

This issue of Ogmios features a discussion of water allocation in Australia and the Netherlands by CSTPR core faculty member Steve Vanderheiden. It also includes a profile of CSTPR alum Joel Gratz. Feedback welcome! [info@sciencepolicy.colorado.edu](mailto:info@sciencepolicy.colorado.edu)



The Murrumbidgee River near Hay in New South Wales. Photo: Arthur Mostead ([www.mdba.gov.au](http://www.mdba.gov.au)).

## Priority Schemes for Water Allocation in Australia and the Netherlands by Steve Vanderheiden, CSTPR Core Faculty Member

The CSTPR blog, *Prometheus* (<http://ciresblogs.colorado.edu/prometheus>), was launched in 2004 as an informal outlet for news, information, and opinion on science and technology policy. It was revived recently to regularly feature content from CSTPR core faculty, research associates, postdocs, visitors, students and affiliates to serve as a resource for science and technology decision makers. This new dynamism reflects the new energies and pursuits taking place in and around CSTPR. Below we feature one of the recent *Prometheus* blog posts.

What can states do when their surface waters run short of the flows needed to satisfy water right schemes, and some valid claimants will need to be denied access? Such is a likely scenario under conditions in which climate change is expected to exacerbate the magnitude and frequency of drought seen across the American west in recent years. Australia and the Netherlands have each developed priority schemes for dealing with severe water shortages, identifying a hierarchy among water claims that supersedes systems governing allocation during normal flow periods.

The Dutch, who are renowned for their efficiency in managing both water surpluses and shortages, have developed an allocation scheme that recognizes the priority of some categories of water use over others, as well as among uses within those categories. Of highest priority are the Category 1 "water safety and prevention of irreversible damage" uses that include stability of the nation's water defenses as the highest priority use, followed by subsidence of peat grounds and the prevention of irreversible damage to ecosystems.

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# OGMIUS EXCHANGE

## Priority Schemes for Water Allocation in Australia and the Netherlands



*Darling and Murray Rivers at Wentworth, New South Wales. Photo: Jjron, Wikimedia Commons.*

Since all three are non-extractive uses, the national legal recognition of this category as of highest value requires that some water be left within river basins even in cases of severe drought, prioritizing these to all extractive uses.

Category 2 “utilities” uses include the provision of drinking water first and production of energy second, except when “the supply of energy is not at risk,” in which case further energy production becomes a category 4 use under the scheme. In Category 3 are two “small-scale, high-quality” uses of water available after Category 1 and 2 uses are satisfied, including “sprinkling” of “crops that are threatened by a total crop failure” due to drought and where “a small amount of water could prevent major damage,” elevating it above general agricultural uses in Category 4, with all remaining uses relegated to Category 4, and with regional officials charged with determining priorities within the category. Remaining uses include major economic uses (shipping, industry, irrigation for agriculture, and fishing) as well as water recreation and environmental flows not involving irreversible damage.

The Dutch scheme reflects a prioritization for security and critical ecological interests within Category 1, basic human needs within Category 2, and higher and low value economic and recreational values in Categories 3 and 4, mirroring principles found in the natural resource justice literature. As such, it represents the most fully developed water allocation priority system for addressing water scarcity, albeit one for a region that is more accustomed to dealing with having too much rather than too little surface water, and within a water governance system that is quite different from U.S. riparian law.

Another innovative priority scheme has been developed in a system that more closely resembles the U.S. in terms of its system of water rights and recent experiences with severe drought. In response to recent severe drought conditions and in anticipation of further water shortages that exceed its ability to recognize historical water rights, Australia has adopted a rationing scheme that seeks to protect “critical human water needs” (CHWN), defined in terms of the “minimum amount of water needed to meet basic human needs.” Under the Murray-

Darling Basin Plan, for example, New South Wales requires 61GL, Victoria requires 77GL, and South Australia requires 204GL to satisfy CHWN, trumping water right claims under Tier 2 “very low water availability” periods as well as Tier 3 “extreme and unprecedented conditions” for water quality or quantity. While not as developed as the Dutch category system, the prioritization of CHWN over routine legal water claims during drought periods represents an innovative reform designed to cope with environmental change through normative criteria that supersede and modify legal rights to water.

Elements of an ad hoc priority scheme began to develop under California’s recent drought and subsequent water emergency, in which municipal water districts faced mandatory reductions in use while rationing efforts did not require similar reductions from the state’s agricultural sector. However, these allocation decisions were not made in the deliberate manner and according to the priority principled used in developing the Dutch category scheme, and do not trigger mandatory “water sharing” responses capable of trumping water rights, as in Australia.

In anticipation of climate change placing increasing strain upon standard schemes of water rights in the future and of water allocation decisions becoming a key component of routine adaptation to such change, these innovative approaches to water governance offer instructive cases for how we in the American West might meet future water supply challenges. Along with an Australian water scientist and a Dutch philosopher and engineer, I am studying these two priority schemes for insights into how the value choices that they embody get identified and operationalized, as well as how various stakeholders are included in processes by which such schemes get developed and implemented. Our goals is to understand how water governance systems may adapt to water shortages while maintaining commitments to equitable, sustainable, and efficient water uses. Read more: <http://ciresblogs.colorado.edu/prometheus/2016/12/21/priority-schemes-for-water-allocation-in-australia-and-the-netherlands>.

# ALUMNI HIGHLIGHT

## Founder of OpenSnow Creates 14er Forecast App by Abigail Ahlert, CSTPR Writing Intern



CSTPR Alum, Joel Gratz. Photo: Megan Gilman.

