



Alarmed



Concerned



Cautious



Disengaged



Doubtful



Dismissive

Class 24: Climate Communication

- Mastering your audience
- How to do really well on your final paper
- Help us improve this class

Learning Objectives

- Understand the three most important skills for communicating your opinions (not only about climate)
- Get prepared for the final paper; hints to do as well as possible
- Get tips on how to do the best final paper from Guest Speaker, Josh Brown, UVM's Environmental reporter

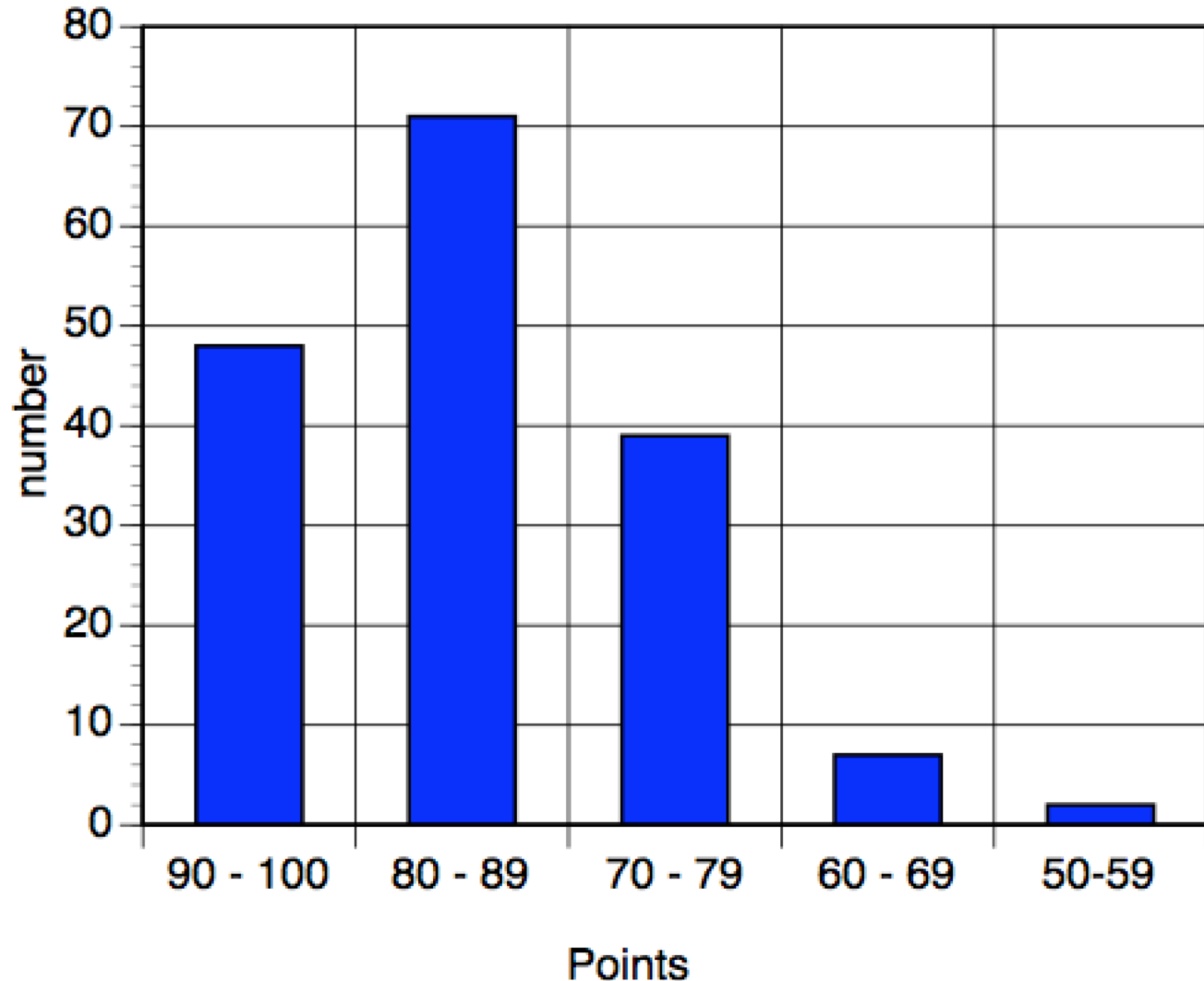
Who's your audience and how will you communicate what you have learned to make our Earth a better place?

Last Exam – NICE WORK!

- Mean = 85.1
- Median = 86.0

Scores will release at end of class.

If you have issues with grading, drop me (Paul) an email with a detailed explanation by Friday midnight.



Climate in the news



Climate models dating back to the early 1970s accurately foretold how greenhouse gases would fuel a hotter future, such as the July heat wave that sent Parisians flocking to the Fountains du Trocadéro. SAMUEL BOIVIN/NURPHOTO VIA GETTY IMAGES

