geosciences at the state and Federal level. Increase public outreach to middle schools and high schools so that students know of career opportunities in the geosciences. Increase AIPG membership and presence at the university level.

Universities Attended
- University of Florida
- Valencia Community College

Company
- TetraTech Inc.
- Hartman and Associates, Inc.
- Dyer, Riddle, Mills and Precourt, Inc.
- Universal Engineering and Sciences
- St. Johns River Water Management District

AIPG Activities
- FAPG Advisor
- National Executive Committee - Advisory Board
- FAPG/AIPG Florida Section President
- FAPG/AIPG Florida Section Vice-President

CANDIDATE FOR AIPG NATIONAL 2024 VICE PRESIDENT

Chris Hogan
CPG-11960
Salem, Missouri

Statement of Purpose or Goals you have for AIPG: Support the Institute’s values and coordinate with leadership to further recruit and develop the diverse professional geologists that comprise AIPG. The fundamental tenets set forth for competence, integrity and ethics will be the guiding principles to support a solid, inclusive membership base.

Universities Attended
- University of Tennessee - Knoxville

Company
- The Doe Run Company
- Freeport-McMoRan-Climax
- The Doe Run Company
- Walmart, Inc.
- ASARCO, Inc.-Tennessee Mines

AIPG Activities
- ECP - GeoCareers panel member, hosted by Brigitte Petras
- Webinar host - Lunch and Earn - The Economics of Mine Geology
- Keynote Speaker - National Conference, Nashville, Tennessee - Tennessee Sphalerite Deposits

CANDIDATE FOR AIPG NATIONAL 2024 PRESIDENT-ELECT

Christine Lilek
CPG-10195
Juneau, Wisconsin

Statement of Purpose or Goals you have for AIPG: As President - Elect I would continue to support previous presidential goals to: increase and broaden membership and membership value, expand our diversity, equity and inclusion efforts, and encourage sustainability efforts of our organization. In order to make continued progress on these goals, I would increase our connections with new geoscientists and advocate joint National and Multi-Section events, activities and projects. I would like to reach out to members who haven’t had their stories included in our communications yet, and include their experiences and knowledge in our strategic planning for AIPG’s future.

Universities Attended
- Valencia Community College
- University of Florida

Company
- Edgewood College - Madison
- Lake Sinnissippi Improvement District
- Wisconsin Dept. Health Services
- Wisconsin Electric Power Company
- Wisconsin State Parks

AIPG Activities
- National Advisory Board Representative
- Wisconsin Newsletter Editor
- Wisconsin Regional Event Coordinator - Sand Mine Life Cycle Workshop
- Wisconsin Section Event Coordinator - PFAS Beyond the Theoretical Workshop
- Wisconsin Section Event Coordinator - PFAS Life Cycle Workshop
- Wisconsin Section Event Coordinator - Sand Mine Life Cycle Workshop
- Wisconsin Section Leadership Award recipient
- Wisconsin Section President
- Wisconsin Section Vice-President

AIPG NATIONAL ELECTION CANDIDATE BIOGRAPHIES

Cast your vote!
AIPG National Executive Committee Election

Polling ends June 30, 2024
Vote Online or Mail in Ballot

www.aipg.org
Apr. May. Jun. 2024 • TPG 25
CANDIDATE FOR AIPG NATIONAL 2024-2025 TREASURER

Joe Brinton
CPG-11437
Grand Junction, Colorado

Statement of Purpose or Goals you have for AIPG: I intend to serve the AIPG membership and the AIPG National Executive Committee in helping to carry out the mission of the AIPG. I will devote my time, skills, and experience to promote the profession of geology, to strengthen the community of geologists, and help develop the next generation of geologists. I hope to channel my enthusiasm for geology to help grow the AIPG as an organization.

Universities Attended
- Purdue University: M.S. Geology & Geophysics (2019-2021)
- Wittenberg University: B.S. Geology (1997)

Company
- Agapito Associates, Inc.: Senior Geologist (2022-present)
- Bowe Resources, LLC: Senior Geologist (2009-2012)

AIPG Activities
- Colorado Section President (2024)
- Colorado Section President-Elect (2023)
- Colorado Section Executive Committee (2019-2023)

CANDIDATE FOR AIPG NATIONAL 2024-2025 TREASURER

Todd McFarland
CPG-11348
Nashville, Tennessee

Statement of Purpose or Goals you have for AIPG: Continue to promote professionalism within the geological community with a focus on students and early professional members. I will accomplish this goal by coordinating with national and the state sections to support programs and initiatives to continue development of student chapters and grow early professional membership.

Universities Attended
- University of Kentucky: M.S. Geology (2003)
- Northern Illinois University: B.A. Chemistry (1999)

Company
- WSP: Assistant Vice President (2022-present)

AIPG Activities
- AIPG Vice President (2024)
- Martin Van Couvering Memorial Award recipient (2023)
- National President Elect, President, Past President (2019-2023)
- National Committee Conference Chairman (2017)
- National Vice President (2015)
- National Executive Committee Member - Advisory Board (2014)
- Tennessee Section Past President (2014)
- Tennessee Section President (2013)

CANDIDATE FOR AIPG NATIONAL 2025 EARLY CAREER PROFESSIONAL

Hannah Weaver
ECP-1014
Worthington, Ohio

Statement of Purpose or Goals you have for AIPG: I would approach this role as an opportunity to begin giving back to this institution that gives so much to the geosciences. I will act as the connection between the student and ECP members, advocate for their interests and goals for the Institute, and provide insight to the Executive Committee on their priorities. In this position, I aim to encourage and grow the involvement from student and ECP members and contribute to the advocacy and emphasis on ethics for the profession of geoscience.

Universities Attended
- Purdue University: M.S. Geology & Geophysics (2019-2021)

Company
- Bureau of Safety and Environmental Enforcement: Geophysicist, Renewable Energy Operations (Atlantic Region, remote work from Columbus, OH) (2023)
- Bureau of Safety and Environmental Enforcement: Geophysicist, Office of Production and Development, Well Analysis Section (Gulf of Mexico Region, New Orleans, LA) (2023)

AIPG Activities
- National Membership Committee (2023-present)
- Ohio Section, Member-At-Large (2023-present)
- ECP Member (2019-present)

Service to AIPG is the path to making a difference in the Geoscience Profession and shaping the future of the Geosciences.
Official AIPG 2024 Ballot National Officer Election

President-Elect
President in 2026

☐ Charles Drake, CPG-11179
☐ Christine Lilek, CPG-10195

Vice-President
Term of office 2025

☐ Chris Hogan, CPG-11960

President-Elect
President in 2026

Treasurer
Term of office 2025-2026

☐ Joe Brinton, CPG-11437
☐ Todd McFarland, CPG-11348

Early Career Professional
Term of office 2025

☐ Hannah Weaver, ECP-1014

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Water Resources of Gaza

Barney Paul Popkin

Gaza is located along the Eastern Mediterranean Coast (Figure 1, following page) at 31°25’N, 34°20’E. It borders Egypt on the southwest and Israel on the north and east (Wikipedia A, 2023). The community has been under Israeli military occupation since 1967. The narrow strip parallels the Mediterranean coast to the east and has a hot, semi-arid temperate climate. Rainfall generally occurs during the mild and warm winters. Summers are dry and hot. Gaza’s annual rainfall is about six inches in the south and 16 inches in the north, mostly between November and February. However, its annual evaporation and evapotranspiration, at as much as 11 feet, are many times greater than its rainfall. Its annual rainfall may decline by as much as 10% due to climate change.

Gaza’s elevation ranges from sea level in the 25-mile long, six miles wide coastal strip to over 400 feet above sea level in the small mountain range near its extreme southeast corner. Its land border is about 39 miles long. The terrain is flat or rolling with sand dunes along the coast and sand covering inland (Ubeid and Albatta, 2014). Its natural resources include arable land, seawater fisheries, and natural gas.

Gaza is one of the most densely populated communities on earth with an estimated density of about 2,500 persons per square mile. Its fertility rate is over twice that of neighboring countries. About 45% of Gaza is urbanized or built-up, 25% is agricultural, and 30% is open soil, forests, and woodlands. Gaza’s environmental issues include desertification, salinization of fresh water, sewage pollution, water-borne disease, and land and soil degradation.

Gross domestic product is estimated to be comprised of 9% agriculture, 28% industrial, and 63% services. Labor by sector is approximately 66% services, 21% industrial, and 13% agricultural (CIA, 2023), though the numbers are likely to be inaccurate. Gaza’s major agricultural products are olives, citrus, vegetables, beef, and dairy products. Citrus and flowers are exports. For administrative reasons, readily available data on drinking water availability, sector use and productivity, sanitation, and water and wastewater are generally unavailable or inseparable from the West Bank.

Less than 3% of its groundwater is considered drinkable. Consequently, its population receives inadequate drinking water and suffers several water-borne diseases (Rand, 2019; Humaid, 2021; OXFAM, 2023; UNICEF). UNICEF, the European Community, and Massachusetts Institute of Technology and others have been funding desalination plants, some solar operated, in Gaza to help ameliorate the water shortage, quality, and related health issues (UNICEF).

Approximately 2.3 million people live in Gaza, a small 141-square mile country bordered by Egypt and the State of Israel, in the Middle East. It has approximately twice the area of Washington, D.C. About 80% of the population lives in poverty, and nearly half its population is under 21 years old. The natural water resources of Gaza are limited to its shallow Coastal Aquifer which is heavily sewage-polluted, overly extracted, and encroached on by seawater, (Amnesty International, 2017). The aquifer consists of unconsolidated alluvium in which groundwater is recharged inland and flows to the Mediterranean Sea. Gaza shares the Coastal Aquifer with Israel and Egypt. It is estimated (UN-ESCWA and BGR, 2013) that this Cenozoic (Pleistocene to Holocene) Coastal Aquifer provides 5,297 to 6,367 MCF (million cubic feet) that are extracted annually from the aquifer in Gaza. Recharge to the aquifer in Gaza, however, is only 1,932 MCF. (UNCTAD, 2015). The hydraulic conductivity of the Coastal Aquifer is approximately 0.03 inches per day (Goldenberg, 1992). Of the estimated 6,311 MCF extracted from groundwater in 2011, about 48% was consumed for irrigation, and the remainder for domestic use. About a third of Gaza’s municipal delivered water supply is lost in its distribution system from leakage and piracy (Wikipedia B, 2023).

