



5/10/2021 final

For this session, we explored the role of field work in our geology curriculum with the goals of both rethinking how we prepare our students for course-related field research and revising our language of risk for geology field trips at Mount Holyoke College.

Opportunities for Field Work

Required courses for the geology major at Mount Holyoke College are currently field-oriented. Some classes use our small-town campus itself for teaching and research. For example, a typical lab in our introductory geology classes involves measuring discharge of Stony Brook, the small stream that runs through campus (https://www.mtholyoke.edu/mwce/water_monitoring). Field work on campus is supported by the Campus Living Laboratory maintained by the college's Miller Worley Center for the Environment (<https://www.mtholyoke.edu/mwce/campus>). Other on-campus sites of teaching and student research are: Project Stream (<https://www.mtholyoke.edu/restoration-ecology/project-stream>) and the on-campus Restoration Ecology Project founded and overseen by a colleague in Environmental Studies; a few Jurassic Longmeadow shale outcrops exposed in the Stony Brook stream bed, and an experimental geothermal well drilled recently into the Mesozoic bedrock. Many intermediate- and upper-level geology classes require afternoon or longer field trips off-campus to explore landforms, deposits, and rocks within the state of Massachusetts. Also of note is our Death Valley Field Course (Geol 342, an elective for the major that we offer approximately every other year). Geol 342 requires flying to and camping in Death Valley National Park for the week of Spring Break. This course is popular with majors, and we are hoping to offer this opportunity in Spring 2022 (plans for the Spring 2021 version of this course fell through with covid). In addition, our students and faculty sometimes participate in Five College Geology field trips (see <https://www.fivecolleges.edu/geology/resources> although this website is not current with the most recent trips).

These opportunities for local field study, and longer trips further afield, constitute part of the identity of the geology department, and many of us got involved in geology as undergraduates because of similar opportunities. Until recently, we viewed field trips as an unambiguous benefit for students in the geology major and minor, and our safety concerns have mostly been related to ticks and traffic. Our emphasis on field study attracts some students to and possibly deters other students from the major. Presumably we are attracting students who have had positive "outdoorsy" experiences before they even begin coursework in our department. Our demographic study (Deliverable #3) suggests that geology majors are disproportionately white,

US-national students, and it is indeed these people who are most likely to feel entitled to explore roadside or rural off-campus settings.

We suspect that the field work component of our curriculum constitutes part of the metaphorical colander (cf. the leaky pipeline) that captures some students into the geology major and minor while allowing others to pass right through. Students who are people of color, gender non-conforming, queer-presenting, and/or new to the US are less likely to assume that they are safe in field settings, especially when they are far away from campus or camping overnight. In addition, students with disabilities or health concerns are sometimes hesitant to participate even in a three-hour-long field trip to unknown roadcuts and outcrops. Anecdotal feedback from majors and minors over the past two decades suggests that some students have been deterred from our upper-level geology courses because they do not feel safe or able to participate in off-campus field work, or because they do not see themselves as outdoorsy enough for geology. In short, we are increasingly aware that we need to diversify our concerns for field safety.

100-level Field Curriculum

We will continue to provide students with meaningful field research experiences at relatively safe and accessible outdoor sites on campus. Especially in introductory-level classes, we aim to gently introduce field research to students, some of whom have little to no experience with gathering field data and conducting research outdoors. The Campus Living Laboratory provides these on-campus opportunities for field teaching. We are interested in beginning to gather data on student interests, concerns, and learning associated with these outdoor experiences that occur relatively early in the curricular path. Specifically, we plan to use our 100-level courses as opportunities for the faculty to better understand how field experiences influence student learning and interest in geoscience research. One way to open up this conversation with students is to survey them about their previous outdoor experiences and to gather information about their expectations and concerns. Another way to support student development of a sense of belonging in the field is to provide reflective opportunities in these courses for students to consider their experiences, comfort, and sense of safety and access (including clothing and other equipment) during field research.

