

# AS.270.356 A Modern History of Climate Science

Fall 2023

TTh : 3-4:15 pm

## Instructor

Ali Siddiqui ([asiddi24@jhu.edu](mailto:asiddi24@jhu.edu))

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## Course Description

This course charts the evolution of the field of climate science over the last 250 years. We will explore the history of scientific development that led to advances in climate research in the 19<sup>th</sup> and 20<sup>th</sup> century. We will also explore the political and social context in which climate science evolved in the West and the backlash of climate change denial that developed due to the influence of the fossil fuel industry. While this course is focused on history, students will be exposed to introductory scientific and technical concepts needed to understand basic climate science.

## Learning goals

Students will be able to demonstrate the following upon successful completion of the course

- Outline the development of climate science through time.
- Analyze primary and secondary sources of historical literature on climate science research.
- Explain the origin of climate change denial and related controversies.
- Evaluate the effects of poor public communication about climate science has had on its reputation.

## Recommended text

1. *The Discovery of Global Warming, 2<sup>nd</sup> Edition (2008)*, by Spencer R Weart. Available through Johns Hopkins Libraries (*encouraged*).
2. *Making Climate Change History : Documents from Global Warming's Past*, by Howe, J. and P. Sutter. Available through Johns Hopkins Libraries (*encouraged*).
3. Additional Reading material and handouts will be posted on Canvas or provided in class.

## Assessment and Grading

The following will be used for assessment of the students :

- *Assignments* : There will be 4 assignments during the course. These assignments require critical thinking and in-depth analysis of particular course topics. The assignments do not have to be writing assignments. There will be options to complete assignments in other creative ways as well, e.g video essays, artistic submissions, mathematical proofs etc. Please consult the instructor before you start working on your HWs. All Homework will be due in 2 weeks time after it is assigned. Extensions will be provided if you require them. You can also email the instructor if you feel like you could do better on the HW, and additional time can be allotted to redo the HW. I want you to learn in this course and have fun while doing so. My hope is that the class does not prove to be a source of additional stress on students. Each assignment will carry **10%** of your grade.
- *Mid-Term and Final* : Mid-Term and Final exams will be worth **15%** and **25%** of the grade. Both will be take home exams/projects based on cumulative reading and lectures. Please talk to me well in advance for your final project.
- *Student Discussion* : During each class time will be allotted to student-led discussion sessions based on the readings for that week. Students will be asked analyze the assigned readings and come prepared for discussion. These will contribute to **20%** of the grade.

Assignments	40%
Student Discussions + class participation	20%
Mid-Term	15%
Final project	25%

## Attendance

The course is planned to take place in-person in Fall 2023 and it is expected that the students attend all classes as it is crucial for their understanding of the course topics and their overall success in the course. In case in-person classes are suspended for some reason, the course will be taught on-line (Although, this is not expected). In case a student is unable to attend class, he/she should inform the instructor in advance and proceed to make up for the class via office hours or own their own. There will always be an option to attend class remotely via zoom, given that we are still living under the impact of COVID-19. I only ask that you let me know in advance if you plan on attending remotely.

## Late work

All late work incurs a penalty of 10% of the score assigned to the submission for every 24 hours delay. However, if the student is unable to submit the assignment due to unavoidable circumstances, they should inform the instructor in advance to avoid the late work penalty. You can also ask for extensions if required and there is an opportunity to redo the HW once it is graded and you feel that there is an opportunity to improve.

## **Academic Integrity**

It is expected that the students conduct themselves with personal and academic integrity. Basically, be honest and don't cheat. Ethical violation include plagiarism, cheating, lying, alteration of graded assignments and unauthorized collaborations. Students are encouraged to collaborate and discuss assignments, but they must turn in their own independent writings, while acknowledging their collaboration. For more information on JHU policies on Academic integrity, please consult <https://studentaffairs.jhu.edu/viceprovost/student-conduct-ethics/resources-for-student-conduct-academic-ethics/>.

## **Disability Services**

Any student with a disability may need to obtain accommodations from Student Disability Services, 385 Garland, (410) 516-4720, [studentdisabilityservices@jhu.edu](mailto:studentdisabilityservices@jhu.edu). More information available at <https://studentaffairs.jhu.edu/disabilities/>.

## **Anxiety, Stress and Mental Health**

If at any point during the course, if you are struggling with anxiety, stress, depression or mental health issues, you are welcome to talk to the instructor. If you do not feel comfortable talking to the instructor or your classmates, please consult resources available at <https://studentaffairs.jhu.edu/counselingcenter/>.

## Course Schedule

(Assigned readings will be updated as we move along the course.)

