

**BIO 485-001/630-001:
Special Topics: Paleontology
JUNE 2-13, 2016**

Course Instructor

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Credits

3 undergraduate credits

Description

Travel to Utah to participate in an ongoing research program involving excavation and study of dinosaur bones and footprints. Students will experience wilderness, acquire technical skills relating to excavation, survey, mapping, anatomical identification, biological interpretation, and geologic observation. Students will visit local National Parks to understand the geologic and evolutionary history of the region.



Course Notes

This Course satisfies the Gen Ed Learning Goal for Quantitative Reasoning. Expect this course to be somewhat physically challenging with hiking, tent camping, high temperatures, and working in the dirt with shovels and other tools.

Prerequisites and other Requirements

This course is appropriate for students with no prior paleontological experience. **BIO 111 (Biological Concepts and Methods I) and BIO 112 (Biological Concepts and Methods II) are prerequisites.** This course is open to non-majors. This course is **not** open to incoming freshman. A minimum GPA of 3.0 is required. A limited number of students will be accepted each season based on a comprehensive application and review process.

Objectives

This project will engage students in paleontological research into dinosaur paleobiology, paleoenvironments, and behavior. We will partner with the Burpee Museum of Natural History (where this course's professor is an Adjunct Curator) to excavate and study a dinosaur quarry and an extensive dinosaur footprint site, both located within 20 minutes' drive of the town of Hanksville, Utah. The students will gain knowledge of the geological history of the area in order to place the biological finds in an ecological and temporal context.

Required Readings (will be distributed in course packet prior to 5/23).

Grading

Participation 100

Exercises 100

Field Notebook 100

Final Research Paper (1 page) 100

Total Points Possible 400. The total number of points will be divided by 400 to give your percentage grade.

Percentage grades will be assigned as follows:

A/A+ = 94-100

A- = 90-93

B+ = 87-89

B = 84-86

B- = 80-83

C+ = 77-79

C = 74-76

C- = 70-73

D+ = 67-69

D = 64-66

D- = 60-63

F = >=59

Participation

Student participation will be assessed based on the following grading scale:

Work during excavations 25%

Seminar Discussion 25%

Chores 25%

Inquisitiveness and Engagement 25%

Total: 100%

For each participation category, point levels are determined as:

No participation: 0

Slight participation: 10

Moderate participation: 15

Good participation: 20

Excellent participation: 25

Work during Excavations

Field research includes the excavation of known sites and the search for new paleontological sites through prospecting. Your work ethic during our days at the quarry

or at the footprint site determine your grade for this category. Your objectives and the correct techniques will be very clearly outlined at the start of each day. We will also carry out rare survey/prospecting hikes that will also serve as forays to interesting geological features in the area.

Chores

Participation in camp chores is an integral part of life in a research base camp. Each week, teams are divided and assigned daily chores. These chores typically consist of preparing lunch and dinner, cleaning up, and packing and unpacking vehicles. The professor assists and observes the level of participation of each individual and notes the days and chores that individual students take part. The objective of this assignment is to build collegiality, teamwork skills, and to ensure the base camp functions are met through communal participation.

Engagement & Inquisitiveness

Students are strongly encouraged to ask questions and participate in conversations pertinent to the ongoing research objectives of the professor. We will be traveling to a relatively unexplored, unmapped part of the United States. Therefore your questions may be ones at the frontier of science, for which no one has an answer. Students that ask questions during and following lectures and engage in discussions with the other participants in the work are recognized as being particularly inquisitive.

Exercises

Students will complete a series of exercises involving mapping, paleobiological interpretation, geological inference, and fossil preparation. Some of the exercises will be due before the start of class. Each student must independently visit the 4th floor of the American Museum of Natural History (on the Upper West Side of Manhattan) before the start of class and complete one exercise based on the exhibits there. Details will be provided at our in-class meetings.

Field Notebook

Student assessments will also include field note-taking skills and landscape and mapping sketches as demonstrated by the submission of an organized field notebook documenting observations, excavations, and site mapping activities. You do not have to be a good artist to do well in this section, but you do have to be organized and detailed. Your artistic and observational skills will be improved through this section.

