Welcome!

FALL 2019

GRAD STUDENT ORIENTATION

Michigan Technological University
Geological and Mining Engineering and Sciences
Work Site Safety – Bob Barron

Fall 2019 Safety Orientation
MTU GMES Department
Bob Barron Chemical Hygiene and Lab Safety Officer

Scope For Today:

Make each of you aware that laboratory-specific training may be required for working in particular labs. For example, if the lab you work in has no potential hazards, i.e., a computer lab, no additional training is required. If you are working in the groundwater lab with hazardous chemicals, then further training will be required.

This overview will be sufficient for teaching assistants covering most of the undergraduate class labs and research assistants who will be doing computer-related research.

Field research and field activities are the responsibility of the person(s) organizing the field trip.

SAFETY FIRST!
Responsible Positions for Training and Compliance:

- **Department Chair**: All Aspects (John Gierke)
- **Department Laboratory Manager and Safety/Chemical Hygiene Officer**: All Aspects (Robert Barron)
- **Administrative Associate**: Tracks safety training of faculty and staff (TBD)
- **Administrative Aide**: Tracks safety training of graduate students, facilitates orientation for new graduate students (Brittany Buschell)
- **Faculty and Staff** ensure their own undergraduate students working in research are trained in safety relevant to their duties and laboratory functions
- **Michigan Mine Safety & Health Program Director**: Provides training for safe mine operations (Matt Portfleet)
Common Hazards Encountered

Laboratories
Dow 615 Mineralogy and Petrology
Dillman 304 & 305 Physical, Historical and Environmental Geology
Dow 316, Rock and Mineral Preparation Lab (Bob Barron's domain)
    Rock crushing/cutting means potential eye injuries and cuts.
Dow 218, Environmental Geochemistry Lab (Gierke)
Dow 317, Fluid Inclusion Lab (Chad Deering)
Dow 618 Earth Magnetism Lab
Dow 622, Rock Physics Lab
Dillman 302, Wet Lab & Physical Geology Lab (Bob Barron)
    • Toxins when handling specimens; specifically heavy metals such as lead, mercury, arsenic. Essential to inform students to wash their hands after handling rocks and minerals.
    • Corrosives (acids & bases) (Dow 218)
    • Oxidizers (Dow 218)
    • Toxic Chemicals (Dow 218)
    • Best chance of broken glassware (Dow 218 & Dillman 302)
    • Mercury spills from broken thermometers (Dow 218)
    • High pressure cylinders (Dow Dow 109)
    • Class IV Laser (Dow 109)
<table>
<thead>
<tr>
<th>Dow* Lab No.</th>
<th>Activity/Title</th>
<th>Chemicals</th>
<th>Specialized</th>
<th>Training Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>623</td>
<td>MINE Enterprise</td>
<td>No</td>
<td>No</td>
<td>Basic + Lab Specific</td>
</tr>
<tr>
<td>622</td>
<td>Rock Physics</td>
<td>No</td>
<td>No</td>
<td>Basic + Lab Specific</td>
</tr>
<tr>
<td>618</td>
<td>Earth Magnetism</td>
<td>No</td>
<td>No</td>
<td>Basic</td>
</tr>
<tr>
<td>316</td>
<td>Rock/Mineral Prep</td>
<td>Epoxy, sulfamic acid, gas</td>
<td>Rock Saws, Drills</td>
<td>Basic + Lab Specific</td>
</tr>
<tr>
<td>317, 318</td>
<td>Petrology</td>
<td>Microscope Liquids</td>
<td>No</td>
<td>Basic Safety</td>
</tr>
<tr>
<td>313</td>
<td>Mineralogy</td>
<td>Microscope Liquids</td>
<td>No</td>
<td>Basic Safety</td>
</tr>
<tr>
<td>221</td>
<td>Natural Hazards</td>
<td>No</td>
<td>No</td>
<td>Basic Safety</td>
</tr>
<tr>
<td>220</td>
<td>Geophysics Equipment</td>
<td>No</td>
<td>Battery charging/storage</td>
<td>Only faculty/GTA access</td>
</tr>
<tr>
<td>218</td>
<td>Environmental Geochemistry</td>
<td>Yes</td>
<td>No</td>
<td>Basic + Lab Specific (incl. Chem. Hyg.)</td>
</tr>
<tr>
<td>211/212</td>
<td>Instrument Prep</td>
<td>No</td>
<td>No</td>
<td>Basic Safety</td>
</tr>
<tr>
<td>109</td>
<td>Earth &amp; Environmental Magnetism</td>
<td>Yes</td>
<td>Pressure-regulated Cylinders, Class IV Laser, Hot Furnaces</td>
<td>Basic + Lab Specific (incl. Chem. Hyg.)</td>
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<tr>
<td>*Dillman 302/303</td>
<td>Class Labs</td>
<td>No</td>
<td>No</td>
<td>Basic Safety</td>
</tr>
</tbody>
</table>
In the Field

