



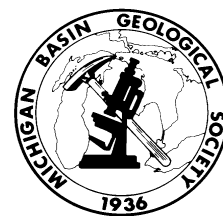
ON THE ROCKS

A Newsletter of the Michigan Basin Geological Society

2018-2019 Edition 8

www.mbgs.org

April 2019



ANNOUNCEMENTS

MBGS Annual Spring BBQ April 10th, 2019 will be held at Western Michigan University in the Michigan Geological Repository for Research and Education Building, Kalamazoo, Michigan. Dr. D. B. Westjohn, retired USGS Hydrogeologist-Geologist, will present "Carboniferous Stratigraphy of Michigan Revisited: Implications of Revised Bedrock Geology Maps of Central Jackson County, Michigan, USA". A BBQ style dinner will be available for members (ribs, chicken, potato salad, baked beans, and beverages). Cost: \$25 members; \$10 students. Social hour - 5:00PM, dinner - 5:30PM, presentation - 7:00PM. **For planning purposes, reservations are required. Please RSVP with Jennifer Trout at jennifer.l.trout@wmich.edu**

Also at the April meeting, please join us in offering our congratulations, many thanks and well wishes to Hal Fitch, who will be officially retiring on April 19th, 2019 after 43 years working for the State of Michigan. For the past 23 years, Hal has served as the State Geologist and Director of the Oil, Gas, and Minerals Division. Please join us!

OTHER NEWS – HAL FITCH RETIRING

Hal Fitch is retiring after 43 years with the State on April 19, 2019. He has served as the State Geologist and Director of the Oil, Gas, and Minerals Division since 1996, the past 23 years. He has been a long-time proponent of replacing the northern Michigan core storage facility, which was supported by the legislature last year and is now under construction in Gwinn. He has provided strong leadership for the States oil, gas, and mining regulatory programs. His involvement with creation of the modern mining statute, Part 632 Non-ferrous Metallic Mineral Mining, stands as an important accomplishment that had diverse stakeholder involvement and unanimous passage in the legislature and is being used as template for a mine permitting program in other states. MBGS also wants to recognize Hal's service as MBGS Vice President in 2010 -2011 and President in 2011-2012.



Hal's roll as State Geologist has him assigned or requested to be involved in many regulatory and professional programs through-out the state. One such program was the Department of Geology at Western Michigan University (WMU) Advisory Council that was initiated in 1983. Many universities in the US have such a group of professionals in the field of Geology serving on such a council and Hal served on the WMU council during his term as State Geologist, providing direction to the department and students on the future of the profession of a geologist in the professional world. In addition, Hal reviewed all the professional functions at all the Michigan universities and he was instrumental in identifying a move of the Geological Survey to Western Michigan University. This move is a success of sorts because it separated the research function of the Geological Survey from the regulatory aspects which remain with the Oil, Gas, and Minerals Division. The survey at WMU is now providing technical and professional support to the State of Michigan to the best of their ability and is supporting identification and protection of water, aggregates and other natural resources in areas being mapped at this time. [Retirement celebrations will be held on April 11th](#) at Constitution Hall from 1-3pm and 4:30-7pm at Midtown Brewery in Lansing.

Hal will also be recognized at the April 10th MBGS meeting and Annual BBQ at MGREE. We hope all local friends and associates can attend to bid him a fond farewell and we all hope Hal enjoys many days touring Michigan and the US on his Harley.

PICTURE: Hal playing and singing a song, "The Geologic History of Michigan" at the DEQ training session, Roscommon October 2018, getting ready to hit the nightclub circuit of Michigan after retirement.



