GEOG 198: Debunking Climate Denialism (or, Holiday Conversations for Your Climate Denying Relatives)

- **Spring 2021, Upper-division**
- **Format:** Lecture-based, 1 hours, 1 day per week, Fridays @ 12pm Pacific
    - News/Weather/Housekeeping: 10 minutes
    - Lecture: 30 minutes
    - Discussion: 20 minutes
- **Facilitator: Caleb W. Lee**
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- **Faculty Sponsor: Norman L. Miller**
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Course Description

Modern scientific observation has concluded with near certainty that Earth's climate is changing primarily due to anthropogenic forcings. According to the UN Intergovernmental Panel on Climate Change (IPCC), "It is *extremely likely* (95% certainty) that human influence has been the dominant cause of the observed warming since the mid-20th century."

Human beings are the only known planetary stewards. We have the remarkable ability to reason, determine right from wrong, carefully study our past, and project our future with a reasonably high degree of accuracy. Our progress as a species means we wield the enormous power to alter our societies, natural systems, and the Earth itself on geologic timescales. Because of this, many members of the scientific community recognize we have an inherent responsibility to protect our changing climate and limit the potential risks and impacts associated with climate change and extreme weather shocks.

Unfortunately, many lacking an understanding of the fundamentals of climate science are in denial that climate change is even real, or vehemently doubt its consequences. Some even perpetuate unsustainable behaviors that are potentially disastrous to our societal and ecological balance. We are in the midst of a climate crisis. Irreparable (on human timescales) damage to our Earth is occurring *now*, and will seemingly continue if we, as planetary stewards, do not change our ways.

This course seeks to deconstruct and debunk the arguments of climate denialism as an everyday observer, in hopes of equipping students with the tools and talking points to better communicate – and defend in argument – our current climate crisis in an objective, reasonable, and sound manner. Engagement will focus on scientific articles, statistical models, and direct evidence that back the theory of anthropogenic climate change, as well as potential solutions and precedents for a more sustainable future that could mitigate the risks associated with a rapidly warming Earth.

In this course, students will develop a basic understanding of atmospheric science and results from statistical modeling relevant to climate projections and impacts, as well as the analytical and communication skills necessary to discuss course content with fellow everyday commentators. Lectures will be supplemented by weekly readings and in-class discussion.

Course Expectations

- This course is open to all UC Berkeley students. A background in media studies, rhetoric, political science, physical geography, atmospheric science, physics, and/or environmental science will prove useful, but is not required. EPS 7 (Introduction to Climate Change) and GEOG 149A (Climates of the World) or 149B (Climate Impacts and Risk Analysis) are excellent prerequisites, if you are able to take them.
    - Surface-level analysis of climate systems/drivers will be taught under the assumption that at least one person in the room is unfamiliar with climate science. Prerequisite material relevant to the accurate communication of our current climate crisis will be covered in the course.
- Required materials: No physical textbook or purchases. Short readings (posted on bCourses) may be used as discussion topics for the following class meeting, as well as potential references for the final paper. Lecture materials/images will be made available on bCourses immediately following class.
- Absences/Tardiness: This course will honor Berkeley Time and begin no earlier than ten minutes after the official class start. Three (3) unexcused absences are permitted each semester, which will not affect final grades. Further absences are subject to penalty, unless course staff are provided notice (up to 24 hours after the fact) via email, in-person discussion, or other appropriate channels.
- Asynchronous Students: If you are located outside of North or South America and the meeting time for GEOG 198 is not a realistic expectation for your time zone, you will be expected to watch the recordings of the lectures (when convenient!) and respond to an asynchronous discussion board in bCourses for that week.
    - Please provide your thoughts/answers to discussion, as well as a news article related to the week's content that you found interesting or worthy of the attention of our audience. Preferably, this article is relevant to the last 5 years and reflects your personal interest in, or connection to, climate change.
    - These weekly responses will be due by the following Friday at 11:59pm.
    - I will leave these discussion boards open for everyone else to take a look, as I expect some great supplementary content to come out of the articles our asynchronous students find. Feel free to respond as well if you'd like!
- Drop Policy: Due to expected demand and limited space for this deCal, students must attend the first two lectures to guarantee their spot in the course. Absentees may be dropped unless proper notice, as outlined above, is given to course staff. Spots will subsequently be filled by waitlisted students.