Even 50-year-old climate models correctly predicted global warming

By **Warren Cornwall** | Dec. 4, 2019, 12:00 PM



Geophysical Research Letters

Research Letter

Evaluating the performance of past climate model projections

Zeke Hausfather , Henri F. Drake, Tristan Abbott, Gavin A. Schmidt

First published: 04 December 2019

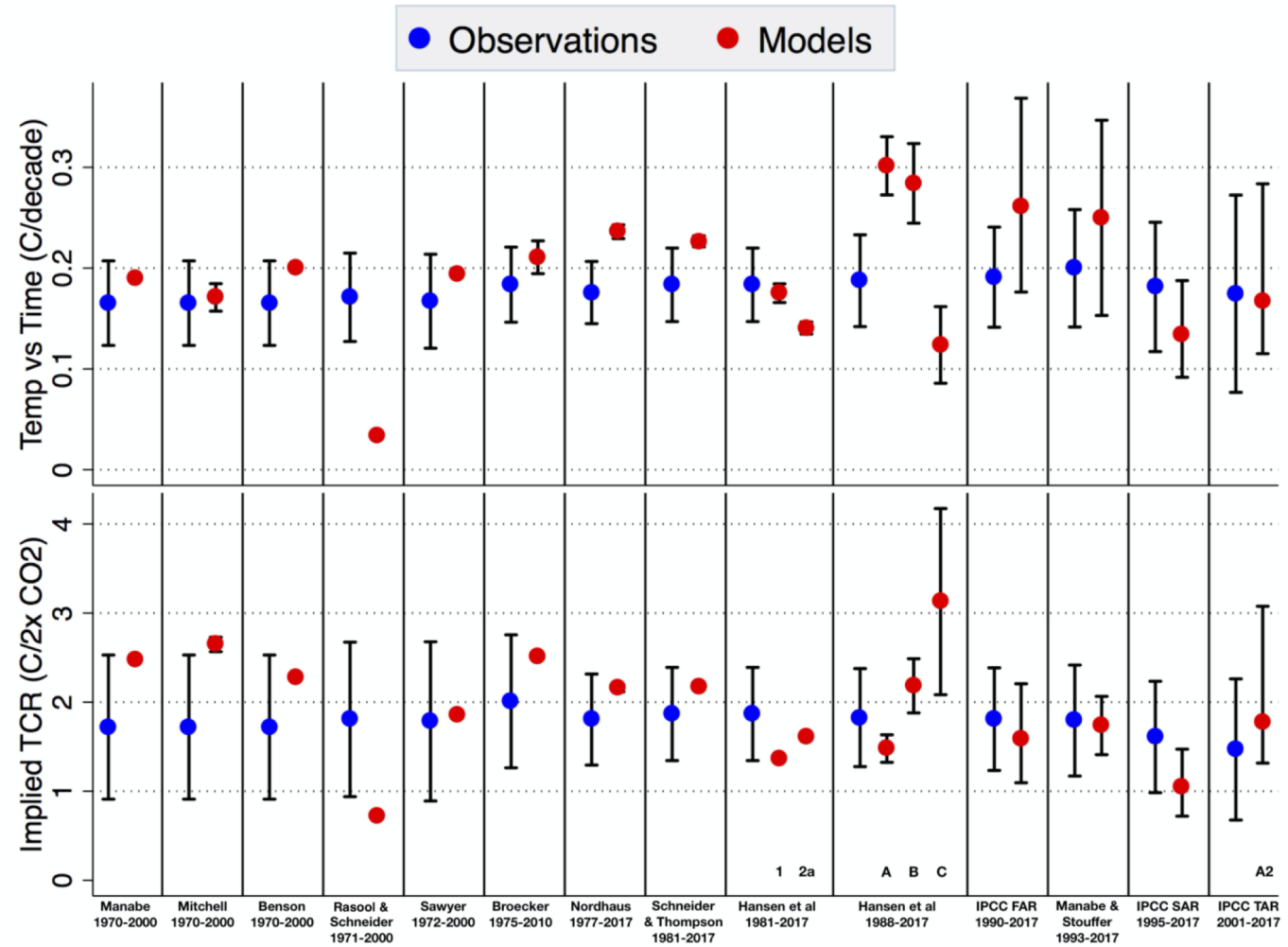
<https://doi.org/10.1029/2019GL085378>



“How much warming we are having today is pretty much right on where models have predicted,” says the study’s lead author, Zeke Hausfather, a graduate student at the University of California, Berkeley.

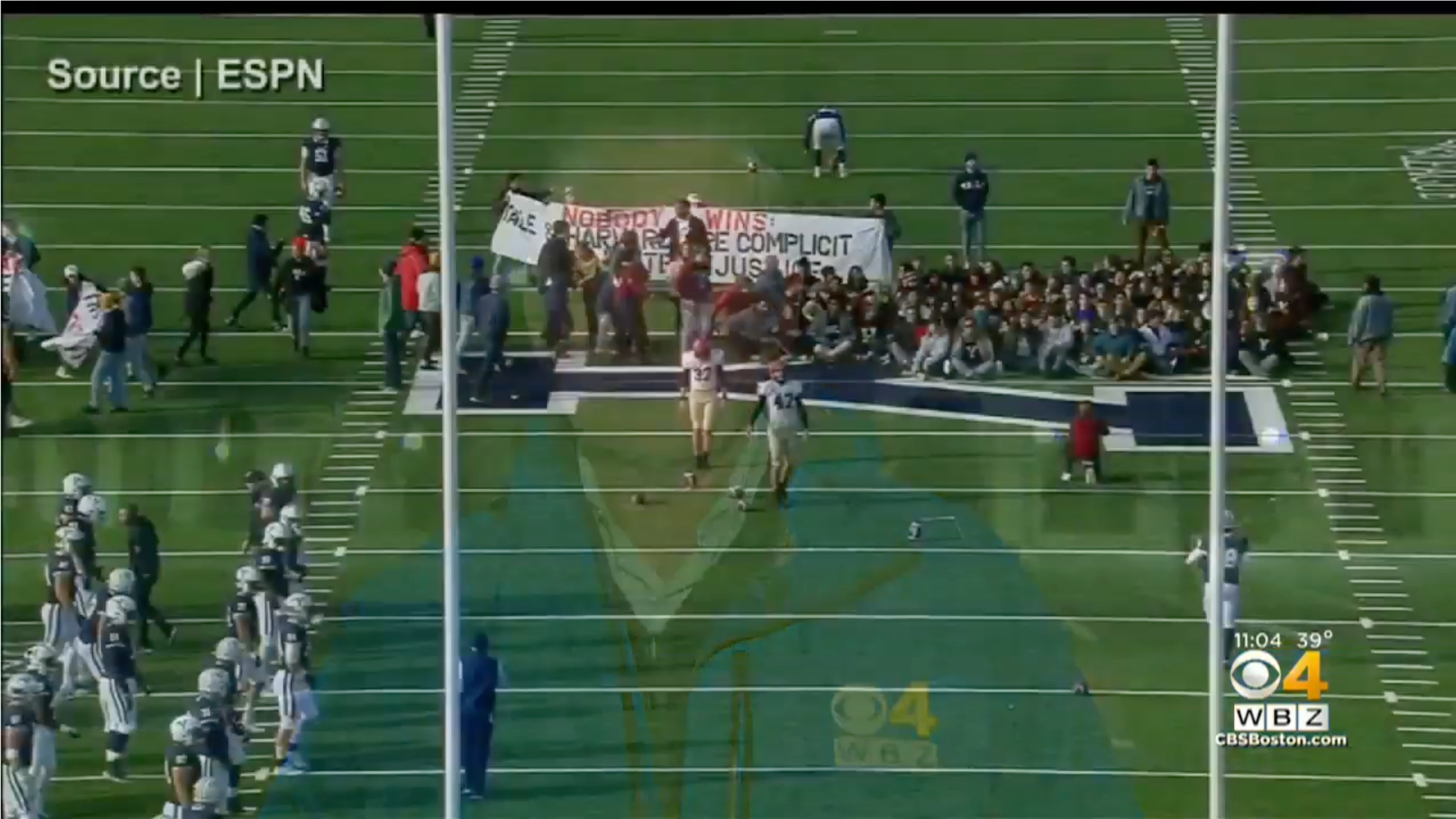
One more denialist claim is done

“We found that climate models – even those published back in the 1970s – did remarkably well, with 14 out of the 17 projections statistically indistinguishable from what actually occurred.”

