



*15<sup>th</sup> Annual*  
**MINNESOTA  
MINERALS  
EDUCATION  
WORKSHOP**

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June 19-21, 2012  
Winona State University  
Winona, MN

***INFORMATION CIRCULAR***  
*With REGISTRATION FORM*

**[www.mmew.org](http://www.mmew.org)**

**GENERAL INFORMATION** – The MMEW is a three-day workshop for K-12 earth science educators, which offers short courses and field trips focused on the geology and mineral resources of Minnesota. The short course sessions will be held in classrooms in the Pasteur Hall and Science Laboratory Center on the campus of Winona State University (see map on p. 11). Participants may choose among 16 different short course topics taught by professional geologists, mining engineers, academics, government scientists, and K-12 educators. Many of the courses introduce curriculum ideas for various grade levels. Field trips are designed to familiarize participants with the geology and mineral resources of southeastern Minnesota. The two days of field trips provide ample opportunity to collect samples and photographs of classic geological exposures.

Participants will receive a variety of resource materials including rock and mineral samples, lesson plan ideas, posters, maps, videos, and other useful information. Upon completion of the workshop, attendees will be provided with a certificate of participation listing contact hours. Participants may also register for two college credits through the University of Minnesota Duluth, which will require submission of a workshop-related lesson plan.

**WORKSHOP SCHEDULE** – The tentative schedule of events for the three-day workshop is listed below. Events tagged with an (ATR) are to meet in the Atrium area of the Science Laboratory Center; those marked (AUD) are to meet in the Science Laboratory Center Auditorium (SLC 120) (see campus map on pg 11).

### **Tuesday, June 19**

- 7:30-8:30 Registration, Continental Breakfast (ATR)
- 8:30-8:50 Welcome and Introductions (AUD)
- 9:00-10:15 Short Course Session 1
- 10:15-10:30 Morning Break (ATR)
- 10:30-11:45 Short Course Session 2
- 11:50-1:20 Lunch Buffet (ATR)  
Presentation by Karl Green, Assoc. Prof., LaCrosse County  
Community Educator *“Frac Sand in Western Wisconsin”*
- 1:30-2:45 Short Course Session 3
- 2:45-3:00 Afternoon Break (ATR)
- 3:00-4:15 Short Course Session 4
- 4:15-4:45 Collect Materials for Resources Box
- 4:45-5:15 Field Trip Overview (AUD)
- 6:00-7:00 Barbeque Picnic (ATR)
- 6:30-8:30 Group Hike to Garvin Heights Overlook or Visit to WSU Flume Lab
- 9:30-10:30 View night sky at the WSU Observatory

### **Wednesday, June 20**

- 7:00-8:00 Continental Breakfast (ATR)
- 8:00AM Buses depart WSU for field trip
- 8:30-4:30 Geology Field Trip
- 5:00PM Buses return to WSU

## **Thursday, June 21**

7:00-8:00	Continental Breakfast (ATR)
8:00AM	Buses depart WSU for field trip
8:30-3:00	Resources Field Trip
3:30PM	Buses return to WSU

**SHORT COURSE OFFERINGS** – The 16 courses being offered during the four short course sessions are described below. On the registration form, participants are asked to identify their first and second class choices for each session.

### **SESSION 1 (9:00-10:15)**

#### **1A) BEYOND BONES! FOSSILS OF THE MIDWEST**

**Julie Bartley**, Assoc. Professor, Dept. of Geology, Gustavus Adolphus College

Everyone knows about dinosaur bones, but hardly anyone finds one of those! Other kinds of fossils, though, can be found right here in Minnesota, sometimes practically in your backyard. These fossils tell us about Minnesota's past – times when the atmosphere was acquiring oxygen for the first time; times when southern Minnesota was a tropical paradise, and, yes, times when dinosaurs walked our landscape. In this session, participants will identify and learn about the fossils of the Midwest, with emphasis on the Paleozoic fossils of SE Minnesota. Participants will receive a bag of fossils to use in the classroom and handy fossil identification guides.