- Late Work: Documented excuses for late submission will be overviewed on a case-by-case basis by course staff. We only have two deliverables, so don't sweat this too much.
- Academic Integrity (I know none of you will do this, but I have to put it in the syllabus): Any deliverable submitted under your name is presumed to be your work that has not been submitted for credit in another course. Words and ideas written by others must be appropriately attributed and sourced. Cheating, plagiarism, and other forms of academic misconduct will result in a failing grade on the assignment in question and will be reported to Student Judicial Affairs.

Grading

P/NP, Pass: > 600pts, out of 1000 possible

- Attendance: 20% (200pts)
    - Show up to class! Each week will be focusing on a specific aspect/talking point present in current climate denialist circles, as well as prerequisite scientific material. It is important to hear all of this information so you can thoroughly argue in favor of the material we cover. You are permitted up to four (4) unexcused absences.
- Discussion/Participation: 30% (300pts)
    - Talk it out! Your opinions, sentiments, and personal experiences with climate change are important, valid, and worth sharing with the rest of us. We come from diverse backgrounds, but our planet's future is shared. It is up to people like us to facilitate conversation and solidarity in the midst of a crisis. Familiarize yourself with the readings and current state of the climate dialogue.
    - Be decent to one another. Bigotry, personal insults, and/or speech inciting violence or hate towards any protected categories will not be tolerated under any circumstance. Do your utmost to respect your fellow classmates' perspectives, as well as those of course staff. *Attack the argument, not the person.*
- Outline of Final Written Assignment: 15% (150pts)
    - Plan ahead for the final! Outlines are always a good idea when writing pieces of literature with lots of moving parts, and your final essay is no exception. As we progress through lectures, take note of the arguments and pieces of information that spark your interest, and go from there. You will receive feedback and pointers/expectations for the final assignment during the outlining period after Week 15.
- Final Written Assignment: 35% (350 pts)
    - More on this below!

Final Assignment Instructions

1. Choose one (1) current argument used by climate denialists. Using everything you have learned this semester, please write out in 3-6 pages, double-spaced, 12-pt Arial font:
    - How is this argument faulty?
        - What biases, if any, are present in the wording/phrasing of this argument?
    - Who has used this argument, and in what context?
        - Is this person speaking on behalf of an industry/special interest, or as an individual denialist?
    - What pieces of direct evidence contradict this argument?
        - Please cite sources using APA format (readings or outside material), in-text and/or in your Bibliography.
    - Using what we have learned, what are the potential impacts of climate denialism being perpetuated? Are certain groups/nations/individuals adversely affected? Are others not?
        - Geographic context is important! Your specific climate scenario may not be a global phenomenon. Be sure to indicate what region is affected by this denialist/"business as usual" scenario.
        - Example: while melting of Arctic sea ice has many teleconnections to the rest of the climate system, perhaps indigenous peoples and ecosystems of the Arctic Circle are particularly affected by this.
    - How do we, as residents of a developed country with access to tools/resources, government intervention, and potential international influence, mitigate the risks associated with these impacts?

2. **Remember:** The goal of this course is *not* to make you regurgitate a bunch of data points about climate change whenever your Republican aunt/uncle starts shouting at Thanksgiving dinner (or any familial gathering you celebrate). Incomplete, faulty arguments are always floating around in the real world. Your job as students at one of the world's most prestigious universities is to make your argument not only concrete, but digestible to folks of many different backgrounds; This is an elective course after all. *Have fun with the paper, and keep the tools we explore and conversations we have in class with you for years to come – that's all we ask as your facilitators, friends, and fellow Bears*.

Standard Outline Format (Roman numerals, then subpoints A. B. C. in Google Docs/Microsoft Word) Example:

I. **The Initial Denialist Argument**
    A. Perpetuated by [insert group/individual]
    B. Biases present in wording
        1. Are they purposefully leaving scientific evidence out? Is it a broad generalization?
    C. Context of this argument
        1. Why are they saying this? What interests are they protecting and/or perpetuating?

