ALASKA GEOLOGY
Newsletter of the
Alaska Geological Society

Cenozoic Flat Slab Subduction Processes and the Tectonic Development of Southern Alaska

Geoscience Engagement with Native American and Alaska Native Students and Their Communities

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During the last two decades there has been a focus of integrated research by many geoscientists on the collision and subduction of the Yakutat microplate/terrane in southern Alaska. These studies build on the pioneering work of USGS geologists George Plafker, Don Miller, Don Richter, and others. In this talk, I will focus mainly on the sedimentary record of Cenozoic flat slab subduction processes in southern Alaska. We will first discuss the sedimentary strata that were deposited directly on the Yakutat oceanic plateau. These strata have been incorporated into the upper plate of the southern Alaska convergent margin along the collisional zone. The lower plate strata archive the record of initial collision, tectonic transport, and subduction of the oceanic plateau along the Cordilleran margin. I will also briefly discuss our ongoing work using data collected from the lower plate strata during the 2022 field season. We will then examine the sedimentary response to flat slab subduction on the upper plate of this convergent margin. The second part of the talk will focus on lessons learned (and still learning) at Purdue University on building an academic environment that allows Native American, Alaska Native, and Native Hawaiian students to successfully pursue STEM graduate research. The geosciences remain the least diverse of all the STEM disciplines. I find this unfortunate since the geoscience and Native communities have much to offer each other in our efforts to understand Earth processes.

AGS Meeting

Date & Time:	Tuesday, January 24; Doors open 11:30 am, announcements 11:45 am, talk 12:00 – 1:00 pm
Program:	Cenozoic flat slab subduction processes and the tectonic development of southern Alaska
Speaker:	Ken Ridgway, Purdue University, West Lafayette, IN
Place:	Virtual presentation both online and at the Energy Center; 1014 Energy Court, Anchorage, AK
Reservations:	Reservations are not required
Login:	For instructions on how to log in see AGS website: http://www.alaskageology.org/events.html
How to Join:	Join with Google Meet: meet.google.com/dfa-ehek-ewr or join by phone: (US) +1 636-888-0212 PIN: 897 901 065#

About the Speaker:

Ken Ridgway has been a faculty member in the Dept. of Earth, Atmospheric and Planetary Sciences at Purdue University since 1992. Much of his research is related to understanding the sedimentary record of tectonic processes that occur along convergent plate boundaries. Ridgway is the co-PI of the Sloan Indigenous Program at Purdue University. This program has graduated over fifty Alaska Native, Native American, and Native Hawaiian graduate students in STEM disciplines since 2007. Ridgway is a GSA Fellow and is the recipient of the GSA Bromery Award and the Purdue Dreamer Award. The Dreamer award is given annually to an individual or organization within the Purdue community whose contributions embody Dr. Martin Luther King's vision of service to others and furthers the university's commitment to diversity.

From the President's Desk:

Happy New Years Geology Community!

I hope you all are having a wonderful 2023. Thank you so much for continued membership! The AGS Board are looking forward to hosting in-person talks this spring, starting at the end of this month!

We are also supporting the Pathfinders in Alaska Geology Wall of Fame to be displayed in the Geologic Materials Center in Anchorage, so please see the blurb below for more information on nominations and awards.

As always, please continue to spread the word about AGS scholarships to those who are still studying. We always need more geologists in our society! Applications are due soon!

I look forward to seeing you all in person and continuing to learn more about Alaska geology together!

