

James Madison University Geology Field Course in Ireland

Geology and Environmental Science: GEOL 399

May 17 – June 22, 2017 6 credits

Faculty

Dr. Steven Whitmeyer, James Madison University, Field Course director. Specializing in structural geology, tectonics, and geospatial techniques. Weeks 2-4.

Dr. Stephen Leslie, James Madison University. Specializing in stratigraphy and paleontology. Weeks 1-2.

Dr. Yonathan Admassu, James Madison University. Specializing in engineering geology. Weeks 1-2.

Prof. Martin Feely, National University of Ireland, Galway. Specializing in petrology, mineralogy, and fluid inclusion geochemistry. Assorted days, weeks 2-4.

Dr. Margaret (Beth) McMillan, University of Arkansas, Little Rock. Specializing in landscape evolution and GIS. Weeks 3-4.

Dr. Steve Baedke, James Madison University. Specializing in aqueous geochemistry and hydrology. Weeks 5-6.

Dr. Shane McGary, James Madison University. Specializing in geophysics. Weeks 5-6.

Dr. Tiernan Henry, National University of Ireland, Galway. Specializing in hydrogeology. Assorted days, weeks 5-6.

Dr. John Haynes, James Madison University. Specializing in stratigraphy and petroleum geology. Week 6.

Dr. Chris Swezey, USGS. Specializing in stratigraphy and petroleum geology. Week 6.

Teaching Assistant: Michael Stone, Weeks 1-4

Course Description and Objectives

The Geology Field Course in Ireland is the James Madison University Department of Geology and Environmental Science capstone course for geoscience majors. After completing the field course, you will be qualified to work for an industry, government, or academic employer who needs you to travel to an isolated field area, assess the local bedrock and surficial geology, natural resources, natural hazards, environmental conditions, *etc.*, write a project report, draft a publishable map, compile a database, and return home safely. The main objective is for you to become confident at scientific observation and interpretation of geological problems in the field. You will learn to recognize and interpret a wide variety of rocks, structures, geomorphic, and hydrologic features. Methods of mapmaking, data recording, and report preparation are emphasized. Projects from one to five days' duration are conducted in regions where igneous, metamorphic, and sedimentary rocks, surficial deposits, and karst features are well-exposed.

Specific learning objectives include:

1. Develop competence in a variety of geologic field methods and techniques.
2. Demonstrate confidence with taking field measurements and collecting field data.
3. Develop habits of mind towards constructing geologic maps and supporting materials (cross-sections, stereonet, documentation) to high quality standards.
4. Develop and enhance the capacity to work independently "to do" geology with a professional skill set.

Prerequisites

Physical geology, historical geology, and mineralogy are required pre-requisites for the field course. In addition, stratigraphy/sedimentology, structural geology, and petrology are strongly recommended. This means that we expect you to have a working knowledge of common rocks and minerals, some idea of stress and strain and what they can do to rocks, and basic stratigraphic and sedimentologic concepts. But otherwise we presume that we are all starting from the same level. PLEASE ASK ONE OF THE INSTRUCTORS or the Teaching Assistant if you have forgotten/misunderstood/never heard of anything mentioned in class. Everyone forgets some of the things they once knew and it's much better for us to deal with these as we go rather than attempt to build a body of knowledge on shaky foundations.

Attendance is required at all lectures and on all field outings unless you have a legitimate (i.e. medical) reason! If you legitimately miss a class or field exercise, we will arrange for you to do make-up work. NOTE that you will be expected to prepare much of the written material, including final maps and reports, in the evenings after dinner. A typical day has us in field from 8am-5pm, and in the classroom from 7pm-9pm. We do not give you work to do on your days off, as the instructors will be busy grading your completed work.

IMPORTANT NOTE: The Ireland field course is strenuous! You will be expected to traverse rugged (boggy and/or mountainous) terrain several hours per day for 6 days per week. Come prepared!

Grading

Your final grade will be based on group projects and independent projects, which include field trip reports and notes, geologic maps and associated materials, presentations, and other evaluation products. All group projects will include a 10% "Participation and Professionalism" grade, which recognizes each individual's contribution to the success of the group's scientific endeavors. Points are gained by being an effective team-player, collaborating appropriately, being punctual, considerate, *etc.* Points are lost for hostile/harassing behavior, non- or grudging participation, tardiness, abandonment of responsibilities, *etc.* Geoscience professionals typically work in teams, and learning how to be effective in group situations is an important skill.

The weighting of projects will be roughly as follows below, but is subject to change depending on weather and/or field conditions. Projects are due the night of the last scheduled day for each project, unless otherwise announced by the faculty.