II. **Contradictory Evidence**
    A. Examples of climate data/papers that directly contradict the denialist argument
        1. Use citations as necessary

III. **Potential Impacts of the Denialist Argument**
    A. If the denialism (and therefore climate change) continues, what happens under a "business as usual" behavior scenario?
    B. Who/where/when is affected, and why?
        1. Geographic context, perhaps a region you are most interested in
    C. What can we do about it?
        1. End on a high note! Set the precedent for hope and change in the future.
        2. Our role as residents of the United States, role of our local/national government, and our space in the international community

IV. **Bibliography**
    A. Insert any relevant readings or outside material that you plan to reference in your writing (You can probably transfer this into your final piece, too!)

Rubric for Outline (150 points possible)

- Put your name and student ID in the top-left corner. (10pts)
- Appropriate outline format is followed. (10pts)
- Student identifies a potential argument(s), talking points, and class discussions for further consideration. (25pts)
- Student examines potential biases and contextual information for the argument(s) that interests them. (25pts)
- Student references in-class lectures, discussions, and scientific sources that refute the denialist argument(s). (25pts)
- Introduction to potential impacts, damages, and outcomes (in terms of humanity and the biosphere, if applicable) if the denialist argument(s) in question is (are) perpetuated or left unchecked. (20pts)
- Potential solutions, sustainable practices, and policy changes are identified that would build resilience at various scales (if applicable). (25pts)
- Sources referenced are present. (10pts)
    - NOTE: A formal bibliography (sources in alphabetical order, MLA citation, etc) is not necessary at this stage, although it will help in terms of the final. Links/hyperlinks and article/lecture titles are fine.

Rubric for Final Paper (350 points possible)

- Put your name and student ID in the top-left corner. (15pts)
- Appropriate font, size, double-spacing, and format is followed. (20pts)
- Correct grammar conventions are followed. A formal, objective tone is present. (25pts)
- One (1) clear argument perpetuated by climate denialists is present. (30pts)
- Student contextualizes the denialist argument - the “who it is being used by and why.” (35pts)
- Student clearly and concisely presents, using scientific evidence (as presented in class/readings), the counter-argument to climate denialism. (60 pts)
- Student uses proper in-text citations for scientific articles, webpages, etc. when necessary. (30pts)
- Student presents, using models and predictions studied in class, the potential consequences of their chosen denialist argument, in terms of humanity and the biosphere. (60 pts)
- Student presents potential solutions to their chosen denialist argument, and mitigation steps to be taken at the appropriate scale - individual, national, and/or global. (50pts)
- Competed bibliography in MLA format is present. (25pts)

Content Warnings

In case it was not already abundantly clear, anthropogenic climate change (and the denial thereof) will have potentially devastating effects on our species and the broader biosphere. This course will unavoidably discuss the effects of an unsustainable future under several global warming scenarios. With this comes the possibility for articles, media, photographs, videos, or other content to appear that some may find upsetting, including (but not limited to): death, discrimination, forced migration/displacement, abject poverty, famine, disease, warfare, sexual violence, and animal rights infringement. The facilitator will always make a conscious effort to inform the class of any potentially unsettling topics prior to lecture/discussion so that personally affected individuals may take the necessary steps to preserve their wellbeing, up to and including temporarily exiting the room. As this is purely supplemental and/or anecdotal material, final grades are not determined by content deemed unsettling by course staff.

Course Calendar

- **Week 3 (2/5): Introductions, First Discussion, Housekeeping**
    - Facilitator info, introductions, and syllabus overview
    - Discussion: What Does Climate Change Mean to You?
    - HW: IPCC Fifth Assessment Report - Summary

- **Week 4 (2/12): Our Climate "Toolbox" Part I**
    - Conservation laws, High and Low pressure, Earth-Sun relationship
    - Planetary energy and water budgets
    - Defining "weather" and "climate"
    - HW: [TBD]

- **Week 5 (2/19): Our Climate "Toolbox" Part II**
    - Atmospheric and oceanic circulations (Walker, Hadley, gyres, thermohaline)
    - Oscillations and natural variability: NAO, AO, IOD, ENSO
    - HW: [TBD]