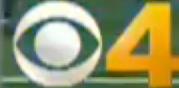


“One of the earliest computer models, made in 1970, got a 91%. What’s so impressive about that is that at the time, climate change wasn’t noticeable in the yearly temperature records like it is now,” Hausfather said.

Source | ESPN



11:04 39°



WBZ

CBSBoston.com

Review and our last clicker question! What's your favorite denier strategy?

- A. Fake experts
- B. Logical Fallacies
- C. Impossible expectations
- D. Cherry Picking
- E. Conspiracy Theories

Take action – 2 easy ways and one harder way you can help make change related to climate at UVM

Do these right now (and I'll send an email later if you don't have a device)

1. Sign the letter demanding UVM divest from fossil fuels.

go.uvm.edu/divest



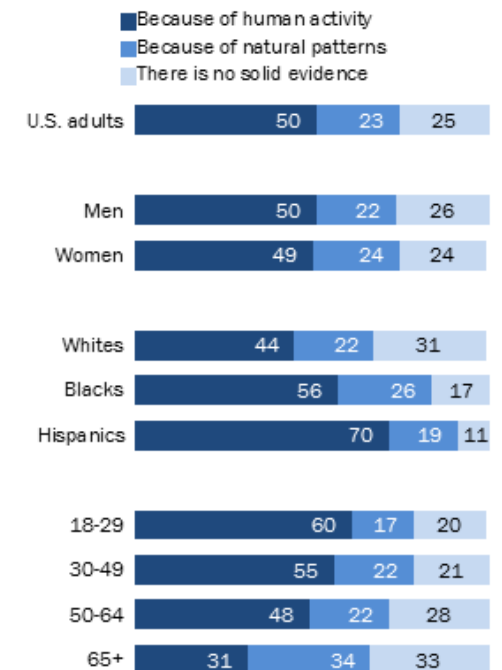
3. Write a GREAT Op-Ed and get it published.

2. Sign the letter supporting a more diverse UVM Board of Trustees because that will make divestment more likely.

go.uvm.edu/diversify

Views on Climate Change

% of U.S. adults saying the Earth is getting warmer because of human activity/because of natural patterns in Earth's environment/or that there is no solid evidence that Earth is getting warmer



SUNDAY REVIEW

The New York Times

Stopping Climate Change Is Hopeless. Let's Do It.

It begins with how we live our lives every moment of every day.

Survey of U.S. adults Aug. 15-25, 2014. Q20F1. "Don't know" responses not shown. Whites and blacks include only non-Hispanics; Hispanics are of any race.

PEW RESEARCH CENTER

Final Essay – your OP ED

Your assignment - write an OP-ED for your hometown paper.

Focusing on the same climate system you have considered all semester, write a 400-600 word persuasive essay. GIVE YOUR ESSAY A CATCHY TITLE!

In your OP-ED: 1) STATE the problem. 2) EXPLAIN how the system works including how it has changed in the past. 3) PROVIDE EVIDENCE that this problem is going to affect people now and in the future, and 4) most importantly, SUGGEST SOLUTIONS.

Your work needs to be well written, polished, and carefully proofread. SUBMIT ON BLACKBOARD by TUESDAY, DECEMBER 10, MIDNIGHT.

The folks at the Writing Center are your friends on this one. If you want some help, please, consult them. Here's the website: <https://www.uvm.edu/undergradwriting>

Chris – how to communicate - 2019 UC Santa Cruz Climate Engagement Program



The Importance of Framing

How you present an issue

- Can help communicate why an issue might be a problem, who or what might be responsible, and what should be done



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General Framing Principles:

- Choose a local frame (bring the message close to home)



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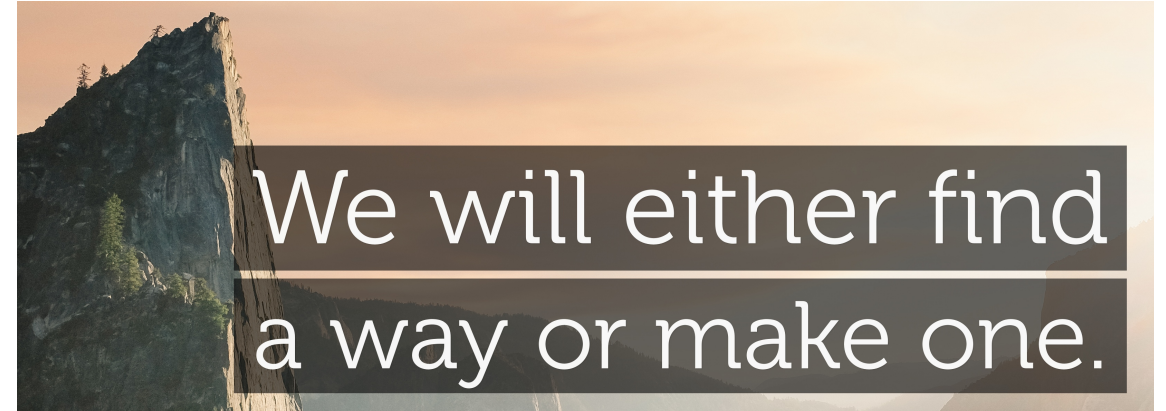
- Choose a local frame (bring the message close to home)
- Identify if your audience cares more for **promotion** or **prevention**
 - Promotion: want to maximize advances
 - Prevention: want to minimize losses (maintain the status quo)



Know Your Audience

Different framing of your message for:

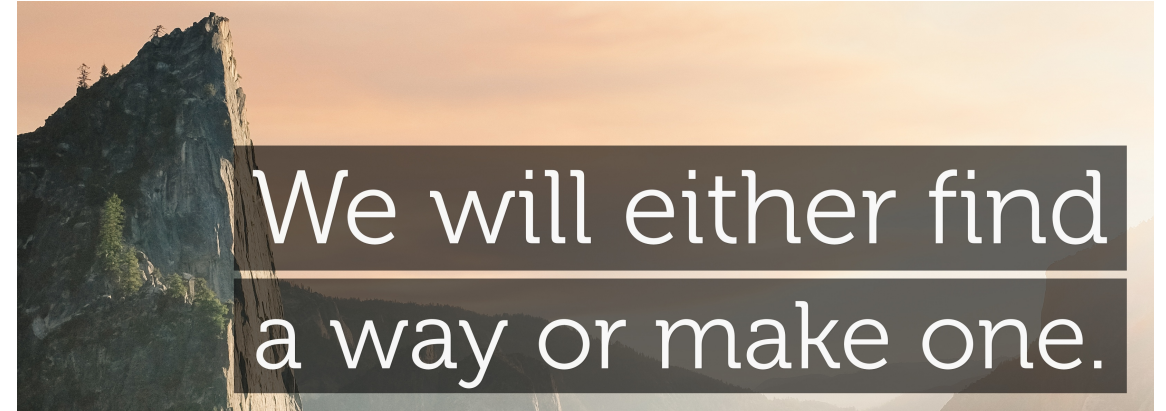
- University students



Know Your Audience

Different framing of your message for:

- University students
- Government employees
- Private industry workers
- Different political ideologies
- Family/friends
- Etc...



