Bending the Curve:  
Climate Change Solutions

Scripps Institution of Oceanography + Department of Political Science  
SIO 109R + POLSCI 117R  
Winter 2021

All lectures are delivered ASYNCHRONOUSLY. We encourage attendance at weekly discussion sessions, but they can also be viewed asynchronously.

Fonna Forman (Pol Sci): fonna@ucsd.edu  
Ram Ramanathan (SIO): vramanathan@ucsd.edu  
Office hours by appointment

TAs:

<table>
<thead>
<tr>
<th>NAME</th>
<th>EMAIL</th>
<th>ZOOM:</th>
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<tbody>
<tr>
<td>MADELIN ANDERSEN</td>
<td><a href="mailto:msa005@ucsd.edu">msa005@ucsd.edu</a></td>
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<tr>
<td>SIO 109R</td>
<td>DISCUSSION SECTION</td>
<td>Thursdays 10am Thursdays 4pm</td>
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<td>OFFICE HOURS</td>
<td>Thursdays 2-4</td>
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<tr>
<td>JOHN PORTEN</td>
<td><a href="mailto:john.porten@gmail.com">john.porten@gmail.com</a></td>
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<td>POLI 117R</td>
<td>DISCUSSION SECTION</td>
<td>Wednesdays 10am Wednesdays 4pm</td>
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<td>OFFICE HOURS</td>
<td>Wednesdays 11-1</td>
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VIDEO CURATOR:

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<tr>
<th>NAME</th>
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<th>ZOOM:</th>
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<tr>
<td>GRACE GROTHAUS</td>
<td><a href="mailto:sgrothau@ucsd.edu">sgrothau@ucsd.edu</a></td>
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<tr>
<td>VIDEO DESIGN MEETINGS (Please sign-up on Canvas!)</td>
<td>Mondays 10-1 Tuesdays 10-1</td>
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Requirements / Grading:

- Participation in weekly Discussion Threads - 20%

- Weekly Review Quiz performance - 20% (your lowest two quiz grades will be dropped)

- Video-based final project due during exam week - 60% (Component Deliverables 20% + Final Video 20% + Individual Essay 20%)

Class Protocols:

UC CANVAS: This is an online course. Please note: all course materials are located on the University of California Canvas Platform. NOT on UCSD Canvas.

COURSE ANNOUNCEMENTS: All course announcements will be posted through UC Canvas. Please check regularly. You should also receive emails when new announcements are posted.

ONLINE VIDEOS AND READINGS: As an online course, the instructional dimension of the course is conducted through online pre-recorded videos and associated reading assignments, authored by climate change experts across the University of California system, and beyond. Links for weekly assigned videos and readings are provided in UC Canvas. It is essential to keep up with weekly videos and readings, before attending the weekly Discussion sessions.

WEEKLY DISCUSSION SESSIONS: Synchronous Zoom participation is encouraged, but sessions can be viewed asynchronously. Students are expected to review all video lectures and associated readings assigned for each Discussion Session, and come prepared to discuss topics and raise questions. If you can not attend your assigned session, you can drop in to a different session. (see page 1 for times and links). We are 100% ok with this! But please note that the TA in your assigned section will be responsible for your grades. We encourage you to visit office hours!

DISCUSSION THREADS: Each week, students must complete six entries in the Discussion Threads on Canvas. Weekly questions are due by Sunday at midnight. Three entries must be a well-constructed paragraph of your own; three can be responses to other students’ entries. Of course you are encouraged to contribute as much and as often as you wish! Participation will comprise 20% of your final grade.

WEEKLY REVIEW QUIZZES: To ensure you are mastering the online materials, you must complete each week’s Review Quizzes by Sunday at midnight. Some weeks have more Review Quizzes than others. Please pay close attention. Your lowest two quiz grades will be dropped; and the remaining quizzes will together comprise 20 % of your final grade.
Final Project: Students will submit a final project, comprised of a Video and accompanying Essay, due during exam week. Component deliverables are also due at various points through the term. Prompt is attached to this syllabus. Students can work individually or in teams of 2-3.

Video Design Sessions: Students will develop their video project throughout the term, with the creative design and technical support of Grace Grothaus, our Video Curator. Each project team / individual will sign up for four mandatory meetings of 20 minutes each, starting during week 3. The sign-up sheet will be available on Canvas. You are welcome to meet more often, if you wish!