#### **1B) INNOVATIVE USES OF GIGIPAN IN THE CLASSROOM**

**Candace Kairies-Beatty & W. Lee Beatty**, Asst. Professors, Dept. of Geoscience, Winona State Univ.

Access to the internet in today's classrooms has opened the door to a variety of new resources that can enhance student learning in the geosciences with minimal investment. This course will focus on innovative ways to use GigaPan panoramas in the classroom. GigaPans are zoomable, explorable, high-resolution gigapixel images that can be accessed by anyone with a high-speed internet connection ([www.gigapan.org](http://www.gigapan.org)). The unique nature of these images and the user interface developed for them makes GigaPans an excellent tool to engage students. GigaPans are an effective way to illustrate key geologic concepts and promote student inquiry. When they are combined with Google Earth, hand samples, historical data, video, annotations, etc., GigaPans can be used to create virtual field experiences that allow students to explore sites that would otherwise be inaccessible due to financial or physical limitations.

#### **1C) GLACIAL GEOLOGY OF SOUTHEASTERN MINNESOTA**

**Howard Hobbs**, Senior Scientist, Minnesota Geological Survey

Southeastern Minnesota is commonly called the "Driftless Area," based on the concept that the bedrock there is not covered by glacial deposits, or "drift". Although the landscape looks very much like the true Driftless Area of Wisconsin, there are traces of past glaciations over the whole area, some of them very old. On the west side, adjacent to the edge of the most recent glaciation, these old glacial deposits are quite thick. See and feel samples of the different kinds of surficial deposits in the area (till, outwash, loess, colluvium, etc.). Learn the glacial history, illustrated with maps and slides. Learn to use weathering as a rough measure of relative age. See and feel ventifacts (wind-eroded stones) and learn how they form.

#### **1D) MODELING THE LAYER CAKE GEOLOGY OF SE MINNESOTA WITH PLAYDOH**

**Jim Miller**, Assoc. Professor, Dept. of Geological Sciences, University of Minnesota Duluth

The flat-lying Paleozoic-aged sequences of sandstones, shales and limestones that underlie most of southeastern Minnesota are commonly referred to as "layer cake geology". When looked at in detail, these marine fossil-bearing sedimentary strata tell the story of their being deposited during several cycles of rising and falling sea levels between 520 and 370 million years ago. As an in-class activity, we will model the deposition of these sedimentary layers across Minnesota with sheets of playdoh. We can reconstruct the buried "stratigraphy" by drilling cores through the layers (with straws) and then creating geologic cross sections from a profile of drill cores.

## **SESSION 2 (10:30-11:45)**

### **2A) USING A DINOSAUR TRACKWAY TO TEACH GEOCIENCE SKILLS**

**W. Lee Beatty**, Asst. Professor, Dept. of Geoscience, Winona State University

This course demonstrates a portable, easy-to-use dinosaur trackway exercise that reinforces skills in mathematics (including algebra and rate calculations), observation, note-taking, data collection, and paleontology (including trace fossils, behavior and paleoecology). The exercise recreates part of the Middle Jurassic Ardley trackway site in Oxfordshire, UK and focuses on a track made by a theropod dinosaur (possibly *Megalosaurus*). Unlike many trackway exercises available online, this exercise can be easily set up anywhere and requires only chalk, a measuring tape, a stopwatch and 50 feet of open sidewalk or parking lot. Students collect data from the trackway (including foot length, stride length, and pace angle) and measure their own time running a similar distance. The data they collect allows them to calculate the speed of the dinosaur that made the track and compare it to their own speed to see who would win in a footrace. Students can also observe changes in stride length and gait along the trackway, suggesting that the dinosaur changed its posture when switching from walking to running. The level of difficulty of this exercise can easily be adjusted to match the skills of students in different grade levels.

### **2B) IMPACT ROCKS IN MINNESOTA**

**Jennifer Anderson**, Asst. Professor, Dept. of Geoscience, Winona State University & **Mark Jirsa**, Senior Scientist, Minnesota Geological Survey

Impact cratering is the most common geologic process in the solar system and has affected every planetary surface, including the Earth's. But did you know that rocks in northern Minnesota record one of the largest impacts ever to occur on Earth? Explore how you can incorporate impact craters into your Earth science classroom through an inquiry-based laboratory activity. And travel (virtually) to these unique Minnesotan outcrops and rocks by taking a Google Earth tour of the Sudbury Impact Layer – a sequence of rocks that preserve the material ejected from Sudbury, Ontario, when a large meteorite struck there almost 2 billion years ago. Teaching guides for the laboratory activity and the Google Earth tour of the Sudbury Impact Layer in northern Minnesota will be provided so that you can utilize these resources in your classroom.