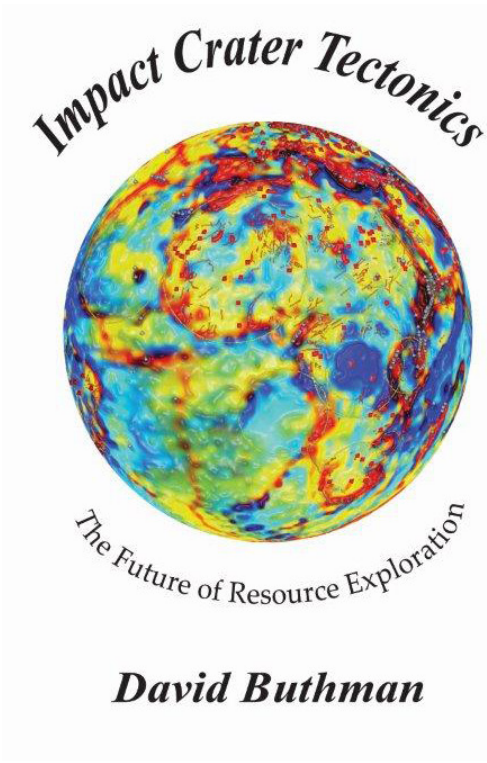
Sincerely yours,
Sarah Frey

Pathfinders in Alaska Geology Wall of Fame

The geology of Alaska is exceptionally diverse and complicated. Mapping and understanding Alaska geology are further challenged by remoteness, rugged terrain, severe weather and limited infrastructure. A Pathfinders in Alaska Geology award has been established to recognize outstanding geoscientists that have risen above these difficulties and contributed significantly to synthesizing and understanding the geology, hazards, and resources of the state. These geoscientists will be honored with a photograph and citation on the Alaska Geological Society website and on a dedicated wall in the Geologic Materials Center in Anchorage, Alaska.

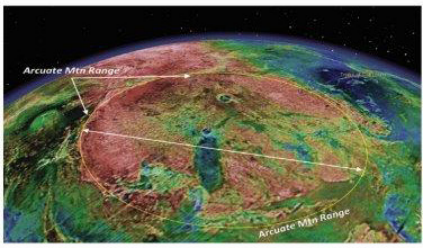
In their December meeting, the AGS Board of Directors voted to form new committee within the Alaska Geological Society to administer the Pathfinders in Alaska Geology program. Tom Homza has generously volunteered to chair the committee and help launch the program. Watch for a new menu tab on the AGS website this spring. A more detailed explanation and description of the program will be posted on the new webpage, along with a Pathfinders nomination form, which all are welcome to download, fill out, and submit. Criteria and instructions for nomination are included in the form. Pathfinder awards will be announced each year at the AGS Technical Conference.

The Alaska Geological Society is a 501c3 organization; any contributions to the Pathfinders in Alaska Geology program are tax deductible and most appreciated.



Impact Crater Tectonics provides a universal geologic framework for the prediction of Earth's mineral resources. Based on sound scientific, mathematic, and geologic principles, the demonstrated relationships between impact craters and mineral resources consecrates an imminent paradigm shift for interpreting the tectonic evolution of Earth, particularly for Alaska.

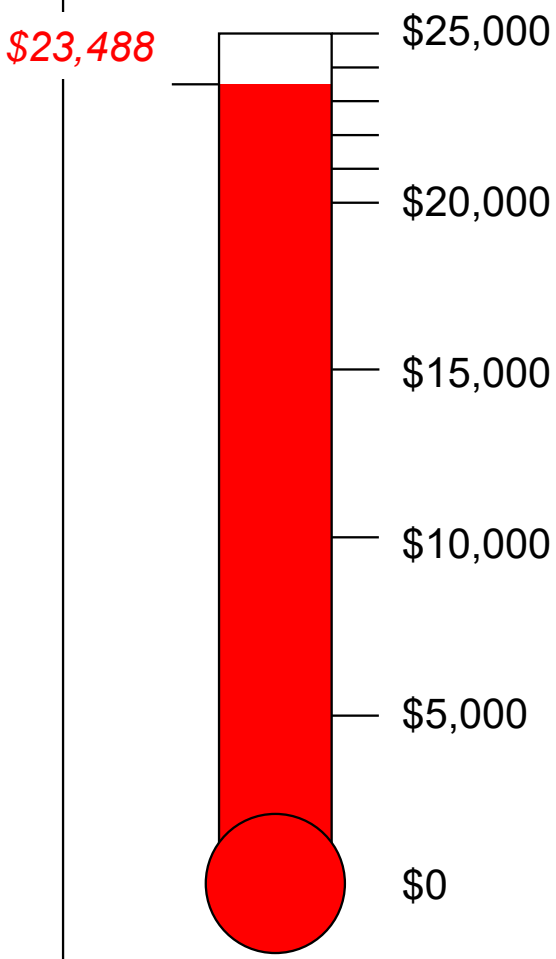
Full-color, 297-page, 8.5" x 11" perfect-bound book, with over 200 photos, graphs, and illustrations. Available on Amazon, or signed copy from author at ImpactCraterStudies.org.



