

GY401W: Invertebrate paleontology

Spring 2024

Instructor

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Preferred contact: Canvas LMS messages

Office Hours: 10:00 am - 12:00 pm MW

1:00 - 3:00 pm T

Office: Life Science Building room 344

Correspondence policy: Within 24 hours on weekdays; 48 hours on weekends

Class information

Classroom: ELCSB 0119

Class Hours: 9:30 - 10:45 am TTh

Course description

How do fossils inform us about the history of life on Earth? In Paleontology (GY401W) we will work on linking change in common marine invertebrate fossils to change in environments and the mode and tempo of evolutionary change. Our focus will include a survey of modern paleontology research methods. Writing and conducting research will be an important component of the class.

Writing requirements

For this class to fulfill the (W) requirements of USA, you will be doing a semester-long research project in an area related to paleontology. To build your skills in discipline-specific writing, we will be doing smaller writing assignments throughout the semester. The final projects will be peer-reviewed, revised, and then submitted for final grading and assessment.

Important Dates

January 16th - Last day to drop without WD

April 7th - Last day to drop or withdraw

May ?? - Final exam at ??? See the [Academic Calendar](#) for more information.

Course goals

1. Observe, describe, classify, and communicate characteristics of major fossil invertebrates.
2. Develop hypotheses using fossil materials.
3. Communicate paleontological research in writing to a variety of audiences.
4. Read and summarize scientific papers focused on paleontology and related fields.

Class textbooks

There is no required textbook for this spring, however I recommend getting these books from the library or used versions to compliment the lectures. Without a required textbook I will also be assigning technical papers to read throughout the semester. We will discuss these and you will build your technical reading skills along with your writing skills.

For general Paleontology

Arnold I. Miller and Michael Foote, **Principles of Paleontology**, 5th edition or earlier edition, Pearson, ISBN: 9780321643186

Field focused rock ID

Dorrik A.V. Stow, **Sedimentary Rocks in the Field: A Colour Guide**, Manson Publishing Ltd, ISBN 10: 1874545693

Improve the mechanics of your writing

William Strunk JR. and E.B. White, **The Elements of Style**, ISBN: 1594200696

Improve the process of writing

Stephen B. Heard, **The Scientists Guide to Writing**, ISBN: 1594200696

Lectures and papers

Both lecture slides and papers will be available via Canvas. Slides will mostly be posted after lectures and assigned papers will be available in Canvas.

Table 1: Course Schedule.

| Date | Class | Week | Lecture |
|------------|-------|------|----------------------------------|
| 2024-01-10 | 1 | 1 | Introduction and project outline |
| 2024-01-15 | 2 | 2 | Fossilization |
| 2024-01-17 | 3 | 2 | Sampling the record |
| 2024-01-22 | 4 | 3 | Phanerozoic diversity |
| 2024-01-24 | 5 | 3 | Phanerozoic diversity |
| 2024-01-29 | 6 | 4 | Describing species |
| 2024-01-31 | 7 | 4 | Phylogenetics |
| 2024-02-05 | 8 | 5 | Species concepts |
| 2024-02-07 | 9 | 5 | Describing variability |
| 2024-02-12 | 10 | 6 | Growth and development |
| 2024-02-14 | 11 | 6 | Allometric growth and ontogeny |
| 2024-02-19 | 12 | 7 | Evolution and fossils |
| 2024-02-21 | 13 | 7 | Mode and tempo of evolution |
| 2024-02-26 | 14 | 8 | Midterm Review |
| 2024-02-28 | 15 | 8 | Midterm |
| 2024-03-11 | 16 | 10 | Functional morphology |
| 2024-03-13 | 17 | 10 | Theoretical morphology |
| 2024-03-18 | 18 | 11 | Global diversity |
| 2024-03-20 | 19 | 11 | Sampling diversity |
| 2024-03-25 | 20 | 12 | Mass extinctions |
| 2024-03-27 | 21 | 12 | Recognizing mass extinctions |
| 2024-04-01 | 22 | 13 | Cambrian explosion |
| 2024-04-03 | 23 | 13 | Causes of the explosion |
| 2024-04-08 | 24 | 14 | Late Permian Extinction |
| 2024-04-10 | 25 | 14 | Determining causes of PT |
| 2024-04-15 | 26 | 15 | End Cretaceous extinction |
| 2024-04-17 | 27 | 15 | Causes of the K-Pg |
| 2024-04-22 | 28 | 16 | Conservation paleobiology |
| 2024-04-24 | 29 | 16 | Modern extinction? |

Student conduct

Attendance policy

- Students who complete less than 50% of assignments/exams will be assigned a failing (F) grade.
- Review the 'Attendance and Absences Policy', in the Undergraduate and Graduate Bulletin for attendance and absences policy

Grading

Late policy

I will be grading assignments in batches to provide fair assessment to everyone. This means late work can be disruptive. The penalty for late work will be 20% a day after the first 24 hours late (0% possible after 5 days). If you have a reasonable excuse (illness, etc.) the late policy may be relaxed.