April MBGS Membership Meeting

Dr. D. B. Westjohn, retired USGS Hydrogeologist-Geologist

presenting

Carboniferous Stratigraphy of Michigan Revisited: Implications of Revised Bedrock Geology Maps of Central Jackson County, Michigan, USA

Abstract: Carboniferous Stratigraphy of Michigan Revisited: Implications of Revised Bedrock Geology Maps of Central Jackson County, Michigan, USA, By D.B. Westjohn and William Harrison III

Mines in and near Jackson Michigan produced all of the States' coal from 1835 to 1868. Geologists from the second Michigan Geological Survey (1861) determined that the Pennsylvanian section consisted of a lower section dominated by sandstone (the Parma sandstone), a middle section of coal and associated fine and subordinate coarser clastics (Saginaw Group), and an upper sandstone unit (Grand River Group). Studies to date have not changed general arrangement of Pennsylvanian strata. Expansion of Interstate I-94 in the Jackson area has renewed interest in Pennsylvanian strata, particularly the location of coal mines. Surface subsidence is documented in areas where this major transportation corridor overlies voids generated by historic coal extraction.

Bedrock geologic mapping by the Michigan Geological Survey, in cooperation with the USGS STATEMAP program, results in an alternate interpretation of Pennsylvanian stratigraphy for the area of Jackson coal mines (herein referred to as the Jackson Coal Province, JCP). Geologic logs of water wells (6,000) and a suite of cores from the Michigan Geological Repository for Research and Education (MGRRE, 1,300 meters of core from 29 sites) constitute a data set used to revise and update bedrock geologic maps of the JCP. Lithostratigraphic units identified record pulses of sea-level change in excess of 50 meters, relative to seal level at the close of Marshall Sandstone time (mid-Mississippian). The Marshall in the JCP is overlain by as much as 40 meters of Bayport Limestone, an intercalated sequence of carbonate (predominantly dolomite) and siliclastics. Coal deposits are remnants of a regional blanket of organic detritus that formed atop the eroded, dissected surface on the Bayport Limestone. The thickest coal (about 1 meter, sufficient for underground mines) formed in braided stream channels that are incised into or near the top of the Marshall sandstone. Coal is contained in predominantly black shales, and subordinate coarser clastics, which infilled the erosional landscape created by pre-coal fluvial processes. Late sandstone channels dissect the coal-bearing sequence to the Marshall datum. Late sandstones (equivalent to the Grand River Group) also form sheet deposits atop the eroded Pennsylvanian coal section and remnants of Bayport. Sandstone outcrops named Parma were misinterpreted as basal sandstones, a consequence of lack of subsurface data, and topographic inversion, where sandstone outcrops in eroded lowland areas appear to underlie the coal section. A pre-Pleistocene period of erosion is recorded by alluvium filled channels, features identified in bedrock maps. These channels are incised in bedrock to the approximate level of coal and late sandstone channels. Bedrock geologic maps have multiple uses, including 1) they illustrate a complexly dissected Carboniferous terrain and identify recharge areas for the regional aquifer (Marshall aquifer), 2) resolve conspicuous stratigraphic relations among sandstones that constitute the bulk of Michigan's Pennsylvanian section, 3) illustrate a much refined and detailed interpretation of Carboniferous stratigraphy, and 4) verify the need to update geologic maps elsewhere in the state. The mapping project has revealed a circumstance that remains inexplicable. Despite multiple episodes of continental glaciation, major drainages in the Grand River basin have reoccupied the same water ways, demonstrating the enigmatic phenomenon of palimpsest superposition, an obscure process that retained institutional memory that spans more than 300 million years of earth's history.

Biography: PhD, Michigan State University 1990, Mine Geologist and Exploration Geologist, Climax Molybdenum and Amoco Minerals 1978-85, Geophysicist/Hydrologist, U.S. Geological Survey 1985-2005, retired. Currently, Contract Geologist, Michigan Geological Survey at Western Michigan University.



