GEO 383T. Tectonic and Climatic Interactions in Foreland Basins

**Unique:** 28050

**Lectures:** 830-1000am MW, EPS 1.126

**Instructor:** Brian Horton: horton@jsg.utexas.edu; JGB 5.220AB

**Office Hours:** 1000-1150am Wed, or by appointment


**Course Description:** Integration of recent advances in the understanding of modern and ancient foreland basins, associated structural evolution of fold-thrust belts, quantitative basin modeling, regional and global climate change, and linkages among tectonics, erosion, climate and sedimentation.

**Prerequisite:** Graduate standing and consent of instructor.

**Grading Policy:** Evaluation is based on 3 class presentations (45%), class participation (10%), peer reviews (10%) and a final written report (10-15 p. double-spaced text) (20%) and affiliated final oral presentation (15%). Grades are assigned as follows: A (93-100); A- (90-93); B+ (87-90); B (84-87); B- (80-84); C+ (77-80); C (74-77); C- (70-74); D+ (67-70); D (64-67); D- (60-64); F (0-60).

**Course Content:**

1. Foreland basins and fold-thrust belts: significance, history, global perspective, hydrocarbons.
2. Fold-thrust belts: convergent and collisional tectonics, key examples, structural geometries.
3. Fold-thrust belts: fold/fault models, kinematics/timing, balanced cross sections, growth strata.
5. Fold-thrust belts: structural style, basement shortening.
6. Fold-thrust belts: inversion, deepwater fold-thrust systems.
7. Foreland basins: flexure, dynamic subsideance, basin modeling.
11. Foreland basins: isotopic techniques, thermochronology, paleoaltimetry.
12. Case studies: interactions of tectonics, climate, and foreland basin sedimentation.

**Course Schedule:**

Aug 21, 23 Mon, Wed: (1)
Aug 28, 30 Mon, Wed: (2)
Sep 6 Wed: (3)
Sep 11, 13 Mon, Wed: (4)
Sep 18, 20 Mon, Wed: (5)
Sep 25, 27 Mon, Wed: (6)
Oct 2, 4 Mon, Wed: (7)
Oct 9, 11 Mon, Wed: (8)
Oct 16-20 No class (GSA meeting)
Oct 23, 25    Mon, Wed: (9)
Oct 30, Nov 1  Mon, Wed: (10)
Nov 6, 8      Mon, Wed: (11)
Nov 13, 15    Mon, Wed: (12)
Nov 20-24     No class (Thanksgiving)
Nov 27, 29    Mon, Wed: final presentations (20-30 min each)
Dec 4, 6      Mon, Wed: final presentations (20-30 min each)

Guidelines for final written report:
You must first send me a brief email providing a rationale and context for your report, where you identify a specific topic, problem, debate, and/or overall scientific approach. Rather than a simplified or one-sided “book report” on 1-2 scientific articles, the final report should present a broader overview of the issue, with a perspective that develops arguments and approaches to better address the issue.

Report goals:
- identify an interesting topic or problem;
- provide an introduction and background information;
- outline the key issues, key relationships, etc;
- if there is a debate, outline the competing positions;
- discuss the implications;
- summarize the main conclusions.

To help motivate your project, consider several issues:
- What is the problem / debate?
- Why is the issue important?
- What are the implications?

Examples: you could identify
- a process (e.g., dynamic subsidence)
- a specific geographic region (e.g., Apennine foreland basin)
- a specific issue (e.g., foreland sedimentation in humid climates)
- a tectonic or geomorphic zone (e.g., forebulge)

Depending on your interests, your paper could place more emphasis on sedimentology, stratigraphy, geomorphology, climate, structure, tectonics, geophysics, geodynamics, etc.

Report format (suggested):
- TITLE
- NO Abstract
- INTRODUCTION
- BODY:
  - select several informative headings
- DISCUSSION / IMPLICATIONS
- CONCLUSIONS
- REFERENCES

Details:
- 1 inch margins (MS Word)
- 12 point font (Times New Roman, Calibri, Cambria)
- 8-10 pages double-spaced text
  - on additional pages (up to 10), at least 5 figures with personalized captions (i.e., figure captions must be modified from original source)
- at least 10 references.

Due date: 5pm Friday December 8
Additional Information:

UT recommends that faculty include the following information on their course syllabi:

- **Academic honesty.** [UT Honor Code and Code of Conduct](#)
  
  Students who violate University rules on academic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and/or dismissal from the University. Since such dishonesty harms the individual, all students, and the integrity of the University, policies on academic dishonesty will be strictly enforced. For further information please visit the Student Judicial Services Web site: [Student Judicial Services](#). The penalty for academic dishonesty will be a course grade of F and a referral of the case to the [Dean of Students](#). Further penalties, including suspension or expulsion from the university may be imposed by that office.

- **Religious holidays.** By UT Austin policy, you must notify class instructors of your pending absence at least 14 days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.

- **Disabilities.** Students with disabilities may request an official letter outlining authorized accommodations from the Division of Diversity and Community Engagement, Services for Students with Disabilities, you can call 512-471-6259 or visit their website. You must provide this letter to class instructors by the 12th class day. Project and assignments deadlines will not be extended for special-needs students.

- **Emergency evacuation.** [Office of Campus Safety and Security](#). Occupants of buildings are required to evacuate when a fire alarm is activated. Alarm activation or announcement requires exiting and assembling outside. Familiarize yourself with all exit doors of each classroom and building you may occupy. Remember that the nearest exit door may not be the one you used when entering the building. Students requiring assistance in evacuation shall inform their instructor in writing during the first week of class. In the event of an evacuation, follow the instruction of class instructors. Do not re-enter a building unless given instructions by the following: Austin Fire Department, UT Police Department, or Fire Prevention Services office.

- **Q drop Policy.** The State of Texas has enacted a law that limits the number of course drops for academic reasons to six. As stated in Senate Bill 1231: "Beginning with the fall 2007 academic term, an institution of higher education may not permit an undergraduate student a total of more than six dropped courses, including any course a transfer student has dropped at another institution of higher education, unless the student shows good cause for dropping more than that number." If you want to drop a class after the 12th class day, you'll need to execute a Q drop before the Q-drop deadline, which typically occurs near the middle of the semester. Under Texas law, you are only allowed six Q drops while you are in college at any public Texas institution. Visit the [website](#) for more information.

- **Behavior Concerns Advice Line (BCAL).** 512-232-5050. If you are worried about someone who is acting differently, you may use BCAL to discuss your concerns about another individual's behavior. This service is provided through the Office of the Dean of Students, the Counseling & Mental Health Center, Employee Assistance Program, and UT Police Department. [https://deanofstudents.utexas.edu/emergency/behaviorconcerns.php](https://deanofstudents.utexas.edu/emergency/behaviorconcerns.php)