Tap water is salty and heavily polluted, especially during the Summer. It is unfit for drinking (B’Tselem, 2020). Therefore, most Gazans depend on private sales of desalinated water for drinking and cooking, though these vendor-provided waters are often polluted. Lack of adequate sanitation facilities, agricultural chemicals and nitrate pollution, internally displaced persons, and impacts of forever conflict, provide little opportunity for sustained water resources development and management.

International donors such as the U.S. and others have planned and installed water reservoirs and distribution systems (USAID, 1.

1. Whether or not Gaza is part of Israel is in dispute. According to Wikipedia “Despite the 2005 Israeli disengagement from Gaza, the United Nations, international human rights organisations, and the majority of governments and legal commentators consider the territory to be still occupied by Israel, supported by additional restrictions placed on Gaza by Egypt” (https://en.wikipedia.org/wiki/Gaza_Strip - accessed 2023/12/02). AIPG takes no position on the political status or the government of the Gaza Strip and has kept the author’s wording.
(ANERA, 2010). Greenhouse, hydroponics, and tube vegetable production has been increasing for decades, though they require more careful crop management and pest control (ICARDA). Gaza’s agricultural sector suffers extensively from blockades, conflict, and warfare as well. These external stresses reduce access to farmland and agricultural financing and restrict water, seed, fertilizer, pesticide, and farm equipment (including cold storage) availability and quality. They promote land grabs, land and soil degradation, and perpetuate harassment and export controls. They also lead to the malicious spraying of aerial herbicide on harvestable crops, and to delays in access to spare parts, diminishing productivity, food security, and farm incomes (UNCTAD, 2015). Consequently, crop production is usually less than half that from similar soils in Israel.

**Sewage and Wastewater Treatment**

Several international donors such as the U.S., Germany, World Bank, Japan, Kuwait, and others planned and installed domestic wastewater treatment plants at the cost of several billion dollars (McKernan and Balousha, 2022; WB, 2023). These are often inoperable or partially functioning due to energy and chemical shortages, and conflict events. Relatively minor amounts of untreated domestic wastewater is disposed in pits seeping through highly permeable soils directly into the Coastal Aquifer. About 40% of Gaza’s domestic sewage is disposed directly into the Sea. Because fresh water is scarce and expensive, domestic wastewater is not well diluted with household grey water and consequently is very high in biological wastes, especially those having high oxygen demands, total dissolved solids, ammonia, and nitrates. Industrial wastewater is generated primarily from metal coating, electroplating, galvanic and electric plating as well as pharmaceuticals, cosmetics and perfumes, paint, plastics, detergent, cloth and clothes washing, ice cream, soft drinks, and car washing. These wastes are generally untreated and high in dissolved silver, aluminum, arsenic, cadmium, chromium, copper, iron, manganese, nickel, lead, and zinc. Capture, treatment, and reuse of domestic wastewater and sludge for agriculture are feasible but not practiced (Shomar et al, 2002).

### Recent Conflict with Israel

Since the start of the Israeli-Gazan war of October 7, 2023, hundreds of miles of subterranean tunnels have been detected throughout Gaza. These are located beneath or adjacent to civilian works such as schools, hospitals, mosques, office, and apartment buildings. Their purpose is to protect and facilitate clandestine military activities by Gazan organizations. Israel is flooding these tunnels with Mediterranean seawater at a rate of thousands of cubic meters per hour to dislodge these hidden Gazan troops.

Although this is a brilliant military strategy, it’s an environmental disaster. Pumping thousands of cubic meters of seawater into the tunnels will irreversibly contaminate the aquifers with salt water as well as petroleum, and paint, solvent, heavy metals, and other hazardous materials. It may also modify if not destroy the regional geotechnical stability.

### Summary Comments

Although Gaza is a very small community in the Eastern Mediterranean coastal desert, it is heavily dependent on very limited water resources. Gaza City is extremely densely populated, and its population growth is about twice that of neighboring countries. Its natural freshwater is scarce and highly contaminated from seawater, sewage, and agricultural chemicals. Its potential development from fisheries, exportable fruits and vegetables, and potential freshwater from desalination is possible if can achieve stability and reduced conflict and warfare. The general consensus among development economists is that for countries to develop, they require stability, as well as good governance, a high

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**Table 1. Summary of analytical test results from well-water samples from the Deir al-Balah Central Coastal Governate, 2009 and 2014**

<table>
<thead>
<tr>
<th>Year</th>
<th>pH</th>
<th>TDS</th>
<th>Ca²⁺</th>
<th>Mg²⁺</th>
<th>Na⁺</th>
<th>K⁺</th>
<th>HCO₃⁻</th>
<th>SO₄²⁻</th>
<th>Cl⁻</th>
<th>NO₃⁻</th>
<th>WQI Score</th>
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</thead>
<tbody>
<tr>
<td>2009</td>
<td>7.45</td>
<td>2456</td>
<td>135</td>
<td>87</td>
<td>509</td>
<td>6.9</td>
<td>308</td>
<td>349</td>
<td>823</td>
<td>110</td>
<td>2.51</td>
</tr>
<tr>
<td>2014</td>
<td>7.80</td>
<td>2732</td>
<td>151</td>
<td>103</td>
<td>603</td>
<td>6.8</td>
<td>356</td>
<td>295</td>
<td>977</td>
<td>129</td>
<td>2.87</td>
</tr>
<tr>
<td>Average</td>
<td>7.62</td>
<td>2594</td>
<td>143</td>
<td>95</td>
<td>556</td>
<td>6.8</td>
<td>332</td>
<td>322</td>
<td>900</td>
<td>120</td>
<td>2.69</td>
</tr>
</tbody>
</table>
percentage of income-earning women, and the ability to self-fund their infrastructure. Gaza does not have any of these conditions.

Author Comments
Barney Paul Popkin is an American geologist and hydrologist. A former University of Arizona Visiting Scientist in Hydrology, U.S. Agency for International Development Advisor, and U.S. Geological Survey Hydrologist, he has over 50 years of international experience including the Levantine coast from Syria to Egypt. Mr. Popkin has conducted several water resources studies in the Middle East, including Israel and Gaza.

References
ICARDA West Asia Regional Program. Integrated management raises greenhouse productivity... in the Gaza Strip.
TOI Staff, December 13, 2023. Report: IDF has begun pumping seawater into Hamas tunnels in Gaza. The Times of Israel (TOI).
UN-ESCWA (United Nations Economic and Social Commission for Western Asia) and BGR (German Federal Institute for Geosciences and Natural Resources, 2013. Coastal Aquifer Basin, Inventory of Shared Water Resources in Western Asia, Chapter 20.
UNICEF. WASH: Water, sanitation, and hygiene, Providing Clean Water to the Children of the State of Palestine.
Chapters

AIPG STUDENT CHAPTERS

Forging Tomorrow’s Geoscience Leaders Today!

Berry College
Mount Berry, Georgia
Founded in 2016
Chapter Sponsor: Ronald J. Wallace, CPG

Bowling Green University
Bowling Green, Ohio
Founded in 2004
Chapter Sponsor: Robert K. Vincent

Central Michigan University
Mt. Pleasant, Michigan
Founded in 2003
Chapter Sponsor: Ronald J. Wallace, CPG

City University of New York at Brooklyn College
Brooklyn, New York
Founded in 2018
Chapter Sponsor: Jennifer Becker, MEM
Faculty Sponsor: Matthew Grab

Colorado College
Colorado Springs, Colorado
Founded in 2021
Chapter Sponsor: Charles Suffrian, CPG
Faculty Sponsor: Sarah Schanz

Colorado School of Mines
Golden, Colorado
Founded in 1999
Chapter Sponsor: Graham Closs, CPG

Columbus State University
Columbus, Georgia
Founded in 2011
Chapter Sponsor: Ronald J. Wallace, CPG
Faculty Sponsor: Dr. Diana Ortega-Ariza
2014, 2018 Student Chapter of the Year

Eastern Illinois University
Charleston, Illinois
Founded in 2013
Chapter Sponsor: Craig McCamack, CPG
Faculty Sponsor: Dr. Diane Marie Burns

Eastern Kentucky University
Richmond, Kentucky
Founded in 2016
Chapter Sponsor: Bill Brab, CPG
Faculty Sponsor: Trent Garrison, CPG

Eastern Michigan University
Ypsilanti, Michigan
Founded in 2006
Chapter Sponsor: Walter Bolt, CPG
Faculty Sponsor: Dr. Chris Gellasch, CPG

Florida Atlantic University
Boca Raton, Florida
Founded in 2014
Chapter Sponsor: Anne Murray, CPG

Florida State University
Tallahassee, Florida
Founded in 2014
Chapter Sponsor: Anne Murray, CPG
Faculty Sponsor: David Farris
2015 Student Chapter of the Year

Georgia Southern University
Statesboro, Georgia
Founded in 2019
Chapter Sponsor: Justin Johnson, MEM

Georgia Southwestern State University
Americus, Georgia
Founded in 2013
Chapter Sponsor: Ronald J. Wallace, CPG
Faculty Sponsor: Dr. Tom Weiland

Georgia State University
Atlanta, Georgia
Founded in 2005
Chapter Sponsor: Ronald J. Wallace, CPG

Indiana University Purdue University, Indianapolis
Indianapolis, Indiana
Founded in 2018
Chapter Sponsor: Shane Schmidt, CPG
Faculty Sponsor: Dr. Kathy Licht

James Madison University
Harrisonburg, Virginia
Founded in 1998
Chapter Sponsor: W. Cullen Sherwood

Metropolitan State University of Denver
Denver, Colorado
Founded in 2013
Chapter Sponsor: Jessica Davey, MEM
Faculty Sponsor: Dr. Uwe Kackstaetter, MEM
2016 Student Chapter of the Year

Michigan Technological University
Houghton, Michigan
Founded in 2018
Chapter Sponsor: Shane Schmidt, CPG
Faculty Sponsor: Dr. Kathy Licht

Middle Tennessee State University
Murfreesboro, Tennessee
Founded in 2014
Chapter Sponsor: Todd McFarland, CPG

Murray State University
Murray, Kentucky
Founded in 2016
Chapter Sponsor: Bill Brab, CPG
Faculty Sponsor: Hluk Cetin

New Mexico Tech – Robert Lessard Memorial
Socorro, New Mexico
Founded in 2017
Chapter Sponsor: John Sorrell, CPG
Faculty Sponsor: Virginia Mclemore, CPG

New Paltz State University of New York
New Paltz, New York
Founded in 2017
Chapter Sponsor: Christopher Brown, CPG and Gordon Magenheim, CPG
Faculty Sponsor: Dr. Shafiul Chowdhury

Northern Arizona University
Flagstaff, Arizona
Founded in 2017
Chapter Sponsors: Doug Bartlett, CPG and Marvin
### AIPG Student Chapters

<table>
<thead>
<tr>
<th>Chapter Name</th>
<th>City, State</th>
<th>Founded Year</th>
<th>Faculty Sponsor</th>
<th>Chapter Sponsor</th>
<th>Notes</th>
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<td>Faculty Sponsor: Dr. Dr. Regina Capuano, CPG</td>
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More information is available at www.aipg.org.
Each year at AIPG brings new challenges and opportunities for our organization. Your National Executive Committee and the staff at the National Office work diligently to meet those challenges and act on those opportunities as they arise. Over the past few weeks, as I thought about where we are as an organization and reflected on the hard work and dedication of our Executive Committee and staff, it occurred to me that you, our members, might appreciate a summary of 2023. What I’ll share with you in this edition of TPG is a summary of the things that we did in 2023 to bring value to your membership. I’ll break it into sections, giving a brief introduction and then a list of the things that we accomplished in 2023. By no means will this list be exhaustive; rather, it will highlight things that we take pride in and our hope is that these activities will bring more value to you as members of AIPG.