Gil Mull Scholarship

PLEASE HELP!

We're nearly there!



In memory of Gil Mull (1935-2021), family and friends are raising funds for the *Charles Gilbert Mull Field Camp Scholarship* for geology students at the University of Alaska Fairbanks. The scholarship will allow students to attend a geology field course of their choice.

GOAL: Build a minimum endowment of $25,000, which will provide a UAF scholarship in perpetuity

DONATIONS:
You may contribute online here:
https://engage.alaska.edu/
Select designation "Other", and write in: *Charles Gilbert Mull Field Camp Scholarship* and complete the form.

For contribution by mail, please note the *Charles Gilbert Mull Field Camp Scholarship* in your correspondence, and address to:

University of Alaska Foundation
Attn: Fund and Gift Services
PO Box 755080
Fairbanks, AK 99775

Please contact Prof. Michael Whalen with any questions (mtwhalen@alaska.edu)

UPPER TRIASSIC FOSSIL FAUNA FROM CRATON-BOUND STRATA OF THE EASTERN PART OF THE YUKON-CHARLEY RIVERS NATIONAL PRESERVE, EAST-CENTRAL ALASKA

Robert B. Blodgett[1], Vincent L. Santucci[2], Jeffery T. Rasic[3], and Justin S. Tweet[4]

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Yukon-Charley Rivers National Preserve (YUCH) was originally proclaimed a national monument on December 1, 1978. The monument was soon redesignated a national preserve on December 2, 1980. The preserve is located along the Canadian border in east-central Alaska where it protects 185 km (115 mi) of the 2,897 km (1,800 mi) Yukon River. The entire Charley River basin is within the preserve consisting of 142 km (88 mi) of one of the most spectacular wild rivers in Alaska. Numerous historic cabins and other structures found within the preserve are reminders of how important the Yukon River was during the 1898 gold rush. An earlier attempt to summarize the paleontological and geological framework for YUCH was made by the National Park Service in 2011 (Santucci et al., 2011).

In terms of geological resources the area around Yukon-Charley Rivers National Preserve (YUCH) is probably the most thoroughly geologically investigated NPS unit within Alaska. Early investigations extend well back into the last decade of the 19th Century and the first decade of the 20th Century. Studies from this interval include McConnell (1890), Spurr (1898), Collier (1903), Brooks and Kindle (1908), Gilmore (1908), and Quakenbush (1909). Cairnes (1914a, 1914b) from the Geological Survey of Canada published the results of his major mapping effort along the Alaska-Yukon boundary area between the Yukon and Porcupine rivers. Subsequently the work of John B. Mertie, Jr. outlined much of what we know of the geological framework for YUCH, his work covering rocks of all ages, including the sedimentary rocks north of the Tintina fault, and the polymetamorphosed rocks of the Yukon-Tanana Upland south of the fault.

References to regional geological mapping within the boundaries of YUCH include: Brabb (1962 – Charley River quadrangle); (Brabb and Churkin (1964 – Charley River quadrangle; 1965 – Eagle D-1 quadrangle; 1969a – Charley River quadrangle [colorized]); Dover (1992 – SE Charley River quadrangle); Cairnes (1914a, b – boundary strip area along Alaska-Yukon boundary); Dover and Miyaoka (1988 – Charley River quadrangle); Foster (1976 – Eagle quadrangle), Mertie (1930, 1933, 1937 and 1942); Miyaoka (1990 – SE Charley River quadrangle); and Van Kooten et al. (1997a – parts of Charley River and Eagle quadrangle).