Schedule

Key:

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<tr>
<th>WEEK</th>
<th>CLUSTER</th>
<th>TOPIC / ASSIGNMENTS</th>
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| WEEK 1| Science Solutions | Introductions / Protocols  
|       |                | Climate Change Science  
|       |                | VIDEO 1: Climate Change (Ramanathan, UCSD)  
|       |                | READING 1: (Ramanathan)  
|       |                | RECOMMENDED (In Additional Materials):  
|       |                | Sea Level Rise  
|       |                | VIDEO: Sea Level Rise From Melting Ice (Rignot, UCI) + READING (Aines) |
| WEEK 2| All            | UC Bending the Curve: An Introduction  
|       |                | VIDEO 2: Ten Clusters & Ten Solutions (Ramanathan, UCSD)  
|       |                | READING 2 (Ramanathan + Cole)  
|       |                | Obstacles  
|       |                | VIDEO 3: Obstacles to Climate Solutions (Davis, UCI)  
|       |                | READING 3 (Samuelson) |

Due: Video Topic Preferences: Friday, January 15, 10am
Due: Teams Established: Monday, January 16

We encourage students to work in teams, but you are welcome to work individually if preferred. Please explore topic options and enter your preferences in Canvas by Friday January 15, 10am. Please also indicate in the preference sheet with “YES” if you wish to work on a team, so others can identify you. You can also see others in the list who share
your preference and reach out to them. These connections should be made over the weekend of January 15-17, so that by Monday of Week 3, your teams are established, and you have signed up for your first Video Design meeting.

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<thead>
<tr>
<th>WEEK 3</th>
<th>Social Solutions</th>
<th>Communication</th>
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<td>VIDEO 4A: Climate Science Communication (Somerville, UCSD)</td>
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<td>VIDEO 4B: Climate Communication (Christensen, UCLA)</td>
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<td>READING 4 (Somerville)</td>
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<th>WEEK 4</th>
<th>Governance Solutions</th>
<th>California as a Living Laboratory</th>
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<td>VIDEO 5: Lessons from California (Press UCSC)</td>
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<td>READING 5 (Millard-Ball + Press)</td>
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<td>VIDEO 6: Carbon Neutrality Initiative of UC (St. Clair, UCOP)</td>
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<td>READING 6 (St. Clair + Chiang)</td>
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<th>WEEK 5</th>
<th>Social Solutions</th>
<th>Climate Justice</th>
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<td>VIDEO 7A: Climate Justice &amp; Equitable Approaches (Forman, UCSD)</td>
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<td>VIDEO 7B: The Quest for Climate Justice (Pellow, UCSB)</td>
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<td>READING 7: Forman + Pellow</td>
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<td>RECOMMENDED (In additional materials): Health Impacts: VIDEO: Climate Change Health Impacts (Solomon, UCSF) + READING (Solomon) + READING (Forman + Solomon, et.al.)</td>
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| WEEK 6 | Social Solutions | **Social Norms + Behavior**  
VIDEO 8: Changing Social Norms and Behavior (Forman, UCSD)  
READING 8 (Forman)  

**Social Movements**  
VIDEO 9: Social Movements and Social Solutions (Han, JHU)  
READING 9 (Han)  

*RECOMMENDED (In additional materials)*  
**Religion:** VIDEO: Climate Change, Christianity and the Real Challenges (Hayhoe, Texas Tech) + READING (Tucker) |

| WEEK 7 | Market Solutions | **Economics and Climate Policy**  
VIDEO 10: Economics / Designing Climate Policy (Auffhammer, UCB)  
READING 10 (Auffhammer)  

**International Governance**  
VIDEO 11: International Governance (Victor, UCSD)  
READING 11 (Victor)  

*RECOMMENDED (In additional materials):**  
**Economics and Climate Policy, cont’d:**  
VIDEO: Cost-effective and Efficient Climate Policy (Jacobsen, UCSD)+ READING (Jacobsen) |

| WEEK 8 | Technology Solutions | **Energy Technologies**  
VIDEO 12: Energy Technology Pathways (Samuelsen, UCI)  
(NO READING 12)  