Developing our Vision

One of the most important responsibilities of the Executive Committee is to develop a vision and a pathway forward for AIPG. The vision and goals that are developed help AIPG to remain relevant for professional geologists in the United States and abroad. During 2023, the National Executive Committee and the AIPG National Office worked together on the following initiatives, designed to maintain our reputation as a leading geoscience professional organization.

We transitioned to a fully electronic CPG application, streamlining the process for applicants, and hopefully for reviewers alike. With the new system, we have been able to fully process and vet an application more quickly and make the process easier for applicants. To my knowledge, AIPG is the first certifying organization that is recognized for resource and reserves reporting, to have a fully electronic application.

This year AIPG attained certification to provide CEU’s for professional geologists in New York state. In addition, we can approve third-party continuing education courses, provided they meet the criteria set in New York, and allow AIPG to maintain records of their event.

Under the guidance and leadership of our National Editor, Adam Heft, we completed a necessary review of our bylaws and reserved reporting, to have a fully electronic application.

Our Executive Committee completed an update of the AIPG Strategic Plan, providing a pathway forward for AIPG.

We provided multiple representatives to the Federal Advisory Committee for the National Cooperative Geological Mapping Program, and for the Global Geoscience Professionalism Group.

We had an AIPG representative on the United Nations Framework Classification System working group, with representation on the Professional Development and Minerals subgroups.

AIPG took an active role in the American Geosciences Institute Taskforce on Collaboration Between Societies.

We also offered the first ever AIPG Section Officer training course in an effort to make it easier for our section officers as they transition into their positions.

Using Technology for Communication and Professional Development

One of our biggest areas of focus for 2023 was to increase our use of internet technology to communicate more effectively with our members and to provide opportunities for professional development to everyone, from our student members, to CPGs with many years of experience. To accomplish those goals, we offered three different series of webinars and created one-off webinars when presenters with expertise in a topic of interest were available.

Webinars in the Town Hall category were designed to provide our members with up-to-date information on the day-to-day operation of AIPG. We covered AIPG budgeting and dues, introduced members to the new executive committee, and kept members abreast of developments with respect to our annual meeting and broader, profession-wide initiatives.

We continued to offer webinars in the AIPG Lunch and Earn series, transitioning from a focus on mining and mining-related issues to exploring water and environment-related topics at mid-year. These webinars were very successful, and attendance increased after we were able to begin to offer CEU's for members in New York. We have to thank each and every presenter for sharing their time, energy, and most importantly, their expertise, with our members.

We also offered a shorter series of webinars and panel discussions focused on helping students and early career professional (ECP) members be more successful. Whether it was tips on building a successful job application, a question-and-answer session on careers in the industry, or an informational session on licensure and certification requirements and benefits, AIPG student and ECP members were able to benefit from the expertise of geologists with extensive professional experience.

Continued on p. 38
We Need More Geoscientists.

Shanna Schmitt, CPG-11781
shanna.schmitt@state.mn.us

We’re well into the new year, and as usual, we have a great slate of national officer candidates and an exciting Annual Conference to learn about. We’re also well into the spring semester for our student members and professors. Current geoscience students and professors know how interesting, diverse, and important the geosciences are. However, many of us in the geoscience professions are asking, how do we create more geoscientists? It’s a complicated question, and no one person or organization has the answer. We had a great discussion about this at the 2023 Annual Conference in Covington, Kentucky, and I’ve attended several additional talks, webinars, and workshops on this topic over the past few years.

AIPG and our members are working on multiple fronts covered by the AIPG strategic goals and outlined in each of these broad categories:

- **Collaboration with other societies.** We regularly work with the American Geosciences Institute (AGI) and its member societies on various initiatives. We provide materials for the AGI Earth Science Week toolkit and participate in the bimonthly AGI Geoscience Caucus. We initiated a recent collaboration task force and provided input on the new Critical Needs Document. AIPG has memorandums of understanding (MOUs) with Geoscientists Canada; the Society of Mining, Metallurgy and Exploration (SME); the Association of Mining Engineers, Metallurgists and Geologists of Mexico, A.C. (AIMMMGM); the Western Museum of Mining and Industry (WMMI); and Women in Mining USA (WIM), which formalize collaborative programming at annual conferences, encourage representatives and members to attend one another’s events, etc. We also have mutual recognition agreements with the American Association of Petroleum Geologists (AAPG), the European Federation of Geologists (EFG), the Geological Society of London (GSL), and the Institute of Geologists of Ireland (IGI).

- **Communication.** The most common themes of communication needs have been the public, policy makers, and geoscience students. The public needs help learning about the relevance and importance of geoscience: everyday items have some component that is a mined resource; geoscientists help find and maintain clean drinking water sources; geoscientists help find and prevent natural disasters. At the national and section levels, AIPG helps inform policy makers about the critical information geoscientists provide that can help them craft policies. And finally, helping geoscience college/university students choose areas of interest, research, and internships.

- **Impact of geoscience exposure in grades 8 to 12.** We recognize that more students will pursue geoscience if they’re exposed to the profession before starting college/university. Several member societies of the AGI, colleges/universities, and high school science teachers are working on this. I know that many AIPG members speak to K-12 students and some partner with earth science teachers on specific lessons, too.

In addition, working with your alma mater or local geoscience department helps create more geoscientists! I have served on the Advisory Board for the Department of Earth and Environmental Science at the University of Minnesota for several years. I know many other AIPG members do the same! There are several big picture things I’ve learned:

1. **Mentorship helps keep students engaged and finish their degrees, helps graduates find jobs, and helps early career professionals navigate their career and be successful. AIPG has a great Mentoring Program, currently lead by Mark Schaaf, CPG. If you’d like to be added to the list of available mentors, just check the box on your profile page and contact Mark. Sometimes you’ll only talk to a mentee once or twice, and sometimes you may talk to them several times. If you can manage an in-person coffee date, all the better (or tea or hot chocolate for those of us that abhor coffee). It takes courage and initiative to reach out to practicing professionals, and the students and early career professionals we partner with are very grateful.**

2. **Scholarships and grants help students so much, and the need grows each year. Many geoscientist students still take 6 weeks of field camp/training, so scholarships, grants, and other resources geared specifically towards field camp/training are incredibly helpful. Some departments collect used gear and/or have campus-wide outdoor recreation gear rentals/loans that accept your donations as well. Scholarships and grants can make the difference in a student finishing their degree.**

3. **Career panels help showcase the diversity of geoscience careers available. Geoscientists work in a wide variety interesting areas, including insurance companies, mines, soil and water conservation districts, national parks, non-profits, government, consulting, legal firms, politics, and so many others. Career panels can help a student choose their first job and start their career with excitement. I still enjoy listening to career panels, and I know other panelists enjoy them, too. Mid- and late-career professionals make career changes, so it can be great to learn about possibilities outside of your area of expertise.**

2024 keeps getting better, and I can’t wait to talk with you in Durango, Colorado and hear about a field trip and/or an interesting technical talk you attended! If you’ve never attended an AIPG conference, please note that spouses and guests are warmly welcomed and have a long history of attending events with us. As usual, my husband will be with me and putting his Geology 101 knowledge to use. As we move through 2024, please continue to reach out if you have questions or comments!

Shanna
1. Which of the following minerals is not classified as a carbonate?
   a) Willemite.
   b) Siderite.
   c) Cerussite.
   d) Rhodochrosite.
   e) Dude, ass ann invirummintal gigiligist I dunt likke carbonate immimisions. I are oll fir sular und weend....

2. The picture to the right is that of a rotational slump failure in the Del Rio Clay Formation of the Cretaceous of Texas.

   The main clay mineral which defines the chemical composition of this rock unit consists of a 2:1 structure with two silica tetrahedra and aluminum octahedron, with the units being held together with the help of potassium cations. Which of the following identifies this critical mineral compound?
   a) Smectite
   b) Kaolinite
   c) Illite
   d) Poofolite
   e) Millerlite.

3. These important organisms in the geologic record consist of two shells where the line of symmetry is perpendicular to their hinge line (i.e., vertically symmetrical).
   a) Brachiopods.
   b) Pelecypods.
   c) Gastropods.
   d) Ornithopods.
   e) Philosopher and deep thinker says: “Symmetrical shells are the essence of life. It is via this symmetry that our minds coalesce beyond the boundaries of universal instincts....”

4. This scientist is considered as the “father of paleontology:”
   a) Georges Cuvier.
   b) Alfred Wegener.
   c) Jean-Baptiste Lamarck.
   d) Rowan Sebastian Atkinson.
   e) De Grate Fossildude.