Lough Fee stratigraphy and mapping project	12%
Engineering geology project	10%
South Mayo digital mapping and tectonics project	10%
Glacial geology exercise	8%
Independent mapping project	20%
County Clare hydrology project	20%
Sedimentary Systems project	20%

Projects submitted after the deadline will receive a 25% deduction from the project score.

Academic and Personal Conduct

All students registered in GEOL 399 are students of James Madison University for the duration of the course, and are subject to the JMU Honor Code (<http://www.jmu.edu/honorcode/code.shtml>) and other JMU codes of conduct. We are required to report cases of suspected academic misconduct to the JMU Dean's Office. Penalties for violations of the Honor Code may include immediate suspension or expulsion from the course. Thus, if the conduct of any student is considered by the JMU Field Course faculty or staff to be particularly egregious, you may be removed from the course immediately.

Specific to this course: You should share data only when instructed to do so in collaborative (group) exercises. Otherwise, never read another student's written work nor copy their measurements, maps, or field notes. Do not alter or embellish your own field measurements after returning from your day in the field.

Drinking: The legal age for drinking alcohol in Ireland is 18. However, students are subject to JMU regulations FOR THE FULL DURATION OF THE COURSE (including the field trip to Northern Ireland). If you drink, you must do so maturely and in moderation, and you are not to disturb the peace of the dorms or the local community. Alcohol is NOT allowed at any of the lodging facilities for the field course: this includes the Petersburg Outdoor Education Centre (POEC), the condos in Doolin, and the hostel in Portstewart. Alcohol is NOT allowed in any vehicles used for the JMU field course. If you violate any of these regulations, cause a serious disturbance, become a danger to yourself or fellow students, or are unable to function effectively due to a hangover, you will be given one warning and then sent home after a second offense.

Smoking: Smoking is not permitted inside any of the lodging/buildings that you will be staying in. Nor is smoking permitted in the vehicles, or at the outcrop. Note that all public establishments (including pubs) are smoke-free in Ireland.

Drugs: Recreational drugs that are illegal in the U.S. are also illegal in Ireland. If arrested for a drug offense you will be expelled from the course, and you will be responsible for arranging your own legal representation and/or bail. The Gardai (police) are not required to read you Miranda rights and may detain and/or deport you if you are a non-EU citizen.

Sexual conduct: JMU defines sexual harassment as follows: Sexual harassment is unwanted sexual or gender based behavior that occurs when one person has formal or informal power over the other. Please read JMU policy 1340: <http://www.jmu.edu/JMUpolicy/policies/1340.shtml>. Sexual conduct is harassing when it is unsolicited and unwelcome or offensive. The fact that a person may accept the conduct does not mean that he or she welcomes it. Consensual sexual conduct must be kept private. "Overnight guests" are not permitted in dorms, even if roommates do not explicitly object. For the safety and security of all, anyone not directly involved with the camp MUST NOT be invited into the house, especially after dark, no matter how friendly they may be. If you ask a local person to walk you home, please explain that they must stop at the gate to Petersburg.

Peace and quiet: Petersburg Outdoor Education Center is a peaceful place. Please respect your fellow students. Loud noise must be curtailed between 11:00 pm and 7 am.

Camp life

Breakfast is self-served, and students make their own lunch sandwiches before departing. Meal set-up (breakfast & dinner) and clean up (dinner) is done by students on a room-based daily roster. Efficiency in the morning is essential, as we depart for the field sites or begin morning lectures on time. Early is on-time, on-time is late, and late is unacceptable. Note that the kitchen and pantry are off-limits between 11:00 pm and 7 am.

NOTE: Please notify us ASAP of any dietary restriction that you might have. We will try our best to accommodate them.

Personal laundry is done on a room-based weekly roster. You must provide your own detergent (powder only); typically each room buys a box of detergent which is shared among the roommates. Please do not break the handles of the front-loader washing machines, which are on a time-switch. Wait two minutes after turning power off and the doors will open without effort. Breaking a handle will cause a back-up in everyone's laundry schedule and thus make you very unpopular. Expect your wash to take well over 1 hour due to the environmentally friendly, water conserving nature of front-loaders. Also, washers in Ireland tend to run hotter than you are used to in the States, so be careful of colors bleeding. Dryers with a condenser must have the water tray changed after (sometimes during) each use. Blue jeans may not be tumble-dried – hang them out to dry. There is a weekly laundry (usually on Wednesdays) of bed linen and towels done by Petersburg staff. You need to bring your own towels and, if desired, top sheets. Comforters (duvets) and fitted sheets are provided with the rooms.

