

## Untold Stories in Geosciences: *Social and Historical Contexts of the Development of Geosciences as a Discipline*

*This is a syllabus developed by Jeemin H. Rhim for a First-Year Seminar (EARS07) that was offered at Dartmouth College during Winter 2022. It is meant to serve as an example template, and some details may not be applicable to other courses or teaching environments. For a more extensive reading list, please see the accompanying document (UntoldStoriesGeosci\_ReadingList.pdf).*

### **COURSE DESCRIPTION**

The foundations of geology as an academic discipline were developed against the backdrop of imperial colonialism and Westward Expansion in the United States. However, the social and historical contexts of these scientific endeavors are often missing in current geoscience curricula. The skewed representations of these endeavors perpetuate the practices of exclusion and exploitation in geosciences. This class will investigate 1) how a set of founding principles in geosciences was established on the basis of scientific racism and colonialism; 2) how the history of racism and colonialism manifests in geoscience practices and communities; and 3) paths forward to build an anti-racist, diverse and inclusive geoscience community. Readings in this course will largely focus on research articles that communicate the social and historical aspects of practices in (geo)sciences as well as commentaries that assess the current status of geoscience disciplines and recommendations for promoting anti-racist practices. Students will conduct their own research on specific individuals or concepts in geosciences and develop a narrative around the “untold stories” around the topics by writing essays for a non-specialist audience. The reading, research and writing skills that students practice in this class can be applied to raise awareness for historical literacy in any academic field including (but not limited to) science, technology, engineering, mathematics, and social sciences.

### **COURSE STRUCTURE & LEARNING OBJECTIVES**

This class will meet three days per week (excluding X-hours and office hours), where we spend the majority of meeting time on critically engaging with the readings through discussions and peer-review exchanges. This course aims to help students be able to:

- articulate social, political and historical aspects of the development of scientific concepts;
- research “untold stories” about a person, research expedition or conceptual development in geosciences using primary and secondary sources;
- develop a narrative to reveal the “untold stories” to academic and public audiences;
- craft an argument for the significance and implications of the developed narrative; and
- critically review peers’ and their own writing.

In addition, general learning outcomes expected in all First-Year Seminars can be found here: <https://writing-speech.dartmouth.edu/curriculum/writing-courses/first-year-seminars/first-year-seminar-course-outcomes>

## **EVALUATION AND GRADING**

Reading Questions & Response	25%
Class Participation	10%
Writing Workshops & Peer-review	5%
Annotated Bibliography for Paper 1	5%
Paper 1 (1,200–1,500 words)	15%
Annotated Bibliography for Paper 2	5%
Paper 2 (1,200–1,500 words)	15%
Annotated Bibliography for Final Paper	5%
Final Paper (1,500–2,000 words)	15%

Grading Scale: A (94–100), A<sup>-</sup> (90–93), B<sup>+</sup> (87–89), B (84–86), B<sup>-</sup> (80–83), C<sup>+</sup> (77–79), C (74–76), C<sup>-</sup> (70–73), D<sup>+</sup> (67–69), D (64–66), D<sup>-</sup> (60–63), E (<60)

## **ATTENDANCE POLICY & PARTICIPATION**

Attendance at all class sessions is mandatory. In addition, the quality of the class will largely depend on each student's participation in and contribution to thoughtful discussions during class and on Canvas. Accordingly, all students are expected to submit their Canvas response on time and show up to class prepared for active participation in discussions or other in-class activities. Attendance and participation together count towards 10% of a student's final grade. Every unexcused absence after two will lower their final grade by 1%, and three tardies will be considered as one full unexcused absence. Attendance to X-hours is highly encouraged but not mandatory unless the course schedule notes "Required X-hour."

