Ogmius

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Dear CSTPR community ~ I hope you're all doing as well as you can in this challenging and pressurized times. Our heart goes out to everyone, especially those directly impacted by the novel coronavirus. Undoubtedly, the global COVID-19 pandemic has changed all of our lives. Over the past months we have been learning many painful and important lessons while we have experienced a time of accelerated learning and intense behavior change.

Also over the past months, you may have now heard that the decision has been made to close the Center for Science and Technology Policy Research (CSTPR) by May 31 as our larger Cooperative Institute for Research in Environmental Sciences (CIRES) considers new directions for social sciences and environment research within the Institute.

I have thoroughly enjoyed my time in CSTPR over the past 11 years. I joined in Fall 2009 and became Director in January 2016. For those who don't know me, I'm also an Associate Professor in the Environmental Studies program here at the University of Colorado Boulder.

CSTPR has been in operation for over 18 years, officially opening its doors in 2002, through the hard work of founding Director Roger Pielke Jr. The founding of the Center in 2002 was also made possible at the time thru the important leadership of then CIRES Director Susan Avery. Roger served as founding Director 2002-2008 and again 2013-2015. Between those stints, Professor Bill Travis served as CSTPR Director 2008-2013.

Roger's efforts were strengthened through the great support of founding Managing Director Bobbie Klein, and of Outreach and Engagement Director Ami Nacu-Schmidt in helping the Center get established. Since I became Director four years ago, we have grown as a community to address four priority areas: Science and Technology Policy, Risk Perception and Management, Sustainability Governance, and Environmental Communication and Society.

We have carried out these research endeavors through a fantastic community of graduate students, alum, postdocs, staff and visiting scholars over the years. We also accomplished great things through the efforts of our many CSTPR Affiliates as well as CSTPR Core Faculty members over time including Lisa Dilling, Steve Vanderheiden, Matt Burgess, Bruce Goldstein, Katie Dickinson, Deserai Crow, and Ben Hale.

And we thrived through the unyielding commitments and contributions from CSTPR undergraduate workers Andrew Benham and Celeste Maldonado among others, CSTPR Outreach and Engagement Director Ami Nacu-Schmidt and CSTPR Office Manager Jennifer Katzung.

During my time as a member of the CSTPR community, I have seen many meaningful collaborations, projects and partnerships that have formed and flourished over the years. I see this as a testament to the great work that has been done in our CSTPR & CIRES community to carry out our mission "to improve how science and technology policies address societal needs, through research, education and service".

So at this time, as we close our doors, we issue this last issue of Ogmius and celebrate our time together, I thank you all for contributions as well as for your support.

Max Boykoff, boykoff@colorado.edu
Director, Center for Science and Technology Policy Research

CENTER FOR SCIENCE & TECHNOLOGY POLICY RESEARCH

BY THE NUMBERS
2004 - 2020

$14,314,450

Awards: Total Funding Brought in by CSTPR Primary Investigators & Collaborators

Successful Graduate Student Programs at CSTPR:

- Science & Technology Policy Certificate Program
- AAAS "CASE" Workshop Competition
- Red Cross Fellowship Program
- Radford Byerly Award Program
- Forum on Science Ethics and Policy

1,446 CSTPR visitors, coauthors and collaborators

1,982 Media References

Seminars at CSTPR **251**

920 Talks by CSTPR faculty & students

434 Peer reviewed publications

419 Other publications

OGMIUS EXCHANGE

Ecological Economics, Dangerous Ideas and Academic Freedom

by Matt Burgess

Few things make me appreciate the importance of leaving space for discussing dangerous ideas—without fear of reprisal or censorship—in academia than teaching ecological economics and interacting with ecological economists. I developed a course at CU called "Sustainable Economies" (ENVS 3555, offered in Spring 2021, for those interested), which brings ecological economics together with traditional macroeconomics and some other topics related to political economy (tribalism, democracy, inequality, social capital, etc.). I also recently joined the International Society for Ecological Economics, and attended their U.S. affiliate's annual conference this past summer.

Ecological economists discuss some pretty dangerous ideas. For instance, some ecological economists—and some students who take my class—argue that environmental sustainability demands radical de-growth, i.e. a radical decrease in the size of the economy. These arguments don't always include specific numbers, but when they do they can be pretty drastic.

For instance, one argument I've seen starts from the target of halving CO2 emissions by 2030 (following the recent IPCC report on 1.5 degrees of warming: https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments), and assumes U.S. growth rates in population (0.5%/year) and CO2 intensity of GDP (–1.5%/year over the past two years) stay constant. To square these numbers with the target of halving emissions, some students calculate—correctly!—that we would need a ~6%/year decline in GDP per capita. To put this in context, this means we'd need an economic contraction larger than the Great Recession in 2008-2009 (which was about –5% per-capita GDP in the U.S.) every year for the next ten years. I have little doubt that an economic shock this severe would cause total sociopolitical breakdown, large increases of poverty, unrest, violence, and probably political movements far scarier than anything we have now.

I've also heard (e.g. here from a prominent climate journalist: https://twitter.com/EricHolthaus/status/1227610354890498048) arguments for immediately banning fossil fuels—despite the fact that they currently make up the vast majority of global energy use. Again, I have no doubt that doing this would cause widespread suffering, poverty, death, and probably violence—

likely most acutely felt by the poor and marginalized.

Whether they're right or wrong, these are very dangerous ideas!

But, I'm glad my students—and my colleagues—are willing to put these ideas forward. These ideas nicely tee up discussions of the sociopolitical implications of radical de-growth, which students might not otherwise discuss. Through rigorous, open, and unencumbered debate, my students, and our profession, will get to grapple with these concerns about radical de-growth or immediate de-carbonization, and weigh them against other very legitimate concerns about the consequences of not meeting climate targets, menus of other options, etc. As a result, we will all become better, more thoughtful, more precise scientists, climate advocates, policy makers, voters, and whatever else we may do in our lives and careers.

What would happen if we instead censored or reprimanded students, journalists, and scholars who put forward these ideas and opinions? Would they change their minds? Would students, parents, and politicians sympathetic to these views trust academics as arbiters of truth and public education? Would we be able to grapple with the important but unsettling tradeoffs that their views might raise (e.g. is it possible to cut emissions in half by 2030 without major de-growth? If so, how? If not, what should we do?)? Would the quality of education and scholarship improve? To my mind, the answer to all of these questions is clearly 'no', which is why I would never advocate for such censorship, nor would any of my colleagues, I suspect.

Nonetheless, I think this is a useful analogy for understanding why academic censorship—of even dangerous ideas—does more harm than good. It's also useful for understanding why many conservatives have recently become skeptical of the value of higher education, as ideological concentration among faculty, and the censorship and chilling of conservative speech, have become more acute on many campuses (e.g., see here: https://heterodoxacademy.org/why-should-we-care-about-ideological-diversity-in-the-academy-the-definitive-response). I suspect that many leftists would have the same jaded views of academia as many conservatives currently do if folks were harassed or hounded out of their jobs, administrative duties, teaching assignments, speaking engagements, etc., for expressing views in favor of radical de-growth or immediate fossil-fuel bans—ideas that are, objectively, far more dangerous than most of the conservative ideas that have invited censorship on campuses recently.