Final Research Paper

Students will have to submit a one-page, hand-written final research paper.

Attendance and Schedule

Students must be feeling well and in good general health upon departure for Utah. In the event of illness, the course instructor will make every effort to accommodate individual

needs. If a student is unable to participate in the field project due to illness, they will be extracted from the field and taken to a clinic or emergency room for treatment by health care professionals and may be sent home early if necessary. Adelphi University is not liable for early extractions arranged for non-emergency or emergency situations. A student who leaves the field early will be required to pay for the logistical expenses associated with an early departure. Students are not permitted to stay at camp alone due to intermittent illness. Because of the remote nature of this project, proof of health insurance coverage is required.

Instructional Technology and Learning Outcomes

Learning outcomes will include paleontological and geological excavation and mapping techniques as well as paleobiological and anatomical study. Students can anticipate learning both new and traditional research methodologies during this project. Laptops are NOT permitted; phones and tablets are permitted.

Landscape, Environment, Weather

The Hanksville, Utah region is defined by contrast: there are low, flat deserts, high mountain peaks that may be snow-capped even in summer, canyons, and badlands scattered across the area. Only a few highways cross the region, but many dirt roads provide access to remote geological and paleontological features.

Central Utah has variable summer weather conditions. Some years have mild summers, others have extreme heat. Average temperature in Utah in early summer has highs in the 80s and 90s and lows in the 50s and 60s. Weather patterns can change within minutes, and snow and hail are possible even in summer. Luckily all of the areas we will be working in are open and have visibility for many miles, so we will be able to see any storms approaching and seek shelter with plenty of time.

Background of Research

We will visit museums and National Parks to introduce students to the geographic, geologic, and evolutionary history of the area and to place our research in the proper context. The professor for the course is the primary investigator (= research director) for two field-based projects in the Hanksville, Utah region. The professor is also an Adjunct Curator with the Burpee Museum of Natural History (BMNH), which is a small museum outside of Chicago. We will be working with staff and volunteers from the BMNH for both of our projects.

Project 1: The first project involves excavation of a 150 million-year-old dinosaur quarry that is one of the largest single dinosaur deposits in the world (<https://blogburpee.wordpress.com/jurassic-journey/>). This quarry was one of National Geographic's "Top Ten Fossil Finds" of 2008, and since then, over 1000 dinosaur bones have been excavated from just a small part of the quarry. So far, nine dinosaur species from juveniles to old adults have been found, and geological data indicate that these animals were washed into a riverbed nearly simultaneously, over the course of just a few seasons. This means that the quarry gives us a "snapshot" of the ecosystem at the time, giving us insights into the animals' ecology and community structure. In addition to our excavation, we conduct histological analyses (studies of bone tissue) to observe the

health and growth of the dinosaurs in the quarry.

Project 2: The second project is newer, with excavation only starting last year (2014). This is a new dinosaur footprint site consisting of the footprints of juvenile and adult sauropod (long-necked) dinosaurs. These footprints were made 90 million years ago along the coast of what was then an extensive sea that covered most of North America. Over 300 footprints were unearthed in 2014, but only a fraction of the footprint-



bearing layer was uncovered. We will excavate more footprints and study track patterns to estimate body size and speed of each animal, as well as try to more finely identify what kind of sauropod dinosaur made these footprints. Previous to this discovery, it was thought that sauropods went extinct in North America around 100 million years ago, so this discovery is important in understanding the true evolutionary and biogeographic history of these animals. In addition to excavating the area that is known to have footprints, we will spend a day prospecting the same geologic layers for new footprints and other fossils.

Anticipated Results

Each student is guaranteed to find dinosaur bones at the quarry, and will learn how to properly excavate and preserve the bones for transport back to the lab. Part of the excitement of paleontological work is that once the science of finding a good site to dig is done, you can't predict what you will find. Students could find new species, young juveniles, or other finds new to science. At the footprint site and in prospecting in that area we will refine our understanding of these track-makers and their environment, and try to better understand the reality of the putative sauropod extinction around 100 million years ago.

