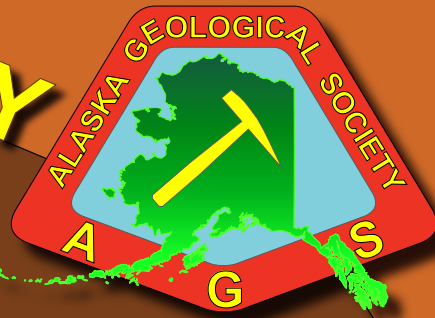


# ALASKA GEOLOGY

## Newsletter of the *Alaska Geological Society*



## Technical Conference Special Edition

Hello AGS Colleagues,

Please register and join us on Saturday, April 23, 2022. The Alaska Geological Society is hosting a one-day technical conference – **“Building on the Contributions of Pioneers”**. Please register at this link: [2022 AGS Technical Conference - ALASKA GEOLOGICAL SOCIETY \(alaskageology.org\)](https://alaskageology.org/2022-AGS-Technical-Conference) The conference will be both **in person at the University of Alaska Fairbanks and through Zoom**. In the spirit of the theme of our meeting, AGS will be highlighting geological contributions of Alaska’s geological pioneers Gil Mull and Gar Pessel, current research projects related to Alaska, and Steve Wright advocacy for “promoting Alaska natural resource optimization and diversification through education in energy, minerals and the environment.” **David LePain**, Alaska State Geologist, will provide an update on the State of Alaska’s Division of Geological and Geophysical Surveys (DGGS).

**Marwan Wartes (Alaska Division of Geological & Geophysical Surveys)**

Inhabiting the Scene – Reflections on the Contributions of Charles G. (Gil) Mull and other Pioneering Geologists of Northern Alaska.’

**George Case (U.S. Geological Survey)**

Graphite Creek, Alaska: A unique type of flake graphite deposit.’

**Thomas Neely and Trond Jensen (ConocoPhillips Alaska, Inc.)**

Kuparuk – The First 40 Years

A narrative authored by one of our pioneers, **Gar Pessel**, will be read by Dr. Elisabeth Nadin (UAF). The presentation, Searching for Oil in Alaska, will take us through the work, crew, and general environment that led to the North Slope geological mapping and petroleum discoveries of the 1960’s.

Professor Michael Whalen, UAF, is heading up a project to fund a UAF geology scholarship in Gil’s honor. The goal is to build a minimum endowment of \$25,000, which will provide a UAF scholarship in perpetuity.

Donations: For contribution by mail, please note the Charles Gilbert “Gil” Mull Field Camp Scholarship in your correspondence, and address to: University of Alaska Foundation

Attn: Fund and Gift Services  
P.O. Box 755080  
Fairbanks, AK 99775

You may also contribute online with the UA Foundation (<https://engage.alaska.edu/>), by selecting Designation “Other”, and writing in: Charles Gilbert “Gil” Mull Field Camp Scholarship and completing the online form.

May is our annual AGS meeting. The society will be voting to select the upcoming board members of AGS. We will be voting for 3 Directors, President Elect, Vice President, Treasurer, and Secretary. If you are interested in running for the following positions, please contact me at [president@alaskageology.org](mailto:president@alaskageology.org).

Sincerely,

Laura Gregersen, AGS President

## ***AGS Technical Conference***

Date & Time:	Saturday, April 23; 8:15 am – 4:00 pm; University of Alaska Fairbanks and Zoom
Place:	Reichardt Geology Building, UAF; 1930 Yukon Dr., Fairbanks, AK
Reservations:	Reservations are required. Please register <a href="#">HERE</a>
How to Join:	After registering, you will receive a Zoom link the week of the conference via email on how to join.