Of course, even if we decide that some ideas are worth censoring, it usually doesn't work, especially for political speech. Firing and de-platforming people for their ideas tends to give them and their ideas a bigger platform as martyrs, and tends to make their adherents angrier and more radical, rather than more willing to listen to countervailing facts or points of view. In other words, an academy with very robust academic freedom norms/policies, and an ability to discuss even dangerous ideas, makes our discourses and institutions smarter and stronger, not weaker; and it makes our policies better and less dangerous, not more dangerous. And constructive, rigorous discourse across ideological and political difference pours water on the fires of our division. Censorship usually pours gasoline on these fires. Credit where it is due, by the way: the ecological economists I have met get this, and are very open to both criticism and vigorous debate.

This will be my last Prometheus column before CSTPR closes this summer, and one reason I wanted to devote it to this topic is in honor of our founding Director, Roger Pielke Jr. Reactions to some of Roger's work—from politicians, online pundits, and occasionally other scientists—have sometimes tested the guardrails of academic freedom—tests we at CU have passed at the institutional level. I have found Roger to be a smart and insightful voice, including in instances when I disagreed with him (e.g., we disagree on the implications of Robert Gordon's work on economic growth, but we have since collaborated on a paper on a related topic: https://osf.io/preprints/socarxiv/ahsxw). His book, The Honest Broker, provides helpful guidance for scientists on how to inform and interact with contentious policy debates.

Our CU Regent policies on academic freedom and free speech are now some of the best in the country, in my estimation. If we maintain this, it will only improve our reputation—as it has at the University of Chicago. It will also improve our ability to build a harmonious, inclusive, and diverse campus, as I argued previously in response to Academic Futures (https://www.colorado.edu/academicfutures/sites/default/files/attached-files/burgess_pasnau.pdf). I hope that our campus leadership and community will continue to appreciate this as we move forward with our "yearlong focus on academic freedom". Schools that fail to uphold academic freedom tend to suffer in terms of reputation, enrollment, and also diversity—as has happened at Evergreen State College and the University of Missouri for instance, following high-profile rows on their campuses.

Thank you to all the staff, faculty, and leadership at CSTPR, who have made this a fun and intellectually stimulating place to work over the past two years.

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OGMIUS EXCHANGE

Crisis Response and the Standing of Expert Knowledge

by Steve Vanderheiden

As I write this, the University of Colorado is starting its first week of fully online teaching and learning as part of an effort to slow the spread of COVID-19. This and other social distancing efforts aim to "flatten the curve" of new infections in order to mitigate impacts on an overwhelmed health care system and buy time for that system to build the capacity it needs to treat those likely to be made seriously ill by the virus. Italy and Spain are in lockdown, restaurants and other facilities across the country have been closed, and financial markets are in freefall as global commerce grinds to a halt. We are now living in one of those times that more attentive societies anticipate and for which successful societies prepare.

Thus far, our social response might charitably be described as mixed. Many states and localities have been proactive in efforts to contain the virus and respond to the needs of those least able to withstand weeks of school closures and mandatory social distancing. The Boulder Valley YMCA is providing emergency day care for the children of first responders, medical personnel, and parents that live paycheck-to-paycheck and cannot afford to take leave from work, and BVSD is providing food for families whose children can no longer access it through school cafeterias. With minimal resources from or coordination by the federal government, states have ramped up their own pandemic response capacities in an effort to fill the huge void left by an inept and broken government In Washington DC.

My aim here is not to detail the full scope and scale of the federal government's failure to adequately respond to the pandemic, but as a professional political scientist neither can I refrain from making a few critical observations about it. Testing capacity remains abysmally low, the result of well-documented problems that will offer a cautionary tale about the perils of poor political judgment and politicized interference in science policy. The President's response has been so inept and counterproductive that it has shaken even his most ardent supporters, along with financial markets, which no previous crisis could manage. Throughout his public appearances, he has appeared to be pathologically unable to avoid spreading misinformation about the virus or to take any kind of responsibility for his administration's failure to prepare (or dismantling of pandemic preparations put in place before his presidency) for this crisis. The absence of even basic administrative competence throughout the executive branch has been on full display, with the need for expert knowledge and guidance made painfully evident.

The postmortem of American social and political analysis that inquires into what led to our being so catastrophically unprepared before the outbreak, as well as during its first two months, will be critical to our identifying failures, and should serve to point the way to being better prepared for such crises

A nurse wears protective gear at a drive-thru coronavirus testing site in Seattle on March 17, 2020. Photo: Brian Snyder, Reuters.

in the future. Crises like this one expose our vulnerabilities as a society, giving us the opportunity to learn from and correct our failures. Some of this analysis has already begun, with early diagnoses focusing upon the President's personal pathologies and those associated with his governing style.

Certainly, these tell an important part of the story. A chief executive that relies upon ideological litmus tests and demands for personal loyalty rather than administrative competence as criteria for key appointments would predictably result in an executive branch that is less effective in advancing its routine mission, with very low capacity to respond to a genuine crisis. One that subscribes to and occasionally perpetuates fringe conspiracy theories but attacks the mainstream media and dismisses mainstream science as unreliable sources of information is unlikely to be circumspect enough to identity his own errors, much less take steps to correct them. Indeed, a President that has literally and metaphorically sought to wall off the country from the world and in so doing exclude and malign those blamed for its problems is unlikely to be prepared for a virus that disembarks at airports and resists the discursive weapons that he maintains in his arsenal. However, focusing on Trump's shortcomings as a leader or the missteps of his administration can obscure a more pervasive malaise that predates his presidency but may also have contributed to the paucity of competent federal government responses to the current pandemic: the diminished standing of expert knowledge in politics.

While this President surely regards any other source of knowledge or information as a threat to his authority, the marginalization of some of those sources has been ongoing for decades. Observers have long decried the declining influence of expertise of various kinds in government actions, institutions, and policies. Indeed, I've previously written in this forum about the silencing of experts in critical policy areas and CU's Center for Science and Technology Policy Research has long served as an advocate for effective translation of science into policy-relevant assessment and guidance. To fully understand why the federal government's pandemic response failed so badly

despite the prodding of recent H1N1 and Ebola outbreaks, we must look to the ways in which expert knowledge has been valued or devalued, how this has affected its standing and influence in policy formation (including emergency preparedness) and how these in turn might help to account for some of the failures and deficits noted above.

A reasonable starting point might involve examination of federal support for scientific research, hypothesizing that this should correlate with the standing of expertise in politics and society. But if the standing of expertise in policy-making has been in a decades-long decline—perhaps punctuated by occasional reversals based on party control of government in Washington but nonetheless on a marked long-term decline from its post-Sputnik peak —this trend would not appear to correspond with trends in science agency research grant budgets. Three years into an administration that has in most ways been overtly hostile to science, and thanks to effective science advocacy within and beyond the U.S. Congress, research funding budgets at the National Science Foundation, National Institutes of Health, and the Department of Energy's Office of Science will all see healthy increases in 2020, despite several months of deadlock (Mervis and Malakof, 2019). We're continuing to support scientific research, but making less use of it and in some cases seeking to distance ourselves as a society from some of what we learn from it. Why is this?

Looking deeper, perhaps the declining standing of expert knowledge in policy is a product not of how much overall research is funded, but what kinds of research get funded. Perhaps the declining standing of expertise in state policy formation is a function of declining state support for the kinds of knowledge creation that might in a more evidence-based political system provide a counterweight to the whims of policymakers that also set science research funding budgets. Here, we might postulate that less policy-relevant science would flourish as the standing of expertise in policy declines, whether to contain any epistemic authority that it creates within a domain where its influence on policy is rare and ineffective or to punish those researchers whose work appears to be too policy-relevant for policymakers to control or dismiss. Perhaps the epistemic authority of expert knowledge poses a potential threat to the political authority of policymakers when the two meet in a single domain, as when the research informs the design or evaluation of policy or institutions, but not otherwise. Here, a recent study about how climate research funds have been allocated across different fields of knowledge production is enlightening.