5. How fast does the moon move around the Earth? Assume a perfectly circular orbit and recall that the distance from the Earth to the moon is 384,000 kilometers and that the orbital period (P) is 27 days.
   a) 67,000 mph
   b) 15,200 mph
   c) 2,300 mph
   d) 1,100 mph
   e) Forget it man! The moon is totally unreliable; sometimes you see it, sometimes you don’t, sometimes its large and round, sometimes its just a sliver, sometimes the sliver flip-flops, sometimes it lies low, sometimes it stands high....
A sustainable future for the geosciences

Both Aaron Johnson, MEM-2783, and Rasoul Sorkhabi, CPG-11981, address issues relating to the declining numbers of students, classes, and geoscience departments around the world in their respective columns, “Executive Director’s Message” and “Educator’s Corner” in the January ’24 issue of TPG. As Johnson notes, “These actions come at a time when Geology and Earth science are more critical than ever to a sustainable future. The current transition from a carbon-intensive energy grid to one that relies more on renewable energy will require an increase in raw materials production. Geologists will play a critical role in not only finding those resources but ensuring that resources are utilized with minimum resources but ensuring that resources are utilized with minimum impact on the environment and the people that live in communities nearby. When production of resources ends, geologists will play a critical role in closure and remediation. As demand for raw materials increases, demand for geologists will increase as well.”

For example (according to Google), the average gasoline-powered car requires about 20 kg of copper, a hybrid-electric car requires about 40 kg, and a fully electric car requires about 80 kg of copper per vehicle. The demand for other natural resources will increase as well. The ore grade of new mines is usually lower than the grade of currently producing mines. These resources are required to maintain our current or desired standard of living.

Sorkhabi reviewed four recently published reports by various well-known agencies on ways to reprogram and refresh the earth sciences.

**NSF Vision for the Earth Sciences 2020-2030**

1. How is the Earth’s internal magnetic field generated?
2. When, why, and how plate tectonics start?
3. How are critical elements distributed and cycled in the Earth?
4. What is an earthquake?
5. What drives volcanism?
6. What are the causes and consequences of topographic change?
7. How does the critical zone influence climate?
8. What does Earth’s past reveal about the dynamics of the climate system?
9. How is the Earth’s water cycle changing?
10. How do biogeochemical cycles evolve?
11. How do geological processes influence biodiversity?

**AGI’s 2020 Report on the critical needs and the geosciences.**

1. Climate change + resilience, adaptation, and sustainability
2. Water + high-quality geospatial data and maps
3. Energy + technology & engineering
4. Natural hazards + infrastructure
5. Natural hazards + high-quality geospatial data and maps
6. Soils + global change
7. Mineral resources + technology & engineering
8. Oceans & coasts + resilience, adaptation, and sustainability
9. Oceans & coasts + infrastructure
10. Waste disposal + public health
11. Workforce + thriving economy

**AGI/NSF 2021: Vision and change in the geosciences**

1. What concepts, skills, and competencies to undergraduates need to succeed in graduate school and/or the future workforce?
2. What are the best teaching practices and most effective uses of technology to enhance student learning?
3. How do we recruit, retain, and ensure success of a diverse and inclusive community of geoscience majors and support K-12 science teachers to contribute to a well-informed public and dynamic geoscience workforce.

**UNESCO and AGI: Geoscience in action (2023)**

1. No Poverty. End poverty in all its forms everywhere.
2. Zero Hunger. End hunger, achieve food security and improved nutrition, and promote sustainable agriculture.
3. Good Health and Well Being. Ensure healthy lives and promote well-being for all at all ages.
4. Quality Education. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.
5. Gender Equality. Achieve gender equality and empower all women and girls.
7. Affordable and Clean Energy. Ensure access to affordable, reliable, sustainable, and modern energy for all.

Continued on p. 39
Answers:

1. The answer is choice “a” or “Willemite.” (See table below).

<table>
<thead>
<tr>
<th>Mineral</th>
<th>Classification</th>
<th>Chemical Formula</th>
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<tr>
<td>Willemite</td>
<td>Silicate of zinc</td>
<td>Zn$_2$SiO$_4$</td>
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<td>Siderite</td>
<td>Carbonate of iron</td>
<td>FeCO$_3$</td>
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<td>Cerussite</td>
<td>Carbonate of lead</td>
<td>PbCO$_3$</td>
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| Rhodochrosite | Carbonate of manga
| stane         | nese           | MnCO$_3$         |

2. The answer is choice “c” or “illite.”

Illite consists of disc-shaped particles with a 20:1 to 30:1 width to thickness (w/t) ratio. It is characterized by medium plasticity, medium potential volume change, medium affinity for water and medium surface activity. It is a 2:1 structure with 2 silica tetrahedra and 1 aluminum octahedron and it is strongly bonded by potassium cations (K$^+\,$). X-ray peaks occur at 10 Å, 4.5 Å and 3.3 Å.

Illite consists of disc-shaped particles with a 20:1 to 30:1 width to thickness (w/t) ratio. It is characterized by medium plasticity, medium potential volume change, medium affinity for water and medium surface activity. It is a 2:1 structure with 2 silica tetrahedra and 1 aluminum octahedron and it is strongly bonded by potassium cations (K$^+\,$). X-ray peaks occur at 10 Å, 4.5 Å and 3.3 Å.

Kaolinite consists of hexagonal flat sheets with 5:1 (w/t) ratio. It is characterized by low plasticity, low potential volume change, low affinity for water and low surface activity. It is a 1:1 structure with 1 silicon tetrahedron and 1 aluminum octahedron. Hydrogen bonding holds units together (a strong bond; not easy to separate). X-ray peaks occur at 7.2 Å, 3.57 Å and 2.33 Å.

Smectite consists of disc-shaped particles with a 200:1 to 300:1 (w/t) ratio. It is characterized by high plasticity, high potential volume change, high affinity for water and high surface activity. It is a 2:1 structure with 2 silica tetrahedra and 1 aluminum octahedron. Only secondary bonds exist between units, and it is easily forced apart by H$_2$O (i.e., expansive clays). X-ray peaks occur at 14 to 15 Å and 9.5 Å for air-dried samples and at peaks at 17.5 Å and 8.9 Å if saturated with ethylene glycol.

If you ever run into a sample of “poofolite”, do let me know.

3. The answer is choice “a” or “brachiopods.”

In brachiopods the line of symmetry is vertical, normal to the hinge line. In contrast, pelecypods or bivalves have their line of symmetry along the hinge line. Unlike pelecypods, brachiopods do not have gills; instead, they use their lophophore (a tube-like organ) to eat and breathe. Gastropods have single, coiled shells. Ornithopods were herbivorous dinosaurs, so no shells here.

4. The answer is choice “a” or “Georges Cuvier” (1769-1832). Wegener (1880-1930) was the proponent of continental drift. Lamarck (1744-1829) was an early proponent of biological evolution. Rowan Sebastian Atkinson (1955-) is the famous comedian (Mr. Bean). You may have your own ideas concerning choice “e.”

5. The answer is choice “c” or 2,300 mph.

The distance from the Earth to the moon is taken as the radius of the circular orbit (r). Then, the circumference of the trajectory is:

\[ C = 2\pi r = (2)(3.1416)(384,000 \text{ km}) = 2,412,748.8 \text{ km} \quad (1) \]

\[ V = \text{Distance/Time} = \frac{C}{P} \quad (2) \]

\[ P = (27 \text{ days})(24 \text{ hours})(60 \text{ minutes})(60 \text{ seconds}) = 2,332,800 \text{ sec} \quad (3) \]

\[ V = \frac{2,412,748.8 \text{ km}}{2,332,800 \text{ sec}} = 1.03 \text{ km sec}^{-1} \quad (4) \]

\[ 1.03 \text{ km sec}^{-1} = 2,236.94 \text{ mph} \quad (5) \]

\[ 2,304.04 \text{ mph} \quad (6) \]

Equation (6) is closest to choice “c” and the answer to the question. Values such as this one can be calculated but the numbers are certainly not intuitive to me, anyway. Just as the moon moves at a velocity of 2,304 mph around the Earth, the Earth moves at a velocity of 67,108 mph around the sun. These are significantly large numbers whose quantities always seem to amaze me.
8. **Decent Work and Economic Growth.** Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all.

9. **Industry, Innovation, and Infrastructure.** Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation.

10. **Reduced Inequalities.** Reduce inequality within and among countries.

11. **Sustainable Cities and Communities.** Make cities and human settlements inclusive, safe, resilient, and sustainable.

12. **Responsible Consumption and Production.** Ensure sustainable consumption and production patterns.

13. **Climate Action.** Take urgent action to combat climate change and its impacts.

14. **Life Below Water.** Conserve and sustainably use the oceans, seas, and marine resources for sustainable development.

15. **Life on Land.** Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation, and halt biodiversity loss.

16. **Peace, Justice, and Strong Institutions.** Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable, and inclusive institutions at all levels.

17. **Partnerships for the Goals.** Strengthen the means of implementation and revitalise the global partnership for sustainable development.

The NSF’s Vision for the Earth Sciences 2020-2030 struck me as entirely too focused on what particular researchers want, not on topics of broader societal application. How many of us lose sleep over the generation of the Earth’s magnetic field? Even when spending a lot of time conducting geomagnetic surveys, my concern was solar flare interruption of the more steady-state magnetic intensities. The AGI’s 2020 Report on the critical needs and the geosciences and UNESCO’s and AGI’s: Geoscience in action (2023) lists were more societal-oriented but neither really seemed to focus on what will get students interested in and excited about the earth sciences. Sorkhabi’s introduction to the UNESCO’s and AGI’s: Geoscience in action (2023) list did observe that rebranding courses from petroleum and mining to natural resources management and resource requirements for renewable energy are part of the solution. I’ve noted over the years that the focus of natural history museums on collections of minerals and fossils are a turn-off for those like me who are not obsessive collectors (like stamp and coin collectors). What excited me about geology was learning about the whys of topography (geomorphology is not an exciting word) and learning about folding, faulting, and other structures (the t-shirt “folds, thrusts, and overturned beds are common in zones of orogeny” is more enticing than structural geology).

What are your suggestions for revising the earth science curriculum to be more attractive to students?

### 100 Years of Geoscience Ethics Standards

**Contributed by Sara Pearson (CPG-10650).**

As geoscientists, we study current earth processes to piece together the geologic events of the past. We hypothesize, collect data, test, and push the boundaries of science and technology to answer challenging questions in an attempt to identify indicators that will allow us to predict processes, events, and outcomes. We test old theories, make new discoveries, develop new theories, and formulate new answers in this ever-changing, multi-disciplinary, and exciting science. Our research and practice ultimately influence and shape human interaction with the planet.