**M**eteorologist Joel Gratz takes weather prediction off the beaten path. Gratz, founder of the skier-beloved forecast company OpenSnow (<http://opensnow.com>) and alumnus of the Center for Science and Technology Policy Research (CSTPR) at the University of Colorado Boulder, recently created a new app for iPhones that provides forecasts for hikers of Colorado's highest peaks. Gratz graduated from CU Boulder in three years with both an M.S. in Environmental Studies and an MBA. His new app, OpenSummit (<http://www.opensummit.com>), delivers hourly temperature, wind, precipitation and lightning forecasts for every mountain in Colorado over 14,000 feet. The app is also synced with Instagram, so users can see for themselves the recent conditions at each summit. OpenSummit launched in September 2016, so summer 2017 will be its first ever 14er season.

"This was always kind of in the back of my mind, to help with forecasts for outdoorsy folks, but it's just until recently that we've had the time and money to put into a new app and a new service," says Gratz. "Eventually we want to provide forecasts for all the trails, not just 14ers."

OpenSummit aims to help eager hikers find ideal days to climb the big peaks, giving them more enjoyable and safer conditions. Hiking above tree line, as all of these hikes require, presents a severe risk of lightning strikes. According to the National Park Service ([https://www.nps.gov/romo/lightening\\_safety.htm](https://www.nps.gov/romo/lightening_safety.htm)), "Each year in Rocky Mountain National Park people are injured—sometimes

killed—by lightning." The National Lightning Safety Institute ([http://lightningsafety.com/nlsi\\_lls/fatalities\\_us.html](http://lightningsafety.com/nlsi_lls/fatalities_us.html)) ranks Colorado as 3rd most deadly for lightning strikes behind Florida and Texas. From 1990-2003, 39 people died from lightning strikes in Colorado.

To work against these risks, OpenSummit repackages publicly available forecast data for hikers to easily access and understand. "Almost all of the data somehow starts with the National Weather Service and with the government, so it's really just building upon decades of work that's taxpayer funded," says Gratz. He describes the missions of OpenSummit and OpenSnow as "specialization", saying that the "National Weather Service, rightly so, is focused on people and property protection and potentially large events that affect large numbers of people. But the number of people that are hiking 14ers, while important, is relatively small compared to the number of people driving or traveling or living in Colorado. So, this is just solving a problem that I didn't find being addressed by the National Weather Service or by other private weather companies."

Indeed, Gratz is no stranger to filling forecast niches. His powder forecasts started as an email chain to his friends in 2007 and transformed into OpenSnow by 2011. OpenSnow provides mountain-specific forecasts, webcams, and snow reports for hundreds of ski destinations across the globe. While it's difficult to know the impacts of these forecasts on ski resort turn out, Gratz is confident in the reach of OpenSnow. "In a lot of the locations where we're the strongest—here in Colorado and in Utah and Tahoe—our forecasters are looked

## ALUMNI HIGHLIGHT

### Founder of OpenSnow Creates 14er Forecast App

at as the main local forecasters for those mountain regions... And just by the number of people that are using our service and the number of partners that are advertising with us, my gut feeling is that we have a pretty good influence." The OpenSnow app and website see about 2 million visitors each ski season and have over 40,000 likes on Facebook.

While OpenSnow has established itself as a reliable source of winter weather predictions, mountain forecasting almost always presents unique challenges. Local knowledge and experience can go a long way in better forecasting, and this benefits regions like Colorado and Utah where OpenSnow has forecasters on the ground. But the organization also produces snowfall predictions for ski resorts in Europe, Canada and Japan, relying almost solely on weather model data. Gratz notes that even over the last nine years, weather models have greatly improved as researchers have refined model physics and parameterizations, and higher resolution runs have become possible. "Because of the higher resolution ensembles, we're able to take some of the ensemble data and weight it a little more than the operational runs, which try to smooth out the peaks and valleys. So while we may miss out on some of the extreme events, what we're not going to do, hopefully, is come up with big misses. Like telling someone it's going to snow a foot and then 6 hours later drop that forecast down to 2 inches," says Gratz, adding with a laugh, "Because that really makes people mad, me included."

Looking forward, the future of mountain ski resorts is uncertain in the face of climate change. Organizations such as Protect Our Winters (<http://protectourwinters.org/take-action>) and the National Ski Areas Association (<http://www.nsa.org/environment/climate-change>) (both headquartered in Colorado) currently work to educate outdoor enthusiasts about the threat of climate change. Increasing temperatures in mountain regions could potentially decrease snowpack levels (<http://journals.ametsoc.org/doi/full/10.1175/2008JCLI2405.1>) and ski season length (<http://link.springer.com/article/10.1007/s11027-007-9136-z>), placing ski resorts at economic risk. Referring to the impact of climate change on powder days, Gratz says, "People ask me a lot about this. The answer, like most things, is multi-faceted. One, ski areas are expanding into summer sports, which is intelligent beyond climate change because it's better to have a 12-month business than a 6-month business... Two, I share with people locally, looking at climate change studies and weather stations, that temperatures have gone up, but there's really no trend in precipitation here in Colorado. But with increased temperatures and equal precipitation we can make reasonable assumptions that potentially you would get more rain in the shoulder seasons [generally late spring



*CSTPR Alum, Joel Gratz. Photo: Megan Gilman.*

and fall], or at least potentially earlier snowmelt and more drought when it's warmer with more evaporation."

Gratz explains that the ski industry has a particularly complicated relationship with greenhouse gas emissions, since its activities often contribute to the problem. "I have a personal qualm about this because all of us skiers are getting in our cars and driving all over the place to go chase powder," says Gratz. "Some of us are riding in snowcats to go chase powder, some of us are getting in helicopters to go ski powder, a lot of us are flying all over the world to go ski powder. I mean, I'm one of them—I went to Japan last year and it was awesome—so I have a personal difficulty lecturing people about what to do."