- Vehicular accidents
- Eye Injuries
- Injuries to feet/legs/arms/hands (trips/falls/falling debris)
- Head Injuries (falling debris)

Solution: USE COMMON SENSE

The majority of the worker related accidents and injuries for our dept. occur during transit to and from field sites, i.e., vehicular accidents. Injuries in the field are probably the second most common. Safety practices that are used in the lab (e.g., safety glasses, proper clothing, etc.) are a must for any field activity which includes the use of geophysical instruments, rock hammers, and sampling equipment.
Specific Lab Safety Procedures

1. Protective eyewear (goggles or glasses) must be worn in the lab at all times. There are no exceptions.
2. Wear proper clothing. This means absolutely no sandals or open toed shoes. If you are wearing shorts or a skirt, then you must wear a lab coat.
3. Use proper practices (common sense)-no exposed wires, proper tools for the job, and keep work area clean.
4. Chemical Hygiene-proper storage, use, and disposal of chemicals.
5. Before using a chemical, check the MSDS (Material Safety Data Sheets) which should be located in a specially marked drawer in every lab.
6. Every chemical/container not in immediate possession must have a minimum of the worker's name/initiais, date, substance and concentration on the label.
7. Be careful about which chemicals are being stored adjacently—for example. Keep acids apart from each other (acids go in properly labeled storage area under the fume hood.

SAFETY & ALLIED PRODUCTS
In case of a mercury spill, isolate the area, put up a sign and notify Bob Barron or John Gierke.

1. Fume hoods are for work and not storage. Keep hood closed as much as possible to avoid having fumes come out. If you break something nasty inside hood, close it all the way and hit emergency button.

2. Only food or drink in designated labeled fridges.

3. Standard Operating Procedures (SOP) required for all experiments and routine tasks, such as changing cylinders.

4. Please put caps on gas cylinders before moving them and use the special cylinder cart to do so.

5. Emergency safety equipment (eye wash, shower, spill kit) is located in every lab.

6. If for any reason you need to ship any hazardous materials, please see John or Bob for proper labeling and packaging.

LASTLY:
Safety training is required for all employees of the University. Information will be provided via email if you fall under this category.
## Staying on Track (Overview)

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Semester 2</th>
<th>Intermediate Semesters</th>
<th>Final Semester(s)</th>
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</thead>
<tbody>
<tr>
<td>Disciplinary Courses</td>
<td>Courses</td>
<td>Course(s?), ACR</td>
<td>Attend Seminars &amp; Defenses</td>
</tr>
<tr>
<td>professional development courses</td>
<td>Identify Advisor,</td>
<td>Attend Seminars &amp;</td>
<td>Meet with Advisory Committee</td>
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<td></td>
<td>Begin to formulate an advisory</td>
<td>Defenses</td>
<td>WRITE</td>
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<td></td>
<td>committee</td>
<td></td>
<td>Pre-Defense Form</td>
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<tr>
<td>Attend Seminars &amp; Defenses</td>
<td>Attend Seminars &amp;</td>
<td></td>
<td>2 weeks prior to defense</td>
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<tr>
<td>Develop a Course Plan</td>
<td>Defenses</td>
<td></td>
<td>Defend (30-minute presentation)</td>
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<tr>
<td>Explore Research Topics (Lit. Rev.)</td>
<td>More background research on</td>
<td>Conduct research</td>
<td>Complete Revisions</td>
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<tr>
<td></td>
<td>potential topics and/or get started</td>
<td>WRITE</td>
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<tr>
<td></td>
<td>PhD Qualifying Exam</td>
<td>(methods, results to</td>
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<td></td>
<td></td>
<td>date)</td>
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<td>Write</td>
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<td>Degree Schedule</td>
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<td>(prior to final</td>
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</table>
Keeping on Track in Graduate School
John S. Gierke, Professor and Chair