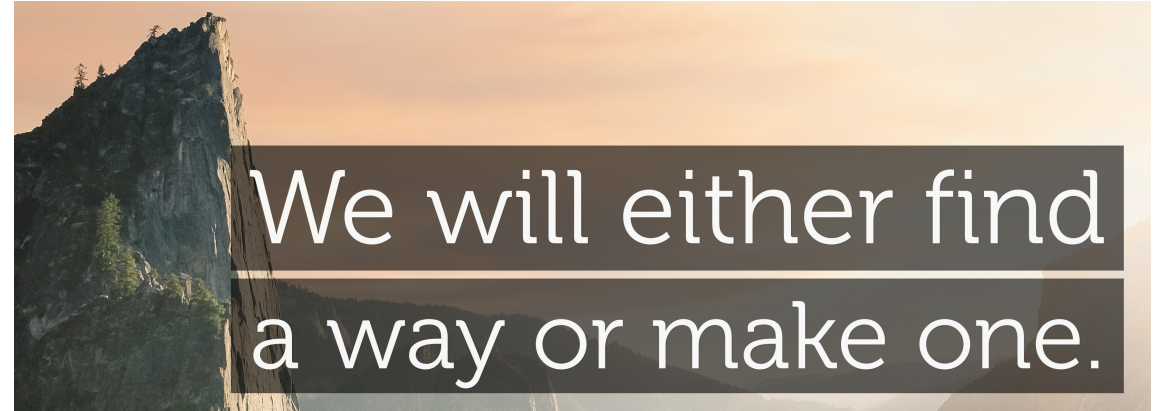
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Different framing of your message for:

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Example:

- Let's talk about a carbon tax...



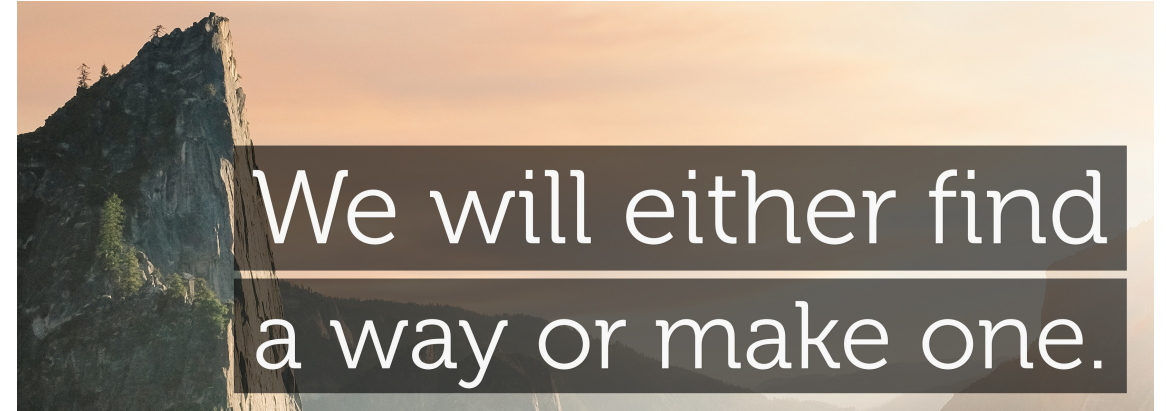
Know Your Audience

Different framing of your message for:

- University students
- Government employees
- Private industry workers
- Different political ideologies
- Family/friends
- Etc...

Example:

- Let's talk about a carbon tax...
- Large national poll found that 52% of respondents supported 'Carbon offsets', while 35% supported a 'Carbon tax', even though the program description was identical



Presenting Your Message

Ok, so you've identified your audience and understand how to frame your message.

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Scientists tend to go into too much detail about their work

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Focus instead on:

- What is the problem?
- Why does it matter?
- What are possible solutions?
- What are the benefits of the solutions?

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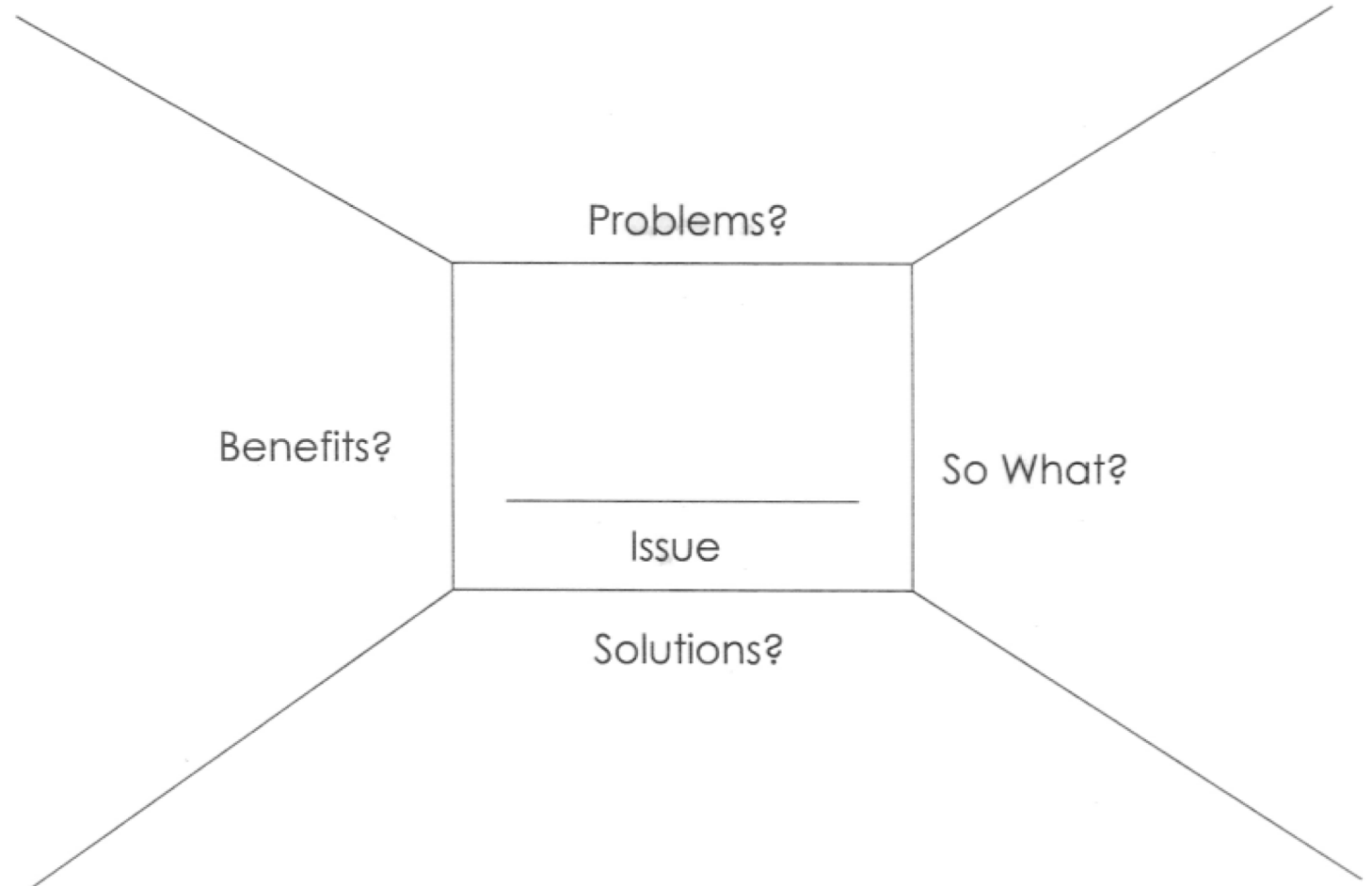
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Message Box