Feeling caught in a tough position, Gratz skirts around the reprimands and sticks to educating skiers about observable trends in the mountains. On any given day, his role is part scientist, part businessman and part communicator—a balance that he developed during his time as a master's student at CSTPR. "I was able to continue to focus on science, but be exposed to policy and be exposed to business and be exposed to people who were trying to integrate a lot of those things," says Gratz of his time at CSTPR. "So I wasn't pigeonholed into creating a better equation. I wasn't pigeonholed into just writing policy briefs. I wasn't just doing financial analysis. It kind of allowed me to do it all and throw it all together. And for me that's exactly what I wanted, and effectively what I do every day."

# VISITOR HIGHLIGHT

## Scientists Informing Congress: How Julia Schubert Uses Geoengineering Policy as a Case Study by Alison Gilchrist, CSTPR Writing Intern

**H**ow do you study the ways in which scientific expertise is brought into the process of policy making? And how do you capture its impact? One possibility is conducting a case study of policy-making in the works that is heavily dependent on politicians reaching out to scientists for their expertise. Julia Schubert, visiting scholar with the CIRES Center for Science and Technology Policy Research (CSTPR), is doing exactly this.

Schubert comes to CSTPR from the Forum Internationale Wissenschaft in Bonn, Germany on a Fulbright Fellowship. As a doctoral student and sociologist, she is interested in the relationship between political entities and the types of scientific expertise they draw on. For her dissertation, geoengineering in United States politics serves as the empirical case study.

Geoengineering refers to human intervention—specifically, deliberate and large-scale intervention—as a means to mitigate climate change. Examples include removal of carbon dioxide from the atmosphere, and solar radiation management, or the forced reflection of sunlight back to space. Since the 1990s, this field has received more attention from the United States government as politicians debate ways to combat the effects of climate change.

Schubert says she was lucky to find an example of a policy debate that is relatively new. Because of the comparatively short time span (25 years) she had to draw documents from, she was able to systematically include all official documentation on geoengineering in U.S. decision-making in her compilation of data. These thousands of pages allow her to follow the progression of geoengineering as a political issue.

“CSTPR is a great place to study this corpus,” said Schubert. “I can reflect and contextualize my findings, and there is great expertise on the policy process in the U.S. I also plan to talk to people in the organizations who work on geoengineering here in Boulder.”

Geoengineering is publically controversial, due to the enormity of the intervention required—such human experiments with nature could be incredibly disruptive. However, as a technological solution it is politically attractive as it does not involve enforcing large-scale behavior changes that have been unpopular with voters. Further, it would create strong ties with industry. Proponents of these measures also argue that these technologies would have low



*CSTPR visiting scholar, Julia Schubert. Photo: Ami Nacu-Schmidt.*

costs compared to enforcing substantial cuts in greenhouse gas emissions.

Schubert describes her project as building on two dimensions of analysis. In one aspect of her work, she asks how different types of expertise aid in defining and framing the problems associated with geoengineering in various ways—that is, how science shapes the discussion. Schubert is also curious about the many ways this expertise effectively entered the decision-making process.

“I follow a communication-based perspective,” said Schubert. “On the one hand I want to know how the problem is addressed, how it is framed in the documents—on the other hand I am interested to see who is talking, which organizations or experts provide the relevant channels informing this policy process.”

In a February 22 CSTPR noontime seminar (see “Center Talks & Events” on page 8), Schubert discussed two specific types of expertise that have been instrumental in framing the political discussion on geoengineering: climate models and threshold values. Both types of expertise play a substantial but distinct role for the political decision-making process at hand. Climate models, or how we mathematically model the changing climate of the Earth, are hotly debated for their accuracy in predictions—they present climate change as a scientific challenge and were particularly relevant in the early discussions of the problem. Threshold values, on the other hand, are highly politicized, communicating climate change as an urgent political challenge.

# CENTER NEWS

## Max Boykoff Quoted in Daily Camera Article About the University of Colorado Passing Climate Change Resolution

Excerpt: [Addressing the Boulder Faculty Assembly's passage of a resolution urging the university community to get involved in the fight against climate change,] "Max Boykoff, an associate professor in CU's Environmental Studies Program and the director of CU's Center for Science and Technology Policy Research, said the resolution set a foundation for dialogue between CU researchers and various university and city leaders.

Boykoff said the university should be a voice in conversations about climate change that provides information and insight based on the work of its faculty members.

'As we go into 2017 and the wider context of U.S politics, and scaling down to Colorado with pressures for further exploration, drilling and extraction of oil and gas, that it was important for us to have this statement in place,' Boykoff said."

### A Conversation with Max Boykoff: Climate Change and the Media

Max Boykoff's research was the subject of a cover story in the winter/spring 2016-2017 issue of Boulder Magazine.



Excerpt: Tom Brock interviewed Dr. Boykoff in his office on the CU campus on Oct. 20, 2016.

Boulder Magazine: Climate change can be an overwhelming topic to many people. Your study of the interface between climate change and public perceptions is fascinating. Please help our readers understand what you do. You describe your field of research as "the cultural politics of climate change." What does that mean?

Max Boykoff: Cultural politics refers to the movement from formal climate science and policy into people's everyday



Max Boykoff interacts with people in Zambia and other countries to gather different cultural perceptions on climate change. Photo credit: Max Boykoff.

lives. How decision-making priorities and discussions within science and policy translate into everyday people's attitudes, intentions, perspectives, beliefs and behaviors about climate change. And how those public attitudes then feed back into the formal processes.

