

# GY306(W): Sedimentology and Stratigraphy

Fall 2023

## Instructor

**Dr. Benjamin J. Linzmeier**

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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: LCSB 337

Class Hours: 12:20 - 1:10 pm MW

Lab room: LCSB 337

Lab Hours: 1:25 pm - 3:55 pm W

## Course description

Sediments house the record of climate at Earth's surface, influence climate through feedbacks, and house important resources. In this course you will learn how sediments are formed, moved, and preserved in the rock record. We will discuss the way that paleoenvironments are interpreted from observations of rocks on multiple scales. We will work to tie observations of sedimentary rocks to their interpretation in both time and space with a focus on the process of conducting stratigraphic research. We will spend time on various correlation and geochronological tools as well as stratigraphic interpretation frameworks. In addition, we will work together to improve your writing skills with a focus on a few of the genres of writing you may be expected to do as professional geologists.

## 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 sedimentology or stratigraphy. 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

August 23rd - Last day to drop without WD

October 10th - Midterm exam

October 28th - Last day to drop or withdraw. See the [Academic Calendar](#) for more information.  
December 5th 1:00 to 3:00 pm - Final Exam

## Course goals

1. Observe, describe, classify, and communicate about sediments and sedimentary rocks.
2. Develop a framework for building hypotheses about the distributions of sediments, sedimentary structures, and sedimentary environments.
3. Communicate sedimentary geology to audiences using different genres of writing.
4. Read and summarize scientific papers focused on sedimentary geology and related fields.

## Class textbooks

We will have two books that you should have access to for the class this semester. The book on writing below will be referenced and discussed often. We will also refer to the general sedimentology and stratigraphy book.

### *For writing*

Heard, Stephen B., **The Scientist's Guide to Writing, 2nd Edition: How to Write More Easily and Effectively throughout Your Scientific Career**. 2nd edition. Princeton: Princeton University Press, 2022.

### *For general Sedimentology and Stratigraphy*

Gary Nichols, **Sedimentology and Stratigraphy**, 2nd edition, Wiley-Blackwell, ISBN: 978-1-405-13592-4

## Optional books

### *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

### *Lectures and papers*

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

Table 1: Course Schedule.

Date	Week	Lecture	Lab
2022-08-17	1	Introduction	NO LAB
2022-08-22	2	Weathering	
2022-08-24	2	Erosion	Clastic Rocks
2022-08-29	3	Petrology	
2022-08-31	3	Carbonate Rocks	Carbonate Rocks
2022-09-07	4	Sedimentary Petrology	Petrology
2022-09-12	5	Science writing	
2022-09-14	5	Fluid Flow Dynamics	Wave flume
2022-09-19	6	Fluid Flow Dynamics	
2022-09-21	6	Gravity Flows	Turbidity
2022-09-26	7	Turbidity current	
2022-09-28	7	Sed. Structures	Sed. Structures
2022-10-03	8	Depositional Environment	
2022-10-05	8	Facies	Figure Making
2022-10-10	9	Midterm review	
2022-10-12	9	Midterm	NO LAB
2022-10-17	10	Rivers, Fans, and Plains	
2022-10-19	10	Rivers, Fans, and Plains	Stream table
2022-10-24	11	Lacustrine Environments	
2022-10-26	11	Eolian Environments	Maps
2022-10-31	12	Glacial Environments	
2022-11-02	12	Deltas 1	Terrestrial Dep. Env.
2022-11-07	13	Deltas 2	
2022-11-09	13	Shallow Marine Environment	NO LAB
2022-11-14	14	Marine Environment	
2022-11-16	14	Carbonate Environment	Dep. Env. Summary
2022-11-21	15	Diagenesis	
2022-11-28	16	Climate and Sedimentology	
2022-11-30	16	Proposal Presentations	Presentations

## 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. 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
Writing scaffolding	20 %
Semester Project	35 %
Labratory Assignments	25 %
Midterm Exam	10 %
Final Exam	10 %

## 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 Story Summary*

Short outline of proposed project that answers the following questions. (Based on S.B. Heard's book).

- 1) What is the central question?
- 2) Why is this question important?
- 3) What data (variables) are needed to answer this question?
- 4) What methods are used to get those data?
- 5) What analysis must be applied for the data to answer this question?
- 6) What results are likely?
- 7) How can results answer the question?
- 8) What does the answer tell us about the broader field?

#### *Proposal introduction draft*

Carefully explain the knowledge that lead you to develop this hypothesis and clearly outline the hypothesis to be tested. Consider these questions: - What do we know about the question you are interested in studying?

- What background knowledge do people need to assess if your hypothesis can be tested?
- How could auxiliary hypotheses be tested?
- What specific data are needed to test the hypothesis and is there a clear distinction between the hypothesis and alternatives?

### *Proposal methods draft*

This section outlines the required samples, locations, and data that must be collected to test your hypothesis. Consider these questions:

- Where will samples or field observations come from?
- Will data be collected in the field or in a lab?
- What instruments are needed to perform the measurements?
- What difficulties may come from the interpretations of the measurements?
- How many analyses are needed?

### *Proposal intellectual merit draft*

Create a section that specifically states how this proposal contributes to the field of research and is potentially transformative (although this is not as important for the assignment.) Consider the following questions:

- What will the potential next steps be beyond testing this hypothesis?
- How could the findings of this work have impacts on other areas of research?

### *Proposal broader impacts draft*

This section summarizes how your work will benefit society. This could be through applications of your discovery, training of individuals, or communication to people outside of the scientific community.

- Does the research have an economic or societal benefit?
- Does the work require the training of individuals?
- How would this work benefit the university or community?

### *Project first draft*

Full proposal draft with figures. The important aspect of this submission is assessment of the research plan and justification.

### *Project peer review*

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

### *Project final draft*

Full, final project proposal with figures, time line and clear plan for work. Focus is on clearly communicating to your peers that the work is worth doing and that you can do it.

### *Project presentation*

Presentation of a peer's research proposal with a focus on justifying funding their project. The goal is to convince the audience that the project can be done and will have an important impact on society.

## 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.

## **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.

## **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](#) 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.**