Travel to and from Hanksville, Utah

Students are responsible for flying to Salt Lake City, Utah, on **June 2** and must arrive before the specified time (to be announced) when the course instructor will pick them up. There, the course director will pick up the students and we will drive to Hanksville, Utah (about a 4 hour drive). We will stop along the way at Brigham Young University's Museum of the Earth for a behind the scenes tour of a real fossil collection. Students should book flights in advance of the summer travel season (no later than the end of April). Do not book travel arrangements prior to acceptance into the program.

Field Logistics and Subsistence

The cost of travel from Salt Lake City to Hanksville and in the field and back to Salt Lake City is covered by your course fees, as are lunches and dinners. Breakfast will be at local diners and you should budget \$5-10 dollars per day for those. In the field, lunches and dinners will be prepared communally on a rotational basis while at camp. While this is a remote part of the world, there is a small grocery store and two convenience stores within walking distance. Vegetarian diets can be accommodated. Any food allergies must be disclosed prior to joining the project and individuals with allergies are solely responsible for understanding what they consume in meals. Always clean up after yourself and keep a clean base camp. Students will be able to subsist in the course without spending additional money.

While schedules may vary, a typical day will with a 7:00 am breakfast followed by a short drive to the quarry, track site, or other destination. We will begin the day with a lecture on our objectives and work until lunch. After lunch we will either continue work (if working at the quarry) or have another lecture and/or work on a lab exercise. Students will have one free day (day off) in the middle of the course to relax or visit one of the many local attractions. As always, the Utah weather varies, so our schedule will vary accordingly, i.e. plans may change at any time to accommodate Mother Nature.

Camp

We will be staying in tents in Hanksville, UT at a developed campsite with running water, bathrooms, and showers. Wi-Fi is provided for free by the campsite, but its quality is variable from day to day and it only really works near the bathroom/showers (i.e., don't expect to watch videos on your phone in your tent). Outlets are



available to charge phones but are in high demand. Phones can also be charged in the van during our daily drives. Laptops are prohibited, tablets and phones are permitted.

You will be sleeping in a tent for all of the nights of the course, luckily the campsite diligently maintains its grass and the ground is very comfortable. Nonetheless, a camping sleeping pad (air or foam) is essential. Nights can get cold even in the summer, so bring warm clothes, socks, a hat, and a good sleeping bag. Small fire pits are available for campfires at night, and without the light pollution we are used to in Long Island, the night sky is incredible.

We will be sharing the campsite with other travelers, including some other school groups. Students must be respectful of their different schedules by observing all quiet hours and regulations at the campsite.

Wildlife

We will be working in a wild area with little human development. Bears, bison, and mountain lions are apparently present but extremely rare in the area and we should

not encounter any of them. Birds are diverse and common in the area. You will see lizards often – these are harmless. Less common but more harmful are snakes – though we should not see any snakes in the area, this is a possibility and we will go over appropriate safety measures before going into the field.

What to Bring

The following items are REQUIRED:

- sleeping bag
- tent (if you know someone else taking the course, you are encouraged to share)
- sleeping pad (foam or air)
- small pillow
- backpack (should be big enough to carry a large watermelon)
- water bottles and/or camelback pack that hold at least 2 Liters total
- any medications you need
- cell phone charger (car charger if you have it)
- soap/toiletries (travel size works fine, also remember there are convenience stores in Hanksville).
- small towel for showering
- sturdy shoes for hiking – these do not have to be expensive hiking boots, but they have to be sturdy shoes (no sandals – you can bring sandals to wear around camp, but not during work).
- sunscreen
- bug repellent
- a hat
- sunglasses
- pencils and pens
- rain jacket or emergency poncho
- pair of work gloves
- coins for laundry
- headlamp

We can make a quick trip to a larger store on the way towards Hanksville for anything students have forgotten if necessary. You are limited to two bags: one large (checked) bag and one smaller (carry on) bag. Follow the size and weight restrictions of the airline. Feel free to contact Professor D’Emic with questions.

Clothing

Avoid bringing too many clothes. A few sets of each item (shirts, pants, etc.) should suffice, because there is laundry (coin washers and dryers) available at the campsite. Cotton socks are not ideal—cotton in general should be avoided. Shorts or pants are fine options. Avoid thick clothing for work because it will likely be hot in the afternoons. Dress in layers than can be added or removed throughout the day.