# **Inhabiting the Scene – Reflections on the Contributions of Charles G. (Gil) Mull and Other Pioneering Geologists of Northern Alaska**

Marwan A. Wartes, Alaska Division of Geological & Geophysical Surveys

The first geological traverse of the Brooks Range in northern Alaska was completed by Frank Schrader of the USGS during 1901. The epic exploration took eight months and included transportation by train, steamship, dogsled, horse, foot, canoe, umiak, and whaleboat and resulted in the first recognition that the North Slope was underlain by a vast sedimentary basin. Between 1906 and 1914, Ernest Leffingwell conducted remarkable geologic mapping and pioneering scientific studies of the eastern North Slope and Brooks Range. Among the more impactful comments in his 1919 Professional Paper was the report of oil seeps near Cape Simpson and Angun Point (long utilized by Native peoples), which contributed to the creation of the Naval Petroleum Reserve 4 (NPR-4) in 1923. A series of arduous field campaigns by the USGS between 1923 and 1926 dramatically increased knowledge of the stratigraphy and resulted in a major new map of northwestern Alaska by Philip Smith and John Mertie. The advent of World War II again drew attention to NPR-4 as a potential fuel source for the Navy, resulting in an extraordinary decade of geological fieldwork (1943-1953), including some seasons that saw as many as seven different field parties, often supported by Weasels, a semi-amphibious, light tracked vehicle. Many of the men executing this work would become legends of northern Alaska geology, including names like Brosge', Chapman, Dutro, Gryc, Mangus, Patton, Reiser, Sable, and Tailleur, among others. This work also included government-sponsored geophysical investigations and the drilling of numerous exploration wells that resulted in the discovery of the Barrow Gas field, the Gubik Gas field, and the Umiat Oil field. Contributions by women to these efforts are less heralded, but no less important, particularly the descriptions and analyses of the collected subsurface core and associated data by Florence Collins and Florence Robinson. These pioneering efforts by the USGS culminated in the publication of the landmark 303-series of Professional Papers in the early 1960s and would serve as the foundation for all subsequent work in northern Alaska.

No one proved a better steward of the early USGS work than C. G. (Gil) Mull (1935-2021), who arrived in northern Alaska in 1963 to conduct the first of more than 40 field seasons in the Brooks Range and North Slope. Gil's early work (1963-1975) was for Richfield Oil (later Atlantic Richfield Company) and Humble Oil (later Exxon Company). Expansive, summer-long field campaigns with Gar Pessel led to important new insight into the petroleum geology of the region and provided critical impetus behind Richfield's collection of seismic data and subsequent leasing of the Prudhoe Bay area. One can only imagine his satisfaction in witnessing the first flow of oil on December 26th, 1967 as wellsite geologist on the Prudhoe Bay State No. 1 discovery well of what remains the largest conventional oil field yet discovered in North America.

By 1975, the halcyon days of industry field campaigns were becoming more rare, so Gil joined the USGS in an effort to avoid a "desk job" and continue conducting field geology in northern Alaska. He eventually transitioned to the State of Alaska where he worked for the Alaska Division of Geological & Geophysical Surveys (DGGS; 1981-2001) and later the Division of Oil & Gas (2001-2003). In retirement, he continued to participate in field studies on the North Slope as a consultant up through 2007 (when he was 72 years old). During his two decades with DGGS, Gil was a tireless advocate for the role of field geology in exploration efforts, eventually creating an industrial consortium to support North Slope petroleum-related studies. This successful program represented a unique collaboration between the public and private sectors. While at DGGS, Gil was also adjunct faculty at the University of Alaska Fairbanks, where he mentored and supported countless students. As an advisor Gil was remarkably selfless, sharing his insights and data, often allowing the student to take ownership of an idea that he'd arrived at through years of painstaking field mapping. His mentorship successfully guided a generation of students that now populate academia, government surveys, and industry.