Analyzing data from 4.3 million research grants for climate research from 333 donors between 1950 and 2021, Overland and Sovacool found that only 0.12 percent of the $1.3 trillion spent to support climate went toward social science research on climate mitigation, which is perhaps the most urgent and policy-relevant problem related to climate change. Overall, the natural and technical sciences received nearly eight times the support as the social sciences over the past three decades, despite "one of the most urgent unsolved puzzles" being fundamentally social scientific in nature – i.e. "how to get people to act on what they know, that is to say, how to alter society to mitigate climate change (Overland and Benjamin K. Sovacool, 2020)." Whether funds for research into climate policy and governance have been restricted in order to minimize the standing of experts that might challenge the authority of policymakers that are disinclined to take action on climate change, or because that decline in standing resulted from being starved of research funding, the gap between government funding of knowledge that can readily be translated into policy guidance and that which cannot is striking, and consistent with funding agencies seeking to avoid the wrath of politicians.

Such wrath and its impacts upon research funding—and with it, entire areas of research—has been seen before. In 2013, longtime critic of the NSF political science program Tom Coburn (R-OK) attached an amendment to funding legislation to ban any use of research funds unless the program director could certify in writing that the project would be "promoting national security or the economic interests of the United States," effectively killing the $10 million political science program. Among the ideological reasons for the program's elimination was that it had supported social science research into climate impacts and mitigation, angering some legislators that viewed such research as posing an obstacle to their attempts to avoid taking action to control greenhouse emissions. Arizona Senator Jeff Flake, who had authored a bill to defund the program the previous year, specifically cited the program's grant of "$700,000 to develop a new model for international climate change analysis" in his rationale (Noah, 2013). Science can be more or less threatening to incumbent politicians, with more policy-relevant research posing a greater potential threat than does research that has no specific implications for policy. Research that is "safe" from threats like those made against the political science program may well be more attractive from a funding agency management perspective, but it may also contribute toward the declining status of the enterprise of science insofar it fails to engage contemporary public problems. Its marginalization from state decision-making during times of emergency may be the most visible consequence, but the sidelining and silencing of experts and suppression of expert knowledge has been ongoing for decades.

A similar dynamic can be seen in the status of various fields of knowledge creation (a term that I prefer for reasons to be explained forthwith) within the University. Those of us that recall taking philosophy of science as part of our social science methods training may cringe when asked whether our research should be categorized as "science," recalling bitter debates between positivists and their critics but also recognizing what

is often at stake in the question for our professional lives. In the academy, it pays to at least emulate the natural sciences, with a hierarchy of faculty salaries and research funding availability within and among social science departments often tracking the extent to which one's research program embraces methodologies shared with the natural sciences, like the quantitative analysis of large data sets. Scholars utilizing critical and normative methodologies to study the same subjects tend as a result to find themselves low in this hierarchy, near their colleagues in the humanities that share their distance from science as conventionally defined but nonetheless engage in knowledge-creation. Not all "science" is policy-relevant or socially useful in an instrumental sense (nor should it be), and some knowledge that serves to better equip society to understand and address its problems occurs outside of STEM fields. We all stand in solidarity against proposals to cut research funding as an attack on knowledge-creation and the social value of University research, but we don't all benefit when those attacks are repelled.

If a society's values can be gleaned from what forms of knowledge-creation it decides or declines to support, we might infer that the contemporary United States continues to value many forms of knowledge of the natural and physical world (if perhaps less than knowledge with more commercial potential), cares relatively less to know how the social and political worlds work or fail to do so, and cares still less for the humanistic disciplines that eschew the scientific method altogether. As for questions of equity or justice, or generally the sort of critical inquiry that is designed to highlight our failings so that we might correct them, the almost complete absence of government research funding support for such research suggests that we value these very little. Apart from intellectual prejudices about whether these count as knowledge at all, their persistent questioning and criticism are often viewed as a nuisance to those making research funding decisions at the legislative level. Indeed, the NSF political science program was viewed as a nuisance and accordingly cut, despite providing little or no support to scholars engaging in critical or normative research. Society might value knowledge about the wider world but does not value (or even actively disvalues) knowledge about itself and its shortcomings.

The University's values might be inferred in a similar way. The relative standing of its various knowledge areas can be discerned by their budget lines and this hierarchy has driven and is further entrenched with the reorganization of the College of Arts and Sciences into separate and more autonomous colleges of science, social science, and arts and humanities. The recent decision to shutter CSTPR likewise reveals the relative standing of the social and natural sciences on campus, which is itself a product of how knowledge-creation is valued and funded by the state and society. While the University has only a limited capacity to assert the value of knowledge creation areas that have not been valued by funding agencies, it has largely accepted and reinforced this hierarchy rather than challenging or flattening it.

As we watch with dismay at how damaging the intentional marginalization of expert knowledge has been in the nation's initial response to COVID-19, we might consider how best to restore the standing of those with the knowledge and expertise to help. We might start with the University, where much of our knowledge and expertise originates, and look for sources of obstruction or diminution. As we continue to follow current events with the realization that some of the errors that have already been committed or are committed in the future could have been avoided if relevant fields of knowledge-creation been properly valued and their contributions constructively utilized, we might wonder how to better appreciate their value, even if as a kind of nuisance. We must of course remain cognizant of elevating the standing and influence of such experts beyond what prudence or democratic norms allow, but this lies within the intellectual wheelhouse of areas of expertise that have been chronically undervalued and so gives us more reason to be inclusive of critical and normative methodologies in the process.

In looking back to diagnose what failed and what worked in our response to this crisis so that we can more intelligently look ahead to the next one, we might recall the story of Socrates in Plato's Apology. Put on trial for corrupting the youth of Athens, Socrates was unafraid to speak truth to power, casting his role in that society as that of a "gadfly" whose critical role was to irritate others out of complacency. As he declares at the end of his trial, "you may feel irritated at being suddenly awakened when you are caught napping" and so be inclined to eliminate the nuisance that disturbs your slumber, but the expert that provides evidence-based crisis preparation or response guidance as well as the researcher that inquires into how to improve our political institutions should be appreciated for the discomfort that they occasionally cause given their value to society in performing this critical function, and be supported as such. (Those familiar with the story know that Socrates made this very argument at his trial, angering his listeners and resulting in his being sentenced to death, but we'll leave that part aside here.) Among the more important reasons for public support of knowledge-creation is this ability for society to engage in self-criticism—or to paraphrase Socrates, the unexamined society is not worth having—which is a prerequisite to self-correction and thus an imperative that is particularly urgent given our failings in the present crisis and our need to learn from them.

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FACULTY AFFILIATE FORUM

Making Learning by Governments More Common – What Disaster Research Tells Us About the U.S. COVID-19 Case by Deserai Crow

We study learning by governments that is catalyzed by disasters. Learning involves reflecting on the root causes of problems, examination of past policies and failures, rethinking goals and objectives, and changing policies moving forward. This disaster-induced learning can help governments improve their preparedness to future disasters or can make them more resilient when another one happens in the future. Right now, we are all living through a public health disaster that US government agencies were warned about months ago. Perhaps more importantly, they were warned about such a disaster years ago and had opportunities to learn from H1N1, Ebola, and SARS over the past 16 years.

