



MONTANA GEOLOGICAL SOCIETY

NEWSLETTER

December, 2014

MGS Luncheons,

**Anatomy of a Petroleum
Source Rock presented
By Dr. Barry J. Katz
(abstract: page 5)**

Members can RSVP by email or
by calling Doretta Brush
at Ballard Petroleum 406-259-8790

All meetings are held at the
Billings Petroleum Club at
11:45 a.m. unless otherwise noted

MGS HOME PAGE:
www.montanags.com

MGS EMAIL:
[montanageologicalsociety@
gmail.com](mailto:montanageologicalsociety@gmail.com)

MGS Vol. 58 No. 11

President's Letter

MGS Membership,

Bells ringing, lights glistening, and children singing, yes, it's that time of the year again. What some consider the best (or worst) season; the holidays. Then there is that age old question uttered by the exasperated parent/spouse/friend/colleague in a fit of gift-giving defeat, "What in the world do I buy my Geoscientist friend for Christmas?!" Well, thanks to the advent of internet shopping sites such as Ebay, Etsy, and Amazon, we at the MGS have a solution for you. Over the past couple years Evelyn Mervine, member of the American Geophysical Union, has compiled a list of the top ten Christmas gifts for Geologists. She writes about them, and other geology related info at her blog at: <http://blogs.agu.org/georneys/>

I now present to you some of my favorites from her multiple lists of Christmas gifts for Geologists (note all text and images were taken directly from her blog):

2011 - Gift #2: Plush Microbe Holiday Ornament Set:



Plush Microbe Holiday Ornament Set. Image from ThinkGeek: <http://www.thinkgeek.com/geektoys/plush/e39e/> For the geobiologist in your family, I recommend the [Plush Microbe Holiday Ornament Set](http://www.thinkgeek.com/geektoys/plush/e39e/), which is going to adorn my own Christmas tree this year (thanks for the early Christmas present, mom!). Aren't these little microbes extra cute when they're all decked out for the holidays?

Cost: \$20 / set

2013-2014 OFFICERS

President

Mark Millard 255-8613

1st Vice President

Riley Brinkerhoff 869-8732

2nd Vice President

Kevin Chandler 272-1605

Treasurer

Jessica Renstrom 294-7841

Secretary/Website Coordinator

Sarah Edwards

Past President

Jay Gunderson 657-2702

NEWSLETTER EDITOR

Kevin Chandler 272-1605

BOARD OF DIRECTORS

Duncan McBane

Steven W. VanDelinder

Betsy Campen

Robert Schalla

AAPG DELEGATES

ROCKY MOUNTAIN SECTION

Don French and Robin P. Diedrich

Alternates:

Richard L. Findley and *Vacant*

NATIONAL

Robin P. Diedrich and Don French

COMMITTEES

Awards:

Jay Gunderson

Continuing Education:

Vacant

RMS-AAPG Foundation:

Rob Diedrich 869-8643

Field Trips:

Gary Hughes 861-2072

Social:

Betsy Campen 652-1760

Christmas Party:

Rob Diedrich 869-8643

Mac Clark 259-2451

Membership:

Treasurer

University Liaison:

Steven W. VanDelinder

Publications:

Duncan McBane 252-3170

Montana Oil & Gas

Fields Update:

Jim Halvorson 656-0040

PUBLICATION SALES

Doretta Brush 259-8790

2011 - Gift #6: Paleontologist Barbie:

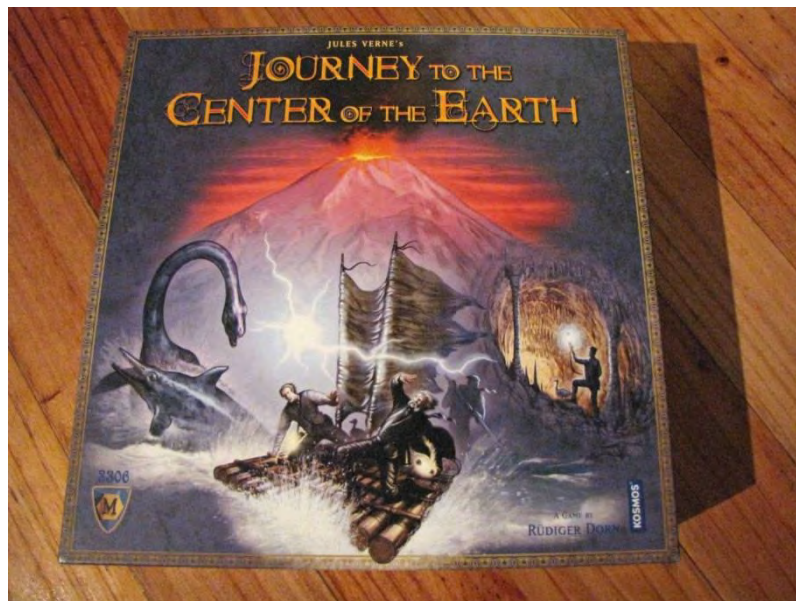


Paleontologist Barbie thinks digging for fossils is fun!

Another ebay gem is Paleontologist Barbie. Every geologist should own a geologist Barbie! I purchased my very own Paleontologist Barbie on ebay for about \$30. If you're on a budget or want to cater to a specific geology subdiscipline, find or buy an inexpensive Barbie and [make your own geologist Barbie](#).

Cost: About \$30 on ebay

2012 - Gift #1: Journey to the Center of the Earth, the Board Game



Journey to the Center of the Earth, the board game! Picture taken by me.

My husband and I recently purchased this game, and I highly recommend it. You can read more about the game [here](#), and you can buy it on Amazon.com [here](#).

Cost: \$20

2010 - Gift #8: Foam Rocks



Image from Amazon.com

Fake foam rocks can be ordered from a variety of toy and gift stores. These are great to throw at geology students who aren't paying attention in class...

Cost: \$5-10.

2012 -Gift #8: Geology Jewelry from Surly-Ramics:



Trilobite necklace from Surly-Ramics.

I recommended my friend Amy's trilobite jewelry in last year's gift guide, and I'll recommend it again this year. I'll also recommend her dinosaur jewelry and her Lucy fossil skeleton jewelry. Amy also has a variety of other scientific themed jewelry— be sure to browse [her Etsy shop](#). Amy can also take special orders if there's something particular you have in mind. Just send her an email.

Cost: \$20 – \$30

2012 - Gift #4: Mars Rover Curiosity Hot Wheels Toy



Curiosity... the Hot Wheels version! (Picture from Amazon.com.)

Hot Wheels has come out with a Mars rover Curiosity toy, which you can buy [here](#). This makes a perfect stocking stuffer for your favorite geologist!

Cost: \$10

2012 - Gift #2: Eurypterid Stuffed Animal



An adorable eurypterid stuffed animal. Picture from: <http://www.museumoftheearth.org/store/storeitemdetails.php?pubID=5743>.

The [eurypterid](#) is the state fossil of New York. You can buy a cuddly version [here](#) at the Museum of the Earth online store. My fellow AGU blogger [Callan Bentley](#) has one of these for his baby boy Baxter.

Cost: \$12.

So there you have it. Now you have no more excuses! If you visit her blog you will find many other gift ideas and other interesting geology related information and pictures.

Here at the MGS we wish you a very Merry Christmas, and a Happy New Year. Stay safe out there. We have a handful of VERY entertaining and informative luncheons set up for the Spring.

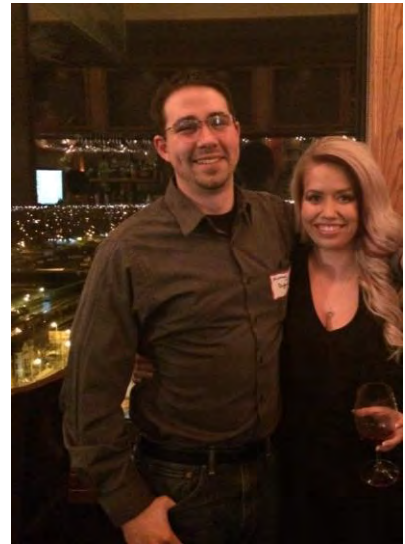
Mark Millard

President, Montana Geological Society

Oilies Holiday Party December 11th, 2014



Great fun this
past Thursday.
**Thank you again
to all the
sponsors!**



MGS Luncheon Meeting

Thursday, January 22nd

11:45 am – Billings Petroleum Club

Please join us for lunch (\$14) and the talk (no charge)