## **ZOOM RECORDING CONSENT**

Some class meetings will be held on Zoom. Some in-person meetings may also partially involve Zoom communication (e.g., to accommodate students in isolation due to COVID-19 but able to participate remotely). Some or all parts of these Zoom meetings may be recorded, and all students participating during the recording will consent to the following:

- I affirm my understanding that class meetings involving students and the instructor may be recorded within the digital platform used to offer remote instruction for this course (e.g., Zoom)
- I further affirm that the instructor owns the copyright to their instructional materials, of which these recordings constitute a part, and distribution of any of these recordings in whole or in part without prior written consent of the instructor may be subject to discipline by Dartmouth up to and including expulsion
- I authorize Dartmouth and anyone acting on behalf of Dartmouth to record my participation and appearance in any medium, and to use my name, likeness, and voice in connection with such recording
- I authorize Dartmouth and anyone acting on behalf of Dartmouth to use, reproduce, or distribute such recording without restrictions or limitation for any educational purpose deemed appropriate by Dartmouth and anyone acting on behalf of Dartmouth

- I affirm that I will not under any circumstance make a recording in any medium of any one-on-one meeting with the instructor without obtaining the prior written consent of all those participating, and I understand that if I violate this prohibition, I will be subject to discipline by Dartmouth up to and including expulsion, as well as any other civil or criminal penalties under applicable law.

## **LATE WORK AND RE-WRITE POLICY**

It is critical to turn assignments in on time, particularly because your peers rely on you getting your work to them so they can get feedback to you and so that I can get you feedback in a timely manner. Unless explicitly stated otherwise, assignments will have a 15% penalty per day late. Please contact me as soon as possible in the event you need to turn in something late. If a student turns in a paper late, they can re-write the paper for no higher than a B<sup>-</sup>. Grade points are not negotiable, but students have an option to re-write their paper once per assignment for a maximum final grade of an A<sup>-</sup>. Note: if a student's original paper was late, they may re-write the paper for at most half letter grade less per the number of days late. Students are highly encouraged to take advantage of X-hours, office hours and/or the RWIT (Dartmouth's Peer Writing Center) for feedback on their rough and final drafts.

## **ACADEMIC INTEGRITY**

Dartmouth College and faculty take the Academic Honor Principle very seriously, and so should all students. Students should be aware of and conform to the Dartmouth Academic Honor Principle as expressed in the ORC. In terms of this course, this means that all written work that is handed in is the student's own. Students are permitted and encouraged to discuss ideas and problems with their peers and to work together, but they must write up their responses and all papers using their own words. This includes the reading responses on Canvas, all writing assignments in and out of class and during peer-review. This also applies to the appropriate citations of references and use of quotation when applicable. If students are unsure, they should consult with the instructor.

Links to academic integrity:

<https://student-affairs.dartmouth.edu/policy/academic-honor-principle>

<http://writingspeech.dartmouth.edu/learning/materials/sources-and-citations-dartmouth>

## **DISABILITY ASSISTANCE**

Students with disabilities who may need disability-related academic adjustments and services for this course are encouraged to see me privately as early in the term as possible. Students requiring disability-related academic adjustments and services must consult the Student Accessibility Services (SAS) office: [Student.Accessibility.Services@Dartmouth.edu](mailto:Student.Accessibility.Services@Dartmouth.edu) or Carson Hall, Suite 125, 646-9900. Once SAS has authorized services, students must show the originally signed SAS Services and Consent Form and/or a letter on SAS letterhead to me. As a first step, if students have questions about whether they qualify to receive academic adjustments and services, they should contact the SAS office. All inquiries and discussions will remain confidential.

## HEALTH & WELL-BEING

The academic environment at Dartmouth is challenging, our terms are intensive, and classes are not the only demanding part of your life. There are several resources available to you on campus to support your wellness, including:

- Undergraduate Dean (<http://www.dartmouth.edu/~upperde/>),
- Counseling and Human Development (<http://www.dartmouth.edu/~chd/>), and
- the Student Wellness Center (<http://www.dartmouth.edu/~healthed/>).

I encourage you to use these resources and speak with me to take care of your physical and mental health throughout the term.