Extra credit

Extra credit may be made available throughout the semester at my discretion.

Assignments will be returned within a week of submission.

| Grade | Range |
|-------|----------|
| A | 90-100 % |
| B | 80-89 % |
| C | 70-79 % |
| D | 60-69 % |
| F | < 60 % |

Assignment weighting will follow:

| Item | Weight | Graded |
|------------------|--------|--------------------------------|
| Discussion posts | 25 % | Effort |
| Gots and notes | 10 % | Completion |
| Tophat questions | 15 % | Completion (80%)/Correct (20%) |
| Weekly Quizzes | 25 % | Correct |
| Midterm Exam | 10 % | Correct |
| Final Exam | 15 % | Correct |

Writing tasks

Scaffolding tasks

Scaffolding writing tasks assigned to give you some practice and general feedback to improve your writing. ### Abstract 1

First attempt at writing an abstract using the Nature paragraph template.

Figure Caption

Write the figure captions for several example figures using some literature examples. Learn to describe figures in text.

Abstract 2

Write the abstract for a second paper using the feedback from the first abstract to improve your process.

Peer Review

Peer review of preprint or publication using example template. The goal of this assignment is to focus on critiquing the logic put forward in the paper with suggestions for refining it.

Semester project

Semester project outline of writing products.

Project topic

Meeting with me or 2-6 sentence description of the research project you plan on doing this semester.

Project outline

Short outline of full project highlighting the hypotheses to test, data to collect, and impact of the project. This includes no figures but could include a small table for organizing hypotheses.

Project first draft

Full paper draft with figures. The important aspect of this submission is a first round of feedback for guiding conclusions and papers to read.

Project peer review

Review of a peer's paper with the goal of improving the work by increasing clarity, readability and communication.

Project final draft

Full, final project paper with figures, data, hypothesis, and interpretations. Focus is on clearly communicating the research work you have done.

Project presentation

Presentation of your research project with a focus on interpretation of data collected or processed by you.

Academic disruption policy

The University of South Alabama's policy regarding Academic Disruption is found in The Lowdown, the student handbook. <http://www.southalabama.edu/lowdown/academicdisruption.shtml>. Disruptive academic behavior is defined as individual or group conduct that interrupts or interferes with any educational activity or environment, infringes upon the rights and privileges of others, results in or threatens the destruction of property and/or is otherwise prejudicial to the maintenance of order in an academic environment. At all times students will be cordial, courteous and respectful of faculty members and fellow students. Cell phones, videotaping, and other electronic devices are not allowed; however, you may use a laptop for note taking. If your laptop is used for other purposes, the instructor holds the right to revoke laptop use.

Academic honesty

The University of South Alabama's policy regarding Student Academic Conduct Policy is found in The Lowdown <http://www.southalabama.edu/lowdown/academicconductpolicy.shtml>: The University of South Alabama is a community of scholars in which the ideals of freedom of inquiry, freedom of thought, freedom of expression, and freedom of the individual are sustained. The University is committed to supporting the exercise of any right guaranteed to individuals by the Constitution and the Code of Alabama and to educating students relative to their responsibilities.

Violation of academic conduct policy may result in receiving 0 credit for the affected exam/assignment.

Do not pass others work off as your own. This constitutes plagiarism and seriously undermines your education. Students may learn about the meaning of plagiarism and how to avoid it at the following link: <http://www.southalabama.edu/univlib/instruction/plagiarismforstudents.html>

Course and Teacher evaluation

Student input for the purpose of course improvement is taken very seriously and will potentially be done periodically. Please take the time to evaluate this course and the instructor, especially at the end of the semester. Evaluations will in no way affect your grade.

Safety

Field Safety

Transportation

Wear your seatbelts at all times while in moving vehicles. Do not distract the driver.

Location awareness

Be aware of potential dangers (animals, weather, etc) and avoid them. When in a group, please think about the safety of your peers.

Building Safety

Fire

Random fire safety drills may occur during the course of the term. You will be expected to evacuate the building and assemble at the designated location: outside by the northeast corner of the building (follow your instructor).

Tornado

Move away from external windows to the hallway in the basement, first, or second floor.