### **2C) CHANGING CLIMATE in MINNESOTA: PAST AND PRESENT**

**Timothy McAulay**, Biology Department, Inver Hills Community College & **Valerie Gamble**, MN Dept. of Agriculture

Minnesota as we know it today has a very dynamic climate with fascinating weather and well defined seasons. However, that has not always been true for this region, and climate change predictions indicate dramatic alterations are likely again in the not so distant future. Learn about Minnesota's past climate, past ecosystems and likely future changes including possible impacts on agriculture, tourism and our 10,000 lakes.

### **2D) ROADSIDE GEOLOGY OF MINNESOTA**

**Dick Ojakangas**, Emeritus Professor, Dept. of Geological Sciences, U of Minnesota Duluth

This PowerPoint presentation will cover the Geology of Minnesota, as outlined in my 2009 book, *Roadside Geology of Minnesota*, published as part of the Roadside Geology Series of Mountain Press (Missoula, MT). A 37-page introduction gives a historical overview of the state's geology, including the application of plate tectonic theory. Four regions cover the state--NE, NW/C, SW, and SE--each with a short introduction and also with both bedrock and Pleistocene geological maps. A total of 43 road logs describe the geology along or near the state's highways, including several state parks and Voyageurs National Park. Included are more than 300 maps, diagrams, and photos, mostly in color. The book was written for non-geologists, but is of value to traveling geologists as well.

## **SESSION 3 (1:30-2:45)**

### **3A) READING THE EARTH'S STORY -- ROCK AND MINERAL IDENTIFICATION**

**Jennifer Anderson**, Asst. Professor, Dept. of Geoscience, Winona State University

Geologists tell the story of the Earth. We read that story through the words and sentences that are found within minerals and rocks. In this session, we will explore how to identify common minerals and rocks, focusing on inquiry-based, hands-on techniques that can be implemented in your classrooms. We will use the theme of the "stories" that these rocks tell and how we can relate them to particular Earth processes. Teaching guides for various activities will be provided.

### **3B) STUDENTS AS STEWARDS OF MINERAL RESOURCES**

**Jim Miller**, Assoc. Professor, Dept. of Geological Sciences, University of Minnesota Duluth

Mineral resources are rare and non-renewable, yet we rely heavily upon them for our modern existence and are consuming them at an ever-increasing rate. Therefore, an important objective of earth science education should be to train students to be stewards of our mineral resources – to give them the knowledge base they will need to make wise choices about how, when and where to use (and reuse) those resources. This class introduces lesson plan ideas that attempt to accomplish some of those objectives.

### **3C) CONSTRUCTION AGGREGATES IN MY BACKYARD**

**Christina Morrison**, Tiller Corporation, Maple Grove, MN

Aggregate mines can be found in every county of the state. Sand, gravel and crushed stone are locally produced resources that are essential to everyday life. This session will highlight how to incorporate backyard geology into the classroom and explore the hands-on science behind a high-quality sand and gravel deposit.

### **3D) GROUNDWATER QUALITY TEACHING TOOLS**

**James Lundy**, Geologist, Minnesota Department of Health

A liquid, water is not strictly a mineral, but we extract and use it every day to keep our bodies healthy and alive. People only live where there is enough water, and Minnesota is a watery place. But what's in the water is as important as how much there is. Do you know what's in the water you drink? Would you want to drink "pure" water? Get tools for presenting the hydrologic cycle, and groundwater movement through clay, sand and gravel. Learn what we know about nitrate and radium in drinking water wells of southeastern Minnesota. Discover how the mystery of TCE in drinking water was solved, and what was done to fix it.

## **SESSION 4 (3:00-4:15)**

### **4A) EVERYDAY USES OF MINERALS**

**Ken Reid**, Emeritus Professor, University of Minnesota-Twin Cities

The fact that every material thing we take for granted in life is either made from minerals or depends on minerals for its production and/or transportation is not commonly recognized or understood. Examples of common everyday items will be traced back to their mineral source to show how modern civilization is totally dependent on mining. Materials available from The Mineral Information Institute ([www.mii.org](http://www.mii.org)) and Caterpillar Inc ([www.cat.com](http://www.cat.com)) will be discussed and portions of DVDs covering documentaries and class demonstration projects will be shown.