Throughout Gil's career, his primary focus was fundamental geologic mapping and his astonishing list of published maps define his geologic legacy. However, he also leveraged this mapping to make insightful interpretations, ultimately shaping much of our present understanding of the tectonic and stratigraphic evolution of northern Alaska. Some of these interpretations required the advent of plate tectonic theory to provide a plausible mechanism to explain the observations, such as the recognition that mafic/ultramafic rocks in the western Brooks Range represent obducted ophiolites. Similarly, Gil contributed significantly to the model that the frontal Brooks Range is composed of far-traveled allochthons, a story best illustrated by his work in the Doonerak Fenster showing that the sub-thrust stratigraphy closely matched the North Slope subsurface, indicating more than 50 miles of tectonic overlap by thrust sheets in the northern Brooks Range. Gil's wide-ranging mapping also gave him insight into the structural style of the fold-thrust belt, including early recognition that mid-Cretaceous uplift of the interior of the mountain belt disrupted the earlier thin-skinned style of the deformation. Robust stratigraphy is the basis for all geologic mapping, and thus many of Gil's most important contributions were in this arena. Examples include his definition and naming of the Imnaitchiak Chert, the Akmalik Chert, and the Kurupa Sandstone in the Killik River area. The breadth of Gil's mapping observations often provided rationale for formal revisions of stratigraphic nomenclature, such as with the Kemik Sandstone on the eastern North Slope. Gil's final major paper, published in 2003, was a substantial overhaul of the complex stratigraphy of the Brookian Sequence, effectively connecting all the disparate pieces of the puzzle that he had inherited from the pioneering USGS geologists.

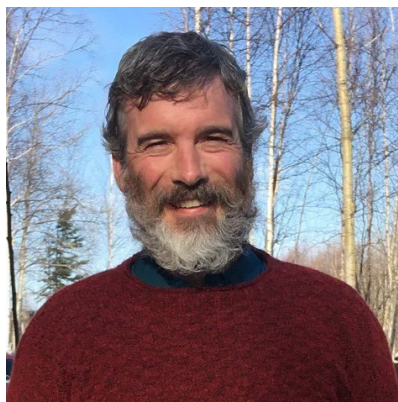
Gil was driven by a deep curiosity about the natural world, something that guided his passion for Earth history. He had an almost romantic view of field geology and few were surprised that he was fond of the following quote:

*"Geologists inhabit scenes that no one ever saw, scenes of global sweep, gone and gone again, including seas, mountains, rivers, forests, and archipelagos of aching beauty, rising in volcanic violence to settle down quietly and forever disappear---almost disappear."*

John McPhee – Annals of a Former World

Gil was the kind of geologist that could "inhabit those scenes". He truly saw things others didn't see and his legacy and influence won't "disappear", but will instead live on through the many students, colleagues, and friends, whose lives he so enriched:

### **About the Speaker:**



Marwan Wartes is Chief of the Energy Resources Section at the Alaska Division of Geological & Geophysical Surveys (DGGs). He is primarily an outcrop-based sedimentary geologist and has completed twenty-two field seasons in basins around Alaska. However, his primary focus has been on the North Slope, echoing his own deep roots on the Arctic prairie, having been born on the Colville River delta where his family was homesteading. Marwan received his B.S. (1997) in Geology from the University of Alaska Fairbanks. He attended graduate school at the University of Wisconsin—Madison where he completed his M.S. (1999) working on Permian lacustrine rocks in northwestern China. He stayed in Madison for his Ph.D. studies on the Early Cretaceous tectonics and sedimentation of proximal foreland basin deposits in northern Alaska. Since 2004, Marwan has led the DGGs Brooks Range Foothills and North Slope program, a multi-agency collaborative effort. His main research interests involve the application of sequence stratigraphy and provenance data to regional tectonic problems and petroleum geology:

# Graphite Creek, Alaska: A unique type of flake graphite deposit

George N.D. Case<sup>1</sup>  
Susan M. Karl<sup>1</sup>  
Sean P. Regan<sup>2</sup>  
Paul O'Sullivan<sup>3</sup>  
Craig A. Johnson<sup>4</sup>  
Eric T. Ellison<sup>5</sup>  
Jonathan S. Caine<sup>4</sup>  
Christopher S. Holm-Denoma<sup>4</sup>  
Laura S. Pianowski<sup>4</sup>  
Jeffrey H. Marsh<sup>6</sup>

<sup>1</sup>U.S. Geological Survey, Anchorage, AK 99508 USA

<sup>2</sup>Geophysical Institute, University of Alaska Fairbanks, Fairbanks, AK 99775 USA

<sup>3</sup>GeoSep Services, Moscow, ID, USA 83843

<sup>4</sup>U.S. Geological Survey, Denver, CO 80225 USA

<sup>5</sup>Department of Geological Sciences, University of Colorado, Boulder, CO 80309 USA

<sup>6</sup>Harquail School of Earth Sciences, Laurentian University, Sudbury, ON, Canada, P3E 2C6