RSVP – montanageologicalsociety@gmail.com , or 406-259-8790

An email reminder will be sent 3 days prior to the talk



DR. BARRY J. KATZ

J. Ben Carsey Distinguished Lecturer
Chevron Fellow and Team Leader

Anatomy of a Petroleum Source Rock

With the growing global attention in shale gas and shale oil plays there has been a renewed interest in source rock geochemistry. This has resulted in a number of key questions concerning source characterization, including: 1) how much internal variability might be anticipated; 2) what is the potential impact of the variability on resource assessment; and 3) how best may a source be sampled to "fully" understand its variability?

These questions were examined, in part, through the detailed sampling of the Kimmeridge Clay at the type locality. A representation of variability was obtained from basic source rock data collected on fresh outcrop samples. Total organic carbon contents, for this world-class source rock, varied between 0.88 and 21.35 wt.%, with a mean of 9.13 wt.%. Samples with greater than 1.0 wt.% TOC had total pyrolysis yields ranging between 6.31 and 126.65 mg HC/g rock, with a mean of 54.16 mg HC/g rock. Hydrogen index values ranged from 240 to 611 mg HC/g TOC, with a mean of 516 mg HC/g TOC.

Even these ranges do not fully capture the variability of the source, if data from elsewhere in the North Sea region are included. For example, TOC values exceeding 40 wt% have been measured. Although the hydrogen index values suggested similar liquid hydrocarbon products at Kimmeridge Bay across the outcrop the variability across the North Sea suggests that there are regions that are more gas-prone character. The differences in organic carbon content and hydrocarbon yields, which range by more than an order of magnitude, would have direct impact on estimates of both conventional and unconventional resources, if assessments were based on individual discrete samples.

Discrete sampling either from an outcrop or a core commonly results in bias. Historically, these biases have been skewed toward the more organically enriched samples. This can be overcome through an increase in the number of samples and the incorporation of lithologic information, so that weighted averages can be generated to obtain a better representation of the unit. The analysis of cuttings samples introduces a different suite of problems, associated with representativeness and positioning. Regional variation also needs to be incorporated through an examination of the depositional systems of the unit, ensuring that the key environments are sampled accounting for the impact of factors such as sedimentary dilution, influence of storms, and oxygen content of the water column

Biography

Barry Katz is a Chevron Fellow and team leader for hydrocarbon charge in Chevron's Energy Technology Company. He received his B.S. in geology from Brooklyn College in 1974 and his Ph.D. from the University of Miami in 1979 in marine geology and geophysics.

After receiving his doctorate, Barry joined Texaco's Bellaire Research Center where he held numerous technical and supervisory positions. He continued with Chevron after the merger in 2001, where he has been part of Chevron's Energy Technology Company. His work has focused on petroleum systems, lacustrine basins and the applications of geochemistry

to petroleum exploration and development. He has been engaged in both research and technical support activities and has worked in approximately 50 basins on six continents.

Barry has authored more than 75 peer-reviewed papers and has edited five books. He serves on the editorial boards of four journals, including the AAPG Bulletin as Senior Associate Editor and as Editor-in-Chief of The Open Geology Journal. He has been chairman of IODP's Environmental Protection and Safety Panel for the past decade and serves on the AAPG Research Committee. His honors include being named a Chevron Fellow, Honorary AAPG Member, recipient of AAPG's Robert H. Dott, Sr. Memorial Award, AAPG's Distinguished Service Award, and Nigerian Association of Petroleum Explorations' Best Presentation Award. He served as Elected Editor for the Houston Geological Society and as President of HGS.

He continues to pursue his interests in a broad range of geochemical topics including:

- Source rock variability and its implications on exploration risk and resource assessment
- Lacustrine basins: their unique characteristics and implications on exploration and production
- Geochemical aspects of unconventional petroleum systems

ENERGY EXPOSITION

June 24-25, 2015
Billings, Montana
Metrapark Expo Center



Technical Sessions
Presented by
American Institute
of Professional
Geologists



Located in the Rimrock Arena During the Expo

— CALL FOR ABSTRACTS —

Join the American Institute of Professional Geologists (AIPG) at the 2015 Energy Exposition in Billings, Montana! Present and attend the technical sessions organized and hosted by AIPG on June 24th-25th with an optional field trip on Friday, June 26th. The schedule is structured to allow plenty of time to browse and participate in the Energy Exposition. Registration will include 'Breakfast and a Movie' both days, lunch, and reduced ticket pricing for the Expo dinner on June 25th. Go to <http://energyexposition.com/> for additional information on the Energy Exposition.