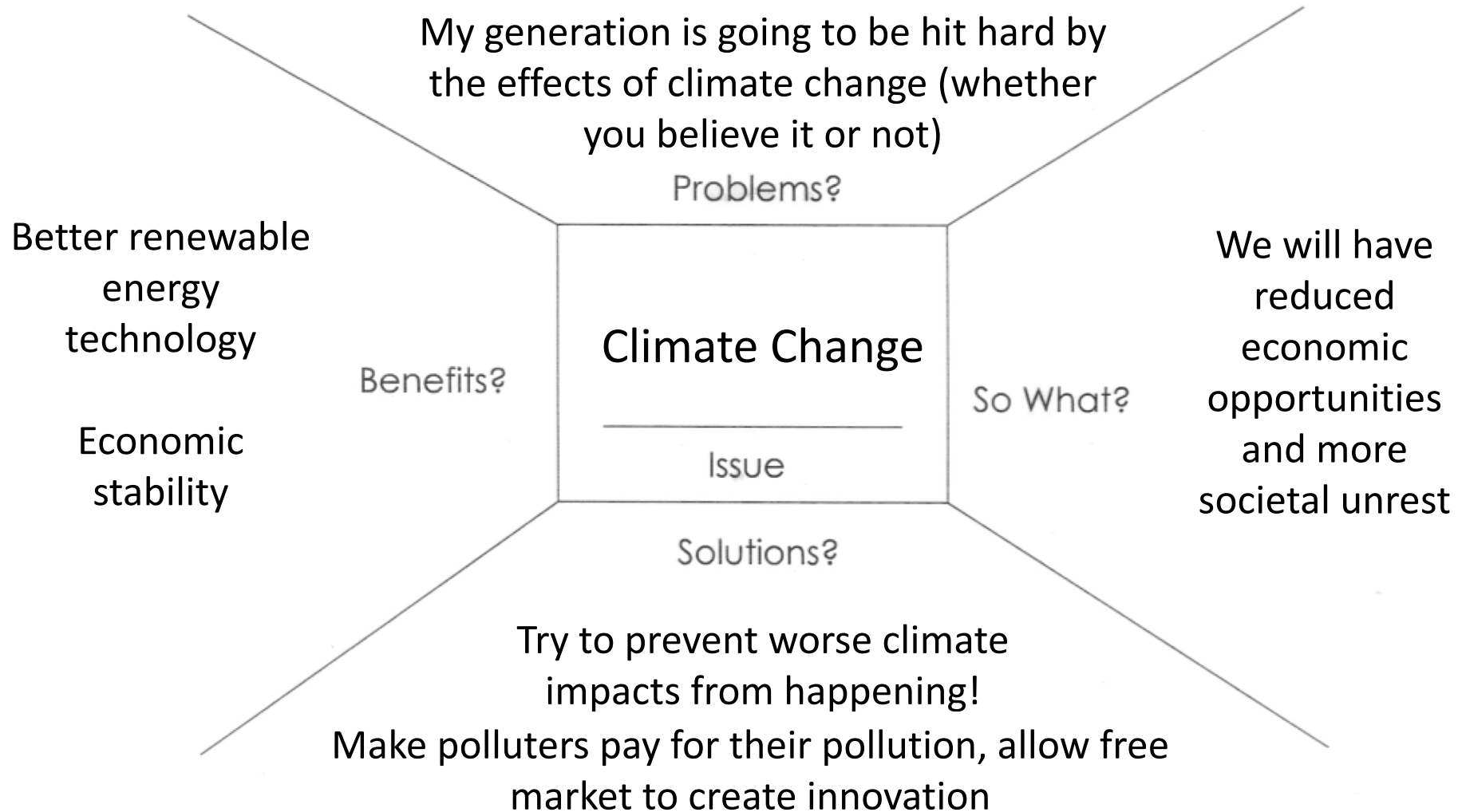
Audience: _____



Example: Talking to a Conservative Family Member about Climate Change

Message Box

Audience: _____



Josh Brown



Greenland on Thin Ice?