Triassic strata are widely exposed in the craton-bound portion of YUCH, notably in the Charley River A-1, A-2, A-3, B-2 and B-3 1:63,000 scale quadrangle, situated in the eastern portion YUCH. These consist of Middle and Upper Triassic strata of the lower part of the Glenn Shale, established by Brabb (1969), which overlies the Permian age Takhkandit Limestone. The lower part is separated from the upper part of the Glenn Shale (primarily Lower Cretaceous) by a significant hiatus, with Jurassic strata and fossils being notably missing for the most part, except for a few occurrences of the bivalve *Otapiria* in lowermost Jurassic strata.

The Glenn Shale is primarily composed of a gray to black carbonaceous shale, and is suggested to be 1,500 m (4,000 ft) thick. Two unconformities have been recognized within the Glenn Shale. The lower portion of the Glenn Shale is approximately 120 m (390 ft) thick and is exposed along the Yukon River and along Trout Creek. These rocks contain a rich, diverse Middle and Late Triassic (late Ladinian to Norian) aged marine invertebrate fauna including rhynchonellid, spiriferid, and terebratuloid brachiopods; nuculid and pectenid pelecypods (*Halobia* and *Monotis*); ammonoids and nautiloids. Higher in the section, the remains of the pelecypod *Otapiria* indicate a probable Early Jurassic age. The crinoid *Pentacrinus subangularis* var. *alaska* of Early Jurassic age has been reported nearby from the same beds. Lower Cretaceous beds are also recognized in the formation and include both Berriasian and probable Valanginian age Buchias. The long time span and great thickness of this formation suggests that future detailed mapping will probably result in a much finer segregation of stratigraphic units within the Glenn Shale.

The National Park Service is currently compiling a comprehensive paleontological resources inventory of the fossil fauna and flora of the Preserve. The lower Glenn Shale is among the geologic strata that will be focused on. Its robust bivalve, ammonoid, nautiloid and brachiopod fauna provides an important glimpse into the composition of a relatively high-latitude Triassic biota along in the northwestern-most corner of what at that time comprised cratonic North America. Primary references to the megafauna include the works of Smith (1927), Kummel (1953), Silberling (1963), Grant-Mackie and Silberling (1990), Silberling *et al.* (1997), and McRoberts (1997). Study of the radiolarian fauna was provided by Robinson (1989) and Robinson and Pessagno (1998). It is our intent to greatly amplify our knowledge of the fossil biota from YUCH, including potential ichthyosaurs (one rib has previously been collected from the lower Glenn Shale). Expanded knowledge of the diversity of the macroinvertebrate fauna of the lower part of the Glenn Shale will be most useful for comparing and contrasting North American mid-latitude cratonic Late Triassic biotas with those from nearby accreted terranes such as Wrangellia (south-central Alaska) and the Lewes River Group of the Stikinia terrane (from Whitehorse area of the Yukon Territory).

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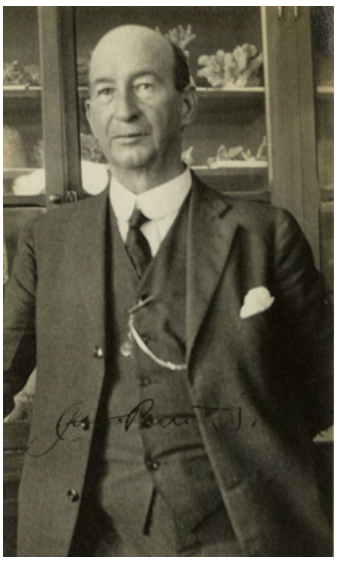
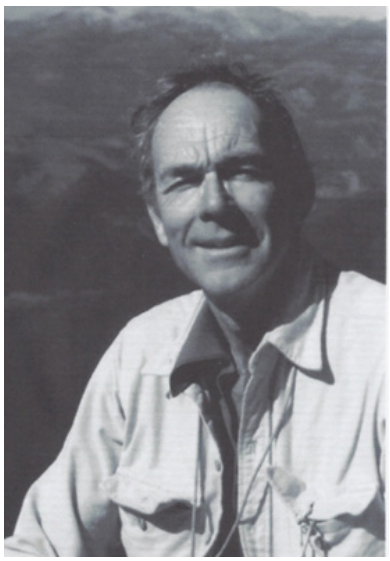
Two renowned Triassic paleontologists whose studies in the Triassic of Alaska, California, and Nevada led to the conceptulization of accreded terrnaes in western North America.