### **4B) EARTH RESOURCES LESSON PLAN SHARING**

**Devon Brecke**, Ellsworth Community High School, Ellsworth, WI

Show off your best and get a discount on registration! Gather with other teachers to share your favorite lesson plan on Earth resources or join in to learn what others are teaching in their classrooms. Up to 8 teachers will have 10 minutes each to present their student-centered lesson to other teachers. Teachers interested in presenting will be expected to prepare handouts (MMEW will pay copying costs). For their efforts, presenting teachers will be given half off their registration costs (\$20 value). Resource topics may include: energy, minerals, oil, gas, water, etc. Give a little and take home a lot!

#### 4C) RECLAMATION OF INDUSTRIAL MINERAL MINESITES

**Paul Eger**, Senior Engineer, Golder Associates

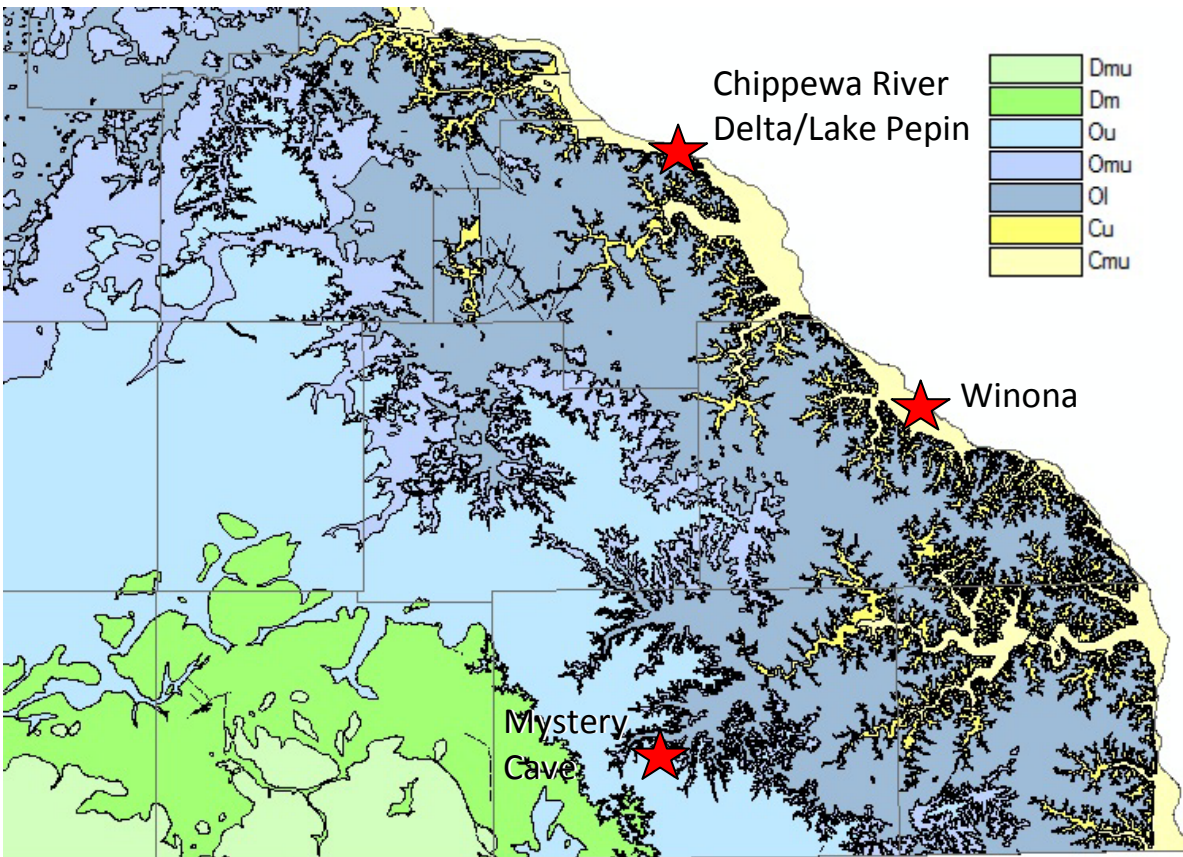
Mining operations in southeastern Minnesota focus largely on extracting industrial minerals and include sand and gravel pits, dimension stone quarries, clay pits, crushed rock quarries, and the new growth in silica sand mines. We will examine the background of mineland reclamation and discuss reclamation challenges that industrial mineral mining creates. We will do some hands-on testing to help identify materials that may need special reclamation approaches and look at new and innovative ways industrial mineral and metal mines are being reclaimed and reused.