Two studies in Nature open deep history of Greenland's ice sheet — and raise new questions about its stability



How much of Greenland's ice melted during past periods of global warming? Two first-of-their-kind studies in Nature look much deeper into the history of Greenland than ever before—including one led by UVM geologist Paul Bierman, "The melting we are seeing today," he says, "may be out of the bounds of how the Greenland ice sheet has behaved for many millions of years." (Photo: Joshua Brown)

The ice sheet covering Greenland is four times bigger than California — and holds enough water to raise global sea-level more than 20 feet if most of it were to melt. Today, sea levels are rising, and the melting of

BY JOSHUA E. BROWN



RELATED LINKS

- Study in Nature
- UVM Cosmogenic Nuclide Lab
- UVM Geology Dept.
- UVM College of Arts & Sciences



Joshua Brown • science writer and photographer
University of Vermont • joshua.brown@uvm.edu



ICE SHEETS ISOTOPES & MUSK-OX PIZZA

A polar scientist's tour of Greenland

Story and photographs by
JOSHUA BROWN

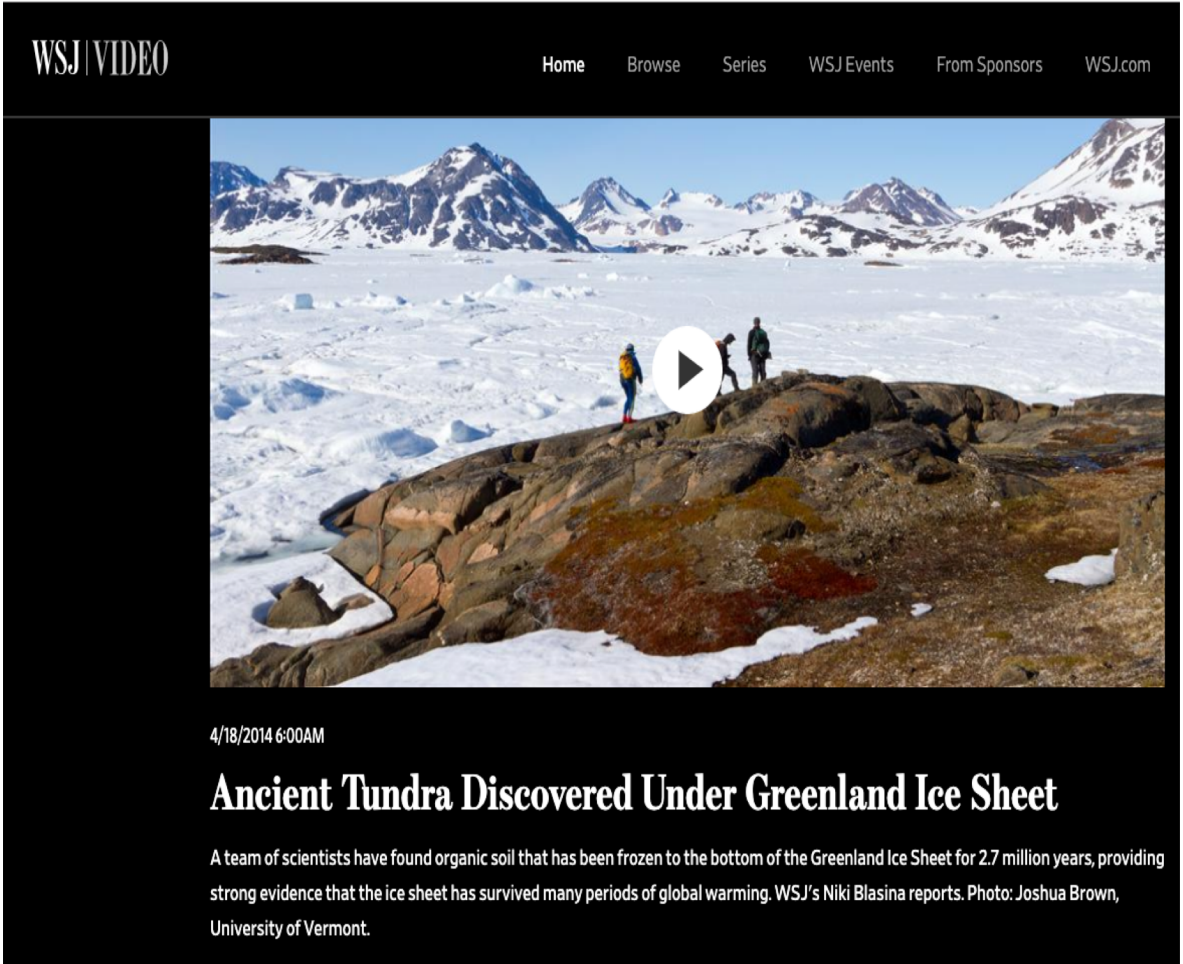
It's getting hot. Paul Bierman takes off his ski hat and wipes his brow. Then he scrambles out of a stream and up a bank of wet snow. Alice Nelson holds open a plastic bag, Bierman carefully empties a brass sieve, filling the bag with sand from the bottom of the stream.

The air temperature feels like it's about fifty degrees Fahrenheit. Chilly for a day in June. Except this is Greenland. We're sixty-two miles from the Arctic Circle. It's supposed to be cold here: most of this not-green island is covered with an ice sheet 1,500 miles long and thousands of feet thick.

Covered, that is, for now—but it's getting hot. That's why Bierman, professor of geology at UVM since 1993, has led a team of scientists to this barren coastline. They're collecting sand and rocks, washing out from the snow and ice, that will help answer a little understood—but most important—question: how fast will Greenland melt in a warming world?

Still standing in the stream, Jeremy Shakun, a researcher from Harvard, stoops to collect more sand. A glinting torrent of ice and water goes rushing past, nearly overtopping his Muck boots. Alice Nelson, Bierman's graduate student, enters our GPS coordinates in a notebook. On the opposite bank, Dylan Rood, a Californian now at the Scottish Universities Environmental Research Centre, arranges black letters on a magnetic

THE WALL STREET JOURNAL.



WSJ | VIDEO

Home Browse Series WSJ Events From Sponsors WSJ.com

4/18/2014 6:00AM

Ancient Tundra Discovered Under Greenland Ice Sheet

A team of scientists have found organic soil that has been frozen to the bottom of the Greenland Ice Sheet for 2.7 million years, providing strong evidence that the ice sheet has survived many periods of global warming. WSJ's Niki Blasina reports. Photo: Joshua Brown, University of Vermont.

WILD EARTH

The Journal of the
Wildlands Project
SPRING/SUMMER 2004

\$6.95 US / \$8.50 Canada



Rod Nash on Wild Rivers
North of the 51st Parallel
The Joyful Terror of Oneness
What are Central America's Parks For?

Health Science

THE BOSTON GLOBE MONDAY, JANUARY 16, 2006

Medical Help Wanted
Deaths
Weather
C
C2
C5
C8

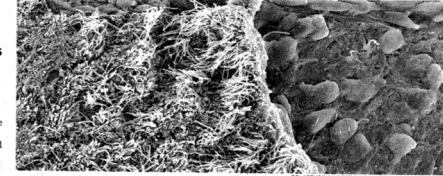
GLOBAL WARMING

Maybe Reagan was right: Trees release greenhouse gas

Say "methane" and many people think of a swamp or the tail-end of a cow. But scientists have been puzzled by satellite images showing clouds of this potent greenhouse gas above tropical forests. Why thyme? It had been thought that oxygen-depleted wetlands and, yes, the flatulence of animals produce most naturally occurring methane. Now, Frank Keppler at the Max Planck Institute in Germany and his European colleagues have made a startling discovery: Living plants spew large amounts of methane into the atmosphere. Their results suggest that 10 to 30 percent of annual releases come from trees and other plants, toppling the belief that methane can't form in the presence of oxygen. Their discovery may also help explain why atmospheric methane levels have dropped in recent years: forests are being leveled across the planet.