So, to what I do. Over time I've looked at how media influences public discussion that takes place. I've analyzed major network coverage of climate change, and print coverage of climate change in different countries to get a sense of what kinds of issues find traction in the public sphere and which others may be overlooked, and what the effects of that might be. Read more: <http://getboulder.com/conversation-max-boykoff-climate-change-media>.

### What's Cooking in Ghana?

Katie Dickinson's research on cookstoves in Ghana was the subject of a news article on the CIRES website, What's Cooking in Ghana?

Excerpt: Close to half the world's population cooks over an open fire every day. That's hard on human health—people cooking over an open fire breathe in smoke and gases that can damage their lungs. Burning biomass is also bad for the environment, contributing to poor air quality and the production of black carbon, as well as deforestation. Making the transition to cleaner cooking practices is a process that intrigues Katie Dickinson, a research scientist with CIRES and the Center for Science and Technology Policy Research at CU Boulder, and a project scientist at the National Center for Atmospheric Research. Part of Dickinson's work explores how people in the developing world make this shift, and she's spent the past few years traveling back and forth to West Africa, to study the use of cookstoves in northern Ghana. Read more: <http://cires.colorado.edu/news/what%E2%80%99s-cooking-ghana>.



As part of her study, Katie Dickinson presents an improved wood stove to an auction winner that was held in Katiu, Northern Ghana. Photo credit: Katie Dickinson.

# CENTER NEWS

## AAAS CASE Workshop Student Competition

For the fourth year CSTPR is sponsoring a campus-wide competition to select two students to attend (all expenses paid) the AAAS Catalyzing Advocacy in Science and Engineering (CASE) workshop in Washington, DC. April 2-5. The competition has been supported all four years by the University of Colorado Graduate School and Center for STEM Learning. More information here: [http://sciencepolicy.colorado.edu/stcert/aaas\\_competition.html](http://sciencepolicy.colorado.edu/stcert/aaas_competition.html). Past competition winners have described the workshop as “well-organized, thought-provoking, and a lot of fun.”

The 2017 competition winners are Caroline Havrilla, doctoral candidate in Ecology and Evolutionary Biology and Adalyn Fyhrie, doctoral candidate in Astrophysical and Planetary Sciences. Congrats Caroline and Adalyn!

## Dr. Leslie Dodson Joins CSTPR as a Visiting Scholar

Leslie earned her PhD in Technology, Media & Society from the ATLAS Institute at CU-Boulder’s College of Engineering and Applied Science. Her research and practice integrates climate change, livelihoods vulnerability, and communication technologies to support resilience in communities facing environmental distress. She has expertise in Information and Communication Technology for Development (ICTD); Integrated Water Resource Management (IWRM); and the ICTs, Climate Change and Development (ICCD) model.



Leslie is currently the Executive Director of Tifawin Institute, an NGO advocating participatory development, user-centered design and gender equity in international development initiatives. Through Tifawin, she collaborates with Dar Si Hmad for Development, Education and Culture to design and deploy communications systems for North Africa’s largest fogwater harvesting project, which serves hundreds of rural Berber residents in southwest Morocco (<http://www.darsihmad.org>).

Also as a Faculty Teaching Fellow at Worcester Polytechnic Institute (WPI), Leslie develops experimental courses in Humanitarian Engineering and Transmedia Storytelling. Additional pursuits include the incorporation of art and creativity in STEM education.

Prior to pursuing a PhD, Leslie was a senior foreign correspondent for CNBC, MSNBC, NHK-Tokyo and Reuters Financial Television. She specialized in reporting on international finance, emerging market economics, international development and global environmental issues.

Leslie has a Masters Degree in Journalism from Northwestern University; a Certificate in Conservation Biology from the Center for Environmental Research and Conservation at the Earth Institute, Columbia University; and a Certificate in Permaculture Design.



*2016 AAAS Case Workshop Winners Sarah Welsh-Huggins and Angela Boag meet with Colorado Senator, Michael Bennet.*

While at CSTPR, she plans to work on generating grant funding for collaborative work we’re engaged in with Red Cross/Red Crescent Climate Centre partners and others on ‘serious games’. These are endeavors that evaluated how analog game play and participatory learning tools in largely rural and low-literacy communities can enhance climate risk management and community-based adaptation.

## Towards A Science and Technology Policy Fellowship Program for Colorado State Policymaking

The Center for Science and Technology Policy Research at the University of Colorado Boulder is leading a strategic planning process for a Science and Technology Policy Fellows (STPF) Program within the Colorado State Legislature and Executive Branch Agencies. The intended program



will place highly trained PhD-level scientists and engineers in one-year placements with decision-makers to provide an in-house source of evidence-based information and a resource for targeted policy-relevant research. Fellows will learn the intricacies of the state policy-making process, be exposed to opportunities for science to inform decisions, and develop a deeper appreciation for Colorado’s science

# CENTER NEWS

and technology needs. The program's ultimate goal is to help foster a decision-making arena informed by evidence-based information relevant to emerging and current policy issues. Throughout 2017, this effort will develop the strategic plan for the program by engaging partners within and beyond the University of Colorado, including key collaborators with experience working with the Colorado legislature.

## Goals

- Listen to a bipartisan contingent of state legislators on their views for how the program could be most helpful to the Colorado state policy process.
- Outreach to various Executive Agencies to explore where and how potential fellows could contribute to existing programs.
- Develop strategies for attracting top-notch scientists with expertise relevant to Colorado issues, such as within water resources, wildfire management, energy, and marijuana legalization.
- Outline professional development opportunities to support fellows in becoming science policy leaders, adept at contributing to the science-policy interface.
- Position CSTPR to eventually host the Fellows Program, building on a foundation of sustained collaboration between CU and Colorado state decision-makers.

