

Aristotle and the Anthropocene: Epistemology of Climate Science Through History

Instructor Information:

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Course Description:

Motivation:

Climate change—whether it is happening, how bad it is, what's causing it, and what we should do about it—elicits strong opinions and even stronger disagreement. But what causes that disagreement? Some philosophers describe it as a purely rational disagreement, one about facts and evidence. Those individuals who disagree are characterized as mistaken, ignorant, or malevolent in some way. Philosophers try to offer an explanation of how so. Sometimes this explanation invokes a lack of scientific literacy as a result of our educational system or darker motives involving financial ties to the petroleum industry. Others offer socio-political explanations—people identify with certain political parties or groups, such as religious communities. As such, they form their beliefs largely on the basis of their peers or group identities, not the “facts” or evidence.

In this course, we will explore a third explanation. Climate change troubles some of philosophy's fundamental categories of “evidence”, “knowledge”, “prediction” and “explanation”. What do these terms mean when we're talking about geologic forces and phenomena of such vast spatio-temporal dimensions that, as writer Tim Morton argues, it defeats our ideas of what an object even *is*. Climate change is a “hyper-object”, one that force us to confront and transform what it means to scientifically “know”, “predict” or “explain” something.

Course approach:

We will start by exploring how the meaning of these basic epistemic concepts have changed in the past from Ancient Greece through the Scientific Revolution of 17th century Europe. Since the 1970s, the study of climate change has been pursued largely using computer simulations. Through philosophical work, fiction, poetry, and film we will see how historical and technological advancements have had corresponding changes on our understanding of scientific prediction and knowledge. We will consider questions like:

- (1) How did people historically understand and relate to the weather or climate as a manifestation of nature?
- (2) How did the historical emergence of new ways of measuring climate, new technologies like the thermometer or barometer, change the relation of human to nature?
- (3) What did human's relation to nature imply for the definition of scientific knowledge, prediction and control?

These are some of the questions we will explore and consider as we try to understand the complex and fascinating ways in which the history of developing technologies and the human experience of the environment and climate dynamically interact with our most basic ideas about knowledge, prediction and control.

Course Aims:

The goal of this class is to gain a deeper appreciation for the philosophical and historical underpinnings of contemporary disagreements concerning climate change. It concerns our foundational beliefs regarding how humans relate to nature. Furthermore, such beliefs have important consequences for what it means to scientifically predict or explain natural events like hurricanes and tornadoes. We may still disagree, in fact we probably will. But my goal is for you to come away from this course having learned more about the historical and philosophical reasons *why* we disagree. More importantly, by seriously engaging with past systems of belief, like Aristotelian science, which are so different from our contemporary science, we can also learn to engage with people who have very different belief systems.

By the end of this course, you will learn to:

- (1) **Understand** and restate the central idea and supporting claims of various types of written work in your own words via a weekly précis.
- (2) **Apply** the “lenses” of different philosophical understandings of scientific prediction and explanation using in-class exercises. In Unit 1, you will scientifically predict and explain things the way an Aristotelian would through the observation and classification of campus nature sites. In Unit 3, you will scientifically predict and explain precipitation change in Bloomington, IN the way a modern day climate modeler would using Future Water’s IU-based hydrology model.
- (3) **Create** concept maps to visually represent how you relate various ideas and concepts in each unit.
- (4) **Evaluate** and compare how epistemic concepts like “scientific explanation” are transformed and interact in complex ways across timescales and media forms by comparing concept maps of Units 1-3.

Required Texts

Shakespeare, *The Tempest*

Hume, *The Enquiry Concerning Human Understanding*

Aeschylus, *Prometheus Bound*

Francis Bacon, *Novum Organon*

Eric Winsberg, *Philosophy and Climate Science*

All other texts are available online and/or on Canvas under “Files” and “Readings”.