Where do you find forms for keeping on track?
http://www.mtu.edu/gradschool/resources/current/
The “How do I complete my degree and what are the rules?” drop-down menu will provide you with specific links to the forms, degree requirements, policies/procedures, etc.

My Michigan Tech: https://mymichigantech.mtu.edu/
Forms:
Master’s:
• Advisor/Committee Form (due during 2\textsuperscript{nd} semester)
• Degree Schedule (semester prior to oral defense)
• Pre-Defense Form (at least two weeks prior to defense)
• Report on Oral Defense (taken care of by Brittany)

PhD:
• Advisor/Committee Form (due during 2\textsuperscript{nd} semester)
• Report on Written Comps (due before start of 2\textsuperscript{nd} year)
• Degree Schedule (due after written comps)
• Report on Oral Comps (due before start of 2\textsuperscript{nd} year)
• Pre-Defense Form (at least two weeks prior to defense)
• Report on Oral Defense (taken care of by Brittany)
How do I choose an advisor and committee?

The purpose of your advisory committee is to guide your research. Your advisor has the primary responsibility of supervising your research.

Your advisor should be someone who
1) has expertise and interest in your research
2) you get along with (you don’t need to be best buddies)

Make an appointment to visit with faculty you may want to work with and discuss your interests and ideas. You may also get to know faculty through courses or other interactions, which can help you decide on whom you will want to work with.

Be aware that many of us are advising a lot of students. Be sure you are the kind of person faculty want to advise!

Your other committee members should have a breadth of expertise so that they can be called upon to assist with different aspects of your work. Your advisor can help you select your committee (also try the Graduate Faculty Locator search tool on the graduate school website). One committee member must have his/her primary affiliation outside the GMES department.

Please try to engage your committee members early on.
When and How Should I Start My Thesis/Dissertation?
John S. Gierke

As soon as you begin reading background material, it is advantageous to start writing your report/thesis/dissertation. There are several purposes in doing so: being efficient in documenting previous work, providing a means of staying abreast of the literature, and practicing scientific writing. Summaries of previous work (literature) are excellent documents to provide your advisor, and even your advisory committee (see the last paragraph for convening an advisory committee), to keep them abreast of your research topic and get feedback on your writing style. The materials and methods section can also be started as soon as you begin planning your research. For many this is a mundane activity, so it is best for most people to do this a little at a time rather than attempt to remember so many details for a long time and write it all at once.
When you get started collecting data, there is a strong tendency for students to show his/her advisor a print out of a graph or map or table showing results as soon as possible. This is natural: you would like to show progress, results are exciting, you would like to get some positive feedback, etc. Do not be disappointed if your advisor appears to lack the same level enthusiasm when he/she starts to ask you a bunch of clarifying questions in an attempt to gain some level of confidence that the results are meaningful. This habit comes from years of experience of observing results “hot off the press” only to find out later that there was a mistake in the spreadsheet/instrument/whatever. If you plan to show your advisor results, it is best that whenever possible that it is accompanied with text summarizing how the data were collected/compiled/analyzed and what the results mean and, if necessary, what assumptions were made in your analysis. The exercise of writing some text to accompany the graph/map/table of results will also help you to review your own work and judge its reliability.
The normal process of starting a thesis is to begin with the Introduction section. This may take a day or two to write the Introduction as a first draft. Let’s say it takes a day. If you have waited until you got all your research is “done” prior to starting writing, then the next day you are likely to begin your day by first re-opening the Introduction and editing it, planning afterwards to move on to the next section. The next day you are likely to start the same way. This sequential process leads to a highly polished Introduction and slow progress on the rest. Moreover, by the time you write your conclusions, which will probably be done hastily the day you plan to hand out your report/thesis/dissertation to your committee, your introduction needs further work because of the changing scope/objectives that typically occurs during the course of the research and thesis/dissertation writing. Avoid wasting time and having to delete polished text, by writing your Introduction LAST, or at least write up only the previous-work sections. If you have been keeping up with the Materials and Methods section, then begin by writing your results and discussion section(s). Along the way think about revising your objectives so that they are consistent with your results and conclusions. Then write the Introduction and include the purpose of your work to provide the reader with the context and background of the work, methods, and analyses you use (the purpose is not as obvious to everyone else).
Ph.D. students are required to write and defend an original proposal for doctoral research. M.S. students are encouraged to do this in a more limited way. M.S. research and involvement of the thesis committee (see below) is more efficient and effective if a research plan (basic objectives, approach, and expected results) is prepared and presented to the committee sometime early on in the research activity. This is not a requirement but a suggestion.