The Colorado Department of Public Health and Environment runs a drive-up testing center for COVID-19 at the state lab on in Denver, Colorado. Photo: RJ Sangosti, The Denver Post.

In some ways, we have learned. Colorado, like other states, trains for pandemics like COVID-19. Nationally, we spend time, resources, and attention providing resources to state and local governments to help them prepare and plan for disasters like COVID-19 so that we can respond when a crisis comes.

In other ways, we've failed to learn. We have witnessed budget cuts to public health agencies and disease spread monitoring, waning of high-level federal policy attention to threats posed by pandemics (such as the elimination of the National Security Council's pandemic team), and the inability of the Strategic National Stockpile to meet national needs during the COVID-19 pandemic.

So why have we failed to learn and act on some essential lessons, especially when so many lives are at risk? There are undoubtedly countless ways of answering this question. Our research helps shed some light on this. Among other cases, we studied the 2013 floods in Colorado, which caused billions of dollars in damage to Colorado communities, homes and businesses, and regional infrastructure. Based on our research, we argue that several factors make government learning and post-disaster policy action more likely.

First, resources available to a government after a disaster are critical to processes and outcomes of disaster recovery. These resources may include financial sources the government previously had through taxes and normal budgeting processes. They may also include external resources from other levels of government or other sources. Low capacity governments or those that face significant disaster damage may be more reliant on external resources for successful disaster recovery and their processes may be dictated by higher governmental authorities.

As the COVID-19 pandemic shows, resources are critical to government action. In the case of pandemics, essential resources include testing, medical supplies, protective equipment for front-line workers, and contact tracing for infected patients (among others). These are bolstered by government willingness and ability to issue stay-at-home orders or other social distancing rules to suppress the spread of the virus. If we don't know the source, spread, and effects of the virus, we cannot adequately deploy resources or respond with policies. All of these require coordinated funding, technical expertise, and administrative capacity.

Second, intergovernmental dynamics and relationships across local, state and federal governmental authorities are important to consider and can either hamper or assist local- and state- governments in making needed changes in the wake of a disaster. These relationships can determine how well governments can leverage resources and networks from outside their own jurisdiction or agency to respond to disasters and plan for future ones.

FACULTY AFFILIATE FORUM

Making Learning by Governments More Common – What Disaster Research Tells Us About the U.S. COVID-19 Case

COVID-19 illustrates this acutely. Due to ongoing feuds between the federal government and states, everything from ventilator access to isolation orders has become divisive. These relationships are critical during any disaster, but particularly one of this magnitude. As a result of these feuds, states that are the most impacted by COVID-19 are going at it almost alone, or in tandem with other state partners. This is possible only for the most well-resourced states like New York and California, but is a huge burden to them as well. States with fewer resources, such as Michigan and Louisiana, will likely not fare as well. Negative intergovernmental relationships hamper response and recovery at all levels of government, from municipalities to the entire nation.

Finally, internal community characteristics can influence the devastation that a disaster causes as well as disaster recovery outcomes. These include the size and demographic composition of a community, along with cleavages that exist within the community. Disasters frequently affect communities and individuals differentially, often over-burdening low income and communities of color most severely. Similar to the devastating floods in Colorado and elsewhere, families and individuals with limited access to resources, marginalized communities (such as undocumented workers), and those who have less autonomy in where they work are being most severely impacted by the pandemic.

The degree of trust that individuals place in one another, their governments, and the information they receive about disasters is critical. These factors can influence whether they believe a risk is worth focusing on, whether they believe it's real, and whether they think they have a role to play in helping solve the problems.

Trust is key here. People must trust one another to do the right thing and help a collective effort during a pandemic. They must trust their government to do the right thing to respond to the pandemic and protect lives. They must also trust the information provided by their government in order to make good decisions about how to mitigate their own risks and how to contribute to collective risk-mitigation. However, when people don't trust, there is a breakdown in action and effective responses.

All of these factors combine to influence the learning we observe within disaster-affected governments. Learning is key to making the change needed to ensure that we can prevent – or are at least prepared for – a disaster like COVID-19 and the economic collapse that we are witnessing. *The Atlantic* (https://www.theatlantic.com/health/archive/2020/03/how-will-coronavirus-end/608719) explored the possible paths for COVID-19 and the role that governments have in putting us on certain paths. The learning we discuss here is key to the various pathways we might observe in the coming months. While the US is behind-the-curve in pandemic crisis learning, more nimble governments like states are working hard to adapt and learn in real-time. We can hope that in the coming days and weeks they can make up for lost time – by leveraging creative resources, developing and improving relationships, and by working to cultivate trust (with residents as well as other governments) and account for differential COVID-19 impacts across demographic groups – and put us on a more positive COVID-19 pathway.

Visit the research team's website for a full report and publications: Visit the research team's website at http://www.learningfromdisasters.org.

Drs. Crow and Albright's book Community Disaster Recovery: Moving from Vulnerability to Resilience is due out next year with Cambridge University Press. Their flood recovery research was funded by the National Science Foundation..x

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FACULTY AFFILIATE FORUM

Steal This Joke: Uplifting Climate Comedy Celebrates Earth Day 2020

by Beth Osnes

Actually, you can't steal these jokes on climate change because we're giving them to you for free. In fact, we're going out of our way to encourage you to give climate comedy a try. If anything in this article tickles your funny bone, it's yours. Go ahead, try it on. And, yes, this joke does make your butt look big. Whereas comedian and author Paul Tompkins bemoans the reality of joke plagiarism within the field of stand-up comedy, we embrace it as a channel for disseminating creative climate communication. With my comedy collaborator, Max Boykoff at the University of Colorado, we've led our students in performing live climate comedy, we've run international climate comedy video contests, and have even published academic articles about the surprising benefits of utilizing comedy to communicate climate — all through *Inside the Greenhouse*, an initiative at the University of Colorado for creative climate communication.

Beth Osnes reads aloud to our nation's capitol from one of her favorite books.

As a comedian, I find that research is the most creative force on Earth. That is why we partner with *Project Drawdown* (https://drawdown.org) which has researched a list of the top climate solutions. This list is a veritable snack platter of comic material. According to Drawdown's 2020 revised ranking of solutions, family planning is part of the third most impactful solution for reversing global warming — above solar. Who knew? This knowledge can help us invest our finances, guide policies, and provide funny rhymes. *Love the glove. Give the pill a free refill. Put your buck on the interrupted f* — …well, you get the idea.

When environmentalist Paul Hawkens, who is the originator and former director of Project Drawdown, learned in 2017 that refrigerant management was the top solutions he pronounced it a PR nightmare. It could likewise be thought of as a comedian's nightmare. What's funny about refrigerants? Yet even in the chill of this subject, there is comedy to be found.

A 1950s refrigerator walks into a bar, sees a good-looking refrigerator and asks, "Are you Freon Friday night?" Since this joke relies on chemical knowledge of how Freon factors into the process of refrigeration, this may be a lesson in "know thy audience." This joke would fall flat on a less informed crowd, but at our performance at the 2019 Drawdown conference in New York, this in-joke got a hearty laugh.

When looking for comedic material beyond climate solutions, remember that nothing is more worthy or ripe for ridicule than us environmentalists. The only risk is that we can be seen as too easy a target. But regardless, we will gladly paint red concentric circles over our bleeding hearts. How do you get an environmentalist to change a lightbulb? Tell them its incandescent. What do you get when you cross F.D.R. with a liberal in the pickle aisle? The Green New Deal.