Assignments

- 1.) **Written Précis (50%):** You will submit short précis every week on an assigned reading of your choice (excluding weeks in which we watch films). This will be turned in at the beginning of the class session. These are 2 page summaries that are structured as follows: *Observe, Think, Wonder*. You will note your personal observations and reflections about the text, identify the author’s primary argument or conclusion and two ways they support their argument, and bring up one question you have after reading the text. The goal of this weekly assignment is to develop a thinking and writing *habit*, rather than simply producing one final essay at the end of the semester which you turn in and never look at again. Furthermore, by interacting with the reading before class, you will be prepared to share and engage in higher order analysis and interpretation with your peers and myself in class.
- 2.) **Presentation (5%):** You will present one of your précis in class. We will distribute who will present on what date on the first day of class. You will meet with me about your presentation at least one week ahead of time. The goal of this assignment is to learn how to communicate your thoughts effectively to your peers.
- 3.) **Concept Maps (30%):** You will produce three concept maps for each of the three historical periods we cover: Ancient, Early-Modern, Modern. The concept map will concern the overarching course topic “how human relates to nature using philosophical concepts of knowledge, prediction and explanation and how that relationship evolved through history”. Concept maps will consist of both nodes and links. Nodes will be used to identify what you take to be the most important ideas, figures, practices, or events in Unit I. For example, you may include things such as agriculture or particular figures in Greek mythology like the Greek god, Demeter. Links will be used to visually represent the connections you observe between the nodes. Perhaps something in discussion or lecture helps you make a connection between Herodotus’ explanation of why the Nile floods and Hippocrates’ medical explanations of disease so you draw a link between those nodes and write a few words explaining the link. At the end of the semester, we will discuss how our three concept maps are related to each other. The goal of this assignment is to make visible, both to ourselves and others, the way different ideas are connected in our minds. We often connect things in our heads, with examples or in discussion, as a way of understanding complex ideas or

making an argument. By building concept maps, we can make these connections explicit and, as we learn, we can build more connections to new ideas. Importantly, for this class, we can visually keep track of and see how ideas about scientific knowledge and explanation change over time in connection with other things change in science and society.

- 4.) **Discussion (5%):** Philosophy is a conversation—with the text, the author, your peers, and others who are long dead or haven't joined us yet. It's a conversation that spans history and borders. Part of what makes a conversation great is hearing other people's thoughts and openly sharing our own. In this way, we can make something new out of old questions, we can ask new questions or offer new answers or raise a new problem with old answers. I strive to always make our classroom a space in which you feel comfortable offering your thoughts on our topic of discussion. In return, I urge you to speak up. Your thoughts and insights matter. **I want to hear what you have to say, as do your classmates. That is why I show up.** If you don't feel comfortable speaking up for whatever reason, please feel free to let me know. I study and teach philosophy because, since my undergrad days (when I first read Descartes) philosophy asked questions that I didn't have the answer to, but I couldn't stop thinking about and wanting to *try to answer*. We're all trying out answers. **Wrong answers are the main reason why the conversation has moved forward.** Don't be afraid to try something out. This course is primarily discussion-based and relies on your boldness. Remember, this is just a conversation with friends, and we're all trying to figure this stuff out together. I'm so excited that you have joined this conversation, *welcome* ☺.

- 5.) **In-class Exercises (10%):**

- a. Unit I – You will be asked to find a local natural spot on campus, a stream or tree grove etc. You will draw a map of your natural area, describe how you perceive the area using your senses and identify which of the four Aristotelian forces we learned about in class is relevant to your area. You will then explain an observed natural phenomenon using the Aristotelian method of scientific explanation. This could be something simple like the ripple of water or floating of a woodchip or peeling of tree bark. You may include personal reflections as well about your experience in that environment. We will then regroup, share and discuss our natural areas in class.
- b. Unit III - FutureWater is an IU-based platform hosting a computer model of the Wabash River watershed, a watershed that covers most of the state of Indiana. You will pick a local body of water (a stream, lake, etc.), download its watershed data from the FutureWater website, and make predictions about future precipitation change, given global warming. Students will complete an exercise that has them compare predictions based on annual and monthly averages. Students will then be asked to reflect and discuss how experimentation, prediction, and knowledge in the context of hydrologic models compares with scientific experimentation and knowledge discussed in earlier units. The goal of this exercise to get hands-on experience using a computer simulation, in this case a hydrology model, to make scientific predictions and explanations about your local environment.

Further notes:

1. We observe norms of respectful, kind, and constructive dialogue in our classroom. See this link for a good description of what that entails: <http://consc.net/guidelines/>
2. Regular attendance in class is a condition for receiving a passing grade. As a discussion-based course, your attendance and participation are crucial to you and your classmates benefit. You are allowed three unexcused absence without penalty, after three absences you will receive a 1/3 grade deduction. Arriving more than 5 minutes late counts as an absence. Excused absences, such as for university sponsored athletic events or religious observance, will require documentation and prior notice so we can work together and find a way to help you stay on track of assignments and discussions. Whatever is going on, come meet with me and let me know as soon as possible so we can work out a way to keep you on track.
3. If you need special accommodations, please get in touch with the Student Disability Services office on campus so we can work together on meeting your needs.
4. Plagiarism and academic misconduct will not be tolerated. If in doubt, come talk to me. I'm happy to discuss what is and is not appropriate collaboration, how to properly cite references etc.
5. Feel free to contact me using your IU email or drop by during office hours. I do my best to respond within 48 hours, excluding weekends and holidays.
6. Any unauthorized use of technology in class, including cell phones/apple watches/laptops/etc., will result in being marked 'absent' for that day and you will forfeit marks for any assignments that day.
7. Requests concerning the name and pronoun by which you would like to be addressed will be happily honored.