## RELIGIOUS OBSERVANCES

Some students may wish to take part in religious observances that occur during this academic term. If you have a religious observance that conflicts with your participation in the course, please meet with me before the end of the second week of the term to discuss appropriate accommodations.

## WRITING RESOURCES

- RWIT: <http://writing-speech.dartmouth.edu/learning/support-writing-research-and-composing-technology/rwit>
- Sources & Citations: <http://writing-speech.dartmouth.edu/learning/materials/sources-and-citations-dartmouth>
- Kresge Physical Sciences Library: <http://www.dartmouth.edu/~library/kresge/>

## TENTATIVE COURSE SCHEDULE

This schedule may change throughout the term to accommodate our needs and interests. Please check Canvas frequently for up-to-date course schedule.

### UNIT 1: Extraction and Oppression During the Early Development of Geosciences

#### Week 1 – Introduction

- Wednesday (January 5<sup>th</sup>)
  - Welcome; course introduction; discussion of expectations
- Friday (January 7<sup>th</sup>)
  - *In class*: brief introduction on “Social and historical contexts of the development of geoscience disciplines”; discussion of writing styles and structures; sign up for discussion leaders

#### Week 2 – Exploitation of Land, Resources and People

- Monday (January 10<sup>th</sup>)

- Before class: Read “Our past creates our present: a brief overview of racism and colonialism in Western paleontology” (Monarrez et al., 2021) and respond to Canvas Discussion
  - Reading: <https://doi.org/10.1017/pab.2021.28> (Monarrez et al., 2021)
- In class: Lecture on “History of geology in Western countries”; student-led discussion on “Extraction, exclusion, oppression and erasure in geosciences”
- Wednesday (January 12<sup>th</sup>)
  - Before class: Read “*The Darker Side of John Wesley Powell*” (Pico, 2019) and “*Minik and the Meteor*” (Meier, 2013) and respond to Canvas Discussion
    - Reading 1: <https://blogs.scientificamerican.com/voices/the-darker-side-of-john-wesley-powell/> (Pico, 2019)
    - Reading 2: <https://narratively.com/minik-and-the-meteor/> (Meier, 2013)
  - In class: Lecture on “Study of Landscapes (Geomorphology) and Scientific Racism”; student-led discussion on “Social and political impacts of early geological expeditions”; introduction to annotated bibliography
- Thursday (January 13<sup>th</sup>)
  - X-hour: DartWrite portfolio workshop (Virtual; see Zoom tab for info)
- Friday (January 14<sup>th</sup>)
  - In class: Lecture by Jane Quigley (Head of Research & Learning for STEM, Business & Economics, Dartmouth Library) on resource search strategy and Q&A

### Week 3 – Scientific Racism and Colonialism

- Monday (January 17<sup>th</sup>)
  - No class: Martin Luther King Jr. Day
- Wednesday (January 19<sup>th</sup>)
  - Before class: Read “The American School and Scientific Racism in Early American Anthropology” (Dewbury, 2007); read “Morton, Agassiz, and the Origins of Scientific Racism in the United States” (Menand, 2002); and respond to Canvas Discussion
    - Reading 1: <https://doi.org/10.1353/haa.0.0026> (Dewbury, 2007)
    - Reading 2: <https://doi.org/10.2307/3134139> (Menand, 2002)
  - In class: Lecture on “Origins of Scientific Racism in the United States”; student-led discussion on “Scientific racism in the United States”
- Thursday (January 20<sup>th</sup>)
  - Required X-hour: RWIT Workshop on “*Crafting a Thesis*” by Pierce Wilson; also bring questions about annotated bibliography!
- Friday (January 21<sup>st</sup>): Annotated references DUE in class
  - In class: Peer review & writing workshop #1 for Paper 1 – exchange of feedback on peers’ outlines and annotated references