The technical session presentations will be held at the Rimrock Arena within the MetraPark Expo Center, 308 6th Avenue N., Billings, MT 59101.

How To Submit an Abstract

To have your abstract considered for a presentation please go to <http://www.aipg.org/abstract/> to submit an abstract online by March 9, 2015. Abstracts must be in Word format, single spaced, 12 point Times New Roman, and should not exceed one page. No tables or pictures will be accepted. You will be notified by March 27, 2015 if your abstract has been accepted. Authors who wish to publish a paper in AIPG's "The Professional Geologist" (TPG) can contact AIPG for additional information.

The host hotels for the Energy Exposition 2015 are:

Crowne Plaza
27 N. 27th Street
Billings, MT 59101
(406) 252-7400

Expo rate: \$129 per night

Northern Hotel
19 N. Broadway
Billings, MT 59101
(406) 867-6767

Expo Rate: \$135 per night

Earn
Contact
Hours
Towards
CEU's!!!

These downtown hotels provide free shuttle service to/from the Billings International Airport. The Energy Exposition will provide free shuttle service to/from the MetraPark Expo Center.

Please contact Cathy Duran at AIPG if you have additional questions.
Phone: (303) 412-6205; E-mail: cld@aipg.org

Call for Abstracts Important Dates

March 9, 2015 Abstracts Due
March 27, 2015 .. Authors Notified

Suggested Technical Session Topics Include, but are not Limited to:

- Alternative Energy
- CO₂ Activities
- Coal Production
- Enhanced Oil Recovery (EOR)
- Federal, State, Tribal, and Local Regulatory Issues
- Flaring Alternatives
- Frac Sand
- Geothermal Resources
- Hydraulic Fracturing Technologies
- Logging
- Mining and Economic Geology
- Mitigation Technologies
- Nanoscale Technology/Research
- Oil and Gas
- Produced Water Reuse
- Propping Agents and Stimulation Activities
- Safety in the Oilfield
- Social Licensing to Operate
- Stray Gas Migration
- Unconventional Reservoirs
- Uranium Exploration and Production

American Institute of Professional Geologists
12000 N. Washington Street, Suite 285, Thornton, CO 80241
www.aipg.org

MONTANA GEOLOGICAL SOCIETY

P.O. Box 844

Billings, MT 59103

Membership Renewal

Last Name _____

First Name _____ **Middle Initial** _____

ANNUAL DUES:

_____ **\$20.00 Regular**

_____ **\$10.00 Student**

Please update the information below if needed. Please leave blank if nothing has changed:

Company/Affiliation _____

Mailing Address (work or home)

Street _____

City _____ **State** _____ **Zip** _____

Phone (w) _____ **Phone (h)** _____ **Phone (c)** _____

E-Mail _____

AAPG Member (please circle) YES NO

Education (School, Degree, Year)

Degree #1 _____

Degree #2 _____

Degree #3 _____



**INDEPENDENT EXPERTISE IN
WATER RESOURCES AND THE ENVIRONMENT**

General Services

- Hydrology
- Geology
- Engineering

Oil and Gas Environmental Consulting Services

- NEPA CATEX/EA/EIS
- Environmental Permitting
- Environmental Compliance
- GIS/Database
- Water Management
- Environmental Due Diligence
- Expert Testimony Services
- Remediation



**HELENA, MT (406) 443-6169
BILLINGS, MT (406) 655-9555**

HSI@HYDROSI.COM

WWW.HYDROSI.COM

SES



**Geosteering
Software**

**If horizontal
wells affect
your bottom
line, visit us
online or call.
You'll be glad you did!**

SES is for geologists who are dissatisfied with drafting-tool methods of geosteering horizontal wellbores. **SES** is 3D technical geosteering software that makes *wellbore stratigraphic tracking quick-n-easy, accurate, and easily shared*. Unlike any other geosteering software, **SES** provides a complete suite of software features to handle your horizontal drilling needs.