BOTTOM LINE: This study raises the ugly possibility that new forests accelerate global warming through methane emissions rather than slow it down by soaking up carbon dioxide. But it's too soon to tell, or to revise policies intended to reduce greenhouse gases. "We don't know how significant these emissions are compared to the carbon dioxide uptake by plants," says David Lowe, who authored a companion article to Keppler's.

CAUTIONS: This is the first research of its kind. It



MOVING IN STEP — This electron microscope image shows a line of neurons moving through the brain on a delicate current of cerebrospinal fluid. The current was discovered as a part of research into how cells in a developing brain travel to the places they are needed.

awaits confirmation by other scientists. Also, the amount of global methane is notoriously difficult to measure, so the relative importance of this new source is not clear. And don't start cutting forests to slow global warming. "I suspect the amount of carbon drawn from the atmosphere by trees is colossal," Lowe says, "while the role of methane in the Earth's carbon cycle is tiny."

WHAT'S NEXT: Political controversy is sure to follow any revision of the mechanisms of global warming.

While policymakers scramble to make sense of this unexpected source of greenhouse gas, scientists will be wondering how they overlooked a worldwide source of methane and working to understand how plants produce it.

WHERE TO FIND IT: Nature, Jan. 12, 2006

JOSHUA BROWN

AXIOS

Lake trout are making a comeback, and no one knows why



Trout in a bucket. Photo: Joshua Brown / University of Vermont

What do you care about?

- Conservation
- Social Justice
- Climate Change Mitigation

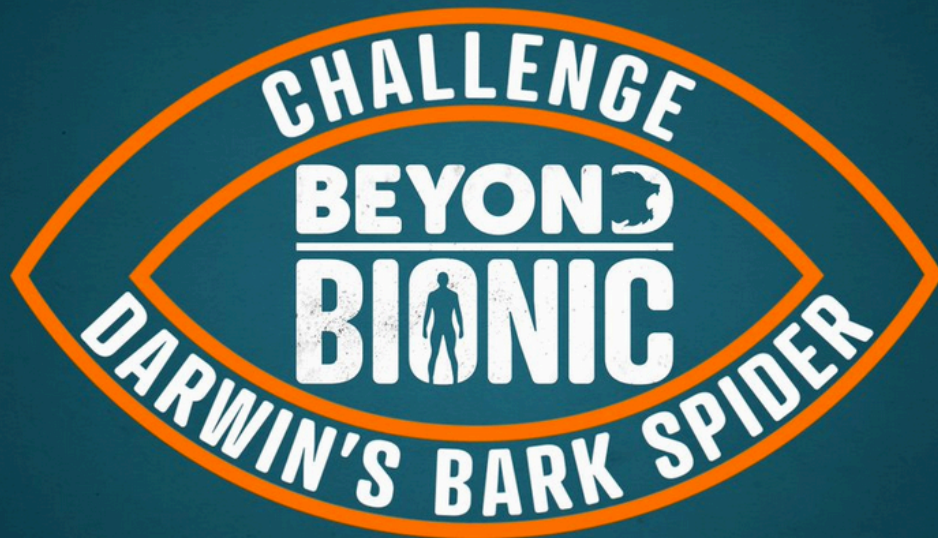
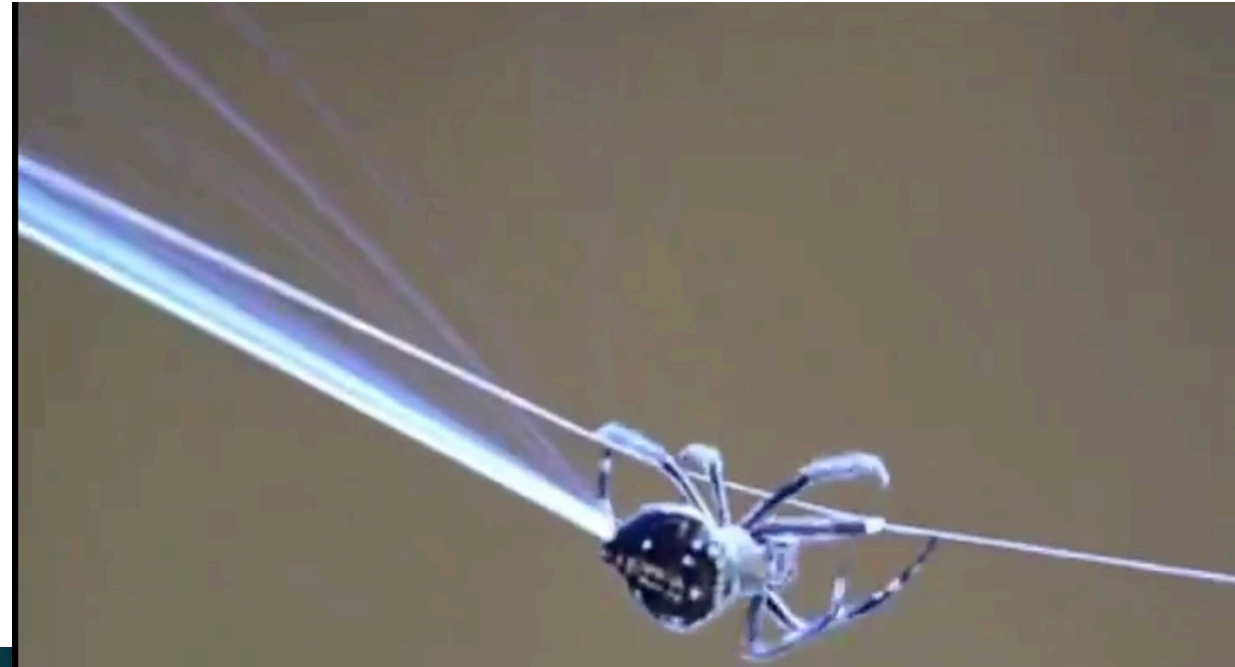
- That's a topic, not a story.

Spiders?



Darwin's Bark Spider

BBC



HE CAN **CLIMB** BUILDINGS
LIKE AN **ARACHNID**

condition for *all future stories*.