What Not to Bring

Do not bring firearms or large knives. A small Swiss-army style tool with a knife is

acceptable. Do not bring pets. Adelphi policy strictly regulates alcohol consumption on its campus and sponsored activities. Alcohol and illegal drugs are prohibited for the duration of the course. Laptops are NOT permitted.

Code of Conduct & Early Dismissals

Project investigators require students to be mature and respectful to others, and all participants must follow a basic camp etiquette to ensure the safety and an overall rewarding experience. These pertain primarily to food supplies, storage, cooking preparation, and waste disposal but also to behavior. Our few rules will be outlined in the beginning of our expedition and students are asked to actively participate in keeping the camp in order. Students are responsible for following all laws and regulations of the state of Utah during their entire stay. Alcohol and illicit drug consumption are prohibited for the duration of the project. As a restricted smoking campus, cigarette smoking is permitted only in specifically designated locations away from non-smoking areas. Irresponsible, disruptive, or potentially dangerous behavior in any regard will be grounds for immediate dismissal from the field school and/or failure in the course. Students must be in good health at the time of departure, as well as physically capable of participating in outdoor activities such as hiking, excavating, and associated tasks. This project is designed for independent discovery and personal experience so students, who need constant supervision, do not enjoy camping, animals, insects, outdoors, or dirt need not apply. Student dismissal from the project will be at the discretion of the principal investigators and the student or parents are solely responsible for arranging, supervising, and covering the expense of any students dismissed from the project early.

Program Changes

Understand that Adelphi reserves the right to make cancellations, substitutions or changes to the Program in its sole discretion, with or without notice, and Adelphi shall not be liable for any loss to Participants by reason of any such cancellation or change except in the event the entire program is canceled for any reason. A complete or partial tuition refund will be given in the event the course is canceled. However, Adelphi is not responsible for penalties assessed by air carriers that may result due to operational and/or itinerary changes, regardless of whether the Participant or Adelphi makes a flight arrangement. The Participant will pay any additional expense resulting from the above. Adelphi reserves the right to substitute hotels or accommodations or housing of a similar category at any time. If a student becomes detached from the Program group, fail to meet a departure vehicle, airplane, boat, or train, or become sick or injured, the student will at their own expense seek out, contact, and reach the Program group at its next available destination.

Guests

No guests or visitors are permitted for the duration of the field course.

Student Course Evaluations

During the last two weeks of the class, you will receive notification, via email and

eCampus, that the course evaluation is available for your input electronically. Availability will end at the start of the final examination period. Your feedback is valuable and I encourage you to respond. Please be assured that your responses are anonymous, the results will not be available to the instructor until after the end of the semester, and therefore after course grades have been submitted.

Moodle

Course materials for this lecture section will be posted on Moodle under [COURSE NUMBER]. Student tutorials for using MOODLE can be found at <http://fcpe.adelphi.edu/moodle/student/>

Equal Opportunity

This project is set in the Utah wilderness and thus will not be held in a facility compliant with the Americans with Disabilities Act. Students with disabilities, which may affect their ability to complete assignments or exams, are advised to contact the Office of Disability Support Services at dss@adelphi.edu or (516) 877-3145 as well as the instructors prior to applying for this program. For more visit <http://students.adelphi.edu/sa/dss>.

Honor Code Statement

Students enrolled in this course are expected to abide by the Adelphi University Honor Code. The purpose of the Honor Code is to protect the academic integrity of the University by encouraging consistent ethical behavior in assigned coursework by students. Following is excerpted from the Student Honor Code:

“The Code of Academic Honesty

The Code of Academic Honesty prohibits behavior that can broadly be described as lying, cheating, or stealing. Violations of the Code of Academic Honesty will include, but not be limited to, the following:

1. Fabricating data or citations
2. Collaborating in areas not approved by the professor
3. Unauthorized multiple submission of one’s own work
4. Sabotage of others' work, including library vandalism or manipulation
5. Plagiarism
6. The creation of unfair advantage
7. The facilitation of dishonesty
8. Tampering with or falsifying records
9. Cheating
10. Other forms of academic dishonesty”