#### 4D) IMPACT OF KARST ON AGRICULTURE

**Calvin Alexander**, Professor, Dept. of Earth Sciences, University of Minnesota

The productive soils of Minnesota's Karst Lands support the major base of SE Minnesota's economy. Karst hydrogeology, however, imposes serious constraints on how the region can be sustainably farmed. Management of soil erosion and water quantity and quality are significant, ongoing challenges to all agriculture in the region. The loess soils are highly erodible both by surface runoff through sinkholes and macropores into the subsurface karst drainage. Three generations of soil conservation efforts have helped tremendously – but we are still losing too much of our soil. The landscape is challenged by both floods and droughts. The "Goldilocks Zone" of just the right amount of moisture is fleeting. Standard BMPs from non-karst regions can be too often do more damage than good unless carefully tailored to karst hydrogeology. All of our food and increasing amounts of our energy come from agriculture. It is critical to preserve the very basis of our lives.

#### FIELD TRIPS



Paleozoic Geology of SE Minnesota. Cambrian units – yellow; Ordovician units – blue; Devonian units – green. Day 1 field trip will travel between Winona and Mystery Cave. Day 2 field trip will travel along the Mississippi River between Winona and Lake Pepin.



**MEALS, LODGING, and PARKING** – In addition to a barbeque picnic on Tuesday evening, registered workshop participants will be provided with continental breakfast in the Atrium of the Science Laboratory Center from 7:30 to 8:30 each morning. During the short course day (Tuesday), morning and afternoon snacks and a lunch buffet will also be provided. During the field trips on Wednesday and Thursday, box lunches and beverages will be provided. Please indicate on the registration form if you prefer vegetarian options.

Thanks to generous donations from over 30 companies and individuals to the Minnesota Center for Mineral Resource Education, participants are being offered the opportunity to stay in new four-person dormitory suites, New Center West (see campus map on pg. 11), for up to three nights –**Free of Charge!** Each air conditioned suite has a common kitchen and living room and four private bedrooms with a twin bed and linens provided. Check out the website <http://www.winona.edu/housing/newhall.asp> for more information on the accommodations. **You must turn in your registration form before the early registration deadline (June 1, 2012) to take advantage of this offer.**

Those who would rather stay in a local motel/hotel or campground near campus at personal expense, some options include:

	Motel	Address	Phone #	URL
<b>A</b>	AmericInn	60 Riverview Drive Winona, MN 55987	507-457-0249	<a href="http://americinn.com">americinn.com</a>
<b>B</b>	Riverport Inn	900 Bruski Drive Winona, MN 55987	507-452-0606	<a href="http://riverportinn.com">riverportinn.com</a>
<b>C</b>	Holiday Inn Express and Suites	1128 Homer Road Winona, MN 55987	888-739-5949	<a href="http://hiexpress.com">hiexpress.com</a>
<b>D</b>	Plaza Hotel and Suites	1025 Highway 61 East Winona, MN 55987	507-453-0303	<a href="http://plazawinona.com">plazawinona.com</a>

	Campground	Phone #	URL
<b>1</b>	Prairie Island Campground	507-452-4501	<a href="http://prairieislandcamp.com">prairieislandcamp.com</a>

Participants will be mailed a parking permit before the workshop which will allow them to park in one of three campus parking areas (see campus map on pg. 11).

**PARTICIPATION CERTIFICATE AND COLLEGE CREDIT** – At the end of the workshop, all participants will be given a certificate acknowledging their participation. The number of contact hours will be listed as 18 for full participation in the short courses and two days of field trips.

Additionally, participants may register for two graduate credits from the University of Minnesota Duluth for the course: Educ 5570 - Exemplary Models for Science Education, Sec. 242 (15<sup>th</sup> Annual Minnesota Minerals Education

Workshop-Conference on the Geology and Earth Resources of Southeastern Minnesota). Tuition and fees for the two credits is \$202. A syllabus and registration form can be downloaded from the MMEW website. The registration form must be submitted with payment by June 28, 2012. In addition to fully participating in the workshop, registrants for the course (EDUC 5570, sec. 242\*) are also required to develop a lesson plan on a topic related to what was learned at the workshop.