## **Week 4 – Sexism and Ableism in Geosciences**

- Monday (January 24<sup>th</sup>)
  - Before class: Read “Women in glaciology, a historical perspective” (Hulbe, Wang and Ommanney, 2010); read “Trends in the Representation of Women Among US Geoscience Faculty From 1999 to 2020: The Long Road Toward Gender Parity” (Ranganathan et al., 2021); and respond to Canvas Discussion
    - Reading 1: <https://doi.org/10.3189/002214311796406202> (Hulbe, Wang and Ommanney, 2010)
    - Reading 2: <https://doi.org/10.1029/2021AV000436> (Ranganathan et al., 2021)
  - *In class*: Student-led discussion on “Past and present: under-representation of women in geosciences”
- Wednesday (January 26<sup>th</sup>): First draft of Paper 1 DUE by 8:00 a.m.
  - *In class*: Peer review & writing workshop #2 for Paper 1 – exchange of feedback on peers’ rough draft of Paper 1
- Thursday (January 27<sup>th</sup>)
  - Required X-hour: RWIT Workshop on “*Writing with Style and Clarity*” by Pierce Wilson
- Friday (January 28<sup>th</sup>): Peer review for Paper 1 DUE by 8:00 a.m.
  - Before class: Read “Creating Spaces for Geoscientists with Disabilities to Thrive” (Marshall & Thatcher, 2019); read “Professionally held perceptions about the accessibility of the geosciences” (Atchison & Libarkin, 2016); read “‘Nothing about us without us:’ The perspectives of autistic geoscientists on inclusive instructional practices in geoscience education” (Kingsbury et al., 2020); and respond to Canvas Discussion
    - Reading 1: <https://eos.org/opinions/creating-spaces-for-geoscientists-with-disabilities-to-thrive> (Marshall & Thatcher, 2019)
    - Reading 2: <https://doi.org/10.1130/GES01264.1> (Atchison & Libarkin, 2016)
    - Reading 3: <https://doi.org/10.1080/10899995.2020.1768017> (Kingsbury et al., 2020)
  - *In class*: Student-led discussion on “Ableism and exclusion of people with disabilities in geosciences”

## **UNIT 2: Modern-day Manifestations of Racism and Colonialism in Geosciences**

### **Week 5 – Continued Impacts on Indigenous People**

- Monday (January 31<sup>st</sup>): Final draft of Paper 1 DUE by 11:59 p.m.

- Before class: Read “Theory and Practice: The Case of the Navajo-Hopi Land Dispute” (Cheyfitz, 2002); read “The Dakota Access Pipeline, Environmental Injustice, and U.S. Colonialism” (Whyte, 2017); and respond to Canvas Discussion
  - Reading 1: <https://digitalcommons.wcl.american.edu/jgspl/vol10/iss3/5/> (Cheyfitz, 2002)
  - Reading 2: <https://ssrn.com/abstract=2925513> (Whyte, 2017)
- *In class*: Student-led discussion on “US colonialism and environmental injustice”
- Wednesday (February 2<sup>nd</sup>)
  - *In class*: Conversation with Prof. Lizz Ultee on “Societal Relevance of Sea-Level Research”
    - Reading: <https://doi.org/10.1002/2018EF000827> “From Ice Sheets to Main Streets: Intermediaries Connect Climate Scientists to Coastal Adaptation” (Ultee et al., 2018)
- Thursday (February 3<sup>rd</sup>)
  - X-hour: Optional X-hour (Writing Tips on Designing and Building an Argument)
- Friday (February 4<sup>th</sup>)
  - Before class: Read “Climate Change, Environmental Justice, and Vulnerability: An Exploratory Spatial Analysis” (Wilson, 2010); read “Climate Change, Vulnerability, and Responsibility” (Cuomo, 2011); read “The impact of climate change on tribal communities in the US: displacement, relocation, and human rights” (Maldonado et al., 2013); and respond to Canvas Discussion
    - Reading 1: <https://doi.org/10.1089/env.2009.0035> (Wilson, 2010)
    - Reading 2: <https://doi.org/10.1007/s10584-013-0746-z> (Maldonado et al., 2013)
    - Reading 3 (optional): <https://doi.org/10.1111/j.1527-2001.2011.01220.x> (Cuomo, 2011)
  - *In class*: Student-led discussion on “Disproportionate impacts of climate change on BIPOC and under-represented communities”