In giving these jokes away for free, we hope to unleash a rogue agent in an otherwise commodified world. Jokes, freely shared, can liberate us through that strange involuntary opening of the mouth and the mind known as laughter. In that moment, rigidity is relaxed, the single perspective is questioned, hypocrisy is exposed, and delight is released.

Get a jumpstart on your inspiration for creating climate comedy by watching *Stand Up for Climate*, a celebration for the 50th anniversary of Earth Day, released on April 22, 2020 (https://insidethegreenhouse.org/media/2020-stand-climate-change-comedy-show). This "best of" show features brief climate comedy videos from our five years of hosting this event along with this year's international climate comedy video contest winners. Max Boykoff and Beth Osnes co-hosted, and Philadelphia comedian Chuck Nice was a featured guest. This online offering is an example of something we call, 'good natured' comedy,' which our research shows helps process negative emotions, feeds hope, and sustains climate action. Reversing global warming is a mighty challenge to our survival that requires a steep incline in new behaviors. But like any huge mountain, there's only one way to get over it. Climate!

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FACULTY AFFILIATE FORUM

Homeward Bound: Learning Leadership in and from Antarctica

by Cassandra Brooks and Justine Shaw

Icy wind from the Antarctic continent stings our faces as we crouch in the zodiacs straining to hear the crackling of the ice. Water rises and falls around us as if it's breathing. Small pieces of ice crackle while large bergs heave and splash. Our heads turn as we hear the exhale of a minke whale, sighing in a way we can all relate to. Penguins splash and porpoise are all around us. Here we are – more than 100 women in STEMM (science, technology, engineering, math and medicine) who have gathered at the bottom of the Earth. Our goal, as part of the *Homeward Bound Project* (https://homewardboundprojects.com.au/about) is to change the current approach to leadership, all of us committed to leadership for global sustainability. The awe-inspiring environment of Antarctica – the last great wilderness left on the planet – has united, awakened and inspired us.

We celebrate that 60 years ago this week this commons was set aside for the sake of peace and science when the Antarctic Treaty was signed. Originally signed by 12 countries in 1959, the Antarctic Treaty now has 54 countries listed as parties, with 29 of them having a vote on how Antarctic is governed. But in today's world, the Treaty is strained and not equipped to manage for a changing climate. As we witness the ecosystem strain all around us due to the threat of climate change, this collective group of women will return home inspired and skilled to be able to lead the way for change.

Every woman on the ship has been awed by Antarctica: its beauty, fragility, scale and wildlife. Antarctica has been more than a backdrop to the Homeward Bound initiative; it is a critical component of the program. This icy continent shows them climate change first-hand as they see glaciers that have retreated and learn about shifting penguin populations. Antarctica, which regulates the Earth's climate and global ocean circulation, has taught them about the connectedness of the entire globe and their potential place in it. Experiencing the extremes of the Antarctic can and will inspire them to go home and lead in their STEMM fields towards a more sustainable future.

As the leaders of this year's on-board Antarctic science stream, we've been granted the opportunity to teach alongside Antarctica. As part of the program we've explored what it means in this day and age for a continent to be dedicated to peace and science. We've described how science feeds into decision making for Antarctic and Southern Ocean conservation. Science is the touchstone of Antarctic diplomacy: it's a key reason countries maintain a presence in Antarctica. National and tourist operators (those that are International Association for Antarctic Tour Operators members) abide by agreed procedures and protocols of the Antarctic Treaty System and Commission Conservation of Antarctic Marine Living Resources which are all informed by

science. We taught them about this amazing environment – including the flora and fauna that live here and about the current and future impacts of climate change.

Being scientists at the forefront of Antarctic conservation, it's been inspiring for us to also learn about the work of our Team HB4 members. For example, a trauma surgeon leading and mentoring young doctors, a scientist working around the world to mitigate dengue fever, an engineer responsible for Heathrow airport infrastructure, a conservation scientist working with Masaai farmers to conserve lions, and women working on sustainable agriculture, aquaculture and the ethics of genetic engineering. These women will disembark the ship, skilled in leadership, strategy, visibility and science, and deeply reflective about their place in the world and how they can collectively lead for the greater good.

Dr. Justine Shaw with the Centre for Biodiversity & Conservation Science at the University of Queensland, Australia and Dr. Cassandra Brooks an Assistant Professor with Environmental Studies at the University of Colorado Boulder led the Science stream for the Homeward Bound Project, a global women's leadership initiative. This fourth Homeward Bound expedition included 111 women, from 33 countries, ages spanning 23-70 from a wide array of science fields.

FACULTY AFFILIATE FORUM

Tomorrow: Sharing Stories of the COVID-19 Experience ... From Quarantine

by Daniel Zietlow and Ryan Vachon

I was in a car traveling south on I-25 when I got a message from my director. We had just finished taking down the National Center for Atmospheric Research (NCAR) Traveling Climate Exhibit which had been on display at Colorado State University. My director called to say it was probably a good idea to swing by the office and get anything I may need to work-from-home for an indefinite amount of time.

Arriving 30 minutes later, the office already felt bare and deserted. The overcast skies and look-like-rain atmosphere certainly added to the feeling. Only a couple of my co-workers were there. We hovered six feet apart from each other, making small talk and debating what we would need at home. I felt a buzz or strange energy. I played it safe and packed everything: iMac, camera gear, papers. Then I grabbed a bottle of cleaning wipes (we had quite a few just sitting around the office) for good measure, made a weak joke about seeing everyone soon, and headed out. The dominoes fell a few days later. The COVID-19 pandemic, which had thus far been a distant threat, was finally spreading fast in our own backyard. Office closures, suspension of in-person education, restaurant shutdowns. It was one of those few moments in life when you just innately knew you are living through history—such a momentous event that our world, as we knew it, was going to change.

Quarantine has been a time warp. The measures put in place to slow the spread of COVID-19, and protect our health workers and most vulnerable populations, have made the hours move slow. Strangely, the days and weeks have moved fast. While quarantine can feel like a drag at times, we find it important to remember that many of us are the lucky ones. In our circle of friends and family, lots of us have not been deemed essential employees, required to continue showing up at work every day. We have a safe home in which to shelter-in-place, where access to clean water and food is easy. There's internet access to continue working from home. But not everyone has these things. As we heard someone say, "we're all in the same storm, but we're not all in the same boat."

This scenario, same-storm-different-boats, can reveal inequities, hope, raw emotions, and chinks in the armor of nations, cultures, communities, and families. Like the spring plants popping out of lots of our gardens right now, limbs tender and fragile, we stretch and strain for lessons—important lessons on equity and sustainable futures.

In partnership with Jenn Paul Glaser (Scribe Arts), we are producing a documentary that shares people's individual stories of the COVID-19 pandemic. Its title? *Tomorrow*. *Tomorrow* features the humans behind these experiences and celebrates the spirit of resilience. What started with a couple of interviews from friends has blossomed into stories from around the planet, like a health worker in Florida, a professional athlete from northern Italy, and English language teacher in Japan. In the next couple of weeks, we'll be honored to hear stories from India, Australia and so many more! Even breaking practices of the past, our film intern works from home—in South Korea.

As we move to rebuild for tomorrow's more resilient society (after the COVID-19 pandemic), we will be navigating complex terrain. Yet we hope that at the roots of these complexities will be the awareness of our values and strengths that are awakened today.

We welcome participation. Learn more about the Tomorrow documentary on our Provare Media website: http://www.ProvareMedia.com/tomorrow.