*\*Note that although the course number is the same as prior years, the section number is different to reflect the different content of the course.*

**REGISTRATION** – A registration form for the workshop is attached to the back of this circular or may be downloaded from the MMEW website. **Early registration ends June 1<sup>st</sup>**. Soon after this date, registrants will be informed of their short course schedule and be given other information to prepare for the workshop. Registrations will be accepted after this date for up to a total of 90 participants, but registration costs will increase from \$40 to \$55, dormitory lodging will not be available, and applicants run the risk of not getting into the courses they have chosen.

**SPONSORS** – The reason that the registration costs for this workshop can be held so low is because of the generous contributions by minerals-related industries, professional associations, and individuals to the Minnesota Center for Minerals Resource Education, which oversees the operation of the MMEW. Contributors to the 2012 workshop as of February 2012\* include:

Aggregate Industries	Northeast Technical Services
Alan Geiwitz	North Shore Mining – Cliffs NR
Anderson Lubricants, Inc	P&H Mining Equipment Inc
Brian McCabe	Rendrag, Inc.
Bryan Rock Products	Richard Backstrom
DMC (USA), LLC	Richwood
Dom-Ex, LLC	Scott Bullock
Graham Ford	Security State Bank Foundation
Industrial Lubricant	The Saint Paul Foundation
Intex Corporation	Tufco
Kelsey Capital Mgmt	Unimin Corporation
Malton Electric Company	United Taconite, LLC
Marine Tech	W.P. & R.S. Mars Co.
Martin Marietta Materials	William Dean Travis
Minnesota Section S.M.E.	Wissota Sand & Gravel Company

*\*A more complete list of contributors will be distributed at the workshop.*

In addition to financial support, many governmental agencies, academic institutions, and companies allow their staffs to contribute time to the planning and production of the workshop and often cover their expenses. These include:

Winona State University	Precambrian Research Center at UMD
UMD Natural Resources Research Institute	MN Department of Health
MN Department of Agriculture	MN Department of Natural Resources
Minnesota Geological Survey	Tiller Corporation
Golder Associates	

**VOLUNTEERS** – Since its inception in 1997, the MMEW has relied upon individual geoscientists from academia, industry and government to volunteer their time and expertise to what we all believe is an important and valuable endeavor. Listed below are the volunteers who have contributed to this year’s MMEW and the roles they have played.

<b><u>Name</u></b>	<b><u>Affiliation</u></b>	<b><u>Committee</u></b>
<b>Calvin Alexander</b>	U of Minnesota Twin Cities	Instructor
<b>Steve Allard</b>	Winona State University	Local Chair, Logistics, Budget, Special Events
<b>Jennifer Anderson</b>	Winona State University	Special Events, Instructor
<b>Julie Bartley</b>	Gustavus Adolphus	Field Trip, Instructor
<b>Lee Beatty</b>	Winona State University	Special Events, Instructor
<b>Candace Kairies-Beatty</b>	Winona State University	Special Events, Instructor
<b>Devon Brecke</b>	U of Wisconsin-River Falls	Curriculum, Instructor
<b>Toby Dogwiler</b>	Winona State University	Field Trip
<b>Paul Eger</b>	Golder Associates	Instructor
<b>Sally Frisby</b>	Cotter HS-Winona	Field Trip
<b>Valerie Gamble</b>	MN Dept. of Agriculture	Instructor
<b>Kent Gordon</b>	Tartan HS - Oakdale	Promotion
<b>Julie Heinz</b>	Natural Resources Research Inst.	Registration
<b>Howard Hobbs</b>	Minnesota Geological Survey	Field Trip, Instructor
<b>Mark Jirsa</b>	Minnesota Geological Survey	Instructor
<b>Jim Lundy</b>	MN Dept. of Health	Field Trip, Instructor
<b>Barb Lusardi</b>	Minnesota Geological Survey	Curriculum
<b>Dennis Martin</b>	MN Dept. of Natural Resources	Resources
<b>Timothy McAulay</b>	Inver Hills Community College	Instructor
<b>Jim Miller</b>	U of Minnesota Duluth/PRC	Registration, Grad Credit, Website, Budget, Instructor
<b>Dean Moosavi</b>	Rochester Community College	Field Trip
<b>Christina Morrison</b>	Tiller Corporation	Instructor
<b>Dick Ojakangas</b>	U of Minnesota Duluth	Instructor
<b>Marsha Patelke</b>	Nat. Resources Res. Inst./PRC	Registration, Resources, Special Events
<b>Ken Reid</b>	U of Minnesota Twin Cities	Instructor
<b>Lee Schmidt</b>	Hamline University	Promotion
<b>Nicollet Schossow</b>	Winona State University	Logistics, Special Events
<b>Cheryl Sill</b>	Thief River Falls HS	Resources