Active Shooter Incident

“Get Out” of the building as long as they can do so safely. Once you have exited the building and are at a safe location, “Call Out” to law enforcement using 911, USA Police at 460-6312, or press the Emergency button on your LiveSafe Mobile Safety App. If you can’t get out, “Shelter in Place” in a secure location that is away from windows and doors, preferably a location that can be locked and barricaded.

On writing

Revising written work

Nothing is perfect on the first draft. We all revise and rework our written creations for a variety of reasons. We may not communicate the point we want to get across to all readers. We may have forgotten or not known important pieces of information initially. The tone of the writing may be inappropriate for the audience. Word choice might obscure meaning. The only way we can make our writing better is by revising it based on constructive feedback from others or ourselves.

Genres of Science writing

Paper reviews

Critical but constructive critique of unpublished research papers. Informs the journal editor of how the work contributes to existing literature and provides guide to authors and the editor for improvement to the manuscript. Can be signed but often anonymous.

Descriptive Reports

Descriptive reports are often made for industry or geological surveys. These describe the composition and structure of rocks in an area. Sometimes they include estimations of resource potentials or environmental impacts of industry.

Research papers

These pieces of science writing typically test one or more closely related hypotheses in the context of existing scientific knowledge. Most have structure that is pre-defined including: abstract, introduction, methods, results, discussion, and conclusion. Figures are an integral part of most papers in the Geosciences and range from images of outcrops to abstracted summaries of observations to plots of measurements.

Conference abstracts

These are generally a step on the path to a full research publication where results, interpretations, and context are publicly presented for the first time.

Grant Applications

Scientific work is generally funded with public or private funds that are obtained by writing grants. Unlike research papers, grants must persuade reviewers that the research planned is important, can be done by the applicant, and can be achieved in the time frame of the funding request.

Science Communication

Scientists also write general summaries of their work for non-specialist audiences. These can be blog posts, or lesson plans that are shared for educators. Some folks also write books for general audiences describing the processes of science.

Common processes

For writing in the discipline, we focus on several specific questions to guide our composition: 1) Who is our audience? 2) What is the one or two sentence take-home point? 3) How quickly are we communicating the information?

Science writing, like all writing, is socially situated and carries with it the beliefs, values, and ideologies of the particular community and culture.

Tips and tricks for good writing

Use a citation management software to organize your papers and create bibliographies. My preference is [Zotero](#) because it is free, open source, and works across multiple operating systems.

Write and then revise. Ask for feedback from peers or wait until you have some distance from your writing and then revise.

Prompt yourself with questions that have short, concrete answers.

Campus resources

COVID policy

While on campus, students are required to follow all USA COVID-19 policies and practices. These policies can be found at <https://www.southalabama.edu/coronavirus/>. Be advised that policies may change during the semester, and students should check the University's Coronavirus Update page regularly.

There is also a student incentive program for getting vaccinated. Details about incentives can be found at <https://www.southalabama.edu/coronavirus/vaccineincentive/>

Writing center

Over the course of this semester, seek help at the Writing Center if you would like additional guidance and critique. You can access the Writing Center at [at their website](#). During graduate school, I found workshops and writing groups at the Writing Center on campus to be helpful in building my motivation and teaching me new strategies for writing efficiently.

Disabilities

In accordance with the Americans with Disabilities Act, students with bona fide disabilities will be afforded reasonable accommodations. The Office of Special Student Services (OSSS) will certify a disability and advise faculty members of reasonable accommodations. If you have a specific disability that qualifies you for academic accommodations, please notify the instructor/professor and provide certification from the Office of Special Student Services. OSSS is located at 5828 Old Shell Road at Jaguar Drive, (251-460-7212).

Food insecurity

If you are subject to food insecurity, JagPantry provides a food for students needing assistance. More information can be found [on their website](#)

Mental health

Being a university student is stressful and can negatively impact mental health. The University Counseling and Testing Center provides confidential, free counseling and crisis intervention services to eligible USA students and consultation and outreach services to members of the USA community. More information can be found [at their website](#).

Disaster plan

In case of Hurricane we will follow university recommendations and off-campus accommodations will be made. Our broad goals for the semester will continue but mode of delivery and content may change.

In case of a shift to remote learning, we will heavily rely on Canvas. We will have at least one synchronous lecture meeting that will be recorded and made available through Canvas. We will use digital options for rock samples and may also use [Rockd.org](https://rockd.org) for local outcrop locations if we are dispersed.

Final thoughts

This document is a roadmap for our semester. We learn about the Earth together and our individual experiences shape how we interpret and value data. Like all your classes, you will get out what you put into this course. Asking for help from one another and your instructors is important, don't be afraid to ask a question about something you don't know or if you want to check your knowledge about something you think you know.

If this document is updated, a copy will be supplied to you via Canvas and changes will be announced in class.