Flake graphite is a critical mineral and component of the Li-ion batteries utilized in electric vehicles, energy storage systems, and portable electronics. Flake graphite deposits occur in amphibolite- to granulite-grade metamorphic rocks, but the processes that form very high graphite concentrations in these environments are not well understood. Graphitization and carbonate devolatilization (loss of CO<sub>2</sub>), potentially coupled with hydrothermal fluid activity, are the most commonly described processes. The Graphite Creek deposit, in the Kigluaik Mountains of the Seward Peninsula, Alaska, is a unique example of flake graphite mineralization resulting from a combination of graphitization and partial melting (anatexis) of the paragneiss host rocks during peak metamorphism. At Graphite Creek, flake graphite is in disseminations and in sets of very high grade (up to 50 wt.% graphite), semi-massive to massive graphite lenses in sillimanite paragneiss. Restitic garnet, sillimanite, graphite, and biotite-rich layers indicate a high degree of anatexis and melt loss. Metamorphic monazite shows strong Y depletion, high Eu/Eu\* values, and shifts to high Sr and Th concentrations consistent with biotite dehydration melting during peak metamorphism from ~97 to 92 Ma, coeval with regional high-temperature metamorphism in the Kigluaik Mountains. Zircon from paragneiss yielded LA-ICP-MS U/Pb ages characterized by a dominant ~100-90 Ma metamorphic/anatectic population and detrital populations potentially Triassic or younger, although a true maximum depositional age is difficult to discern from metamorphic populations. Graphite  $\delta^{13}\text{C}$  values of -30 to -12‰ and pyrrhotite  $\delta^{34}\text{S}$  values of -14 to +10 ‰ are compatible with organic carbon and sedimentary sulfur sources, respectively. Together, these data suggest that genesis of massive graphite lenses occurred coevally with high-temperature metamorphism and anatexis of a highly carbonaceous pelitic protolith. Melt loss and potential fluid release associated with anatexis were important for concentrating graphite. Outcrops of the same rock type and semi-massive graphite lenses elsewhere in the Kigluaik Mountains suggest significant regional mineralization potential. Although Graphite Creek is unusual compared to described flake graphite deposits, high-temperature, carbonaceous paragneiss sequences that have undergone partial melting may be prospective for this style of high-grade mineralization.

## **About the Speaker:**



George moved to Alaska and began working for the USGS in November 2016. He is interested in utilizing tools such as stable isotopes and uranium-lead geochronology to understand the evolution of mineral systems in poly-mineralized terranes and applying that understanding to mapping and assessing mineral system potential using GIS.



# Kuparuk – The First 40 Years

Thomas Neely and Trond B. Jensen, ConocoPhillips Alaska Inc.

December 13, 2022 marks the 40th anniversary of first oil at the Kuparuk field, one of the largest producing oil fields in North America. This presentation outlines the key milestones in field history from initial discovery and development through technological innovations that enabled additional recovery including 3D seismic, enhanced oil recovery (EOR), and coil-tubing infill drilling.