MBGS Monthly Membership Meeting, April 10th, 2019

Michigan Geological Repository for Research and Education

When: Wednesday, April 10th, 2019
Location: Michigan Geological Repository for Research and Education, 5272 W. Michigan Avenue, Kalamazoo
Time: Social hour - 5:00PM, dinner - 5:30PM, presentations - 7:00PM
Costs: Cost: \$25 members; \$10 students

MBGS asks that you reply with your affirmation to attend the meeting and BBQ so that we may estimate the number of attendees. You may request a vegetarian option when making reservations. Please bring your money and email Jennifer Trout with your concurrence to attend to: jennifer.l.trout@wmich.edu

Michigan Geological Repository for Research and Education



5272 W. Michigan Avenue, Kalamazoo, MI 49006--(269) 387-8633

From the East or West

- From I-94, exit onto US 131 North and drive ~2.5 miles to exit 36A.
- Then follow directions below under "From the North or South."

From the North or South

- From US 131, take exit #36A onto Stadium Drive East and immediately get into the leftmost lane. Go 0.3 miles to the stoplight at Drake Road.
- Turn left onto Drake Road and go 0.3 miles to W. Michigan Avenue.
- Turn left onto W. Michigan Avenue and go 0.3 miles.
- Turn right at the last driveway on the right before the US 131 overpass.
- Go through the open gates and immediately turn left. Follow the drive to the biggest building you see—there's a big sign at the top that says "Western Michigan University."



UPCOMING EVENTS

April 24, 2019: The Department of Environmental Quality (DEQ), the Department of Natural Resources (DNR), and the Michigan Department of Agriculture and Rural Development (MDARD) will come together to celebrate Earth Day at Constitution Hall in Lansing, Michigan. https://www.michigan.gov/deq/0,4561,7-135-3307_3580_66835---,00.html

May 3-5, 2019: 60th Anniversary Rock and Mineral Show “Rockrama”. Kalamazoo County Expo Center. Information is available at: www.kalamazoorockclub.org

May 19-20, 2019: AAPG Annual Conference and Exhibition, San Antonio, Texas
<https://www.aapg.org/events/conferences/ace>

June 3-5, 2019: NGWA Field Methods: Groundwater Sampling and Analysis (Short Course #226), Westerville, Ohio,
<https://www.ngwa.org/detail/event/2019/06/03/default-calendar/226jun19>

June 10-11, 2019: AIPG Michigan Section’s Environmental Risk Management Workshop at the Ralph A. MacMullen Conference Center in Roscommon, Michigan.

June 19-20, 2019: NGWA The PFAS Management, Mitigation and Remediation Conference (#5010), Westerville, Ohio,
<https://www.ngwa.org/detail/event/2019/06/03/default-calendar/226jun19>

October 11-13, 2019: Michigan Mineralogical Society, “The Show” Greater Detroit Gem, Mineral, and Fossil Show. Information is available at: www.michmin.org.

MDEQ Calendar of Training and Workshops

http://www.michigan.gov/deq/0,4561,7-135-3308_3333---,00.html

Michigan State University, College of Natural Science, Department of Earth and Environmental Science,
Events <https://ees.natsci.msu.edu/events/>

Michigan Tech – Geoseminars - <http://pages.mtu.edu/~raman/SilverI/Geoseminar/Welcome.html>

University of Michigan Earth and Environmental Science
Events <https://lsa.umich.edu/earth>

Western Michigan University, Geological and Environmental Sciences
Events <https://wmich.edu/geology/events>



MBGS NEEDS VOLUNTEERS

MBGS volunteers needed for Earth Day, April 24th, 2019 Constitution Hall Lansing. Again, MBGS will have a booth at the State of Michigan Earth Day event. https://www.michigan.gov/deq/0,4561,7-135-3307_3580_66835---,00.html If you are interested in volunteering, please contact any of the MBGS officers.

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MICHIGAN BASIN GEOLOGICAL SOCIETY PUBLICATIONS 2018

The following list details the contents of each available CD-ROM.

This list is also available on-line at <http://www.mbgs.org/publications.html>

Prices include postage, handling and any applicable sales tax.