Course Schedule

Unit 1 Nature, a Living Creator

Week 1: Nature and the Gods

<i>M</i>	Hesiod's Theogony
<i>W</i>	Homer's Illiad (Book 18. 465-617; Book 21)
<i>F</i>	Homer's Odyssey (1.1-10; 7.1-200; 9.105-308; 10.1-335)

Week 2: Human and Nature

<i>M</i>	Hesiod's Works and Days (383-678)
<i>W</i>	Aeschylus' Prometheus Bound
<i>F</i>	Herodotus (Histories 2.19-2.31)

Week 3: Explaining Nature

<i>M</i>	Aristotle (Posterior Analytics 1.2-1.10; 2.1-2.10; skip 2.3-2.7)
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<i>W</i>	Aristotle (<i>Meteorology</i> , Book 1)
<i>F</i>	Nature Observation Exercise

Week 4: Predicting Nature

<i>M</i>	Hippocrates, <i>On Airs, Waters, Places</i> (selections)
<i>W</i>	Theophrastus, <i>Concerning Weather Signs</i>
<i>F</i>	Aratus, <i>Phaenomena</i> (733-1153)

Week 5: Greek Science in Modern Film

<i>M</i>	<i>Agora</i> (film viewing)
<i>W</i>	<i>Agora</i> (film viewing)
<i>F</i>	Discussion (Concept Map 1 due)

Unit 2 Human's Dominion Over Nature

Week 6: Human's God and God's Earth

<i>M</i>	Holy Bible, Book of Genesis (Ch. 1-4)
<i>W</i>	Holy Bible, Book of Genesis (Ch. 6-9)
<i>F</i>	Galileo Galilei, "Letter to the Grand Duchess Christina"

Week 7: Nature as Mechanism

<i>M</i>	Descartes, <i>The World/A Treatise on Light</i> (selected readings)
<i>W</i>	Descartes, <i>Principles of Philosophy</i> (1.52-59; 2.1-3, 2.23-35)
<i>F</i>	Descartes, <i>Meteorology</i> (Of Clouds; Of Snow, Rain and Hail; Of Storms)

Week 8: Skepticism

<i>M</i>	David Hume, <i>An Enquiry Concerning Human Understanding</i> , Ch. 3-4
<i>W</i>	David Hume, <i>An Enquiry Concerning Human Understanding</i> , Ch. 5
<i>F</i>	David Hume, <i>An Enquiry Concerning Human Understanding</i> , Ch. 7

Week 9: Response to Skepticism: Scientific Method

<i>M</i>	Francis Bacon, <i>Novum Organon</i> , Book 1
<i>W</i>	Francis Bacon, <i>Novum Organon</i> , Book 1
<i>F</i>	Discussion

Week 10: Experimenting on Nature

<i>M</i>	<i>Radioactive</i> (film viewing)
<i>W</i>	<i>Radioactive</i> (film viewing)
<i>F</i>	Discussion

Week 11: Human and the New Nature

- M John Donne, *An Anatomy of the World* 1
W Shakespeare, *The Tempest*
F Shakespeare, *The Tempest* (**Concept map 2 due**)

Unit 3 Human Simulates Nature

Week 12: Reconstructing Reality

- M Kristine C. Harper, *Weather by Numbers* (Ch. 4)
W Eric Winsberg, *Science in the Age of Computer Simulation* (Ch. 3)
F Eric Winsberg, *Philosophy and Climate Science* (Ch. 4)

Week 13: Predicting Climate Change

- M Eric Winsberg, *Philosophy and Climate Science* (Ch. 10)
W Future Water Indiana Modeling Exercise
F Future Water Indiana Modeling Exercise

Week 14: Knowledge and Skepticism

- M Norton & Suppe (2001) “*Why Atmospheric Modeling is Good Science*”
W James Woodward (1997) “*Explanation, Invariance, and Intervention*”
F Lenhard and Winsberg (2011) “*Holism, entrenchment, and the future of climate model pluralism*”

Week 15: Human in the Anthropocene

- M Ted Chiang, *Exhalation*
W Bruno Latour, *Agency at the Time of the Anthropocene*
F William Cronon, “*The Trouble with Wilderness; Getting Back to the Wrong Nature*”
(Concept map 3 due)