

**Human Biology B200/S200 (4 CR), Section #8078
M & W 11:15-12:30
Morrison Hall 103/107
Spring 2019**

**THE INTRICATE HUMAN
Global Climate Change:
Linking Human and Planetary Health**

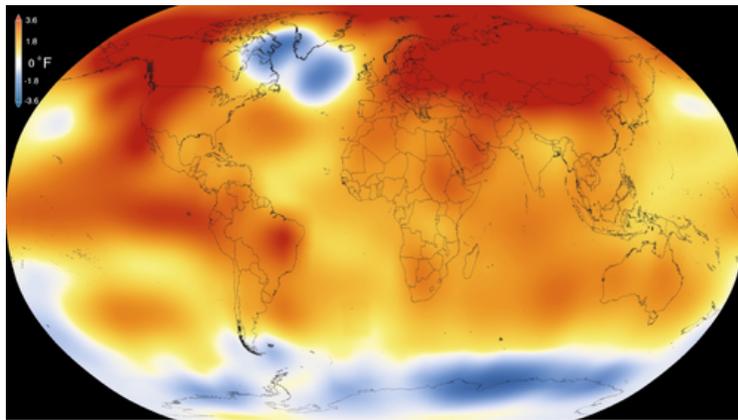


Image Source: https://en.wikipedia.org/wiki/Climate_change

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Undergraduate Teaching Assistants

Lillian Boots (Friday 9:30a-10:45a)
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Course Description:

Global climate change is one of the most pressing issues of our time, yet there remains much confusion regarding its scientific background among the public and policymakers and continued arguments among politicians over the best way to deal with its consequences. We will address the science and politics of climate change in this class using an interdisciplinary approach. Scientifically, we will examine the basics of climate science, how climate influences organisms and ecosystems, how humans influence the climate, and the ways organisms deal with climate change biologically. An emphasis will be placed on the role of climate change in ecological and evolutionary processes, how human activity interacts with these processes, and the consequences of this interaction on human health and sustainability. Complimenting the science, we will also look at the historical and political context in which the science operates. Specifically, we will consider the processes of industrialization that are driving climate change, the current rhetoric and consequence of climate change denial, and responses to that denial. Finally, we will examine how humans are dealing with climate change through technological advances, public policy agreement, and conservation and the success, or lack thereof, of those efforts. As part of the course, students will conduct independent research in the Bloomington area across the semester to examine temporal correlations between climatic variables, such as temperature and rainfall, and ecological factors, such as timing of leaf loss or emergence, bird diversity and abundance, and human health and activity. Results from this work will be evaluated in the context of larger regional and global trends, as well as compared to past course projects to establish local trends, and presented in a public poster presentation at the end of the semester.

Learning Outcomes:

- Students will recognize and analyze the basics of climate science and how humans influence the climate
- Students will describe how climate influences organisms and ecosystems in terms of ecological and evolutionary processes
- Students will understand and explain the relationship between climate change and human health
- Students will locate current climate science within the history industrialization
- Students will recognize, analyze and critique the rhetoric of climate denial and understand its relationship to economic growth
- Students will identify and assess the effectiveness of government policy and international agreements on addressing climate change
- Students will develop social responsibility related to civic engagement

Pre-requisites: Anthropology B200, Statistics

Class Structure: The entire class meets twice each week and is subdivided into three lab sections that meet once a week. The large class meetings will include lectures, case studies, and team collaborations. The sections will include laboratory exercises, data collection, analysis and interpretation, and discussion. Class assignments will be done both in teams and by individuals; working successfully in teams is a central aspect of all HUBI courses.

Team Interactions: Effective teamwork can lead to productive insights. You are expected to coordinate with your team members, not only to get work done in a timely manner, but to work together to get the most out of any given assignment and the course as a whole. Starting in week 3, you will sit with your team during class lecture. Over the course of the semester, large team assignments will be turned in with a statement about the % contributions of each member to the final product. Your individual score on team assignments will be adjusted based on the evaluation of your team members. If your team encounters difficulties in interactions among team members it is the team's responsibility to first try to resolve these by meeting and discussing these problems. If they cannot be resolved through this mechanism, you should meet with your AI and the professors to find a solution.

Attendance Policy: Attendance in all lectures and lab sections is required. Please arrive in class on time and stay for the entire class period. Late arrival, early departure, or inappropriate use of technology will be considered non-attendance. In addition to being crucial for maximizing your individual learning, team interactions can be considerably hampered by absenteeism. We will use your attendance record, in addition to your team members' assessments of your performance, in adjusting your score on team assignments.

Internet or phone usage in class: We will be using the internet regularly in class to do research. Please make sure that at least one team member (and ideally two) has a laptop or tablet for in-class work. You are welcome to use your laptop/tablet to take notes related to the class.