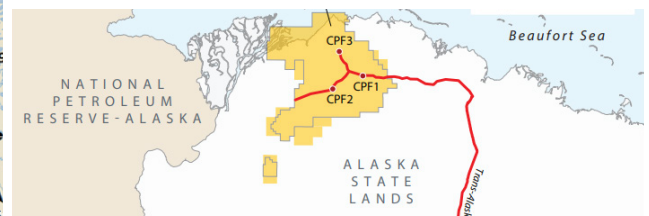
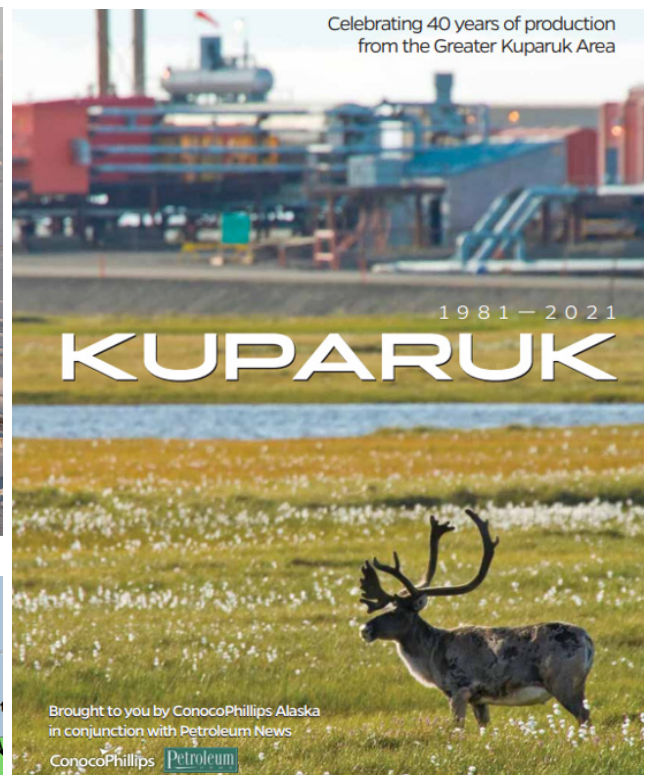
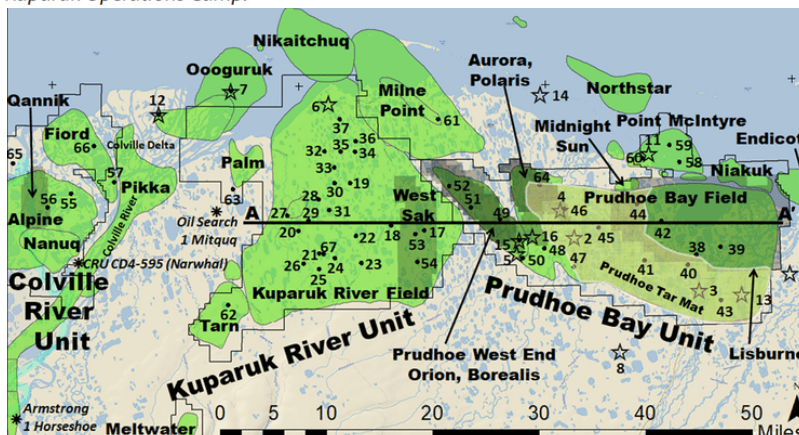
## About the Speakers:

Thomas Neely received a M.S. in Structural Geology from Colorado State University in 2006. Joined ConocoPhillips' Structure and Geomechanics group in 2006, working globally on petroleum structural geology projects until joining ConocoPhillips L48 Business Unit in 2011 to work on unconventional exploration and appraisal projects. He moved to Alaska in 2015 to work as a geologist on ConocoPhillips' Kuparuk field, and is currently the Geoscience Advisor for the Greater Kuparuk Area.

Trond B. Jensen received a PhD in Petroleum Engr from University of Wyoming 1991. Worked two years for Institute for Energy Technology in Oslo, Norway, before he hired on with Phillips Petroleum in Stavanger, Norway. Worked North Sea developments (Ekofisk area) for Phillips Petroleum from 1994 to 2002. In 2002, Trond moved to Alaska to work Prudhoe Bay as secondee in BP for two years. Since 2004, Trond has worked for ConocoPhillips on their operated assets in Alaska with an emphasis on Kuparuk. Trond is currently the Reservoir Engineering advisor for the Greater Kuparuk Area.



Kuparuk Operations Camp.





### AGS Technical Conference - Building on the Contributions of Pioneers in Alaska Geology - Saturday, April 23, 2022 - University of Alaska Fairbanks and Zoom

