

# GEOL 441/541: GREAT EVENTS IN EARTH HISTORY

## Spring 2023 Syllabus

**Professor:** Dr. Geoff Gilleaudeau

**Meeting Time:** Mondays 10:30 to 1:10 pm

**Meeting Place:** Exploratory Hall Room 1005

**Professor's Office:** Exploratory Hall Room 3452

**Office Hours:** Thursdays 11am to 12pm or by appointment

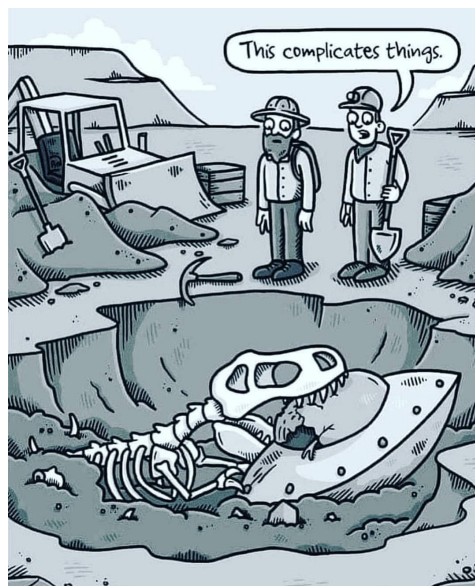
**Professor's Email:** [ggilleau@gmu.edu](mailto:ggilleau@gmu.edu)

### Course Goals:

The story of Earth is one of the most gripping and compelling tales ever told. Through 4.5 billion tumultuous years, Earth has undergone monumental changes from the formation of the moon, early magma oceans and meteorite bombardment, the origin of life, the buildup of oxygen, great ice ages, the explosion of multicellular organisms, great mass extinction events, and ultimately, human evolution and anthropogenic change. In this course, each week we will have an in-depth, student-led discussion on one “Great Event” that helped shape the course of Earth history. In addition to providing perspective on the fascinating history of our planet, this course is also designed to teach scientific literacy. That means being able to read and interpret the primary scientific literature, generate informed lines of discussion, present ideas clearly, and ultimately, write an NSF-style research proposal and make a conference-style scientific presentation (for graduate students) on the “Great Event” of your choice. This course is meant to be fun, intellectually-stimulating, and highly participatory!

*“Thus, although we are mere sojourners on the surface of the planet, chained to a mere point in space, enduring but for a moment of time, the human mind is not only enabled to number worlds beyond the unassisted ken of mortal eye, but to trace the events of indefinite ages before the creation of our race, and is not even withheld from penetrating into the dark secrets of the ocean, or the solid globe.”*

— Charles Lyell



## **Grading Scheme:**

### **GEOL 441:**

20%: Presentations and leading of discussions

45%: Weekly write-ups

35%: Research proposal (10% for first draft, 10% for peer review, and 15% for final proposal)

### **GEOL 541:**

20%: Presentations and leading of discussions

40%: Weekly write-ups

30%: Research proposal (5% for first draft, 10% for peer review, and 15% for final proposal)

10%: Final presentation

Each week for each “Great Event”, 3 scientific papers will be assigned for discussion. Each student is expected to thoroughly read and be prepared to discuss each paper that is assigned. **I strongly recommend that you read the papers in chronological order based on when they were written, oldest first to youngest last.** There will be a total of 12 discussion weeks (12 “Great Events”). Each week, the discussion will be led by students in groups of 3. For each week, you will either be leading the discussion (each student will lead the discussion twice throughout the semester) or be responsible for a weekly write-up. If you are not presenting, parts of the write-up must be completed before class, with other parts completed after class. See below and the template document on Blackboard.

### **Leading of discussions**

Each student will end up presenting and leading the discussion twice throughout the course of the semester (10% of your grade for each presentation/discussion lead). The discussion-leading groups are required to start with a presentation on each paper (separate instructions can be found on Blackboard) but are encouraged to be creative in the use of the rest of the class time. Some ideas for taking the lead include (but are not limited to):

- Preparing a list of discussion questions for each paper
- Designing a classroom activity that illustrates key concepts/linkages
- Being prepared to answer and discuss the discussion questions that your classmates create for each paper
- Being prepared to define terms that are unfamiliar to the class
- Promoting participation and a stress-free idea-sharing environment

Geoff will always be prepared to jump in if the discussion stalls or additional definitions are needed. After the discussion, the group that leads will hand in whatever materials they used (i.e., their PowerPoint, list of discussion questions, and other materials). A grading rubric for the presentations and discussion leads is provided in a separate document on Blackboard.

## **Weekly write-ups**

For the 10 weeks that you are NOT leading the discussion, each student is required to turn in a write-up summarizing the broad concepts covered in the papers and in the class discussion. Parts of this write-up must be completed before the class discussion, with others completed after the class discussion. A specific template for these write-ups is provided on Blackboard.

These will be due via Blackboard by 11:59pm on the Sunday night following the Monday discussion (the night before the next class). 10% will be taken off for each day late. Your lowest 2 grades of these 10 will be dropped and your grade for this portion of the course will consist of your best 8 write-ups.

## **Research proposal on the “Great Event” of your choice**

Each student will choose one “Great Event” on which to write a 10-page (single-spaced including figures) National Science Foundation (NSF)-style research proposal. In this proposal, students will be required to investigate the scientific literature beyond what has been assigned in class and come up with a research plan to advance our knowledge on the “Great Event” of your choice. A paragraph describing your desired research proposal topic will be due on 2/24/25. A first draft will be turned in on 4/4/25. Your draft will then be reviewed by both Geoff and one of your peers in the class. Your peer review of a classmate’s paper will then be due on 4/18/25. You will then have an opportunity to consider the comments and make revisions before turning in your final research proposal by 5/11/25.