—David Roberts

Provoke

CNN

Opinion

• LIVE TV 

Trump's failure to fight climate change is a crime against humanity

By Jeffrey Sachs

🕒 Updated 12:33 PM ET, Mon August 19, 2019

(CNN) — President Donald Trump, Florida Gov. Rick Scott, Florida Sen. Marco Rubio, and others who oppose action to address human-induced climate change should be held accountable for climate crimes against humanity. They are the authors and agents of systematic policies that deny basic human rights to their own citizens and people around the world, including the rights to life, health, and property. These politicians have blood on their hands, and the death toll continues to rise.



Trump remains in willful denial of the [thousands of deaths](#) caused by his government's inept, under-funded, and under-motivated response to Hurricane Maria in Puerto Rico in 2017. The image that will remain in history is of the President gleefully [throwing paper towels](#)

for a photo op as the people of Puerto Rico around him suffered and died of neglect. Last September, 2018 Hurricane Florence claimed at least [48 lives](#), with more likely to come in its aftermath. Soon after, Hurricane Michael claimed at least [32 lives](#), with more than a thousand people reportedly still [missing](#). The final death toll will likely soar in the months ahead as the residual consequences of the storm become more clear.

What are you an **expert** on?

What are you an expert on?

- Your life....your story.

What are you an expert on?

- Your life....your story.
- How you're changed by the world.

Opinion | OP-ED CONTRIBUTOR

Why I Am Leaving Goldman Sachs

By GREG SMITH MARCH 14, 2012



372

TODAY is my last day at Goldman Sachs. After almost 12 years at the firm — first as a summer intern while at Stanford, then in New York for 10 years, and now in London — I believe I have worked here long enough to understand the trajectory of its culture, its people and its identity. And I can honestly say that the environment now is as toxic and destructive as I have ever seen it.

To put the problem in the simplest terms, the interests of the client continue to be sidelined in the way the firm operates and thinks about making money. Goldman Sachs is one of the world's largest and most important investmentbanks and it is too integral to global finance to continue to act this way. The firm has veered so far from the place I joined right out of college that I can no longer in good conscience say that I identify with what it stands for.

Opinion

BRITTANY BRONSON

Can You Be a Waitress and a Feminist?



By Brittany Bronson

April 17, 2015



Opinions

Drivers, help us cyclists get home alive



A cyclist zooms past a Cita Sadeli "Chelove" mural near Fifth & T streets NE on the Metropolitan Branch Trail to downtown Washington in 2015. (Linda Davidson/The Washington Post)

By **Guy Edwards**

May 11, 2018 at 3:20 p.m. EDT

I had a hot date and was running late. And it had begun to rain. Damn it! No time for an Uber; I'd have to cycle. I pulled on my leather jacket. At least it was semi-waterproof, so I could arrive without resembling a bedraggled swamp monster.

What's at stake?

I had a hot date and was running late. And it had begun to rain. Damn it! No time for an Uber; I'd have to cycle. I pulled on my leather jacket. At least it was semi-waterproof, so I could arrive without resembling a bedraggled swamp monster.

I needed to hop across town from Woodley Park to Shaw. If the lights were on my side, I'd be there in 15 minutes without having to go flat-out. Coasting down the hill on 16th Street NW alongside Meridian Hill Park, also known as Malcolm X Park, I was making good time. The lights were green on 16th Street at Florida Avenue. As I was turning left, there was no need to speed up and take the corner like a pod racer in "Star Wars."

Then I saw it.

Too late.

I was going to crash. How bad is this going to hurt?

What exactly do you want
people to do?

Say something **unexpected**

The New York Times

Opinion

What if All That Flying Is Good for the Planet?

Without tourism, it's easy to imagine the Serengeti turned into cattle ranches.

By Costas Christ

Mr. Christ is the founder of Beyond Green Travel.

Nov. 19, 2019



Why write (an op-ed)?

- Hope is a duty from which paleontologists are exempt.
- —David Quammen, “Planet of Weeds,” Harper’s Magazine.

Whoever tells the story, writes history.



The Essential Truth About Climate Change in Ten Words

IT'S REAL

IT'S US

EXPERTS AGREE

IT'S BAD

THERE'S HOPE

The basic facts of climate change, established over decades of research, can be summarized in five key points:

Global warming is happening.

Human activity is the main cause.

There's scientific consensus on human-caused global warming.

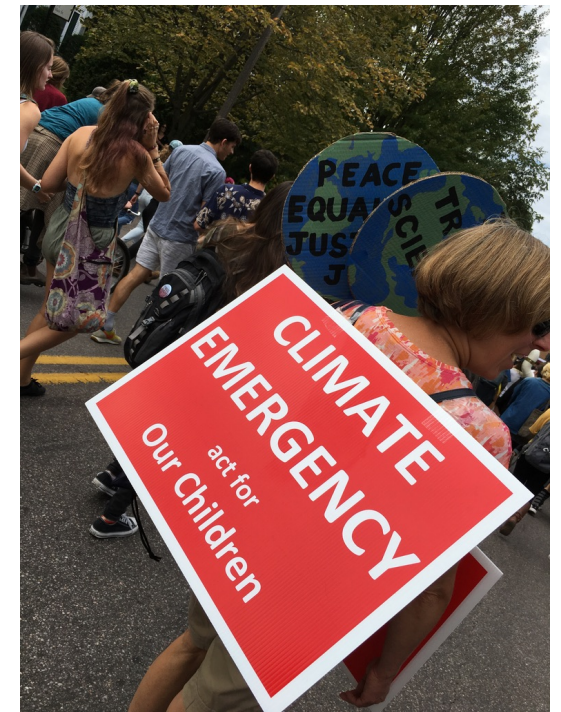
The impacts are serious and affect people.

We have the technology needed to avoid the worst climate impacts.

Keep in touch, we are here to help

- You have our emails...ask us about anything
- Geology Instagram is **uvmgeology**
- There's still some space in spring Geology classes
 - [GEOL 001](#) Earth System Science (4 credits)
 - [GEOL 007](#) SU: Earth Hazards (3 credits)
 - [GEOL 110](#) SU:Earth Materials (4 credits)
 - [GEOL 195](#) Human Health/Geology (3 credits)

Quite the semester – Thank you's all around





Think, Pair, Share

Think of any place(s) on Earth that have been affected by dominant ocean currents?
Think of areas that are warmer than makes sense based on their location alone (i.e., far north or south but are still warm).
Get ready to offer your ideas to the class.

Thanks to you all for
**Being engaged,
excited, and
pushing for change
at UVM and around
our world.**

**GO OUT AND DO
GOOD THINGS!**

Evaluations

This is a new class – we really need your feedback!

Help us keep what works and do better next time.

Fill out the forms, we'll be in back to collect them.

They won't be read until all the grades are in and keep your names off them!