Email is available during evenings and free days only, via a wireless connection. Note that this is a rural, slow, and sometimes intermittent connection (sorry – best we can do in a small town in western Ireland). Phones are not available on location at Petersburg (except for emergency use). Many students purchase international phone cards in order to call home from pay phones or purchase pay-as-you-go cell phones in Ireland.

Many US cell phones will not work in Europe, which uses a different system (GSM). If you currently have AT&T or T-Mobile as your carrier, your phone likely will work in Ireland, but calls to the US may be very expensive. You should check in advance on international rates. You can also use Google Voice with your global-ready cell phone, or purchase a pay-as-you-go phone on your arrival. These have gotten quite inexpensive, and the “top-ups” can be purchased in most grocery stores or from dedicated vending machines. If you have had an account in good standing with your cell-phone provider for at least 6 months, you can ask them for an “unlock” code so that you can use a SIM card acquired locally.

On free days, you may sleep in and eat breakfast at your leisure. However, you are responsible for cleaning your own dishes. Please keep the kitchen and dining room clean after use. You may eat out provided you give advanced notice to the kitchen staff. Any day trips on free days are organized by students and need to be cleared with the faculty. The teaching staff can provide ground transportation, provided we have advanced notice and a (mostly) full van of students. Kayaking, caving, gorge walking, and some other activities can be arranged (by students) with advance consultation with Petersburg staff. There usually is an extra fee for students for activities directed by Petersburg staff.

References

General field geology texts: Compton: "Geology in the Field",
Coe: "Geological Field Techniques", or equivalent.

The following articles are helpful for general information about Ireland geology:

Clark et al., 2012: Pattern and timing of retreat of the last British-Irish Ice Sheet:
http://csmres.jmu.edu/Geollab/Whitmeyer/IrelandFieldCampReferences/IrelandGlaciation/Clark_et_al_2012.pdf

Feely et al., 2010: Long-lived granite-related molybdenite mineralization at Connemara, western Irish Caledonides:
http://csmres.jmu.edu/Geollab/Whitmeyer/IrelandFieldCampReferences/Connemara/Feely_et_al_2010.pdf

Friedrich & Hodges, 2013: Geological significance of $^{40}\text{Ar}/^{39}\text{Ar}$ mica dates across a mid-crustal continental plate margin, Connemara...:
http://csmres.jmu.edu/Geollab/Whitmeyer/IrelandFieldCampReferences/Connemara/Friedrich_Hodges_2016.pdf

Martinsen et al., 2017: Deep-water clastic systems in the Upper Carboniferous (Upper Mississippian-Lower Pennsylvanian) Shannon Basin, western Ireland:
http://csmres.jmu.edu/Geollab/Whitmeyer/IrelandFieldCampReferences/CountyClare/Martinsen_et_al_2017.pdf

McConnell et al., 2009: Detrital zircon provenance and Ordovician terrane amalgamation, western Ireland:
http://csmres.jmu.edu/Geollab/Whitmeyer/IrelandFieldCampReferences/SouthMayo/McConnell_et_al_2009.pdf

The webpage below has a more extensive list of articles relevant to the Ireland Field Course:

<http://csmres.jmu.edu/Geollab/Whitmeyer/IrelandReferences.html>

Ireland Field Course schedule
(draft - subject to change)

GEOL 399, Summer 2017

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
14-May	15-May	16-May	17-May	18-May	19-May	20-May
			Students Arrive	Lough Fee Stratigraphy exercise		Lough Fee Mapping
21-May	22-May	23-May	24-May	25-May	26-May	27-May
Lough Fee Mapping exercise		Free Day	Connemara Regional Field Trip		Engineering Geology exercise	
28-May	29-May	30-May	31-May	1-Jun	2-Jun	3-Jun
Eng. Geo. Exercise	Free Day	Digital Mapping exercise			Geoculture Field Tr	Glacial geology ex.
4-Jun	5-Jun	6-Jun	7-Jun	8-Jun	9-Jun	10-Jun
Glacial geology ex.	Free Day	Independent Mapping project				
11-Jun	12-Jun	13-Jun	14-Jun	15-Jun	16-Jun	17-Jun
Travel to Doolin	Clare Hydrology exercise				Free Day	Sed. Systems
18-Jun	19-Jun	20-Jun	21-Jun	22-Jun	23-Jun	24-Jun
Sedimentary Systems exercise				Optional Northern Ireland Trip or Students Depart SNN		
25-Jun	26-Jun	27-Jun	28-Jun	29-Jun	30-Jun	1-Jul
Students depart BFS						