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STUDENT HIGHLIGHT

Victory is Won Through Many Advisers: Rad Byerly and the Radford Byerly, Jr. Award by Alison Gilchrist

I interviewed Carol Byerly on the fourth anniversary of the death of Rad Byerly, her late husband, and the mood was solemn. But as we were sitting down to talk about Rad's contribution to science policy, and his legacy both for the Center of Science and Technology Policy (CSTPR) as well as the nation, there was an equal sense of celebration and honor. A candle was burning behind the table to commemorate Rad, and for an hour Carol and I talked quietly about his life, writing, and values.

After completing a PhD and holding a postdoctoral position in physics, Rad Byerly had a long career in politics guided by a simple idea.

"Rad believed that science should serve society," said Carol Byerly. "And scientists have an obligation."

This conviction that scientists should have a commitment to the serving of society first, before the serving of personal or professional interests, gave Rad a purpose and drive that guaranteed his legacy as a tough, scrupulous, and principled advisor.

"Rad was a philosopher king, and a great critic," said Daniel Sarewitz, a professor of science and society at Arizona State University, who worked with Rad in the US House of Representatives. Sarewitz went on to tell the story of writing a speech for Science Committee Chairman George Brown Jr. The initial feedback he received from another committee member was that the speech was "too negative". Rad, on the other hand, said it "wasn't challenging enough."

"Rad believed that the scientific community needed to be knocked around the head a bit," laughed Sarewitz. "He thought it needed to be woken up and held accountable."

Rad believed that often, money was being thrown at scientists without clear guidelines about reporting and accountability to the public good. He thought that at the intersection of science and politics lay the truly interesting work of guidance: a two-way street between scientists and politicians that would ultimately improve the work of both. At the beginning of one of his books on science policy is a quote from the Bible: "For lack of guidance a nation falls, but victory is won through many advisers (Proverbs 11:14)." At the beginning of another, a similar quote: "Where there is no vision, the people perish: but he that keepeth the law, happy is he (Proverbs 29:18)." Together, these profoundly illustrate Rad's ideals: that science for the public good is best conducted with a guiding hand from government.

In 2017, in recognition of Rad's contributions to and impact on the CSTPR community, CSTPR established the Radford Byerly, Jr. Award in Science and Technology Policy. Each year, a CU Boulder graduate student who has proposed a significant contribution to science and technology policy through his or her work is given this award.

The 2020 recipient of the Byerly award was Diana Dorman, a Ph.D. student in the Environmental Studies Program at the University of Colorado Boulder. Dorman studies issues of energy access in the developing world, specifically how energy is supplied reliably and affordably and how those systems are affected by climate change.

When I asked how she was feeling about diving into the policy issues of her dissertation work, Diana Dorman said "I'm comfortable with it—I've had quite a bit of policy experience in my career so far. This is just at an international level instead of state level."

I asked if writing the proposal or winning the award had changed anything about her research approach, but Diana said that policy was always an important component of the project.

"It's always nice to be acknowledged or recognized for the work you're doing," said Diana. "I wouldn't say anything about how I think about my work has changed, but it's more validation that that connection is valued by others and that it has real world application."

As a recipient of the award, Diana Dorman was asked to present her thesis work at a lunchtime seminar. Normally it would have been in person, but under these extraordinary circumstances she instead presented over a Zoom call. Despite this setback, attendance was impressive with approximately 50 people in the audience. Diana expressed disappointment that she was not able to meet Carol Byerly in person, but said that it was still an honor to present her work.

Rad Byerly would have appreciated scientists like Diana Dorman, who sit at the intersection of science and policy. Byerly's commitment to science as a service to society is partly responsible for the legacy of CSTPR, and is embodied by the Byerly Award. As Sarewitz said about the award, "It's helping keep Rad's memory alive."

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CSTPR Science Writer

STUDENT HIGHLIGHT

#Makingourcase: Science Has a Place in Policy by Spencer Zeigler

Each year, the CIRES Center for Science and Technology Policy Research, with support from the CU Graduate School and the Center for STEM Learning, hosts a competition to send a small group of CU Boulder upper-class undergraduate or graduate students to the annual AAAS "Catalyzing Advocacy in Science and Engineering" workshop, which is hosted in Washington, DC each Spring (https://www.aaas.org/programs/catalyzing-advocacy-in-science-and-engineering).

2019 AAAS "CASE" workshop participants.

Aligning with the mission of CSTPR, the competition encourages CU Boulder students in STEM fields who have a strong interest in the role of science in policymaking to participate. This passion can take many forms—involvement on the federal policy-making processes or as researchers who have a strong voice for making their science the basis of effective policy. This year, **Shirley Huang** (Ph.D. candidate in the Department of Speech Language, and Hearing Science), **Marielle Pellegrino** (fourth year Ph.D. student in Aerospace Engineering), and **Tasha Snow** (fifth year Ph.D. candidate in the Geography Department) were selected from a strong pool of candidates to represent CU Boulder at the 2020 workshop. Their passion for communicating science through podcasts focused on science-policy (Sciencing with a Purpose: https://sciencingwithpurpose.org), writing blogs about astronomy and engineering (missareospace.com), and as a healthcare provider makes them exactly who the CASE workshop targets to become the next leaders in science policy.

The CASE workshop is a three-and-a-half-day program where participants get the unique opportunity to learn about the structure and organization of Congress, the federal budget and appropriations processes, and tools for effective science communication and civic engagement. The participants also experience the policy creation process during interactive seminars and, on the last day, get to conduct a meeting with their elected Members of Congress and their staff.

But this is not your high school's civics class all over again—the AAAS CASE workshop has a strong focus on effective science communication which is desperately needed from researchers so that the reality of scientific principles creates policy which affects those who need it the most (@turmo_aiko, Twitter, 3/26/19). In addition to science communication, the 2019 attendees were spoken to by Dr. Shirley Malcolm on equity in STEM, where she said, "only institutional transformation will get us where we need to be" (@holberman, Twitter, 3/29/19). These special opportunities have woven together

some of the important aspects of CSTPR's mission: federal policy making, governmental structure and funding, science communication, and the inclusivity and equity necessary for strong research and policy.

The AAAS CASE workshop has been going on since 2013, and although this year's meeting was cancelled due to COVID-19, we congratulate our 2020 winners and know their passion for the intersection of science and policy will lead to a brilliant future.

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STUDENT HIGHLIGHT

How to Ruin a Party? Make it Political by Colleen Johns

Parties are generally fun. They bring people together through cake and laughter and dancing and sometimes pinatas. Birthday parties, retirement parties, Halloween parties, holiday parties, and block parties exude happiness. But one party in particular is the opposite of happy these days— the political party.

Arvada High School students marching for Earth Day on April 22, 1970. Photo: Dick Davis/Rocky Mountain News.

Today, political parties are anything but fun. In fact, sometimes they're rude, mean, and cruel. Lately, our nation's two largest political parties can't seem to agree on anything. If they were asked to pick a dessert to share, they'd likely disagree. It is no surprise than that solutions to issues much larger than the flavor of a cake, such as climate change, are also stifled by disagreement.

Climate policy hasn't always been a partisan issue. Nearly fifty years ago to the day on April 22, 1970, the first Earth Day was officially celebrated in the United States. Developed by Democratic Wisconsin Senator Gaylord Nelson and supported by bipartisan grassroots efforts across the country, the celebration was observed by 20 million Americans through rallies and protests for a clean and healthy environment. By the end of 1970, America had established the Environmental Protection Agency and passed the Clean Water, Clean Air and Endangered Species Act.