## Planning

- Convene a taskforce of expert partners from CU and beyond to advise the planning process.
- Host planning workshops at CU-Boulder with potential program champions, collaborators, and funders.
- Develop a series of science briefings to demonstrate the concept of 'usable science' for policymaking.
- Create a long-term plan for managing the program, informed through collaboration with the federal-based AAAS Science & Technology Policy Fellows Program.

## Partners

- University of Colorado Office of Government Relations
- Cooperative Institute for Research in Environmental Sciences, University of Colorado Boulder
- School of Public Affairs, University of Colorado Denver
- Western Water Assessment, University of Colorado Boulder
- Getches-Wilkinson Center for Natural Resources, Energy and the Environment, University of Colorado Law School

## Project Leads

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# CENTER TALKS & EVENTS

The spring 2017 noontime seminar series is underway. All talks take place at noon in the CSTPR conference room, are free and open to the public, and most will also be webcast. Directions: [http://sciencepolicy.colorado.edu/about\\_us/find\\_us.html](http://sciencepolicy.colorado.edu/about_us/find_us.html). The schedule is as follows:

## January 25, 2017

Supreregulatory Agreements and Public Perceptions of Unconventional Energy Development in Colorado  
by Jessica Smith, Liberal Arts and International Studies, Colorado School of Mines

## February 8, 2017

Transitioning Research to Operations in an Applied Science Program  
by Elizabeth McNie, Western Water Assessment

## February 15, 2017

The High Water Mark: Policy Lessons Learned from Colorado's 2013 Floods  
by Deserai Crow, School of Public Affairs, University of Colorado Denver

## February 22, 2017

Addressing Climate Change as an Engineering Challenge: Scientific Expertise in U.S. Geoengineering Politics  
by Julia Schubert, Forum Internationale Wissenschaft, Bonn, Germany

## March 8, 2017

Emerging Biotechnologies and Public Engagement  
by Jason Delborne, Science, Policy, and Society, North Carolina State

## March 15, 2017

Climate Change Politics and Machine Learning  
by Justin Farrell, Yale University

## March 22, 2017

Machine Learning, Social Learning and Self-Driving Cars  
by Jack Stilgoe, Department of Science and Technology Studies, University College London

## April 12, 2017

Renewable Energy in Africa: Findings from the Social Sciences  
by Kathleen Hancock, Colorado School of Mines

## April 26, 2017

Anticipating Disaster: Local Dependence on Formal Climate Information vs. Traditional Ways of Knowing  
by Sierra Gladfelter, Geography Department, University of Colorado Boulder

The full schedule including titles, abstracts, bios, and webcast information can be found at [http://sciencepolicy.colorado.edu/news/seminars\\_spring2017.html](http://sciencepolicy.colorado.edu/news/seminars_spring2017.html).



# MEDIA AND CLIMATE CHANGE OBSERVATORY MONTHLY SUMMARIES

The Media and Climate Change Observatory (MeCCO) ([http://sciencepolicy.colorado.edu/media\\_coverage](http://sciencepolicy.colorado.edu/media_coverage)) analyzes traditional/legacy media representations of climate change. MeCCO team endeavors to comprehensively aggregate, monitor, appraise and critically examine media coverage that influence the spectrum of possibility for effective responses to ongoing climate challenges. The MeCCO team monitors coverage monthly in fifty selected sources globally, and eight country profiles (Australia, Canada, India, Japan, New Zealand, Spain, UK, US).

## Issue 1, January 2017 Summary

January ushered in a new era for many things, including media attention to climate change. As many around the world braced for a new phase of approaches to science and the environment by the United States (US) Trump administration - who took up power on January 20th - stories focused largely on political and policy dimensions of climate change this month.

Coverage of climate change and global warming increased most prominently in the US this month, with coverage up 13% from December 2016, and 117% from the previous January. Numbers across all sources in twenty-seven countries showed a 2% increase from December 2016 overall.

A larger majority of stories appearing in US media and around the world surrounded the election of Donald J. Trump in November 2016. Reverberations throughout the country and around the world kicked up coverage. Examples included stories on Trump's first Executive Orders re-initiating Dakota Access and Keystone XL pipeline projects, and articles on how funding would be curtailed in key federal agencies. Actions, and threats like these, sparked media attention.

To illustrate, Ian Austen and Clifford Krauss from *The New York Times* reported how for Canadian Prime Minister Justin Trudeau, Trump's "revival of Keystone XL upsets a balancing act" (<https://www.nytimes.com/2017/01/25/world/canada/canada-justin-trudeau-keystone-xl.html>). Stephen Mufson and Brady Dennis at *The Washington Post* ([https://www.washingtonpost.com/news/energy-environment/wp/2017/01/20/on-white-house-website-obama-climate-priorities-vanish/?utm\\_term=.854683c09932](https://www.washingtonpost.com/news/energy-environment/wp/2017/01/20/on-white-house-website-obama-climate-priorities-vanish/?utm_term=.854683c09932)) reported on how the White House website's energy pages, which went up within moments of Trump's inauguration, removed references to combating climate change, a topic that had been featured prominently on the site under President Barack Obama. Betsy McKay from *The Wall Street Journal* (<https://www.wsj.com/articles/cdc-postpones-meeting-on-climate-change-and-health-1485211145>) reported that Centers for Disease Control and Prevention said it recently postponed a gathering it had planned to hold next month on the effects of climate change on



Climate change and global warming coverage in January 2017 from five US sources: Washington Post, Wall Street Journal, New York Times, USA Today, and Los Angeles Times. Size of the term represents its frequency of appearance in the dataset (e.g. Trump=3174; science=663 [http://sciencepolicy.colorado.edu/icecaps/research/media\\_coverage/usa](http://sciencepolicy.colorado.edu/icecaps/research/media_coverage/usa)).

health, and Coral Davenport from *The New York Times* (<https://www.nytimes.com/2017/01/25/us/politics/some-agencies-told-to-halt-communications-as-trump-administration-moves-in.html>) reported on a freeze on federal grant spending at the Environmental Protection Agency (EPA), Departments of the Interior, Agriculture and Health and Human Services as well as other government agencies.