Schedule	Title	Affiliation
8:15 Coffee at UAF		
8:30	Introduction and AGS Scholarship Awards	
8:45 Marwan Wartes	Inhabiting the Scene – Reflections on the Contributions of Charles G. (Gil) Mull and Other Pioneering Geologists of Northern Alaska	State of Alaska, Division of Geological & Geophysical Surveys
9:40 Michael Whalen	Charles Gilbert “Gil” Mull Field Camp Scholarship	University of Alaska Fairbanks
9:45 George Case	Graphite Creek, Alaska: A unique type of flake graphite deposit	US Geological Survey
10:30 Coffee Break	-	-
10:45 Trond Jensen and Thomas Neely	Kuparuk – The First 40 Years	ConocoPhillips
11:40 Elisabeth Nadin on behalf of Gar Pessel	Searching for Oil in Alaska	unaffiliated -- retired geologist
12:00 Kynan Hughson	A Comparative Morphometric Analysis of Terrestrial Pingos and Potential Pingo Analogs on the Dwarf Planet Ceres	University of Alaska Anchorage
12:15 Lunch	-	-
1:00 Dave LePain	Alaska DGGs’ technical sections – Energy, Minerals, Engineering Geology, and Volcanology	State of Alaska, Division of Geological & Geophysical Surveys
1:10 James Bonelli	Employing Quantitative Biofacies Analysis to Identify Controls on Paleosol Development Within the Prince Creek Formation, North Slope Alaska, USA	Repsol USA - Exploration North America
1:30 Josh Long	Depositional Systems of the Upper Cretaceous Tuluwak Formation from Outcrop and Core in Eastern NPR-A and the Central North Slope	U.S. Geological Survey
1:40 Sue Karl	New Early Jurassic to Early Cretaceous ages constrain different depositional settings on Wrangellia and the Alexander terrane and the timing of juxtaposition of these terranes in southeast Alaska	US Geological Survey
1:50 Mike Hendricks	The Alaska DGGs Geologic Mapping System	State of Alaska, Division of Geological & Geophysical Surveys
2:00 Nina Huran	The Geothermal Sites of Alaska Web App (Interactive Map)	State of Alaska, Division of Geological & Geophysical Surveys
2:10 Erin Donaghy	The structural and depositional evolution of pull-apart basins: an example from the Eocene Chumstick basin, central Washington	Purdue University
2:20 Skye Kushner	First Estimates of Volcanic Mercury Emissions from Three Alaska Eruptions	University of Alaska Fairbanks
2:30 Break	-	-
2:40 Erin Donaghy	Revisiting Stratigraphy of the Eocene to Miocene sedimentary peripheral rocks on the Olympic Peninsula, Washington	Purdue University
2:50 Nick Regier	Sedimentology of the Eocene Blue Mountain Unit at Tyler Peak, Olympic Peninsula, WA: Implications for sediment deposition adjacent to volcanic centers following Siletzia’s accretion	Purdue University
3:00 Jennifer Athey	Alaska radon maps suggest potential scope of health concern	Alaska Division of Geological & Geophysical Surveys
3:10 Khawaja Ahad Javed	Testing Hyperspectral Spatial Resolution for different flight altitudes and mapping alteration mineral over Mount Elephant, Alaska.	University of Alaska Fairbanks
3:20 Marlee Haralson	The Chignik Formation, Aniakchak National Monument & Preserve, Alaska: A Late Cretaceous (Campanian-Maastrichtian) Estuary-Fill	University of Alaska-Fairbanks, Alaska Division of Geological & Geophysical Surveys
3:30 Veselina Yakimova	Evolution of a ductile-to-brittle fault in the Chugach terrane, southern Alaska	Shannon & Wilson
3:40 Pablo Saunderson-Schultz	Deep Learning Identification of Volcanic Thermal Anomalies in VIIRS Infrared Imagery	University of Alaska Fairbanks

In-person 'behind the scenes' University of Alaska Museum of the North tour starts immediately following the scheduled presentations.



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## Charles Gilbert “Gil” Mull Field Camp Scholarship

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

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

**DONATIONS:** For contribution by mail, please note the **Charles Gilbert “Gil” 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

You may also contribute online with the UA Foundation (<https://engage.alaska.edu/>), by selecting Designation "Other", and writing in: **Charles Gilbert “Gil” Mull Field Camp Scholarship** and completing the online form.