Thorough rubrics, instructions, and suggestions for your research proposal and peer review will be provided in a separate document on Blackboard.

## **Final presentation (only for graduate students enrolled in GEOL 541)**

On the final week of class, each graduate student will give a conference-style 15-minute presentation on the “Great Event” that they chose for their research proposal. Rubrics and suggestions will be provided in a separate document on Blackboard.

## **Final Grading Scale:**

97 to 100% = A+	73 to 77% = C
93 to 97% = A	70 to 73% = C–
90 to 93% = A–	60 to 70% = D
87 to 90% = B+	Less than 60% = F
83 to 87% = B	
80 to 83% = B–	
77 to 80% = C+	

## **Fun popular science readings that may help (not required):**

*The Story of Earth: The First 4.5 Billion Years, From Stardust to Living Planet*  
Book by Robert M. Hazen

*A Brief History of Earth: Four Billion Years in Eight Chapters*  
Book by Andrew H. Knoll

**Semester Schedule:**

Week 1 (1/27/25): Introductions, syllabus, and initial discussion

Week 2 (2/3/25): **The formation of the moon and the Giant Impact Hypothesis** (discussion led by students A, B, and K)

Week 3 (2/10/25): **The origin of life and the oldest evidence of life on Earth** (discussion led by students D, E, and I)

Week 4 (2/17/25): **The origin of plate tectonics** (discussion led by students C, F, and N)

Week 5 (2/24/25): **Earth, life, and environment during the so-called “Boring Billion”** (discussion led by students H, M, and Q)

\*\*\*A paragraph describing your research proposal topic will be due via Blackboard by 11:59pm on 2/24/25

Week 6 (3/3/25): **The Neoproterozoic Snowball Earth events and biogeochemical change** (discussion led by students G, L, and R)

Week 7 (3/10/23): Spring Break (No Class)

Week 8 (3/17/25): **The Cambrian Explosion of animals** (discussion led by students O, P, and Q)

Week 9 (3/24/25): **The Great Ordovician Biodiversification Event** (discussion led by students C, E, and R)

Week 10 (3/31/25): **Devonian land plants, tetrapod evolution, and the transition to life on land** (discussion led by students B, D, and H)

\*\*\*First draft of research proposal due via Blackboard by 11:59pm on 4/4/25. Each proposal will be distributed to a classmate for peer review soon after this. 10% will be taken off for each day late.

Week 11 (4/7/25): **The Permo-Triassic mass extinction and Siberian Traps eruptions** (discussion led by students A, G, and I)

Week 12 (4/14/25): **The Triassic-Jurassic mass extinction, CAMP volcanism, and dinosaur evolution** (discussion led by students F, M, and Q)

\*\*\*Peer review of your classmate’s research proposal is due via Blackboard by 11:59pm on 4/18/25.

Week 13 (4/21/25): **The Cretaceous evolution of flowering plants** (discussion led by students K, L, and O)

Week 14 (4/28/25): **Extinction of the Pleistocene megafauna and anthropogenic change** (discussion led by students J, N, and P)

Week 15 (5/5/25): Final proposal presentations for graduate students; wrap-up discussion

\*\*\*Final research proposal due via Blackboard by 11:59pm on **5/11/24**.

**Student A:** Owen Alfaro

**Student B:** Jacob Anderson

**Student C:** Sydnee Baldwin

**Student D:** Shelby Currie

**Student E:** Sophia Damico

**Student F:** Camille Do

**Student G:** Robert Fonderson

**Student H:** Piero Giuffra

**Student I:** Elizabeth Greenheck

**Student J:** Parker Hagerty

**Student K:** Claire Hoover

**Student L:** Paige Klug

**Student M:** Bobbie Marcoux

**Student N:** Elena Taylor

**Student O:** Zachary Tredwell

**Student P:** Ryan Wilkerson

**Student Q:** Jackson Williams

**Student R:** Joseph Conaty

### **Academic Integrity**

*The integrity of the University community is affected by the individual choices made by each of us. Mason has an Honor Code with clear guidelines regarding academic integrity. Three fundamental and rather simple principles to follow at all times are that: (1) all work submitted be your own; (2) when using the work or ideas of others, including fellow students, give full credit through accurate citations; and (3) if you are uncertain about the ground rules on a particular assignment, ask for clarification. No grade is important enough to justify academic misconduct. Plagiarism means using the exact words, opinions, or factual information from another person without giving the person credit. If you have any doubts about what constitutes plagiarism, please see me.*

### **Disability Accommodations**

*Disability Services at George Mason University is committed to providing equitable access to learning opportunities for all students by upholding the laws that ensure equal treatment of people with disabilities. If you are seeking accommodations for this class, please first visit <http://ds.gmu.edu/> for detailed information about the Disability Services registration process.*

*Then please discuss your approved accommodations with me. Disability Services is located in Student Union Building I (SUB I), Suite 2500. Email: ods@gmu.edu | Phone: (703) 993-2474*

### **Privacy**

*Students must use their Mason email account to receive important University information, including communications related to this class. I will not respond to messages sent from or send messages to a non-Mason email address.*

### **Policy on Chat GPT or other AI tools**

Chat GPT or other AI tools can be used to get started on researching a topic or gathering sources used in the assignments for this class. However, you **CANNOT turn in text for any assignment in this class that was written directly by Chat GPT or another AI tool.** This also qualifies for presentations. **You must read the articles assigned in this class yourself and you cannot use materials directly generated by Chat GPT or another AI tool in your PowerPoint presentation.** Any text or presentation material written by an AI tool will be given an automatic zero and be reported to the university academic integrity office. Handing in AI-written work is cheating.