

# ATS 580A4: GEOENGINEERING THE CLIMATE

## Can Science Fix Climate Change? Is It Ethical?



Spring 2019, Monday and Wednesday 2:00-2:50 p.m., Natural Resources Building, Room 112

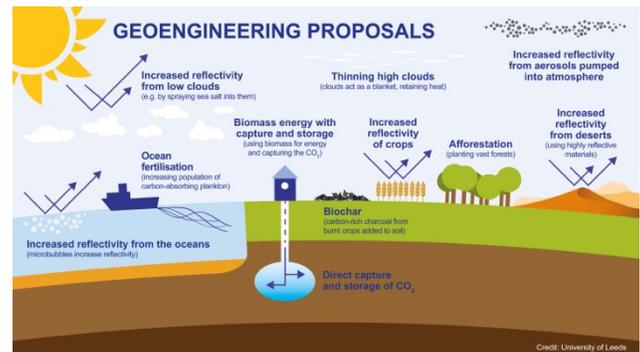
Instructor: Prof. James Hurrell  
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Phone: 970-492-4041

### What is Climate Geoengineering?

Climate change is occurring and its impacts on ecosystems, humans, and the economy will continue to grow. Moreover, the international community is not presently addressing climate change through policy and mitigation in a way that will avert profound consequences. This reality is leading to the consideration of geoengineering the climate system. Climate geoengineering – deliberate, large-scale intervention in the climate system designed to counter global warming or offset some of its effects – could well be in our collective future, especially as the impacts of climate change become more severe and geoengineering technologies are within reach.

### Why Should This Course Be of Interest?

Geoengineering is increasingly becoming part of the societal discourse around climate change. The recent Fourth National Climate Assessment has reemphasized that climate change is upon us and the natural, built and social systems we rely on are increasingly vulnerable to its cascading impacts. Yet, global efforts to reduce carbon dioxide emissions into the atmosphere are falling far short of what is necessary to avoid the worse impacts of climate change. It is within this backdrop that the concept of geoengineering the climate is being considered. Given this topic is at the interface of science, ethics and policy, **this course is designed to benefit upper-level undergraduate and graduate students from disciplines across campus.**



### What You Will Learn

**No prerequisites or textbooks required:** this course will be taught from first principles and will be useful to students from many different disciplines.

#### This course will cover:

- The major findings of recent national and international assessments of climate change and climate change impacts
- The major characteristics of proposed geoengineering techniques
- Ethical and governance considerations of any future geoengineering efforts

The course will facilitate broad discussion of the many facets of climate geoengineering, informed and enriched by the diverse backgrounds and perspectives of the students. Students will emerge at the end of the semester with their own views on whether it makes sense to move forward with the deployment of geoengineering techniques.

**Course Structure:** Homework will mostly involve assigned readings, which will form the basis for in-class discussion, as well as individual and group projects. Grades will be based on the projects and a final exam.

# ATS 580A4: Geoengineering the Climate

Colorado State University

Spring 2019

Monday and Wednesday, 2:00-2:50 p.m.

Natural Resources Building, Room 112

**Instructor:** Prof. James Hurrell ([James.Hurrell@colostate.edu](mailto:James.Hurrell@colostate.edu))

**Office hours:** ENGR A102F – M/W 12:00-1:30  
ATS Main 407 – by appointment

**Prerequisites:** None

**Class Website:** Canvas for ATS 580A4 (<http://info.canvas.colostate.edu/>)  
Hurrell's Website (<https://www.atmos.colostate.edu/people/faculty/hurrell/>)

**Required Textbook:** None

**Climate Geoengineering** – deliberate, large-scale intervention in the climate system designed to counter global warming or offset some of its effects – could well be in our collective future, especially as the impacts of climate change become more severe and geoengineering technologies are within reach. **This course will cover:**

- The major findings of recent national and international assessments of climate change and climate change impacts
- The major characteristics of proposed geoengineering techniques
- Ethical and governance considerations of any future geoengineering efforts

**Course structure:** The course is offered for two credits. The class will be conducted in a lecture/discussion format. PDF files of course notes and slides will be made available by no later than the end of every class session. **Homework** will mostly involve assigned readings, which will form the basis for in-class discussion, as well as individual and group projects. **Grades** will be based on the homework and projects, including a final project that each student will present to the class. The course will facilitate broad discussion of the many facets of anthropogenic climate change and geoengineering, informed and enriched by the diverse backgrounds and perspectives of the students. Students will emerge at the end of the semester with their own views on whether it makes sense to move forward with the deployment of geoengineering techniques.

## **Grading:**

Homework: 40%

Individual and Group Projects: 35%

Final Project: 25%

## **Tentative Schedule (Spring 2019):**

Week 1 (Jan 21):	Introductions and Discussion of Expectations and Course Objectives
Week 2 (Jan 28):	Anthropogenic Climate Change: Scientific Basis
Week 3 (Feb 4):	Scientific Basis
Week 4 (Feb 11):	Scientific Basis
Week 5 (Feb 18):	Anthropogenic Climate Change: Impacts
Week 6 (Feb 25):	Impacts
Week 7 (Mar 4):	Adaptation and Mitigation Strategies
Week 8 (Mar 11):	Introduction to Geoengineering
Week 9 (Mar 18):	Spring Break
Week 10 (Mar 25):	Carbon Dioxide Removal (CDR) techniques
Week 11 (Apr 1):	CDR techniques
Week 12 (Apr 8):	Solar Radiation Management (SRM) Techniques
Week 13 (Apr 15):	Geoengineering: Philosophical perspectives
Week 14 (Apr 22):	Geoengineering: Legal issues
Week 15 (Apr 29):	Geoengineering: Governance frameworks
Week 16 (May 6):	No class (extra time for final project preparation)
Week 17 (May 13):	Finals Week (final project presentations)

## **CLASS POLICIES**

**UNIVERSITY POLICIES:** Students are expected to follow the CSU Student Honor Pledge (<http://tilt.colostate.edu/integrity/honorpledge/>). This course will adhere to the CSU Academic Integrity Policy as found in the General Catalog (<http://www.catalog.colostate.edu/FrontPDF/1.6POLICIES1112f.pdf>) and the Student Conduct Code (<http://www.conflictresolution.colostate.edu/conduct-code>). At a minimum, violations will result in a grading penalty in this course and a report to the Office of Conflict Resolution and Student Conduct Services.

**POLICY ON COLLABORATION:** Students are encouraged to discuss homework assignments. However, each student must complete their own assignment. If I determine that students are simply copying assignments, I will pursue action through the Office of Academic Integrity (<http://tilt.colostate.edu/integrity/>). Any copying on tests will be similarly not tolerated.

**POLICY ON LATE HOMEWORK ASSIGNMENTS:** Late homework assignments will not be accepted, unless alternative arrangements have been made in advance with the Instructor.

**POLICY ON REMARKING HOMEWORK:** Students who disagree with how their assignment or project has been marked should resubmit their work with a written explanation of their concern. The work will be re-evaluated by the instructor in its entirety.

**POLICY ON MISSED PROJECTS:** Alternative arrangements for completing missed projects will be made given the submission of appropriate documentation.