Orders for publications should be prepaid in U.S. dollars and addressed to:

MBGS — Publications, P.O. Box 14044, Lansing, MI 48901-4044

HISTORICAL PUBLICATIONS DISK 1

Nine out-of-print publications – Cost - \$15

- The Stratigraphy of Manitoulin Island, Ontario, Canada, June 1954
- The Devonian and Silurian Rocks of Parts of Ontario, Canada and Western New York, June 1951
- The Traverse Group of the Northern Part of the Southern Peninsula of Michigan, June 1949
- The Devonian Strata of the London-Sarnia Area, Southwestern Ontario, June 1956
- The Ordovician Rocks of the Escanaba-Stonington Area, June 1950
- The Niagara Escarpment of Peninsular Ontario, Canada, June 1955
- Lower Paleozoic and Pleistocene Stratigraphy Across Central Wisconsin, May 1960
- Geology of Central Ontario, Canada, May 1965
- Classic Silurian Reefs of the Chicago Area, June 1998

HISTORICAL PUBLICATIONS DISK 2

Four out-of-print publications – Cost - \$15

- Copper Country Field Trip, Michigan, June 1947
- Geology of Mackinac Island and Lower and Middle Devonian, South of the Straits of Mackinac, June 1959
- Tectonics, Structure and Karst in Northern Lower Michigan, August 1983
- Geology of the Pictured Rocks, Upper Peninsula, Michigan, July 1991

HISTORICAL PUBLICATIONS DISK 3

Six out-of-print publications – Cost - \$15

- Pleistocene and Early Paleozoic of the Eastern Part of the Northern Peninsula of Michigan, June 1948
- Stratigraphy and Structure of the Devonian Rocks in Southeastern MI and Northwestern OH, June 1952
- Lower Ordovician and Upper Cambrian of Wisconsin, May 1990
- Guidebook to the Precambrian Geology and Metallogeny of the Central Upper Peninsula of Michigan, September 1991
- Diamond Bearing Kimberlite and Related Geology in the Upper Peninsula of Michigan, April - May 1993
- Karst Geology of Northeast Lower Peninsula, Michigan, April 1995

HISTORICAL PUBLICATIONS DISK 4

Six out-of-print publications – Cost - \$15

- Silurian Rocks of the Northern Peninsula of Michigan, June 1957
- Cambrian Geology of Parts of Dickinson and Iron Counties, Michigan, June 1958
- Geologic Features of Parts of Houghton, Keweenaw, Baraga and Ontonagon Counties, Michigan, May 1961
- Correlation Problems of the Cambrian and Ordovician Outcrops Areas, Northern Peninsula of Michigan, June 1967
- The Geology of Manitoulin Island, June 1968
- 1970 Field Excursions - Pleistocene, Devonian, Precambrian, May 1970

HISTORICAL PUBLICATIONS DISK 5

Five out-of-print publications – Cost - \$50

- Oil & Gas Fields Symposium, Volume 1, April 1969, 200 pp., maps, illus., second printing with updates
- Oil & Gas Fields Manual of the Michigan Basin, Volume 2, 1992, 520 pp., maps, illus.
- Glacial Geology of Southwestern Michigan, September 1989
- Geology of the Lake Erie Islands and Adjacent Shores, 1971
- Glacial Geology of Southwestern Michigan, Landforms of the Lake Michigan Lobe, Southwestern Michigan, September 2001

HISTORICAL PUBLICATIONS DISK 6

Eight out-of-print publications – Cost - \$15

- Guidebook for Ordovician Stratigraphy of the Cincinnati, Ohio and Richmond, Indiana Areas, June 1953
- Guidebook for Ontario Geological Excursion to Kettle Point –Owen Sound- Waubesa, June 1946
- Guidebook for the Stratigraphy of the Silurian Rocks in Western Ohio, May - June 1963
- Guidebook for Cambrian Stratigraphy in Western Wisconsin, May 1966
- Geology of the Manitoulin Area, Special Papers #3, September - October 1978
- Middle Devonian Cratonic Carbonates and Shales in Southwestern Ontario, November 1987
- The Richfield Challenge, A Review of the Richfield Developments in Michigan, 1952
- A Theory of Rogers City and Dundee Relationships in Central Michigan, Tom Knapp Master's Thesis, 1947

