

CLIM 759 / COMM 640: Understanding and Responding to Climate Misinformation

Description

While human-caused global warming is not scientifically controversial, public debate and political campaigns have resulted in many misconceptions about climate change. How can scientists respond effectively to climate misinformation? In this course, students will learn the basics of climate science, then explore the various misleading techniques used to distort climate science. Next, students will combine this knowledge with science communication principles to develop their own rebuttal to a specific climate myth. Ultimately, this rebuttal will be published on the website Skeptical Science and students will assess how effective their rebuttal is in countering misinformation.

Instructors

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Prerequisites

An undergraduate degree (case-by-case exceptions with permission from instructors)

Required Text

None, select reading will be assigned via Blackboard

Course Goals & Objectives

Main learning objectives are:

- Understand the science underpinning the key climate beliefs (it's real, it's us, experts agree, it's bad, there's hope).
- Understand the techniques used in misinformation intended to undermine the key climate beliefs.
- Develop competence in responding to climate misinformation.

During this course, students will:

- Engage in role playing exercises in difficult climate conversations.
- Develop a rebuttal to a climate myth, to be reviewed by instructors, students, and climate communicators.
- Publish the rebuttal on a public website and assess its impact.

Syllabus

Weeks 1-4

1. Science Communication 1: Climate Misinformation
 - a. Taxonomy of climate myths
 - It's not real, it's not us, it's not bad, there's no hope, experts are unreliable
 - b. Introduce SkS rebuttals
 - Present list of 20 most-trafficked rebuttals on SkS
 - c. Blackboard quiz
2. Climate Science 1: Climate Basics
 - a. Five key climate beliefs: it's real, it's us, experts agree, it's bad, there's hope
 - b. Introducing the science underpinning these climate realities
 - c. Blackboard quiz
3. Science Communication 2: Debunking Basics
 - a. Fight sticky myths with stickier facts
 - b. Sticky science communication
 - c. Introduction to inoculation & critical thinking
 - d. Introduce grading rubric
 - e. Blackboard quiz
4. Climate Science 2: Climate models
 - a. How climate models work
 - b. History of climate models and past predictions
 - c. State of current predictions
 - d. Rebuttal Oral Proposals: Part 1
 - First group of students present rebuttal plan
 - Feedback from students/instructors
 - e. After lecture, students also post proposal on SkS for feedback
 - f. Students have 2 weeks to develop first draft
 - g. Blackboard quiz
5. Climate Science 3: Carbon cycle
 - a. Introduction to carbon cycle
 - b. Sources of CO₂ emissions
 - c. Human emissions vs. natural flows
 - d. Rebuttal Oral Proposals: Part 2
 - Remaining students present rebuttal plan
 - e. Blackboard quiz
6. Science Communication 3: Communication Best-Practices
 - a. Scientific jargon vs. plain English words.
 - b. Principles of effective scientific visualizations.
 - c. Characteristics of sticky science communication.
 - d. Seepage/Erring on Side of Least Drama - how scientists tend to moderate in anticipation of denialist backlash, and how to be more resilient .
 - e. Students submit first draft of written assignment.
7. Instructor feedback
 - a. Instructors give guidance on written assignments
 - b. Students submit second draft assignment for student feedback.

- c. Students must peer-grade (randomly assigned, blinded) 3 other assignments to get full grades for peer-graded assignment.
 - d. Students assigned to play Cranky Uncle game (1% grade per 100 Cranky points up to 5%)
- 8. Science Communication 4: Critical Thinking
 - a. FLICC taxonomy: denial techniques & logical fallacies
 - b. Discussion of gamification exercise
 - c. Roleplaying exercise
 - One student plays scientist, another plays Cranky Uncle
- 9. Student feedback
 - a. Students provide oral feedback on each assignment
 - b. Class discussion about each assignment
- 10. Climate Science 4: Paleoclimate & History of Science
 - a. History of past climate change
 - b. Hockey stick
 - c. Past CO2 levels
 - d. Climategate
- 11. Science Communication 5: Publishing and Promotion
 - a. Publishing online
 - b. Case studies on viral climate communication
 - c. Discuss ways to promote article, boost traffic
 - Social media
 - Republish elsewhere
 - Infographics
 - d. Between week 11/12, rebuttals will be published on SkS
- 12. Climate Science 4: Impacts, detection and attribution
 - a. Greenhouse effect (more in depth)
 - b. Detection and attribution
 - c. Impacts
 - Intensified water cycle?
 - More/intensified extreme weather
- 13. Science Communication 6: Social science methods
 - a. Analysing impact of published rebuttal
 - b. Present case study from existing SkS rebuttals
- 14. Presentation of Rebuttal Impact
 - a. Students present impact of their rebuttal
 - Introduce myth (briefly)
 - Summarize rebuttal
 - Traffic
 - Survey data (if sufficient data)
 - Option: give students sample data from existing SkS rebuttals
 - Social media response