Stories in January 2017 about Trump nominations for key posts in the administration - particularly for Secretary of State (former ExxonMobil CEO Rex Tillerson), EPA Administrator (Oklahoma Attorney General Scott Pruitt), Secretary of the Department of Interior (Montana Congressman Ryan Zinke) and Secretary of the Department of Energy (former Texas Governor Rick Perry) - focused mainly on worrisome dimensions of these appointments for those who care about climate and environmental protection, justice and human well-being among other things. Moreover, some media pieces also addressed cultural dimensions regarding how climate concerns were voiced in Women's marches across the world on January 21st, and (mainly in US coverage) how 'alt' Twitter accounts cropped up from US National Park Services and other US agency spin-offs to communicate #climatefacts and dismay about Trump Administration plans for shifts in science, environment and climate policy engagements.

So as Barack Obama and his administration vacated the White House, media attention was paid to Donald Trump's and his aides' promises for swift and aggressive action to dismantle

# MEDIA AND CLIMATE CHANGE OBSERVATORY MONTHLY SUMMARIES

and block Obama's climate-related policies and actions, such as incorporating the social cost of carbon to project planning and Clean Power plan regulations. Media treatments also covered how Trump administration behaviors served to embolden Republican legislative officials in the House of Representatives and in the Senate, where the elimination of regulations on coal mining near streams and rules to reduce methane emissions were said to be prioritized in the next Congressional sessions. On January 4, Chelsea Harvey from *The Washington Post* ([https://www.washingtonpost.com/news/energy-environment/wp/2017/01/04/republicans-can-tear-up-a-few-obama-environment-rules-but-theyll-have-to-choose-carefully/?utm\\_term=.b9736570e024](https://www.washingtonpost.com/news/energy-environment/wp/2017/01/04/republicans-can-tear-up-a-few-obama-environment-rules-but-theyll-have-to-choose-carefully/?utm_term=.b9736570e024)) wrote "As a new Congress convenes this week, regulatory reform is the rage, and the upshot seems to be that at least a few of President Obama's environmental regulations could be dismantled quickly by the Republican Congress, with President-elect Donald Trump's approval".

And a number of stories in January 2017 discussed how this destabilizing new stance on climate change in the US Trump administration would influence other key nations such as China and India, and how it would impact the implementation of the Paris Climate Accord (signed in December 2015 and entered into force in November 2016). For example, Alice Wu from *The South China Morning Post* (<http://www.scmp.com/comment/insight-opinion/article/2066011/insular-trumps-first-days-show-he-has-already-turned>) said in an opinion piece, "The American retreat from the world will have irrevocable consequences. Within minutes of taking office, Trump's White House had removed minority initiatives and the threat of climate change from its website. President Xi Jinping had already made clear at Davos that China is ready to step up as the US relinquishes its global leadership roles in globalization and fighting climate change."

But January 2017 media attention to climate change and global warming wasn't merely focused on politics and policy. News about the science of climate change emerged mid-month focused on continued temperature increases in the US and around the world, with 2016 data just in. As examples:

- on January 10th, Doyle Rice at *USA Today* (<http://www.usatoday.com/story/weather/2017/01/09/2016-usas-second-warmest-year-record/96355508/>) covered the announcement by the National Oceanic and Atmospheric Administration (NOAA) that 2016 was the second-warmest year on record in the US data;
- on January 18th, Damian Carrington at *The Guardian* (<https://www.theguardian.com/environment/2017/jan/18/2016-hottest-year-ever-recorded-and-scientists-say-human-activity-to-blame>) covered the announcement of global data from the UK Meteorological Office, National Aeronautics and Space Administration (NASA) and NOAA,

noting that this set a new high for a third year in a row "with scientists firmly putting the blame on human activities that drive climate change".

Together, January animated the emerging adage that 'not all news is good news for climate change'.

While there are early signs and speculations that climate actions and media coverage of them will scale down to regional and local levels while widening out to climate leadership from other countries in the time of the new Trump administration, these tropes earned scant attention in these fifty media sources across twenty-seven countries around planet Earth in January.

- report prepared by Max Boykoff, Kevin Andrews, Gesa Luedecke, Meaghan Daly and Ami Nacu-Schmidt

## MULTIMEDIA HIGHLIGHT



### *More Than Scientists Campaign* **I Do Have Hope For the Future by Carol Wessman**

Seeing and studying the environmental change around us gives Carol Wessman a very intimate connection to the environment. And being among all the students at CU and seeing their skills and talent gives her hope and trust that we're in good hands.

*In this Inside the Greenhouse project, Fall semester 'Climate and Film' (ATLS 3519/EBIO 4460) students and Spring semester 'Creative Climate Communication' (ENVS3173/THTR4173) students, along with the More than Scientists campaign, create and produce a short video based on an interview of a climate scientist in the local Boulder area, depicting human/personal dimensions of their work.*

*These scientists work at NCAR, NOAA, CIRES, INSTAAR, WWA, NSIDC, LASP and various other units at CU-Boulder.*

Video [1:29]: <http://morethanscientists.org/#/video/1186>



To view more videos from the More Than Scientists Campaign see: <http://www.insidethegreenhouse.org/project/inside-greenhouse-more-scientists-collaboration>

# CENTER PUBLICATIONS

Below is a sample of recent publications by CSTPR faculty (Center personnel highlighted):

Bailey, A., L. Giangola, and **M. T. Boykoff** (2017). How Grammatical Choice Shapes Media Representations of Climate (Un)certainty. *Media Research on Climate Change*, Ed. U. Olausson and P. Berglez, Routledge.