The significance of this responsibility is comparable to practicing professional engineers and medical professionals as examples of occupations where a code of ethics is expected to be followed and is familiar to the public. A series of bridge failures and other structural failures in the late 1800s to the early 1900s prompted the requirement for defined credentials for engineers. Public health, safety, and welfare were key considerations in the establishment of formal codes of ethics by the American Institute of Electrical Engineers (AIEE) in 1912, the American Society of Civil Engineers, and the American Society of Mechanical Engineers adopted theirs in 1914. The National Society for Professional Engineers introduced its Canons of Ethics for Engineers and Rules of Professional Conduct in 1946. The Oath of Hippocrates describes expectations for the conduct of physicians dating from the 5th Century BCE. A Code of Medical Ethics was first published in the early 1800s by English physician, Thomas Percival. The American Medical Association adopted its code in 1847 following Percival’s work.

It was not until the discovery of oil, an economically viable source of energy that a code of ethics was deemed necessary in the geosciences. The American Association of Petroleum Geologists (AAPG) was the first organization to adopt a code of ethics for its members in 1924. The aim was to protect “regularly qualified geologists” from “unqualified and unscrupulous men practicing geology,” according to E.G. Woodruff.

The 1924 version of AAPG’s Code of Ethics described the expectations of members to be honest and act with integrity, fairness, and loyalty. They recognized the obligation of the profession to the public, the employer, colleagues, and the organization. The general principles have not changed significantly since it was adopted 100 years ago, showing it remains just as relevant today. The original thought in developing the code was that exhibiting high ethical standards was the pathway to earning the public and oil industry’s trust. Subsequent revi-

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sions to the code expanded this thought to include all levels of membership in AAPG and the expectation that they be guided by high standards of business ethics, personal honor, and professional conduct.3

Sixty years ago, growth in infrastructure and unethical behaviors of individuals posing as professionals making decisions affecting the health and welfare of the public again inspired the founding members of AIPG, many AAPG members, to create our organization of professionals from all geoscience disciplines. They were compelled to establish a national organization to define the requirements of a qualified professional and establish a code of ethics. AIPG’s code of ethics language was similar to AAPG’s, again promoting honesty and integrity and describing obligations to the public, the employer, colleagues, and the profession.

**Tuff Schist**

I contributed question 5 to Robert Font’s “Test Your Knowledge” questions in the Jan/Feb/Mar ’24 TPG. A bumper sticker is available reading “Tuff Schist.” Aside from the sophomoric humor, if a dacitic tuff containing prominent biotite phenocrysts has been subjected to greenschist-grade metamorphism, what would the metamorphic rock be described as a) granite gneiss, b) granulite, c) gneiss, d) gneissic granite, or e) leucocratic schist. I stated that the answer is gneissic granite.

Dave Groves, CPG-11456, sent an email to Font and me stating, “As much as I liked the humor in the “Test Your Knowledge” quiz, I am pretty sure a dacitic tuff would not be a “gneissic granite” after being subjected to greenschist facies metamorphism. ‘Gneissic’ describes mineral segregation or banding, and a dacitic tuff composed primarily of plagioclase and quartz would not undergo recrystallization and mineral segregation. The biotite might undergo retrograde changes to chlorite and the matrix might have some chlorite or epidote from the albitionization of plagioclase, but the rock would still largely be light-colored and fine-grained. Most geologists working in the Abitibi greenstone belt in Canada would probably use the term ‘metadacite’ to describe a dacitic tuff metamorphosed to greenschist facies.”

I haven’t spent time mapping in the Abitibi greenstones. I’ve worked with the sillimanite-biotite gneisses, granitic gneisses, and migmatites marginal to a mesozonal quartz monzonite batholith in central Colorado. In drafting the question, I was starting with tuff with a lot of biotite phenocrysts, one of the prominent ash flow units of southwestern Colorado with a composition closer to the rhyolitic boundary of dacite on a QPFA diagram. But I’ll yield to Groves’ greater experience with greenschist rocks.

**Contributions to this column are welcomed**

Please send me any questions or discussions of ethical and practice issues that occur to you. Your contributions will be acknowledged and demonstrate that you have spent time considering ethical and practice issues if you are required to report such activities as part of a professional development program.

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3. Ibid.
What does success and career advancement look like to you? Obviously, this can look very different from person to person. However, every roadmap of someone’s career includes just that—a plan. The detail and type of plan that you create will guide you throughout your career, and this plan starts forming early on in school. This past February and March, two Student ECP webinars focused on developing and succeeding in your geocareer. Launching your Career was focused on students, while Advancing your Career was focused towards ECPs that have had at least one career opportunity. The recordings of these are available on AIPG’s website, so students and ECPs can watch them for the first time or rewatch them to gain additional insights you may have missed.

The student and early career panelists of Launching your Career discussed topics on if/when to attend graduate school, how professional connections helped to get your first geo opportunity, internship advice, and what to expect from your first geoscience opportunity. Below is a list of key messages from the webinar:

- Develop and maintain your network.
- Ask someone to mentor you (and/or join the AIPG mentorship program).
- Apply to internship opportunities early and often.
- Guidance should be found both within and outside of your degree program.
- Internships help you understand what fields of geology you enjoy and should be sought after.

A first geoscience opportunity is a great learning opportunity where you can finally contribute to a company but remember that a first opportunity does not have to be your last. You may be interested and better suited in different fields of geology or employer types (government, industry, etc.), so it’s normal to explore what type of opportunities are best for you and the company. And graduate school may not be for everyone, but a graduate degree can be gained at any time during your career.

Panelists of Advancing your Career delved into the details of changing career paths or employer types, transitioning to a second or third career opportunity, and how to accelerate your career success in general. Panelists emphasized the difference between working in industry, consulting, and government and how the pace, projects, and pay vary between them. For example, some government jobs may have a slower pace than an industry job, and some may flourish more in such a work environment. However, some government jobs may have projects and research that are more interesting to others than other opportunities. Below are some additional takeaways:

- Learn about the various geoscience career paths when developing your career path early on.
- Mentors remain an essential part of your early career, whether you are transitioning into another opportunity or not.
- Certifications can be a competitive advantage.
- Attending graduate school as an early career professional can be challenging but worthwhile.

Special thanks to the panelists for their invaluable insights, and Mark Schaaf as moderator and for his continuous collaboration and dedication towards students and ECPs. Hopefully, the experiences and ideas from these webinars help others develop their own roadmap for success. Join us in the upcoming GeoCareers Panel in April so you can learn more about the interesting careers that a geologist such as you can have.
AIPG webinars and presenters for 2023

**Town Hall Meetings**

April 5 - *Key Information from the 2022 AGI Leadership Forum: The Next Generation of Geoscience Societies: Views from Early- and Mid-Career Geoscientists and Leadership*, Jon Arthur

June 8 - *60th Anniversary AIPG National Conference Update*, Chris Lilek and Shanna Schmitt

October 13 - *Dues and financial update from AIPG*, Mark Schaaf, Shanna Schmitt, Dawn Garcia, and Aaron Johnson

November 7 - *AIPG national committee and officers*, Shanna Schmitt, Brandy Barnes

**Lunch and Earn**


February 28 - *Managing Drilling Programs-drill rig and drilling photos and discussion*, Matt Rhoades

March 28 - *Groundwater Issues Encountered in Mining Projects*, Doug Bartlett

April 25 - *Securing access to mineral resources: combining soft and hard power*, Vitor Correia

May 30 - *The role of geological data collection in developing mineral resources*, Jacob Anderson

June 27 - *Lithium Resources at the Salar del Hombre Muerto, Argentina*, Sean Kosinski and William Cutler

July 26 - *Applying advanced site characterization technologies for optimized remediation design*, John Fontana

August 29 - *Three decades of US/China cooperation in karst hydrogeology and resource protection under the auspices of UNESCO*, Chris Groves

September 26 - *Importance of Archea in Bioremediation*, Keith Rapp


November 28 - *Groundwater Tracing in Karst Regions*, Doug Gouzie

**Student-Early Career Professional Series**

February 22 - *Licensures and Certifications*, Dawn Garcia

March 17 - *Panel Discussion: Geocareers*, Brigitte Petras, Doug Bartlett, Jessica Davy, Chris Hogan, Sara Pearson

April 26 - *Tips for creating a successful job application*, Hanna Weaver, Michael Gross, Steve Townsend, Brigitte Petras

**Other Webinars**

- March 21 - *Content learning outcomes from geological virtual field trips can exceed those from in-person field trips*, Tom Ruberto
- August 15 - *Cognition-guided learning in the geosciences*, Stephen Reynolds and Julia Johnson
- October 6 - *The importance of AIPG and how YOU benefit*, Dawn Garcia
- December 12 - *The Confidence Gap*, Kelly Greaser

**Geoscience Online Learning Initiative (GOLI) Courses**

- February 15 - *Cultivating Geosciences, Justice, and Action through Participatory Research Methods*, Mónica Ramírez-Andreotta, M.P.A., Ph.D.

**Building Partnerships**

With geology being such a small, specialized field, it’s very important that we work together to achieve common goals for the profession. To that end, AIPG has been very active in securing memoranda of understanding (MOUs) with other professional organizations and not-for-profit geoscience groups, to help us find common ground. In 2023 we entered into three new MOUs, two with other professional organizations and the third with a not-for-profit museum. These MOUs are similar in their language, and focus on joint programming, representation at annual meetings and conferences, and provide a foundation upon which broader collaborations can be made when and if they might be necessary.

**Memoranda of Understanding**

- Society for Mining, Metallurgy, and Exploration (SME)
- Western Museum of Mining and Industry
- Women in Mining

**Supporting AIPG Sections**

Individual AIPG sections are the lifeblood of AIPG. The National Office provides important support for AIPG sections. This support ranges from managing elections for individual sections, to providing registration and technical support for larger section initiatives such as the Texas Webinar Series. We also file the IRS 990 forms for individual sections to ensure that sections retain their 501(c)6 status.