## QUESTIONS?

### About workshop content:

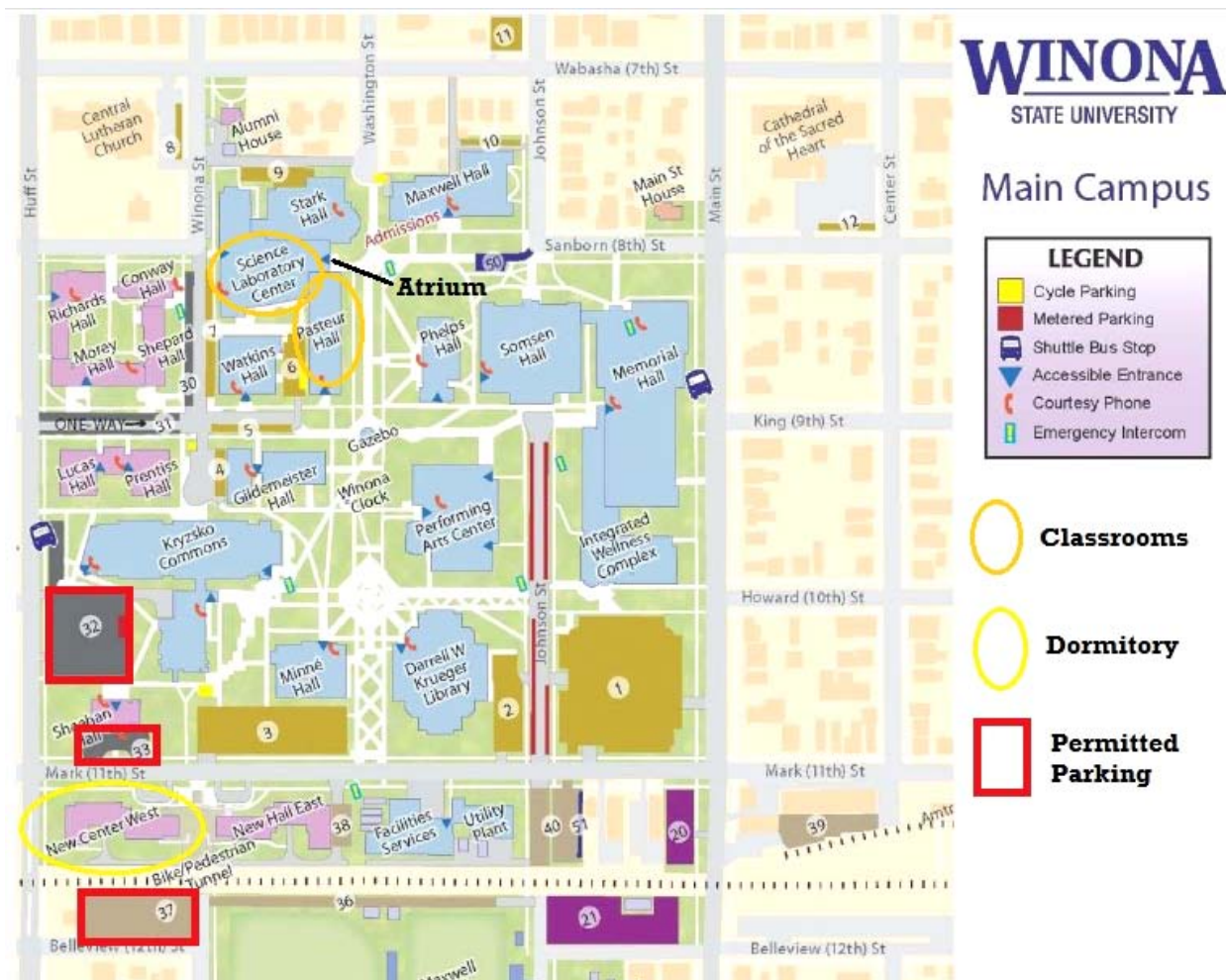
- Jim Miller (218-720-4355), [mille066@umn.edu](mailto:mille066@umn.edu)
- Steve Allard (507-457-2739), [sallard@winona.edu](mailto:sallard@winona.edu)