**Week 1 (28 August - 1 September)** : Introductions

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**Week 2 (4-8 September)** : Measuring Earth's Temperature

Reading : Ch-1, *The Discovery of Global Warming* by [Weart \[2008\]](#)  
Part 1 *Making Climate Change History*, [Howe and Sutter \[2017\]](#)

**Week 3 (11-15 September)** : Signs of Climate Change : Observations

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Reading : *Past Cycles : Ice Age speculations* essay by [Weart \[2008\]](#)  
*Privileged positions : The Expansion of Observing Systems*, by [Fleming \[1998\]](#)

**Week 4 (18-22 September)** : The Climate Influencers : Greenhouse gases

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Introduce **Writing Assignment #1**

Reading : Ch-2, *The Discovery of Global Warming* by [Weart \[2008\]](#)  
*By the light of the silvery moon*, [Archer and Pierrehumbert \[2013\]](#)

**Week 5 (25-29 September)** : The Climate Influencers : Aerosols

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Reading : *Aerosols : Volcanoes, dust, clouds and climate* essay by [Weart \[2008\]](#)  
*Aerosols*, [Archer and Pierrehumbert \[2013\]](#)

**Week 6 (2-6 October)** : The Climate Influencers : Biosphere and the Sun

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Reading : *Biosphere : How life alters Climate* essay by [Weart \[2008\]](#)  
*Changing sun, changing climate* essay by Weart  
*One if by Land*, [Archer and Pierrehumbert \[2013\]](#)

**Week 7 (9-13 October)** : The Climate Influencers : Oceans

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Introducing **Writing assignment #2**

Reading : *Ocean currents and climate* essay by [Weart \[2008\]](#)  
*Two if by Sea*, [Archer and Pierrehumbert \[2013\]](#)

**Week 8 (16-20 October)** : Modeling the Climate

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Reading : Ch-3, *The Discovery of Global Warming* [Weart \[2008\]](#)  
*The Birth of the General Circulation Climate Model*,

*Archer and Pierrehumbert* [2013]

*General circulation models of the climate*, essay by Weart

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**Week 9 (23-27 October) : Chaos and Predictability**

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Introducing **Writing assignment #3**

Reading : Ch-4,6 *The Discovery of Global Warming* *Weart* [2008]

*The origin and rise of numerical weather prediction*, *Fleming* [2016]

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**Week 10 (30 October - 3 Nov.) : Sounding the alarm**

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Reading : Ch-5, *The Discovery of Global Warming* *Weart* [2008]

*Public and the climate*, essay by Weart

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**Week 11 (6-10 Nov.) : International Cooperation in Climate Research**

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Reading : Ch-7,8 *The Discovery of Global Warming* *Weart* [2008]

*Government, The view from DC*, essay by Weart

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**Week 12 (13-17 November) : Climate Change denial**

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Introducing **Writing assignment #4**

Reading : Ch-9 *The Discovery of Global Warming* *Weart* [2008]

Part 3 *Making Climate Change History*, *Howe and Sutter* [2017]

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**Week 13 (20-24 November) : Thanksgiving break**

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**Week 14 (27 Nov. - 1 Dec) : Climate Change Governance : The IPCC**

Reading : Ch-9 *The Discovery of Global Warming*

Part 5 *Making Climate Change History*, *Howe and Sutter* [2017]

## Additional Readings

- *Divine Wind : History and Science of Hurricanes* (2005) by [Emanuel et al.](#) [2005].
- *Beyond Global Warming: How Numerical Models Revealed the Secrets of Climate Change* (2020) by [Manabe and Broccoli](#) [2020].
- *The Little Ice Age: how climate made history 1300-1850* (2019) by [Fagan](#) [2019].
- *Merchants of Doubt : How a handful of scientists obscured the truth on issues from tobacco smoke to global warming* by [Oreskes and Conway](#) [2011]

## References

- Archer, D., and R. Pierrehumbert, *The Warming Papers: The Scientific Foundation for the Climate Change Forecast*, Wiley, 2013.
- Emanuel, K., et al., *Divine wind: the history and science of hurricanes*, Oxford university press, 2005.
- Fagan, B., *The Little Ice Age: how climate made history 1300-1850*, Hachette UK, 2019.
- Fleming, J., *Historical Perspectives on Climate Change*, Oxford University Press, 1998.
- Fleming, J., *Historical Essays on Meteorology, 1919–1995: The Diamond Anniversary History Volume of the American Meteorological Society*, American Meteorological Society, 2016.
- Howe, J., and P. Sutter, *Making Climate Change History: Documents from Global Warming's Past*, Weyerhaeuser Environmental Classics, University of Washington Press, 2017.
- Manabe, S., and A. J. Broccoli, *Beyond Global Warming: How Numerical Models Revealed the Secrets of Climate Change*, Princeton University Press, 2020.
- Oreskes, N., and E. M. Conway, *Merchants of doubt: How a handful of scientists obscured the truth on issues from tobacco smoke to global warming*, Bloomsbury Publishing USA, 2011.
- Weart, S. R., *The discovery of global warming*, Harvard University Press, 2008.