HISTORICAL PUBLICATIONS DISK 7

Six out-of-print publications – Cost - \$15

- Silurian Rocks of the Southern Lake Michigan Area, 1962
- Studies of the Precambrian of the Michigan Basin, 1969
- The Geology of the Marquette District: a Field Guide, May 1977
- Ordovician and Silurian Geology of the N. Peninsula of Michigan, 1980
- Special Paper #4: Ordovician and Silurian Rocks of the Michigan Basin and its Margins, 1985
- Upper Keweenaw Rift-Fill Sequence, Mid-Continent Rift System, Michigan, September 1988

HISTORICAL PUBLICATIONS DISK 8

Four out-of-print publications – Cost - \$15

- Niagaran Stratigraphy: Hamilton, Ontario, 1972
- Silurian Reef-Evaporite Relationships, 1974
- Special Papers #1: Middle Devonian Stratigraphy and Depositional Environments in the Michigan Basin, 1974
- Sedimentology and Paleogeography of the Pennsylvania Strata of Grand Ledge, Michigan, May 1989
- Paleozoic Geology of the Central Upper Peninsula of Michigan, August 2014

HISTORICAL PUBLICATIONS DISK 9

Five out-of-print publications – Cost - \$15

- Geology and the Environment: Man, Earth and Nature in Northwestern Lower Michigan, 1973
- Special Papers #2: The Belle River Mills Gas Field: Productive Niagaran Reefs Encased by Sabkha Deposits, Michigan Basin, 1977
- Geohydrology of Carboniferous Aquifers of the Michigan Basin, September 1994
- Sedimentology, Paleogeography and Geochemical Weathering of the Pennsylvania Strata of Grand Ledge, Michigan, September 1994
- Geological and Historical Field Trip to the Keweenaw Peninsula: A Tribute to Douglass Houghton: "Michigan's Pioneer Geologist," Field Guidebook, September 2016

A DIGITAL PUBLICATION

Northeast Lower Peninsula Geological Field Conference, 2004, T.J. Black and M.S. Wollensak, 133 pp, illus., maps, digital presentations and posters (available on CD-ROM only). Cost - \$10

- Road Log and Stop Descriptions by T.J. Black, D. Baxter and M.S. Wollensak
- Methane Gas Venting at Hemlock Lake, by T.J. Black
- The Glaciated Landscape in the Grand Traverse Bay Region of Michigan and the Nature of the Greatlakean Advance of the Laurentide Ice Sheet in Michigan, USA, poster by S.C. Lindstrom
- Thunder Bay Marine Sanctuary Sink Hole Investigations, poster by T.J. Black
- Evaluation of Relationships Between Hydrogeologic Environment and Petroleum Hydrocarbon Remediation in Quaternary Glacial Sediments, presentation by Lisa M. Botcher and Arden D. Davis
- Log Curve Amplitude Slicing of the Traverse Group in the Pentwater Field, Oceana County, Michigan, by Albert S. Wylie, Jr.
- Traverse Group Stratigraphy in the Michigan Basin - A Detailed Review, by Albert S. Wylie, Jr.