Canvas: All course information (including sections) will be on a combined course site SP19-BL-HUBI-B200-8078. Your section site will not be used.

Required Text: Available at the IU bookstore, TIS or online
Dire Predictions: Understanding Climate Change, Michael Mann and Lee Kump, (2015)
Additional readings will be posted on Canvas and most are listed on the syllabus.

Deadlines: Deadlines for course requirements are firm. No extensions will be allowed except for dire circumstances, which must be accompanied by documentation. Any requests must be made in advance of the deadline. Late materials will result in a 10% reduction in the total possible grade for each 24 hours they are late.

Student Conduct: All students are expected to abide by the IU Student Rights, Responsibilities & Conduct: <http://www.iu.edu/~code/code/index.shtml>. Academic misconduct (e.g., cheating, plagiarism) will not be tolerated and evidence of such misconduct will result in disciplinary action. You are responsible for understanding what constitutes academic misconduct and plagiarism, for further information see: <http://www.iu.edu/~code/code/responsibilities/academic/index.shtml> or there is more information at http://teaching.iub.edu/policies_misconduct.php?nav=policies

***You must also pass the plagiarism certification test before you will be assigned a grade for this course.** You can access it here: https://www.indiana.edu/~istd/iutest/plagiarism_test.phtml. Take the undergraduate test and have the certificate emailed to you. Print out, sign, and bring the certificate to your section meeting the first week of class.

Assessment: Your class grade will be determined as weighted by the categories listed below. Minimum guaranteed grades are: A \geq 90%, B = 80-89%, C = 70-79%, D = 60-69%, F < 60%. Pluses and minuses will be assigned: e.g., A+ = 100-97%, A- = 92.9-90%.

Pre-Class Lecture Participation (5%): Readings are assigned for each lecture and we expect that you will have completed the readings prior to the start of class. For each reading, you must submit one question and one response to a classmate's question on Canvas before class on the day the reading is due.

In-Class Lecture Participation (5%): Each lecture class will include an opportunity to discuss the course material and submit an in-class assignment.

Team Project (25%): Each team will design and carry out a test of a scientific hypothesis related to the themes of this course. The focus of the research project for this semester will be timing of ecological events in and around Bloomington. For example, your group may choose to examine a hypothesis that explains how time of year influences temperature, rainfall, snowfall, flowering of trees, bird presence or diversity, human use of greenspace, prevalence of cold or flu, allergies, energy usage, water usage, agricultural practices, etc. By examining seasonality in various biological and physical factors, as well as how this relates to human behavior, physiology, and health, we will develop a dataset for tracking changes in the timing of events in Bloomington over the years and how this relates to long-term records at local, regional, and global levels.

We encourage you to think broadly and inventively about what you are interested in testing and how your goals can be accomplished. We will have several workshops to guide your team along: project proposals will be due to help in establishing your approach before data collection begins, times will be set aside for you to present your preliminary results and to get feedback on your posters. At end of the semester, each team will present their work in a public scientific poster session. Additionally, each group will also present their work creatively as a product that would be of benefit to the greater community (for example, a public service announcement, a K-12 lesson, a community event). These team creative projects will also be shared and evaluated in section during the final week of class.

Climate Change Debate (5%): We will have a debate over global climate change and possible solutions at an international level.

Lab Exercises (15%): Each lab section will be associated with one or more pre- or post-lab assignment. The goal of the labs is to give you hands-on experience with the scientific approaches used to study the content we cover in lecture. Most labs include some data analysis and presentation. An additional intention of these assignments is to give you a tool kit that you can employ in the final team project.

Midterm Exams (30%): There will be two exams (Feb. 11, Mar. 25). Each will be worth 15% of your grade. There will be no make-up exams. Midterm exams will consist of an individual and a team portion.

Final Exam (15%): There will be a final exam on Monday, May 1st, from 12:30 – 2:30p

Note: If you ask us to reconsider your grade on your final project, we will be happy to do so.

But please note, there are no guarantees that your grade will go up. Upon further scrutiny, your grade may go up, stay the same, or go down.

Email Policy: Please write “Climate Change” in the subject line of your email, preceded by “Urgent” if you need us to read your email immediately. Otherwise, it may take us about a week to get back to you. For immediate responses, **students are encouraged to bring their substantial content questions to office hours rather than email.**

Additional Important Announcements:

1. Positive Learning Environment: As your instructors, it is our responsibility to create a positive learning environment for all students. Bias incidents (events or comments that target an individual or group based on age, color, religion, disability, race, ethnicity, national origin, sex, gender, gender identity, sexual orientation, marital status or veteran status) are not appropriate in our classroom or on campus. What should you do if you witness or experience a bias incident? Report it by submitting a report online (biasincident.indiana.edu) or calling the Dean of Students Office (812-855-8187).