**National Office Support**

- Letter of support for the Arizona Board of Geologists during their Sunset Review
- Provide management services for the AIPG-Texas Webinar series managed by John Berry
- Helped to plan NM-AZ joint field trip to Copper Flat and Very Large Array
- Filed IRS 990 forms for 36 sections
- Manage and transfer section dues payments collected during membership renewal

**Outreach on a Local, National, and International Scale**

One of our most important activities is representing AIPG to the larger geoscience community. We do this by attending various meetings across the country, throughout the year. The AIPG National Office doesn't pay for members to attend each of these meetings. We often are represented by members who are attending on behalf of their employer and spend some time representing AIPG to the community. At other meetings we provide the booth if section members will be there to talk all things AIPG to attendees.
Each year we find that we gain a significant number of members through our presence at professional meetings. We often assist with programs during these meetings, such as the joint ASBOG-AIPG-AGI workshop on licensure and certification or providing judges for the National Cooperative Geologic Mapping Program’s Best Student Geologic Mapping Competition.

Meetings Attended

February 26 - March 1: SME Annual Conference, Denver, CO
March 5 - 8: Prospectors & Developers Association of Canada, Toronto, Ontario, Canada
March 17 - 19: Joint Northeast/Southeast Geological Society of America (GSA) Section Meeting, Reston, VA
April 12 - 15: Women in Mining, Tucson, Arizona
AIPG Arizona Section supporting the field trips on April 14
May 4 - 5: North Central GSA Section Meeting, Grand Rapids, MI
May 17 - 19: Cordilleran Section GSA Meeting, Reno NV
May 23 - 25: Rocky Mountain Section GSA Meeting, Fort Collins, CO
May 30 - June 1: Discoveries Conference, Mazatlán, Sinaloa, Mexico - Presentation on certification of professional geologists by Dawn Garcia
June 11 -15: AASG Annual Meeting, Glenwood Springs, CO
August 14 - 16: National Council of State Legislatures Legislative Summit, Indianapolis, IN
August 22 - 24: Colorado Oil and Gas Association Energy Summit, Denver, CO
October 15 - 18: Geological Society of America Annual Meeting, Pittsburgh, PA
AIPG-AIPE Joint workshop on Licensure and Certification
December 4 - 8: AEMA Annual Meeting, Reno, NV

The National Executive Committee

Members of the National Executive Committee develop the vision and identify short-, medium- and long-term initiatives to keep AIPG at the forefront of challenges and opportunities in our profession. The 2023 National Executive Committee included: President Dawn Garcia (Arizona); Past-President Matt Rhoades (Missouri); President-Elect Shanna Schmitt (Minnesota); Vice-President Dennis Pennington (Pennsylvania); Secretary John Sorrell (New Mexico); Treasurer Mark SchAAF (Capitol); National Editor Adam Heft (Michigan); ECP Member Brigitte Petras (Ohio); and, Advisory Board Members Robert Andrews (Ohio), Bill Brab (Kentucky), Andrew Jones (Colorado), and Mehmet Pehlivan (California).

The National Executive Committee met in full AIPG business meetings four times during the year, along with conducting monthly check-in meetings. The full business meetings included reports from each officer, updates from the National Office, and brainstorming sessions to develop ideas and initiatives to move AIPG forward.

The monthly check-in meetings served two primary purposes. The first was to monitor progress of individual initiatives. Secondly, the check-in meetings could serve to address AIPG business between full meetings in order to better serve the institute. In cases where AIPG business was to be conducted, a notice to the membership was sent out in advance. Business meetings for the institute are open, and we strongly encourage AIPG members to attend either in person or virtually whenever possible. We need your input if AIPG is to stay abreast of current events in our field and remain the vibrant, relevant organization that we are today.

AIPG Executive Committee Meetings

January 27 - Monthly check-in meeting
February 4 - National Executive Committee business meeting, Tucson, AZ
February 17 - Monthly check-in meeting
March 17 - Monthly check-in meeting
April 21 - Monthly check-in meeting
May 19 - Monthly check-in meeting
June 3 - National Executive Committee business meeting, Virtual
July 21 - Monthly check-in meeting
August 18 - Monthly Check-in meeting
September 16 - National Executive Committee Meeting, Covington, KY
October 20 - AIPG Executive Committee Monthly Check-in
November 4 - AIPG National Executive Committee Meeting, Hybrid (virtual and in person St. Louis, MO) with associated field trip to the Brushy Creek Mine, Reynolds County, MO
December 9 - AIPG National Executive Committee Transition meeting, virtual

The events outlined in this article are in addition to the day-to-day tasks the Executive Committee and our National Office staff undertake on behalf of our members. While this summary doesn’t represent everything that the AIPG Executive Committee and National Office achieve each year, I hope it gives you some idea of the hard work that the Executive Committee, AIPG volunteers, and our National Office staff do on behalf of our members and our organization. Our job is to support you, our members, and to promote professionalism, ethics, and integrity in practice, across the profession.

I hope each of you have a successful spring and summer.

Best Regards,

Aaron
Geoscience Jobs

Rasoul Sorkhabi, Ph.D., CPG-11981

Dr. Rasoul Sorkhabi is a professor at the University of Utah's Energy & Geoscience Institute, Salt Lake City. Email: rsorkhabi@egi.utah.edu

Years ago, when I lived in Arizona, I chanced to have a conversation with a nurse during a hospital visit. This was a year or so after I had got my PhD in geology. She asked, “What do you do for work?” “I am a geologist,” I said. She didn’t know what a geologist was. “I study rocks, mountains, things like that.” She paused for a few seconds, and then asked, “Do they pay you to do that?” I still remember this conversation, and even though it may not represent a common perception about geology, it does show that the public may not have a correct perception about geology either. When I teach an undergraduate geology course to young students, at the start of the semester, I explain what kinds of jobs geologists do and how they make a living, even though I know that the vast majority of the students will not be geologists.

What can you do with a geology or geophysics degree on the job market? This is an important question not only for students but also for colleges and universities, especially given the low enrollment in earth science degrees in recent years, which has forced some universities to merge or even slash geoscience departments. The following are some job descriptions for aspiring geology students and for my colleagues who may share this article with their students. Our focus here is the USA, although much of the discussion is also relevant to other countries.

1. Career Paths

People often think of geologists as oil, coal, mining, dirt, or earthquake lovers. We need to clarify what geology is – it is “earth science.” It is actually the only science that studies Earth as a whole, as a planetary system (while other natural sciences, like chemistry and biology, study some parts of Earth). Geology informs us how Earth works (both internal and surficial processes), what it is made of (materials), how it has evolved (geologic history), and how this science can be used to serve society and solve various economic and environmental (and even intellectual) challenges that humanity faces.

In terms of academic training, geologists are categorized into BS, MS, and PhD graduates. For a BS degree in geology, the graduate should take core courses in this science: physical geology, historical geology, mineralogy, petrology, sedimentology, stratigraphy, geomorphology, structural geology and tectonics, field geology and mapping. It is also important to take courses in GIS and basic computer programming since these tools are increasingly becoming vital for the profession. MS geology graduates specialize in one particular field – say volcanology, sedimentary geology, or mineralogy.

PhD degrees in geoscience (geology, geochemistry, and geophysics) are for those who want to be professors or research scientists. You do not need a PhD for an entry level geoscience job in a company or government agency. There are over 100 specialty areas in geoscience. A PhD degree in geoscience involves novel research in a sub-field, a highly specialized aspect of say volcanology or sedimentology. PhD graduates are hired for their in-depth expertise in a particular area. Of course, life-long work is the best school, and it is important to learn new skills as our career demands.

The geoscience profession includes various activities in the office, laboratory, and field, as well as project management, mentoring, publishing, fund raising, and marketing, depending on our professional roles and expert areas. Field work and travel are among major motivations for students who want to become geologists. After some work experience, one may choose a technical or a managerial career path – the latter facilitated by having an MBA degree.

2. US Geological Survey

US Geological Survey (USGS) is a federal agency that has branches in all 50 states and is involved in all aspects of geoscience research and mapping, mineral resources, natural hazard monitoring (earthquakes, volcanic eruptions, and landslides), groundwater resources, and so forth. USGS currently has over 10,000 employees, including scientists, technicians, and support staff working in more than 400 locations throughout the country. USGS is a great place to work if you would like to commit your career to a particular region. Other countries have equivalent surveys and organizations.

3. Geophysical Survey

Geophysical surveys by gravity, magnetic, electromagnetic, magnetotelluric, and seismic techniques are conducted to image subsurface formations for various objectives, including oil and gas exploration, mining, archeology, ocean floor mapping, and large-scale engineering projects. Ground-based, aerial, ship-borne, and space-based technologies may be employed for the survey. Geophysical surveys encompass various stages from instrumentation, data acquisition, data processing to interpretation, imaging.

2. https://www.usgs.gov/about/organization
and modeling. Geophysical methods are so advanced that each one of them requires highly trained experts. There are many companies engaged in geophysical surveys. They come in different sizes. Some are specialized in a particular geophysical method or operate in a particular region. Others are major international corporations, for example, CGG Veritas, PGS (Petroleum Geo-Services), TGS Nopec, and WesternGeco (part of Schlumberger), which mainly conduct seismic surveys for oil and gas exploration.

4. Geographic Mapping and Geospatial Analysis

Geospatial experts use rapidly advancing mapping and visualization technologies including GIS (geographic information systems), GPS (global positioning systems), satellite imagery and remote sensing, laser mapping (Lidar), digital elevation modeling (DEM), data visualization and imaging, and spatial analysis. Special training for each of the technologies is required. Government (civil as well as military) and various private companies employ mapping experts and geospatial analysts to create map layers incorporating various types of information.

5. Environmental Geology

Environmental geology is a growing field and includes a diverse array of jobs. An environmental geologist applies geologic knowledge, field work, laboratory analysis, and computer models to study and protect ecosystems and mitigate environmental hazards to human health. Environmental geologists study the pollution of soil, air, and water and other environmental accidents by industries; they suggest plans for remediation and clean-up of contaminated areas; they design strategies to manage industrial wastes and mitigate hazards; and they sometimes serve as expert witnesses in environmental issues and safety cases. Therefore, an environmental geologist must also be well versed in environmental laws and regulations.

One particular area for which environmental geologists may be hired is environmental site assessments (ESAs; both Phase I and II) which involve document review, site examination, and sample collection and analysis. ESA reports are prepared for real estate holdings and must consider the regulations and standards drawn by the US Environmental Protection Agency (EPA) and ASTM International (American Society for Testing and Materials).

Environmental impact assessment (EIA) is another area where environmental scientists are employed. EIS reports discuss the impact of industrial, mining, construction, and development projects on the quality of the surrounding environment and human health. These reports are meant to inform community leaders and decision makers.