You should begin thinking about who will serve on your committee right away. Select members by their breadth of knowledge and strengths in particular research aspects (computer, laboratory, field), how well you interact with him/her (typically through coursework), and by discussions with your advisor. Ideally you should have an advisory committee selected at the start of your research, surely at the time of some sort of proposal.
When Can I Defend My Thesis/Dissertation?
John S. Gierke

It is fine to try and schedule your time towards a defense: for example, "if I want to defend at a certain time, when must I have a draft to my advisor, committee, etc." But this is only an estimate, not a commitment. Difficult as it is to put your life on hold, you have to trust in the process and your advisor/committee's experience and let your advisor tell you when you are ready to defend.

Your advisor will try to be accommodating and reasonable with regards to the scheduling and timing of a defense, but it is a two-way street. Declaring an intention to defend because of: a pending job, housing, marriage, sickness, and so on are not adequate reasons, even though at the time they may seem much more important than satisfying a picky advisor. Your document quality is the top priority.

It is difficult for an advisor or committee to properly evaluate your document until it is in a complete state (i.e., a full draft; an approved outline, extended outline, chapters, etc., don't cut it). Do not count on us to completely understand what work you have done until then.
From the first draft to defense can easily take a month or longer; 2-3 months is typical. Count on this when scheduling. Do NOT assume that your first draft will be acceptable for defense. You also need to consider your advisor and committee have many other commitments, and need time to properly review your work.

The defense consists of both a public part (your presentation and general questions from the audience) and an examination part (where you defend your thesis/dissertation work by answering questions posed by the thesis/dissertation committee and other faculty who elect to participate). In addition, thesis committees may ask any question that pertains to your academic training in your discipline. You should not feel compelled to study for the potential to be asked some obscure question about a pedantic subject, but you should be aware that it is expected of you to be able to satisfactorily answer general questions in your field and specific topics related to your thesis.

**Thesis Content and Review**

We assume that every student realizes that they need to collect some body of data, present their data in an organized way, investigate related work, and analyze and discuss the implications of their work. Whether it is stated or not, these are required aspects of a Master's or Ph.D. thesis.
Every part of the thesis is important. That means science as well as grammar and spelling and technical presentation. Figure captions that are handwritten, or an incomplete reference section are not part of a professional document. Sloppy errors are just not acceptable. Make use of your fellow students to help check for errors, clarity as well as scientific reasoning. This will benefit them as well.

"Defendable" does not mean perfect. It means that you have everything organized so a collection of professionals could understand what you've done, how you've done it, and what you feel are the important aspects of your work. They may not agree, or need some additional clarification, but there should be no doubts about whether you understand the work you've done, and its basic applications and implications.