Title IX and IU’s Sexual Misconduct Policy prohibit sexual misconduct in any form, including sexual harassment, sexual assault, stalking, and dating and domestic violence. If you have experienced sexual misconduct, or know someone who has, the University can help. If you are seeking help and would like to speak to someone confidentially, you can make an appointment with:

- The Sexual Assault Crisis Services (SACS) at (812) 855-8900 (counseling services)
- Confidential Victim Advocates (CVA) at (812) 856-2469 (advocacy and advice services)
- IU Health Center at (812) 855-4011 (health and medical services)

It is also important that you know that Title IX and University policy require us to share any information brought to our attention about potential sexual misconduct, with the campus Deputy Title IX Coordinator or IU’s Title IX Coordinator. In that event, those individuals will work to ensure that appropriate measures are taken and resources are made available. Protecting student privacy is of utmost concern, and information will only be shared with those that need to know to ensure the University can respond and assist.

We encourage you to visit stopsexualviolence.iu.edu to learn more.

2. Disability Services for Students (DSS): Every attempt will be made to accommodate qualified students with disabilities (e.g. mental health, learning, chronic health, physical, hearing, vision neurological, etc.). You must have established your eligibility for support services through the appropriate office that services students with disabilities. Note that services are confidential, may take time to put into place and are not retroactive; captions and alternate media for print materials may take three or more weeks to get produced. Please contact Disability Services for Students at <http://disabilityservices.indiana.edu> or 812- 855-7578 as soon as possible if accommodations are needed. The office is located on the third floor, west tower, of the Wells Library, Room W302. Walk-ins are welcome 8 AM to 5 PM, Monday through Friday. You can also locate a variety of

campus resources for students and visitors that need assistance at:
<http://www.iu.edu/~ada/index.shtml>.

3. Counseling and Psychological Services (CAPS): Available if needed and do not hesitate to contact one of us or the Health Center as early as possible: IU Health Center is located at corner of North Jordan Avenue and East 10th Street with free parking for patients behind the clinic (General Info: 812-855-4011, Medical Appointments: 812-855-7688).

4. Note Selling: Several commercial services have approached students regarding selling class notes/study guides to their classmates. Selling the instructor's notes/study guides in this course is not permitted. Violations of this policy will be reported to the Dean of Students as academic misconduct (violation of course rules). Sanctions for academic misconduct may include a failing grade on the assignment for which the notes/study guides are being sold, a reduction in your final course grade, a failing grade in the course, among other possibilities. Additionally, you should know that selling a faculty member's notes/study guides individually or on behalf of one of these services using IU email, or via Canvas may also constitute a violation of IU information technology and IU intellectual property policies and additional consequences may result.

5. Writing Tutorial Services: Successful participation in the course involves demonstrating effective writing skills, including the careful use of technical vocabulary. Excessive typographical or grammatical errors will lower your grade. If you believe there may be a problem in this regard, see AL, MW, or JC, and we can arrange for help at Writing Tutorial Services <http://www.indiana.edu/~wts/>.

Course Schedule

Unit 1: The Long and Short History of Climate Change

Week 1

Jan 7 Introduction to HUBI and B200

Jan 9 Lecture 1: Basics of Climate Change: Greenhouse Gases, the Sun, and Us

Readings: "Hoosiers' Health in a Changing Climate", pp. 6-15 in *Dire Predictions*, and "A New World," (pp. 1-27) in *Eaarth*, Bill McKibben (2010)

Lab Introduction to Lab and SimBio Activity, Scientific Method Exercise

Week 2

Jan 14 Lecture 2: Precipitation and Temperature: Critical Conditions and Resources for Life

Readings: Mora et al. 2017, "Indiana's Past & Future Climate", and pp. 16-29 in *Dire Predictions*

Jan 16 Lecture 3: Biodiversity, Mass Extinctions, and Human Well-Being

Readings: Pecl et al. 2017 and pp. 118-131 in *Dire Predictions*

Lab Explain and Organize Semester Projects and Climate Change Debate: Form Groups;
How to read a scientific paper

Week 3

Jan 21 MLK Day

Jan 23 Lecture 4: Evolution of Humans: Shifting Climates, Shifting Landscapes

Readings: Gibbons 2013 and Anderson 2017

Lab Methodology Workshop Part 1: An Overview

Week 4

Jan 28 Lecture 5: Fire! Extrasomatic Energy Use

Readings: Wrangham 2017 and “Climate Change Basics” Part 2: pp. 40-67

Jan 30 Lecture 6: The Energy Revolution

Reading: “Fossil Fuels, Wind, Water, Nuclear and Solar Energy” in *The Human Footprint*, Anthony N. Penna (2010)