## **Week 6 – Where the Geoscience Community Stands Today**

- Monday (February 7<sup>th</sup>)
  - Before class: Read “Minorities in the geosciences” (American Geological Institute, 1972); read “Minorities in the Geosciences: Beyond the Open Door” (Gillette, 1972); read “No progress on diversity in 40 years” (Bernard and Cooperdock, 2018); and respond to Canvas Discussion
    - Reading 1: <https://urgeoscience.org/wp-content/uploads/sites/33/2021/02/Minorities-In-The-Geosciences-1972-1.pdf> (American Geological Institute, 1972)
    - Reading 2: <https://www.jstor.org/stable/1734820> (Gillette, 1972)
    - Reading 3: <https://doi.org/10.1038/s41561-018-0116-6> (Bernard and Cooperdock, 2018)



- *In class*: Student-led discussion on “History of racism and its impact on the geoscience community today”
- Wednesday (February 9<sup>th</sup>)
  - Before class: Read “Safe fieldwork strategies for at-risk individuals, their supervisors and institutions” (Demery and Pipkin, 2020); read “Ten Steps to Protect BIPOC Scholars in the Field” (Anadu, Ali and Jackson, 2020); read “The Challenges of Fieldwork for LGBTQ+ Geoscientists” (Olcott and Downen, 2020); and respond to Canvas Discussion
    - Reading 1: <https://doi.org/10.1038/s41559-020-01328-5> (Demery and Pipkin, 2020)
    - Reading 2: <https://doi.org/10.1029/2020EO150525> (Anadu, Ali and Jackson, 2020)
    - Reading 3: <https://doi.org/10.1029/2020EO148200> (Olcott and Downen, 2020)
  - *In class*: Student-led discussion on “Challenges faced by BIPOC and LGBTQ+ geoscientists in the field”
- Thursday (February 10<sup>th</sup>)
  - NO required X-hour, but TWO office hours for Paper 2 pre-writing exercises (attendance is not required, but I highly encourage everyone to join, even partially, either office hour!)
    - Office hour #1. 10-11 a.m. Fairchild 213
    - Office hour #2. 3-4 p.m. Fairchild 213
- Friday (February 11<sup>th</sup>)
  - *In class*: Conversation with Prof. Tamara Pico on racism in history, career in geoscience, GeoContext project, etc.

## **Week 7 – How Inequity Impacts Women and BIPOC in Geosciences**

- Monday (February 14<sup>th</sup>): Annotated references DUE by 8:00 a.m.
  - Before class: Read “Faculty Service Loads and Gender: Are Women Taking Care of the Academic Family?” (Guarino and Borden, 2017); read “Racism and Mental Health: the African American experience” (Williams and Williams-Morris, 2000); read “Doctoral Women of Color Coping with Racism and Sexism in the Academy” (Ramos and Yi, 2020); and respond to Canvas Discussion
    - Reading 1: <https://doi.org/10.1007/s11162-017-9454-2> (Guarino and Borden, 2017)
    - Reading 2: <https://doi.org/10.1080/713667453> (Williams and Williams-Morris, 2000)
    - Reading 3: <https://doi.org/10.28945/4508> (Ramos and Yi, 2020)
  - *In class*: Student-led discussion on “Challenges faced by under-represented individuals (with intersecting identities)”
- Wednesday (February 16<sup>th</sup>)



- *In class*: Peer review & writing workshop #1 for Paper 2 – short (3-5 min each), informal presentation of Paper 2 outline and exchange of feedback
- Thursday (February 17<sup>th</sup>)
  - X-hour: Optional X-hour – bring your questions and first drafts of Paper 2!
- Friday (February 18<sup>th</sup>): First draft of Paper 2 DUE *by 8:00 a.m.*
  - *In class*: Writing workshop #2 for Paper 2 – peer review on peers’ first drafts