Government agencies (such as EPA), geochemical laboratories, and environmental consulting firms hire a large number of environmental scientists.

6. Engineering Geology

Engineering geologists assess geological factors that impact engineering projects. They study rocks, soil, relief, rivers, groundwater, and other geological features near construction sites. To do this, they review geologic maps, test rock and soil samples for mechanical properties, and develop computer models incorporating various geologic data relevant to the construction project. In short, engineering geologists work with construction engineers to develop proper earthworks and foundations for construction projects. Civil engineering companies hire engineering geologists.

7. Hydrology

Hydrology is a vast field; it deals with liquid freshwater which only amounts to one percent of the total water budget of Earth, and even then, it is distributed non-uniformly depending on location, climate, and topography. Water is critical to our survival—drinking, irrigation, industry, hygiene, and so forth. Geologists specializing in hydrology—what is called hydrogeologists—study the distribution and production of freshwater resources and reservoirs as well as their properties, qualities, management, and regulations. The actual work may include, for example, mapping and delineating subsurface aquifers based on their rock porosity and permeability; studies of drainage basin in terms of runoff, movement, storage, flooding, and sustainability; chemistry and quality of water in rivers, lakes and underground formations; designing riparian-zone restoration areas, and so forth.

Government agencies, both at the federal level (e.g., US Geological Survey, National Oceanic and Atmospheric Administration, NOAA, US Bureau of Land Management, BLM) and state level (water district bodies, water advisory boards, and water resource management departments) and hydrologic or environmental companies employ hydrologists.

8. Natural Hazards

Natural hazards are categorized according to their origin. Some like earthquakes and volcanic eruptions are tectonic; some like landslides are surficial processes; others are oceanic and atmospheric phenomena such as hurricanes and tornadoes. Nevertheless, they all adversely affect human life and property and need to be studied and monitored. Each type of natural hazard has its own specialized discipline. Earthquake geologists, for example, map active faults and investigate their earthquake records. Such studies are important for development projects in places like California. States home to earthquakes and active volcanoes hire seismologists and volcanologists to monitor earth tremors and volcanic eruptions respectively, as part of warning systems and emergency planning. Geomorphologists map and monitor hillside slopes for landslide hazards, road safety, and real estate development. NOAA employs 12,000 personnel worldwide, including 6,773 scientists and engineers, many engaged in oceanography and meteorology.

9. Mining Industry

According to the International Mineralogical Association, there are (as of 2023) 5,975 mineral species identified by geologists. We do not use most of them, but all that we use in our daily life, home and workplace comes directly or indirectly from minerals and rocks dug from Earth. Aside from the obvious metals (copper, platinum, silver, and gold), consider these mineral uses: talc in baby powder, fluoride in toothpaste, gypsum in drywalls, lithium in batteries, potassium in crop fertilizers, and uranium in nuclear power plants.

Geologists specializing in mineralogy, economic mineral deposits, and mining geology can find jobs in various segments of the mining industry—identifying ore minerals, locating suitable mining sites, estimating ore reserves, and developing ore processing (sepa-
ogy and engineering. In recent years, exploration and production of critical minerals from domestic feedstock. This has given a new impetus to mining geology, and seismic interpretation. An MS or PhD in one of these fields 10. Gemology

Have you ever been to a jewelry store, rock shop, or a mineral show? All those precious gemstones – augite, emerald, ruby, sapphire, topaz, gold, etc. – were explored, extracted, separated, cut, polished, and designed by experts. There are some geologists – gemologists – who specialize in some of these tasks. They often work for gemstone companies. But some gemologists, after gaining sufficient knowledge, skills, and experience and clients, work for themselves; they have maps, mining leases, workshops, online stores or other client bases for their business. Aside from geology courses at colleges, there are also gemology schools who offer training and certification.

11. Oil and Gas Industry

The oil and gas industry used to hire nearly half of all geology and geophysics graduates annually. However, in recent decades this employment has dwindled significantly due to oil market crashes and the fact that the US shale revolution depends more on drilling and fracture stimulation of the already known shale formations rather than new geological exploration. Moreover, because of concerns for global warming as a result of the burning of fossil fuels and the needs felt for the energy transition, few students are willing to major in petroleum fields. As a result, a large number of petroleum geoscience and engineering programs in the USA and Europe have shut down. The future for these programs in universities is uncertain; however, if the world cannot make a rapid transition to alternative energy sources and demand for oil and gas grows, the companies will have to hire petroleum geologists, geophysicists, and engineers for new exploration workflow and reserves growth.

Traditionally, geoscience graduates have been hired by the oil and gas companies for a variety of jobs including mud logger, wellsite geologist, exploration, field development or production geologist, and for technical jobs such as basin modeling, petroleum geochemistry, sedimentology, micropaleontology, structural geology, and seismic interpretation. An MS or PhD in one of these fields will be necessary to work for a petroleum company.

12. College and University Professors

Community colleges give two-year associate degrees to their graduates, and usually offer geology courses either as part of general science credits or associate degrees in geology. There are 942 public community colleges and 73 independent community colleges in the USA. Each year, tens of thousands of students take geology courses in these colleges. In principle, a person with an MS in geology can teach general geology courses in a community college, although most professors in these colleges have PhD degrees, even though they are not required to do research work. Community colleges hire some full-time geology professors but a larger number of adjunct professors on a part-time basis; adjunct professors usually have other full-time jobs and teach these geology courses for passion and supplementary income.

There are 2,832 universities in the USA, of which nearly 2,000 universities have geoscience departments, employing over 18,000 faculty and staff. University professors teach, train students, and conduct research. The research work may consist of field work, laboratory analysis, experimental work, and computer modeling. University professors must have a PhD degree and often also do a post-doctoral fellowship. They follow step-wise academic ladders as assistant professor, associate professor, and full professor positions (comparable to lecturers, reader and professor positions in British universities). Assistant professors usually undergo several years of evaluation by their peers – evaluation of their teaching, grants and funds, publications, research and scholarship, and professional service and reputation – before they get tenure. Aside from teaching and mentoring, publications in journals and conferences is a major part of a professor’s job (“publish or perish” as they say). In order to support their students and research, professors also write research proposals to get funds and grants from government agencies (e.g., National Science Foundation, Department of Energy, Environmental Protection Agency, Department of Defense) or industries.

13. Research Scientists

Research scientists have PhD degrees and are employed by research institutes and laboratories, operated by governments (for example, NASA, NOAA, USGS, and national laboratories), universities, and corporations. There are 17 national laboratories under the Department of Energy located in Alaska, Washington State, Oregon, California, Colorado, New Mexico, Texas, Iowa, Illinois, Pennsylvania, West Virginia, Virginia, New Jersey, and New York. Research scientists are usually engaged in cutting-edge research and development. They often write grant proposals for their research, and collaborate with colleagues and graduate students.

14. Service Companies and Consultancy

There are numerous service and technical companies, operating in various fields such as geoscience, engineering, energy, environment, materials, mining, construction, and hydrology. Each year, these companies hire a large number of geoscientists for various jobs – field work, mapping, laboratory testing, experimental work, resource exploration, data analysis, computer modeling, project management, and so forth. These companies range from small busi-
ness and mid-sized firms to major international corporations such as Schlumberger, Halliburton, Baker Hughes, Weatherford, Veolia, AECOM, Jacobs, Terra Tech, Clean Harbors, and WSP. Joining one of the service or technical companies at entry-level is perhaps the easiest career path to gain work experience and professional network.

Senior geologists with a long record of research and word experience and a supportive client base may start their own consultancy companies. Consultancy can require a professional geologist (PG) license from the state of residence and work. In fact, a PG license may even be required early in the career; it definitely helps with promotion and professional development.

**15. Data Science**

Even though data science is not a discipline in earth science, it is used in various geoscience-based workflows. A geology major also trained in data science, computer programming, and information technology will have better opportunities to find employment in jobs that process large geoscience databases. Companies like Amazon, Google, and Microsoft hire expert domain data scientists.

**16. Science Journalism and Writing**

Science journalists are employed by magazines, new agencies, TV networks, documentary film producers, and public relations offices at corporations, universities, and organizations. Developments in Earth science are always a huge part of science reportage and analysis, and draw public attention. A combined degree in geology and journalism provides great career pathways for specializing in geoscience journalism and writing. Some journalists are hired full time while a vast majority of journalists work as freelance for various clients.

Some journalists and writers specializing in earth science and nature have gained legendary fame, for instance, Rachel Carson, David Attenborough, John McPhee, Simon Winchester, and Elizabeth Kolbert. On the other hand, there are geologists who have become successful writers of popular science books or producers of documentary films such as Loren Eiseley, Stephen Jay Gould, Richard Fortey, Rick Bass, and Iain Stewart.

**17. Geoarchaeology**

Anthropology and archaeology overlap with geology in a number of areas. These include physical anthropology which examines the fossil record of human evolution; Quaternary geology which studies the environmental, climatic, and landscape changes in the past 2.6 million years during which humankind evolved; and archeology of prehistoric sites, sediments, and artifacts which require geochronologic dating, subsurface geophysical imaging, geochemical analysis of samples, and so forth. Geologists, geochemists, and geophysicists with a minor in archeology or anthropology will thus be best candidates for these types of jobs. Geoarchaeology is a multi-disciplinary and fascinating field as it explores, surveys, and excavates exotic places where ancient peoples once lived, and collects and analyses ancient tools they used. All this information unravels how humans, both physically and culturally, evolved.

**18. Natural History and Science Museums**

According to the Institute of Museum and Library Services there are approximately 35,000 museums (in a broad sense of term) in the USA, of which 268 are natural history museums and 834 are science and technology museums. All 50 states have museums, and overall, they employ 74,000 people. Museums are operated by states, universities, corporations, professional society, and private owners. Some, like the Smithsonian and the New York Natural History Museum, are very large enterprises. Depending on the size and type of the museum, geology graduates can serve as field or laboratory researchers, guides, instructors, curators, or managers.
The Foundation of the American Institute of Professional Geologists

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Be sure to check the web site www.aipg.org/foundation for additional information about the Foundation.

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Thank you!

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Apr. May. Jun. 2024 • TPG 49
Thomas Grose, CPG-00379
Golden, Colorado
1924 - September 13, 2023

Obituary obtained from the December 2023 Mining Engineering magazine.