Lab Proposal Workshop – Study Design, Data Collection, and Statistics

Week 5

Feb 4 Lecture 7: A Century of Oil

Reading: “Today’s Date: 1 E.C.E. Today’s Weather: Hot, Flat and Crowded,” in *Hot, Flat and Crowded*, Thomas Friedman (2008)

Feb 6 Lecture 8: Temperatures Rise

Reading: *Six Degrees: Our Future on a Hotter Planet*, Mark Lynas (2008)

Lab Methodology Workshop Part 2: Developing Specific Skills, Initial Proposal Due

Week 6

- Feb 11 Exam 1
- Feb 13 Team Project Proposal Revisions Workshop & IU Central Heating Plant Guest Lecture
- Lab* IU Central Heating Plant Tour, Required Meetings with AI

Unit 2: Biological and Sociopolitical Responses to Climate Change

Week 7

- Feb 18 Lecture 9: Phenotypic Plasticity, Migration, Adaptation or Extinction?:
Readings: McLachlan et al. 2007, “Aquatic Ecosystems in a Shifting Indiana Climate” and pp. 68-81 in *Dire Predictions*
- Feb 20 Lecture 10: General Effects of Climate Change on Human Morbidity and Mortality
Readings: “Tourism and Recreation in a Warmer Indiana” and pp. 82-117 in *Dire Predictions*
- Lab* Methodology Workshop Part 3: Finalizing Your Study Design and Long-Term Data Set, Evolution: Climate Game - Training, Final Proposal Due

Week 8

- Feb 25 Lecture 11: More Mosquitos and Ticks, More Infectious Diseases?
Readings: Kilpatrick 2017 and pp 132-149 in *Dire Predictions*
- Feb 27 Lecture 12: What Will We Eat in the Future of the Anthropocene?
Readings: Medek et al. 2017, “Indiana’s Agriculture in a Changing Climate” and pp. 150-163 in *Dire Predictions*
- Lab* Evolution: Climate Game – Competition, SimBio Due

Week 9

- Mar 4 Lecture 13: The Politics of Doubt
Readings: “Introduction,” “Doubt is our Product” and “The Denial of Global Warming” in *Merchants of Doubt*, Naomi Oreskes and Erik Conway (2010)
- Mar 6 Lecture 14: Skepticism and Denial

Readings: “The Chicken Little Syndrome,” “Cooking the Climate Books,” and “Forcing Factors and Fictions” in *Climate of Corruption*, Larry Bell (2011)

Lab U.N. Debate Part 1: Causes & Consequences of Climate Change

Spring Break

Week 10

Mar 18 Lecture 15: Denying to the Grave

Reading: “The Psychological Climate Paradox” and “Climate is the New Marx” in *What We Think About [When We Try Not to Think About] Global Warming*, Per Espen Stoknes (2015)

Mar 20 Lecture 16: Climate Refugees

Viewing: *Climate Refugees*, Michael Nash (2016), [[Bloomington](https://indiana.kanopy.com/node/171082)]
<https://indiana.kanopy.com/node/171082> (Available on campus and off campus with authorized logon)

Lab U.N. Debate Part 2: National & Global Solutions to Climate Change

Week 11

Mar 25 Exam 2

Mar 27 Team Projects Workshop – Data Collection Check-In

Lab Carbon Sequestration Activity Part 1 - Data Collection on Campus

Unit 3: Keep Hope Alive? or Keep on Truckin'?

Week 12

Apr 1 Lecture 17: Politics in Paris

Reading: “Losing Earth: The Decade We Almost Stopped Climate Change” in *New York Times Magazine*, Nathaniel Rich (2018)

Apr 3 Lecture 18: Planetary Health in the Anthropocene: Unintended Consequences of Our Carbon Footprint

Readings: Carleton 2017 and “Indiana’s Future Forests”

Lab Carbon Sequestration Activity Part 2 - Meet at Classroom for Data Analysis and Presentation of Results

Week 13

Apr 8 Lecture 19: Earth Optimism: Human Mitigation & Adaptation

Readings: “Maintaining Indiana’s Urban Green Spaces” and pp. 164-213 in *Dire Predictions*

Apr 10 Lecture 20: From Global to Local

Readings: “Preface,” “Where We Live,” and “The Way Forward” in *Climate of Hope*, Michael Bloomberg and Carl Pope (2017)

Lab Statistics Workshop: Group Project Data Analysis and Poster Prep

Week 14

April 15 Solutions

April 17 Team Project Work Day: Poster Prep

Lab Group Project Poster Final Edits

Week 15

April 22 Poster Session I: Teams Present Posters to Class & Community

April 24 Poster Session II: Teams Present Posters to Class & Community

Lab Creative Project Presentations

Finals Week

May 1 Final Exam on Wednesday, May 1st, 12:30-2:30p in MO 103/107