Today, though the parties agree on the reality of climate change, climate policy to address the issue is polarized. But if climate policy is not a new issue, and bipartisan efforts to address climate change have succeeded in the past, why is polarization today so significant?

In a 2018 study, researchers found that citizens and policymakers tend to support policy from their own party and devalue the policies proposed by the other. However, disagreement strictly for the sake of partisanship is sometimes exaggerated, and this exaggeration only increases political divide. If America truly wants to end political polarization over climate policy and move forward addressing climate change, it must speak positively of the working relationship between Republicans and Democrats and decouple political identity from climate policy.

Positivity is powerful. In a study measuring the effects of what the researchers called "positive psychological capital" on work performance and satisfaction, the researchers found that individuals who are more hopeful, optimistic, efficacious, and resilient may be more likely to weather adversity. These individuals perform better in the workplace and are generally more satisfied with their work. Employing any one of these attributes in policy may help Congress overcome polarity.

The first Earth Day succeeded not because the Democratic party supported Nelson more than the Republican party opposed him, but because both parties supported him (Nelson's co-chair for the Day was Republican Congressman Pete McCloskey). To achieve the bipartisan support the first Earth Day did today, partisanship must be made a nonfactor. The congressional leaders of climate policy must represent both sides such that there are no sides at all; there is one effort by many groups just as there is one Earth inhabited by many individuals. An inhabitable planet must be prioritized. After all, no planet? No parties.

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Winning entry from an op-ed contest in Matt Burgess's ENVS 4100: Sustainable Economies class, Spring 2020

CENTER NEWS

Max Boykoff Receives 2020 Thomas Jefferson Award

Max Boykoff was selected as the recipient of the 2020 Thomas Jefferson Award in the faculty category. This award honors students, staff, and faculty members who advance the ideals of Thomas Jefferson. These include broad interests in literature, arts and sciences, and public affairs, a strong concern for the advancement of higher education, a deeply seated sense of individual civic responsibility, and a profound commitment to the welfare and rights of the individual.

Max also recently received another Faculty award from the Center to Advance Research and Teaching in the Social Sciences (CARTSS) Steering Committee. Congratulations Max!

AAAS Local Science Engagement Network Gets Under Way

The American Association for the Advancement of Science has partnered with pilot initiatives in Missouri and Colorado to integrate scientists with local and state policy-makers, community stakeholders, and the public to leverage scientific evidence and inform efforts to address varied local impacts of climate change.

"Instead of focusing on global theoretical concepts of climate change or impacts that are happening in far-flung communities in this country or internationally, we want local scientists to talk about how they can inform local decisions that improve the lives of people sitting in the room," said Dan Barry, director of AAAS's Local Science Engagement Network.

In Colorado, Maxwell Boykoff, director of the Center for Science and Technology Policy Research and Matthew Druckenmiller, a research scientist at the National Snow and Ice Data Center in the Cooperative Institute for Research in Environmental Sciences, also are at work developing the Colorado Local Science Engagement Network which recently launched in March: https://sciencepolicy.colorado.edu/co-lsen.

5 Takeaways From Colorado Climate Education Webinar

Getting people to care about climate change as the COVID-19 pandemic sweeps the globe is tough—but not impossible, several Colorado political and environmental leaders said during a webinar Tuesday hosted by CU Boulder.

"Power Dialog: Climate Solutions for Colorado" was hosted by Associate Professor of Environmental Studies Max Boykoff, Associate Professor of Communication Phaedra Pezzullo and engineering undergraduate student Andrew Benham. Similar events were hosted by universities nationwide. At least 251 people tuned in from across the state for the event.

The recorded webinar, plus subject-area online resources, is available to watch online: https://insidethegreenhouse.org/media/power-dialog-climate-solutions-colorado. Here are five key takeaways:

1. We could have imagined this future
2. Environmental health is directly tied to human health
3. The importance of a 'just transition'
4. We are capable of radical change
5. Local level changes will make the difference

The Colorado webinar hosted by CU Boulder was co-sponsored by the Colorado Energy Office, the Conference on World Affairs, the Center for Science and Technology Policy Research, the Boulder Faculty Climate Science & Education Committee, the Media and Climate Change Observatory, and Inside the Greenhouse at CU Boulder.

Student News

CSTPR Grad student Patrick Chandler was recently awarded a Summer 2020 Fellowship from the Center for Humanities & the Arts. This award was given to support his work in the Creative Climate Change Curriculum project. Congrats Patrick!

CSTPR grad student Olivia Pearman recently was awarded a CIRES Graduate Student Research Award for 2020. The Graduate Student Research Award program was established to promote student scholarship and research excellence. The goal of the program is to recognize the scholarship and merit of CIRES' outstanding graduate students. Congrats Olivia!

CSTPR grad student Jeremiah Osborne-Gowey recently received an Institute of Behavioral Science (IBS) summer research grant for work with IBS researchers Drs. Amanda Carrico and Lori Peek of the IBS Environment and Society Program to study the role of inter-community social ties and migration on knowledge transmission about adaptive agricultural practices among Bangladeshi farmers. He also received a CU Boulder Graduate School Summer Fellowship to conduct dissertation research, analysis and writing. Lastly, Jeremiah just received an Association of American Geographers (AAG) and Gamma Theta Upsilon (GTU) Student Travel Award! AAG and GTU have partnered to raise funds to support student attendance at the AAG annual meeting. The 2021 Annual AAG meeting will be held in Seattle next spring. Congrats on your recent awards Jeremiah!

CENTER NEWS

CSTPR Grad student David Oonk recently successfully completed his PhD defense "Assessing the Present and Future of Fracking Governance: Science, Expertise, and Policy of Fracking in Colorado's Denver Julesburg Basin" with a strong dissertation and oral defense. David was advised by Dr. Max Boykoff and his committee members are Dr. Shelly Miller, Dr. Michaele Ferguson, Dr. Steve Vanderheiden and Dr. Morgan Brazilian (Colorado School of Mines). David, congrats on this major milestone!

2020 ITG Comedy & Climate Change Short Video Competition Winners

Inside the Greenhouse held an International competition to harness the powers of climate comedy through compelling, resonant and meaningful videos. The 2020 winners were announced and shown at the *Stand Up For Climate Change Comedy Show* held on April 22: https://insidethegreenhouse.org/media/2020-stand-climate-change-comedy-show.

First Place Winner

Climate Change in South Africa: How bad can it be? by Stephen Horn and Politically Aweh
https://insidethegreenhouse.org/media/2020-comedy-climate-change-first-place-winner-climate-change-south-africa-how-bad-can-it-be

Second Place Winner

Do people know more about the actual universe or Marvel Universe? by Rollie Williams & An Inconvenient Talk Show
https://insidethegreenhouse.org/media/2020-comedy-climate-change-second-place-winner-do-people-know-more-about-actual-universe-or

Third Place Winner (tie)

Be a Climate Voter by Celia Gurney
https://insidethegreenhouse.org/media/2020-comedy-climate-change-third-place-winner-be-climate-voter

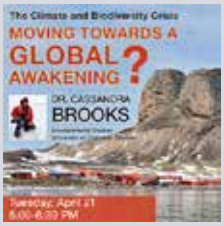
Third Place Winner (tie)

Too late to stop Climate Change? by Adam Levy
https://insidethegreenhouse.org/media/2020-comedy-climate-change-third-place-winner-too-late-stop-climate-change

MULTIMEDIA HIGHLIGHTS

Stand Up For Climate Change Comedy Show
https://insidethegreenhouse.org/media/2020-stand-climate-change-comedy-show

The Climate and Biodiversity Crisis: Moving Towards a Global Awakening? by Cassandra Brooks
https://youtu.be/FeSzVgZmo-k



Power Dialog: Climate Solutions for Colorado
https://vimeo.com/405921412

To view more videos from CSTPR see: https://sciencepolicy.colorado.edu/news/webinars

CENTER PUBLICATIONS

How experiences of climate extremes motivate adaptation among water managers

Page, R. and **L. Dilling**, 2020. *Climatic Change*, doi: 10.1007/s10584-020-02712-7.