Please contact Prof. Michael Whalen with any questions ([mtwhalen@alaska.edu](mailto:mtwhalen@alaska.edu))

*Here's to remembering a giant of Alaska geology!*



Gil Mull in 2004 at the Brooks Range mountain front near Kikiktat Mountain in the Killik quadrangle (photo by M.A. Wartes)



Gar Pessel, North Slope front of Brooks Range 1963







# Alaska Geological Society



## 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  
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*including*

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The Don Richter Memorial Scholarship



Scholarship information and applications are available online at  
**[www.alaskageology.org](http://www.alaskageology.org)**

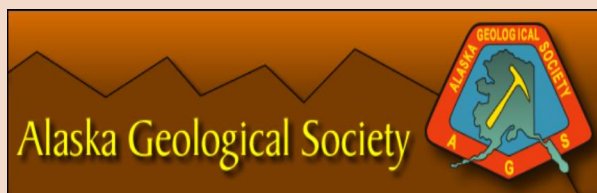
The Alaska Geological Society, Inc.

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Anchorage, Alaska 99510

*The Alaska Geological Society is a 501c3 nonprofit organization  
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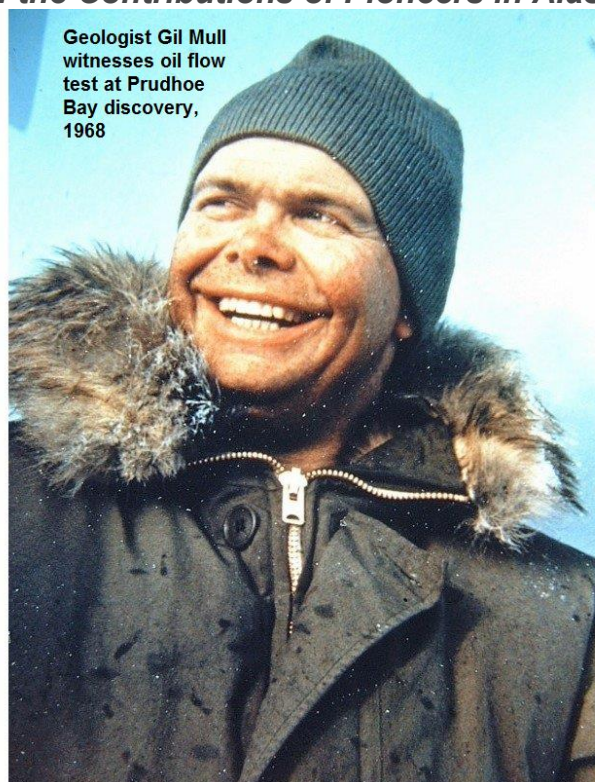
## Please join us online or in Fairbanks for our 2022 Technical Conference!

**When:** April 23, 2022, 8am-5pm

**Where:** Reichart Geology Building, UAF  
1930 Yukon Drive, Fairbanks, Alaska

**2022 Conference Theme:**

***Building of the Contributions of Pioneers in Alaska Geology***



Geologist Gil Mull  
witnesses oil flow  
test at Prudhoe  
Bay discovery,  
1968

(Photo courtesy of Marwan Wartes)

Join us virtually online or in Fairbanks, Alaska for our 2022 Technical Conference. This conference will emphasize the strong relationship AGS and its members have with the University of Alaska geoscience programs, and the contributions of early Alaskan geologists that formed a strong foundation for current and future research throughout the State.

Please consider submitting an abstract for a brief presentation (10 minutes including Q&A) during the conference. Abstracts will be due April 8, 2022. More details to follow.





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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 electronically per month.

Kenneth P. Helmold (Editor)  
Alaska Geological Society, Inc.  
P. O. Box 101288  
Anchorage, AK 99510  
e-mail: [helmold@alaskageology.com](mailto:helmold@alaskageology.com)  
mobile: 907-297-8883

## MEMBERSHIP INFORMATION

AGS annual memberships expire November 1. The annual membership fee is \$25/year (\$5 for students). Lifetime membership 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 coordinator Kirk Sherwood with changes or updates (e-mail: [membership@alaskageology.org](mailto: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](mailto:jennifer.r.crews@conocophillips.com) to place ad.

# Pick.Click.Give.

## It's PFD Application Time!

Did you know that you can support the society through Pick.Click.Give? When you fill out your PFD application, just select Alaska Geological Society, Inc. in the list of non-profits and you can help AGS to promote the uniqueness of Alaskan Geology and provide for education, geologic research, and networking to all who are interested as well as provide scholarships to students across a wide range of geologic topics.