**Boykoff, M. T.** and G. Luedecke (2016). Elite News Coverage of Climate Change. *Oxford Research Encyclopedia, Climate Science*, doi: 10.1093/acrefore/9780190228620.013.357.

Summary: During the past three decades, elite news media have become influential translators of climate change linking science, policy, and the citizenry. Historical trends in public discourse—shaped in significant part by elite media—demonstrate news media’s critical role in shaping public perception and the level of concern towards climate change. Media representations of climate change and global warming are embedded in social, cultural, political, and economic dimensions that influence individual-level processes such as everyday journalistic practices. Media have a strong influence on policy decision-making, attitudes, perspectives, intentions, and behavioral change, but those connections can be challenging to pinpoint; consequently, examinations of elite news coverage of climate change, particularly in recent decades, have sought to gain a stronger understanding of these complex and dynamic webs of interactions. In so doing, research has more effectively traced how media have taken on varied roles in the climate change debate, from watch dogs to lap dogs to guard dogs in the public sphere. Within these areas of research, psychological aspects of media influence have been relatively underemphasized. However, interdisciplinary and problem-focused research investigations of elite media coverage stand to advance considerations of public awareness, discourse, and engagement. Elite news media critically contribute to public discourse and policy priorities through their “mediating” and interpretative influences. Therefore, a review of examinations of these dynamics illuminate the bridging role of elite news coverage of climate change between formal science and policy, and everyday citizens in the public sphere. Read more: [http://sciencepolicy.colorado.edu/admin/publication\\_files/2016.23.pdf](http://sciencepolicy.colorado.edu/admin/publication_files/2016.23.pdf).



**Dickinson, K. L.,** A. J. Monaghan, I. J. Rivera, L. Hu, E. Kanyomse, R. Alirigia, J. Adoctor, R. E. Kaspar, A. R. Oduro, and C. Wiedinmyer (2016). Changing Weather and Climate in Northern Ghana: Comparison of Local Perceptions With Meteorological and Land Cover Data. *Regional Environmental Change* 1-14, doi: 10.1007/s10113-016-1082-4.

Abstract: Local perspectives on changing weather and climate

and analyses of meteorological data represent two different but potentially complementary ways of knowing about the local-scale impacts of global climate change. This paper uses quantitative social survey data from the Kassena and Nankana Districts of Northern Ghana and the best available meteorological records to examine recent changes in weather patterns for this region. The most commonly mentioned changes perceived by respondents include changes in the timing or predictability of rains, and overall drier conditions. Both of these changes are corroborated by precipitation datasets: The onset of the peak rainy season has shifted progressively later over the past decade, by up to a month, and the rainy season has been drier over the past 3–5 years compared to the past 10–35 years, mainly due to lower rainfall during peak months (June and July). Many respondents also said that conditions had become windier, and we find that this perception varies spatially within the districts, but no meteorological data are available for this climate parameter in this region. The common perception that deforestation is responsible for observed changes in weather patterns is partly supported by Landsat imagery indicating a reduction in dense vegetation in recent decades. This comparison highlights some of the potential benefits and challenges involved in giving more voice to community perspectives in the co-production of knowledge on global climate change and its regional impacts. Read more: [http://sciencepolicy.colorado.edu/admin/publication\\_files/2016.22.pdf](http://sciencepolicy.colorado.edu/admin/publication_files/2016.22.pdf).



**Dilling, L.,** E. Pizzi, **J. Berggren,** A. Ravikumar, and K. Andersson (2017). Drivers of Adaptation: Responses to Weather- and Climate-Related Hazards in 60 Local Governments in the Intermountain Western U.S., *Environment and Planning A* 1-21, doi: 10.1177/0308518X16688686.

Abstract: Cities are key sites of action for adaptation to climate change. However, there are a wide variety of responses to hazards at the municipal level. Why do communities take adaptive action in the face of weather- and climate-related risk? We studied what cities are doing in response to existing natural hazards, such as floods, droughts, and blizzards as an analog for understanding the drivers of adaptive behavior toward climate change risks. We conducted a survey of 60 U.S. municipalities followed by six in-depth case studies in the intermountain west states of Colorado, Wyoming and Utah that regularly experience weather and climate extreme events. Our analysis shows that perception of risk and external factors such as planning requirements and availability of funding stand out as important drivers. Nevertheless, political action is rarely driven by a single factor or event. Overall, our results suggest that



# CENTER PUBLICATIONS

multiple factors interact or act in combination to produce an enabling environment for action in the face of weather- and climate-related risk. Read more: [http://sciencepolicy.colorado.edu/admin/publication\\_files/2017.02.pdf](http://sciencepolicy.colorado.edu/admin/publication_files/2017.02.pdf).

González, A. (2017). A Snapshot of Commercial Space, An EU Fellowship Report. Center for Science and Technology Policy Research (CSTPR) White Paper 2017-01, 30 pp.

Excerpt: Colorado has a vibrant aerospace sector and tightly knit community of dynamic aerospace stakeholders from academia, government and industry, which provides an excellent environment to investigate the subject of this report. The report is based primarily on input gathered through face to face interviews, informal discussions and attendance at several relevant events, from August 15th to December 15th, 2016. In so far as possible, I have tried to identify the sources for specific input reflected in the report. However, this is not always possible as, at times, the same idea has been echoed by several people or it has emerged from one of the numerous informal conversations.