Abstract: As water systems are likely to experience mounting challenges managing for climate variability and extremes as well as a changing climate, there is increasing interest in what motivates systems to implement adaptive measures. While extreme events have been hypothesized to stimulate organization change and act as "windows of opportunity" and "pacemakers" driving toward adaptation, they do not always seem to do so. We therefore sought to understand the responses and motivations for organizational behavior in the wake of two significant droughts across five smaller water systems in Western Colorado, USA. We conducted interviews and focus groups across these systems to understand whether and why significant droughts in 2002 and 2012 prompted adaptive change. Results indicate that systems did not uniformly decide to change their policies in the wake of drought, and even well-prepared systems were driven to change policies by other pressures, such as peer-system pressure and political pressure from residents. We find that organizational worldviews were important mediators of how the experience of drought manifest, or not, in organizational changes. These findings have implications for assumptions about what might drive organizational learning and change among water managers for climate adaptation in the future. Read more: http://sciencepolicy.colorado.edu/admin/publication_files/2020.06.pdf

Mass media representations of Anthromes

Sklair, L. and **M. Boykoff**, 2020. *Encyclopedia of the World's Biomes: Reference Module in Earth Systems and Environmental Sciences*, Ed. M. Goldstein and D. DellaSala, Elsevier, doi: 10.1016/B978-0-12-409548-9.12121-9.

Abstract: This article is divided into three sections. The first deals with the ways in which ideas of anthropogenic biomes (anthromes) have appeared in mass media coverage of climate change and global warming. The second section addresses the ways in which ideas of anthromes have appeared in mass media coverage of the Anthropocene. While the precise specifications of anthropogenic biomes have varied somewhat over time, our focus is on the six main categories, namely dense settlements/urban, croplands, rangelands, forests, wildlands, and indoor anthromes. In the third section, we draw out some conclusions from these findings. Read more: http://sciencepolicy.colorado.edu/admin/publication_files/2020.05.pdf

Opportunities for agent-based modelling in human dimensions of fisheries

Burgess, M.G., E. Carrella, M. Drexler, et al, 2020. *Fish and Fisheries*, doi: 10.1111/faf.12447.

Abstract: Models of human dimensions of fisheries are important to understanding and predicting how fishing industries respond to changes in marine ecosystems and management institutions. Advances in computation have made it possible to construct agent-based models (ABMs)—which explicitly describe the behaviour of individual people, firms or vessels in order to understand and predict their aggregate behaviours. ABMs are widely used for both academic and applied purposes in many settings including finance, urban planning and the military, but are not yet mainstream in fisheries science and management, despite a growing literature. ABMs are well suited to understanding emergent consequences of fisher interactions, heterogeneity and bounded rationality, especially in complex ecological, social and institutional contexts. For these reasons, we argue that ABMs of human behaviour can contribute significantly to human dimensions of fisheries in three areas: (a) understanding interactions between multiple management institutions; (b) incorporating cognitive and behavioural sciences into fisheries science and practice; and (c) understanding and projecting the social consequences of management institutions. We provide simple examples illustrating the potential for ABMs in each of these areas, using conceptual ("toy") versions of the POSEIDON model. We argue that salient strategic advances in these areas could pave the way for increased tactical use of ABMs in fishery management settings. We review common ABM development and application challenges, with the aim of providing guidance to beginning ABM developers and users studying human dimensions of fisheries. Read more: http://sciencepolicy.colorado.edu/admin/publication_files/2020.04.pdf

What unmanaged fishing patterns reveal about optimal management: Applied to the balanced harvesting debate

Burgess, M.G. and M.J. Plank, 2020. *ICES Journal of Marine Science*, doi: 10.1093/icesjms/fsaa012.

Abstract: Balanced harvesting (BH)—the idea of harvesting all species and sizes in proportion to their production rate—has been a topic of recent debate. Developed world fisheries tend to fish more selectively, concentrating on certain species and sizes preferred in the market. However, fishing patterns in some developing countries, with a range of different fishing gears and more generalist markets, more closely resemble BH. The BH debate therefore hinges on whether selective fisheries

should become more balanced, whether unselective fisheries should do the opposite, both, or neither. In this study, we use simple and general analytical theory to describe the ideal free distribution that should emerge in unmanaged fisheries, and we show that this ideal free distribution should approximately produce BH only when prices, catchabilities, and fishing costs are similar across species and sizes. We then derive general properties of yield and profit maxima subject to conservation constraints. We find that BH is unlikely to be optimal in any fishery but may be closer to optimal in fisheries in which it emerges without management. Thus, BH may be more useful as a heuristic for understanding differences between fisheries in locally appropriate management than as an exact management strategy. Read more: http://sciencepolicy.colorado.edu/admin/publication_files/2020.03.pdf

Simple Adaptive rules describe fishing behaviour better than perfect tationality in the US West Coast Groundfish Fishery

Ernesto Carrella, E., S. Saul, K. Marshall, **M.G. Burgess**, et al., 2020. *Ecological Economics* 169, doi: 10.1016/j.ecolecon.2019.106449.

Abstract: Most bio-economic models in fisheries assume perfectly rational profit-maximizing behaviour by fishing vessels. Here we investigate this assumption empirically. Using a flexible agent-based model of fishing vessels called POSEIDON, we compared predicted fishing patterns to observed patterns in logbook data, that resulted from a wide range of stylized decision-making processes in the U.S. west coast dover sole-thornyhead-sablefish (DTS) fishery, which is managed with tradable quotas (ITQs). We found that observed vessel behaviour was best predicted in the model by simple decision algorithms whereby vessels chose between exploring new fishing grounds and revisiting previous ones based on their and other vessels' past successes. In contrast, when the model assumed that vessels were perfect profit maximizers, the model substantially overestimated their profits and utilization of quota of rare, constraining species that carry high quota costs, such as yelloweye rockfish. Our results suggest that bounded rationality is an important driver of vessel behaviour in this fishery. Read more: http://sciencepolicy.colorado.edu/admin/publication_files/2020.02.pdf

Digital cultures and climate change: 'Here and now'

Boykoff, M., 2020. *Journal of Environmental Media* 1 (1) 21-25, doi: 10.1386/jem_00003_1.

Abstract: We are living through momentous times as we confront issues surrounding digital cultures and communications about climate change. There is urgency derived from our recognition that climate change is 'here and now'. Inequalities of power and access - in both digital cultures and in a changing climate - disadvantage individuals and communities who seek to take actions in the face of climate threats. Via digital cultures, creativity is expanding rather than retracting from the challenge of meeting people where they are on climate change in the twenty-first century. Amid signs of progress and hope, there is much more work to be done. Read more: http://sciencepolicy.colorado.edu/admin/publication_files/2020.01.pdf

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