Links/Resources

- <https://skepticalscience.com/fellowship.shtml>

Grading Criteria

- 30% blackboard quizzes (graded automatically)
 - 5% week 1 (Climate Misinformation: Five key climate beliefs)
 - 5% week 2 (Climate Basics: How global warming works)
 - 5% week 3 (Debunking Basics)
 - 5% week 4 (Climate Models)
 - 5% week 5 (Carbon Cycle)
 - 5% week 7 (Gamification - 1% per 100 cranky points)
- 30% on rebuttal development
 - 10% Week 4 & 5 Oral presentation grade (instructors)
 - 20% Week 9 Peer-assessment of second draft
- 40% on final rebuttal (instructors)

Grading Schema

A+	>95%
A	90-95%
A-	85-90%
B+	80-85%
B	70-80%
B-	65-70%
C/Fail	< 65%

Grading Rubric for Oral and Written Rebuttals (totaling 20 points)

CATEGORY #1: STRUCTURE

Structure: Evaluate the student's ability to follow the Fact-Myth-Fallacy structure.

For this category, determine if the student clearly mentions the fact first, then addresses the myth (while giving a warning cue before the myth) and finally explains the fallacy by which the myth distorts the science.

Excellent	The student has clearly followed the Fact-Myth-Fallacy structure throughout the assignment and has done so with logical and effective transitions between those required elements.	5 points
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Good	The student has adequately followed the Fact-Myth-Fallacy structure throughout the assignment.	4 points
Needs Improvement	The student has not followed the Fact-Myth-Fallacy structure consistently throughout the assignment.	3 points
Inadequate	The student has submitted something that does not meet the assignment requirements or has submitted a blank response.	1 point

CATEGORY #2: STICKY SCIENCE

Sticky Science: Evaluate the student's ability to provide a factual alternative to the myth in a sticky and fallacy-free manner.

This category asks you to determine if the student has included facts and evidence to support the points made throughout the writing. Look for simple, credible and concrete explanations.

Excellent	The student has included a fact as an alternative to the myth. The fact is sticky (is or contains one or more of the following: Simple, Unexpected, Credible, Concrete, Emotional, Stories) and does not contain fallacies.	5 points
Good	The student has included a fact as an alternative to the myth. The fact may be missing some of the qualities of stickiness (is or contains one or more of the following: Simple, Unexpected, Credible, Concrete, Emotional, Stories) but is fallacy-free.	4 points
Needs Improvement	The student has included a fact as an alternative to the myth, but the fact is missing some of the qualities of stickiness (is or contains one or more of the following: Simple, Unexpected, Credible, Concrete, Emotional, Stories) and may include writing that is a fallacy or close to a fallacy.	3 points
Inadequate	The student has submitted something that does not meet the assignment requirements or has submitted a blank response.	1 point

CATEGORY #3: INOCULATION

Inoculation: Evaluate the student's ability to explain why the myth is incorrect and identify the fallacy.

For this category, you should focus on the Fallacy section of the student's response. Did the student identify the correct fallacy and explain how the fallacy is expressed by the myth?

Excellent	The student has clearly and completely explained why the myth is incorrect and has identified the fallacy correctly.	5 points
Good	The student has adequately explained why the myth is incorrect and has identified the fallacy correctly.	4 points
Needs Improvement	The student has not sufficiently explained why the myth is incorrect or has not identified the fallacy correctly.	3 points
Inadequate	The student has submitted something that does not meet the assignment requirements or has submitted a blank response.	1 point

CATEGORY #4: CONVINCING ARGUMENT

Convincing Argument: Evaluate the ability of the student to present a response that is convincing.

For this category, we are asking you to mark the overall impression of the effectiveness of the argument made by the student. Ask yourself if all of the elements worked together to develop a cohesive and complete response.

Excellent	The student presents a response that is convincing and contains a clearly written and complete argument.	5 points
Good	The student presents a response that is convincing.	4 points
Needs Improvement	The student presents a response that is somewhat convincing.	3 points
Inadequate	The student has submitted something that does not meet the assignment requirements or has submitted a blank response.	1 point

Top 20 Rebuttals

	Climate Myth	Category
1	Animal agriculture and eating meat are the biggest causes of global warming	Carbon cycle
2	There is no consensus	History of science
3	It's not bad	Impacts
4	They changed the name from 'global warming' to 'climate change'	History of science
5	CO2 increase is natural, not human-caused	Carbon cycle
6	Ice age predicted in the 70s	History of science
7	Climategate CRU emails suggest conspiracy	History of science
8	Climate's changed before	Paleoclimate
9	Hockey stick is broken	Paleoclimate
10	Animals and plants can adapt	Impacts
11	Most of the last 10,000 years were warmer	Paleoclimate
12	We're heading into an ice age	Climate models
13	CO2 is not a pollutant	Impacts
14	It's a natural cycle	Attribution
15	CO2 was higher in the past	Paleoclimate
16	CO2 is not increasing	Carbon cycle
17	Models are unreliable	Climate models
18	We're heading into cooling	Climate models
19	Human CO2 is a tiny % of CO2 emissions	Carbon cycle
20	It's the sun	Attribution