Thomas L. Trowbridge Grose “Trobe” of Golden, Colorado died September 13, 2023. He is survived by his wife Cecilia Travis; sister Virginia Young; two children, Clark Grose and Kathy Beymer; four grandchildren; two great-granddaughters; two step daughters; and a step granddaughter. He is fondly remembered by many cousins, nieces, and nephews, friends and colleagues. He was preceded in death by his wife Barbara Clark Grose, granddaughter Lucia and brother Peter.

Grose was born in 1924, in Evanston, Illinois to Clyde L. and Carolyn T. Grose. He served in WWII as Aerologist 3rd class in the United States Navy. He served with honor and humility in the Pacific, a Coxswain on the U.S.S. Goodhue, until the end of WWII, and his love of country endured all the days of his life. On July 20, 1946, G. W. married his childhood sweetheart, Sophia Nell. She encouraged and supported every endeavor and enriched each day. She was his best friend, partner in all things, and greatest love.

G. W. grew up in Shreveport an independent and resourceful boy who made his own way delivering milk and blocks of ice, working at a filling station and later, as a self-taught draftsman. He rode bare back and fished with childhood friends, and remembered always having an interest in geology, with an early introduction to the oilfield through his uncle, who owned a trucking company. In the 1930’s, he rode on trucks hauling steam boilers and moving rigs with a driver named Jesse Wallace, who loved G. W. so much that he took Brock as his last name.

After graduating C. E. Byrd High School, G. W. enlisted in the United States Navy. He served with honor and humility in the Pacific, a Coxswain on the U.S.S. Goodhue, until the end of WWII, and his love of country endured all the days of his life. On July 20, 1946, G. W. married his childhood sweetheart, Sophia Nell. She encouraged and supported every endeavor and enriched each day. She was his best friend, partner in all things, and greatest love.

G. W. attended Centenary College in Shreveport, and joined the Kappa Sigma fraternity, before moving to Oklahoma City, where Sophia worked, while G. W. hitch-hiked to Norman, to attend the University of Oklahoma on the GI Bill. In 1950, G. W. earned a Bachelor of Science in Geology, nearly completing a master’s degree. He later served on the alumni advisory council of OU’s school of geology and attended too many football and bowl games to count.

Grose was honored with the Thomas Dibblee Award for excellence in field geology and mapping for his work in California and Nevada. He was named the 2002 Outstanding Scientist by the RMAG. He continued to publish maps well into his nineties.

Grose was an SME member for 58 years. He was a Fellow of the Geological Society of America and the American Association of Petroleum Geologists, American Geophysical Union, Society of Economic Geology, Association of Engineering Geology, American Institute of Professional Geologists, Rock Mountain Association of Geologists, Colorado Scientific Society, Northern California Geological Society and Sigma Xi.

Garnet W. Brock, CPG-01975
Midland, Texas
August 11, 1926 - August 16, 2023

Obituary and photograph excerpted from the legacy.com website...

G. W. Brock lived a wonderful life, in every sense of the word. He was born August 11, 1926, in Shreveport, Louisiana, and passed away peacefully at home in Midland, Texas, on August 16, 2023. He did everything he wanted to do, except drill a few more wells and live to be 100.

His character and values were shaped by the Great Depression, the segregated South, and World War II. G. W. never met a stranger. He treasured friends in every generation and all walks of life, and he treated everyone the same way. His integrity was never shaken, his faith was unwavering. He was kind and generous, and the last of the Honest John’s, he was a gentleman.

G. W. grew up in Shreveport an independent and resourceful boy who made his own way delivering milk and blocks of ice, working at a filling station and later, as a self-taught draftsman. He rode bare back and fished with childhood friends, and remembered always having an interest in geology, with an early introduction to the oilfield through his uncle, who owned a trucking company. In the 1930’s, he rode on trucks hauling steam boilers and moving rigs with a driver named Jesse Wallace, who loved G. W. so much that he took Brock as his last name.

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G. W. was dedicated to the community of Midland. Over the years he was active in the Jaycees, on the board of the Salvation Army, and as a Deacon and treasurer at First Presbyterian Church. He was also a most loving father who nurtured the talents and education of his daughters, volunteered for Bowie Elementary carnivals and Midland High homecoming parades, sent them to Camp Mystic, took them out on wells, taught them the art of fly fishing, and even became a Longhorn fan, except for one certain game in October.

G. W. had a distinct voice, a tremendous sense of humor, and a lot of fun. He was The Original GWB. He was happy all of his life and thankful for his many blessings, including his survivors, among them younger friends and family, and his beloved daughter and landman, Michelle.
Vincent Sengens Peter Amy, CPG-02035
Tequesta, Florida
January 16, 2024

Member Since 1969

Photograph excerpted from the Dignity Memorial website; Obituary written by Helen Hickman, CPG-07535.

I first met Vince, as he was known to all with whom he worked and his friends, at an interview in the West Palm Beach office of Geraghty and Miller Inc. (G&M) in late 1980. I was seeking my first professional job as a hydrogeologist at a time when there were very few female geologists in Geraghty and Miller, or in Florida. Another person in that office at the time, Thomas (Tom) L. Tessier had interviewed me and referred me to Vince, who was office manager at the time. Vince had an on-going “Deep Injection Well” project for the City of Fort Lauderdale for which he needed additional staff. They hired me for that project in March 1981 and I spent eight years at G&M working on similar projects as well as other well construction and water resources projects. It was a ground-breaking time in the development of water supply and wastewater disposal in Florida.

The City of Ft. Lauderdale project was a test project co-funded by the US Environmental Protection Agency (USEPA), United States Geological Survey (USGS) and the City of Ft. Lauderdale for the installation of a Deep Injection well for secondarily treated wastewater (effluent) from a plant to also be built on the site near Port Everglades. At that time Vince was one of the few people in Florida who were proposing the use of Deep Injection wells for effluent disposal. This was prior to the State of Florida accepting primacy of the Federal Underground Injection Control (UIC) program or formulating regulations for Class I Effluent Disposal wells. Effluent injected into these wells was benign in comparison to the Hazardous or Industrial Waste injection wells in Florida or other states and the unique Florida geology suggested that these wells would be successful, but it had to be proven. Florida was eager to try to solve the issue of domestic waste washing up on its pristine beaches, so it supported these efforts. Vince also participated on the EPA Region IV Technical Advisory Committee (TAC) during the research phase of these wells, along with the USGS, State of Florida geologists and others. The TAC devised several tests to determine how the wells should be constructed and tested to meet the guidelines of the USEPA regulations as well as satisfy the State of Florida Department of Environmental Regulation (FDER) who were to obtain primacy of the UIC program.

Vince managed this and other Deep Injection Wells of the same type during the 1980’s, teaching others how to successfully negotiate the strict State of Florida UIC rules, as well as generate technical specifications to manage these projects during construction, testing and successful operation. He also was involved in other technical projects and often served as an expert witness on a wide range of interesting projects. During his tenure at G&M from 1961, as Staff Geologist to Jim Geraghty and David Miller, the principals of the firm, until his retirement in 1994, in addition to his technical, mentoring and project management contributions in a wide variety of projects, he also served as Board Executive Vice President, Chief Operating Officer and Vice Chairman. He expected his technical staff to have business sense and to be able to be good project managers; this has helped me in subsequent firms where they apparently thought that geologists were not good project managers.

Recently, after he died, I learned a lot more about Vince’s early years including that he first lived in Manhattan, New York and later moved to East Moriches, Long Island, in 1946. He was drafted into the Army in 1952. Upon working in field radio repair in Eritrea for the US Army Signals Corp, he developed and interest in geology and the environment. He studied at the New Mexico School of Mines and then to Hofstra College for a BA in Geology in 1960 and an MA in Geology from Columbia University in 1963.

Vince was married to his wife, Patricia (Pat) for 63 years, and they had four children, three daughters and a son. He also had six grandchildren. The family lived in Tequesta, Florida and spent summers in East Moriches. Vince lived near the ocean and had a lifelong love of boats and fishing, which he shared with his son. If I ever needed to contact Vince on the weekend when working on an Injection Well project to report the results of a test or if things did not go to plan, I usually had to leave a message with Pat, because he was out in his boat!

He was active in both his church in Tequesta and East Moriches. At his commemorative service on January 27, 2024 in Jupiter, Florida, close to his family’s home, the pastor of his Tequesta church conducted the service and read a beautiful letter from the East Moriches United Methodist Church pastor. In the letter she mentioned that she was a second career pastor and this church had been her very first appointment after Divinity School. She met Pat Amy first and received an unusual reaction to sharing what her first career had been. It turned out she had been a geologist! Pat’s interested and excited response was “my husband is a geologist!” - so a friendship was founded and a new pastor’s first months made easier. Also, Vince was always known at work for his dress shirts and somewhat formal appearance – even when he went into the field! After retirement, he helped the church by doing small maintenance and construction projects, however he always showed up to work - in a dress shirt!

That about sums it up. I like to think that Vince had a lot to do with giving me my first job in a career I love. I realized that Vince enjoyed his personal and professional life, and it proves the statement that geology is not a career, it is a way of life.

Lois D. George, CPG-05147
Tuscaloosa, Alabama
December 9, 2023

Member Since 1982

Obituary and photograph excerpted from the Magnolia Chapel funeral home website...

Lois D. George passed away on December 9, 2023 at Druid City Hospital after a brief illness.

Lois was born in Bath, NY and was the daughter of the late Helen and Walter Dildine. After graduating from Haverling High School, she attended SUNY Fredonia, NY where she received a degree in Geology. She moved to Alabama in 1975 where she later attended the University of Alabama.

Lois was a 47-year employee of PELA GeoEnvironmental where she was Vice President of Environment and Ecology. There she worked on numerous projects related to water resources and other environmental matters. During her career she became a licensed geologist in seven states, a member of numerous professional organizations and authored many professional articles.

She enjoyed the outdoors, photography, and was an avid fan of Crimson Tide Football and Softball. But her favorite hobby was fishing and spent many hours waiting for the thrill of the next bite. She will be missed by all who knew her.
Comments on proposed rule: Modernization of Property Disclosures for Mining Registrants

Comments on the U.S. Security and Exchange Commission’s (SEC’s) proposal are available at https://www.sec.gov/comments/s7-10-16/s71016.htm

Adam Heft, CPG-10265, Editor
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