- **Week 6 (2/26): Calculating, Modeling, and Applying Climate Science**
    - Intro to statistical modeling and types of models
    - Defining climatology, climographs, anomalies and extremes
    - Signal-to-noise ratio, climate fingerprints, confidence intervals
    - HW: *Miller, et al.* 2007 - Climate, Extreme Heat, and Electricity Demand in California

- **Week 7 (3/5): Climate Change Rhetoric**
    - Examining common arguments, generalizations, and types of rhetoric present in the climate science and climate denialism spheres
    - The HISTORY of climate denialism: ExxonMobil in the 70's
    - Logical fallacies, inherent bias, and the context of unsustainable industries/practices
    - HW: [COVID-19 denial and worldview article]

- **Week 8 (3/12): COVID-19: Without Precedent**
    - Silver linings? Air pollution, new wildlife protections, and long term change
    - Modeling the pandemic and examples of different uncertainties
    - What 2020 taught us about the human condition
    - Discussion: Do pandemic and climate denialism come from similar sources?
    - HW: [COVID-19 response paper, masks/social distancing effectiveness + articles on air pollution reductions in China and U.S.]

- **Week 9 (3/19): "This is one of the COLDEST WINTERS ever, freezing all over the country for long periods of time! So much for GLOBAL WARMING." –President Trump, Twitter, 12/12/2013**
    - Jet stream dynamics, polar vortex, natural variability
    - The North Atlantic: AO, NAO, hurricanes, and Brazilian/Sahelian droughts
    - Discussion: What are the implications of leaders/politicians in climate denial? (The "top-down" problem)
    - HW: [Paper on jet stream slowdown consequences]

- **Week 10 (3/26): SPRING BREAK – NO CLASS MEETING TODAY**

- **Week 11 (4/2): "We have nothing to lose even if the Earth is warming."**
    - The concept of climate change "winners and losers"
        - Investors, companies, and profiteering in a changing world
    - U.S. consequences and global economic connectedness
        - Small Island Nations and forced migration/displacement
    - Discussion: Are the benefits/losses of climate change truly quantifiable? Are they "worth it" or justifiable?
    - HW: [Paper on arctic sea ice melt + news articles about Russia's advancements]

- **Week 12 (4/9): "Even if climate change is real, trying to stop it is expensive and pointless."**
    - Renewables vs fossil fuel companies – costs and impacts
    - Case studies: Hurricane Andrew and Hurricane Harvey
    - Discussion: Mitigation strategies in our own lives, and room for improvement
    - HW: [Paper on economic benefits of green infrastructure + investment in renewables]

- **Week 13 (4/16) “Greenhouse gases aren’t causing climate change (or aren’t the primary cause); So many other factors are at work.”**
    - Natural forcings, solar dimming, and modeling *net* anthropogenic forcings
    - Examples of natural variability, and hypothesized effects from the past
        - Temperature record, Volcanic extinctions, and impact events
    - Societal and government responses to catastrophic risk
    - Discussion: Our preparedness for natural climate change and today’s catastrophic/existential risks
    - HW: [Paper on anthropogenic forcings vs natural variability]

- **Week 14 (4/23): “The Earth has been in hot periods and ice ages. This time is no different.”**
    - Paleoclimatology methods and data
        - “Icehouse” and “Greenhouse” Earth cycles
    - Unprecedented rates of temperature and CO2 increase compared to the last 50 million years; This is not like the past.
    - Heat-specific risks: California
    - Discussion: Wildfire, flooding, and landslides: What can our state do?
    - HW: [Exceptional 2003 European Heat Wave analysis]

- **Week 15 (4/30): FINAL MEETING - Hope and Change in the 21st Century**
    - Voices of change and the role of indigeneity – past and present
    - Promising technologies, policies, and intersectional approaches
    - Final discussion: What does climate change mean to you *now*?
    - HW: [Precedents for Hope and Change]

- **Week 16 (5/7 RRR WEEK): NO CLASS MEETING TODAY**

- **Week 17 (5/14 FINALS WEEK): NO CLASS MEETING TODAY**