<https://www.pickclickgive.org/index.cfm/pfdorgs.info/Alaska-Geological-Society-Inc>

- From the PFD home page <http://pfd.alaska.gov/Application>, select the green "Add or Change Your Pick.Click.Give. Donation" button
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and engineering analog properties from  
a thin section image recognition model



# Alaska Geological Calendar of Events



Date	Time	Organization	Event	Location
Feb. 17 2022	11:45 am	AGS	Trevor Waldien, Interactions among inherited plate boundaries, slip rate gradients, and lithospheric structure in the Alaska Range, southern Alaska	Google Meet
Mar. 17, 2022	11:45 am	AGS	Edward A. Duncan, Duncan Petroleum Advisors, LLC, Integrated Seismic Stratigraphic, Geochemical Volatiles Analysis and Petrophysical Quantification of a Brookian Foredeep, North Alaska Campanian Margin Multi-Billion Barrel "Super Trap"	Google Meet
Apr. 23, 2022	8:15 am - 4:00 pm	AGS	AGS Technical Conference	UAF & Zoom Meet

**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*



## 2021 - 2022 Alaska Geological Society Board, Committees and Delegates

Title	Name	Phone	e-mail	Affiliation
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Treasurer	Corey Ramstad	907-777-8427	<a href="mailto:cramstad@hilcorp.com">cramstad@hilcorp.com</a>	Hilcorp
Secretary	Heather Beat	907-443-3842	<a href="mailto:heather.beat@alaska.gov">heather.beat@alaska.gov</a>	AK DOG
Director 2020-2022	Jennifer Crews		<a href="mailto:jennifer.r.crews@conocophillips.com">jennifer.r.crews@conocophillips.com</a>	CononcoPhillips
Director 2020-2022	Matt Frankforter	907-717-6898	<a href="mailto:mfmattkate@gmail.com">mfmattkate@gmail.com</a>	
Director 2020-2022	Sean Regan	907-474-5386	<a href="mailto:sregan5@alaska.edu">sregan5@alaska.edu</a>	UAF
Director 2021-2023	Michael Unger		<a href="mailto:mike.unger.geo@gmail.com">mike.unger.geo@gmail.com</a>	BOEM
Director 2021-2023	Claudia Cannatelli		<a href="mailto:ccannatelli@alaska.edu">ccannatelli@alaska.edu</a>	UAA
Director 2021-2023	Tom Homza	907-301-2851	<a href="mailto:thomas.homza@shell.com">thomas.homza@shell.com</a>	Shell
AAPG Delegate	Andy Dewhurst	713-297-1288	<a href="mailto:andy.dewhurst@alaskageology.org">andy.dewhurst@alaskageology.org</a>	
PSAAPG AGS Representative	Andy Dewhurst	713-297-1288	<a href="mailto:andy.dewhurst@alaskageology.org">andy.dewhurst@alaskageology.org</a>	
Advertising	Jennifer Crews		<a href="mailto:jennifer.r.crews@conocophillips.com">jennifer.r.crews@conocophillips.com</a>	CononcoPhillips
Education/Science Fair				
Field Trips				
Bylaws	Sue Karl	907-441-8010	<a href="mailto:smkarl107@gmail.com">smkarl107@gmail.com</a>	USGS
Memberships	Kirk Sherwood	907-240-2546	<a href="mailto:membership@alaskageology.org">membership@alaskageology.org</a>	
Newsletter Editor	Ken Helmold	907-297-8883	<a href="mailto:helmold@alaskan.com">helmold@alaskan.com</a>	
Publications	Kirk Sherwood	907-240-2546	<a href="mailto:publications@alaskageology.org">publications@alaskageology.org</a>	
Scholarship	Sue Karl	907-441-8010	<a href="mailto:smkarl107@gmail.com">smkarl107@gmail.com</a>	USGS
Website	Heather Beat	907-443-3842	<a href="mailto:heather.beat@alaska.gov">heather.beat@alaska.gov</a>	AK DOG
Fundraising	Jennifer Crews		<a href="mailto:jennifer.r.crews@conocophillips.com">jennifer.r.crews@conocophillips.com</a>	CononcoPhillips