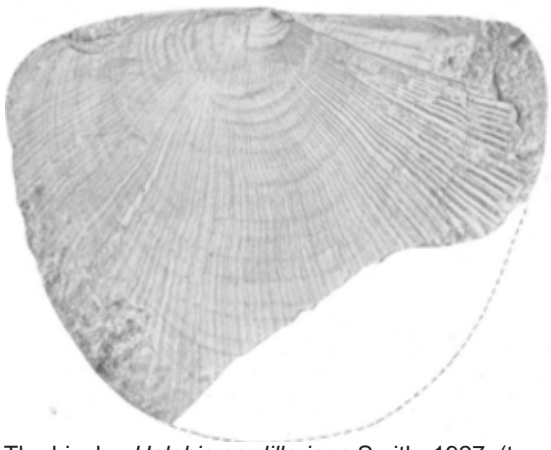


James Perrin Smith (1864-1934), renowened Stanford University paleontologists.



Norman J. Silberling (1928-2011), USGS paleontologist and stratigrapher, earlier with Stanford University.

Selected primary megafossil elements of the lower part (Middle nad Upper Triassic) of the Glenn Shale.



The bivalve *Halobia cordilleriana* Smith, 1927 (type specimen), from Smith, 1927, Pl. XCIX, fig. 2.

The bivalve *Lima martini* Smith, 1927 (from Smith, 1927, Pl. CI, fig. 11.

The brachiopod *Rhynchonella blackwelderi* Smith, 1927 (from Smith, 1927, Pl. CII , figs. 1-3

The bivalve Pecten *(Entolium) yukonensis* Smith, 1927 (from Smith, 1927, Pl. CI, figs 9 (type).

The brachiopod *Dielasma chapini* Smith, 1927 (from Smith, 1927, Pl. CII, figs. 4-6)

The bivalve *Eumorphotis nationalis* Smith, 1927 (from Smith, 1927, Pl. CI, fig. 12.

The brachiopod *Spiriferina yukonensis* Smith, 1927 (from Smith, 1927, Pl. CI, figs. 13-14, type specimen)

Marine vertebrate bone (ichthyosaur) from USGS Mesozoic, loc. 9387.

The nautiloids *Germanonautilus brooksi* Smith, 1927 (on the left) and the *ammonoid Cladiscites* martini Smith, 1927 (right) (from Smith, 1927, Pl. CII, fig. 7 and fig. 17.

Applications for Alaska Geological Society Scholarships

http://www.alaskageology.org/scholarships.html

Application Deadline
February 1, 2023
Submit Documents via Email:
Email all documents by midnight February 1, 2023 to: scholarships@alaskageology.org with the subject line "2023 AGS Scholarship"
Or via U.S. mail:
AGS Scholarship committee, Alaska Geological Society, P.O. Box 101288, Anchorage, AK 99510
Scholarship grant recipients will be notified by March 25, 2023.

Contact for questions: Sue Karl
Phone: 907-441-8010
Email: smkarl107@gmail.com

Eligibility:

1. Full time enrollment at an accredited institute of higher education.
2. Status as a BA, BS, MS, or PhD candidate in geoscience or equivalent degree program.
3. Project or thesis/dissertation topic focused on Alaskan geology or related geoscience topic.
4. Having received the AGS Scholarship no more than two (2) times previously. Previous awardees shall be additionally required to provide the Scholarship Committee with a summary of how previous funds were used.
5. Applicants for Alaska Geological Society scholarships may not be related to any member or to any family member of the Scholarship Committee or Board of Directors of the Society.

