Speaker Biographies

James D. Miller, Associate Professor, Department of Geological Sciences, University of Minnesota Duluth

Geology and Mineral Deposits of the Duluth Complex, Northeastern Minnesota

- Geology and Genesis of the Duluth Complex
- Characteristics of Cu-Ni-PGE Sulfide Mineralization
- Prospects for Permitting and Mining

Education:

B.S. Geology, University of Illinois-Urbana/Champaign, 1977
Ph.D. Geology, University of Minnesota Twin Cities, 1986

Experience:

2008-present: Associate Professor, Dept. of Geological Sciences, UMD
1985-2008: Senior Geologist, Minnesota Geological Survey
1979-1982: Geological Assistant, Phillips Petroleum (Minerals Division)

Affiliations:

Geological Society of America
American Geophysical Union
Institute on Lake Superior Geology
Prospectors and Developers Association of Canada

Ernest K. Lehmann, Franconia Minerals Corp

Mining in Minnesota

A certified professional geologist and past president of the American Institute of Professional Geologists, Ernest Lehmann has been active in the mineral industry since 1950. He is currently president of MiningMinnesota, and serves on the state's Minerals Coordinating Committee and on the Governor's Committee on Minnesota's Mining Future. Since managing Kennecott Copper Corporation's successful discovery of the New Lead Belt in Missouri in the mid-1950's, Mr. Lehmann has managed successful exploration programs across North America, and Central and South America, managed or evaluated mining operations in Europe, Africa, Mexico, South America and Southeast Asia.

Jennifer Engstrom, Minnesota Department of Natural Resources, Division of Lands and Minerals

Permitting and Regulatory Framework for Metallic Mining in Minnesota

- Brief description of environmental review
- Overview discussion of permits required for mining operations
- More detailed discussion of Permit to Mine

Education:

M.S. (geology), University of Minnesota, 2005
B.A. (geology and environmental studies), Macalester College, 1993

Experience:

2007-present, Minnesota Department of Natural Resources (Mineland Reclamation Section Manager)
1991-2007, Minnesota Department of Natural Resources (various positions, culminating with Mineland Reclamation Specialist)

Affiliations:

Society for Mining, Metallurgy, and Exploration, Inc. (SME)

Rick Wilkin, U.S. Environmental Protection Agency

Monitored Natural Attenuation of Inorganic Contaminants in Ground Water

- Introduce new technical guidance from EPA
- Application at mine sites
- Example of site-specific work at CA mercury mine

Education:

Ph.D. (geochemistry), Pennsylvania State University, 1995
M.S. (geology), Michigan Technological University, 1991
B.A. (geology), University of Minnesota, 1988

Experience:

1999-present: Environmental Scientist, U.S. EPA
1995-1999: Post-doctoral Research Associate, Penn State University
1991-1995: Graduate Research Assistant, Penn State University
1989-1991: Graduate Research Assistant, Michigan Technological University
1986-1987: Field Geologist, Ernest K. Lehmann and Associates
1985-1987: Junior Scientist, University of Minnesota (Mineral Resource Research Ctr)

Affiliations:

Geological Society of America (GSA)
American Chemical Society (ACS)
Mineralogical Society of America (MSA)
Geochemical Society (GS)
Editorial Board, *Chemical Geology* (2008-)
Associate Editor, *American Mineralogist* (2006-)
Editorial Board, *Geochemical Transactions* (2005-)

Michael E. Berndt, Minnesota Department of Natural Resources

Source and Fate of Sulfate Released by Mining on Minnesota's Iron Range

- Environmental concerns about sulfate
- Sulfate distribution in the St. Louis River watershed
- Isotopic composition (d34S and d18O of dissolved sulfate)
- Conclusions about sources and sinks

Education:

PhD Geology, University of Minnesota, 1987
MS Geology, University of Wisconsin, 1983 BS Geology, University of Minnesota, 1980
BS Geophysics, University of Minnesota, 1980

Experience:

2001 to present, Minnesota Department of Natural Resources, (Research Scientist – Geochemistry; Adjunct Professor University of Minnesota)
1987-2001 University of Minnesota (Research Associate)

Affiliations:

Geochemical Society (GS)
Society of Mining, Metallurgy, and Exploration (SME)

Brian Sperrazza, P.E., P.G., Foth Infrastructure and Environment, LLC

Hydrogeological Characterization of Bedrock at Potential Mine Sites

Abstract:
As part of exploration efforts for potential mine sites, located in the Precambrian bedrock of the Canadian Shield, there is a need to understand the physical and hydraulic aspects of the country rock. The physical aspects include geotechnical and structural properties, as well as water chemistry; the hydraulic aspects include aquifer properties. Geophysical surveys, hydrophysical surveys, pump testing and groundwater sampling techniques are employed to obtain this information. This presentation provides examples from investigations where such activities were used to understand the degree of bedrock fracturing, fracture orientation, water quality, and transmissive properties.