Don't be surprised/discouraged when it seems like your advisor is changing things approved earlier, or ask you to keep adding new work. Scientific writing is not always a straightforward process: sometime a certain part of work generates new ideas; sometimes what seems fine in one context is no longer adequate; sometimes we're wrong; sometimes we need to see if something works without knowing if it will.

The Defense
Your advisor should be your biggest advocate during the defense. Do not make the defense an event where we decide if your thesis is defendable. The extra time involved can be frustrating, but it is better to take more time to prepare then get disappointed later on.
The defense should be a time where YOU are the expert - you have done all the work and know the topic better than anyone else, including your advisor. Your committee's questions at this point will be ones they would ask a colleague, not a student. You will be teaching everyone something, and you should feel proud of your accomplishment.

**Afterwards**

Expect that you will be handed a list of corrections or additions to your thesis after the defense by each committee member. Virtually every published paper goes through the same rigorous process, and the author is expected to defend their ideas or accommodate those of the reviewers. If all has gone well prior to the defense, it is unlikely anything major will arise, but it is always possible. You should expect your committee to give a rigorous review, so that your thesis is a document you can be proud of and will make an important scientific contribution. The committee will help ensure that no embarrassing mistakes or scientific errors are published.

When you apply for jobs and we get calls for references, the typical questions are:
- how well can they communicate?
- can they finish a project?
- can they work independently?
A successful thesis pretty much covers these, and is strong evidence of your capabilities for a prospective employer.
Peer-Mentoring Program for GMES Graduate Students

The peer-mentoring program matches more senior graduate students, who volunteer to act as mentors, with incoming graduate students who request a peer mentor. While many mentoring activities already take place naturally for many graduate students, this formal program ensures that all incoming graduate students have the opportunity to tap into the social and academic networks early on in their graduate careers.

The goals for this program include, but are not limited to,
1) ensuring that incoming graduate students are fully integrated into the department quickly;
2) ensuring that incoming graduate students are fully integrated into the community and local culture; and
3) to reduce confusion about department and graduate school policies and expectations. In order to offer the best chance of success, we expect that mentors and protégés will meet at least two times a month during the protégé’s first semester. Each should keep a log of meeting times and topics for later review, although the content may be kept confidential.
More specifically, the peer mentor will assist the new student in any or all of the following ways:

- welcoming the new student,
- giving the student a tour of the department and related facilities,
- introducing the student to faculty, staff, and other graduate students,
- taking the student to events specifically designed for graduate students (including events hosted or sponsored by the University’s Graduate Student Council),
- providing insight about departmental and University expectations for students,
- helping the student understand departmental and university policies,
- assisting the student in developing an understanding of the “culture” of the local area,
- exposing the student to sources of support and resources for students, both on campus and in the community,
- helping the student to get established in their new community (e.g., finding housing, a bank, a physician, or childcare)

Please see Brittany Buschell, Graduate Program Coordinator, for more information about participating in this program.
ADMINISTRATIVE DETAILS
DEPARTMENT OF GEOLOGICAL AND MINING
ENGINEERING AND SCIENCES

Chair: John S. Gierke, Dow 631
Graduate Committee Chair: Luke Bowman
Administrative Associate: TBD
Administrative Aide: Brittany Buschell, Dow 630
Asst. Research Scientist: Carol Asiala, Dow 626
Computing: it-help@mtu.edu, Main Floor of Library

Listed below are guidelines to assist you in your initial orientation to MTU and the Department of Geological and Mining Engineering and Sciences. Some issues require your immediate attention; others are informational only. If you have any questions, see Kelly McLean or Brittany Buschell.