SPECIAL OFFERS

- Stratigraphic Lexicon for Michigan, 2001, prepared by MBGS and published by DEQ, **Cost - \$4.**
- Robert E. Mosher Geological Studies A lifetime of geological research on Silurian Rocks with John T. Sanford. The disks are organized chronologically and include field work in North America and Europe. 2007, 2 CDs **Cost - \$35.**
- Historical CD Set - #1– #9 and 2004 NE LP Geological Field Conference (detailed above) for a special purchase price of **\$125 (best price for all).**

INTERESTING NEWS

New Survey Publication – An Updated Bibliography of Michigan Geology

Dr. Peter Voice, Western Michigan University Department of Geological Sciences and John Yellich, reviewer, Michigan Geological Survey

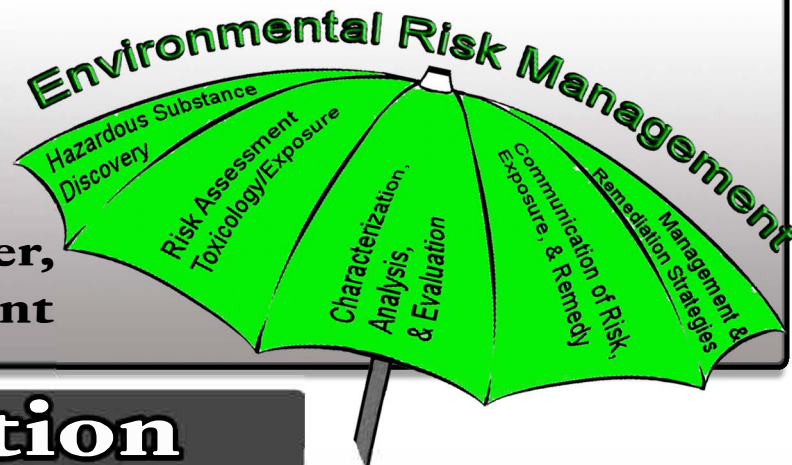


The Michigan Geological Survey is proud to announce a new publication: Michigan Geology: A Bibliography, the second volume in the Michigan Geological Survey Data Compilation Series. This updated compilation lists over 7,700 references from all known Michigan sources, including industry, professional associations and universities and includes publications from 1818 to present. This report documents 200 years of Geological Research in Michigan. The Bibliography is sorted into four general categories – Precambrian, Basin, Quaternary, and Other. The report is free to download at the Michigan Geological Survey's webpage: <https://wmich.edu/geologysurvey/research/publications>. This updated version of the bibliography also includes a short section on Michigan Stratigraphic Nomenclature, as well as brief discussion of historical trends in publication frequency in Michigan.

AIPG Michigan Section Announces the

9TH ANNUAL

**Environmental Risk Management Workshop
Hazardous Substances in Groundwater,
Soil, & Vapors: The New Turning Point**



Registration Information

Registration is now open for the 9th Annual AIPG Michigan Workshop on June 11 and 12, 2019, at the Ralph A. MacMullan Conference Center on Higgins Lake in Roscommon, Michigan. Early bird discounts are available. Click on the “Register Here” below.

This 9th workshop in the series of annual training events hosted by the AIPG Michigan Section focuses on providing quality technical information and case studies. These environmental workshops bring together a broad base of topic expertise from consulting, regulatory, academic, and owner perspectives. This unique workshop forum promotes collaboration for solving tough environmental problems through real site case studies using innovative approaches as valuable technical learning tools to develop strategies for evaluating and managing risks associated with releases of hazardous substances to the environment.

The theme for this year’s Environmental Risk Management Workshop is **Hazardous Substances in Groundwater, Soil, & Vapors: The New Turning Point**. Advances in science and technology along with the discovery of new contaminants has changed the way we investigate, remediate and manage risks from hazardous substances released to the environment. We are at a turning point in the environmental industry. In some situations, science and technology have resulted in greater accuracy and efficiency; in others, the advances raise more questions than answers; and as we are discovering, new situations where the science and technology are non-existent.

Hazardous substances volatilizing to indoor air from contaminated soil and groundwater is at the forefront of concern across the nation. In the past decade, we have learned more about these invisible threats and means for managing the risks associated with them. AIPG is dedicating an entire track at this year’s workshop to vapor intrusion including demonstrations with opportunities for workshop attendee participation.