**Transportation**  
VIDEO 13: Transportation Pathways (Sperling, UCSD)  
READING 13A (Auston et. al)  
READING 13B (Barth + Sperling)  

**Super-Pollutants** |
| WEEK 9 | Technology Solutions | **Renewables**  
VIDEO 15: Renewable Energy (Samuelson UCI)  
(NO READING 15)  
**Nuclear**  
VIDEO 16: Nuclear Energy (Peterson, UCB)  
(NO READING 16)  
*RECOMMENDED (In additional materials):*  
**Negative Emissions:**  
Negative Emissions Technology (Aines, LLNL) |
| WEEK 10 | Ecosystem Management Solutions | **Carbon Sinks**  
VIDEO 17: Enhancing Carbon Sinks (Silver, UCB)  
READING 17 (Silver)  
**Local / Bioregional Solutions**  
VIDEO 18: Local and Bioregional Solutions to Climate Change (Pezzoli, UCSD)  
READING 18 (Pezzoli) |

**DUE: FINAL VIDEO + ESSAY: Wednesday, March 17**
Final Project Guidelines: A *Bending the Curve* Communication Video

Due on Canvas, **Wednesday, March 17 2021** before midnight.

Students will complete a final project individually or in small groups, imagining solutions to the climate change crisis in ways that demonstrate an ability to synthesize diverse approaches, and to communicate to diverse audiences. Students will research a climate change solution, write a narrative, and use visuals and media resources (existing or created) to produce a 5-7 minute video that explains and communicates their topic. The assignment does not require shooting film, so the only resources needed are computers and editing software, and a microphone.

The ultimate goal is to produce a video, but there are components steps along the way that are submitted and graded. The project is a total of 60 points:

1. **COMPONENT DELIVERABLES** (described below): (20 points)
2. **VIDEO**: A video of 5-7 minutes, designed to clearly communicate a complex climate change solution to a particular type of audience: (20 points)
3. **ESSAY**: An essay of 3-5 pages (12 pt., double spaced), describing the video and its intentions. What communication strategies did you employ to create the video? Which Bending the Curve clusters are implicated in the problem you hope to solve? What attitudes / behaviors do you hope your audience will change after viewing your work? The essay is meant to demonstrate your mastery of the course materials, and how the video draws upon them. Whether you work individually or in teams on your video, each student will submit an individual ESSAY: (20 points)

**LEARNING GOALS:**
1. Research and gain insight into an active climate change challenge and its impacts, and design a solution.

2. Access relevant online primary sources, literature, review articles, news and articles about your topic.

3. Think critically and collaboratively about how to effectively convey information about your topic, and motivate action in your audience.

4. Create or locate digital images and video clips that illustrate climate change science concepts within your topic area.

5. Create a compelling storyline that synthesizes and visualizes information into a cohesive and persuasive media piece.

**VIDEO TOPICS**: Students will design an integrated climate solution for California, drawing on the 6 clusters of the *Bending the Curve* report, with a focus on one of the following topics.
Please explore and enter your option in Canvas by Friday January 15, 10am, and also indicate YES if you wish to work on a team with others sharing your preference:

1. Start a **youth movement** committed to climate action.
2. Address the **public health impacts** of climate change, with an emphasis on **air quality**.
3. Design a **social media / communications** strategy / campaign for skeptical demographics.
4. **Protect disadvantaged California populations** disproportionately vulnerable to heat waves, fires, and the health impacts of climate disruption.
5. California adaptation strategies – **sea-level rise and flooding**
6. California adaptation strategies – **fires**
7. California adaptation strategies - **precipitation whiplash**
8. California adaptation strategies – **heat waves**
9. Address **food waste** in California, while addressing food disparities
10. **Campus carbon neutrality** – Drawing inspiration from the UC Carbon Neutrality Initiative, design a solution for your UC campus.

**INTENDED AUDIENCE:** Students should identify the *kind of audience* they wish to target with their video, from the following:

1. Young learners (Grades 3-6)
2. Teen learners (Grades 7-12)
3. Adults who accept climate change, but are less clear about what to do
4. Adults who are skeptical (Outright deniers are not among our target audiences.)