Ph. 720-279-0182

SES Geosteering
Software

www.makinhole.com

**Riley
Wellsite
Geosteering**

- Observe.
- Report.
- Adjust.
- Drill Ahead.

Jackson Riley, Geologist
406.780.0627 (cell) • 406.633.9487 (office)
geology@rileywellsite.com

Hydrometrics, Inc.

WWW.HYDROMETRICS.COM

Founded in 1979, Hydrometrics provides an expansive range of science and engineering services. We have serviced many projects, large and small for the petroleum and mining industries, ranging from the Arctic Circle to South America.

For more information Contact:

Billings, MT - Al Hilty, P.G.
(406) 656-1172 ahilty@hydrometrics.com

Helena, MT - Mike Wignot, P.E.
(406) 443-4150 mwignot@hydrometrics.com

Missoula, MT - Doug Parker, P.G.
(406) 721-8243 dparker@hydrometrics.com

- Environmental/Civil Engineering
- Geotechnical Engineering & Soil Testing
- Water Resources Engineering
- Storm Water Management, Dam Design & Investigation
- Hydrogeology & Geochemistry
- Design Plans & Specifications
- Graphic/Drafting Services
- Data Management Services
- Regulatory Compliance
- Environmental Analysis
- Industrial & Mining Services
- Solid & Hazardous Wastes
- Soil & Water Field Testing
- PowerProbe & Auger Drilling

2013 Advertising Rates:
Full Page \$100/month;
½ Page \$50/month;
¼ Page \$25/month;
Business Card \$10/month.

All ads must be prepaid.
Send ad and payment to:
MGS, P.O. Box 844
Billings, MT 59103.

Montana Geological Society
PO Box 844
Billings, MT 59103

MGS PUBLICATIONS

AAPG - MGS Datapages DVD - (MGS publications from 1950-2006)	(members) -----	\$ 150.00
	(non-members) -	\$ 180.00
2006 Montana Oil & Gas Fields CD-----		\$ 65.00
MGS - NRGDC Northwestern Geologic Service Sample Logs (MT, ND, SD) -----		\$ 2500.00
Over 2500 sample logs on CD-ROM, regional sets also available		
2000 Guidebook: Northern Montana & the Montana-Alberta Thrust Belt (2 Vol. Set) -----		\$ 125.00
50 th Anniversary Symposium		
1998 8 th International Williston Basin Symposium -----		\$ 55.00
1998 Core Workshop Guide for Williston Basin Symposium -----		\$ 30.00
1997 Bighorn Symposium Guidebook -----		\$ 50.00
1997 MGS-TRGS Field Conference Guide -----		\$ 25.00
"The Edge of the Crazies: Where the Mountains Meet the Plains"		
1996 AAPG Rocky Mountain Section Meeting Expanded Abstracts Volume -----		\$ 25.00
1995 Guidebook: Seventh International Williston Basin Symposium -----		\$ 100.00
1993 Guidebook: Energy and Mineral Resources of Central Montana -----		\$ 54.00
1991 6 th International Williston Basin Symposium -----		\$ 55.00
1991 Guidebook: Geology and Horizontal Drilling of the Bakken Formation -----		\$ 50.00
1991 Field Trip Guides: Beartooth Mountains -----		\$ 7.50
Sequence Stratigraphy of the Eagle Sandstone at Billings -----		\$ 7.50
1989 Guidebook: Geologic Resources of Montana -----		\$ 80.00
1986 Guidebook: Geology of the Beartooth Uplift and Adjacent Basins -----		\$ 45.00
1985 Symposium: Montana Oil and Gas Fields -----		\$ 55.00
1978 Economic Geology of the Williston Basin -----		\$ 100.00
1971 Catalog of Stratigraphic Names -----		\$ 10.00
1969 Guidebook: Economic Geology of Montana -----		\$ 8.50
1951 BGS 2 nd Annual Central Montana Field Conference -----		\$ 12.50
1950 BGS 1 st Annual Field Conference -----		\$ 12.50

To place an order please contact Doretta Brush (406) 259-8790 dbrush@ballardpetroleum.com
S & H charges are not included in prices. Add \$6 US shipping or \$12 Canadian for each book ordered. For 1985 guidebooks add \$15 US shipping or \$25 Canadian.