The presentations in the 1st track at this workshop will feature the many aspects of the volatilization to indoor air pathway (VIAP) including investigation, sampling, analytical, and mitigation methodologies. The 2nd track will focus on innovative approaches to evaluating the risks, characterizing the contaminants, communicating the risks, and management and remediation strategies in all media. This workshop will provide thought-provoking, high quality technical presentations and discussions that have come to be expected of the AIPG Michigan Section’s annual workshop. As professionals working in the environmental industry sharing the latest information on the advances in the science as well as the regulatory requirements and other legal issues, we can make better, informed decisions regarding the risks associated with these substances in the environment.

Register Here

See you at the Workshop!

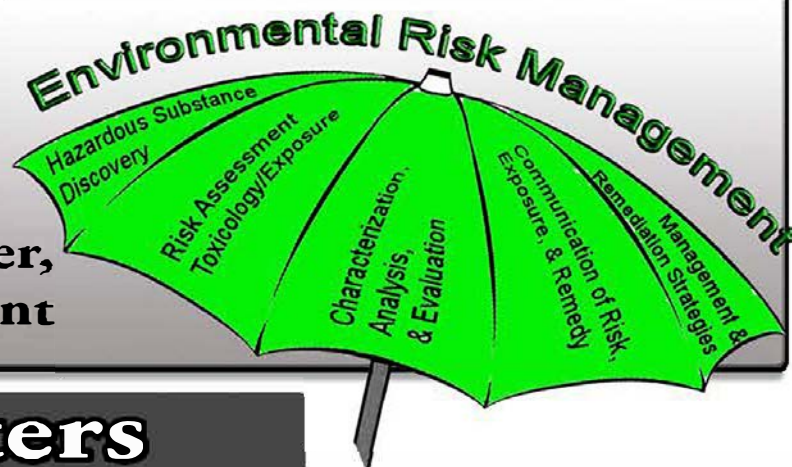
Questions? Contact Sara (pearsons@michigan.gov) or Tammy (tammy.rabideau@ergrp.net)



AIPG Michigan Section Announces the

9TH ANNUAL

**Environmental Risk Management Workshop
Hazardous Substances in Groundwater,
Soil, & Vapors: The New Turning Point**



Call for Student Posters

The American Institute of Professional Geologists' (AIPG) Michigan Section for the first time is calling for student posters for the 9th Annual AIPG Michigan Workshop to be held June 11-12, 2019, at the Ralph A. MacMullan Conference Center on Higgins Lake in Roscommon, Michigan.

For this 9th workshop in the series of annual training events, the AIPG Michigan Section is extending an invitation to students to participate in the workshop by bringing a poster highlighting their research and interests in the environmental field. We are dedicating an entire segment of the workshop as a student poster session to give students the opportunity to talk with professionals about their interests.

The AIPG Michigan Section offers a unique workshop forum that promotes collaboration for solving tough environmental problems. We are inviting students to attend and learn along with our practitioners in the field to share the innovative approaches and encourage more innovation with fresh perspectives on problems. The workshop is an excellent opportunity for exchange of ideas and networking with great potential for launching professional careers.

The theme for this year's Environmental Risk Management Workshop is **Hazardous Substances in Groundwater, Soil, & Vapors: The New Turning Point**. Advances in science and technology along with the discovery of new contaminants has changed the way we investigate, remediate and manage risks from hazardous substances released to the environment. We are at a turning point in the environmental industry. In some situations, science and technology have resulted in greater accuracy and efficiency; in others, the advances raise more questions than answers; and as we are discovering, there are new situations where the science and technology are non-existent.

The poster registration deadline is April 15, 2019. Discounted student rates for registration will be available, and the Michigan Section offers two scholarships per AIPG student chapter that include registration, lodging and meals.

Questions? Please contact Co-Chairs:
Sara Pearson (pearsons@michigan.gov) or
Tammy Rabideau at (tammy.rabideau@ergrp.net).



Registration Deadline: April 15, 2019