Education:

B.S. (geology and geophysics), University of Wisconsin-Madison, 2000
B.S. (geological engineering), University of Wisconsin-Madison, 2000

Experience:

2007-present	Foth Infrastructure and Environment, LLC (environmental engineer)
2001-2007	Malcolm Pirnie, Inc (engineer/hydrogeologist)
2000-2001	Douglas Engineering Environmental Services (field hydrogeologist)
1998-2000	Minnesota Pollution Control Agency (field technician)

Michael Liljegren, MN Department of Natural Resources, Division of Waters

Borehole Mining of Manganese near Emily, MN

- Geology of the Manganese Deposit in Emily
- Proposed Mining Methods
- Bulk Sample Collection Project (Permitting Requirements and Hydrogeologic Evaluation)

Education:
B.S. (Geosciences), North Dakota State University, 1995

Experience:
1995-Present, MN Department of Natural Resources, Division of Waters (Hydrogeologist)

Affiliations:
Minnesota Ground Water Association (MGWA)
Society for Mining and Metallurgy and Exploration (SME)
Minnesota Water Well Association (MWWA)

O'Niell Tedrow, Northeast Technical Services.

Ground Water / Surface Water Interactions and Aquatic Toxicity Testing

- Common characteristics of GW and SW, and how these characteristics may change following GW exposure to the atmosphere.
- Potential influences from these characteristics on responses of organisms used for toxicity testing.
- Introduction to aquatic toxicity testing.
    - Organisms used, measurements, examples of variability, experimental design, data interpretation.
- Re-cap of presentation points with discussion.

Education:

- Master of Science, Forest Resources- Clemson University, 2007.
    - Specific research: Freshwater toxicology / ecology; experimental design.
- Bachelor of Science, Aquatic Biology / Ecology- St. Cloud State University, 2004.
    - Specific research: Freshwater toxicology / ecology

Experience:
2009 – Present: Northeast Technical Services, Virginia, MN.
2007 – 2009: Assistant Research Scientist (SSA), US EPA, Athens, GA.
2004 – 2007: Graduate Research Assistant, Clemson University, Clemson, SC.
2001 – 2004: Research / Teaching Assistant, St. Cloud State University, St. Cloud, MN.

Affiliations:
Member: Regional (Midwest) and National Society of Environmental Toxicology and Chemistry (SETAC).

James S. Aiken, Evan Christianson, Cale Anger

Groundwater Considerations for Gravel Mining at UMore Park: Background, Groundwater Modeling, and Monitoring

James S. Aiken, P.G., Barr Engineering Co

Part 1: *Overview of UMore Park History, Vision, and Plans for the Future*

- Location of UMore Park, General Setting
- University's Vision and Plans for Future
- History – Farmland – GOW – Research – Mining
- Investigations conducted for EIS

Education:
B.S. Geology 1986 UW Madison
M.S. Glacial/Hydrogeology 1993 UW Madison

Experience:
Barr Engineering Company, 2007-Present – Senior Consultant/Hydrogeologist
McCain and Associates, Inc. 2003-2007 – Vice President, Environmental Services
Polaris Group, Inc. 2001-2003 – Senior Scientist/Hydrogeologist
North Jackson Company – 2000-2001 – Vice President
Barr Engineering Company 1989-2000 – Hydrogeologist
Warzyn Engineering Company, 1986-1989

Evan Christianson, Barr Engineering

Part 2: *Groundwater Modeling as a Planning Tool: Sustainability in a Gravel Matrix*

- Groundwater model development
- Potential effect of mining activities on groundwater
- Simulations of future conditions
- Implementation of modeling results in mining plan

Education:
M.S. Geology, Iowa State University, 2008
B.A. Geology, Gustavus Adolphus College, 2005

Experience:
Barr Engineering Company, 2007-Present – Groundwater Hydrologist

Cale Anger, University of Minnesota

Part 3: *Groundwater Monitoring at UMore Park: Baseline Data and Future Assessment*

- Baseline groundwater data at UMore Park
- Implications of mining on groundwater
- Groundwater and sustainable development of the property

Education:
M.S. Candidate – Geology, University of Minnesota, Expected 2010
M.S. Candidate – Environmental Engineering, University of Minnesota, Expected 2011
B.S. Geology, University of Wisconsin – Eau Claire, 2007
B.S. Geography (GIS), University of Wisconsin – Eau Claire, 2007

Experience:
University of Minnesota, 2008-Present – Graduate Research and Teaching Assistant

Heather E. Arends, Department of Natural Resources

Statewide Trends Impacting Aggregate Resource Availability

- The effects of natural distribution, depletion, population growth, and land-use competition on future supplies of aggregate resources.
- Sustainable development and permitting the next generation of aggregate mines.
- Assessing risks, environmental impacts, and reclamation of mining in terms of scale.

Education:
M.S. (Geology), University of Minnesota 2011
B.A. (Geology), University of Minnesota 1996

Experience:
1998 – Present, Minnesota Department of Natural Resources, Division of Lands and Minerals, Research Scientist II
1996 – 1998, Contract Geologist

Affiliations:
Geologic Society of America (GSA)

Scott C. Alexander, University of Minnesota

Hydrogeology of the Soudan Mine, Minnesota: Applications to Terrestrial and Extra-terrestrial Research

I have been actively investigating deep saline fluids found across Minnesota for 20 years. The Soudan Mine represents a prime location to continue research into the hydrogeology, geochemistry, mineralogy and microbiology of crustal fluids. This interdisciplinary research on the geochemistry and geomicrobiology of the ancient crust of the Earth has applications as an analog for surface and subsurface processes on Mars and other terrestrial planets.

In addition, my recent research efforts, in conjunction with Dr. Martin Saar (U of MN Geology), have focused on combined CO_2 sequestration and geothermal electricity production in deep saline aquifers across the Midwestern US. Understanding of the deep environments around the Soudan Mine will have strong applicability to these CO_2 / Geothermal research efforts.