**INDIVIDUAL OR TEAM PROJECT:** We encourage students to work in teams, but you are welcome to work individually if preferred. Please explore topic options and enter your preferences in Canvas by Friday January 15, 10am. Please also indicate in the preference sheet with “YES” if you wish to work on a team, so others can identify you. You can also see others in the list who share your preference and reach out to them. These connections should be made over the weekend of January 15-17, so that by Monday of Week 3, your teams are established, and you have signed up for your first Video Design meeting.

**VIDEO DESIGN MEETINGS (REQUIRED):** Individuals / teams will meet 4 times over the course of the term with Grace Grothaus for ideational, creative design and technical support. Meetings will be structured by a set of deliverables, elaborated below. A sign-up sheet will be available on Canvas.

**COMPONENT DELIVERABLES:**

*You will be assigned a team number. Always use your TEAM # in the title of your submissions, as follows:*

**Deliverable 1:**

1-GroupX-TopicX-LastnameFirstname-LastnameFirstname-etc.

So for example, Group 3 doing Topic 5 with three group members would title their file:

1-Group3-Topic5-JorgeDoe+BaoLee+RashidSmith
MEETING 1: IDEATION BRIEF (Weeks 3-4): 5 points

By 5pm the evening before your meeting, you will submit as a group a brief / report that contains three things:

1) A List of major research questions about your topic: Your first task is to meet as a group, discuss your topic area, and assemble major questions that you want to address during your project.

2) A diagram of your “system”: create an overview of the system you are studying – to understand how it works – and assign each group member to research an aspect of that system. The diagram your submit can be a visual drawing, or a narrative. For example: a group investigating climate-carbon cycle feedbacks in tropical rainforests might approach the “system” in this way:
   - Factors that currently control “net primary productivity” (NPP) in tropical rain forests
   - Climate change impacts on abiotic factors such as moisture availability and temperature and how those impacts might change over time
   - Whether/how changing abiotic factors may influence carbon dioxide uptake and net primary productivity of the tropical rainforest in the future
   - Exogenous factors that may accelerate or mitigate climate change impacts (e.g., deforestation, species extinctions, agricultural use, pollution).

3) Division of labor among team members (if you are working in a team). Each member’s area of focus.

MEETING 2: “MINI-SCRIPT” + STORY BOARDS (Weeks 5-6): 5 points

By 5pm the evening before your meeting, you will submit two things:

1) “Mini-Script”: A brief script that narrates the main intentions from beginning to end. What is the story-line? What are the major highlights, transitions.

2) “Story Board”: You will receive a 11x17 template to create a story board that begins to
speculate on concept / image sequence and transitions. Commit to a conceptual sequence and begin to distribute the script schematically through the images. At the end of this stage you will begin to understand what images / video clips you will need, and will begin collecting them for the next stage of work.

MEETING 3: BLOCK ARCHITECTURE + REHEARSAL (Weeks 7-8): 5 points
At Meeting 3 with Grace you will present two things:

1) **Block Architecture**: Main sections and sequences of your video “blocked out and transitions clarified. Think of this as the visual architecture of your sequence. The main “elements” of the story are assembled, but not yet fully populated with images and video.

2) **Block Rehearsal**: From the Mini-Script and Story Boards, select two or three important moments / blocks and rehearse them in an actual video sketch, to understand the relationship of image to text to soundtrack, and how your transitions will be managed. This will help you to establish a visual identity for your video, and that can carried through the entire sequence.

MEETING 4 (Weeks 9-10): MASH-UP DRAFT (Weeks 9-10): 5 points
At Meeting 4 with Grace you will present:

**Mash-Up Draft**: Groups will work collaboratively to combine individual narratives and images into a single 5-7 minute video mash-up. At this stage, you should present a piece that you are proud to show, and be ready to receive constructive feedback. Keep in mind the following questions:
- Does the video present information clearly and concisely?
- Are statements made substantive? Is there a need for more (or less) information to make statements more compelling?
- Are visuals, video clips, text, illustrations, sound effectively used to communicate key messages and information? Could they be used more effectively?
- Are there any scientific inaccuracies?
- Is the video effective in reaching the target audience? Will they understand the content and relate to the style of presentation?

**FINAL VIDEO + INDIVIDUAL FINAL ESSAYS: Due March 17, Midnight.**