REGISTRATION: When you first arrive on campus, you should meet with your graduate advisor in order to set up your schedule of classes for fall semester. After meeting with your advisor, you should register for your courses if you haven’t done so already. This should be done through your banweb account (http://www.banweb.mtu.edu). Note: supported students not in the Peace Corps program should not enroll for any more than 9 credits. If you go over the 9 credits at any time (ie, dropping and adding courses after the closing date), you will be responsible for additional charges.
TUITION PAYMENT: After scheduling courses you will need to confirm your enrollment (pay your bill), and this must be done online (banweb.mtu.edu). Please Note: Michigan Tech has specific requirements with regard to paying your bill which can be found online (http://www.admin.mtu.edu/acct/students/aboutbill.html). **If there is any problem with your tuition bill, please see Brittany or Kelly.** All students (supported or not) must walk through the process of confirming registration. Failure to do on time will result in a late fee.

STUDENT FEES: All students (supported or not) must pay the student fees (~$120) each semester you are on campus. One of the fees is called the experience tech fee which allows free access to the ski hill, tennis courts, golf course, tech trails as well as tickets to some sporting and Rosza Center events. Detailed information can be found online (http://www.mtu.edu/student-affairs/interests/experience-tech/).

VEHICLE REGISTRATION - PARKING: Transportation Services (100 Administration Building) handles vehicle registration and paid parking for those students who commute to campus (http://www.mtu.edu/registrar/students/parking-vehicle/commuter/). In order to get into a paid parking lot, you will need your Tech Express Card (see below). If you are planning to live in one of the Residence Halls you would register your vehicle online or with Public Safety and Police Services.
TECH EXPRESS (ID) CARD: ID cards are issued after you have registered and paid tuition. They are obtained from the HuskyCard Service Center just inside the main entrance of the J.R. Van Pelt and John and Ruanne Opie Library.

OFFICE ASSIGNMENTS, KEYS and AFTER-HOURS BUILDING ACCESS (Idek): You have been assigned an office and a desk; office/lab keys and idek access have also been requested for you. Your keys are available for pickup at Public Safety which is located on MacInnes Drive. Idek access is on the 1st floor of the Dow Building, the campus side main doors, and the sixth floor entrance located on the street side.

MAIL SERVICES: Located in the department’s library, room 628. Mail is delivered to the department around 10:00 a.m., Monday - Friday, at which time outgoing mail is also picked up. Campus and stamped outgoing mail may be deposited in the bin that is located on the wall right inside 628. Telephone and other messages are relayed via email.

PAYROLL/PAYCHECKS: If hired by the department during your tenure, Brittany/Kelly will work with you to get you on payroll. Payday is every other Friday, and fellowship checks are cut the 24th of each month and mailed to the department. The University requests that you sign up for both non-payroll and payroll (if applicable) direct deposit; registration for both can be done online (banweb.mtu.edu). Note: Graduate Student Patent Rights forms must be on file with the Graduate School in order to receive a check.
COMPUTER ACCESS: Access to the geo/mining computers is authorized through the Central Engineering Computing Network. You will have access to all computer labs on campus. All communication from the department is through email; please check your “mtu” messages daily.

STUDENT COPIER and FAX MACHINE: The department has a copy/fax machine in room 629 and a fax machine in the main office. There is no charge for the black and white copy service but please check with the office staff if you have color or large copying to do. The copier can also send .pdf files to email addresses. Fax charges are the same as a long distance call. When you use the fax machine, you will have to fill out a sheet with your name, etc.

KITCHEN FACILITIES: The department is fortunate to have a small kitchen to allow you to store items in a refrigerator and use of a microwave and sink for your daily needs. It is each person’s responsibility to clean up after themselves, by doing their own dishes and cleaning out the sink area when finished.
Sites to familiarize yourself with:

Department’s Home Page
http://www.mtu.edu/geo/

MTU Registrar
http://www.mtu.edu/registrars

MTU Grad School
http://www.mtu.edu/gradschool

Accounts Payable/Travel Forms
http://www.admin.mtu.edu/acct/forms/travel/index.html
Specifically the following:
International Travel Request
Travel Voucher (pdf version)
Request for Advance of Funds

Michigan Tech Logos
http://www.mtu.edu/idstandards/visual/logos/
Office Assignments

Name - Office

Keys are available for pickup from Public Safety.