A More Holistic Introduction to Research

We also aspire to provide a more holistic picture of the modes of contemporary research in earth science, including lab science and data science. With our transition into an interdisciplinary major, we have an opportunity to rethink our curriculum to include different modes of experience (for example, field work and lab work) in a single class, along with reflective (and feedback) opportunities for students to think about what appeals to them and what would appeal more with some changes. One mode that we admire is the experiential field and lab learning experiences in the geoscience curriculum at nearby University of Massachusetts: (UMass) Geo131 Experiencing Geology, 231 Introductory Field Geology, 331 Advanced Field Geology (note that 331 requires weekend field trips). These classes are available to MHC students through the Five College Exchange, would count towards our MHC

geology major, and would allow students to stay local and access their existing financial and on-campus support systems during the academic year as they gain the experience that is usually associated with off-campus month-long undergraduate summer field camps (we do not require, or even push, field camp for the major). We will continue to advise our students that these UMass courses are excellent options if they are interested in exploring field and lab geoscience experiences through the larger research-oriented university nearby. Another mode that we are curious about is a community science approach to gathering field data on campus. In summary, our goal for the curriculum is a non-judgmental exposure to different ways of doing geoscience with multiple opportunities for reflection and engagement.

Off-campus Field Curriculum and Safety

Many of our classes at the 200- and 300-levels involve afternoon or weekend field trips off campus, and some faculty take students into the field for summer research projects. Another goal is to better support students during off-campus field study by expanding our approach to risk mitigation and assessment. Specifically we aim to provide opportunities for all of our students, faculty, and staff to consider how they can best support students with a wide range of identities as they head out into the field. We also aim to expand the way our faculty and staff prepare students for field work, improve safety for people with marginalized identities, and learn and teach basic bystander intervention strategies. Our work here will be guided by three short pieces:

- Anadu, Josh, Hendratta Ali, and Chris Jackson (2020), Ten steps to protect BIPOC scholars in the field. *Eos* (101) (<https://doi.org/10.1029/2020EO150525>)
- Demery, Amelia-Juliette Claire and Monique Avery Pipkin (January 2021), Safe fieldwork strategies for at-risk individuals, their supervisors and institutions. *Nature Ecology and Evolution* (5) pp. 5–9. (<https://doi.org/10.1038/s41559-020-01328-5>)
- Lawrence, Anya (2020), Six simple steps to make fieldwork more accessible and inclusive. *Geoscience for the Future #Ask a Geo* blog. (<https://geoscienceforthefuture.com/six-simple-steps-to-make-fieldwork-more-accessible-and-inclusive/>). This is a short blog post by an undergraduate author.

All three of these pieces were written by students who have successfully navigated some of the challenges of field work, and any one of these pieces is appropriate for use as a starter for discussions with students and faculty in preparation for the field.

We need to help students prepare for the field, being particularly sensitive to students who do not (yet) have much outdoor experience. Here are some recommendations for framing explicit conversations about expectations in the field well before departure (when students have enough time to prepare):

- Anonymously survey students about their concerns and needs, and complete this work well in advance of the first field trip in order to adequately address student concerns about: time for breaks, time for religious observance, social expectations, personal time/space, first aid and emergency resources, footwear and outerwear, and riding in the van.