There is, of course, a little bit of my own observations and perceptions, as well as a personal attempt at organising the main ideas emerging from my discussions. The final section reflects exclusively my own personal views. Read more: [http://sciencepolicy.colorado.edu/admin/publication\\_files/white\\_papers/2017.01.pdf](http://sciencepolicy.colorado.edu/admin/publication_files/white_papers/2017.01.pdf).

Vanderheiden, S. (2017). Anti-Immigrant Populism & Climate Change Denial. *The Critique*.

Excerpt: As United States president-elect Donald Trump prepares his agenda for his first 100 days in office, for which he has promised and signaled significant change, analysts and pundits are left to speculate which of his various policy themes stressed during the campaign will be given priority, which will result in genuine change rather than posturing and theatrics or encounter successful resistance, and which will be relegated to campaigning rather than governing. Based on his own repeated climate denial, that of his appointee to head the Environmental Protection Agency, his promise to rejuvenate the coal sector, as well as his rhetoric in the weeks leading up to Inauguration Day, two predictions seem safe to make: the incoming Trump administration will at least try to (1) further restrict immigration (given his recurring promises to build the border wall, threats against sanctuary cities, and demonization of immigrants) and (2) to roll back the Obama administration's efforts to slow the U.S. contribution toward climate change, as



well as participate in cooperative international efforts to bring about the same result. Read more: <http://www.thecritique.com/articles/immigrationandclimatechange>.

Vanderheiden, S. (2016). Climate Change and Free Riding. *Journal Of Moral Philosophy* 11 (4) 1-27, doi: 10.1163/17455243-4681046.

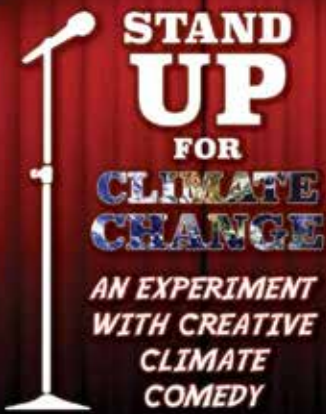
Abstract: Does the receipt of benefits from some common resource create an obligation to contribute toward its maintenance? If so, what is the basis of this obligation? I consider whether individual contributions to climate change can be impugned as wrongful free riding upon the stability of the planet's climate system, when persons enjoy its benefits but refuse to bear their share of its maintenance costs. Two main arguments will be advanced: the first urges further modification of H.L.A. Hart's "principle of fairness" as the basis for demanding that would-be free riders pay their fair share in the context of climate change, while the second claims that remedial action on climate change is better captured through collective action analysis than through harm principles that seek to connect individual actions to bad environmental outcomes. Read more: <http://booksandjournals.brillonline.com/content/journals/10.1163/17455243-4681046>.



Vanderheiden, S. (2016). Territorial Rights and Carbon Sinks. *Science and Engineering Ethics*, doi: 10.1007/s11948-016-9840-8.

Abstract: Scholars concerned with abuses of the "resource privilege" by the governments of developing states sometimes call for national sovereignty over the natural resources that lie within its borders. While such claims may resist a key driver of the "resource curse" when applied to mineral resources in the ground, and are often recognized as among a people's territorial rights, their implications differ in the context of climate change, where they are invoked on behalf of a right to extract and combust fossil fuels that is set in opposition to global climate change mitigation imperatives. Moreover, granting full national sovereignty over territorial carbon sinks may conflict with commitments to equity in the sharing of national mitigation burdens, since much of the planet's carbon sink capacity lies within territorial borders to which peoples have widely disparate access. In this paper, I shall explore this tension between a global justice principle that is often applied to mineral resources and its tension with contrary principles that are often applied to carbon sink access, developing an analysis that seeks to reconcile what would otherwise appear to be fundamentally incompatible aims. Read more: [http://sciencepolicy.colorado.edu/admin/publication\\_files/2016.25.pdf](http://sciencepolicy.colorado.edu/admin/publication_files/2016.25.pdf).





**Stand Up for Climate Change: An Experiment With Creative Climate Comedy**  
**Friday, March 17**  
**at 7:00 PM**

Old Main Auditorium  
University of Colorado Boulder

View Flyer: [http://sciencepolicy.colorado.edu/news/comedy\\_climate\\_change\\_2017poster.pdf](http://sciencepolicy.colorado.edu/news/comedy_climate_change_2017poster.pdf)

Humor is a tool underutilized, and comedy has the power to effectively connect with people about climate change issues. Our event is associated with the Spring 2017 'Creative Climate Communication' course (ENVS3173/THTR4173) and the larger 'Inside the Greenhouse' project.

## Job Opportunities



For a list of S&T policy-related job openings please visit our jobs page at <http://sciencepolicy.colorado.edu/students/jobs.html>.

More examples of recent listings include:

- Climate Central, Program Director (posted 2/10/17)
- Climate Central, Communications Director (posted 2/10/17)
- Intergovernmental Platform on Biodiversity and Ecosystem Services, Global Assessment Officer (posted 2/28/17)
- National Socio-Environmental Synthesis Center, Associate Director for Research (posted 2/24/17)
- National Socio-Environmental Synthesis Center, Associate Director for Actionable Science (posted 2/24/17)
- Union of Concerned Scientists, Climate Scientist (Posted 2/8/17)
- Union of Concerned Scientists, Federal Campaign Director (posted 2/1/17)
- University of Maryland, Maryland Sea Grant Coastal Climate Specialist (posted 3/2/17)

Check the individual listing to see if the application deadline has passed.

## ABOUT US

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