Applications Must Include:

1. AGS Scholarship application form: http://www.alaskageology.org/uploads/1/1/9/5/119566579/ags_scholarship_application_form.pdf
2. A cover letter describing your personal and educational career goals, your interest in the Earth Sciences, your financial need, and how you would use the scholarship funds. Examples of how to apply the funds include, but are not limited to, field camp, field work, research/lab fees, or tuition and books. If you are a past scholarship recipient, please include an update on how you used previous AGS funding.
3. A project description if you are an undergraduate student or copy of your thesis proposal if you are a graduate student (please limit to 5 pages of text plus figures).
4. A minimum of two letters of recommendation from those familiar with your academic record. A third letter may be included if it contains important additional information.
5. A copy of your transcripts from your current institution. If you are a first year graduate student, please also send a copy of your transcripts from your previous institution. A formal confidential transcript is not required; a copy or unofficial transcript will suffice.

Students may apply for both the AGS and the Richter Memorial scholarships in the same calendar year. If a student wishes to apply for both scholarships, he/she must submit two separate cover letters addressed to the respective scholarship committees. Upon receipt of the two cover letters, all other application components will automatically be forwarded to both scholarship committees. AGS scholarship awards range from $500 to $3000.

The AGS Scholarship Committee will take into account all facets of the information received. Priority will be given to those individuals whose thesis work is intended towards publication of results. For those who receive a scholarship award, an abstract (not exceeding 1000 words) summarizing preliminary or final results should be submitted to AGS for publication in our monthly newsletter within a year of the award.

Applications for the Don Richter Memorial Scholarship

http://www.alaskageology.org/scholarships.html

The Alaska Geological Society's Don Richter Scholarship fund is requesting applications for support of graduate student research. Proposals in all geology and geophysics disciplines related to work in Alaska are welcome, and proposals for research in the areas of Don's interests, including volcanology, igneous petrology, neotectonics, or field-based studies in the Aleutian arc, Talkeetna Mountains, and Wrangell Mountains region are especially encouraged. The scholarship fund will award $2000 to one proposal.

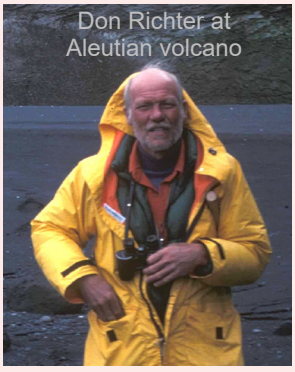
Eligibility:

1. Enrollment at an accredited institute of higher education.
2. Status as a MS or PhD candidate in geoscience or equivalent degree program.
3. Project or thesis/dissertation topic focused on Alaskan geology or related geoscience topic with a preference for topics that reflect Don Richter's career interests, including but not limited to: volcanology, igneous petrology, field-based investigations in the Wrangell Mountains, the Aleutian arc, the Talkeetna arc, the Denali Fault system, and the stratigraphy of south-central Alaska.
4. Having received the Richter Scholarship no more than one (1) time previously. Previous awardees shall be additionally required to provide the Scholarship committee with a summary of how previous funds were used.
5. Applicants for the Richter Scholarship may not be related to any member of the Richter family or to any person serving on the Scholarship Committee or the Board of Directors of the Society.