- Be clear about toileting and bathroom breaks. For locations without public restrooms, share two different 10 minute long videos from Emily Graslie's "The Brain Scoop" on YouTube: 1) "Getting outside" (peeing outside starts a little before 5 minutes, then pooping) <https://www.youtube.com/watch?v=YXg55KU7mnQ>, and 2) "Menstruation and Field Work" <https://www.youtube.com/watch?v=jjFZ1nzijrl>
- Prepare all the students going out into the field to respect and support each other by talking about: what harassment looks like within a group; what harassment might look like from people that we encounter in the field, how we keep each other safe; how to avoid and address microaggressions; and how to use basic bystander intervention strategies (<https://www.ihollaback.org/bystander-resources/>).
- Make the materials and conversations outlined above available as documents and links that students can share with people in their support systems. Consolidate these documents and online resources so that they are consistently available in one place for both faculty and students, well in advance of field trips (on an exportable Moodle site; or a Google Drive; or the department website available). Make sure that these conversations are helpful to students who are communicating with skeptical parents.
- Before long or distant field trips, or trips that require overnight camping, consider practice trips - short camping or hiking experiences. Our department has a field gear collection, and students can practice setting up tents, sleeping in tents, cooking and cleaning up after a meal on camping stoves, and/or working outside in uncomfortable weather. The Mount Holyoke College Outing Club rents gear like sleeping bags (<https://www.mtholyoke.edu/org/outing/>). One benefit of practicing is that the field trip leaders will be able to assess student comfort and fitness levels and plan accordingly.
- Explore virtual field experiences. Some new programs show promise: https://nagt.org/nagt/teaching_resources/field/summer_2021_virtual_field_camp.html and <https://www.geo.arizona.edu/AccessibleEarth>. (For students who are excited about traditional field camp experiences, we are aware of these resources: <https://geology.com/field-camp.shtml> and <https://www.usgs.gov/science-support/osqi/youth-education-science/survey-geoscience-field-camps>.)

New Risk Waiver Language

The Five College Office of Risk Management (<https://www.fivecolleges.edu/riskmgmt>) provides us with an online waiver process for off-campus field trips and travel. Field trip leaders add language to these online waiver forms in order to communicate with students about expectations and safety on field trips. We have used the following language in our risk waiver form for about a decade:

Field trips are mandatory for completing the academic requirements of this course. These trips to various locations are described in the class syllabus and are subject to change, and participants are limited to students in the course or faculty guests. The college will provide transportation for the field trips by college van or other college or rented vehicle. While in the field, you should expect to be walking on rugged terrain, making observations and taking notes, discussing, and possibly collecting samples. Because these activities are outdoors, you should

expect sun, wind, and weather of all kinds. You should also anticipate insects, such as mosquitoes, ticks, and bees, and potentially dangerous plants, such as poison ivy. It is your responsibility to dress appropriately for outdoor activities: wear sturdy hiking shoes or boots that cover your whole foot; bring extra layers of clothing to be comfortable in all weather; bring protection from the sun and insects. It is also your responsibility to look out for your health: bring a full water bottle and any medicines that you might need; bring your ID and health insurance card; inform the instructor(s) regarding any health or medical conditions that you have that could limit your full involvement in field activities or could place you or the group at risk. Where necessary, be cautious of vehicular traffic. In populated areas, stay with your group and be aware of your surroundings. [If rock hammers are used, safety glasses will be available, but eye protection is your responsibility. Do not leave rock fragments or other debris on roads.]

We hope to add to this language and alter its tone. Here is a draft revision:

Field trips to various locations are part of this class and are described in the class syllabus. Some important information that will help ensure your comfort and success is below. The college will provide transportation for the field trips by college van or other college or rented vehicle, and participants are limited to students in the course or faculty guests. Before departure, the field trip leader will let you know what to expect from each field trip in terms of destinations, timing, and access to toilets and privacy. While in the field, please treat each other with patience, kindness, and respect. Expect to be walking on rugged terrain, making observations and taking notes, discussing, and possibly collecting samples. Because these activities are outdoors, expect sun, wind, weather of all kinds, insects (such as mosquitoes, ticks, and bees), and potentially dangerous plants (such as poison ivy). Dress appropriately: wear sturdy hiking shoes or boots that cover your whole foot; bring extra layers of clothing to stay warm; bring protection from the sun and insects. Look out for your health: bring a full water bottle and any medicines that you might need; bring your ID and health insurance card; inform the instructor(s) regarding any health or medical conditions that you have that could limit your full involvement in field activities or could place you or the group at risk. [Where necessary, be cautious of vehicular traffic. In populated areas, stay with your group and be aware of your surroundings. Use eye protection if rock hammers are used - safety glasses will be available. Do not leave rock fragments or other debris on roads.] Field trips are mandatory for completing the academic requirements of this course, although there may be alternate activities available. Student backgrounds vary in terms of experience in the outdoors- please ask the field trip leader for more information if you have concerns about the field experiences for this class.