### **UNIT3: Building Anti-Racist Culture and Practices in Geosciences**

#### **Week 8 – Opportunities for Equitable Solutions**

- Monday (February 21<sup>st</sup>): Final draft of Paper 2 DUE *by 11:59 p.m.*
  - Optional Zoom office hour (Presidents’ Day)
- Wednesday (February 23<sup>rd</sup>)
  - Before class: Read “How to include Indigenous researchers and their knowledge” (Gewin, 2021); read “Indigenous frameworks for observing and responding to climate change in Alaska” (Cochran et al., 2012); read “Sámi traditional ecological knowledge as a guide to science: Snow, ice and reindeer pasture facing climate change” (Riseth, 2010); and respond to Canvas Discussion
    - Reading 1: <https://doi.org/10.1038/d41586-021-00022-1> (Gewin, 2021)
    - Reading 2: <https://doi.org/10.1007/s10584-013-0735-2> (Cochran et al., 2013)
    - Reading 3: <https://doi.org/10.1017/S0032247410000434> (Riseth et al., 2010)
  - *In class*: Student-led discussion on “Environmental racism and a more equitable path forward for Indigenous communities”
- Thursday (February 24<sup>th</sup>)
  - X-hour: Optional X-hour
- Friday (February 25<sup>th</sup>)
  - *In class*: Brainstorming session / writing workshop for the Final Paper

#### **Week 9 – Paths Toward a Diverse, Inclusive, and Equitable Geoscience Community**

- Monday (February 28<sup>th</sup>)
  - Before class: Read “Race and racism in the geosciences” (Dutt, 2020); read “Combating Racism in the Geosciences: Reflections From a Black Professor” (Morris, 2021); read “Does Our Vision of Diversity Reduce Harm and Promote Justice?” (Keisling et al., 2020); and respond to Canvas Discussion
    - Reading 1: <https://doi.org/10.1038/s41561-019-0519-z> (Dutt, 2020)
    - Reading 2: <https://doi.org/10.1029/2020AV000358> (Morris, 2021)
    - Reading 3: <https://doi.org/10.1130/GSATG429GW.1> (Keisling et al., 2020)

- *In class*: Student-led discussion on “Combating racism and promoting diversity and justice in the geosciences”
- Wednesday (March 2<sup>nd</sup>)
  - *In class*: Peer review & writing workshop #1 for Final Paper – exchange of feedback on peers’ outlines and annotated references
- Thursday (March 3<sup>rd</sup>)
  - X-hour: Optional X-hour
- Friday (March 4<sup>th</sup>): Annotated references DUE *by 11:59 p.m.*
  - *In class*: Conversation with Prof. Bala Chaudhary on “Ten simple rules for building an antiracist lab”
    - Reading: <https://doi.org/10.1371/journal.pcbi.1008210> “Ten simple rules for building an antiracist lab” (Chaudhary and Berhe, 2020)

### **Week 10 – Final Paper Preparation**

- Monday (March 7<sup>th</sup>)
  - Last day of class (Winter term classes end on March 8<sup>th</sup>)
  - *In class*: Peer review & writing workshop #2 for Final Paper – exchange of feedback on peers’ rough draft of Final Paper
- Wednesday (March 9<sup>th</sup>): Peer review on Paper 3 First Draft due *by 8:00 a.m.*
- Between Monday and Thursday (March 7<sup>th</sup> – 10<sup>th</sup>)
  - Required: Schedule a 15-minute individual meeting with the instructor to discuss plans for Final Paper revision
- Friday (March 11<sup>th</sup>): Final Paper due *by 11:59 p.m.*

### **Final Examination period**

- Monday (March 14<sup>th</sup>): Self-Evaluation due *by 11:59 p.m.*