Applications Should Include:

1. AGS Scholarship application form http://www.alaskageology.org/uploads/1/1/9/5/119566579/ags_scholarship_application_form.pdf
2. A cover letter describing your personal and educational career goals, your interest in the Earth Sciences, your financial need, and how you would use the scholarship funds. Examples of how to apply the funds include, but are not limited to, field work, research/lab fees, or tuition and books. If you are a past scholarship recipient, please include an update on how you used previous AGS funding.
3. A project description if you are an undergraduate, or thesis proposal, if you are a graduate student; please address relevance of project to Don Richter's interests (see #3 above).
4. A minimum of two letters of recommendation from those familiar with your academic record. A third letter may be included if it contains important additional information.
5. A copy of your transcripts from your current institution. If you are a first year graduate student, please also include transcripts from your previous institution. Formal confidential transcripts are not required; copies will suffice.

The AGS Scholarship Committee will take into account all facets of the information received. Priority will be given to those individuals whose thesis work is intended towards publication of results. Within one year of receipt of the award, an abstract (not exceeding 1000 words) summarizing your preliminary or final results should be submitted to AGS for publication in our monthly newsletter.


Don Richter at Aleutian volcano

Application materials must be submitted by **February 1, 2023**:

Applications may be sent electronically to scholarships@alaskageology.org or by U.S. mail to:

Richter Scholarship Committee
Alaska Geological Society
P.O. Box 101288
Anchorage, AK 99510

Questions regarding scholarship applications may be directed to Sue Karl at smkarl107@gmail.com or 907-441-8010. **Awards will be announced March 25, 2023**.

SEEKING DONATIONS FOR AGS SCHOLARSHIP FUNDS

This is a challenging year for students at all levels, and geoscience students in the universities need our support more than ever. When you pay your membership dues this year, please consider a contribution to an AGS scholarship fund. You can also contribute to AGS scholarships through Pick, Click, Give when you apply for your Alaska Permanent Fund Dividend. **AGS is a 501c3 nonprofit organization and all contributions are tax deductible**.

The Alaska Geological Society offers scholarship awards
to graduate and undergraduate students
who are conducting geoscience research projects in Alaska

including

Alaska Geological Society Scholarships
The Don Richter Memorial Scholarship

Scholarship information and applications are available online at
www.alaskageology.org

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The Alaska Geological Society is an organization which seeks to promote interest in and understanding of Geology and the related Earth Sciences, and to provide a common organization for those individuals interested in geology and the related earth sciences.

This newsletter is the monthly (September-May) publication of the Alaska Geological Society, Inc. 300± newsletters delivered eletronically per month.

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MEMBERSHIP INFORMATION

AGS annual memberships expire November 1. The annual membership fee is $25/year ($5 for students). Lifetime menbership is $250. You may download a membership application from the AGS website and return it at a luncheon meeting, or mail it to the address above.

Contact membership coordintor Kirk Sherwood with changes or updates (e-mail: membership@alaskageology.org; phone: 907-240-2546)

All AGS publications are now available for on-line purchase on our website. Complete catalogue at: http://www.alaskageology.org/publications1.html

ADVERTISING RATES

Advertisements may be purchased at the following rate: $200 for 9 monthly issues (September - May) of AGS newsletter (any size up to full page) and companion ad on AGS website for full year (beginning each September).

Contact Jennifer Crews at jennifer.r.crews@conocophillips.com to place ad.

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Alaska Geological Calendar of Events

Date	Time	Organization	Event	Location
Jan 24, 2023;	11:45 am	AGS	Ken Ridgway, Perdue University. “Cenozoic flat slab subduction processes and the tectonic development of southern Alaska”	Virtual Google Meet & Viewing at BP Energy Center
Feb 2023; Date to be determined	11:45 am	AGS	Speaker to be determined	Hybrid: Google Meet & BP Energy Center
Mar. 2023; Date to be determined	11:45 am	AGS	Speaker to be determined	Hybrid: Google Meet & BP Energy Center

AMA: Alaska Miners Association; **AGS**: Alaska Geological Society: **GSA**: Geophysical Society of Alaska

AAEP: Alaska Association of Environmental Professionals; **SPE** Society of Petroleum Engineers;

UAA University of Alaska Anchorage.

Membership Note

Membership renewal is November 1; annual dues are:

Full member - $25

Student member - $5

Lifetime membership - $250

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