### About registration:

- Julie Ann Heinz (218-720-4272), [jheinz@nrri.umn.edu](mailto:jheinz@nrri.umn.edu)

### About lodging:

- Nikki Schossow (507-457-5260), [nschossow@winona.edu](mailto:nschossow@winona.edu)



Directions to WSU campus - Take Huff Street off Highway 61/14. Head NE about 1 mile. Participants will be given parking permits which allows parking in lots 32, 33, and 37.



**15<sup>th</sup> Annual**  
**MINNESOTA MINERALS EDUCATION WORKSHOP**  
 Winona State University, Winona, MN  
 June 19-21, 2012

**Early Registration Deadline: JUNE 1, 2012**

NAME: \_\_\_\_\_ SCHOOL: \_\_\_\_\_

HOME ADDRESS\* : \_\_\_\_\_ GRADE: \_\_\_\_\_

CITY/STATE/ZIP: \_\_\_\_\_

PHONE: \_\_\_\_\_ (H,C,W?) EMAIL: \_\_\_\_\_

SPECIAL ACCESS OR DIETARY NEEDS \_\_\_\_\_

**Short Course Schedule**

	A	B	C	D
Session 1 9:00-10:15	Fossils of the Midwest <i>Julie Bartley</i>	Using Gigapan in the Classroom <i>Candace Kairies-Beatty &amp; Lee Beatty</i>	Glacial Geology of SE MN <i>Howard Hobbs</i>	Paleozoic Geology of SE MN <i>Jim Miller</i>
Session 2 10:30-11:45	Dinosaur Trackway <i>Lee Beatty</i>	Impact Rocks in MN <i>Jennifer Anderson &amp; Mark Jirsa</i>	Climate Change <i>Tim McAulay &amp; Valerie Gamble</i>	MN Roadside Geology of SE MN <i>Richard Ojakangas</i>
Session 3 1:30-2:45	Rock and Mineral ID <i>Jennifer Anderson</i>	Mineral Resource Stewardship <i>Jim Miller</i>	Construction Aggregate <i>Christina Morrison</i>	Groundwater Quality <i>Jim Lundy</i>
Session 4 3:00-4:15	Mineral Uses <i>Ken Reid</i>	Earth Resource Lesson Plan Sharing <i>Devon Brecke</i>	Mineland Reclamation in S MN <i>Paul Eger</i>	Impact of Karst on Agriculture <i>Calvin Alexander</i>

Enter the letter of your first and second preference of short courses for each session

Session 1: \_\_\_\_\_ / \_\_\_\_\_ Session 2: \_\_\_\_\_ / \_\_\_\_\_ Session 3: \_\_\_\_\_ / \_\_\_\_\_ Session 4: \_\_\_\_\_ / \_\_\_\_\_

I plan to attend the Tuesday evening dinner and will bring \_\_\_ children (\$6) + \_\_\_ adults (\$10)

I plan to stay at the New Center West dorms the following nights  Mon  Tues  Wed

I would like to share a suite with \_\_\_\_\_

**PAYMENT: Choose method of payment**

Enclosed is a check for \$40 (+ cost of additional Tues. guests) made out to "MMEW-UMD"

Please charge \$40(+) to my credit card: \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_

Type:  Visa  MC  AmEx  Other Exp: \_\_\_\_\_ / \_\_\_\_\_ Name on Card: \_\_\_\_\_

\* Be sure address above is same as listed for credit card

Mail Form and Payment to: Julie Heinz, MMEW Registrar  
 UMD-Natural Resources Research Institute  
 5013 Miller Trunk Hwy, Duluth, MN 55811

Or, Fax Form with Credit Info to: 218-720-4329 (form will be shredded after card is charged)